



SCHOOL OF  
ECONOMICS AND  
MANAGEMENT

Spring 2024

BUSN79

Master Thesis

# Navigating Green Returns in Family Firms

The influence of family ownership on ESG and firm performance

**Authors:**

Elina Kornbakk

Hedda Jensen

**Supervisor:**

Diem Nguyen

## **Abstract**

**Title:** Navigating Green Returns in Family Firms - The influence of family ownership on ESG and firm performance

**Seminar date:** May 29, 2024

**Course:** BUSN79 Degree Project in Accounting and Finance

**Authors:** Elina Kornbakk & Hedda Jensen

**Supervisor:** Diem Nguyen

**Keywords:** ESG, Family ownership, Firm performance, Germany

**Purpose:** This study aims to examine the relationship between ESG performance and firm performance, with a specific focus on how family ownership structure may moderate this relationship within the German market.

**Methodology:** The multivariate analysis begins with pooled ordinary least squares (POLS) as a baseline and extends to a random effects model to address unobserved heterogeneity and endogeneity issues. The study further analyzes individual ESG pillar scores and conducts a robustness check using a propensity score-matched (PSM) sample.

**Theoretical perspective:** Our research questions are grounded in the theoretical frameworks of agency theory, stakeholder theory, and socioemotional wealth theory.

**Empirical foundation:** This study is based on a multivariate analysis of data collected from 193 German firms (totaling 1159 firm-years) listed on the Frankfurt and Munich Stock Exchange between 2018 and 2023.

**Conclusion:** First, we identify a negative relationship between ESG performance and firm performance, suggesting that higher ESG scores correlate with lower immediate financial returns. Second, the relationship between family ownership and firm performance is complex. This underscores the nuanced and context-dependent nature of family ownership's influence on profitability. Third, family ownership demonstrates a positive moderating effect on the relationship between ESG performance and firm performance, particularly within the governance pillar. This indicates that family-owned firms can effectively mitigate the negative financial impacts of ESG initiatives through robust governance practices.

## **Acknowledgments**

We sincerely thank our supervisor, Diem Nguyen, for her commitment and guidance throughout the process of writing this thesis. Your feedback and dedication have significantly improved the thesis and made the process smoother.

---

Elina Kornbakk

Hedda Jensen

<b>1. Introduction</b> .....	<b>5</b>
1.1 Background.....	5
1.2 Problem discussion .....	7
1.3 Purpose & research question.....	8
1.4 What the authors do .....	9
1.5 The main findings .....	9
1.6 Contribution .....	10
1.7 Structure of the paper.....	10
<b>2. Literature review</b> .....	<b>10</b>
2.1 Theoretical literature.....	10
2.1.1 Stakeholder Theory .....	10
2.1.2 Agency Theory.....	12
2.1.3 Socioemotional Wealth.....	13
2.2 Empirical literature and hypothesis development.....	14
2.2.1 ESG and firm performance .....	14
2.2.2 Family ownership and firm performance.....	16
2.2.3 Family ownership moderating effect on the relationship between ESG and firm performance .....	17
<b>3. Methodology</b> .....	<b>20</b>
3.1 Regression approach .....	20
3.2 Variable definition .....	20
3.2.1 Dependent Variable .....	20
3.2.2 Explanatory Variables.....	21
3.2.3 Control Variables.....	22
3.3 Estimation method .....	24
3.3.1 POLS.....	24
3.3.2 Fixed and random effects.....	25
3.3.3 Heteroskedasticity.....	26
3.3.4 Propensity score matching.....	26
<b>4. Data and sample description</b> .....	<b>27</b>
4.1 Sample description.....	27
4.3 Summary statistics .....	28
4.4 Correlation Matrix .....	30
4.5 Univariate analysis.....	31
<b>5. Empirical results</b> .....	<b>34</b>
5.1 Pooled OLS.....	34
5.2 Random effects .....	36

5.3 Individual pillar score .....	38
5.4 Propensity score matching .....	39
<b>6. Analysis .....</b>	<b>41</b>
6.1 ESG & Firm performance .....	41
6.2 Family ownership.....	43
6.3 Family ownership moderating effect .....	44
<b>7. Conclusion .....</b>	<b>46</b>
<b>References .....</b>	<b>49</b>
<b>Appendices.....</b>	<b>54</b>

# 1. Introduction

## 1.1 Background

During the past decades, Environmental, Social, and Governance (ESG) investing has gained significant attention within the corporate landscape, mirroring a shift towards responsible investment and enhanced corporate accountability. Alongside the addition of ESG criteria to the Principles of Responsible Investment (PRI) of the United Nations and a growing consciousness among responsible investors and the public, there has been a notable increase in firms adopting socially responsible practices and disclosing their performance (Alsayegh et al., 2020, Friede, G. 2019). As competition intensifies, the ability to excel in ESG performance has become integral for firms striving for success in competitive markets. Corporate non-financial practices are encapsulated by the "modern three pillars" of Environmental, Social, and Governance (ESG). These pillars comprehensively measure a firm's ESG performance, reflecting its commitment to environmental sustainability, social responsibility, and sound corporate governance practices (Paolone et al., 2022, Ognen et al., 2017). The ESG score serves as a key metric for assessing performance, acting as a reliable measure of a firm's commitment to corporate sustainability. The resulting score ranges from 0 to 100, with higher scores implying a stronger dedication to sustainability practices within the company (Refinitiv, 2023). Designed to offer an objective and transparent evaluation of a company's environmental stewardship, social impact, and governance practices, the ESG score provides measurable insights (Cheng et al., 2014, Paolone et al., 2022).

Germany has been at the forefront of integrating ESG aspects into corporate management and reporting practices. Since the financial crisis in 2008, German listed companies have been enforced by various regulatory mandates to incorporate ESG aspects into their management and disclosure processes. This includes the adoption of sustainable management compensation systems and the inclusion of non-financial information in their management reports (Saenger, 2017). Moreover, German-listed companies demonstrate significant engagement in voluntary ESG reporting by adhering closely to the Global Reporting Initiative (GRI) Guidelines. In addition to these efforts, the framework of the International Integrated Reporting Council (IIRC) has gained recognition among German Public Interest Entities (PIEs). Germany's active participation in the IIRC pilot program preceded the implementation of the final framework, showcasing its commitment to

integrated reporting. The adoption of integrated reporting, exemplified by industry leaders such as BASF and SAP, is indicative of a pioneering approach in this domain (Eccles and Krzus, 2010).

In Europe, over 65% of all companies are family-owned, representing a diverse spectrum of businesses across various sizes and sectors (EY, 2023). According to statistics from the Frankfurter Allgemeine Zeitung (2013), half of the top ten enterprises in Germany were family firms. These included Volkswagen, BMW-Group, Schwarz-Gruppe (the parent company of Germany's major retailers Kaufland and Lidl), Metro AG, and Aldi-Gruppe. Additionally, data from the Institut für Mittelstandsforschung Bonn reveals that in 2006, over 90% of private and public listed German companies, totaling 3.2 million, were family-run enterprises. These firms contributed to over 40% of the country's total turnover and accounted for more than half of the available job opportunities (Dingliang, Fan. ,2018).

The definition of family firms can vary among studies, leading to differing interpretations. Scholars typically consider an organization a family firm if a family exerts significant influence through various means, such as holding a certain amount of shares, possessing voting rights, or occupying crucial management positions (Su et al., 2022). The Stiftung Familienunternehmen in Germany defines a family firm based on ownership, requiring control by at most three families who collectively own at least 50% of the stock, with no obligation for stockholders to participate in business administration (Dingliang, Fan. ,2018). In contrast, the Institute für Mittelstandsforschung Bonn defines it based on management rights, stipulating control by at most two families who collectively own at least 50% of the stock, with at least one stockholder directly involved in business administration (Dingliang, Fan. ,2018). However, previous studies examining the link between family ownership and ESG typically define family ownership as ownership ranging from 10% to 20% in the firm (Sun et al, 2023, Zeng, T 2021, Rees & Rodionova, 2013). Consensus on the definition remains elusive, resulting in conflicting findings in research on family ownership and ESG performance. Research on family firms and ESG performance has yielded mixed results. Some studies show a positive correlation, while others suggest a negative correlation. This highlights the complexity of their relationship (Gomez-Mejia et al. 2007).

## 1.2 Problem discussion

The literature has been increasingly responsive to the momentum of ESG considerations, with a growing emphasis on understanding the factors that drive and hinder ESG performance, notably within the context of its relationship with firm performance. Moreover, sustainability performance is evolving into a critical component of corporate strategy, gaining significance alongside other essential business aspects as time progresses. Analyzing 2200 empirical studies, Friede et al. (2015) discovered that approximately half of them demonstrated a positive correlation between ESG activities and firm performance and around 10% indicated a negative relationship. This finding highlights the increasing acknowledgment of the potential advantages of incorporating ESG considerations into corporate strategy. Su et al. (2022) further explored how different ownership structures could influence ESG performance in varied ways. They analyzed factors such as owner preferences, the balance between ESG commitments and financial returns and the underlying motivations driving sustainability initiatives. Although the impact of ownership on ESG has been widely studied, the findings present a diverse landscape. The research showcases various associations between ownership structures and ESG initiatives, including positive, negative, and U-shaped relationships (Su et al., 2022).

Europe has a deep-rooted tradition of family enterprises, with Germany playing a particularly significant role. As the second-largest contributor to the 2023 EY and University of St. Gallen Family Business Index, Germany generates US\$1.13 trillion in revenue and employs 3.35 million people. This makes Germany a cornerstone of family-owned businesses (EY, 2023). Family owners have demonstrated an ability to mitigate the agency problem between owners and managers with stronger alignment with firm performance and less diversified portfolios (Nam et al, 2024). In contrast to non-family enterprises, which often prioritize ESG practices to enhance their corporate image and financial standing, family firms take a long-term approach to ownership. This allows them to accumulate expertise over time, leading to more effective insights and monitoring capabilities as this knowledge matures (Nam et al, 2024). Further, their engagement with ESG is guided by non-financial and socioemotional objectives. These include preserving and enhancing family reputation to sustain control and influence, facilitating smooth generational transitions, and promoting sustainable development (Su et al., 2022). According to socioemotional



wealth theory, family firms often prioritize non-economic factors such as reputation and control over financial performance. This perspective proposes that maintaining the firm's legacy and social standing is more important to them than purely economic gains. This can further create a divergence of incentives between family members and other shareholders. (Rees & Rodionova, 2013)

Research into the impact of shareholders on ESG performance has yielded inconclusive results, with much of the existing literature centering around firm-specific attributes, audit committee dynamics, and board compositions. However, the literature lacks a comprehensive exploration of the factors influencing ESG performance within family firms (Gomez-Mejia et al, 2007). For countries leading the integration of ESG aspects into corporate management, particularly those with a strong presence of family-owned businesses like Germany, exploring the connections between family ownership and a company's ESG performance is essential for advancing the understanding in this area (Rees & Rodionova, 2013).

### **1.3 Purpose & research question**

This study aims to investigate the interplay between ESG performance and its impact on firm performance. Our primary interest lies on how family ownership structure may moderate this relationship within the German market. To achieve this, we pose the following research questions:

*1. Does ESG performance affect firm performance?*

*2. How does family ownership structure moderate the relationship between ESG performance and firm performance?*

## **1.4 What the authors do**

This paper is based on a multivariate analysis with a data collection consisting of 193 German firms (1159 firm years) from the Frankfurt and Munich Stock Exchange. Based on the dataset we want to explore if there is a relationship between ESG scores and firm performance, and if family ownership structure has a moderating effect on this relationship. Family ownership is identified by the largest family owing more than 10% of the voting rights. ESG performance is measured using Refinitiv EIKON's ESG scores, while firm performance is measured through Return on Assets (ROA). To further dissect the impact of ESG, we separately analyze the environmental, social, and governance pillars. In the multivariate analysis, pooled OLS and random effects models are used, incorporating adjustments for industry and year effects, with robust standard errors clustered by firm. Lastly, we enhance the credibility of our findings through a robustness check using a propensity score-matched sample.

