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Does ESG Performance Drive Financial Results? Evidence from EURO STOXX 50 Companies (2020–2023)

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Dissertation
Master in Finance

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2024/2025

Abstract: This dissertation investigates the relationship between Environmental, Social, and Governance (ESG) performance and financial results in companies listed on the EURO STOXX 50 index during the period 2020–2023. ESG performance is examined through Refinitiv indicators, including ESG Score, ESG Combined Score, ESG Controversies, and the three ESG pillars (Environmental, Social, and Governance). Using panel data regression models with firm and year fixed effects, the study tests whether ESG practices enhance financial performance, measured by Return on Assets (ROA), Return on Equity (ROE), and Operating Income.

The results suggest that overall ESG performance does not exert a statistically significant short-term effect on financial performance. However, heterogeneous effects emerge across ESG components: environmental performance shows a weak negative association, social performance a weak positive association, and governance performance no clear impact. In addition, firm size does not moderate the ESG–performance link, and large firms appear resilient to reputational shocks, as measured by ESG controversies.

These findings contribute to the ongoing debate on whether sustainability practices create financial value. The evidence suggests that, for large European firms, ESG initiatives function more as mechanisms of compliance and risk management than as immediate drivers of financial performance. The study provides academic contributions by extending empirical evidence on ESG in the European context and practical insights for managers, investors, and regulators concerned with the financial materiality of sustainability strategies. However, the short time frame analysed (2020–2023) and the focus on large-cap European firms limit the generalisability of the findings, suggesting avenues for future research.

Keywords: ESG; Financial performance; Corporate sustainability; EURO STOXX 50

JEL classification: G32, M14, Q56

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List of Abbreviations, Acronyms, and Initialisms

CSR – Corporate Social Responsibility

ECB – European Central Bank

ESG – Environmental, Social, and Governance

EU – European Union

EURO STOXX 50 – Index of the 50 largest and most liquid companies in the Eurozone

HC3 – Heteroskedasticity-Consistent standard errors (MacKinnon & White, 1985)

OLS – Ordinary Least Squares

Refinitiv – Financial data and ESG scores provider (LSEG)

ROA – Return on Assets

ROE – Return on Equity

TBL – Triple Bottom Line

1. Introduction

In view of the rapid growth of the world's population, international development, and the intensification of resource use with its environmental consequences, the need for a sustainable future has become undeniable. Addressing these challenges requires a global approach. Environmental responses must be intrinsically connected to economic and social transformations, ensuring long-term balance and viability (Bocken et al., 2014).

Over the past decades, sustainability has gained increasing importance in corporate and academic debates. Several studies demonstrate that companies which actively manage sustainability indicators tend to show superior performance and greater ability to create long-term value for stakeholders (Fulton et al., 2013; Funk, 2003; Govindan et al., 2020). This growing recognition reinforces the necessity for organisations to invest in sustainability, not only to meet regulatory and societal expectations but also to secure competitive advantage (Govindan et al., 2020).

At the same time, it is essential for firms to assess whether their sustainable practices translate into tangible results. Understanding this link requires measuring the impact of sustainability on corporate performance, thus clarifying sustainability from an operational perspective and evaluating how it can be effectively achieved in industrial organisations (Alayon et al., 2017; Govindan et al., 2020).

The engagement of firms with corporate sustainability has been widely debated, combining insights from strategic management with interdisciplinary research. Nevertheless, there is still a pressing need for empirical studies that explore how sustainability practices influence financial outcomes (Engert et al., 2016).

This dissertation contributes to this debate by examining the relationship between Environmental, Social and Governance (ESG) performance and financial results in large European corporations. ESG performance refers to a framework of measurable indicators that assess how firms manage environmental, social, and governance dimensions, translating sustainability principles into operational metrics (Eccles et al., 2014). In this sense, ESG complements the broader concept of corporate sustainability by providing comparable

measures of how companies balance financial objectives with environmental protection, social responsibility, and governance quality (Friede et al., 2015).

The focus is on companies listed in the EURO STOXX 50 index during the period 2020–2023 — a timeframe marked by heightened regulatory pressure and post-pandemic restructuring. Unlike many existing studies, this research does not limit itself to average ESG scores. It also analyses changes in ESG performance over time, the moderating role of firm size and the distinct effects of environmental, social, and governance components, as well as the impact of controversies. These refer to negative events, such as environmental accidents, labor disputes, or governance scandals, which may weaken stakeholder trust and damage corporate reputation (Awaysheh et al., 2020). Their inclusion ensures that the analysis considers not only positive sustainability practices but also potential risks.

The results indicate that ESG performance has no statistically significant short-term impact on financial performance among EURO STOXX 50 firms. While the environmental pillar shows a weak negative effect and the social pillar a weak positive association, the governance pillar has no clear impact. Moreover, firm size does not appear to moderate the ESG–performance link, and large firms seem resilient to reputational shocks. These findings suggest that ESG practices in large European companies function more as compliance and risk management mechanisms than as immediate drivers of financial performance.

The dissertation is structured as follows: Section 2 reviews the relevant literature and develops the research hypotheses. Section 3 describes the methodology, including data collection and model specification. Section 4 presents the empirical evidence, starting with descriptive statistics and correlation analysis, and then reporting and discussing the regression results in detail. Finally, Section 5 concludes with the main findings, limitations, and directions for future research.

2. Literature Review and Hypotheses

2.1 ESG and Financial Performance

Sustainability concerns how present actions affect future ecosystems, societies, and economies. For companies, these concerns must be integrated into strategic planning, requiring a forward-looking perspective and broader responsibilities toward ethical practices, employee well-being, environmental stewardship, and customer engagement (Ameer & Othman, 2012).

Over time, sustainability has evolved into a central theme of the 21st century, encapsulating the vision of a society progressing towards a more just and prosperous world. This vision emphasizes the preservation of both the natural environment and cultural achievements for the benefit of future generations. Historically, emphasis has been placed predominantly on economic growth and social equity. By adding the concern for maintaining the sustainable balance of natural systems, sustainability integrates the main contemporary challenges of humanity (Dyllick & Hockerts, 2002).

Firstly, it is important to distinguish between Corporate Social Responsibility (CSR), Environmental, Social, and Governance (ESG), and Corporate Sustainability. CSR is understood as the responsibility of enterprises for their impacts on society, requiring the integration of social, environmental, ethical, and consumer concerns into business operations and corporate strategy.

European Commission, 2011). ESG, by contrast, translates these broader principles into measurable indicators that allow stakeholders and investors to evaluate non-financial risks and corporate performance (Eccles et al., 2014). Corporate Sustainability represents a broader strategic orientation that integrates environmental, social, and economic concerns into the core of business models and decision-making processes, emphasizing long-term value creation and balance across the triple bottom line (Dyllick & Hockerts, 2002; Schaltegger et al., 2016).

Corporate sustainability involves satisfying the requirements of a company's diverse stakeholders—such as shareholders, employees, customers, pressure groups, and communities—without jeopardizing its ability to meet the needs of future stakeholders. Achieving this goal requires firms to preserve and enhance their economic, social, and environmental capital, actively participating in sustainability initiatives within the political and regulatory spheres (Dyllick & Hockerts, 2002). At the business level, sustainability is often associated with eco-efficiency; however, limiting it to this perspective neglects other crucial benchmarks that companies must meet to achieve genuine sustainability (Dyllick & Hockerts, 2002).

Incorporating corporate sustainability into strategic management therefore requires a framework that takes into account organizational dynamics, internal and external drivers, as well as factors facilitating or hindering its assimilation (Engert et al., 2016). In this regard, sustainable business models can accelerate the adoption of sustainable practices by optimizing material and energy efficiency, extracting value from waste, embracing renewable substitutes, and fostering sufficiency, stewardship, and the reorientation of business practices for the benefit of society and the environment (Bocken et al., 2014).

ESG, in turn, operationalizes sustainability principles by translating them into measurable and comparable indicators that enable investors, analysts, and stakeholders to evaluate non-financial risks, monitor corporate performance, and make informed investment decisions. ESG is commonly structured into three pillars: environmental (climate, resource use, emissions, efficiency), social (labor practices, diversity, human rights, community engagement), and governance (board independence, transparency, shareholder rights, and anti-corruption) (Eccles et al., 2014).

