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UNIVERSITY OF VAASA

Alex Kaplas

## **Executive Age and ESG**

Evidence from the S&P 1500 firms

School of Accounting and Finance  
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<b>Author:</b>	Alex Kaplas	
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<b>Supervisor:</b>	Sami Vähämaa	
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**ABSTRACT:**

This thesis examines whether the age of top executives is associated with firms' ESG performance. More precisely, the purpose of this thesis is to examine whether the ages of chief executive officers (CEOs) and chief financial officers (CFOs) are associated with the firm's ESG scores. The topic is motivated by the rising importance of ESG considerations among investors, regulators, and other stakeholders, as well as the growing interest in how managerial characteristics influence corporate decision-making.

The theoretical framework is based on three key theories. Stakeholder theory explains why firms should consider the interests of broader stakeholder groups, while institutional theory suggests that the external environment encourages firms to adopt responsible business practices. Upper echelons theory provides the main theoretical foundation for the empirical analysis, as it suggests that executives' personal characteristics influence a firm's strategic choices and organizational outcomes.

The empirical analysis is conducted using an unbalanced panel of non-financial S&P 1500 firms during the period 2006–2023. ESG performance is measured using LSEG ESG scores. In addition to the combined ESG score, the environmental, social, and governance pillar scores are examined separately. The main methodology to test the association between top executives' age and a firm's ESG scores is fixed-effects panel regression. Additional tests are conducted to assess the robustness of the results and to reduce concerns about endogeneity and selection bias.

The results provide evidence that executive age is associated with a firm's ESG performance. The results from the main regressions suggest that older CEOs are negatively associated with overall ESG and governance performance. The negative relationship between CEO age and governance score remains statistically significant across all tested regression models, providing strong evidence of an association between these two variables. The results for CFO age are more mixed. Older CFOs tend to be negatively associated with environmental performance but positively associated with social performance. However, the propensity score-matched regressions and additional robustness checks indicate that the findings are not fully robust across all model specifications.

In summary, the findings suggest that executive age may influence firms' ESG performance, particularly in relation to governance outcomes. However, the results should be interpreted with caution, as the additional tests suggest that some relationships may be influenced by firm selection effects or other unobserved characteristics.

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**KEYWORDS:** ESG score, Age, CEOs, CFOs, Executives, CSR, Sustainability

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**TIIVISTELMÄ:**

Tässä tutkielmassa tutkitaan, onko ylimmän johdon iällä yhteyttä yritysten ESG-suoriutumiseen. Tutkielman tarkoitus on syvemmin perehtyä siihen, onko toimitus- ja talousjohtajan iällä yhteyttä yritysten ESG-pistemääriin. Tutkielman aihe on saanut motivaationsa ESG-seikkojen kasvavasta merkitystä sijoittajien, sääntelyviranomaisten ja muiden sidosryhmien keskuudessa sekä lisääntyneestä kiinnostuksesta siihen, miten johdon ominaisuudet vaikuttavat yritysten päätöksentekoon.

Teoreettinen viitekehys pohjautuu kolmeen pääteoriaan. Sidosryhmäteoriassa kerrotaan siitä, miksi yrityksen tulisi ottaa huomioon laajemman sidosryhmän intressit. Institutionaalinen teoria pohjautuu ajatukseen, että ulkoinen toimintaympäristö kannustaa yrityksiä omaksumaan vastuullisia liiketoimintakäytäntöjä. Ylimmän johdon teoria muodostaa keskeisimmän teoreettisen perustan empiiriselle analyysille, sillä sen mukaan johtajien henkilökohtaiset ominaisuudet vaikuttavat yrityksen strategiaan valintoihin ja organisaation tuloksiin.

Tutkielman empiirinen analyysi toteutettiin käyttäen epätasapainoista paneeliaineistoa, joka koostuu S&P 1500 -yrityksistä ajanjaksolla 2006–2023 poissulkien rahoitusalan yritykset. ESG-suorituskykyä mitataan LSEG:n toteuttamilla ESG-pisteytyksillä. Yhdistetyn ESG -pisteytyksen lisäksi tutkimuksessa tarkastellaan ympäristön, sosiaalisen vastuun ja hallintotavan osa-alueiden pisteytyksiä erikseen. Empiirisen analyysin päämenetelmä, jolla tutkitaan ylimmän johdon iän ja yrityksen ESG-pisteytyksen välistä yhteyttä, on kiinteiden vaikutusten paneeliregressio. Lisäksi ylimääräisiä testejä suoritettiin tulosten luotettavuuden arvioimiseksi sekä endogeenisuuden ja valintaharhan aiheuttamien huolenaiheiden vähentämiseksi.

Tulokset osoittavat, että johdon iällä on yhteys yritysten ESG-suoriutumiseen. Pääregressioanalyysin tulokset viittaavat siihen, että iäkkäämmät toimitusjohtajat vaikuttavat negatiivisesti yritysten yhdistettyyn ESG suoriutumiseen ja hallintotavan suoriutumiseen. Toimitusjohtajan iän ja yrityksen hallintopisteytyksen välinen negatiivinen yhteys säilyy tilastollisesti merkitseväenä kaikissa testatuissa regressiomalleissa, mikä tarjoaa vahvaa näyttöä näiden kahden muuttujan välisestä yhteydestä. Tulokset talousjohtajan iän osalta ovat vaihtelevampia. Vanhemmilla talousjohtajilla on taipumus vaikuttaa negatiivisesti yrityksen ympäristöasioiden suoriutumiseen, mutta positiivinen vaikutus yrityksen sosiaalisten asioiden suoriutumiseen. Propensiteettipiste kaltaistuksen regressioanalyysit ja ylimääräiset kestävyystestaukset osoittavat kuitenkin, että tulokset eivät ole täysin luotettavia kaikissa mallimäärittelyissä.

Yhteenvedon voidaan todeta, että tulokset viittaavat siihen, että johdon ikä saattaa vaikuttaa yritysten ESG-suoriutumiseen ja erityisesti hallintotavan pisteytykseen. Tuloksia on kuitenkin tulkittava varovaisesti, sillä lisätestit viittaavat siihen, että joihinkin yhteyksiin saattavat vaikuttaa yritysten valikoitumisefekti tai muut havaitsemattomat ominaisuudet.

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**KEYWORDS:** ESG score, Age, CEOs, CFOs, Executives, CSR, Sustainability

## Contents

1	Introduction	7
1.1	Purpose of the Study	8
1.2	Hypotheses Development	9
1.3	Structure of the Thesis	10
2	Theoretical Framework	12
2.1	Stakeholder Theory	12
2.2	Institutional Theory	13
2.3	Upper Echelons Theory	17
2.4	Conceptual Framework	19
3	Literature Review	21
3.1	Corporate Social Responsibility and ESG	21
3.2	ESG Performance	25
3.3	Managerial Characteristics	27
4	ESG Score and ESG Score Controversy	31
4.1	ESG Scores	31
4.2	ESG Score Controversy	35
5	Data and Methodology	37
5.1	Research Methods	37
5.2	Descriptive statistics	39
6	Regression results	43
6.1	Univariate tests	43
6.2	Main regression	44
6.3	Endogeneity and selection concerns	49
6.4	Robustness checks	51
7	Conclusions	59
7.1	Limitations	61
7.2	Suggestions for Further Studies	62

References	63
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## Figures

Figure 1. Triple Bottom Line adapted from John Elkington (Slaper & Hall, 2011)	15
Figure 2. Sustainable Development Goals (United Nations, n.d.)	16
Figure 3. Conceptual Model of the Upper Echelons Theory	17
Figure 4. Conceptual Framework of the Study	20
Figure 5. The pyramid and steps of Corporate Social Responsibility, adapted from Carroll, 1991	22
Figure 6. Percentiles of ESG Scores Adapted From LSEG	33
Figure 7. LSEG ESGC score framework, adapted from LSEG 2024	34

## Tables

Table 1. Descriptive Statistics	40
Table 2. Pairwise Correlation	41
Table 3. Univariate Tests	44
Table 4. Main Regressions	46
Table 5. Propensity Score-matched Regressions	50
Table 6. Re-estimates Excluding the Smallest Firms	53
Table 7. Re-estimates Excluding the Largest Firms	55
Table 8. Re-estimates 2006–2014	57
Table 9. Re-estimates 2015–2023	58

## Abbreviations

CEO – Chief Executive Officer  
 CFO – Chief Financial Officer  
 CSR – Corporate Social Responsibility  
 ESG – Environmental, Social, and Governance  
 ROA – Return on Assets  
 SDGs – Sustainable Development Goals

UET – Upper Echelons Theory

MSCI – Morgan Stanley Capital International

TBL – Triple Bottom Line

UN – United Nations

CSP - Corporate Sustainability Performance

LSEG – London Stock Exchange Group

ISS – Institutional Shareholder Services

S&P – S&P Global Ratings

SMEs – Small and Medium-sized Enterprises

## 1 Introduction

The core purpose of companies is to maximize their returns to stakeholders. In recent decades, there has been a lot of discussion about corporate responsibility and sustainability, which has led companies to actively develop and monitor reports on topics related to these subjects. There are two different tools commonly used in the market for monitoring these issues: CSR, which stands for Corporate Social Responsibility, where the goal is to do public good beyond what's required by law (Yoon, 2018; Marrewijk, 2003; Ells & Walton, 1961; Keith, Davis & Carroll, 1991), and ESG, which stands for Environment, Social, and Governance, where the goal is to use the tool to quantitatively assess how companies are doing (Kaźmierczak, 2022; Li et al., 2021; Atkins, 2020; Fatemi, Glaum & Kaiser, 2018).

However, as the focus on CSR and ESG grows, corporate management must abandon the idea of maximizing shareholder value alone and consider shifting towards a stakeholder-oriented perspective, taking into account all relevant stakeholders (Freeman et al., 2018; Mahajan et al., 2023; Galbreath, 2018). The CEO plays a key role in this shift, as their personal characteristics influence strategic decisions within the company (Hambrick & Mason, 1984; Bertrand & Schoar, 2003). Nevertheless, little is known about how a CEO's or CFO's managerial characteristics, particularly their age, influence a company's ESG performance.

Upper Echelons Theory (UET) emphasizes how a leader's psychological traits guide their decision-making (Hambrick, 2007). Hambrick and Mason (1984) propose that leaders develop interpretations of their environment based on past experiences, values, and personalities, and make decisions based on these interpretations. Among a leader's many traits, age is significant as previous studies have shown that it affects risk-taking propensity, innovation and development efforts, and attitudes towards environmental issues (Serfling, 2014; Yousaf & Nguyen, 2025; Li et al., 2017; Chowdhury & Fink, 2017).

This thesis aims to address a specific gap in existing research by examining how the age of a company's CEO or CFO affects its ESG performance. While there has been research into how various executive characteristics, such as experience, tenure, education, gender, compensation, and values, affect company performance, less attention has been paid to the influence of age. Furthermore, CFO's characteristics have not been studied as much as those of CEOs, and therefore, the age of CFOs is included in this thesis.

## **1.1 Purpose of the Study**

Previous studies have examined the effect of age on a CEO's managerial characteristics. Older CEOs tend to be more risk-averse and, consequently, less willing to commit to environmental goals, since these usually require substantial investment and do not typically generate a quick return (Yuan et al., 2019; Yousaf & Nguyen, 2025). Conversely, younger CEOs make bolder changes, such as acquiring new companies and adopting an active leadership style (Li et al., 2017). Aging can also reduce responsiveness and the ability to adapt to a changing operating environment (Wang et al., 2016).

Age has been examined from many different perspectives, but this study provides a new viewpoint by exploring how the age of the CEO or CFO influences ESG performance. The approach of this study differs from prior research, which has primarily focused on the board of directors, age diversity in boards, or specific characteristics such as leadership practices and length of tenure (Johnson et al., 2013). This study provides empirical evidence on whether the age of top executives is positively or negatively associated with ESG performance.

Investors are also beginning to take ESG factors into account when evaluating companies and making investment decisions. According to an MSCI report, companies with higher ESG ratings tend to have higher market valuations and lower costs of capital (Kotsantonis & Serafeim, 2019). Examining the impact of CEO and CFO age on ESG performance can

help to understand how investors perceive CEO and CFOs roles in promoting sustainable practices, and their impact on market performance.

The main question of the study is:

*Does the age of the CEO or CFO affect the company's ESG performance?*

This study aims to examine whether there is a link between the age of the CEO or CFO and ESG performance, and to determine whether the effects of their age on ESG performance differ. In this study, ESG performance is measured with the ESG score from LSEG. This study focuses on the age of the CEO because they are responsible for defining the company's long-term strategy, as well as making key decisions regarding risk-taking, innovation, and corporate responsibility. The CFO's age was also selected as a focus because CFOs are responsible for allocating resources and making investment decisions. The roles of both the CEO and CFO can influence whether the company views ESG investments as costs or as a long-term opportunity to create value.