## **1.5 The main findings**

We find a consistent negative relationship between ESG scores and firm performance across all models which implies that higher ESG scores correlate with lower immediate financial returns. The influence of family ownership on this relationship presents mixed results. While some models indicate that family ownership might mitigate some of the negative impacts of ESG on firm performance, others suggest that family ownership could exacerbate the financial challenges associated with ESG practices. However, we cannot confirm either of our hypotheses regarding the impact of family ownership on firm performance. Our findings also demonstrate that family ownership can effectively moderate the negative impacts of ESG scores on ROA, suggesting that family-owned firms possess unique characteristics that enable them to better integrate and benefit from ESG initiatives.

## **1.6 Contribution**

This study contributes to the literature on the interplay between ESG and family ownership, particularly regarding firm performance in Germany. By investigating how family ownership moderates the relationship between ESG factors and firm performance, our research provides new insights that address previously unexplored aspects of this relationship within the unique context of ownership structures in Germany. The research sheds light on the broader implications of ESG investment in family-owned businesses, emphasizing the importance of robust internal governance and the potential for family owners to leverage ESG practices for long-term sustainability and stakeholder engagement. These insights are crucial for ESG-focused investors and policymakers who seek to enhance corporate sustainability while maintaining economic competitiveness in markets like Germany, where family-owned enterprises play a pivotal role in the economy.

## **1.7 Structure of the paper**

The structure of the rest of the paper is as follows: section 2 will present the literature review with a theoretical approach and a presentation of previous research, as well as a formulation of the hypotheses. This is followed by the methodology of the paper in Chapter 3. Section 4 displays data and sample description, followed by a discussion of the results in section 5. Chapter 6 presents the analysis of the results. Lastly, chapter 7 concludes the paper by introducing the conclusions.

## **2. Literature review**

### **2.1 Theoretical literature**

#### **2.1.1 Stakeholder Theory**

Introduced by Robert Edward Freeman in 1984, stakeholder theory emerged as a critique against the limited perspective of shareholder theory. Freeman argued that businesses should not only focus on shareholders but also consider the wider array of stakeholders affected by their operations, including employees, customers, communities, and the environment. He stated that true financial success is intrinsically linked to the ability of a business to create value not just for shareholders but for all its stakeholders. This broader approach to value creation is essential for sustainable financial achievement, shifting the narrative towards a more inclusive and responsible business practice (Freeman et al. 2008). Aligned with this framework, ESG initiatives are crucial for establishing and strengthening trust and positive relationships with a broad array of stakeholders. By strategically engaging in ESG practices, firms can reduce transaction costs and enhance operational efficiency. Once stakeholders are identified, the objective should shift towards enhancing value for all stakeholders, thereby also increasing shareholder value. This perspective implies that stakeholder and shareholder theories are complementary rather than opposing (Freeman et al, 2010). Analyzing ESG activities through the lens of Stakeholder Theory highlights the importance of integrating societal interests into business practices. ESG initiatives are vital for developing and sustaining trust-based stakeholder relationships, leading to operational benefits such as reduced transaction costs and improved efficiency (Hou, 2019). Freeman (2008) observed that companies that consider the needs and interests of all their stakeholders are generally better managed and more profitable than those that focus solely on shareholders.

Donaldson and Preston (1995) categorize stakeholder theory into three insightful interpretations. The descriptive approach, instrumental approach, and normative approach, each provide a unique viewpoint for analyzing stakeholder claims and their impact on firm dynamics. The authors outline the descriptive interpretation as a tool used to demonstrate specific corporate attributes or actions, often applied in analyses that delve into the nature of the firm or the strategic approaches of its management. Secondly, the instrumental interpretation aims to identify the link between effective stakeholder management and a company's financial performance, suggesting that managing

stakeholder interests effectively is crucial and beneficial as it directly contributes to a positive bottom line. This is particularly relevant for understanding ESG initiatives, which are deeply rooted in stakeholder engagement. Lastly, the normative perspective is utilized to evaluate corporate behavior from an ethical and philosophical standpoint, highlighting the fundamental importance of valuing and respecting stakeholders' interests. In analyzing ESG initiatives' impact on firm performance, the instrumental interpretation stands out for its ability to link stakeholder engagement directly to financial performance (Jones et al, 2018). Family-owned businesses, with their unique characteristics and often closer stakeholder relationships, might leverage these initiatives differently compared to non-family-owned firms. This difference could manifest in how ESG practices are implemented and their subsequent impact on firm performance, highlighting the nuanced ways in which stakeholder theory can be applied to understand the varied outcomes of ESG initiatives across different business types.

### **2.1.2 Agency Theory**

The agency theory is proposed by Jensen and Meckling (1976) and focuses on the relationships between principals (e.g., shareholders) and agents (e.g., company executives), where the principal delegates work to the agent. The theory addresses the inherent problems that arise due to the conflicting interests between these two parties and the costs associated with resolving these conflicts. The costs are agency costs incurred to ensure that the agent acts in the best interests of the principal, and mainly consist of monitoring expenses borne by principals to oversee agent action. Furthermore, there is often a divergence in the interests of the principal and the agent where conflicts can arise when agents might pursue strategies that deviate from the principals' preferences. This situation is exacerbated by information asymmetry, with agents typically possessing more comprehensive knowledge about the company's operations and financial status than the principals. This enables the agents to take actions that might not align with the best interests of the principals and are often difficult for principals to detect or prevent. To mitigate these conflicts, there can be an implementation of incentive structures to harmonize the agents' actions with the principals' goals. Jensen and Meckling further continue to discuss how different ownership structures can impact agency costs and the alignment of interests between principals and agents.

In a literature review focused on ESG in family-owned business structures, Stock et al. (2023) explores how the degree of control exerted by owning families, either through ownership stakes or direct management roles, influences the alignment of the firm's operations with the family's objectives. Their findings are grounded in agency theory and propose that a stronger grip by the owning family enables it to imprint its goals more effectively onto the company's strategic direction. The article continues to explain the dynamics of conflict within family-owned firms, particularly between the principal (mainly the owning family) and the agent (typically non-family managers). Highlighting the issue of information asymmetry, where the agent possesses more information than the principal thereby creating an imbalance. This disparity in information can lead to scenarios where the agent might prioritize personal interests over those of the principal, acting opportunistically rather than in the best interest of the owning family.

Another study by Chrisman, J. J., Chua, J. H., & Litz, R. A. (2004) delves into the agency costs associated with family and non-family firms, presenting a nuanced analysis that distinguishes between these two types of firms in terms of their agency costs and financial performance. The involvement of a family in a business can both increase and decrease financial performance due to agency costs. For non-family firm's agency costs mainly arise from the separation of ownership and management, whereas family firms experience agency costs that are influenced by factors unique to the family dynamic such as altruism and conflicts among family members. The research concludes that family firms may have a comparative advantage in managing agency costs due to their unique structure and relationships.

Whereas Stakeholder Theory might argue for the intrinsic value of ESG initiatives in building long-term value for all stakeholders, Agency Theory could critique these initiatives as potential avenues for managerial overreach, where managers pursue personal or social goals at the expense of shareholder wealth. This theoretical dichotomy highlights the varied managerial incentives and potential outcomes, particularly in family-owned firms where the overlap of family and business goals can either mitigate or exacerbate these agency costs, depending on how well the interests of family and non-family shareholders are aligned.

### **2.1.3 Socioemotional Wealth**

Gomez-Mejia et al. (2007) introduced the theory of socioemotional wealth, which stands as a fundamental concept in family business research, emphasizing the non-financial values and emotional characteristics that these firms value equally with their economic objectives. This concept underscores the unique blend of business and family objectives within family-owned enterprises, where preserving SEW often guides strategic decision-making and differentiates these entities from non-family businesses (Gomez-Mejia et al., 2007). SEW encompasses elements such as maintaining family control, enhancing family reputation, fostering a personal connection with the firm, autonomy, prestige, and building social capital (Gomez-Mejia et al., 2007). The concept of SEW in family businesses is often seen as an extension of the behavioral agency theory, highlighting family firms' commitment to preserving non-financial values like identity, legacy, and emotional bonds (Gomez-Mejia et al., 2007; Berrone et al., 2012). Contrary to non-family firms that prioritize financial gains, family-owned businesses often value SEW more, even at the expense of financial health. This commitment to prioritize the preservation of SEW highlights a risk-averse approach in strategic choices, supporting the unique essence of family-owned businesses in the corporate landscape.

## **2.2 Empirical literature and hypothesis development**

### **2.2.1 ESG and firm performance**

Research studying the relationship between ESG criteria and firm performance has shown varying results, including positive and negative correlations between ESG practices and firm performance, as well as instances where no significant relationship was identified. Orlitzki, Schmidt, and Rynes (2003) provide a comprehensive meta-analysis examining the relationship between corporate social/environmental performance and corporate financial performance. Their study, which aggregated 52 studies with a total of 33,878 observations, finds a positive association between corporate virtue in social and environmental responsibility and financial performance. However, the impact of environmental responsibility might be slightly less pronounced than the social responsibility and financial performance relationship but shown to be much more consistent across industries within the environmental and financial performance relationship. The study also shows that reputation appears to be an important mediator of the relationship. The authors' conclusions

align with the stakeholder perspective, which posits that financial performance is enhanced through ESG initiatives, even considering the costs associated with these efforts. A more recent meta-analysis by Friede, Busch, and Bassen (2015), studied 2200 empirical studies revealing that the majority identified a positive correlation between ESG practices and financial performance. However, 33.7% of these studies reported a neutral or negative impact, and 18% yielded mixed outcomes regarding the influence of ESG on financial performance.

Another research by Chen, Song, and Gao (2023) explored the influence of ESG criteria on the financial performance of companies listed worldwide over a decade (2011-2020). Utilizing data from 3332 listed companies and employing multiple regression analyses, the study finds a positive relationship between ESG performance and corporate financial performance. However, the influence of ESG rating on corporate performance proved to only be significant for large-scale companies, and therefore insignificant for small-scale companies.

In contradiction to previous studies mentioned, some studies have shown that a strong focus on ESG principles can negatively impact financial performance. The arguments behind this have been that high levels of social responsibility lead to increased operational costs which may economically disadvantage these companies compared to their peers who may not prioritize such responsibilities as highly (Brammer et al., 2006; Lee et al., 2009). Furthermore, Peng and Yang (2014) studied Taiwanese firms from 1996 to 2006 and observed a negative correlation between environmental performance and firm performance when there is a divergence between control and cash flow rights. They concluded that ownership concentration plays a critical role in monitoring, which helps explain the relationship between ESG performance and firm performance.

Azaare et al., (2023) investigated the influence of ESG performance on the financial outcomes of companies listed in Germany from 2011 to 2021, utilizing a dataset of 450 firms and 4,950 observations. The findings reveal a positive relationship between ESG scores and the financial performance of firms, indicating that higher ESG ratings are associated with increased company systematic risk which potentially enhances stock returns. However, the study does not find a direct predictive causality between ESG scores and accounting-based financial performance (ROA). This suggests that while better ESG performance might improve organizational financial outcomes, the



relationship is complex and nuanced, varying between different measures of financial performance.