Sustainable practices are also conceptually linked to the Triple Bottom Line (TBL) framework (Elkington, 1997), which assesses corporate outcomes by integrating social, environmental, and economic performance. TBL emphasizes that companies should not only operate profitably but also safeguard natural resources and address social issues associated with their activities (Carter & Rogers, 2008). While influential, TBL has been criticized for being largely conceptual, whereas ESG provides operational metrics.

The relationship between CSR practices—captured by ESG indicators—and financial performance has been widely studied, though results remain mixed. Several empirical studies suggest a positive association with metrics such as Return on Equity (ROE), Return on Assets (ROA), and Net Income. A comprehensive contribution is the meta-analysis by Friede et al., (2015), which reviewed more than 2,000 studies and found that around 90% reported a non-negative relationship, with most indicating positive effects. Explanations for this association include reduced risk exposure, improved access to capital, stronger stakeholder loyalty, and enhanced operational efficiency. Eccles et al. (2014) similarly found that firms with strong sustainability profiles outperformed peers in both market and accounting performance.

Nevertheless, some studies highlight neutral or inconclusive results. ESG initiatives may involve significant short-term costs, particularly in industries where environmental or social improvements are difficult to monetize (McWilliams & Siegel, 2000; Borgers, et al., 2013; Escobar-Saldívar, et al., 2025). Moreover, the benefits of ESG may not be immediate: Awaysheh et al. (2020) suggest that the financial impact of ESG performance may not be immediate, reinforcing the need to consider the evolution of ESG scores over time, as proposed in this research.

Given this theoretical and empirical background, this study proposes the following hypotheses:

- H1. Companies with higher ESG performance tend to exhibit stronger financial performance.

- H2. Improvements in ESG performance over time are associated with positive changes in financial outcomes.

2.2 Firm Size Effects

The relationship between ESG performance and financial outcomes may not be uniform across firms of different sizes. Firm size is frequently identified in the literature as a critical moderating factor, as it influences both the visibility of sustainability practices and the resources available to implement them. Larger companies are typically subject to greater public scrutiny, stronger stakeholder expectations, and more extensive media coverage, which amplifies both the reputational benefits and potential costs of ESG initiatives (Udayasankar, 2008). Moreover, large firms have more financial and managerial resources to devote to ESG activities and are more likely to be included in sustainability indices, making them attractive to institutional investors (Aguinis & Glavas, 2012; Fatemi et al., 2018)

From a theoretical perspective, stakeholder theory suggests that larger companies face more diverse and complex stakeholder demands, increasing the pressure to engage in ESG practices (Freeman, 1984; Udayasankar, 2008). Similarly, the resource-based view indicates that large firms are better equipped to leverage ESG as a strategic resource, given their superior capabilities and economies of scale (Barney, 1991; Aguinis & Glavas, 2012). In contrast, smaller firms may lack both the incentive and the capacity to implement ESG strategies effectively, or may not experience measurable financial benefits from such practices (Aguinis & Glavas, 2012).

Empirical research supports these arguments. Cahan et al. (2016) found that the value relevance of CSR disclosures was greater for large firms than for small ones. Similarly, Fatemi, Glaum, and Kaiser (2018) argued that firm size enhances the financial materiality of ESG initiatives, especially in sectors where sustainability efforts are capital-intensive. Buallay (2019) reported that ESG performance significantly affected financial performance in large European banks but not in smaller ones, suggesting that scale magnifies the financial materiality of ESG. Velte (2017) also noted that firm size enhances the credibility of ESG reporting, which in turn strengthens investor confidence. However, smaller firms may struggle to allocate sufficient resources to ESG activities, making the impact less evident or delayed (Aguinis & Glavas, 2012).

Despite these findings, evidence is not entirely consistent. Smaller firms may benefit more from ESG engagement as a differentiation strategy, as they often implement responsibility

practices in a more informal and organic way, closely tied to their local stakeholders. This proximity and credibility can translate into greater stakeholder loyalty and competitive advantage (Baumann-Pauly et al., 2013; Wickert et al., 2016). Nonetheless, the prevailing view in the literature is that firm size tends to amplify the positive relationship between ESG performance and financial performance.

This study explores this dynamic by introducing interaction terms between ESG scores and firm size indicators (such as total assets and number of employees) in the regression models, in order to empirically test whether firm size moderates the ESG–performance relationship.

Based on this discussion, the following hypothesis is formulated:

- H3. The relationship between ESG performance and financial performance is stronger for larger firms.

2.3 ESG Components and Governance Dimension

While many studies rely on aggregate ESG scores, an increasing body of literature emphasizes the importance of analyzing the three ESG pillars individually. Aggregated scores may obscure the fact that the Environmental (E), Social (S), and Governance (G) dimensions can exert distinct and sometimes divergent effects on financial performance (Atan et al., 2016).

The environmental dimension captures how firms manage their ecological footprint, including emissions, energy efficiency, waste management, and climate strategies. Strong environmental performance can reduce regulatory and operational risks, improve efficiency, and strengthen brand reputation, particularly in carbon-intensive industries. The social dimension encompasses employee relations, diversity, human rights, and community engagement. These practices may foster employee satisfaction and productivity, while improving customer loyalty and corporate legitimacy. Finally, the governance dimension includes board independence, executive remuneration, shareholder rights, and transparency, which are often linked to investor confidence, risk management, and capital access (Garcia et al., 2017).

Empirical results suggest heterogeneity in the impact of these pillars. Atan et al. (2016) reported that governance was the strongest predictor of financial performance in Malaysia, while environmental and social dimensions played a smaller role. Garcia et al. (2017) found that environmental and governance practices carried more weight in emerging markets. In Europe, Velte (2017) observed that governance frequently exerts the strongest effect, but also noted that environmental practices are gaining prominence due to increasing regulatory pressure and societal concern about climate change.

However, the evidence is not consistent across contexts, and results often depend on industry and time period. Some scholars argue that while governance tends to be the most stable driver of financial outcomes, environmental and social factors may be more dynamic and context-dependent (Fatemi et al., 2018).

This study contributes to the debate by disaggregating ESG scores into their three pillars and testing their individual effects on financial performance. By doing so, it evaluates whether the aggregate ESG effect is driven by one particular dimension or whether the three components contribute differently.

Based on the literature, the following hypothesis is formulated:

- H4. The Environmental, Social, and Governance components have distinct effects on financial performance.

2.4 ESG Controversies and Financial Performance

While ESG scores are designed to capture a company's commitment to sustainable practices, they may not fully reflect negative events such as environmental accidents, human rights violations, or governance scandals. These incidents, commonly referred to as ESG controversies, can erode stakeholder trust, damage corporate reputation, and impose significant financial costs through fines, lawsuits, or loss of market share.

Several studies emphasize that controversies may offset or even reverse the benefits of strong ESG performance. Awaysheh et al. (2020) highlight that companies with high ESG disclosure but recurring controversies face heightened scrutiny and risk premiums, which undermine the expected financial advantages of sustainability strategies. Similarly, Eccles et

al. (2014) argue that reputational shocks linked to ESG incidents may diminish long-term value creation, regardless of a firm's overall sustainability profile.

Despite the growing integration of ESG metrics in investment strategies, controversies remain a relatively underexplored dimension in the empirical literature. By focusing exclusively on positive sustainability practices, many studies may overestimate the benefits of ESG without adequately accounting for the potential financial costs of misconduct or adverse events.

This study addresses this gap by explicitly including ESG controversies in the empirical analysis, testing whether negative incidents exert an independent effect on corporate financial performance, beyond the influence of ESG scores.

Based on the literature, the following hypothesis is proposed:

- H5. Exposure to ESG controversies negatively affects financial performance.

3. Methodology

3.1 Research Design

This dissertation adopts a quantitative research design, an approach that tests objective theories by examining relationships among variables through measurable and numerical data. Such a design enables hypothesis testing using statistical inference, while ensuring objectivity, replicability, and the possibility of generalization (Creswell & Creswell, 2018).

The analysis is based on panel data, combining cross-sectional and time-series information for the EURO STOXX 50 firms between 2020 and 2023. Panel methods provide several advantages: they control for unobserved heterogeneity, increase efficiency in estimation, and allow the study of dynamic effects (Baltagi, 2013; Wooldridge, 2010).