## **1.2 Hypotheses Development**

To formulate a hypothesis, the first step is to briefly consider how age affects the leadership styles of CEOs and CFOs. Older CEOs are often associated with extensive professional experience. They have typically enjoyed long careers, experienced many different stages of company development, and are more concerned with the company's reputation. This accumulated experience may cause older CEOs to prioritize long-term stability and risk avoidance (Bertrand & Schoar, 2003; Serfling, 2013; Pletomäki et al., 2021). From this perspective, older CEOs may be less supportive of ESG initiatives (Yousaf & Nguyen, 2025).

In contrast, younger CEOs are more up to date and have grown up surrounded by green values and awareness. Responsibility-related values have become more prominent over

the last ten years, so younger CEOs may place more emphasis on ESG issues as a result. They may also be more willing to demonstrate modern leadership, raising more ESG-related issues in the process (Wiersema & Bantel, 1992; Li et al., 2017). Therefore, they may be more receptive to ESG issues. Based on these considerations, the following hypothesis is formulated:

H1: CEO age is negatively associated with ESG performance.

As the CFO is responsible for resource allocation and investment planning, ESG-related decisions also fall within their remit. However, older CFOs may view ESG initiatives as a potential misuse of resources, favoring stable cash flows and lower-risk projects instead (Peltomäki et al., 2021; Peni, 2014). They may believe that allocating resources to ESG activities involves long-term investments and that the financial returns from such projects are less immediate and more uncertain (Yousaf & Nguyen, 2025). In contrast, younger CFOs may be more open to innovative ESG solutions. They may also recognize that investing in ESG can generate long-term value and ultimately pay off (Yousaf & Nguyen, 2025; Serfling, 2014). Based on these arguments, the following hypothesis is formulated regarding the influence of CFO age on ESG performance:

H2: CFO age is negatively associated with ESG performance.

### **1.3 Structure of the Thesis**

This thesis consists of seven main chapters. The first chapter provides an overview of the background, hypothesis, and structure of the thesis. The second chapter discusses the theoretical framework, which is based on stakeholder theory, institutional theory, and upper echelons theory.

The third chapter examines previous literature on CSR, ESG, ESG performance, and managerial characteristics in greater detail. The fourth chapter provides a more detailed

analysis of ESG scores and the controversy surrounding them. The fifth chapter presents the research objectives, methods, and descriptive statistics.

The sixth chapter analyses the study's empirical results. The final, seventh chapter presents the study's conclusions, limitations, and suggestions for further research.

In this thesis, artificial intelligence tools (ChatGPT 5/5.5 and Grammarly) were used to support the writing process. Both tools were employed to enhance writing quality and to refine academic language. Also, ChatGPT 5.5 was used to spot formatting errors in the reference list. However, the author is fully responsible for the final contents and quality of this thesis.

## **2 Theoretical Framework**

This chapter presents the theoretical framework of the study. The theories covered include stakeholder theory, institutional theory, and upper echelons theory. A conceptual model of the study is presented at the end of the chapter.

### **2.1 Stakeholder Theory**

In the 1960s, there was a need to identify other parties involved in an organization besides shareholders, so the concept of stakeholder theory was introduced for the first time (Mahajan et al, 2023). In 1984, Freeman defined a stakeholder as any group or individual that can influence the achievement of an organization's goals or be affected by the achievement of those goals. He strongly emphasizes the relationship between a company and its suppliers, customers, and employees, which he refers to as stakeholders (Galbreath, 2018).

Freeman et al. (2004) suggest that stakeholder theory can be examined through two key questions. The first relates to the purpose of the company's existence and helps management understand what kind of value the company produces and what factors connect its most important stakeholders. The second question concerns management's responsibility in relation to the company's stakeholders. From this perspective, management must assess what kind of relationships the company should build and maintain with its stakeholders in order to fulfill its purpose and achieve its goals (Freeman et al., 2004).

Mahajan et al. (2023) describe stakeholder theory as a theory that emphasizes the importance of understanding and managing the needs and requirements of stakeholders. According to them, the theory encourages consideration of both external and internal stakeholders. Stakeholder theory is also defined as the better an organization is able to meet the requirements and needs of its various stakeholders, the better the

organization's products and services will sell (Velte, 2017). However, Nordberg (2010) points out that attention should not be focused only on the needs that increase shareholder value, and that the board of directors has a responsibility to ensure that the needs of all stakeholders are taken into account.

Guthrie et al. (2006) divide stakeholder theory into two different perspectives. According to them, the first of these is the ethical or moral approach, which means that all different stakeholder groups should be treated equally within the organization. The second perspective, according to Guthrie et al. (2006), is positive, or managerial. This perspective suggests that the stakeholders who have significant control over the company's resources should receive the most attention from the company's management.

## **2.2 Institutional Theory**

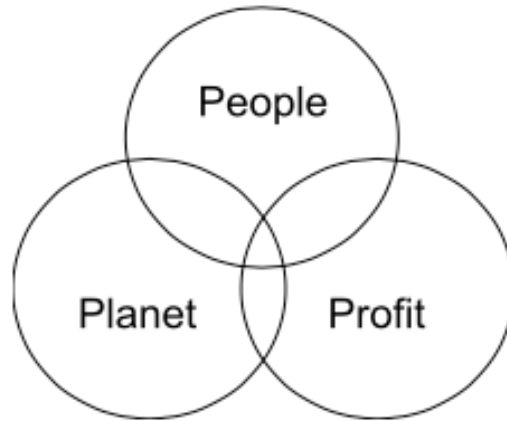
Institutional theory examines how firms tend to adopt similar structures, processes, and strategies, resulting in a high degree of similarity between firms in the same industry (Deephouse, 1996; DiMaggio & Powell, 1983; Zucker, 1987). The homogenization of firms is influenced by both internal processes and the external operating environment (Zsidisin et al., 2005). In principle, any industry may initially have a wide variety of organizations, but according to institutional theory, organizations begin to resemble one another over time. DiMaggio and Powell (1983) emphasize that organizations strive for legitimacy, i.e., acceptance within their environment, because an organization's survival or success requires it to adapt to norms, rules, and established ways of thinking. Zucker (1987) also argues that organizations are influenced by external pressures and social norms. He defines institutionalization through two distinct perspectives: "a rule-like, social fact quality of an organized pattern of action," and "an embedding in formal structures, such as formal aspects of organizations that are not tied to particular actors or situations."

According to DiMaggio and Powell (1983), “isomorphism” describes the process of organizational standardization. They argue that it compels organizations to resemble one another in terms of their structures, operating practices, goals, and strategies. While providing legitimacy and acceptance, isomorphism also limits innovation since everyone operates in the same way, and new ideas do not emerge. In institutional theory, pressures for change that lead to isomorphism can be divided into three groups: coercive, where authorities or other external actors drive change; normative, where professional standards and educational systems exert influence; and mimetic, where organizations model successful actors in uncertain situations (DiMaggio & Powell, 1983; Granlund & Lukka, 1998). Granlund and Lukka (1998) argue that economic pressures should also be included in this framework, considering the effects of markets, the economy, and technology on an organization’s operations and alignment. They include economic pressures because, in a global and competitive environment, money and market forces influence organizational behavior as much as social and institutional norms.

Institutional theory has also been criticized for placing too much emphasis on the idea that organizations simply adapt to their environment and for failing to adequately explain how they can change themselves or their environment (Hirsch & Lounsbury, 1997). This raises the question of how organizations can innovate and change those structures if they are so strongly bound by institutional structures (Holm, 1995). Some studies suggest that organizations not only adapt to environmental pressures, but also actively shape their environment and practices (Oliver, 1991; Dacin et al., 2002). This implies that companies are not simply similar, but rather naturally seek to position themselves advantageously.

The Triple Bottom Line (TBL) is a sustainability measurement framework developed by John Elkington in the mid-1990s that evaluates an organization’s performance across three dimensions: economic (profits), social (people), and environmental (planet) (Carroll, 2015). Instead of traditional profit-focused reporting, TBL also takes social and environmental impacts into account, which helps organizations make decisions that

support long-term sustainability and responsibility (Slaper & Hall, 2011). Institutional theory emphasizes that organizations strive for legitimacy, or acceptance from their stakeholders. TBL provides a concrete framework that enables organizations to demonstrate responsibility in their economic, social, and environmental activities.



**Figure 1. Triple Bottom Line adapted from John Elkington (Slaper & Hall, 2011)**

Figure 1 illustrates the TBL framework. The “People” category focuses on workers, community well-being, equality, education, and quality of life. The “Planet” category addresses the use of natural resources, energy efficiency, emissions, waste management, and ecological sustainability. The “Profits” category examines traditional economic indicators such as profit, productivity, tax revenue, and employment. (Slaper & Hall, 2011)

TBL is important because traditional metrics, such as profit and return on invested capital, do not reveal an organization’s overall impacts on the environment and society. The metric helps businesses, non-profit organizations, and governments assess the long-term overall impacts of their decisions and supports sustainable development because decisions are considered from economic, social, and environmental perspectives. (Slaper & Hall, 2011)

In 2015, the UN General Assembly adopted the Sustainable Development Goals (SDGs), a plan to make the world a better place by 2030. The plan aims to solve major problems such as poverty, hunger, inequality, and climate change. It includes 17 specific goals

designed to promote balanced development in terms of human well-being, the economy, and the environment. Figure 2 illustrates these goals. Achieving these goals is the responsibility of not only the government, but also businesses, communities, and individuals. (United Nations, n.d.)

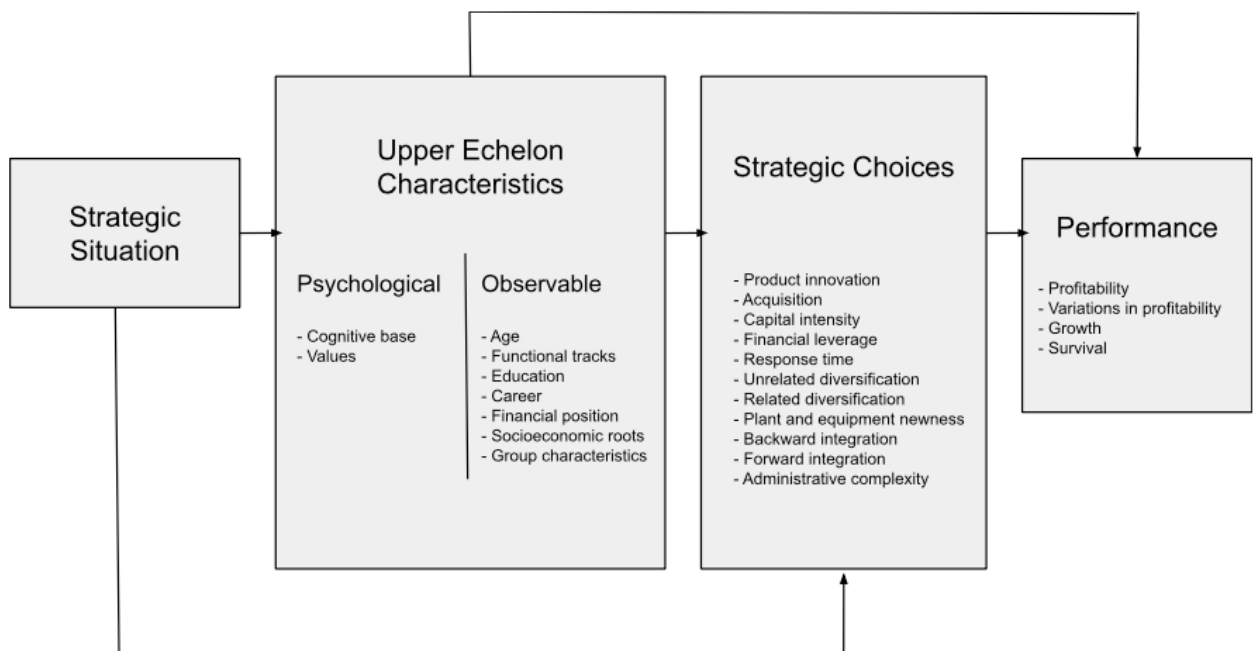


**Figure 2. Sustainable Development Goals (United Nations, n.d.)**

Through institutional theory, the 2030 Agenda for Sustainable Development can be understood as a global framework that guides the actions of organizations in their pursuit of legitimacy. The Sustainable Development Goals (SDGs) establish widely accepted norms regarding sustainability, equality, and responsibility. This creates institutional pressure on states, companies, and other actors to align their actions with these goals.