Based on the theoretical and empirical literature review both negative and positive relationships between ESG and firm performance have been identified. The stakeholder theory predicts a positive relationship, positing that strong stakeholder relationships can lead to new business opportunities and attract sustainability-focused investors. Given Germany's leadership in sustainability, it is plausible that many stakeholders may view robust ESG performance favorably. Conversely, the costs associated with ESG investments could be high, potentially leading to a reallocation of resources that might not benefit the company financially, supporting the traditional view of a trade-off between environmental and operational performance. Our first hypothesis is therefore formulated as follows:

*H1a: There is a positive relationship between ESG performance and firm performance.*

*H1b: There is a negative relationship between ESG performance and firm performance.*

### **2.2.2 Family ownership and firm performance**

Anderson and Reeb (2003) conducted a comprehensive cross-sectional analysis, shedding light on the performance of family-owned firms in comparison to their non-family-owned counterparts. Utilizing profitability-based metrics such as ROA, they found that family firms outperform non-family counterparts significantly. Their findings suggest that in transparent and well-regulated markets, family ownership in publicly traded firms effectively mitigates agency problems without compromising decision-making efficiency. These findings align with the notion that family control has the potential to mitigate the traditional agency problem between owners and managers, as proposed by Fama and Jensen (1983). In a study conducted by W. Chu (2011), analyzing data from 786 public family firms in Taiwan spanning from 2002 to 2007, it was further revealed that family ownership correlates positively with firm performance. This relationship is particularly robust when family members hold key positions such as top managers, CEOs, chair members, or directors within the firms. However, when family members are not actively engaged in the management or control of the firm, this correlation weakens. These findings underscore the importance of active

family involvement in management and control for realizing the potential benefits of family ownership (W. Chu, 2011).

Cella (2009) found that family ownership significantly impacts firm performance. Analyzing data from 1,565 European firms across various sizes from 1993 to 2006, family firms consistently generated higher returns compared to non-family firms. These returns remained statistically and economically significant across different specifications and even after adjusting for industry average returns. Interestingly, the disparity in performance couldn't be entirely explained by existing financial models like the Fama and French factors model. Moreover, Cella discovered that the strength of minority shareholder protection in a country influences family firms' returns, with weaker protections correlating with higher returns for family-owned businesses. Additionally, the presence of institutional blockholders in the ownership structure adversely affected firms' returns during this period (Cella, 2009).

Martínez et al, (2007) further highlight the potential for family involvement in business management to enhance performance. Conversely, they also suggest that family ownership may have detrimental effects on business performance. Family businesses are often associated with characteristics such as conservatism, authoritarian governance, and the potential for minority shareholder interests to be compromised. Empirical evidence from numerous studies indicates that family members may exploit their positions to benefit personally at the expense of minority shareholders (Martínez et al, (2007). However, several studies support the view that family ownership reduces agency problems between managers and owners, as well as a deeper investment in the firm's success (Anderson and Reeb, 2003, W. Chu 2011). Based on these considerations, we formulate the hypotheses examining the influence of family ownership on firm performance as follows:

*H2a: There is a positive relationship between family ownership and firm performance.*

*H2b: There is a negative relationship between family ownership and firm performance.*

### **2.2.3 Family ownership moderating effect on the relationship between ESG and firm performance**

Espinosa, Maquieira & Arias (2023) delve into the relationship between ESG performance and the valuation of family firms, with particular emphasis on how financial constraints and agency problems moderate this relationship. The study examined 254 of the largest family-owned businesses globally from 2015 to 2021. It highlighted that overall ESG performance is positively correlated with firm value in family firms. Notably, it was observed that while environmental and social aspects of ESG positively impact firm value, governance did not show a significant effect. The research further introduced a nuanced perspective by examining the role of financial constraints and agency problems, which can dampen the positive impact of ESG on firm value. The analysis reveals that agency costs, more than financial constraints, significantly moderate the relationship between ESG and firm value. This suggests that while ESG initiatives can enhance firm value, their effectiveness can be substantially reduced by internal management issues and financial limitations. Furthermore, the paper enriches the discourse on family firm heterogeneity, indicating that family firms do not uniformly behave regarding ESG performance. (Espinosa, Maquieira & Arias 2023)

Moreover, Yeon et al. (2021) conducted an in-depth panel regression analysis across 25 years, examining 565 firm-year observations to explore the dynamics between ESG practices and firm performance, with an emphasis on the role of family involvement in the U.S. hospitality sector. Their research demonstrates that involving family members in key governance roles significantly enhances the impact of ESG activities on firm performance. This finding highlights the unique advantage that family-owned firms have in leveraging ESG initiatives to improve firm valuation, suggesting they may achieve a better return on ESG investments than non-family-owned companies. According to Hamberg et al. (2013), the founder's extensive knowledge of the firm grants them superior monitoring capabilities compared to other shareholders and managers. Additionally, their substantial ownership stake provides them with greater incentives to actively oversee and direct the firm's decisions and investments, all to augment its wealth. Thahira and Mita (2021) further discovered a positive correlation between ESG disclosures and firm value, indicating that transparency in ESG matters can enhance a company's valuation. However, the benefit from ESG disclosures is less significant in family firms than non-family firms. This

suggests that the unique characteristics of family ownership, such as potential conflicts and governance quality, may dilute the benefits of transparency.

Further, Rees and Rodionova (2015) conducted an extensive analysis, examining a broad international dataset spanning 23,902 firm-year observations from 2002 to 2012, encompassing 46 countries and 3,893 firms. Their study delved into the intricate dynamics between ESG and ownership structures, specifically closely held equity and family ownership. Their findings indicate a consistent negative association between both closely held equity and family ownership with ESG performance. Even after considering governance factors, the negative impact of family ownership persists. Notably, the influence of closely held equity weakens with governance controls, while family ownership remains influential. One striking observation is the distinct behavior of individual nations. France, Germany, and Sweden stand out as exceptions, exhibiting a positive correlation between family ownership and certain aspects of ESG performance, such as environmental responsibility. Remarkably, Germany emerges as unique among its peers, displaying a positive association between family ownership and governance, further highlighting the intricate nuances within each market (Rees and Rodionova 2015).

Drawing from the socioemotional wealth (SEW) theory and social-emotional goals, family firms exhibit a natural inclination towards embracing sustainable development, ESG activities, and non-economic goals. This inclination stems from both internal and external factors. Internally, family identification and emotional attachment foster an organizational culture that values trust among employees and a collective ethos (Gomez-Mejia et al., 2007). Externally, the drive to uphold social connections and reinforce family bonds compels family-owned enterprises to allocate resources toward cultivating relationships with important stakeholders (Rovelli et al., 2022). The commitment to preserving SEW wealth steers family enterprises to prioritize addressing the needs of diverse stakeholders and fostering community development. Consequently, the alignment with ESG criteria in family-owned firms is predominantly outward-oriented, aiming to satisfy the diverse interests of stakeholders and shareholders throughout the ownership chain (Rovelli et al., 2022). Based on these considerations, we propose the following hypotheses about the moderating impact of family-controlled firms on the relationship between ESG performance and firm performance:

*H3a: Family ownership positively moderates the relationship between ESG scores and firm performance*

*H3b: Family ownership negatively moderates the relationship between ESG scores and firm performance*

### **3. Methodology**

#### **3.1 Regression approach**

This study utilizes an unbalanced panel dataset to explore the relationship between ESG and ROA, with a particular focus on how family ownership structure moderates this relationship. Our analysis starts with a univariate approach to evaluate the distinctions between family and non-family firms. We test our first and second hypotheses with specific variables which are extensively discussed in section 3.2. For testing our third hypothesis, we introduce an interaction term to investigate the potential moderating effects of family ownership. Given that our study utilizes a panel dataset we start our multivariate analysis with pooled ordinary least squares (POLS) as a baseline method. We then extend our analysis to include a random effects model to tackle the challenges of unobserved heterogeneity and potential endogeneity issues. We further deepen our investigation into the drivers influencing the relationship between ESG performance and firm performance by analyzing the scores of individual ESG pillars. Additionally, we perform a robustness check using a propensity score-matched (PSM) sample. This chapter is dedicated to discussing and justifying the selection of variables and models, the decisions made during the analysis, and addressing any potential issues that arose during the study.

#### **3.2 Variable definition**

##### **3.2.1 Dependent Variable**

Firm performance is the dependent variable represented by return on assets (ROA). ROA is a crucial indicator of financial performance as it measures how profitably a firm uses its assets. It is calculated as follows:

*Equation 1: Calculation of ROA:*

$$ROA = \frac{\text{Net income}}{\text{Total assets}}$$

ROA is a metric for financial performance which is a variable used in several previous studies who has explored the relationship between ESG and firm performance, such as in the meta-analysis by Orlitzki, Schmidt, and Rynes (2003) as well as Chen, Song, and Gao (2023). ROA has also been qualified as the best predictor of firm performance (Yousaf & Dey, 2022). A higher ROA suggests better financial performance reflecting the effective and productive utilization of total assets. Furthermore, ROA is an accounting-based performance indicator that reflects a company's performance using balance sheet metrics. However, this makes the measure prone to manipulation, but firm actions impacting performance should be reflected in the ROA over time. Considering that our sample covers multiple years, we use ROA as the metric to evaluate firm performance.

### **3.2.2 Explanatory Variables**

#### **3.2.2.1 ESG**

The primary explanatory variable believed to influence firm performance is ESG, including its separate environmental, social, and governance pillars. ESG scores are designed to assess a firm's relative performance, commitment, and effectiveness in ESG practices based on the information supplied by the company. The scores are based on a weighted aggregate of various criteria categorized under each separate pillar such as emissions, human rights, and ESG strategy. The methodology involves a rank scoring system that ranges from 0 to 100, where the scores reflect a company's performance relative to its peers in the industry and are sensitive to sector-specific issues. This scoring system also accounts for any controversies the company may have been involved in which can impact the overall ESG score (Azaare et al., 2023). A higher score indicates better ESG performance, whereas a lower score suggests comparatively poorer performance. We analyze the individual scores for the environmental, social, and governance pillars to determine if one pillar more significantly explains financial performance than the others. The weighting of the environmental and social scores varies by industry, though the governance score maintains consistent weighting across all industries, making it a relative measure (Refinitiv, 2023).

### 3.2.2.2 Family Ownership

A family owner is an individual within the family circle or representing the family's business interests. Additionally, such an owner must possess sufficient voting rights to impact company decisions. Following the approach of Zeng (2021), we have constructed a dummy variable set to 1 when the largest shareholder is a family entity with over 10% of the voting rights, and set to 0 otherwise.

## **3.2.3 Control Variables**

### 3.2.3.1 Firm Controls

We have several control variables to represent firm characteristics that previous studies found had an impact. Following the study by El Ghouli (2016), we account for leverage, size, age, and market-to-book ratio. Firm age is a common control variable applied in studies regarding the effect of a firm's ownership structure and older firms tend to be more profitable. Consistent with prior research, this study employs the natural logarithm of the number of years since a firm's incorporation as the metric for determining firm age. Size is included because generally larger firms tend to be more profitable. In our analysis, we control for firm size by using the natural logarithm of total assets. We also control for MTB as it reflects the market's valuation of the firm, and we anticipate a positive correlation with ROA. MTB is logarithmized to increase normality. To control for leverage we use the debt-to-equity ratio as a proxy. It is essential to analyze the leverage of a firm, as Espinosa, Maquieira & Arias (2023) found that companies with high levels of debt have lower firm performance. Lastly, we develop a capex-ratio in similarity to Li et al., (2018), which serves as an indicator for never assets since never assets tend to be more sustainable. All variables used are winsorized at the 1st and 99th percentiles to minimize the effect of potential outliers.

### 3.2.3.2 Governance Controls

To explore the link between family ownership structure, ESG, and ROA, we incorporate governance-related control variables. We account for board size, acknowledging that larger boards are often associated with decreased firm performance due to inefficiencies, as noted by Yan, Hui & Xin (2021).