Taken together, these features make the quantitative panel design especially appropriate for this dissertation. This methodological choice therefore strengthens the internal validity of the study and is consistent with best practices in empirical corporate finance and ESG research (Baltagi, 2013; Wooldridge, 2010; Eccles et al., 2014; Friede et al., 2015).

3.2 Sample and Data Collection

The empirical sample includes all companies listed in the EURO STOXX 50 index during the period 2020–2023. This choice ensures that the dataset is composed of large, representative, and internationally active firms, which are among the most advanced in terms of ESG disclosure and reporting practices.

Financial data were retrieved from Refinitiv Eikon, primarily from the Income Statement and Financial Summary sections, and cover a wide range of indicators, including Return on Assets (ROA), Return on Equity (ROE), Operating Income, Total Assets, and the number of employees. Refinitiv was selected because it is one of the most widely used and reliable databases in academic and professional research, offering standardized, comparable, and high-quality financial and ESG data across firms and countries. More detailed descriptive information at the firm level can be found in Appendix A.

ESG-related variables were also collected from Refinitiv, including the ESG Score, ESG Combined Score, the three ESG pillar scores (Environmental, Social, Governance), and the ESG Controversies Score.

The integration of both financial and non-financial data allows for a comprehensive analysis of the relationship between ESG practices and corporate performance.

The dataset therefore integrates both financial and non-financial information for all firms, which ensures consistency and allows for the construction of dependent, independent, moderating, and control variables used in the empirical models.

3.2.1 Distribution by sector

The sectoral distribution of the EURO STOXX 50 is reported in Table 1. The sample covers a broad set of industries, with the largest representation in Financials and Consumer Discretionary (10 firms each), followed by Industrials and Technology & Communications (8 firms each). Consumer Staples account for 7 firms, while Energy & Materials include 4. Finally, Utilities and Health Care are the least represented, with 2 and 1 firm, respectively.

Table 1 - Distribution of firms by sector (2020–2023)

Sector	Firms
Consumer Discretionary	10
Financials	10
Industrials	8
Technology & Communications	8
Consumer Staples	7
Energy & Materials	4
Utilities	2
Health Care	1

Source: Refinitiv Eikon (2020–2023).

This distribution highlights the predominance of financial, consumer-oriented, and industrial sectors in the index, while other areas such as health care and energy supply remain marginal. The heterogeneity across sectors is relevant for the analysis, as differences in firm size,

business models, and ESG disclosure practices may influence both ESG scores and their relationship with financial performance.

3.2.2 Distribution by country

Table 2 shows the geographical distribution of the sample. The largest shares correspond to France (16 firms) and Germany (14 firms), which together represent more than half of the index. The Netherlands contributes with 8 firms, followed by Italy (5 firms) and Spain (4 firms). Smaller contributions come from Finland (2 firms) and Belgium (1 firm).

Table 2 - Distribution of firms by country (2020–2023)

Country	Firms
France	16
Germany	14
Netherlands	8
Italy	5
Spain	4
Finland	2
Belgium	1

Source: Refinitiv Eikon (2020–2023).

This distribution highlights the strong weight of the largest Eurozone economies in the EURO STOXX 50, while still ensuring representation of firms from smaller European countries. Such heterogeneity justifies the inclusion of country fixed effects in the empirical models, in order to capture institutional and macroeconomic differences across jurisdictions.

3.3 Variables and Measurement

3.3.1 Dependent Variables – Financial Performance

Financial performance is primarily measured using two accounting-based ratios:

- **Return on Assets (ROA):** defined as Net Income divided by Total Assets, this ratio reflects the efficiency with which a firm uses its asset base to generate profits. It is a standard measure of managerial effectiveness and overall financial health (Brealey, 2023).

- Return on Equity (ROE): calculated as Net Income divided by Common Equity, ROE indicates the return earned on shareholders' capital. It assesses the firm's capacity to deliver value to equity investors (Damodaran, 2012).

In addition, Operating Income is used as the dependent variable in Models 7 and 8, where the analysis is conducted both in a cross-sectional framework (using average values for 2020–2023) and in a dynamic framework (using first differences between 2020 and 2023). Operating Income reflects profitability from a firm's core operations before the effects of financing and taxation. This measure complements ROA and ROE by focusing on operational efficiency and offering a cleaner comparison across firms and countries, as it is less affected by capital structures and tax regimes (Brealey, 2023).

All financial statement items retrieved from Refinitiv are reported in millions of euros. For readability, descriptive statistics in Chapter 4 present values in billions when appropriate.

3.3.2 Independent Variables – ESG Indicators

The independent variables in this study are based on the ESG performance of companies, as reported by the Refinitiv ESG database. ESG indicators are used to capture the extent to which firms engage in responsible environmental, social, and governance practices.

The following ESG-related variables are considered:

- ESG Score (Weight 100%): This is the pure ESG score, calculated solely based on the company's performance in the three ESG pillars - Environmental (e.g., emissions, resource use, innovation); Social (e.g., human rights, community involvement, workforce practices); and Governance (e.g., management structure, shareholder rights, transparency). The "weight 100%" indicates that only ESG performance factors are considered, without penalisation for external incidents. This score is generally considered the main indicator of ESG commitment.
- ESG Combined Score: This is an adjusted ESG score, which incorporates the effect of ESG-related controversies. Controversies include negative events such as: environmental scandals, violations of human or labour rights, executive misconduct and legal or reputational issues. If a company has a good ESG Score but is involved in controversies, its Combined Score will be lower than the pure ESG Score. This

makes the Combined Score a more comprehensive and risk-sensitive measure of sustainable performance.

- ESG Controversies Score: This variable independently measures the severity and frequency of negative incidents, allowing for an isolated analysis of reputational risks.
- ESG Pillar Scores (E, S, G): capture individual effects of each dimension.

ESG data provided by Refinitiv are originally expressed in the form of ratings ranging from D– to A+. To conduct the quantitative analysis, these categorical scores were converted into a continuous numeric scale ranging from 0 to 1, following the mapping procedure documented in Appendix B. This transformation ensures comparability across firms and facilitates the use of regression-based methods, while preserving the relative differences between rating categories.

3.3.3 Moderating Variable – Firm Size

Firm size is included as a potential moderator in the ESG–performance relationship. Two proxies are used: the logarithm of total assets and the logarithm of the number of employees. These transformations reduce skewness in the data and facilitate interpretation in regression models. While total assets reflect the financial and operational base of the firm, the number of employees captures its human capital dimension.

The use of logarithmic transformations for firm size is well established in financial and ESG research. Prior studies have applied log of total assets as a standard measure of firm size (Titman & Wessels, 1988; Chen & Chen, 2011), including sustainability-oriented studies (Ameer & Othman, 2012; Buallay, 2019). Following this approach ensures comparability with existing literature and strengthens the validity of the methodological design.

3.3.4 Control Variables

To isolate the effect of ESG performance on financial outcomes, the models incorporate both sector and country dummies as control variables. The inclusion of these dummies is consistent with best practices in ESG–performance research (Eccles, Ioannou, & Serafeim, 2014; Buallay, 2019), reinforcing the robustness of the empirical design.

3.3.4.1 Country Effects

The institutional environment of a firm can play a decisive role in shaping the relationship between ESG performance and financial outcomes. According to institutional theory, companies are embedded within national systems that influence regulatory standards, social norms, and investor expectations (Ioannou & Serafeim, 2012). For example, firms operating in countries with strong legal protections, stricter environmental regulations, and more active civil societies are likely to face higher pressure to adopt ESG practices, but also greater rewards from stakeholders when they do so (La Porta et al., 2000).

Empirical research confirms that country-level institutions contribute to heterogeneity in ESG outcomes. Ioannou and Serafeim (2012) showed that firms from countries with stronger political and legal institutions display significantly higher sustainability strategies. Similarly, La Porta et al. (2000) highlighted the role of legal origin and governance quality in determining corporate behavior and investor trust. Velte (2017) similarly found that the ESG–performance relationship varies substantially across European countries, reflecting differences in governance systems, investor protection, and cultural attitudes towards sustainability. This suggests that ESG performance may not have a uniform impact across countries but is instead shaped by the broader institutional context.

At the same time, inconsistencies remain. Some studies argue that once industry and firm-level factors are controlled for, country-level effects may lose explanatory power (Krüger, 2015). Others highlight that while country context explains baseline profitability, it may not necessarily alter the slope of the ESG–financial performance link.