## 2.3 Upper Echelons Theory

The upper echelons theory was first introduced by Hambrick and Mason in 1984. Their aim was to use theory to answer two questions: why organizations operate the way they do, and why organizations perform the way they do. The upper echelons theory examines how top executives influence organizational performance through their behavior and decisions (Certo et al., 2006). The theory can be viewed as a conceptual model that illustrates the relationship between four concepts: strategic situations, top management characteristics (upper echelons), strategic choices, and organizational performance. Figure 3 illustrates this.



**Figure 3. Conceptual Model of the Upper Echelons Theory**

The theory is based on the idea that the cognitive basis and values (psychological) of top management are reflected in observable characteristics (observable) and together they form the way in which top management interprets and responds to various strategic situations, which then affect how the organization performs (Hambrick & Mason, 1984).

The top management team is responsible for strategy formulation and, therefore, plays a key role in the organization's success (Hambrick, 2007). Hambrick (2007) argues that,

to understand why organizations operate in a certain way, we must understand the actions and personality traits of those responsible for decision-making. Hambrick and Mason (1984) propose that leaders develop interpretations of their environment based on past experiences, values, and personalities, and make decisions based on these interpretations. Mischel (1977) argues that, when analyzing an organization's performance, it is sufficient to analyze the decisions made by top management. He claims that organizations operate precisely because of these decisions.

In the UET, it is important to examine demographic characteristics at the group level rather than focusing solely on individuals, since organizational leadership is a highly collaborative process based on the combined capabilities and interactions of all leaders (Hambrick, 2007). The literature primarily focuses on internal diversity within the top management team, such as average age, gender, level of education, and work experience (Bell et al., 2011). Unlike values, mindsets, and attitudes, demographic factors are easy to measure.

The UET has since been refined with the concept of "managerial discretion," which refers to the fact that some managers within a company have greater influence over decision-making and greater discretion (Haleblian & Finkelstein, 1993). Managers with greater discretion can influence organizational decision-making significantly more than those with less power and control (Finkelstein & Hambrick, 1990). "Executive job demands" are also considered a later addition to the theory (Hambrick, Finkelstein & Mooney, 2005). While higher job demands can motivate managers, they can also create work pressure, causing managers to take shortcuts in their decision-making (Hambrick, 2007). Conversely, managers with fewer job demands can make more rational decisions because they have time to analyze them more thoroughly (Hambrick, Finkelstein & Mooney, 2005). Cho and Hambrick (2006) further refined the theory in the area of "managerial attention", which refers to what managers focus on when making decisions. According to Ocasio (1997), there is a great deal of variation among managers in terms of what they focus on and how much time and energy they devote to strategic issues.

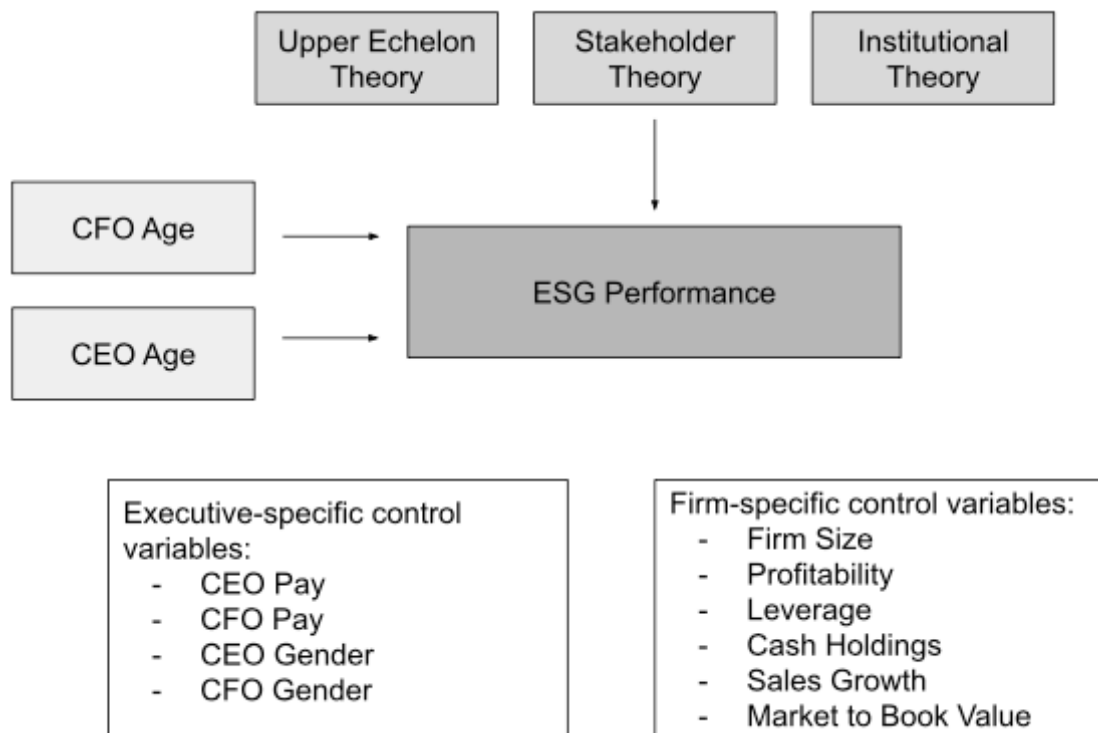
## 2.4 Conceptual Framework

Figure 4 below shows the conceptual framework of this study. The model illustrates the relationship between the ages of the CEO and CFO and the company's ESG performance. ESG performance refers to a company's environmental, social, and governance activities, and their assessment using an ESG score. The study is based on the premise that the age of top management influences a company's ESG performance.

The conceptual model is based on three key theories: upper echelons theory, stakeholder theory, and institutional theory. According to the upper echelons theory, a company's strategic decisions reflect the experiences, values, and personal characteristics of top management (Hambrick & Mason, 1984). In this study, the age of the CEO and CFO serves as a key variable that may influence ESG performance.

Stakeholder theory emphasizes a company's obligation to take into account the expectations of various stakeholders, such as investors, employees, customers, and society (Freeman et al., 2004). ESG activities can be seen as a way to meet these expectations and strengthen a company's legitimacy and reputation. Institutional theory complements this perspective by explaining how companies adapt to the norms, regulations, and institutional pressures of their operating environment that encourage responsible business practices (DiMaggio & Powell, 1983; Zucker, 1987).

The ages of the CEO and CFO are assumed to influence the company's ESG performance. In addition, the analysis takes into account several control variables that may affect the results. These include variables related to management characteristics, such as the CEO's and CFO's compensation, gender, as well as firm-level variables, such as firm size, profitability, leverage, cash holdings, sales growth, and the ratio of market value to book value. The control variables are used to ensure that the analysis measures the impact of management age on ESG performance as accurately as possible.



**Figure 4. Conceptual Framework of the Study**

### **3 Literature Review**

This chapter provides a review of the existing literature on the topic. Its purpose is to provide an overview of the research topic, identifying key findings and potential gaps in the literature. First, the chapter reviews the literature on corporate social responsibility (CSR) and environmental, social, and governance (ESG) factors. Second, the chapter discusses prior studies focusing on the relationship between ESG performance and firm performance. Lastly, the chapter introduces how the age of top executives may affect corporate decisions.

#### **3.1 Corporate Social Responsibility and ESG**

Corporate Social Responsibility (CSR) can be defined from many different angles depending on the company's field of activity, and it has also been defined in slightly different ways at different periods of time. In 1960, Keith Davis suggested that social responsibility refers to corporate decisions and actions that are made at least partly for reasons other than the company's direct financial interests. Around the same time, in 1961, Ells and Walton argued that CSR refers to the problems that arise when business activities affect society, for example, the environment, employees, and consumers. In their view, CSR also covers ethical principles, meaning that companies should act morally in their relationships with people and society. Marrewijk (2003) defines it as part of a company's activities in which it voluntarily takes responsibility for environmental and social issues in its business operations and in interactions with its stakeholders. In summary, CSR means that a company considers more than just financial benefits in its operations and takes responsibility for its impact on society.

Carroll (1991) proposed four levels of the CSR model in a pyramid. The pyramid is presented in Figure 5. The first level is economic responsibility, meaning that a company must generate value and wealth for its stakeholders by offering products that benefit the economy and society and create jobs. The second level is legal responsibility, which

emphasizes compliance with laws and regulations. The third level is ethical responsibility, where a company must act morally and, even if the law does not regulate everything, a company must comply with accepted practices in its business activities. The fourth and final level is philanthropic responsibility, meaning that a company must be a good citizen and participate in various charitable activities for the benefit of society.



**Figure 5. The pyramid and steps of Corporate Social Responsibility, adapted from Carroll, 1991**

Although CSR has been used for several years, it has not developed into a tool that can be used to quantitatively assess a company's environmental responsibility themes. CSR focuses more on qualitative measurement, where CSR can be defined as a company's responsible corporate culture and sustainable development framework (Kaźmierczak, 2022). For quantitative measurement, a tool called ESG, which stands for environment, social, and governance, has been created. It can be used to assess a company's overall sustainability performance and is easy for investors to use (Kaźmierczak, 2022). Gillan et al. (2021) define ESG as the way companies and investors incorporate environmental, social responsibility, and governance considerations into their business models. They define CSR as actions that companies take to be more socially responsible and better

corporate citizens. However, CSR has laid the foundation for ESG, and it appears that ESG is gradually replacing CSR. ESG can be used to assess non-financial factors and enables a deeper understanding of the concept of corporate value, as it utilizes CSR by translating it into concrete, measurable numbers (Kaźmierczak, 2022).

National Cash Register was one of the first companies to recognize the link between employee well-being and efficiency when it offered their employees profit sharing, lunch rooms, and free clinics (Carroll, 2008; Visser, 2011). In the 1920s, ESG activities shifted from supporting social well-being to also supporting shareholders. In the 1970s, ESG expanded to include companies' financial performance, as companies began to consider their position on social and environmental causes (Carroll, 2008).

In 2000, the United Nations Conference launched a voluntary program for companies to commit to human rights, labor, environmental, and anti-corruption principles. In 2004, a partnership between the UN and eighteen financial institutions produced the "Who cares Wins" report, which formed the basis for the launch of the Principles for Responsible Investment (PRI) (UN The Global Compact, 2004; Gillan et al., 2021). The PRI was established in 2006, and the term ESG was first used when financial institutions and the UN jointly developed ESG criteria for inclusion in corporate financial ratings (Atkins, 2020). ESG is a term from the words environmental, social, and corporate governance, and describes corporate social responsibility. The PRI was created to ensure market transparency and the integration of ESG into investment processes. ESG criteria and their relevance to the financial evaluation of companies have grown significantly in the financial industry over the last two decades, largely due to the strong commitment of large institutional investors to ESG criteria (Atkins, 2020).

ESG can be divided into three areas first is E, which refers to environmental responsibility then there is S, which deals with social responsibility and lastly G, which refers to governance. ESG can be used to assess how a company manages Environmental risks, such as toxic waste management, greenhouse gas emissions, and compliance with

environmental regulations. Companies must address many different environmental issues, such as energy consumption, waste management, climate policy, pollution control, animal welfare, and the protection of natural resources. From Social perspective, companies can be assessed on how they interact with both internal and external stakeholders. These include employees, suppliers, customers, and local communities. The social perspective includes assessing, for example, whether the company ensures the safety and healthy working conditions of its employees, participates in supporting the community through voluntary activities and donations, and prevents unethical business practices towards its customers. The aim of the Governance perspective is to ensure that companies comply with transparent and accurate accounting practices, emphasize diversity and integrity in the selection of management, and act as responsible shareholders. This perspective also includes companies complying with principles such as avoiding conflicts of interest, not using donations to gain advantages, and refraining from illegal activities. (Li et al., 2021)

Several studies have examined the benefits of ESG. Fatemi et al. (2018) demonstrated that ESG initiatives add value to a company by reducing capital costs, increasing operational efficiency, and improving access to finance. The study shows in particular that the ESG disclosure has an impact on the outcome. Also, Fatemi et al. (2018) have found that transparency in ESG reporting has positive effects, as investors can more easily assess companies' credibility on climate issues. These studies show that ESG is needed and can improve corporate performance and provide clarity for investors. The model developed by Fitzgibbons, Pedersen, and Pomorski (2021) shows that a company's ESG actions can influence capital markets regardless of its operational performance, as companies with high ESG ratings can attract demand from ESG-oriented investors. ESG can therefore affect a company's value even if it does not improve the company's efficiency. This can raise a company's valuations even if its returns may be lower than expected.