**Table 1** Variable Description

<b>Variables</b>	<b>Description</b>	<b>Source</b>
ROA	Dependent variable. Net income divided by total assets	EIKON Refinitiv
ESG	A combined measure of a company's environmental, social, and governance performance.	EIKON Refinitiv
Environmental Pillar	The environmental pillar of ESG.	EIKON Refinitiv
Social Pillar	The social pillar of ESG.	EIKON Refinitiv
Governance Pillar	The governmental pillar of ESG.	EIKON Refinitiv
Family ownership	Family ownership is represented by a dummy variable, equal to 1 if the largest owner is a family holding a stake exceeding 10%, and 0 otherwise.	EIKON Refinitiv, Annual reports
Firm age	The natural log value of the company's years since its establishment.	EIKON Refinitiv
Firm size	The natural log value of total assets in million EUR.	EIKON Refinitiv
Capex ratio	Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles.	EIKON Refinitiv
MTB	MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets.	EIKON Refinitiv
Board size	Total number of directors on the company's board	EIKON Refinitiv, Annual reports

Note: The table above provides a comprehensive overview of all the dependent, independent, and control variables that will be utilized in the regression models presented in the following subsection.



### 3.3 Estimation method

#### 3.3.1 POLS

A pooled OLS regression is conducted to include both time series and cross-sectional dimensions, but inadvertently ignores the underlying panel structure of the data. POLS also assumes constant average values and relationships unless specifically adjusted with dummy variables. Therefore, the use of dummy variables for year and industry is used to control their specific effects and allow the model's intercept to vary over time, accommodating variations in distributions across different periods. This approach not only increases the statistical power of the tests but also helps mitigate potential problems such as multicollinearity and omitted variable bias through appropriate model structuring. However, despite these adjustments, the POLS model might still produce biased results if it fails to account for unobserved heterogeneity, which could skew the dependent variable (Brooks, 2008). To test our three hypotheses, we perform a POLS regression analysis using the model outlined in Equations 2 and 3.

*Equation 2: Hypotheses 1 & 2*

$$(1) ROA_i = \beta_0 + \beta_1 ESG_i + \beta_2 Family\ Ownership_i + \beta_3 Firm\ Size_i \\ + \beta_4 Firm\ Age_i + \beta_5 Capex\ Ratio_i + \beta_6 Leverage_i \\ + \beta_7 MTB_i + \beta_8 Board\ Size_i + \gamma Industry\ control_i + \lambda Year\ control_t + \varepsilon_{i,t}$$

*Equation 3: Hypothesis 3*

$$(2) ROA_i = \beta_0 + \beta_1 ESG_i + \beta_2 Family\ Ownership_i + \beta_3 Family\ Ownership * ESG_i \\ + \beta_4 Firm\ Size_i + \beta_5 Firm\ Age_i + \beta_6 Capex\ Ratio_i + \beta_7 Leverage_i \\ + \beta_8 MTB_i + \beta_9 Board\ Size_i + \gamma Industry\ control_i + \lambda Year\ control_t + \varepsilon_{i,t}$$

### 3.3.2 Fixed and random effects

POLS is useful for its ease of implementation and in scenarios where unobserved heterogeneity is not a concern. However, since we suspect unobserved heterogeneity, we will implement fixed or random effects in our model. The Hausman test is a statistical procedure used to test the null hypothesis that a random effects (RE) model is appropriate against the alternative of a fixed effects (FE) model (Brooks, 2008). The results from the Hausman test indicate a p-value of 0 meaning we reject the null hypothesis and therefore that the fixed effects model is preferable to the random effects model (*Appendix 1*). However, the FE model primarily captures variation within entities over time, effectively excluding variables that are constant or exhibit little change across the periods being studied. This requires that the variables included must exhibit sufficient variation over time (Wooldridge, Wadud & Lye, 2016). When dealing with our explanatory variables like ESG score and family ownership that do not change much over time, the fixed effects model may lead to biased results. In the study of Rees and Rodionova (2015), the incorporation of firm fixed effects eliminates all significant relationships between the explanatory variables and the dependent variable. This is explained by the slow change in ESG performance and ownership. Our data exhibits similar patterns and therefore the FE model is not appropriate. Hence, the RE model will be used since it does not eliminate time-invariant characteristics. The random effects model operates under the assumption that the individual-specific effects are uncorrelated with the explanatory variables and allows for the inclusion of both time-varying and time-invariant variables, making it possible to estimate the effects of variables like ESG score and family ownership (Wooldridge Wadud & Lye, 2016). Given these considerations and the patterns observed in our data, we will perform a random effect model to test our hypotheses outlined in Equations 4 and 5.

Equation 4: Hypotheses 1 & 2

$$(3) ROA_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Family\ Ownership_{i,t} + \beta_3 Firm\ Size_{i,t} \\ + \beta_4 Firm\ Age_{i,t} + \beta_5 Capex\ Ratio_{i,t} + \beta_6 Leverage_{i,t} \\ + \beta_7 MTB_{i,t} + \beta_8 Board\ Size_{i,t} + \gamma Industry\ control_{i,t} + \lambda Year\ control_t + \varepsilon_{i,t}$$

Equation 5: Hypothesis 3

$$(4) ROA_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 Family\ Ownership_{i,t} + \beta_3 Family\ Ownership * ESG_{i,t} \\ + \beta_4 Firm\ Size_{i,t} + \beta_5 Firm\ Age_{i,t} + \beta_6 Capex\ Ratio_{i,t} + \beta_7 Leverage_{i,t} \\ + \beta_8 MTB_{i,t} + \beta_9 Board\ Size_{i,t} + \gamma Industry\ control_{i,t} + \lambda Year\ control_t + \varepsilon_{i,t}$$

### 3.3.3 Heteroskedasticity

Heteroskedasticity is a common issue in financial data analysis. To address this problem, we conduct a White's test for heteroskedasticity in the Pooled OLS. White's test for heteroskedasticity presented in *Appendix 2* provides very strong evidence to reject the null hypothesis of homoscedasticity, meaning there is heteroskedasticity present in the model. The White test's indication of heteroskedasticity suggests that the standard errors of the regression coefficients may not be reliable. This affects the validity of hypothesis tests and confidence intervals based on these standard errors. To address this issue, we use robust standard errors clustered at the firm level. The concept of clustering standard errors is crucial for achieving robust inference in econometric analysis and allows for arbitrary correlation and varying variances within each cluster. Although clustered standard errors tend to be larger, their conservative nature ensures more valid inferences in the presence of heteroscedasticity (Wooldridge, Wadud & Lye, 2016).

### 3.3.4 Propensity score matching

As highlighted by Stock et al. (2023), ownership structure may be influenced by self-selection, where families might choose to maintain ownership based on perceived control benefits and unique

ability to manage agency costs, as discussed by Chrisman, Chua & Litz (2004). We aim to investigate the definite impact of family ownership when it is concentrated. To assess this impact, we compare family-owned vs non-family firms to understand the "treatment" effect of family ownership. Following the approach by Rees and Rodionova (2015), our final robustness check included a propensity score matched (PSM) sample. This method, unlike traditional OLS, allows for a more nuanced interpretation of the effects of family ownership intervention. The PSM approach pairs a treatment group (firms with family ownership) with a control group (firms without family ownership) based on our observable characteristics; firm size, market-to-book ratio, and industry sector (Rees and Rodionova 2015). Using a logit regression model with replacement, this matching process permits multiple pairings between control units and treatment units (Caliendo & Kopeinig, 2008). It is crucial to ensure the balance between the treatment and control groups when matching with replacement to prevent biased outcomes (Wooldridge, Wadud & Lye 2016). This methodological rigor helps in closely aligning firms within the matched sample, facilitating a more accurate analysis of the effects of family ownership.

## 4. Data and sample description

### 4.1 Sample description

The sample for this study includes firms listed on the Frankfurt and Munich Stock Exchanges. Our sample was collected through Refinitiv Eikon. Using Refinitiv Eikon as our database is mainly based on the fact that Refinitiv has the most comprehensive data on ESG scores (ESG Analytics, 2023). The ratings of ESG from Refinitiv are widely used in previous literature which further motivates the choice of the database and increases the reliability of this study. Some previous studies using Refinitiv Eikon as their database for the collection of ESG scores are Azaare et al., (2023) and Chen, Song, and Gao (2023) The data for family ownership and firm age were also collected from Refinitiv, but we had to gather data for each company separately using Refinitiv's search function. The data that was missing from Refinitiv was extracted via the company's annual report. Regarding the time horizon, the data was collected from 2018 to 2023 which is motivated by the data availability. ESG data is more prominent in later years. The initial sample included 1268 firms with a total of 7608 firm-years and was grouped by industry using ICB codes. The largest drop of 982 firms and 5892 firm years were removed due to the lack of ESG Scores in Refinitiv Eikon resulting in 286 firms. Firms related to the financial industry were then excluded as supported by previous literature resulting in a total of 193 firms with 1159 firm years (Alshbili et al., 2020). See Table 2 for the distribution of firms by year and industry.

**Table 2** Distribution by year and industry

**Tabulation of the distribution by year and industry**

ICB Industry name	Year						Total
	2018	2019	2020	2021	2022	2023	
Basic Materials	15	15	16	16	17	18	97
Consumer Discretionary	40	42	43	44	44	44	257
Consumer Staples	6	7	7	7	7	7	41
Energy	5	6	7	7	7	7	39
Health Care	11	11	12	12	12	12	70
Industrials	49	51	51	52	52	51	306
Real Estate	12	12	12	12	12	12	72
Technology	30	32	32	33	33	35	195
Telecommunications	8	8	8	8	8	7	47
Utilities	5	6	6	6	6	6	35
Total	181	190	194	197	198	199	1159

### 4.3 Summary statistics

The summary statistics presented in Table 3 offer a comprehensive overview of various metrics used in the study. The study examines the four different under groups presented in the table: firm performance and ESG performance, along with several moderating and control variables. When looking at the dependent variable, firm performance which is proxied by ROA, it can be concluded that the average ROA is 0.03 with a median of 0.04. These measures indicate moderate profitability but with a negative skewness which is confirmed by the range of ROA from -0.23 to 0.22. This also suggests a significant variability among the firms. Some firms are underperforming or potentially operating at a loss, as indicated by negative ROA values, while others are generating positive financial outcomes from their assets. The mean ESG score of 50.19, with a standard deviation of 19.92, highlights a broad spectrum of ESG compliance among the firms. The scores range from as low as 1.2 to as high as 93.1 which underscores a significant disparity in commitment to ESG practices. This variance might reflect different strategic priorities, industries, or operational scopes among the firms. Compared to a study by Chen, Song, and Gao (2023), their average of 42.6 is lower. This can be explained by their significantly larger sample size consisting of 24,076 observations collected from companies worldwide over a decade (2011-2020). With 34% of firms showing significant family ownership (defined as owning more than 10% of voting rights), there is a notable influence of family stakeholders in the corporate governance of these firms. However, the percentage of family-owned companies is lower than expected and might skew the understanding of the impact of family ownership. Regarding the control variables, the average MTB ratio is 0.58, indicating that the firms are typically valued below their book values. This could suggest market undervaluation or conservative asset valuation practices. The significant average assets (log value of 21.29) underscore the substantial scale of operations with assets ranging widely, which indicates a mix of small and large firms in the study. An average capex ratio of 0.82 demonstrates substantial reinvestment relative to revenue, suggesting that firms are actively investing in their operational capacity and future growth. The leverage ratio averages 0.9 but varies extensively from 0 to 6.71 which highlights different strategies in capital structuring and financial risk management across the sample. With an average board size of 9.81 and a range from 2 to 34, the firms exhibit a variety of governance structures. This proposes that the distribution provides adequate variability for our regression models.

**Table 3** Summary statistics**Summary statistics**

	Mean	Median	SD	Min	Max	N
<i>Firm performance:</i>						
ROA	.03	.04	0.07	-.23	.22	1159
<i>ESG performance:</i>						
ESG score	50.19	50.34	19.92	1.2	93.1	1159
Environmental Pillar	46.44	45.91	26.14	0	97.18	1159
Social Pillar	57.62	59.46	23.65	.83	97.52	1159
Governance Pillar	50.11	50.26	24.02	1.17	97.32	1159
<i>Moderating variable:</i>						
Family ownership	.34	0	0.47	0	1	1159
<i>Control variables:</i>						
MTB	.58	.59	1.08	-7.08	3.03	1159
Firm age	3.88	3.76	0.86	1.61	5.46	1159
Firm size	21.29	21.07	1.96	18.07	26.93	1159
Capex ratio	.82	.45	3.12	-11.19	18.64	1159
Leverage	.9	.58	1.09	0	6.71	1159
Board size	9.81	8	5.68	2	34	1159

Note: The table above presents the summary statistics for all the variables used in the study. ROA is a measure of firm performance and is calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar, and governance pillar. Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1st and 99th percentiles. Board size refers to the number of directors on the company board.