This study directly addresses these concerns by incorporating country fixed effects into the regression models. This approach allows us to control for unobserved, time-invariant national characteristics—such as regulatory frameworks, cultural norms, and institutional quality—while testing whether ESG retains explanatory power across countries.

3.3.4.2 Sector Effects

The influence of ESG practices is not homogeneous across industries. Empirical research shows that firms in environmentally sensitive sectors, such as energy, chemicals, and utilities, face greater regulatory oversight and stakeholder scrutiny due to their direct environmental

impact (Clarkson et al., 2008; Kolk & Pinkse, 2008). In contrast, companies in the financial sector are less exposed to environmental pressures but are often evaluated on governance and social responsibility dimensions, reflecting their role in capital allocation and fiduciary duties (Scholtens, 2009). Moreover, firms in consumer-facing industries, such as food, beverages, and retail, are particularly subject to reputational pressures, since ESG performance in these sectors is closely monitored by consumers and the media (Garcia, Mendes-Da-Silva, & Orsato, 2017). These differences suggest that the relationship between ESG and financial outcomes is shaped by industry-specific characteristics.

Empirical evidence reinforces these distinctions. Clarkson et al. (2008) show that firms in environmentally sensitive industries disclose more environmental information to mitigate legitimacy and regulatory risks. Garcia, Mendes-Da-Silva, and Orsato (2017) further argue that firms in high-visibility industries tend to achieve stronger ESG scores, reflecting their need to respond to public and investor scrutiny. Similarly, Orlitzky et al. (2003) highlight that the ESG–performance relationship varies across industries, depending on their exposure to environmental and social issues.

In this study, sector fixed effects are therefore included as control variables in all empirical models. This ensures that differences across industries in the EURO STOXX 50 are accounted for, allowing the analysis to better isolate the relationship between ESG performance and financial outcomes.

3.3.5 Fixed Effects

To address unobserved heterogeneity across firms, the regression models employ firm fixed effects (γi). This specification controls for time-invariant characteristics at the company level, such as industry affiliation, organizational culture, or structural governance features, which could otherwise bias the estimated relationship between ESG performance and financial outcomes. By focusing on within-firm variation over the 2020–2023 period, the fixed effects approach increases the internal validity of the results. Year dummies (δt) are also included to account for macroeconomic shocks and common time trends affecting all firms. This design choice follows standard practices in panel data analysis in corporate finance and ESG research (Baltagi, 2013; Wooldridge, 2010).

The use of fixed effects is consistent with econometric best practices in panel data analysis (Wooldridge, 2010; Baltagi, 2013) and with prior research on ESG and financial performance (Eccles, Ioannou, & Serafeim, 2014; Friede et al., 2015). This design improves internal validity by reducing omitted variable bias and ensuring that the estimated coefficients reflect within-firm variation over time rather than cross-sectional differences.

In addition, robust standard errors clustered at the firm level were employed to correct for heteroscedasticity and serial correlation. Specifically, the HC3 estimator of MacKinnon and White (1985) was used, as it provides heteroscedasticity-consistent standard errors that are more reliable in finite samples.

3.3.6 Variable Construction

To complement the annual panel regressions, two additional specifications were constructed to test the robustness of results and capture different dynamics in the ESG–performance relationship. These derived variables were specifically designed to test Hypotheses 1 and 2 through Models 7 and 8.

First, average variables were computed for each company by taking the mean of annual values across the four-year period. This included the average ESG score (converted to a numeric scale) and average operating income, which were later employed in the cross-sectional specification (Model 7).

Second, change variables were created as the difference between 2023 and 2020 values (Δ). In this study, the symbol Δ denotes the variation in a given variable between 2020 and 2023 (i.e., the difference between its value in 2023 and its value in 2020). This transformation focuses on within-firm dynamics, testing whether improvements or deteriorations in ESG scores are associated with corresponding changes in financial performance. These change-based measures were used in Model 8 to test whether improvements in ESG performance translate into enhanced financial outcomes.

This process required restructuring the dataset into a wide format, aligning company-year observations, and ensuring that changes were only computed when both start- and end-year data were available. The resulting dataset therefore combined both average and change-based

indicators, enabling the regression analyses focused on the evolution of ESG and financial performance.

Both approaches are consistent with prior literature that employs aggregated or differenced measures to analyse the long-term and dynamic effects of sustainability practices (Lo & Sheu, 2007; Velte, 2017; Buallay, 2019).

3.4 Model Specification

To test the hypotheses formulated in Chapter 2, eight econometric models are estimated. These specifications differ in terms of the ESG measures considered, the inclusion of interaction terms, and the treatment of controversies and dynamics.

All panel models (1–6) are estimated using firm fixed effects (γ_i) and year fixed effects (δ_t), which control for unobserved time-invariant firm characteristics and common macroeconomic shocks. In addition, sector and country dummies are included as control variables to capture structural heterogeneity. Robust standard errors are applied throughout.

The general specification is given by:

$$I. \qquad FP_{i,t} = a + \beta_1 ESG_{i,t} + \beta_2 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

where $FP_{i,t}$ denotes the financial performance of firm *i* in year *t* (measured as ROA, ROE, or Operating Income), $ESG_{i,t}$ represents the ESG-related variable of interest, $Controls_{i,t}$ are control variables (e.g., sector and country dummies), γ_i captures firm fixed effects, δ_t represents year fixed effects, and $\epsilon_{i,t}$ is the error term. The explanatory power of the models is evaluated through the coefficient of determination (R^2), which indicates the proportion of variation in the dependent variable explained by the independent variables.

3.4.1 Model 1 – Baseline ESG Model (H1)

This model investigates the direct impact of ESG performance on financial performance, following the general specification in Equation (I). The ESG Score (Weight 100%) is used as the main explanatory variable. Control variables for sector are included, while country fixed effects control for institutional differences across national contexts. This baseline

specification directly tests Hypothesis 1, which predicts that companies with higher ESG performance tend to exhibit stronger financial outcomes.

3.4.2 Model 2 – ESG Combined Score Model

In this model, the ESG Combined Score (which integrates controversies) replaces the pure ESG Score. This allows testing whether incorporating ESG-related risk exposure changes the relationship with financial performance.

$$II. \qquad FP_{i,t} = a + \beta_1 ESGCombined_{i,t} + \beta_2 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

As with Model 1, sector and country dummies are included, along with firm and year fixed effects. This model also tests Hypothesis 1 but with a broader ESG measure.

3.4.3 Model 3 – ESG Pillars Disaggregated

This model decomposes ESG into its three individual components — Environmental, Social, and Governance — to analyse their distinct effects on firm performance.

$$III. \qquad FP_{i,t} = a + \beta_1 E_{i,t} + \beta_2 S_{i,t} + + \beta_3 G_{i,t} + \beta_4 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

This specification tests Hypothesis 4, which predicts that the three ESG dimensions exert different effects on financial performance.

3.4.4 Model 4 – ESG Controversies Score

This model focuses solely on the ESG Controversies Score, capturing negative events (e.g., accidents, governance scandals, human rights violations).

$$IV. \qquad FP_{i,t} = a + \beta_1 Controversies_{i,t} + \beta_2 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

It directly tests Hypothesis 5, which posits that higher controversy exposure negatively affects financial performance.

3.4.5 Model 5 – Moderation Model: ESG × Firm Size

Firm size is proxied by the natural logarithm of total assets (LogTA), following prior research. The logarithmic transformation reduces skewness and ensures comparability across firms of different magnitudes. This specification introduces an interaction term between ESG performance and firm size to test the moderating effect of company scale on the ESG–financial performance relationship.

$$V. \quad FP_{i,t} = a + \beta_1 ESG_{i,t} + \beta_2 FirmSize_{i,t} + + \beta_3 (ESG \times FirmSize)_{i,t} + \beta_4 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

This model tests Hypothesis 3, which states that the ESG–performance relationship is stronger for larger firms.

3.4.6 Model 6 – Robustness Check with Alternative Size Proxy

As a robustness test, the moderation model is re-estimated using the number of employees (log-transformed) instead of total assets as proxy for firm size.

$$VI. \quad FP_{i,t} = a + \beta_1 ESG_{i,t} + \beta_2 Employees_{i,t} + + \beta_3 (ESG \times Employees)_{i,t} + \beta_4 Controls_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t}$$

This specification validates whether the moderating effect is consistent across different measures of size, reinforcing Hypothesis 3.