From a more critical perspective, consideration has been given to whether ESG measures bring financial benefits or whether they are just things that sound good in public relations. Cornell and Damodaran (2020) argue that ESG actions should not be expected to have a significant impact on company value if they do not lead to an increase in future cash flows or a reduction in risk. The definition of ESG is flexible, as there are no global standards regulating ESG, so different actors define ESG according to their own operating environment and objectives (Sekol, 2024).

### **3.2 ESG Performance**

In recent years, there has been a lot of research into how ESG performance affects financial performance or company value. Many studies have examined whether ESG reporting has a positive or negative impact on a company's performance. These studies show that companies with better ESG performance tend to outperform other companies. A meta-analysis done by the Stern Center for Sustainable Business at New York University (NYU) and Rockefeller Asset Management, which looked at over 1,000 research papers from 2015 to 2020 on the relationship between ESG performance and financial performance, found that over 58% showed a positive effect between ESG and firm performance. (Whelan et al., 2021).

In a study conducted by Van Beurden and Gössling (2008), a large collection of previous research on the relationship between corporate social responsibility (CSR) and financial performance was analyzed. They identified a positive relationship in 23 cases, no significant relationship in nine cases, and a negative relationship in two cases. They emphasize in their findings that there is a positive link between CSR and financial performance, stating that “good ethics is good business”. By these words, they mean that CSR is a long-term investment in increasing a company's value, not an extra cost.

A study about ESG performance conducted by Albertini (2013) over 35 years shows that the majority of studies included in the research found a positive relationship between

ESG performance and financial performance. They conducted a meta-analysis including 52 studies. What is interesting about the study is that it shows that ESG performance has had a positive impact on companies' financial performance for a long time, even though ESG issues have been of greater interest in the last few decades.

Although most studies have found a positive correlation between ESG performance and financial performance, some studies have found a negative or neutral impact of companies' ESG performance on their financial performance. The reasons for the varying results may include differences in social conditions, legislation in different countries, and measurement methods for different data and variables (Kahloul et al., 2022). Huang (2021) conducted a review of existing literature and found that, on average, ESG activities have a positive impact on a company's financial performance, albeit a very small one. Therefore, ESG activities should be considered as part of a broader strategic framework that can improve a company's reputation, reduce risks, and stabilise business operations.

ESG performance has also been studied from the perspective of how the power of the CEO affects ESG performance and financial performance (Velte, 2020; Li et al., 2018). Both studies concluded that ESG performance has a positive impact on a company's value or financial performance. The studies also found that in companies where the CEO has more power, there is a stronger link between ESG performance and financial performance. Velte (2020) also found through his research that the longer a CEO has been in their role, the more familiar they are with the company. This can have a positive impact on the relationship between ESG performance and financial performance. Triyani et al. (2020) discovered that CEO tenure had a moderating effect on the relationship between ESG performance and financial performance.

### 3.3 Managerial Characteristics

According to upper echelons theory, the personal characteristics of executives influence strategic decision-making and consequently organizational outcomes (Hambrick & Mason, 1984). While the general assumption is that older CEOs have more experience, studies have not found a clear answer as to whether a CEO's advanced age improves a company's efficiency and performance. Nevertheless, research has shown that older executives tend to be more cautious and take fewer risks than their younger counterparts (Bertrand & Schoar, 2003). This is particularly important because managerial risk preferences may influence firms' investment decisions, innovation activities, and ESG-related strategies.

Serfling (2014) conducted a study to determine whether the age of a CEO affects the level of risk that a company takes. The study's central question was whether younger CEOs are more risk-seeking than older ones. The study found that, as a CEO's age increases, the volatility of the company's stock returns decreases. This suggests that older CEOs are more risk-averse, while younger CEOs are more risk-seeking. It also indicates that older CEOs are offered fewer incentives to take risks and that lower-risk companies tend to hire older CEOs (Serfling, 2014). Chowdhury and Fink (2017) confirm these findings but add that, upon closer examination, the effect of older CEOs' risk aversion is that they cut R&D spending and, in doing so, sacrifice firm value. Their study also revealed that this issue tends to be most prevalent in poorly managed companies (Chowdhury & Fink, 2017). The findings of Serfling's study are also confirmed by Trabert (2023), but his study finds no evidence that younger CEOs are willing to take more risks. Instead, the higher risk associated with younger CEOs is linked to market uncertainty. This is due to the fact that investors are less familiar with the capabilities of younger CEOs than with those of more experienced CEOs (Trabert, 2023). A study by Peltomäki et al. (2021) found that companies led by older CEOs and CFOs exhibit lower volatility in stock returns. This finding supports the idea that older age makes executives more risk-averse.

Firms' strategic decisions and investment activities may also be influenced by differences in managerial risk preferences. A study by Wiersema and Bantel (1992) showed that companies undergoing major strategic changes usually have a management team whose members are, on average, younger. This suggests that younger managers may be more open to change and willing to adopt new strategies. A study by Li et al. (2017) also found that companies invest less as their CEOs' ages increase. Younger CEOs tend to be more active leaders. They are more likely to make bold changes and investment decisions, such as acquiring companies, whereas older CEOs tend to maintain the status quo (Li et al., 2017). According to Yim (2013), CEOs who are 20 years older are about 30% less likely to announce acquisitions, and acquisition activity is associated with higher CEO compensation. This suggests that younger CEOs may be more interested in financial compensation when making acquisition decisions. The decision to acquire a firm may therefore be driven by the potential financial gain for the CEO rather than the interests of the shareholders.

Despite consistent evidence on managerial risk preferences, findings on the relationship between a company's CEO age and performance remain mixed. According to Wang et al. (2016), future firm performance is positively associated with CEO age and other CEO characteristics, such as tenure, education, and prior career experience. A study by Peni (2014) also examines how CEO age impacts firm financial performance, measured by Tobin's Q and ROA. The sample included S&P 500 firms from 2006 to 2010 and also excludes financial institutions. According to Peni (2014), there are mixed results regarding how CEO age affects firm performance. The study finds that CEO age does not affect Tobin's Q but shows a positive association with ROA. The findings, which are a mix of positive and negative results, suggest that a company's CEO age may have a greater impact on the company's strategic decision-making and risk preferences than on its financial performance.

The age of the CEO may also influence firms' innovation activities and ESG-related strategic decisions. A study by E-Vahdati and Binesh (2022) found that there is no

significant relationship between CEO age and R&D intensity, but the level of education of the CEO does affect R&D intensity. The study also highlighted that investments in ESG practices positively affect a company's R&D intensity (E-Vahdati & Binesh, 2022). These results are consistent with the upper echelons theory, in which CEO characteristics predict organizational outcomes and the CEO's characteristics determine his or her strategic decisions (Hambrick & Mason, 1984). Companies whose CEOs support ESG practices are more attractive to investors and stakeholders, and such companies also adapt innovation strategies and R&D expansions more quickly and easily (Heyden et al., 2017; Beauchamp & O'Connor, 2012; Li et al., 2018). A study by Ginesti et al. (2021) revealed that the effect of a CFO's age on a company's R&D intensity is often the opposite of what is assumed. The study found that companies with older CFOs tend to invest more in R&D.

Yousaf and Nguyen (2025) examined the impact of a CEO's age and corporate stakeholder engagement regarding environmental issues. They found that older CEOs negatively impact a company's environmental performance. Their findings support the view that older CEOs are more cautious about committing to projects where returns are uncertain and the payback period is long (Yousaf & Nguyen, 2025). These findings suggest that older executives may be less willing to support ESG initiatives. This is because they have a greater preference for stability and lower-risk investments.

In addition to age, the length of time that a CEO has held their position has also been identified as an important managerial characteristic that influences strategic decision-making. Hambrick and Fukutomi (1991) found that while tenure initially has a positive impact on a company's performance, it begins to undermine performance once it reaches an optimal level. Henderson, Miller, and Hambrick (2006) also found that the optimal length of tenure varies by industry: in stable industries, it has a positive impact on performance over a longer period, whereas in fast-paced industries, its impact is limited to the early stages.

Studies have also found that a CEO's willingness to develop is affected by tenure. Research by Hambrick, Geletkanycz, and Fredrickson (1993) shows that the longer a CEO's tenure, the more likely they are to resist significant changes. This can significantly slow down a company's decision-making process, leading to innovations being overlooked in favor of maintaining the existing model.

Other studies have also highlighted that CEO tenure is negatively associated with a company's willingness to change and its strategic risk-taking. Long-serving CEOs implement fewer major strategic changes, instead moving forward along a stable and secure path that has already been proven to work (Wang et al., 2016). Miller (1991) describes this situation as "stale in the saddle", meaning that personal views begin to influence decision-making more than external conditions and industry dynamics, and at this point, the organization is less able to adapt to the external environment.

The general assumption is that higher risk leads to higher returns. However, a study by Khan and Vieito (2013) examining the impact of gender on company performance revealed that this does not hold true. It revealed that companies led by female CEOs are less risky than those led by men. It also found that female CEOs have a positive impact on company performance, as measured by return on assets (ROA). Therefore, according to this study, a female CEO generates better returns with lower risk. Another study by Faccio, Marchica, and Mura (2016) supports these findings. They conclude that women choose more cautious and risk-averse strategies that promote corporate stability, resulting in a lower debt ratio and significantly lower profitability variation when measured by ROA.

## 4 ESG Score and ESG Score Controversy

This chapter provides insight into ESG scores and the controversies surrounding them. Firstly, the chapter explains what ESG scores measure and how they are constructed, with a primary focus on the LSEG ESG scoring methodology, as LSEG ESG scores are used in this study. Secondly, the chapter reviews the main criticisms and limitations of ESG scores, including concerns about transparency, measurement consistency, comparability across rating providers, and greenwashing.

### 4.1 ESG Scores

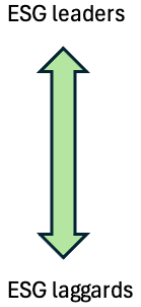
An ESG score is a systematic assessment of a company's performance in relation to ESG standards. ESG scores assess a company's commitment to ethical and sustainable practices. These ratings show how well a business adheres to sustainability and social responsibility principles, and they serve as a proxy for Corporate Sustainability Performance (CSP). The use of ESG scores as part of investment decisions has grown significantly in recent years (Sahin et al., 2023). For Sustainable and Responsible investments, ESG scores are essential as they serve as a measure for investors who consider responsibility and sustainability alongside financial gain (Clément, Robinot & Trespeuch, 2025).

Different assessment platforms offering ESG scores have varying assessment criteria, but they all relate to one or more of the E, S, or G categories (Noeth, 2024). The data needed for ESG scores can be collected in many different ways. Eccles and Strohle (2018) explain that data for ESG scores are usually collected annually and may vary depending on the topic. Data for ESG scores are collected using various methods, such as interviews, financial statements, news, CSR reports, social media, annual reports, regulatory reports, interviews with stakeholders, and analysis of various documents (Eccles & Strohle, 2018; Visalli et al., 2023). Nowadays, artificial intelligence is also widely used in data collection (Visalli et al., 2023).

There are several ESG score data providers, and the five best recognized in the industry are LSEG, ISS, MSCI, Sustainalytics, and S&P Global. This study uses data that complies with the LSEG provider, so this section provides more information about LSEG data and how the ESG score is determined according to them.

LSEG stands for London Stock Exchange Group, and their goal is to provide transparent, accurate, and comparable ESG data to the financial sector. They offer one of the most comprehensive ESG databases in the industry, covering over 90% of the global market capitalization. It includes historical data from 2002 onwards and over 870 ESG metrics. LSEG's ESG scores measure companies' relative ESG performance, commitment, and effectiveness. The assessment covers 10 key themes and includes for example emissions, human rights, environmental innovation, and shareholder-related factors. The scores are based on publicly available data reported by the companies themselves, external data sources, ESG metrics, comparative analysis, and ESG controversies. ESG scores are presented numerically on a scale of 0-100 and as letter grades from D- to A+. The model consists of two overall ESG scores: the ESG score, which measures a company's ESG performance based on publicly reported and verified data, and the ESGC score, which combines the ESG score and ESG controversies to provide a more comprehensive assessment of a company's responsibility over time. Figure 6 illustrates how LSEG defines ESG performance across different quartiles. (LSEG, 2024)

Score range	Description
76-100	Scores within this range indicate strong relative ESG performance and high level transparency in the public disclosure of relevant ESG data
51-75	Scores within this range indicate above average relative ESG performance and solid transparency in the public disclosure of relevant ESG data
26-50	Scores within this range indicate below average relative ESG performance and moderate transparency in the public disclosure of relevant ESG data
0-25	Scores within this range indicate weak ESG performance and insufficient transparency in the public disclosure of relevant ESG data.