#### 4.4 Correlation Matrix

The correlation matrix provided in Table 4 offers a detailed examination of the relationships between various variables that are central to the study. This matrix is crucial for understanding the dynamics between ROA, which serves as the primary measure of firm performance, and a variety of other factors including ESG scores and firm structural characteristics. The overall ESG score shows a modest positive correlation with ROA at 0.040, indicating a slight positive relationship between firm performance and broader ESG practices. However, this relationship is not significant. When breaking down the ESG score into its components, the social pillar is the only one demonstrating a significant, although weak, relationship with ROA, showing a slightly stronger correlation at 0.049. This being an indication that social practices may have a more discernible impact on financial outcomes. Regarding firm size and firm age, both variables are positively correlated with ROA (0.043 and 0.039, respectively). However, only firm size shows weak significance. This suggests that larger and older firms typically exhibit better financial performance. Conversely, Leverage and MTB show a non-significant negative correlation with ROA. Board size also shows a non-significant relationship with ROA, although this correlation is slightly positive. Interestingly, the Capex ratio has a small positive correlation with ROA at 0.045 at a 10% level, pointing to potential benefits from investments in an operational capacity. Family Ownership has a 5% significant influence on ROA, as indicated by a nearly negligible correlation of 0.059, suggesting that familial control over firms does inherently affect their profitability. We are also interested in the interaction of ESG and family ownership which shows a negatively correlated relationship, but this relationship is not significant. The strongest correlations observed are the ones between the different ESG pillars, ranging from 0.544 to 0.860. These high inter-correlations could introduce multicollinearity issues in regression analyses, potentially inflating variances of the estimated coefficients. However, this is not a concern since each pillar is analyzed in separate regressions.



**Table 4** Pearson's Correlation Matrix of variables**Pairwise correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1) ROA	1.000											
2) ESG score	0.040	1.000										
3) Environmental pillar	0.013	0.800***	1.000									
4) Social pillar	0.049*	0.860***	0.740***	1.000								
5) Governance pillar	0.036	0.765***	0.544***	0.601***	1.000							
6) Family ownership	0.059**	-0.021	0.006	-0.003	-0.039	1.000						
7) Firm size	0.043*	0.548***	0.623***	0.619***	0.497***	-0.032	1.000					
8) Firm age	0.039	0.115***	0.179***	0.150***	0.006	0.141***	0.039	1.000				
9) Capex ratio	0.045*	0.025	0.025	0.031	0.015	-0.018	0.020	0.101***	1.000			
10) Leverage	-0.032	0.074**	0.079***	0.081***	0.084***	-0.058**	0.204***	-0.098***	0.022	1.000		
11) MTB	-0.019	0.028	-0.068**	0.004	0.051*	0.145***	-0.191***	-0.097***	-0.032	0.005	1.000	
12) Board size	0.027	0.450***	0.576***	0.505***	0.350***	0.022	0.700***	0.174***	0.083***	0.192***	-0.145***	1.000

Note: The table above presents Pearson's correlation matrix of variables. ROA serves as a measure of firm performance and is calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately as the environmental pillar, social pillar, and governance pillar. Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1st and 99th percentiles. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Board size refers to the number of directors on the company's board. Standard errors are in parentheses \*\*\* p<.01, \*\* p<.05, \* p<.1.

## 4.5 Univariate analysis

In the univariate analysis presented, the data is segregated based on ownership type, distinguishing between family-owned and non-family firms, to explore significant differences in various metrics related to firm performance and governance. The analysis reveals that family firms demonstrate a higher ROA than non-family firms, with a mean of 0.036 compared to 0.027, showing a statistically significant difference with a p-value of 0.023. This means that family firms, possibly due to concentrated control and a longer-term strategic focus, achieve higher profitability from their assets. Regarding ESG performance, the analysis indicates no significant differences in overall ESG scores between family and non-family firms, with family firms scoring slightly lower on average. The Environmental and Social pillars show virtually identical performance across both groups which suggests a consistent approach to these aspects irrespective of ownership. However, a notable difference emerges in the Governance pillar, where family firms score lower than non-family firms, although this difference does not reach statistical significance. When examining firm characteristics, no significant difference is observed in the size of the firms, indicating that the scale of operations is not necessarily dependent on whether a firm is family-owned. Interestingly, family firms are found to be significantly older on average than non-family firms, which could imply a greater legacy and sustainability in family-run businesses, supported by the 1% significant p-value. The capital expenditure ratio shows no statistically significant differences indicating similar investment behaviors between the two groups. Regarding the leverage metrics, non-family firms tend to use more debt financing compared to family-owned firms which is supported by the 5% significant p-value. There is also a notable difference in the MTB, with family firms exhibiting a higher ratio which indicates a stronger market valuation relative to their book value. Board size slightly favors family firms, which tend to have larger boards, though this difference is not statistically significant. It hints at a possible preference within family firms for larger governance bodies but does not definitively differentiate them from non-family firms in terms of board governance structure.

**Table 5** T-Test for comparing means

	Non- family ownership		Family ownership		p-value
	N	Mean	N	Mean	
ROA	774	0.027	385	0.036	0.023**
ESG score	774	50.503	385	49.606	0.469
E pillar	774	46.306	385	46.650	0.834
S pillar	774	57.680	385	57.520	0.915
G pillar	774	50.763	385	48.783	0.185
Firm size	774	21.337	385	21.204	0.211
Firm age	774	3.797	385	4.053	0***
Capex ratio	774	0.862	385	0.746	0.496
Leverage	774	0.947	385	0.813	0.024**
MTB	774	0.470	385	0.801	0***
Board size	774	9.718	385	9.989	0.444

Note: The table above presents the univariate results, specifically t-tests comparing the means of variables between non-family firms (first column) and family-controlled firms (second column). Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. ROA serves as a measure of firm performance and is calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar and governance pillar. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1st and 99th percentiles. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Board size refers to the number of directors on the company's board.

An additional univariate analysis segregated based on ESG scores to compare firms with low and high ESG scores is presented below. Firms with low ESG scores have a slightly higher ROA, but this difference is not statistically significant, indicating that ESG performance may not directly impact asset profitability. There is a consistent significant difference across each separate pillar. High ESG score firms also tend to be larger and slightly older. Family ownership, capital expenditure ratio, leverage, and market-to-book ratio show no significant differences between the groups. However, board size significantly differs, with high ESG score firms having larger boards which suggests a preference for larger governance structures to enhance oversight.

**Table 6** T-Test for comparing means

	Low ESG score		High ESG score		p-value
	N	Mean	N	Mean	
ROA	388	0.033	771	0.028	0.188
E pillar	388	29.198	771	63.375	0***
S pillar	388	41.059	771	73.941	0***
G pillar	388	34.315	771	65.653	0***
Family owned	388	0.362	771	0.329	0.188
Firm size	388	20.830	771	21.567	0***
Firm age	388	3.835	771	3.914	0.081*
Capex ratio	388	0.828	771	0.819	0.961
Leverage	388	0.880	771	0.915	0.548
MTB	388	0.569	771	0.588	0.747
Board size	388	7.580	771	12.002	0***

Note: The table above presents the univariate results, specifically t-tests comparing the means of variables between low ESG score (first column) and high ESG score (second column). The first column, low ESG, is lower than the mean ESG score, while high ESG is higher. ROA serves as a measure of firm performance and is calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar, and governance pillar. Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1st and 99th percentiles. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Board size refers to the number of directors on the company's board.

## 5. Empirical results

### 5.1 Pooled OLS

The regression results in Table 7 using pooled ordinary least squares (POLS) to investigate the relationship between firm performance (ROA) and different variables. The models incorporate controls for industry and year effects and utilize robust standard errors that are clustered by firms to account for within-firm correlation in the errors. In the analysis, the ESG score is the primary explanatory variable across the three columns. Column 1 illustrates a weakly significant negative correlation between ESG and ROA. A 1-point increase in ESG score corresponds to a 0.021 percentage decrease in ROA. This effect, while statistically significant, suggests a very minimal practical impact on firm performance. This relationship is consistent for all three models. Columns 2 and 3 introduce family ownership into the analysis. In Column 3, when ESG score interacts with family ownership, there is a positive effect noted (coefficient of 0.000399), implying that the negative impact of ESG on ROA is less pronounced in family-owned firms. Family ownership changes from a weakly positive significant relationship in column 2 to a negative non-significant relationship in column 3. Regarding the control variables, both firm size and firm age consistently show a strong and positive effect on ROA across all models, which indicates that larger and older firms generally achieve higher returns. However, the relationship for firm age is at a weaker significant level. The capex ratio also positively influences ROA at a 5% level for the three models, signifying that firms investing heavily in capital expenditures tend to perform better financially. Conversely, leverage shows a consistent negative association with ROA across all models at a 1% significant level. This implies that higher levels of debt relative to equity are detrimental to firm performance. The market-to-book ratio is positively correlated with ROA at a 1% significant level, indicating that firms with higher market valuations relative to their book values are generally more profitable. Board size has an insignificant impact on ROA which means that the number of directors does not meaningfully influence firm performance in the context of these models.

**Table 7** Regression Pooled OLS**Regression results**

	(1)	(2)	(3)
Dependent variable: ROA	Pols	Pols	Pols
ESG score	-0.000207*	-0.000194 *	-0.000237*
	(0.000139)	(0.000137)	(0.000151)
Family ownership		0.003996*	-0.000058
		(0.002751)	(0.013614)
ESG * Family ownership			0.000399*
			(0.000243)
Firm size	0.00478***	0.004524**	0.004588**
	(0.002229)	(0.002259)	(0.002237)
Firm age	0.006868*	0.006243*	0.006167*
	(0.003641)	(0.003620)	(0.003598)
Capex ratio	0.000804**	0.000824**	0.000844**
	(0.000358)	(0.000363)	(0.000369)
Leverage	-0.014556***	-0.014311***	-0.014246***
	(0.002491)	(0.002524)	(0.002539)
MTB	0.015390***	0.014880***	0.014917***
	(0.004113)	(0.004147)	(0.004145)
Board size	-0.000418	-0.000416	-0.000447
	(0.000739)	(0.000734)	(0.000723)
_cons	-0.069667	-0.065128	-0.063645
	(0.043934)	(0.044127)	(0.045044)
Year effect	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes
Observations	1159	1159	1159
R-squared	0.185840	0.188109	0.188504
Standard errors	Clustered	Clustered	Clustered
Method	POLS	POLS	POLS

Note: The table above presents the results of multivariate regressions conducted using POLS to examine the relationship between ESG performance and firm performance, while also considering the moderating effects of concentrated ownership and family ownership. ROA serves as a measure of firm performance and is calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar, and governance pillar. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99<sup>th</sup> percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1<sup>st</sup> and the 99<sup>th</sup> percentiles. Board size refers to the number of directors on the company's board. *Standard errors are in parentheses* \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ .



## 5.2 Random effects

The regression results presented in Table 8 utilize the Random Effects (RE) model, analyzing the interplay between ESG performance, family ownership, and firm performance (ROA). This model accounts for unobserved heterogeneity across firms and helps to address potential issues of endogeneity. The models are robust, including controls for the year and industry effects, and utilize standard errors that are clustered at the firm level for greater precision. In the results, the ESG score consistently shows a significant negative relationship with ROA across all models. Moving from weak significance in the POLS regression to clear statistical significance at the 5% level in columns 1 and 2, and at the 1% level for column 3. This signifies a robust finding that higher ESG scores slightly reduce firm performance, though the effect size remains small. The interaction between ESG score and family ownership is shown in column 3 with a positive coefficient of 0.000386 at a 10% significant level. This suggests that the negative impact of ESG on ROA is less pronounced in family-owned firms which is indicative of a mitigating effect. However, the effect of family ownership alone on ROA shows variability: it is non-significant with a positive coefficient of 0.003326 in column 2 but turns to a significant negative impact with a coefficient of -0.014742 in column 3. This variation is particularly noteworthy when compared to the POLS results, even though the sign of the coefficients is the same the significance of family ownership's impact differed: in POLS, it was significant in column 2 and not significant in column 3. Moreover, comparing the control variables with the POLS regression shows an overall consistency but with higher statistically significant levels for firm size, firm age, and capex ratio.



**Table 8** Regression random effects**RE regression**

Dependent variable: ROA

	(1) RE	(2) RE	(3) RE
ESG score	-0.000298** (0.000143)	-0.000295** (0.000142)	-0.000430*** (0.000166)
Family ownership		0.003326 (0.006438)	-0.014742* (0.013602)
ESG * Family own			0.000386* (0.000243)
Firm size	0.008418*** (0.002429)	0.008364*** (0.002446)	0.008651*** (0.002429)
Firm age	0.008786** (0.003992)	0.008472** (0.004103)	0.008209** (0.004063)
Capex ratio	0.000758** (0.000301)	0.000761** (0.000302)	0.000803*** (0.000309)
Leverage	-0.019433*** (0.003247)	-0.019384*** (0.003260)	-0.019219*** (0.003276)
MTB	0.014823*** (0.005115)	0.014675*** (0.005162)	0.014613*** (0.005171)
Board size	-0.001094 (0.000833)	-0.001090 (0.000834)	-0.001199 (0.000820)
_cons	-0.159927*** (0.048930)	-0.158089*** (0.049565)	-0.155510*** (0.050639)
Industry effect	Yes	Yes	Yes
Year effect	Yes	Yes	Yes
Observations	1159	1159	1159
Pseudo R <sup>2</sup>	.z	.z	.z
Standard errors	Clustered	Clustered	Clustered
Method	RE	RE	RE

Note: The table above displays the outcomes of multivariate regressions conducted using the RE (Random Effects) methodology. It aims to explore the connection between ESG performance and firm performance, alongside examining the moderating impact of concentrated ownership and family ownership. ROA is the dependent variable and is a measure of firm performance calculated as net income divided by total assets. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar, and governance pillar. MTB represents the market-to-book ratio, calculated by dividing the market value of assets by the book value of assets. Age refers to the natural logarithm of the company's years since its establishment. Firm size indicates the natural logarithm of total assets in million EUR. Capex-ratio is determined by dividing capital expenditures by total revenue, with adjustments made for outliers at the 1st and 99th percentiles. Leverage is expressed as the ratio of total debt to total equity, with adjustments for outliers at the 1st and 99th percentiles. Board size refers to the number of directors on the company's board. All regressions incorporate robust standard errors clustered by firms and firm-level clustered robust standard errors are reported in parentheses. In Column 1, the results depict the association between ESG and ROA. Columns 2 illustrate the relationship between concentrated ownership and ROA, along with its moderating influence on the ESG-ROA relationship. Column 3 presents findings regarding family ownership's impact on ROA and its moderating effect on the ROA-ESG relationship. Standard errors are in parentheses \*\*\* p<.01, \*\* p<.05, \* p<.1.

### 5.3 Individual pillar score

The purpose of the regression analysis in Table 9 is to examine the correlation between individual ESG pillar scores and firm performance, while also assessing how family ownership influences the relationship between each ESG pillar and ROA. The environmental pillar score exhibits a significant negative relationship with ROA, reflected in a coefficient of  $-0.000367$  at the 5% level. In practical terms, this indicates that a one-point increase in the environmental pillar score is associated with a 0.0367 percentage-point decrease in ROA, holding all other factors constant. Further, the social pillar score exhibits a significant negative relationship with ROA, with a coefficient of  $-0.002253$  at the 10% level. Lastly, the governance pillar score shows a negative and significant relationship with ROA, with a coefficient of  $-0.001145$  at the 10% level. Moreover, different results emerge when the pillar scores interact with family ownership. The interaction term between the environmental and social pillars and family ownership yielded non-significant results, implying no significant effect. However, the interaction term between the governance pillar and family ownership in column 6 exhibited a positive and statistically significant relationship of  $(0.000220)$  at the 10% level. This suggests that family ownership acts as a mitigating factor, counterbalancing the negative influence of the governance pillar on ROA.

**Table 9** Individual pillar score random effects regression

RE regression	(1)	(2)	(3)	(4)	(5)	(6)
ROA	RE	RE	RE	RE	RE	RE
Environmental Pillar	-0.000367** (0.000124)			-0.000435** (0.000139)		
Social Pillar		-0.000253* (0.000153)			-0.000319* (0.000177)	
Governance Pillar			-0.000145* (0.000122)			-0.000215* (0.000146)
E*Familyown				0.000217 (0.000195)		
S*Familyown					0.000213 (0.000232)	
G*Familyown						0.000220* (0.000201)
Family ownership				-0.005586 (0.010715)	-0.008009 (0.01572)	-0.006891 (0.011818)
Firm size	0.009400*** (0.002656)	0.008586*** (0.002396)	0.007762*** (0.002532)	0.009394*** (0.002665)	0.008701*** (0.002399)	0.007765*** (0.002560)
Firm age	0.009661** (0.003933)	0.009008** (0.004010)	0.008141** (0.003973)	0.009124** (0.004062)	0.008579** (0.004099)	0.007617* (0.004044)
Capex ratio	0.000743** (0.000298)	0.000769** (0.000299)	0.000756** (0.000300)	0.000758** (0.000302)	0.000794*** (0.000303)	0.000781** (0.000305)
Leverage	-0.019557*** (0.003199)	-0.019435*** (0.003216)	-0.019356*** (0.003194)	-0.019456*** (0.003217)	-0.019247*** (0.003245)	-0.019286*** (0.003215)
MTB	0.014871*** (0.005076)	0.014758*** (0.005135)	0.014635*** (0.005047)	0.014646*** (0.005121)	0.014526*** (0.005185)	0.014612*** (0.005153)
Board size	-0.000852 (0.000814)	-0.001099 (0.000840)	-0.001217 (0.000818)	-0.000904 (0.000810)	-0.001182 (0.000826)	-0.001274* (0.000811)
_cons	-0.184862*** (0.052590)	-0.165469*** (0.048548)	-0.149030*** (0.049784)	-0.178724*** (0.054131)	-0.162579*** (0.049818)	-0.142898*** (0.051549)
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1159	1159	1159	1159	1159	1159
Pseudo R <sup>2</sup>	.z	.z	.z	.z	.z	.z

Note: The table above presents the outcomes of multivariate regressions conducted using RE (Random Effects) methodology, aiming to explore the relationship between ESG pillars and firm performance, while also investigating the moderating impact of family ownership on each pillar's association with ROA. ROA is calculated by dividing net income by total assets and used as the dependent variable in all regressions. ESG score serves as a combined measure of a company's environmental, social, and governance performance. The weighted score is then served separately, as the environmental pillar, social pillar, and governance pillar. Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. Robust standard errors clustered by firms are utilized in all regressions and firm-level clustered robust standard errors are reported in parentheses. Columns 1-3 present the results for each pillar's relationship with ROA, while Columns 4-6 display the moderating effect of family ownership on these relationships. Standard errors are in parentheses \*\*\* p<.01, \*\* p<.05, \* p<.1.

#### **5.4 Propensity score matching**

To ensure the reliability of the findings on family ownership, additional investigation was undertaken to ensure the robustness. The propensity score matched sample methodology was adopted to mitigate potential biases stemming from self-selection ownership. By matching firms based on firm size, market-to-book ratio, and industry sector the sample is balanced. Table 10 presents the findings using the propensity score matched sample, where the sample size is reduced to 632 observations due to limited overlap between groups. Model 1 shows that family-owned firms have a positive but statistically insignificant effect on ROA, with a coefficient of 0.007163. The negative coefficient for the ESG score (-0.000351) is significant at the 10% level, implying that higher ESG scores are associated with lower profitability (ROA). This relationship remains consistent for model 2 but at a higher significant level. Model 2 also explores the moderating role of family ownership on the relationship between ESG scores and ROA. The interaction term between ESG and family ownership is positive and significant at the 10% level (0.000369), indicating that family ownership mitigates the adverse impact of ESG scores on ROA. This effect remains significant and positive even as the coefficient for ESG scores becomes more negative. These findings confirm the robustness of our previous results, underscoring that family ownership moderates the relationship between ESG scores and ROA.

**Table 10** Propensity score regression**PSM regression**

Dependent Variable:

	(1) Model_1	(2) Model_2
ROA		
ESG score	-0.000351* (0.000189)	-0.000557** (0.000242)
Family ownership	0.007163 (0.007598)	-0.011261 (0.016636)
ESG * Family owned		0.000369* (0.000309)
Total assets	0.004406 (0.002882)	0.004676 (0.002870)
Firm age	0.011498** (0.005233)	0.011228** (0.005167)
Capex ratio	0.001003* (0.000531)	0.001095* (0.000564)
Leverage	-0.014489*** (0.003509)	-0.014212*** (0.003551)
MTB	0.025444*** (0.004606)	0.025515*** (0.004629)
Board size	0.000202 (0.000900)	0.000115 (0.000886)
_cons	-0.125098** (0.059383)	-0.116673* (0.061967)
Year effect	Yes	Yes
Industry effect	Yes	Yes
Observations	673	673
R-squared	0.215529	0.218608
Standard errors	Clustered	Clustered

Note: The table above presents the findings from multivariate regressions conducted through a propensity score-matched sample using RE (Random Effects) methodology to ensure the robustness of the results. ROA is considered as the dependent variable, calculated as net income divided by total assets. Family ownership serves as a dummy variable set to 1 when the largest owner holds over 10% of voting rights and is a family, 0 otherwise. Firm-level clustered robust standard errors are reported in parentheses. The results regarding the relationship between family ownership and ROA are illustrated in Column 1. Column 2 shows how family ownership moderates the relationship between ROA and ESG. Standard errors are in parentheses \*\*\*p<.01, \*\* p<.05, \* p<.1

## 6. Analysis

### 6.1 ESG & Firm performance

This paper has focused on ESG's impact on financial performance, measured by ROA. POLS and RE models (Tables 7 and 8) have consistently demonstrated a significant but relatively minor negative relationship between ESG and ROA. The random effect model better accounts for unobserved heterogeneity and shows a higher significant level. This is in line with the study of Brammer et al., (2006) & Lee et al., (2009) who show that a strong focus on ESG principles can negatively impact financial performance. Since German firms are in the lead of sustainability it can be argued that high levels of social responsibility can lead to increased operational costs and therefore impact the firm's financial performance negatively. The costs or strategic shifts required to improve ESG metrics may initially outweigh their financial benefits.

In examining the individual pillar scores of ESG separately in Table 9, we observe varied impacts on ROA. The environmental pillar demonstrates a strongly significant negative relationship with ROA at the 5% level. This finding indicates that environmental performance is the primary factor influencing the overall ESG impact on ROA. Thus, if a company's ESG score is primarily driven by its environmental initiatives, a negative relationship with ROA could be anticipated. The governance and social pillars also show negative relationships but with lesser significance at the 10% level. Notably, the observed negative impact of the environmental pillar on ROA indicates that investments in environmental activities, such as green technologies and stricter regulations, might lead to diminished financial performance. These findings contrast with Espinosa, Maquieira & Arias (2023) who find a positive relationship between each pillar and firm performance. However, they only find a significant relationship for the environmental and social pillar at the 1% level.