3.4.7 Model 7 – Cross-sectional Regression with Averages

This model tests the relationship between average ESG performance and average financial outcomes across the period 2020–2023, using a cross-sectional regression.

$$VII. \quad OperatingIncome_{i,avg} = a + \beta_1 ESG_{i,avg} + \epsilon_i$$

It serves as a robustness check for Hypothesis 1 in a static, cross-sectional framework.

3.4.8 Model 8 – Change-based Regression (Δ variables)

The final model applies a first-differences approach, regressing changes in ESG on changes in financial performance between 2020 and 2023.

$$VIII. \quad \Delta OperatingIncome_{i,t} = a + \beta_1 \Delta ESG_{i,t} + \epsilon_{i,t}$$

This specification directly tests Hypothesis 2, which predicts that improvements in ESG performance lead to better financial outcomes.

While each model has been discussed individually, Table 3 provides a consolidated overview of the specifications, their main explanatory variables, and the hypotheses tested. This summary also serves as a bridge to the empirical analysis presented in the next chapter.

Table 3 – Regression Models and Associated Hypotheses

Model	Main Independent Variable(s)	Hypothesis Tested
Model 1	ESG Score (Weight 100%)	H1
Model 2	ESG Combined Score	H1
Model 3	Environmental, Social, Governance Scores	H4
Model 4	ESG Controversies Score	H5
Model 5	ESG × Firm Size (Log Assets)	H3
Model 6	ESG × Firm Size (Log Employees)	H3
Model 7	ESG Score (avg. 2020–23)	H1
Model 8	Δ ESG Score (2020–23)	H2

3.5 Data Processing and Preparation

To ensure consistency and reproducibility in the empirical analysis, all data processing steps were performed in Python (Jupyter Notebook). Several procedures were applied before estimating the econometric models.

3.5.1 Time Coverage and Sample

Although financial data such as ROA, ROE, Operating Income and Total Assets are available for the full period from 2020 to 2024, ESG ratings are only available up to 2023. To ensure consistency and to avoid missing data in regression analyses, the year 2024 was excluded during the data cleaning process.

After cleaning, the final dataset consists of up to 200 firm-year observations (50 firms × 4 years). Observations with missing values for key variables (financial or ESG-related) were excluded on a case-by-case basis.

3.5.2 Currency Conversion

To ensure comparability across firms reporting in different currencies, all financial data were converted into euros (EUR) using annual exchange rates published by the European Central Bank (ECB). Average annual rates were applied to flow variables (Operating Income, ROA, ROE, Employees), while end-of-year rates were applied to stock variables (Total Assets).

The specific exchange rates applied for each year are provided in Appendix C. After conversion, all currency values in the dataset are expressed in EUR.

3.5.3 Sector Aggregation

The original dataset contained detailed industry classifications (e.g., "Automobiles & Auto Parts", "Banking Services"). For analytical consistency and to improve interpretability, these fine-grained sectors were grouped into broader macro-sectors following common industry classification practices. The mapping applied is shown in Appendix D.

3.5.4 ESG Score Transformation

As previously mentioned in Section 3.3.2, Refinitiv reports ESG performance in alphabetical ratings ranging from D– to A+. For the econometric analysis, these categorical scores were transformed into a continuous numeric scale between 0 and 1. This conversion preserves the relative ranking of firms and ensures that ESG scores can be treated as quantitative variables in regression models. The detailed mapping procedure is presented in Appendix B.

3.5.5 Other Data Processing Steps

In addition to the procedures described above, the following data processing steps were implemented to ensure consistency and reproducibility:

1. Variable Renaming and Standardisation – Column names were renamed to concise, standardised English identifiers to avoid mismatches and simplify reference in the analysis scripts.

2. Automation and Replicability – All data preparation steps were executed through Python scripts to minimise manual intervention and allow full reproducibility of results.

4. Empirical Results and Discussion

4.1 Descriptive Statistics

Before presenting the regression results, this chapter provides a preliminary overview of the dataset. Descriptive statistics are reported to summarise the main characteristics of the sample and to validate the plausibility of the data. In addition, a correlation analysis is conducted to explore initial associations between the key variables. These steps provide context for the subsequent empirical models and ensure transparency regarding the structure of the data used in the study.

4.1.1 Summary statistics of main variables

Table 4 reports descriptive statistics for the main variables used in the empirical analysis, based on 200 firm-year observations from 2020 to 2023. The variables include financial performance measures (ROE, ROA, Operating Income), firm size indicators (Assets and Employees), and sustainability performance (ESG Score). For each variable, the mean, median, standard deviation, minimum, maximum, and the number of valid observations are reported. These figures provide an overview of the dataset and confirm the presence of substantial heterogeneity across firms in both financial and ESG dimensions.

Table 4 - Descriptive statistics of main variables (2020–2023)

Variable	Mean	Median	Std. Dev.	Min	Max	N
roe	0.51	0.13	2.65	-0.4	22.48	200
roa	0.27	0.04	1.56	-0.13	12.71	200
assets	4 701 015	113 202	31 511 892	4 158	269 108 800	200
employees	317 024	100 501	1 319 697	1 747	11 656 000	200
esg_num	0.85	0.83	0.11	0.5	1	200
operating_profit	47 563	5 711	286 134	-703	2 525 800	200

ROE has a mean of 0.51 and a median of 0.13. with a wide dispersion (SD 2.65) and values ranging from –0.40 to 22.48. ROA exhibits a similar distribution, with a mean of 0.27, a median of 0.04, a standard deviation of 1.56 and values between –0.13 and 12.71. In both cases, the gap between the mean and the median indicates positive skewness, suggesting that a small number of highly profitable firm-years pull the average upwards.

Firm size also shows extreme heterogeneity: assets range from €4 billion to over €269 billion, and the number of employees varies between fewer than 2 000 and more than 11 million, and medians far below the means, confirming strong size heterogeneity within the STOXX Europe 50. This supports the use of logarithmic transformations of size in the empirical models.

The normalised ESG score averages 0,85 (median 0,83), which corresponds approximately to an A− ESG rating. Dispersion is relatively low (SD 0,11), with values ranging from 0,50 (around C+) to 1,00 (A+). This distribution shows that most firms in the sample achieve high ESG ratings, clustered towards the top of the scale, implying limited cross-sectional variation.

Operating Income shows a mean of €47 563 and a median of €5 711, with a very wide SD (€286 134) and observations below zero (min €–703), signalling the presence of loss-making years for some firms and a strongly right-skewed distribution (max €2 525 800).

Overall, the descriptive evidence portrays a sample of large European corporations with high ESG ratings, substantial dispersion in size and financial performance, and some negative operating outcomes in certain years—features that the subsequent econometric analysis will account for.

4.1.2 Constructed Variables (Averages and Changes 2020–2023)

To complement the annual analysis, additional variables were constructed to capture both the average performance of firms over the 2020–2023 period and the changes observed between the first and last year of the sample. These include the average ESG score (ESG_avg), average operating Income (OperatingIncome_avg), and their changes between 2020 and 2023 (ΔESG and ΔOperatingIncome). Table 5 reports the descriptive statistics for these derived measures.

Table 5 – Descriptive statistics of constructed variables (2020–2023)

Variable	Mean	Median	Std. Dev.	Min	Max	N
ESG_avg	0.85	0.88	0.10	0.58	1.00	50
OperatingIncome_avg	47 563	6 599	283 619	-553	2 012 575	50
ΔESG	-0.01	0.00	0.08	-0.17	0.25	50
ΔOperatingIncome	22 695	2 994	129 730	-9 869	920 700	50

The results show that the average ESG score (ESG_avg) is high (0.85) with limited dispersion, confirming that EURO STOXX 50 companies consistently maintain robust sustainability practices. In contrast, average operating income (OperatingIncome_avg) displays considerable heterogeneity, ranging from slight losses (€–553 million) to profits exceeding 2 billion, reflecting differences in business models and the impact of external shocks.

Regarding changes, the mean variation in ESG between 2020 and 2023 (ΔESG) is close to zero (–0.01), suggesting stability in ratings over the period. Conversely, operating income shows significant volatility: the change in operating income (ΔOperatingIncome) has a large spread, with differences reaching nearly 1 billion euros, highlighting the financial performance volatility during the post-pandemic recovery and the European energy crisis.