**Figure 6. Percentiles of ESG Scores Adapted From LSEG**

The ESG score is divided into three pillars, where the environment pillar focuses on the factors that can impact the Earth’s ability to sustain life. The main factors are air, water, and soil pollution, climate change, loss of biodiversity, land exploitation, and economic models that involve unsustainable consumption. It assesses the company's contribution to resource usage, emissions, and innovation. The social pillar focuses on the well-being of communities and humans overall. It evaluates the company's efforts on factors that are impacting employees’ satisfaction, like workforce, human rights, community, and product responsibility. The governance pillar is related to factors such as corporate management, shareholders, and corporate social responsibility (CSR) strategy. (LSEG, 2024)

The data points collected by LSEG from companies are either numerical or Boolean (“yes/no/null”). Boolean data is converted into numerical points depending on whether the higher value is positive or negative; for example, an emissions reduction policy increases the score, while environmental disputes decrease it. Numerical data is scored using a percentile rank, which takes into account how many companies in the same industry are in a weaker, equal, or better position. (LSEG, 2024)

ESG scores are calculated by LSEG with the following formula:

$$\text{Score} = \frac{N \text{ of companies with a worse value} + \frac{N \text{ of companies with a same value}}{2}}{N \text{ of companies with a value}}$$

LSEG has developed a materiality matrix to justify the significance of the themes. The matrix groups ESG themes into categories and identifies critical data points that are used as indirect metrics in calculating ESG scores (magnitude matrix). The magnitude of numerical data points is calculated based on industry medians, while transparency weights are taken into account for Boolean values (LSEG, 2024).

The overall ESG score is formed from the scores of ten categories, for which category-specific weights are calculated using magnitude weighting. For example, the weight of the governance category is determined by the total number of data points in the governance pillar multiplied by the default weight (15). All category weights are normalized into percentages, and finally, each category score is multiplied by its weight and summed to produce the company's final ESG score. (LSEG, 2024)

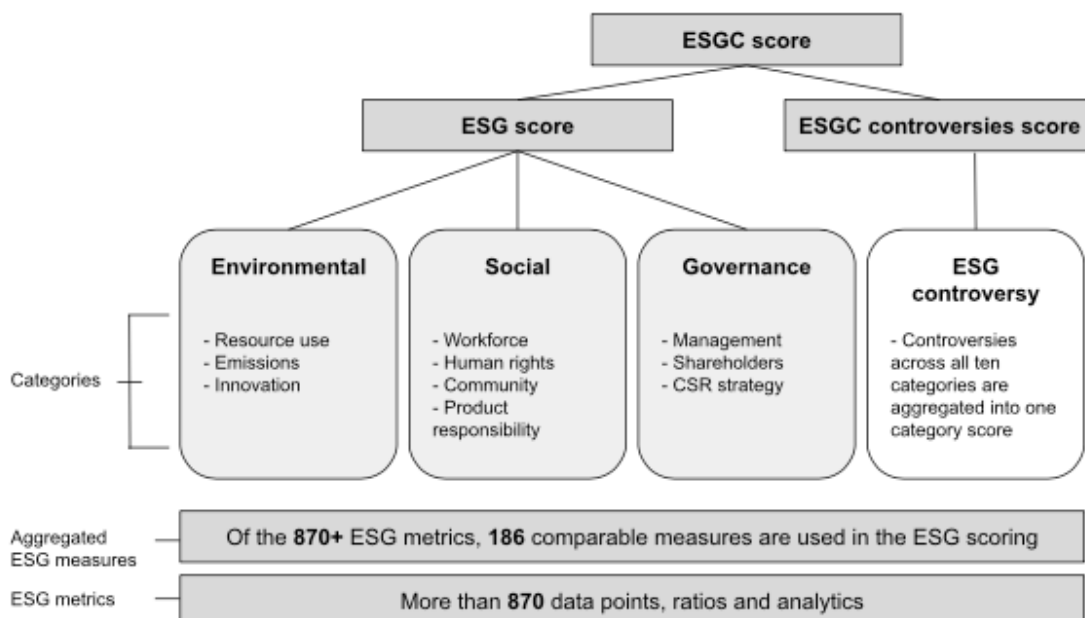


Figure 7. LSEG ESGC score framework, adapted from LSEG 2024

## 4.2 ESG Score Controversy

The growing importance of ESG scores has sparked significant controversy, mainly due to concerns about data reliability, measurement approaches, scoring methodologies, and implications for investment decisions (Dorfleitner, Halbritter & Nguyen, 2015). One major challenge, according to Escrig-Olmedo et al. (2019), is that rating providers do not communicate clearly and publicly enough about the criteria and assessment processes they use to evaluate ESG performance. Drempetic et al. (2020) argue that ESG scores do not accurately measure a firm's sustainability and that firm size is the main variable affecting data availability and the resources required to provide ESG data, which in turn increases ESG scores.

The lack of transparency makes it difficult to compare rating providers. Studies conducted by Berg et al. (2020) and Gibson Brandon et al. (2021) have highlighted substantial disparities in the calculations of firms' ESG quality across major rating providers, raising concerns about the overall quality of ESG databases. Since 2010, numerous agencies have started to provide ESG ratings without coherent standards or guidelines. Billio et al. (2021) showed in their study that differences in ESG ratings between service providers can lead to a company receiving completely different ratings from different providers. The big three credit rating agencies, Fitch, S&P, and Moody's, have started incorporating ESG measurements into their ratings (Billio et al., 2021), but it would also be beneficial in the big picture if all rating agencies agreed on common metrics.

The link between ESG scores and greenwashing has been studied, as companies want to present themselves as sustainable as possible. A study by Biju et al. (2023) showed that there is a positive linear correlation between ESG and greenwashing. A study by Lee et al. (2023) also showed that the weighting methodology used by ESG score providers can lead to greenwashing because the weightings used in the scoring are selected differently by different rating providers, which means that a company can achieve a good overall ESG score even if it performs poorly in other important areas.

ESG scores have also been examined from the perspective of reliability. Utz (2019) conducted a study that examined how various scandals and controversies related to companies' public image affect their ESG scores. He found that ESG scores were reliable in these situations and that scores declined in years when the public image was damaged.

## 5 Data and Methodology

The sample in the empirical analysis consists of the S&P 1500 firms, covering the period from 2006 to 2023. The sample includes firms that have been listed on the S&P 1500 as of the end of each sample period year. The ESG scores data is sourced from LSEG (London Stock Exchange Group) Workspace (formerly Thomson Reuters, Eikon Asset4, Refinitiv). The age and gender data for the firms' CEOs and CFOs, as well as executive compensation data, are obtained from ExecuComp.

The financial statement data used as control variables are from Worldscope. Individual firms with insufficient or missing data on executive characteristics and/or financial information are excluded from the sample. Also, banks, insurance companies, and other financial institutions (SIC codes 6000-6999) are excluded because their distinct regulatory environments differ substantially from those of non-financial firms and might bias the estimation of CEO and CFO influence on ESG scores. Furthermore, firms with non-positive total assets and book values of equity are excluded. The sample consists of an unbalanced panel of 1507 individual non-financial firms that have been included among the S&P 1500 firms during the sample period and 13 033 usable firm-year observations for the main regressions.

### 5.1 Research Methods

The fixed-effects panel regressions are utilized to examine whether the age of CEOs and CFOs is associated with a firm's ESG scores. In the main analysis, the effect of the age of firms' top executives is estimated using the different versions of the following regression:

$$(1) \text{ ESG score}_{j,t} = \alpha + \beta_1 \text{ CEO age}_{j,t} + \beta_2 \text{ CFO age}_{j,t} + \gamma (\text{Firm-specific controls})_{j,t} + \omega (\text{firm fixed-effects})_{j,t} + \varphi (\text{Year fixed-effects})_{j,t} + \varepsilon_{j,t}$$

where the dependent variable ESG score $_{j,t}$  is one of the LSEG ESG scores for firm  $j$  at time  $t$ . The first measure of ESG score is the combined LSEG ESG score $_{j,t}$ , which includes 10 ESG factors with different category weights that reformulate the final ESG score for the firm  $j$  at time  $t$  based on the firm's publicly-reported information. The second measure of the ESG score $_{j,t}$  is the environment score (ENV score) for firm  $j$  at time  $t$ , which is calculated with category weights from 3 factors, including resource use, emissions, and innovation. The third measure of the ESG score $_{j,t}$  is the social score (SOC score) for firm  $j$  at time  $t$ , which is calculated with category weights from 4 factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score (GOV score) is used as the ESG score $_{j,t}$  for firm  $j$  at time  $t$ , which is calculated with category weights from 3 factors, including management, shareholders, and CSR strategy.

Several control variables are included in the analysis to account for potentially confounding effects of firm-specific factors such as size, leverage, profitability, growth, executive compensation, and gender, following the approaches of previous studies. The set of controls used in equation (1) are defined as follows: *Size* $_{j,t}$  is measured as the logarithm of firm  $j$ 's total assets at the end of year  $t$ ; *Leverage* $_{j,t}$  is the logarithm of one plus the ratio of long-term debt to market value of equity at the end of year  $t$ ; *Profitability* $_{j,t}$  is measured as the return on assets at time  $t$ ; *Cash holdings* $_{j,t}$  is the logarithm of one plus cash and short term investments scaled by total assets; *Growth* $_{j,t}$  is the transformed logarithm of the growth rate of sales from year  $t-3$  to year  $t$ ; *Market-to-book* $_{j,t}$  is the logarithm of the market value of equity scaled by the book value of equity at time  $t$ .

Moreover, managerial characteristics are controlled by adding CEO pay and CFO pay variables, which are the logarithm of the total compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) of the corresponding executive. Also, Female CEO and Female CFO are used as dummy variables for executive gender, where Female CEO equals 1 for firms that have a female CEO, and Female CFO equals 1 for firms that have a female CFO.

## 5.2 Descriptive statistics

Most variables in the main regressions are logged, but in Table 1, the actual values are presented, except for CEO pay and CFO pay. Table 1 presents the descriptive statistics of our four alternative dependent variables (*ESG score*, *ENV score*, *SOC score*, and *GOV score*), the 2 different executive age variables (*CEO age*, *CFO age*), and the control variables used in the regressions.

As shown in Table 1, the average ESG score (*ESG score*) of the S&P 1500 firms during our sample period is 45,77, and all four ESG scores have a standard deviation of over 19, but less than 29. Table 1 also implies that among the ESG pillar scores, the governance scores tend to be the highest (mean = 53,14), followed by the social scores (mean = 47,30), and the environment (mean = 34,41), which indicates that the sample firms seem to perform better on governance-related metrics. The environment score presents the highest standard deviation (28,02), implying higher variation in environmental performance across the firms. Table 1 reveals that all four ESG scores span nearly the full range from 0 to close to 100, which indicates that the sample firms are highly heterogeneous regarding ESG performance.

Table 1 shows that the median age of CEOs of S&P 1500 firms is 57 years, whereas the average CFO is slightly lower at 52 years old. Noting that the standard deviation on executives' ages is less than 7, which implies that the sample CEO age and CFO age are relatively homogeneous. Moreover, the table reveals a notable gender imbalance in top executive positions, where only 5% of CEOs are female, and 12% of CFOs are female during the sample period. Lastly, the descriptive statistics suggest that the sample firms are substantially heterogeneous with respect to the firm-specific control variables.