The propensity score matching regression reinforces the negative relationship between ESG and ROA, with statistical significance observed in both models. This method creates a balanced comparison among matched firms and supports that current ESG practices are associated with lower immediate returns on assets. This suggests that transitioning to and investing in comprehensive ESG frameworks could involve significant upfront costs. The consistent negative

relationship between ESG and firm performance contrasts with existing research which generally supports that enhanced ESG practices are associated with stronger financial performance (Orlitzki, Schmidt, and Rynes. 2003; Chen, Song, and Gao, 2023). However, these studies have examined ESG performance over a longer time horizon, thereby capturing long-term benefits, which stands in contrast to our study that provides a short-term analysis.

Moreover, these results challenge stakeholder theory (Freeman, 1984), which argues that ESG activities enhance relationships with stakeholders, potentially improving reputation and increasing bargaining power. Instead, the observed negative relationship proposes a possibility that firms in our sample might be encountering scenarios where ESG investments detract from value, implying that stakeholder pressures could be pushing firms to prioritize ESG initiatives at the expense of financial performance. Potential reasons for this discrepancy include the specific context of German firms, where stringent regulations and high expectations for ESG performance can lead to increased operational costs, thereby reducing overall profitability. This interpretation aligns with the findings of Brammer et al., (2006) & Lee et al., (2009), who noted that improvements in ESG may come at the cost of shareholders' wealth. This could also be explained by Agency Theory, where managers may pursue socially or environmentally favorable projects that enhance their personal reputations or align with their values, even if these projects do not maximize shareholder value. Thus, supporting the traditional view of a trade-off between environmental and operational performance.

Our hypothesis posits that there is a relationship between ESG performance and firm performance. Based on our regressions (POLS, RE, PSM) we support the hypothesis of *H1b* since the data indicates that a significant negative relationship exists. The hypothesis is supported as the analysis confirms a systematic relationship between ESG scores and ROA.

## **6.2 Family ownership**

Investigating the relationship between family ownership and firm performance through various regression analyses provides nuanced and mixed results. The POLS, RE, and PSM models all showed a positive coefficient at first. However, the coefficient turned negative when the interaction

term was introduced, with the significance of these results varying across the models. Initially, The pooled OLS models reveal a positive significant relationship between family ownership and ROA. This resonates with findings from Anderson and Reeb (2003), who observed that family firms often exceed their non-family counterparts in well-regulated markets. However, this relationship becomes negative but insignificant when the interaction term is added in Model 3. Similarly, the random effect model 3 presents a negative relationship between family ownership and ROA, but now at a statistically significant level. These results imply family-owned firms tend to perform worse than non-family-owned firms in profitability. This observation is consistent with concerns raised by Martínez et al. (2007), who noted that family members in control might exploit their positions, potentially to the detriment of minority shareholders. Such behavior could stem from prioritizing familial interests or legacy preservation over immediate financial returns, underscoring the complexity of governance in family-owned enterprises where personal and professional boundaries are often intertwined. Stakeholder theory supports this perspective by emphasizing that prioritizing the interests of a wide array of stakeholders can lead to complex trade-offs. In family firms, these trade-offs often involve balancing the preservation of socioemotional wealth with pursuing financial objectives. This dynamic can result in decisions that favor long-term sustainability and strong stakeholder relationships over immediate profitability, which further explains the observed underperformance in profitability.

The agency theory further provides valuable insights into the mixed evidence observed in our study. While family firms may benefit from reduced agency costs due to the alignment of interests between family owners and managers, they also face unique challenges. Internal conflicts, such as disagreements over strategic direction or resource allocation among family members, can increase costs and complicate decision-making. This dual dynamic of reduced agency costs and increased internal conflicts may explain the varied impact of family ownership on firm performance.

Additionally, when evaluating the relationship between family ownership and firm performance, it's important to consider the limitations of our dataset. Given that Germany is the second-largest contributor to the 2023 EY and University of St. Gallen Family Business Index, we expected a higher percentage of family firms in our study. The lack of family-owned firms in our sample could result in an incomplete understanding of the true dynamics and performance of family



businesses, potentially skewing the study's findings and limiting the generalizability of the results. Further, the sample size in the propensity score regression was reduced due to limited overlap between the treatment and control groups, potentially affecting the statistical significance of the results for family ownership and firm performance. Moreover, the differences in our models suggest that the initial positive effect of family ownership on ROA is not robust when considering the interaction with another variable. This indicates that the relationship may be more complex than initially understood, aligning with the mixed findings. Therefore, we cannot confirm either of our hypotheses regarding the impact of family ownership on firm performance. However, it can be concluded that while a relationship does exist between family ownership and firm performance, its nature is not consistently positive or negative but depends significantly on external factors and the specific characteristics of the family firm.

### **6.3 Family ownership moderating effect**

In analyzing the moderating effect of family ownership on the relationship between ESG factors and firm performance, a comprehensive assessment was conducted using various regression models. POLS (Table 7), the random effects regression analysis (Table 8), and the propensity score regression (Table 10) presents positive and significant results for the interaction term between ESG scores and family ownership. This consistent finding across different regression models implies that family ownership has the potential to reverse the negative impact of ESG scores, effectively turning it into a positive effect. These results indicate that family-owned firms may be better equipped to leverage ESG initiatives for improved financial outcomes, as their unique governance structures and long-term orientations enable them to mitigate the adverse effects of ESG scores on ROA.

Espinosa, Maquieira, and Arias (2023) provide relevant insights into this relationship. Their research proposes that while ESG initiatives generally enhance firm value, the impact within family-owned firms is highly contingent on the effective management of internal dynamics, such as agency costs and financial constraints. Specifically, they found that agency costs more significantly moderate the relationship between ESG and firm value than financial constraints. This aligns with our findings, implying that the positive moderating effect of family ownership on ESG and firm performance is contingent upon effectively managing internal governance issues. If

family-owned firms can mitigate these agency costs, they are more likely to harness the benefits of ESG initiatives fully.

Further supporting our findings, Yeon et al. (2021) demonstrated that the involvement of family members in key governance roles significantly enhances the effectiveness of ESG activities, subsequently improving firm valuation. Their research indicates that family-owned firms achieve better returns on ESG investments due to their long-term investment horizons and deep institutional knowledge. This is consistent with our results which imply that the active involvement of family members in governance can enhance the positive moderating effect of family ownership on the relationship between ESG and ROA. By participating actively in governance-related ESG practices, family owners can mitigate typical drawbacks of family business structures, such as resistance to change or nepotism, thereby improving overall firm performance.

Furthermore, the individual pillar score random effects regression reveals that the interaction terms with family ownership are generally positive, though not always significant. Notably, the interaction term for governance is the only one that is both significant and positive. This finding aligns with Anderson and Reeb (2003), who found that strong governance structures are essential for family firms to outperform non-family firms. Additionally, Yeon et al. (2021) emphasize the critical role of family involvement in governance for effectively leveraging ESG initiatives. These insights propose that family-owned firms may benefit from focusing on governance-related ESG practices to enhance firm performance. Rees and Rodionova (2015) further highlight the distinct behavior of individual nations. Specifically, Germany stands out with a positive association between family ownership and governance, reinforcing our findings that family firms in Germany leverage strong governance to enhance ESG performance. This suggests that the cultural and regulatory environment in Germany may amplify the beneficial effects of family ownership on ESG performance, particularly in governance practices.

Drawing from the socioemotional wealth theory, family firms have a natural inclination towards ESG activities driven by internal and external motivations to preserve socioemotional wealth. This supports our finding that family ownership positively moderates the negative effects of ESG scores on ROA, as family firms likely prioritize long-term sustainability and stakeholder relationships. This aligns with the observations of Gomez et al. (2007), who suggested that family firms' focus

on non-financial and socioemotional objectives could uniquely position them to navigate the complexities of ESG integration more effectively than non-family firms.

In conclusion, the evidence from our regression analyses, supported by empirical findings and the theoretical framework suggests that family ownership positively moderates the relationship between ESG scores and firm performance. Therefore, we can support the hypothesis of *H3a*: Family ownership positively moderates the relationship between ESG score and firm performance. Our results indicate that family ownership can indeed mitigate the negative impacts of ESG scores on firm performance, enhancing the overall positive effect of ESG initiatives when effectively managed.

## 7. Conclusion

The core aim of this study is to explore the complex dynamics between ESG performance and firm performance, particularly focusing on the moderating role of family ownership. By examining this interplay within the context of German firms, the study seeks to provide deeper insights into how ESG activities influence firm performance in distinctly structured enterprises, distinguishing between family-owned and non-family-owned businesses.

Across multiple econometric models (POLS, RE, PSM), there is a consistent finding of a significant negative relationship between ESG scores and firm performance, measured by ROA. This implies that while firms may be engaged in ESG practices, these initiatives could be leading to short-term financial drawbacks, likely due to the initial costs or strategic shifts required for ESG integration. The influence of family ownership on the firm performance relationship presents mixed results. While some models indicated that family ownership might mitigate some of the negative impacts of ESG on firm performance, others suggested complex dynamics where family ownership could exacerbate the financial challenges associated with ESG practices.

Further, our analysis reveals a positive and significant moderating effect of family ownership on the relationship between ESG scores and firm performance. This suggests that family-owned firms are better equipped to leverage ESG initiatives for improved financial outcomes. Their unique governance structures and long-term orientations allow them to mitigate the adverse effects of ESG scores on ROA. The findings indicate that strong governance practices play a crucial role in enhancing the benefits of ESG activities, particularly prevalent in family-owned firms.

These findings have significant implications for stakeholders interested in the ESG performance of German companies. They can be extended to similar developed economies with a high prevalence of family-owned businesses. The unique dynamics of family ownership in these firms might lead to ESG activities driven by motives beyond short-term financial gains. Moreover, regulatory bodies aiming to enhance corporate sustainability while maintaining competitiveness can find valuable insights from Germany's experience balancing family ownership and ESG initiatives, potentially applying these lessons to improve corporate practices in other developed markets. For policymakers, investors, and corporate leaders, these findings offer a deeper

understanding of how family ownership can influence and improve the integration of ESG practices, leading to a more sustainable and competitive corporate landscape in developed economies.

One limitation of our study is the absence of comprehensive ESG data, leading to the exclusion of many firms from the initial sample. Since we examined for the period 2018 to 2023, not all firms had ESG scores for all years, further reducing our sample size. Additionally, the study exclusively uses ROA to measure firm performance. While ROA is a widely recognized indicator, it may incompletely capture a firm's overall financial health or operational efficiency. Future research should address these limitations and further explore these dynamics by focusing on the German market and other similar economies where family firms are predominant. Efforts should be made to obtain comprehensive ESG data to minimize exclusions due to missing information. Increasing the sample size and diversity would enhance the robustness and applicability of the findings. Collecting detailed data on the roles of family members, their active involvement, ownership stakes, and participation in ESG initiatives within these firms would provide critical insights. By examining these factors in the context of Germany and comparable markets, researchers could identify further specific conditions under which family ownership impacts firm performance. This targeted approach would allow for the development of nuanced strategies that optimize the potential of family firms in these significant economic regions.