4.2 Correlation Analysis

In addition to descriptive statistics, simple correlations were computed to provide an initial overview of the associations between sustainability measures and financial performance. Table 6 presents the Pearson correlation coefficients, while Table 7 reports the corresponding p-values.

Table 6 – Correlation matrix

	ESG_avg	Operating	ΔESG	ΔOperating
ESG_avg	1.00	-0.10	-0.12	-0.10
OperatingIncome_avg	-0.10	1.00	-0.13	1.00
ΔESG	-0.12	-0.13	1.00	-0.13
ΔOperatingIncome	-0.10	1.00	-0.13	1.00

Table 7 – Correlation significance levels (p-values)

	ESG_avg	Operating	ΔESG	ΔOperatingIncome
ESG_avg	0.00	0.48	0.42	0.49
OperatingIncome_avg	0.48	0.00	0.37	0.00
ΔESG	0.42	0.37	0.00	0.38
ΔOperatingIncome	0.49	0.00	0.38	0.00

The results indicate that correlations between ESG performance and financial outcomes are weak and statistically insignificant. The average ESG score (ESG_avg) shows a small negative association with both average operating income ($r = –0.10$, $p = 0.48$) and changes in operating income ($r = –0.10$, $p = 0.49$). Similarly, improvements in ESG ratings (ΔESG) are weakly and negatively correlated with operating income levels and variations, but these associations are not statistically significant ($p > 0.35$).

In contrast, there is a nearly perfect positive correlation between OperatingIncome_avg and ΔOperatingIncome ($r \approx 1.00$, $p < 0.01$), which is expected since both measures capture overlapping aspects of firm financial performance.

Overall, the correlation analysis suggests that ESG scores and their changes are largely independent of operating performance in EURO STOXX 50 firms during the period 2020–2023. This reinforces the need for multivariate regression analysis, presented in Chapter 5, to explore these relationships while accounting for firm-level, sectoral, and country-specific effects.

4.3 Regression Results

4.3.1 ESG Scores and Financial Performance (H1)

Hypothesis H1 tested whether higher ESG scores are associated with superior financial performance. Table 8 reports the regression results for ROA and ROE as dependent variables, with ESG score as the main explanatory variable and the number of employees as a control. Sector, country, and year fixed effects are included in the models.

Table 8 – Regression results for H1: ESG scores and financial performance

	H1_ROA	H1_ROE
ESG score	0.693	1.328
Employees	-0.000	0.000
Constant	-0.227	-0.540
N	200	200
R2	0.163	0.156

*Notes: OLS regression with robust (HC3) standard errors in parentheses. All models include sector, country, and year fixed effects. Significance levels: * p<0.10. ** p<0.05. *** p<0.01.*

The coefficients on ESG score are positive for both ROA (0.693) and ROE (1.328), suggesting a potential positive association between ESG performance and financial performance. However, the standard errors are relatively large (0.929 and 1.608, respectively), and the results are not statistically significant at conventional levels.

The control variable (Employees) is not significant, and the constant terms are also close to zero. The explanatory power of the models is modest, with an R^2 of 0.16 in both cases, indicating that ESG score and the included controls explain only a small share of the variation in financial performance.

Overall, these results do not support H1. Although the coefficients point in the expected positive direction, the absence of statistical significance implies that ESG scores do not have a measurable effect on financial performance in the sample of EURO STOXX 50 firms. This finding contrasts with meta-analyses such as Friede et al., (2015), which document a predominantly positive ESG–performance link, and suggests that the homogeneity of ESG ratings among large European firms may limit the explanatory power of this variable. Similarly, Orlitzky et al. (2003) and Friede et al., (2015) find evidence that corporate social performance tends to improve financial outcomes. The lack of significance in this study may reflect the homogeneity of ESG scores among EURO STOXX 50 firms, which already maintain high standards, reducing variability across companies.

4.3.2 ESG Improvements and Financial Performance Changes (H2)

Hypothesis H2 examined whether improvements in ESG performance between 2020 and 2023 are associated with changes in operating income over the same period. Table 9 presents the results of the regression, where the dependent variable is the variation in operating income (ΔOperating Income), and the independent variable is the change in ESG scores (ΔESG).

Table 9 – Regression results for H2: ESG changes and operating income variation

	H2_Δ(2020-2023)
Δ ESG (2023–2020)	-202 533
Constant	21 197
N	50
R2	0.016

*Notes: OLS regression with robust (HC3) standard errors in parentheses. No additional controls are included by construction, as the analysis is based on within-firm changes between 2020 and 2023. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.*

The coefficient of ΔESG is negative (–202 533), suggesting that increases in ESG scores are, if anything, associated with decreases in operating income. However, the estimate is highly imprecise, with a large standard error (213 805), and is not statistically significant. The explanatory power of the model is extremely low ($R^2 = 0.016$), indicating that changes in ESG explain virtually none of the variation in operating income between 2020 and 2023.

These findings imply that short-term improvements in ESG performance do not generate measurable financial returns within this period. This is consistent with the idea that ESG initiatives often yield long-term benefits, such as reputational gains, improved stakeholder trust, and lower risk exposure, rather than immediate financial performance effects (Awaysheh et al., 2020). Moreover, as shown in Chapter 4, the average change in ESG during 2020–2023 was close to zero (–0.01), which limits the potential to identify any significant association. In contrast, Lourenço et al. (2014) observe reputational gains in the short run, which were not replicated here, possibly because ESG changes within the EURO STOXX 50 sample were minimal during the period analysed.

Therefore, H2 is not supported: variations in ESG performance across EURO STOXX 50 companies during the sample period did not lead to significant changes in financial outcomes. The absence of significance may be explained by the short time frame (2020–2023), during which changes in ESG scores were minimal and external shocks such as COVID-19 and the energy crisis dominated corporate performance. These contextual factors likely overshadowed any measurable ESG effects.

4.3.3 Firm Size as a Moderator (H3)

Hypothesis H3 predicted that firm size would moderate the relationship between ESG scores and financial performance, with larger firms expected to benefit more from ESG engagement. Table 10 reports the results of the regression, which includes an interaction term between ESG score and the logarithm of total assets.

Table 10 – Regression results for H3: ESG × Firm Size interaction

	H3_ESGxSize(ln_assets)
ESG score	10.566
Employees	0.000
esg_num:ln_assets	-0.706
ln(Assets)	0.282
Constant	-4.792
N	200
R2	0.164

*Notes: OLS regression with robust (HC3) standard errors in parentheses. All models include sector, country, and year fixed effects. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.*

The coefficient of ESG score is positive (10.566), while the interaction term ESG × ln(Assets) is negative (–0.706). However, both are statistically insignificant given their large standard errors. Similarly, the main effect of firm size (ln(Assets)) is not significant. The explanatory power of the model remains low ($R^2 \approx 0.164$).

These results indicate that firm size does not significantly moderate the ESG–financial performance relationship. This outcome differs from previous findings (e.g., Fatemi et al., 2018; Buallay, 2019), which suggested that larger firms benefit more from ESG due to greater visibility, stakeholder pressure, and resource capacity.

A plausible explanation for the absence of a moderating effect in this study is the homogeneity of the sample. All firms in the EURO STOXX 50 are already very large multinationals, with relatively little variation in size compared to broader firm populations. As a result, the moderating role of firm size may be more relevant in heterogeneous samples that include both small and large firms.

Therefore, H3 is not supported. The insignificance of the moderating effect may be attributed to the relative homogeneity of the sample: all firms in the EURO STOXX 50 are large multinationals, leaving little variation in size for ESG effects to manifest differently.

4.3.4 ESG Pillars and Financial Performance (H4)

Hypothesis H4 examined whether the three ESG pillars—Environmental, Social, and Governance—affect financial performance differently. Separate regressions were estimated for each pillar, with ROE as the dependent variable. Table 11 summarises the results.

Table 11 – Regression results for H4: ESG pillars

	H4_Environmental	H4_Governance	H4_Social
Employees	-0.000	-0.000	0.000
Environmental (E)	-1.927*		
Governance (G)		-0.167	
Social (S)			1.425
Constant	2.235**	0.632	-0.736
N	200	200	200
R2	0.16	0.154	0.157

*Notes: OLS regression with robust (HC3) standard errors in parentheses. All models include sector, country, and year fixed effects. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.*

The results show mixed evidence across the ESG pillars:

- Environmental (E): The coefficient is negative (–1.927) and weakly significant at the 10% level. This suggests that greater environmental engagement may be associated with lower short-term financial performance, potentially reflecting upfront costs of environmental initiatives without immediate financial returns.