**Table 1. Descriptive Statistics**

Variable	Mean	Median	Min	Max	Std. Dev.	No. Of obs.
<u>ESG scores:</u>						
ESG score	45,77	44,00	0,44	95,16	19,41	14 012
ENV score	34,41	31,28	0,00	98,55	28,02	14 012
SOC score	47,30	44,86	0,26	98,14	21,66	14 012
GOV score	53,14	54,45	0,17	99,37	21,62	14 012
<u>Age:</u>						
CEO age	57,09	57,00	28,00	90,00	6,82	14 012
CFO age	52,17	52,00	30,00	90,00	6,44	14 012
<u>Control variables:</u>						
Size	13 571,58	4 250,52	36,24	147 000,00	25 345,45	14 012
Leverage	0,35	0,19	0,00	4,66	0,53	14 012
Profitability	0,06	0,06	-0,48	0,35	0,09	14 012
Cash holdings	0,14	0,09	0,00	0,79	0,15	14 012
Sales growth	0,32	0,17	-0,64	5,74	0,71	14 012
Market-to-book	4,72	2,74	0,41	48,24	6,84	14 012
CEO pay	8,72	8,80	5,65	10,46	0,85	14 012
CFO pay	7,72	7,73	5,47	9,48	0,73	14 012
Female CEO	0,05	0,00	0,00	1,00	0,22	14 012
Female CFO	0,12	0,00	0,00	1,00	0,32	14 012

The table reports summary statistics for the sample of S&P 1500 firms. Financial institutions (SIC codes 6000–6900) and firms with missing data are excluded. The variables are defined as follows: ESG score<sub>*j,t*</sub> is the combined ESG score for the firm *j* at time *t*, which accounts for industry effect on environmental and social scores, and it is based on the firm's publicly reported information. ENV score<sub>*j,t*</sub> is the environment score for firm *j* at time *t*, which is a combination of three factors, including resource use, emissions, and innovation, with category weights. SOC score<sub>*j,t*</sub> is the social score for firm *j* at time *t*, which is calculated with category weights from four factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score (GOV score) is used as the ESG score<sub>*j,t*</sub> for firm *j* at time *t*, which is calculated with category weights from three factors, including management, shareholders, and CSR strategy. CEO age and CFO age represent the ages of the corresponding executives. Size is measured by the firm's total assets, Leverage is the ratio of the long-term debt-to-market value of equity, Profitability is measured as the return on assets (ROA), Cash holdings is cash and short-term investments scaled by total assets, Growth is the 3-year growth rate of sales, Market-to-book is the market value of equity divided by the book value of equity. CEO pay and CFO pay variables are the logarithm of the total compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) of the corresponding executive. Female CEO equals 1 if the firm's CEO is a female, and Female CFO equals 1 if the firm has a female CFO. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.

**Table 2. Pairwise Correlation**

	ESG SCORE	ENV SCORE	SOC SCORE	GOV SCORE	CEO AGE	CFO AGE	CFO GENDER	CFO GENDER	CEO PAY	CFO PAY	SIZE	CASH HOLDINGS	LEVERAGE	MARKET-TO-BOOK	PROFITABILITY
ENV SCORE	0,869														
SOC SCORE	0,891	0,742													
GOV SCORE	0,668	0,411	0,368												
CEO AGE	0,014	0,027	-0,003	0,016											
CFO AGE	0,084	0,072	0,078	0,059	0,159										
CEO GENDER	0,053	0,035	0,040	0,059	-0,032	0,018									
CFO GENDER	0,084	0,054	0,062	0,090	0,017	-0,012	0,041								
CEO PAY	0,414	0,416	0,412	0,160	0,048	0,034	0,016	0,010							
CFO PAY	0,419	0,414	0,427	0,147	-0,006	0,076	0,011	0,011	0,709						
SIZE	0,448	0,462	0,415	0,221	0,035	0,051	0,037	0,037	0,392	0,477					
CASH HOLDINGS	-0,116	-0,155	-0,046	-0,140	-0,050	-0,006	-0,004	0,051	-0,127	-0,030	-0,119				
LEVERAGE	0,004	0,035	-0,035	0,048	-0,007	-0,027	-0,006	-0,030	0,036	0,012	0,080	-0,281			
MARKET-TO-BOOK	0,067	0,045	0,096	-0,007	-0,025	0,000	0,024	0,012	0,098	0,126	-0,005	0,174	-0,130		
PROFITABILITY	0,093	0,089	0,094	0,041	0,022	0,022	0,018	0,022	0,127	0,120	0,021	0,073	-0,255	0,177	
SALES GROWTH	-0,167	-0,167	-0,117	-0,148	-0,061	-0,065	-0,026	-0,007	-0,067	-0,001	-0,045	0,197	-0,059	0,095	0,087

The table presents pairwise correlation coefficients where variables are defined as follows: ESG score $_{j,t}$  is the combined ESG score for the firm  $j$  at time  $t$ , which accounts for industry effect on environmental and social scores, and it is based on the firm's publicly reported information. ENV score $_{j,t}$  is the environment score for firm  $j$  at time  $t$ , which is a combination of three factors, including resource use, emissions, and innovation, with category weights. SOC score $_{j,t}$  is the social score for firm  $j$  at time  $t$ , which is calculated with category weights from four factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score (GOV score) is used as the ESG score $_{j,t}$  for firm  $j$  at time  $t$ , calculated using category weights from three factors: management, shareholders, and CSR strategy. CEO age and CFO age represent the ages of the corresponding executives. Size is measured by the firm's total assets, Leverage is the ratio of the long-term debt-to-market value of equity, Profitability is measured as the return on assets (ROA), Cash holdings is cash and short-term investments scaled by total assets, Growth is the 3-year growth rate of sales, Market-to-book is the market value of equity divided by the book value of equity. CEO pay and CFO pay variables are the logarithm of the total compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) of the corresponding executive. Female CEO equals 1 if the firm's CEO is a female, and Female CFO equals 1 if the firm has a female CFO. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.

Pairwise correlation coefficients between the variables used in the analysis show that the ESG score and its pillars are strongly positively correlated. In particular, the combined ESG score is highly correlated with the environmental score ( $r = 0.869$ ) and the social score ( $r = 0.891$ ), while the correlation with the governance score is also strongly positive but somewhat weaker at 0.668. The environment score shows a high level of positive correlation with the social score ( $r = 0,742$ ), whereas the correlations between environment and social score against governance score are weaker, but still moderate ( $r$

= 0,411,  $r = 0,368$ , respectively). Overall, Table 2 suggests that firms that are performing well on one ESG score tend to perform well in others as well.

The matrix suggests that there is little to no linear correlation between executive characteristics and ESG scores. CEO age and CFO age are mainly weakly positively correlated with ESG performance across all four scores, suggesting that executive age does not strongly influence ESG scores. Similarly, the correlations between female executives and ESG scores are positive but negligible, indicating that firms with female executives might exhibit slightly higher ESG scores. In addition, CEO age and CFO age seem to be negligibly positively correlated ( $r = 0,159$ ), implying that firms with older CEOs tend to have older CFOs and vice versa.

The correlations further show that CEO pay and CFO pay are moderately positively correlated with all ESG scores except the governance score, which shows a bit weaker correlation ( $r = 0,147 - 0,160$ ). Moreover, the larger firms tend to have higher ESG scores, while firms with higher cash holdings and stronger sales growth tend to exhibit slightly lower ESG scores.

The pairwise correlation matrix indicates a strong positive correlation between the ESG score and its pillars, as expected. Even though firm size, CEO pay, and CFO pay are moderately positively correlated with ESG scores, mainly other variables show relatively weak correlations. Besides the structural relationship between the ESG score and its pillars, this indicates that multicollinearity is unlikely to cause a significant concern in the empirical analysis.

## 6 Regression results

This chapter reviews the results of an empirical study examining the relationship between CEO and CFO ages and ESG scores. First, a univariate test is used to examine the relationship between age and ESG score across different ESG score quartiles, revealing that companies with high ESG scores have, on average, older CEOs and CFOs than those in the lowest quartile. The results of the main regression are reviewed, which show consistent results with previous studies. Endogeneity and selection bias issues are present in the panel study, so these problems and how the study aims to mitigate them are discussed. Finally, the results of the robustness tests are presented, which assess the stability of the results across different sample selections and model specifications.

### 6.1 Univariate tests

Table 3 shows multiple univariate tests to study whether executive ages and ESG scores are associated with each other. The mean values of CEO age and CFO age are presented across quartiles of the ESG score, ENV score, SOC score, and GOV score. The two-tailed t-tests are used to examine the significance of the mean executive age difference between the bottom and top quartiles of ESG scores. The results report that high ESG firms tend to have older CEOs across all ESG scores, and the results are statistically significant except in the SOC score and GOV score. Table 3 shows similar results for CFO age, but the results are significant at 1% level across all different ESG variables.

**Table 3. Univariate Tests**

	Bottom quartile	Second quartile	Third quartile	Top quartile	Difference (q1-q4)	t-stat
<u>ESG score:</u>						
CEO age	56,996	56,799	56,937	57,348	-0,352**	-2,191
CFO age	51,274	51,821	52,259	52,992	-1,718***	-10,822
<u>ENV score:</u>						
CEO age	56,926	56,814	56,943	57,398	-0,472***	-2,856
CFO age	51,339	51,885	52,391	52,664	-1,325***	-8,679
<u>SOC score:</u>						
CEO age	57,286	56,904	56,581	57,319	-0,033	-0,214
CFO age	51,472	51,766	52,220	52,823	-1,351***	-8,928
<u>GOV score:</u>						
CEO age	56,832	56,971	57,189	57,091	-0,259	-1,601
CFO age	51,448	51,960	52,347	52,538	-1,090***	-7,107

The table presents univariate tests where the mean values of CEO age and CFO age are presented across quartiles of the ESG score, ENV score, SOC score, and GOV score. In addition, the results of the two-tailed t-tests are reported to examine the significance of the mean executive age difference between the bottom and top quartiles of ESG scores. The variables are defined as follows:  $ESG\ score_{j,t}$  is the combined ESG score for the firm  $j$  at time  $t$ , which accounts for industry effect on environmental and social scores, and it is based on the firm's publicly reported information.  $ENV\ score_{j,t}$  is the environment score for firm  $j$  at time  $t$ , which is a combination of three factors, including resource use, emissions, and innovation, with category weights.  $SOC\ score_{j,t}$  is the social score for firm  $j$  at time  $t$ , which is calculated with category weights from four factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score (GOV score) is used as the  $ESG\ score_{j,t}$  for firm  $j$  at time  $t$ , which is calculated with category weights from three factors, including management, shareholders, and CSR strategy. CEO age and CFO age represent the ages of the corresponding executives.

## 6.2 Main regression

The study uses fixed-effects panel regression to analyze the impact of executive age and ESG scores. The results for the eight alternative versions of equation (1) are shown in Table 4. Models 1 and 2 use the combined ESG score as the dependent variable, models

3 and 4 use the ENV score as the dependent variable, models 5 and 6 use the SOC score as the dependent variable, and models 7 and 8 use the GOV score as the dependent variable. Moreover, the regressions are divided into two models for each dependent variable, where models 1, 3, 5, and 7 are used as baseline regressions with a limited set of control variables (Size, Leverage, and Profitability) to ensure that the results are not caused by spurious correlations or influenced by the overlapping or unnecessary independent variables. The models 2, 4, 6, and 8 use the full set of control variables (Size, Leverage, Profitability, Cash holdings, Sales growth, Market-to-book, CEO pay, CFO pay, Female CEO, and Female CFO). To control for unobserved heterogeneity across firms and potential systematic variation in ESG performance over time, all the model versions include firm and year fixed effects.

The beta coefficients of different regression variables are shown in each of the following tables. The statistical reliability of the results is presented by using stars (\*, \*\*, and \*\*\*) next to the beta coefficients, denoting the statistical significance of the obtained p-values. If no statistically significant relationship between the dependent variable and independent variable is found, the beta coefficients in the tables do not have stars. \* denotes significance at 10% confidence level, \*\* denotes significance at 5% confidence level, and \*\*\* denotes significance at 1% confidence level. The values of the two-tailed t-statistics are reported in parentheses below each coefficient.

The adjusted  $R^2$  values are between 0.61 and 0.84 across the model versions. A relatively high  $R^2$ s are caused by the inclusion of firm and year fixed effects, which capture a big portion of the variation in the dependent variable. When the fixed effects are excluded, the adjusted  $R^2$  values drop to much lower levels, ranging from 0.09 to 0.42. This suggests that a considerable portion of the explained variation is caused by fixed effects rather than the explanatory variables alone, which is expected with panel data like this. The F-statistics are significant at the 1% level in all model versions.