## References

- Alsayegh, MF, Rahman, RA & Homayoun, S. (2020). “Corporate Economic, Environmental, and Social Sustainability Performance Transformation through ESG Disclosure,” *Sustainability*, 12(9):3910, <https://doi.org/10.3390/su12093910>.
- Alshbili, I., Elamer, A. A., & Beddewela, E. (2020). Ownership types, corporate governance and corporate social responsibility disclosures: Empirical evidence from a developing country. *Accounting Research Journal*, 33(1), 148-166. <https://doi.org/10.1108/ARJ-03-2018-0060>
- Anderson, R. C., & Reeb, D. M. (2003). Founding-Family Ownership and Firm Performance: Evidence from the S&P 500. *The Journal of Finance*, 58(3), 1301–1328. <http://www.jstor.org/stable/3094581>
- Azaare, Jacob & Wu, Zhao & Modzi, Socrates Kwadwo & Li, Ping & Mintah, Enoch. (2023). Examining the Impact of Environmental, Social and Governance Scores on Financial Performance of Listed Companies on the German Stock Exchange (XETRA). *Science Journal of Business and Management*. 11. 74-92. 10.11648/j.sjbm.20231102.12.
- Berrone, Pascual & Cruz, Cristina & Gomez-Mejia, Luis. (2012). Socioemotional Wealth in Family Firms. *Family Business Review*. 25. 258-279. 10.1177/0894486511435355.
- Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate social performance and stock returns: UK evidence from disaggregate measures. *Financial Management*, 35(3), 97–116.
- Brooks, C. (2008) *Introductory econometrics for finance*. 2. ed. Cambridge University Press. Available at: <https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,uid&db=cat07147a&AN=lub.6179984&site=eds-live&scope=site> (Accessed: 8 May 2024).
- Caliendo, M. and Kopeinig, S., (2008). Some practical guidance for the implementation of propensity score matching. *Journal of economic surveys*, 22(1), pp.31-72.
- Cella, Cristina. (2009). Ownership Structure and Stock Market Returns. *SSRN Electronic Journal*. 10.2139/ssrn.1267268. <http://dx.doi.org/10.2139/ssrn.1267268>
- Chen, Simin, Song, Yu & Gao, Peng. (2023). Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance, *Journal of Environmental Management*, Volume 345,.

<https://doi.org/10.1016/j.jenvman.2023.118829>.

(<https://www.sciencedirect.com/science/article/pii/S0301479723016171>)

CHENG, B., IOANNOU, I., & SERAFEIM, G. (2014). CORPORATE SOCIAL RESPONSIBILITY AND ACCESS TO FINANCE. *Strategic Management Journal*, 35(1), 1–23. <http://www.jstor.org/stable/24037207>

Chu, Wenyi. (2011). Family Ownership and Firm Performance: Influence of Family Management, Family Control, and Firm Size. *Asia Pacific Journal of Management*. 28. 833-851. 10.1007/s10490-009-9180-1.

Chrisman, J. J., Chua, J. H., & Litz, R. A. (2004). Comparing the Agency Costs of Family and Non-Family Firms: Conceptual Issues and Exploratory Evidence. *Entrepreneurship Theory and Practice*, 28(4), 335-354. <https://doi.org/10.1111/j.1540-6520.2004.00049.x>

Dingliang, Fan. (2018). Family and world: the German family business in the global market in the second half of the 20th century. *Revue française d'histoire économique*. N° 9-10. 176. 10.3917/rfhe.009.0176.

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *The Academy of Management Review*, 20(1), 65–91. <https://doi.org/10.2307/258887>

Eccles, R.G. & Krzus, M.P.. (2010). One Report: Integrated Reporting for a Sustainable Strategy. 26. 28-32.

El Ghouli, S., Guedhami, O., Wang, H., Kwok, C. (2016). Family control and corporate social responsibility, *Journal of banking & finance*, Available online: <https://www.sciencedirect.com/science/article/pii/S0378426616301479>

Espinosa-Méndez C, Maquieira CP, Arias JT. (2023) The Impact of ESG Performance on the Value of Family Firms: The Moderating Role of Financial Constraints and Agency Problems. *Sustainability*. 2023; 15(7):6176. <https://doi.org/10.3390/su15076176>

ESG Analytics. (2023). Top 10 ESG data providers, Available online: <https://www.esganalytics.io/insights/top-10-esg-data-providers> [Accessed 25 April 2024]

EY. (2023) The 2023 EY and University of St.Gallen Family Business Index reveals the largest family enterprises are growing faster than the global economy. Available online:

[https://www.ey.com/en\\_gl/insights/family-enterprise/family-business-index](https://www.ey.com/en_gl/insights/family-enterprise/family-business-index) [Accessed 3 May 2024]

Faller, C.M., zu Knyphausen-Aufseß, D. (2018) Does Equity Ownership Matter for Corporate Social Responsibility? A Literature Review of Theories and Recent Empirical Findings. *J Bus Ethics* 150, 15–40. <https://doi.org/10.1007/s10551-016-3122-x>

Freeman, R. E. (1984) *Strategic Management: A Stakeholder Approach*. Pitman, Boston

Freeman, R. E. (2010). *Strategic Management: A Stakeholder Approach*. Cambridge: Cambridge University Press.

Freeman, R. Edward. (2008) *Managing for Stakeholders*. Available at SSRN: <https://ssrn.com/abstract=1186402> or <http://dx.doi.org/10.2139/ssrn.1186402>

Friede, G. (2019) Why don't we see more action? A meta-synthesis of the investor impediments to integrating environmental, social, and governance factors. *Bus Strateg Environ* 28(6):1260–1282. <https://doi.org/10.1002/bse.2346>

Friede, G., Busch, T. and Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies, *Journal of sustainable finance & investment*, 5(4).

Gómez-Mejía, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J. L., & Moyano-Fuentes, J. (2007). Socioemotional Wealth and Business Risks in Family-Controlled Firms: Evidence from Spanish Olive Oil Mills. *Administrative Science Quarterly*, 52(1), 106–137. <http://www.jstor.org/stable/20109904>

Hou, T. C. T. (2019). The relationship between corporate social responsibility and sustainable financial performance: Firm-level evidence from Taiwan. *Corporate Social Responsibility and Environmental Management*, 26 (1), 19–28. <https://doi.org/10.1002/csr.1647>

Jensen, M., & Meckling, W. (1976). “Theory of Firm: Managerial Behavior, Agency Costs and Ownership Structure”, *Journal of Financial Economics*, Vol. 3, pp. 305-360.



Jones TM, Harrison JS, Felps W. (2018) How Applying Instrumental Stakeholder Theory Can Provide Sustainable Competitive Advantage. *Academy of Management Review*. 2018;43(3):371-391. doi:10.5465/amr.2016.0111

Lee, D. D., Faf, R. W., & Langfeld-Smith, K. (2009). Revisiting the vexing question: Does superior corporate social performance lead to improved financial performance? *Australian Journal of Management*, 34(1), 21–49.

Li, Yiwei , Gong, Mengfeng, Zhang, Xiu-Ye & Koh, Lenny. (2018) The impact of environmental, social, and governance disclosure on firm value: The role of CEO power, *The British Accounting Review*, Volume 50, Issue 1, Pages 60-75, <https://doi.org/10.1016/j.bar.2017.09.007>.

Martínez, J. I., Stöhr, B. S., & Quiroga, B. F. (2007). Family Ownership and Firm Performance: Evidence From Public Companies in Chile. *Family Business Review*, 20(2), 83-94. <https://doi.org/10.1111/j.1741-6248.2007.00087.x>

Nam, HJ., Bilgin, M.H. & Ryu, D. (2024) Firm value, ownership structure, and strategic approaches to ESG activities. *Eurasian Bus Rev* 14, 187–226 . <https://doi-org.ludwig.lub.lu.se/10.1007/s40821-024-00252-z>

Ogden, R., Thomson, T., & Scores, R. E. (2017). Thomson Reuters ESG Scores

Orlitzky, M., Schmidt, F. L. & Rynes, S.L. (2003) Corporate social and financial performance: A meta-analysis, *Organization Studies*, Available online: (PDF) Corporate Social and Financial Performance: A Meta-Analysis (researchgate.net)

Paolone, F., Cucari, N., Wu, J. and Tiscini, R. (2022), "How do ESG pillars impact firms' marketing performance? A configurational analysis in the pharmaceutical sector", *Journal of Business & Industrial Marketing*, Vol. 37 No. 8, pp. 1594-1606. <https://doi-org.ludwig.lub.lu.se/10.1108/JBIM-07-2020-0356sun>

Peng, C-W., & Yang, M-L. (2014). The Effect of Corporate Social Performance on Financial Performance: The Moderating Effect of Ownership Concentration, *Journal of Business Ethics*.

Rees, W., and Rodionova, T. (2015), The Influence of Family Ownership on Corporate Social Responsibility: An International Analysis of Publicly Listed Companies. *Corporate Governance: An International Review*, 23, 184–202. doi: [10.1111/corg.12086](https://doi.org/10.1111/corg.12086).

Refinitiv (2023). Environmental, Social, and governance scores from Refinitiv, Available online:[https://www.lseg.com/content/dam/data-analytics/en\\_us/documents/methodology/lseg-esg-scores-methodology.pdf](https://www.lseg.com/content/dam/data-analytics/en_us/documents/methodology/lseg-esg-scores-methodology.pdf) (Accessed 4 May 2024)

Rovelli P, Ferasso M, De Massis A, Kraus S (2022) Thirty years of research in family business journals: status quo and future directions. *J Fam Bus Strateg* 13(3):100422.  
<https://doi.org/10.1016/j.jfbs.2021.100422>

Saenger, Ingo. (2017). Disclosure and Auditing of Corporate Social Responsibility Standards: The Impact of Directive 2014/95/EU on the German Companies Act and the German Corporate Governance Code. 10.1007/978-3-319-51868-8\_12.

Stock, Christoph & Pütz, Laura & Schell, Sabrina & Werner, Arndt. (2023). Corporate Social Responsibility in Family Firms: Status and Future Directions of a Research Field. *Journal of Business Ethics*. 190. 1-61. 10.1007/s10551-023-05382-4.

Su, Saier, Fei Zhu, and Haibo Zhou. (2022). "A Systematic Literature Review on Ownership and Corporate Social Responsibility in Family Firms" *Sustainability* 14, no. 13: 7817.  
<https://doi.org/10.3390/su14137817>

Sun, Jiamu & Pellegrini, Massimiliano & Dabic, Marina & Wang, Kai & Wang, Cizhi. (2023). Family ownership and control as drivers for environmental, social, and governance in family firms. *Review of Managerial Science*. 18. 1-32. 10.1007/s11846-023-00631-2.

Thahira, A.M. and Mita, A.F. (2021). ESG Disclosure and Firm Value: Family versus Nonfamily Firms. In *Asia-Pacific Research in Social Sciences and Humanities Universitas Indonesia Conference (APRISH 2019)* (pp. 653-657). Atlantis Press.  
<https://doi.org/10.2991/assehr.k.210531.081>

Wooldridge, J.M., Wadud, M. and Lye, J.,( 2016). *Introductory econometrics: Asia Pacific edition with online study tools 12 months*. Cengage AU.

Yan Cao Chu, Hui Yang Zhi, and Xin Liang (2021) 'The relationship between board size and firm performance', *E3S Web of Conferences*, 257, p. 02079.  
doi:10.1051/e3sconf/202125702079.

Yeon, J., Lin, M. S., Lee, S., & Sharma, A. (2021). Does family matter? The moderating role of family involvement on the relationship between CSR and firm performance. *International Journal of Contemporary Hospitality Management*, 33(10), 3729-3751.

Yousaf, M., & Dey, S. K. (2022). Best proxy to determine firm performance using financial ratios: A CHAID approach. *Review of Economic Perspectives*, 22(3), 219-239.

Zeng, T. (2021), "Corporate social responsibility (CSR) in Canadian family firms", *Social Responsibility Journal*, Vol. 17 No. 5, pp. 703-718. <https://doi.org/10.1108/SRJ-12-2019-0410>

## Appendices

Appendix 1: Hausman test

<b>Hausman (1978) specification test</b>	
	Coef.
Chi-square test value	44.385
P-value	0

Appendix 2: White test

White's test	df	p
H0: Homoskedasticity		
Ha: Unrestricted heteroskedasticity		
chi2(235) = 405.19		
Prob > chi2 = 0.0000		
Cameron & Trivedi's decomposition of IM-test		
chi2		
405.190	235	0.000
78.110	23	0.000
19.790	1	0.000
503.090	259	0.000