- Governance (G): The coefficient is negative (–0.167) but statistically insignificant, indicating no clear relationship between governance practices and financial performance in this sample.

- Social (S): The coefficient is positive (1.425) but not statistically significant, although the direction suggests potential financial benefits from stronger social practices, consistent with the idea that improved employee relations and stakeholder engagement can enhance firm performance.

The explanatory power of the models remains low ($R^2 \approx 0.15–0.16$), and the results highlight that no single ESG pillar consistently explains financial performance. This aligns with prior findings (Garcia et al., 2017; Velte, 2017) that the financial materiality of ESG components is context-dependent. Overall, H4 is not supported.

The results provide limited evidence in this regard: although some coefficients are positive, their statistical significance is weak and not robust across specifications, meaning that no consistent evidence emerges that any single ESG pillar drives financial performance in this sample. The mixed and weak results suggest that the financial materiality of ESG dimensions is context-dependent. In this case, the limited statistical power may arise from overlapping effects among pillars and the short-term nature of the analysis, which may not capture the delayed benefits of environmental and social initiatives.

4.3.5 ESG Controversies and Financial Performance (H5)

Hypothesis H5 predicted that ESG controversies would negatively affect financial performance, given their potential to harm reputation, stakeholder trust, and long-term financial performance. Table 12 reports the results from two specifications: one controlling for employees and another using ln(assets) as the size proxy.

Table 12 – Regression results for H5: ESG controversies

	H5_Controversies+controls	H5_Controversies+ln_assets
ESG controversies	0.307	0.249
ESG score	1.705	1.864
Employees	-0.000	
ln(Assets)		-0.072
Constant	-1.031	-0.350
N	200	200
R2	0.157	0.158

*Notes: OLS regressions with robust (HC3) standard errors in parentheses. All models include sector, country, and year fixed effects. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.*

The coefficients of ESG controversies are positive in both specifications (0.307 and 0.249), contrary to expectations, but they are statistically insignificant with relatively large standard errors. This indicates that the presence of controversies does not have a measurable effect on firm financial performance.

Similarly, ESG scores remain insignificant, and the explanatory power of the models is modest ($R^2 \approx 0.16$). These results suggest that large EURO STOXX 50 firms are resilient to reputational shocks, likely due to diversified operations, established investor bases, and crisis management capabilities. Furthermore, the way Refinitiv measures controversies may not fully capture the financial severity of incidents, which could explain the absence of significant effects.

This finding contrasts with Krüger (2015), who shows that negative CSR events often lead to short-term stock price declines. A possible explanation is that large firms in the sample have diversified operations and strong reputational capital, which makes them resilient to negative incidents. This is consistent with Godfrey et al. (2009), who propose that CSR can serve as insurance-like protection against reputational damage.

Overall, the findings do not support H5: ESG controversies do not appear to undermine short-term financial performance in the sample. The lack of a significant negative effect suggests that large firms may be resilient to reputational shocks, due to their diversified

operations, strong stakeholder relations, and crisis management capacity. This aligns with the "insurance-like" role of CSR proposed in prior literature.

4.4 Summary

The regression analysis presented in this chapter provides a comprehensive assessment of the link between ESG practices and financial performance among EURO STOXX 50 firms between 2020 and 2023. Overall, the results indicate that ESG performance—whether measured as absolute scores, changes over time, or disaggregated components—does not exert a statistically significant effect on firm financial performance in this sample.

For H1, higher ESG scores were associated with positive but insignificant coefficients, suggesting no evidence that ESG levels enhance financial outcomes. H2 similarly showed that improvements in ESG ratings (ΔESG) do not translate into measurable changes in operating income over the period studied. With respect to H3, the interaction between ESG and firm size was not significant, indicating that larger firms do not capture greater benefits from ESG engagement.

Turning to the ESG pillars (H4), results were mixed: the environmental pillar exhibited a weak negative effect, the social pillar a weak positive effect, and the governance pillar no effect. None of these results reached consistent statistical significance, underscoring the context-dependent and heterogeneous nature of ESG components. Finally, H5 showed that ESG controversies did not harm financial performance; coefficients were positive but insignificant, suggesting that large multinational firms may be resilient to reputational shocks.

Taken together, the findings suggest that for large, highly rated European companies, ESG does not serve as a driver of short-term financial performance. Instead, ESG practices may function more as a compliance requirement and a mechanism for long-term reputation and risk management, rather than as a determinant of immediate financial performance.

These findings contrast with the evidence reported in major meta-analyses, such as Friede et al., (2015), who reviewed over 2,000 studies and concluded that the majority documented a positive relationship between ESG and financial performance. The divergence may be explained by the specific context of large European firms, which exhibit limited variation in ESG scores, as well as by the short time horizon analysed. This suggests that the relationship

between ESG and financial outcomes may be contingent on firm characteristics, market maturity, and temporal scope.

5. Conclusion

This dissertation examined the relationship between Environmental, Social, and Governance (ESG) practices and financial performance in the context of large European firms. Using a dataset covering EURO STOXX 50 companies between 2020 and 2023, the study combined descriptive statistics with econometric analysis to test fixe hypotheses. The models controlled for firm size, sector, and country fixed effects, while financial performance was measured primarily through return-based indicators (ROE and ROA) and operating income.

The results consistently showed that ESG performance does not exert a significant short-term impact on financial outcomes. Higher ESG scores were positively but insignificantly associated with financial performance, and changes in ESG ratings between 2020 and 2023 did not translate into measurable changes in operating income. Firm size did not moderate the relationship, while country effects proved relevant for explaining baseline levels of financial performance but did not alter the insignificance of ESG itself. The analysis of ESG pillars yielded mixed results, with environmental engagement showing a weak negative effect, social practices a weak positive association, and governance no measurable impact. Finally, ESG controversies were not found to reduce financial performance, suggesting that large European firms may be resilient to reputational shocks. Importantly, however, the absence of statistically significant results should not be interpreted as evidence that ESG has no financial relevance. Rather, it reflects the characteristics of the sample and the period analysed: large firms already exhibit high ESG scores, leaving limited variation to explain financial performance, while external shocks such as COVID-19 and the energy crisis may have overshadowed potential ESG effects.

These findings contribute to the literature by highlighting the contextual nature of the ESG–performance nexus. In contrast to many prior studies that document a positive relationship, the results presented here suggest that in large, mature firms with already high ESG standards, the limited heterogeneity of scores reduces their explanatory power. Moreover, the short timeframe analysed, which coincided with external shocks such as COVID-19 and the energy crisis, may have overshadowed any potential benefits of ESG. The results therefore underscore the importance of considering firm size, market maturity, and institutional context when evaluating the financial consequences of sustainability practices.

From a practical perspective, the study carries implications for investors, managers, and policymakers. For investors, the results caution against expecting immediate financial gains from ESG engagement in large-cap European firms, while reinforcing the role of ESG as a long-term risk management and reputation-enhancing mechanism. For corporate managers, the evidence suggests that ESG strategies should be pursued not as direct drivers of short-term financial performance, but as part of broader frameworks for long-term value creation, compliance, and stakeholder trust. For policymakers, the results indicate that regulatory focus may be more effective when directed at smaller or less mature firms, where ESG differentiation is greater and its financial impact potentially stronger.

Several limitations should be acknowledged. The analysis covers a relatively short time horizon, restricting the ability to capture long-term ESG effects. The sample is limited to very large firms, reducing generalisability to smaller companies or firms outside Europe. Furthermore, reliance on Refinitiv ESG data, though widely used, may not fully capture the qualitative dimensions of sustainability or the severity of controversies.

Another limitation concerns the choice of indicators. The analysis relied exclusively on Refinitiv ESG scores and on accounting-based measures of financial performance (ROA, ROE, and operating income). While these are widely used in the literature, they may not fully capture market-based performance or investor perceptions of ESG.