**Table 4. Main Regressions**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Age:</b>								
CEO age	-0,067*** (-3,16)	-0,050** (-2,71)	0,015 (0,53)	0,026 (1,04)	0,017 (0,82)	0,023 (1,15)	-0,247*** (-10,77)	-0,220*** (-10,92)
CFO age	0,013 (1,00)	0,005 (0,33)	-0,038 (-1,61)	-0,054** (-2,45)	0,032** (2,501)	0,028* (2,09)	0,042 (1,44)	0,033 (1,02)
<b>Control variables:</b>								
Size	3,688*** (12,68)	3,821*** (10,15)	5,619*** (12,19)	5,964*** (11,95)	3,428*** (8,50)	3,709*** (7,25)	2,761*** (7,96)	2,648*** (6,87)
Leverage	-1,940*** (-3,53)	-2,050*** (-3,68)	-4,142*** (-6,38)	-4,724*** (-6,41)	-1,969*** (-3,71)	-1,728** (-2,95)	-0,055 (-0,06)	0,246 (-0,33)
Profitability	-0,219 (-0,33)	2,169** (2,43)	-1,770 (-1,25)	0,255 (0,15)	0,916 (1,16)	3,927*** (3,21)	0,093 (0,07)	2,364 (1,29)
Cash holdings		1,693** (2,36)		0,298 (0,17)		2,267*** (3,17)		0,927 (0,78)
Sales growth		-2,220*** (-5,23)		-2,290*** (-4,49)		-2,820*** (-6,42)		-1,763*** (-3,38)
Market-to-book		-0,086 (-0,19)		-0,224 (-0,66)		0,100 (0,27)		-0,102 (-0,14)
CEO pay		0,263* (1,79)		-0,097 (-0,50)		0,355** (2,16)		0,471* (2,01)
CFO pay		-0,064 (-0,33)		-0,193 (-0,64)		-0,085 (-0,39)		0,018 (0,05)
Female CEO		0,688 (1,32)		1,544** (2,26)		-0,141 (-0,24)		0,520 (1,05)
Female CFO		-0,314 (-0,97)		-0,952 (-1,71)		-0,789*** (-3,46)		0,933 (1,73)
Constant	18,530*** (8,39)	15,799*** (5,36)	-10,330* (-2,12)	-9,263 (-1,49)	16,416*** (5,67)	11,852*** (3,17)	41,940*** (11,93)	38,168*** (12,56)
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	13 919	13 033	13 919	13 033	13 919	13 033	13 919	13 033
Adjusted R2	0,83	0,83	0,84	0,84	0,80	0,81	0,61	0,62
Adjusted r2 excl. Fixed effects	0,35	0,39	0,39	0,42	0,29	0,34	0,09	0,12
F-statistic	42,18***	41,43***	44,90***	44,78***	36,15***	35,84***	14,37***	14,42***

*The table presents the results for the eight alternative versions of equation (1). The dependent variables are defined as follows:  $ESG\ score_{j,t}$  is the combined ESG score for the firm  $j$  at time  $t$ , which accounts for industry effect on environmental and social scores, and it is based on the firm's publicly reported information.  $ENV\ score_{j,t}$  is the environment score for firm  $j$  at time  $t$ , which is a combination of three factors, including resource use, emissions, and innovation, with category weights.  $SOC\ score_{j,t}$  is the social score for firm  $j$  at time  $t$ , which is calculated with category weights from four factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score*

*(GOV score) is used as the ESG score<sub>j,t</sub> for firm j at time t, which is calculated with category weights from three factors, including management, shareholders, and CSR strategy. The test variables of interest are defined as follows: CEO age and CFO age represent the ages of the corresponding executives. The control variables are defined as follows: Size is measured as the logarithm of the firm's total assets, Leverage is the logarithm of one plus the ratio of the long-term debt-to-market value of equity, Profitability is measured as the return on assets (ROA), Cash holdings is logarithm of one plus the cash and short-term investments scaled by total assets, Growth is the logarithm of the 3-year growth rate of sales, Market-to-book is the logarithm of market value of equity divided by the book value of equity. CEO pay and CFO pay variables are the logarithm of the total compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) of the corresponding executive. Female CEO equals 1 if the firm's CEO is a female, and Female CFO equals 1 if the firm has a female CFO. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

Table 4 presents that the ESG scores are negatively associated with the age of top executives. The coefficient results for CEO age are negative and statistically significant at 1% level in models 1 (ESG score), 7 (Gov score), and 8 (Gov score), and statistically significant at the 5% level in model 2 (ESG score). The results in models 1 and 2 suggest that a one standard deviation increase in CEO age would decrease the ESG score by 0,46 ( $-0,067 \times 6,82 = -0,457$ ) to 0,34 points ( $-0,050 \times 6,82 = -0,341$ ). Also, the results in models 7 and 8 suggest that a one standard deviation increase in CEO age would decrease the GOV score by 1,69 ( $-0,247 \times 6,82 = -1,685$ ) to 1,5 points ( $-0,220 \times 6,82 = -1,500$ ). However, the magnitude of the effect is relatively small as ESG scores are measured on a 0-100 scale, which limits the economic significance. Overall, the regressions indicate that firms led by older CEO have worse ESG performance even after controlling for numerous firm-specific variables and executive variables.

Furthermore, the coefficient result for CFO age is negative and statistically significant at 5% level in model 4 (ENV score). While CFO age is positively and statistically significant at 5% level in model 5 (SOC score), and statistically significant at the 10% level in model 6 (SOC score). The result in model 4 suggests that a one standard deviation increase in CFO age would decrease the ENV score by 0,35 points ( $-0,054 \times 6,44 = -0,348$ ). Moreover, the results in models 5 and 6 suggest that a one standard deviation increase in CFO age

would increase the SOC score by 0,21 ( $0,032 \times 6,44 = 0,206$ ) to 0,19 points ( $0,028 \times 6,844 = 0,192$ ). The results indicate that firms led by older CFO are less focused on environmental performance, including resource use, emissions, and innovation metrics. On the other hand, the results indicate that firms led by older CFO are more concerned about social matters, including workforce, human rights, community, and product responsibility.

Table 4 shows the importance of including the firm-specific control variables, as their coefficient estimates are highly significant across the alternative model versions. The regressions suggest that the ESG scores are negatively associated with Leverage and Sales growth. While being positively associated with Size, Profitability, Cash holdings, and CEO pay. Furthermore, the ENV score is positively related to Female CEO, whereas the SOC score is negatively related to Female CFO, suggesting that female-led firms tend to prioritize environmental focus while being less concerned about social aspects.

Firm size is the most consistent and significant across the alternative model specifications, showing a positive association with the ESG score and its pillars at the 1% level. The results are in line with previous studies, for example, Dremptic et al. (2020) find that firm size is positively correlated with ESG scores. Their study comprises 3,828 individual firms from 2004 to 2015, including companies worldwide.

Also, leverage shows consistent and significant results across alternative model versions, indicating a negative relationship with the ESG score and its pillars at the 1% or 5% levels, except that the GOV score shows a mixed association with leverage that is not statistically significant. Furthermore, Models 2, 4, 6, and 8 show that sales growth is strongly and negatively associated with all ESG variables, and the results are significant at the 1% level.

### 6.3 Endogeneity and selection concerns

It may be that individual firm characteristics influence both a firm's ESG score and the age of the top executives they appoint to lead the firm, especially among larger firms included in the S&P 1500. Also, executives might have their own preferences when it comes to the firm's ESG scores, and they may affect the decisions when choosing the firms they work for. To strengthen the results of the main regressions and mitigate endogeneity and selection concerns, the thesis uses firm fixed effects and lagged independent variables ( $t-1$ ), except for the CEO and CFO genders.

Furthermore, to mitigate the endogeneity concerns, the thesis uses propensity score matching (PSM). The point of using propensity score matching is to match firms led by young CEOs and CFOs with identical firms led by older CEOs and CFOs, which should eliminate any endogenous selection on observed variables. If PSM is done correctly and the results show differences in ESG scores, this suggests that the observed differences can be explained only by the age of top executives, since other variables should be held constant. The propensity scores are estimated by using firm-specific control variables along with year dummies to match firms with younger CEO and CFO to similar firms with older CEO and CFO as closely as possible by using nearest neighbor matching based on the estimated propensity scores.

Table 5 shows that before matching, the Pseudo  $R^2$ s are 0.02-0.03, and the Likelihood Ratio (LR) chi-squares are very high and significant at 1% level. This indicates that there are systematic differences between firms with younger and older executives. After matching, the Pseudo  $R^2$ s decline to 0.00 for both executives' samples, and the LR chi-squares drop substantially and become statistically insignificant. This suggests that the matched firms are identical based on firm-specific variables, and the observable differences between the firms no longer exist.

The results from the propensity score-matched regressions in Table 5 are inconsistent with those from the main regressions in Table 4. Only the coefficient estimate for the

CEO age is negative and statistically significant at 1% level in the regression with the GOV score. Moreover, Table 5 shows that the relationship between CEO age and ESG score is negative, but no longer significant. Also, the coefficient estimate for CEO age turns negative with the SOC score but stays insignificant. In the matched samples, the coefficient for CFO age with ESG score remains positive but insignificant. Furthermore, the negative and statistically significant relationship between CFO age and ENV score in the main regression (Table 4) is no longer significant. The same appears to the relationship between CFO age and SOC score, which is no longer positive and significant, not even at the 10% level. Surprisingly, propensity score-matched regressions reveal a new relationship between CFO age and GOV score. The coefficient for CFO age is positive and significant at the 10% level in model 8 (GOV Score).

**Table 5. Propensity Score-matched Regressions**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<u>Age:</u>								
CEO age	-0,036 (-1,10)		0,029 (0,73)		-0,007 (-0,23)		-0,163*** (-3,91)	
CFO age		0,057 (1,73)		-0,038 (-0,85)		0,073 (1,71)		0,104* (2,04)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	4814	4602	4814	4602	4814	4602	4814	4602
Adjusted R2	0,83	0,83	0,84	0,85	0,81	0,80	0,62	0,64
F-statistic	17,38***	17,57***	19,18***	19,17***	15,35***	14,51***	6,65***	6,88***
<u>PSM diagnostics:</u> CEO age      CFO age								
Pre-matching								
pseudo R <sup>2</sup>	0,03	0,02						
Pre-matching LR chi-square	578,82***	387,24***						
Post-matching								
pseudo R <sup>2</sup>	0,00	0,00						
Post-matching LR chi-square	1,52	2,09						

*The table presents the results for the eight alternative versions of equation (1) with propensity score-matched samples, where the young CEO and CFO samples consist of the bottom quintile of CEO and CFO ages. The propensity scores are estimated by using firm-specific control variables along with year dummies to match firms with younger CEO and CFO to similar firms with older CEO and CFO as closely as possible by using nearest neighbor matching based on the estimated propensity scores. The dependent variables are*

*described as follows: ESG score<sub>j,t</sub> is the combined ESG score for the firm j at time t, which accounts for industry effect on environmental and social scores, and it is based on the firm's publicly reported information. ENV score<sub>j,t</sub> is the environment score for firm j at time t, which is a combination of three factors, including resource use, emissions, and innovation, with category weights. SOC score<sub>j,t</sub> is the social score for firm j at time t, which is calculated with category weights from four factors, including workforce, human rights, community, and product responsibility. Lastly, the governance score (GOV score) is used as the ESG score<sub>j,t</sub> for firm j at time t, which is calculated with category weights from three factors, including management, shareholders, and CSR strategy. The test variables of interest are described as follows: CEO age and CFO age represent the ages of the corresponding executives. The control variables are defined as follows: Size is measured as the logarithm of the firm's total assets, Leverage is the logarithm of one plus the ratio of the long-term debt-to-market value of equity, Profitability is measured as the return on assets (ROA), Cash holdings is logarithm of one plus the cash and short-term investments scaled by total assets, Growth is the logarithm of the 3-year growth rate of sales, Market-to-book is the logarithm of market value of equity divided by the book value of equity. CEO pay and CFO pay variables are the logarithm of the total compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) of the corresponding executive. Female CEO equals 1 if the firm's CEO is a female, and Female CFO equals 1 if the firm has a female CFO. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

Since only the coefficients for CEO age and CFO age are significant with the GOV score in the propensity score-matched regressions, the results do not provide strong evidence of the overall relationships between CEO age and CFO age and ESG scores. The PSM reduces endogeneity concerns, but it does not fully eliminate them. The differences in results between Table 4 and Table 5 may suggest that the main regression results are influenced by selection bias.

#### **6.4 Robustness checks**

To test the robustness of the study, two different robustness checks are conducted and tabulated below. Tables 6 and 7 present additional regressions in which the firm size effect is examined by dividing the data into two subsamples based on firm-size quartiles. Tables 8 and 9 present re-estimates of the main regressions where the sample period is divided into two subsamples based on time: 2006-2014 and 2015-2023. The idea is to

test whether the main regression results remain constant over time, given that the original sample period is 18 years, and a lot has happened around ESG during this time.

In the main regressions in Table 4, firm size is positive and significant at the 1% level across all equation (1) versions. Also, the univariate test in Table 3 suggests that older executives work for high-ESG companies and younger executives work for low-ESG firms. Firstly, in Table 6, the main regressions are re-estimated by excluding the smallest quartile of the firms. Secondly, in Table 7, the main regressions are re-estimated by excluding the largest quartile of the firms.

The first robustness test indicates that the negative relationship between CEO age and ESG performance holds across both subsamples, particularly for the GOV score. Table 6, where the smallest firms are excluded, shows similar results for the association between CEO age and GOV score in Models 7 and 8, but the significance in Model 1 (ESG score) drops to the 5% level, and Model 2 (ESG score) becomes insignificant. The CFO age relationship with the ENV score (model 4) and the SOC score (models 5 and 6) remains unchanged.