These limitations open avenues for future research. Extending the time period analysed, incorporating market-based measures such as stock returns, and expanding the sample to include mid-cap and small-cap firms would provide a more comprehensive understanding of the ESG–performance relationship. Comparative studies across different regions and institutional contexts could further clarify the extent to which national environments condition the financial relevance of ESG practices.

Future research could also incorporate market-based performance indicators, such as Tobin's Q or stock returns, which are widely recognised as robust proxies for firm value in the ESG–performance literature (e.g., McWilliams & Siegel, 2000; Cheng et al., 2014). Recent empirical work (e.g., Glova & Panko, 2025; Amor et al., 2025) continues to employ Tobin's Q to capture how ESG practices are reflected in firm valuation. Nevertheless, Tobin's Q remains one of the most widely used measures of firm value in ESG studies, and its use

underscores the importance of considering both accounting and market perspectives when evaluating ESG effects. In addition, comparing ESG data across different providers (e.g., Refinitiv, MSCI, Sustainalytics) would allow testing the robustness of findings against potential measurement inconsistencies.

In conclusion, this dissertation finds that ESG practices do not serve as a short-term driver of financial performance in large European firms. Their value lies instead in ensuring compliance, protecting reputation, and supporting long-term resilience. These findings reinforce the idea that the impact of ESG is complex and context-dependent, requiring a nuanced understanding that considers firm size, institutional frameworks, and temporal horizons.

Appendices

Appendix A – Firm-level Sample Description (average 2020–2023 values)

	Average 2020–2023							
Company	**Country**	**Sector**	**Currency**	**Operating Income**	**Total Assets**	**ROE**	**ROA**	**Employees**
Banco Santand	Spain	Banking Services	EUR	16 658	1 694 577	7.17	0.44	190 287
Banco Bilbao	Spain	Banking Services	EUR	11 676	731 347	12.49	0.95	119 680
AXA SA	France	Insurance	EUR	8 484	703 317	10.94	0.87	94 836
ASML Holding	Netherlands	Semiconductors	EUR	7 298	38 298	45.30	17.56	35 136
AB Inbev	Belgium	Beverages	USD	13 054	194 827	5.70	2.60	159 330
Allianz SE	Germany	Insurance	EUR	13 564	1 032 618	11.55	0.80	155 888
Airbus SE	Netherlands	Aerospace &	EUR	4 360	116 234	24.01	2.58	139 385
Adyen NV	Netherlands	Financial Technolo	EUR	643	7 710	26.46	8.51	3 160
Adidas AG	Germany	Textiles &	EUR	1 053	20 432	8.75	2.86	54 793

Company	Enel SpA	Deutsch e	Deutsch e Post	Deutsche Boerse	Danone SA	Compag nie de	BNP Paribas	Bayerisc he	Bayer AG	BASF SE
Country	Italy	Germany	Germany	Germany	France	France	France	Germany	Germany	Germany
Sector	Electric Utilities	Telecom municati	Freight & Logistics	Financial Technolog	Food & Tobacco	Homebui lding &	Banking Services	Automob iles &	Pharmac euticals	Chemical s
Currency	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Operating Income	10 767	18 175	6 624	2 190 020	3 633	4 097	9 152	12 440	9 885	4 988
Total Assets	194 526	288 075	64 813	220 926 880	44 665	52 574	2 616 618	242 347	117 806	81 991
ROE	15.46	13.08	21.60	17.60	9.66	9.70	6.94	13.52	-8.28	2.75
ROA	2.63	3.43	6.95	0.70	3.61	3.98	0.36	4.59	-2.65	1.45
Employees	63 907	209 485	592 127	10 343 400	97 495	167 174	187 363	140 633	98 616	111 362

Company	Kering SA	Intesa Sanpaol	ING Groep	Infineon Technol	Industri a de	Iberdrol a SA	Hermes Internati	Ferrari NV	EssilorL uxottica	Eni SpA
Country	France	Italy	Netherla nds	Germany	Spain	Spain	France	Italy	France	Italy
Sector	Specialty Retailers	Banking Services	Banking Services	Semicon ductors	Specialty Retailers	Electric Utilities	Textiles &	Automob iles &	Healthcar e	Oil & Gas
Currency	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Operating Income	4 206	9 585	7 823	2 288	4 806	8 254	4 488	1 298	3 317	11 846
Total Assets	35 545	988 612	970 502	25 865	29 294	144 542	17 178	7 688	59 416	137 818
ROE	19.81	9.69	9.49	13.16	21.80	10.67	27.86	41.63	4.51	8.22
ROA	8.29	0.55	0.53	6.71	12.32	3.51	19.73	13.84	2.99	2.43
Employees	44 897	91 536	61 429	53 960	162 409	39 513	20 221	4 901	181 089	32 401

Company	Prosus NV	Pernod Ricard	Nordea Bank	Nokia Oyj	Muench ener	Mercede s-Benz	LVMH Moet	L'Oreal SA	L'Air Liquide	Koninkli jke
Country	Netherla nds	France	Finland	Finland	Germany	Germany	France	France	France	Netherla nds
Sector	Software & IT	Beverage s	Banking Services	Commun ications	Insuranc e	Automob iles &	Textiles &	Personal &	Chemical s	Food & Drug
Currency	USD	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Operating Income	-525	2 813	5 303	1 968	5 224	11 886	17 859	7 159	4 843	3 549
Total Assets	52 347	35 309	585 060	39 638	288 010	266 723	132 302	48 335	47 696	46 924
ROE	22.09	9.58	12.47	5.15	13.30	13.53	22.88	1895.20	10.19	13.86
ROA	16.18	4.27	0.68	2.74	1.38	4.12	9.47	1118.00	5.06	4.29
Employees	23 699	19 347	28 505	86 782	41 342	189 271	174 519	89 435	66 485	406 200

Company	Volkswagen AG	Vinci SA (SGEF.	UniCredit SpA	TotalEnergies	Stellantis NV	Siemens AG	Schneider	SAP SE (SAPG.	Sanofi SA	Safran SA
Country	Germany	France	Italy	France	Netherlands	Germany	France	Germany	France	France
Sector	Automobiles &	Construction &	Banking Services	Oil & Gas	Automobiles &	Machinery. Tools.	Machinery. Tools.	Software & IT	Pharmaceuticals	Aerospace &
Currency	EUR	EUR	EUR	USD	EUR	EUR	EUR	EUR	EUR	EUR
Operating Income	20 384	6 048	6 888	28 147	15 723	7 790	4 820	6 767	8 419	2 507
Total Assets	564 658	110 404	855 087	258 552	173 477	141 531	53 260	68 850	124 128	46 711
ROE	9.44	13.90	8.53	11.48	18.33	12.63	13.02	11.54	11.06	1.45
ROA	2.56	3.25	0.61	4.63	6.40	4.43	6.04	6.20	6.28	0.36
Employees	674 933	218 515	75 238	102 706	249 998	310 800	160 634	107 706	91 802	86 056

Company	Country	Sector	Currency	Operating Income	Total Assets	ROE	ROA	Employees
Wolters Kluwer	Netherlands	Professional &	EUR	1 260	9 096	44.64	10.06	20 110

Appendix B – ESG Score Conversion Table

Letter Rating	Numeric Value
A+	1.00
A	0.92
A−	0.83
B+	0.75
B	0.67
B−	0.58
C+	0.50
C	0.42
C−	0.33
D+	0.25
D	0.17
D−	0.08
E	0.00

Source: Refinitiv Eikon (2020–2023). Own elaboration.

Appendix C — EUR/USD Exchange Rates (ECB)

Year	Average Annual Rate	End-of-Year Rate
2020	1.1422	1.2271
2021	1.1827	1.1372
2022	1.0530	1.0666
2023	1.0826	1.1035

Source: European Central Bank (ECB)

Appendix D — Sector Aggregation Mapping

Original Sector(s)	Macro-Sector
Automobiles & Auto Parts. Textiles & Apparel. Specialty	Consumer
Food & Drug Retailing. Food & Tobacco. Personal &	Consumer Staples
Oil & Gas. Chemicals	Energy & Materials
Aerospace & Defense. Machinery. Tools. Heavy	Industrials
Semiconductors & Semiconductor Equipment. Software	Technology &
Banking Services. Insurance	Financials
Electric Utilities & IPPs	Utilities
Healthcare Equipment & Supplies	Health Care

Source: Refinitiv Eikon (2020–2023). Own elaboration.

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