**Table 6. Re-estimates Excluding the Smallest Firms**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Age:</b>								
CEO age	-0,054** (-2,24)	-0,032 (-1,55)	0,029 (0,95)	0,045 (1,70)	0,026 (1,06)	0,040 (1,74)	-0,229*** (-8,24)	-0,201*** (-8,13)
CFO age	0,008 (0,51)	-0,003 (-0,18)	-0,048 (-1,72)	-0,068** (-2,47)	0,040** (2,63)	0,033* (1,86)	0,027 (0,74)	0,016 (0,40)
<b>Control variables:</b>								
Size	4,250*** (11,95)	4,492*** (9,75)	6,632*** (12,40)	7,085*** (12,41)	3,972*** (8,35)	4,487*** (7,28)	2,925*** (6,87)	2,814*** (5,89)
Leverage	-1,817*** (-2,90)	-2,034*** (-3,51)	-4,492*** (-6,55)	-5,242*** (-6,63)	-1,922*** (-3,31)	-1,650** (-2,60)	0,697 (0,72)	0,345 (0,45)
Profitability	1,376 (1,36)	4,411*** (3,49)	-1,319 (-0,75)	2,488 (1,13)	2,585** (2,68)	6,283*** (3,79)	2,521 (1,22)	4,968** (2,21)
Cash holdings		2,143** (2,54)		-1,530 (-0,60)		2,536** (2,46)		3,065** (2,91)
Sales growth		-2,763*** (-5,52)		-3,475*** (-6,04)		-3,387*** (-6,29)		-1,928** (-2,93)
Market-to-book		-0,362 (-0,78)		-0,576 (-1,75)		0,060 (0,15)		-0,647 (-0,84)
CEO pay		0,387** (2,19)		-0,132 (-0,55)		0,369* (1,85)		0,616** (2,34)
CFO pay		-0,024 (-0,11)		-0,211 (-0,57)		-0,002 (-0,01)		0,017 (0,04)
Female CEO		0,531 (0,94)		1,530** (2,22)		-0,428 (-0,66)		0,358 (0,66)
Female CFO		-0,391 (-1,02)		-1,160* (-1,97)		-0,652** (-2,27)		0,741 (1,20)
Constant	13,930*** (5,38)	9,106** (2,62)	-17,644*** (-3,01)	-18,622** (-2,56)	11,586*** (3,44)	3,941 (0,99)	40,134*** (10,51)	35,74*** (10,46)
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	12 195	11 380	12 195	11 380	12 195	11 380	12 195	11 380
Adjusted R2	0,82	0,83	0,82	0,83	0,80	0,81	0,60	0,62
Adjusted r2 excl. Fixed effects	0,31	0,36	0,33	0,37	0,26	0,31	0,08	0,11
F-statistic	40,41***	39,59***	41,05***	40,69***	35,22***	34,82***	14,71***	13,76***

*The table presents the results for the re-estimate versions of the main regressions. The smallest quantile of the firm size is excluded. The dependent variables, the test variables of interest, and control variables remain the same as in Table 4. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

Table 7, where the largest firms are excluded, shows similar results for the CEO age relationship with GOV score in Models 7 and 8, but the significance in Model 1 (ESG score)

drops to the 5 % level, and Model 2 (ESG score) significance declines to the 10% level. The CFO age relationship with the ENV score (model 4) and SOC score (models 5 and 6) remains consistent with the main regressions. However, the CFO age results vary more. The association between CFO age and ENV score in Model 4 remains negative and significant at 5% level, and the result in Model 3 becomes significant at 10% level. In contrast, the results indicate that CFO age is less significantly associated with SOC score, as the significance drops to 10% level in Model 5 and becomes insignificant in Model 6. Interestingly, when the largest firms are excluded, Model 1 shows a strongly negative association between ESG score and profitability at 5% significance level.

**Table 7. Re-estimates Excluding the Largest Firms**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Age:</b>								
CEO age	-0,058** (-2,31)	-0,045* (-1,90)	0,011 (0,26)	0,022 (0,59)	0,042 (1,73)	0,045* (1,95)	-0,254*** (-8,30)	-0,233*** (-7,05)
CFO age	0,011 (0,58)	-0,003 (-0,19)	-0,055* (-1,99)	-0,078** (-2,74)	0,034* (1,88)	0,025 (1,40)	0,039 (1,71)	0,024 (0,95)
<b>Control variables:</b>								
Size	2,007*** (5,98)	1,847*** (4,56)	2,943*** (6,03)	2,788*** (4,78)	2,025*** (4,41)	1,924*** (3,47)	1,758*** (3,89)	1,515*** (3,18)
Leverage	-1,861** (-2,78)	-1,673* (-1,91)	-2,099** (-2,25)	-2,132* (-2,01)	-2,285*** (-2,99)	-1,817* (-1,89)	-1,730 (-1,56)	-1,743 (-1,71)
Profitability	-1,377** (2,13)	-0,050 (-0,08)	-2,935** (-2,23)	-3,076** (-2,18)	0,465 (0,42)	2,876** (2,24)	-1,824 (-1,58)	-0,518 (-0,36)
Cash holdings		1,098 (1,61)		-0,338 (-0,22)		1,797** (2,23)		-0,048 (-0,03)
Sales growth		-0,724** (-2,31)		0,137 (0,28)		-1,840*** (-5,35)		-0,120 (-0,32)
Market-to-book		-0,077 (-0,17)		-0,076 (-0,18)		-0,120 (-0,35)		-0,044 (-0,05)
CEO pay		-0,080 (-0,51)		-0,390* (-1,92)		0,255 (1,64)		-0,069 (-0,20)
CFO pay		-0,049 (-0,24)		-0,19 (-0,53)		0,055 (0,23)		-0,149 (-0,38)
Female CEO		0,700 (0,83)		2,541** (2,50)		-0,029 (-0,03)		-1,091 (-1,59)
Female CFO		-0,094 (-0,37)		0,533 (1,14)		-1,003** (-2,36)		1,277* (1,82)
Constant	27,211*** (10,14)	29,770*** (8,76)	4,735 (1,04)	11,609* (2,05)	21,897*** (6,56)	20,822*** (4,63)	48,795*** (12,21)	52,338*** (13,00)
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	9 230	8 660	9 230	8 660	9 230	8 660	9 230	8 660
Adjusted R2	0,79	0,79	0,80	0,80	0,76	0,76	0,63	0,64
Adjusted r2 excl. Fixed effects	0,12	0,17	0,16	0,20	0,11	0,16	0,02	0,06
F-statistic	26,76***	26,12***	27,81***	27,64***	22,48***	22,14***	12,55***	12,69***

*The table presents the results for the re-estimate versions of the main regressions. The largest quantile of the firm size is excluded. The dependent variables, the test variables of interest, and control variables remain the same as in Table 4. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

The second robustness check suggests that the relationship between CEO and CFO age and ESG scores is partially time-dependent. Still, while other relationships change over

the model versions, the CEO age is negatively associated with the GOV score across all regressions at the 1% significance level.

Table 8 below shows that during the sample period 2006–2014, the relationship between CEO and CFO age and ESG scores remains mainly robust. However, in Model 2, the relationship between CEO age and ESG score becomes insignificant, whereas the Model 1 result remains unchanged. The first subsample in Table 8 finds a new association between CFO age and GOV score in Model 8, where the relationship turns out negative and significant at the 5% level, whereas the main regression finds no relationship.

Interestingly, Table 9 presents that during the sample period 2015–2023, the CEO age is positively associated with the SOC score in both models 5 and 6 at the 1% significance level. More surprisingly, the results suggest that CFO age is no longer associated with environmental or social performance but is positively related to governance performance in both models 7 and 8 at the 1% level. Earlier PSM regressions in Table 5. Supports the findings on the relationship between CFO age and governance score. Moreover, the robustness check supports the main regression results, indicating that CEO age is negatively associated with the overall ESG score and GOV Score, whereas the results for CFO age are more mixed.

**Table 8. Re-estimates 2006–2014**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Age:</b>								
CEO age	-0,096*** (-4,10)	-0,060 (-1,92)	0,009 (0,54)	0,017 (0,89)	0,028 (1,17)	0,057 (1,76)	-0,374*** (-5,75)	-0,319*** (-4,13)
CFO age	-0,008 (-0,29)	-0,037 (-1,81)	-0,034 (-0,91)	-0,072** (-2,71)	0,048** (2,60)	0,054** (2,60)	-0,060 (-1,08)	-0,133** (-3,14)
<b>Control variables:</b>								
Size	2,681*** (4,28)	2,627** (3,10)	3,469*** (5,83)	3,372*** (4,16)	2,341*** (3,82)	2,774** (2,90)	2,477** (2,40)	2,083* (2,44)
Leverage	-2,386*** (-5,33)	-2,505*** (-4,84)	-3,084*** (-4,03)	-4,260*** (-5,18)	-3,612** (-3,23)	-2,344* (-2,24)	-1,758 (-1,05)	-2,984** (-3,02)
Profitability	-0,552 (-0,81)	-0,968 (-0,87)	0,827 (0,89)	-0,094 (-0,13)	0,689 (0,50)	0,861 (0,46)	-3,150* (-2,23)	-3,469 (-1,92)
Cash holdings		-1,308 (-1,07)		-11,06** (-3,34)		1,426 (0,86)		1,870 (0,53)
Sales growth		-1,006* (-2,05)		-0,810 (-2,00)		-0,939** (-3,20)		-1,012 (-1,06)
Market-to-book		0,777 (1,15)		0,752 (1,86)		0,150 (0,35)		1,363 (0,98)
CEO pay		-0,325 (-1,47)		-0,369 (-0,81)		-0,408 (-1,22)		-0,269 (-1,11)
CFO pay		0,553** (3,55)		0,899* (2,34)		0,310 (1,10)		0,257 (0,42)
Female CEO		4,189** (3,88)		3,027 (1,88)		3,880*** (4,82)		4,452** (2,71)
Female CFO		0,121 (-0,25)		-0,957 (-1,19)		0,102 (0,18)		2,053 (1,51)
Constant	26,050*** (5,30)	24,609** (3,88)	4,942 (1,37)	5,936* (2,53)	20,902*** (3,83)	16,239 (1,92)	52,539*** (5,57)	55,646*** (5,49)
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	4 690	3 966	4 690	3 966	4 690	3 966	4 690	3 966
Adjusted R2	0,88	0,89	0,89	0,91	0,86	0,88	0,65	0,68
Adjusted r2 excl. Fixed effects	0,32	0,37	0,34	0,37	0,25	0,30	0,12	0,16
F-statistic	43,74***	41,06***	50,13***	52,83***	38,61***	37,00***	12,07***	11,99***

*The table presents the results for the re-estimate versions of the main regressions, where the sample period is 2006–2014. The dependent variables, the test variables of interest, and control variables remain the same as in Table 4. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

**Table 9. Re-estimates 2015–2023**

	ESG score		ENV score		SOC score		GOV score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Age:</b>								
CEO age	-0,053** (-3,33)	-0,051*** (-4,05)	0,008 (0,29)	0,017 (0,77)	0,051*** (5,48)	0,039*** (4,28)	-0,244*** (-7,45)	-0,233*** (-7,16)
CFO age	0,018 (1,25)	0,017 (1,07)	-0,032 (-1,54)	-0,035 (-1,61)	-0,003 (-0,26)	-0,001 (-0,07)	0,107*** (3,75)	0,103*** (3,40)
<b>Control variables:</b>								
Size	2,604*** (9,16)	2,530*** (6,29)	4,524*** (13,77)	4,64*** (12,48)	1,851*** (7,25)	1,841*** (5,73)	2,491*** (5,11)	2,342*** (4,55)
Leverage	-1,343* (-1,97)	-1,698** (-2,35)	-2,570** (-2,46)	-2,741** (-2,71)	-1,859*** (-3,79)	-2,440*** (-4,69)	0,239 (0,25)	0,067 (0,07)
Profitability	-0,249 (-0,31)	1,295 (1,10)	-3,007* (-1,92)	-2,367 (-1,27)	0,671 (0,61)	3,080** (2,42)	1,245 (0,66)	2,611 (0,97)
Cash holdings		1,795** (2,76)		3,801** (2,84)		1,923 (1,75)		-0,150 (-0,12)
Sales growth		-1,052** (-2,33)		-0,741 (-1,33)		-1,675*** (-4,45)		-0,843 (-1,32)
Market-to-book		-0,746** (-2,85)		-0,408 (-1,22)		-0,969*** (-4,36)		-0,402 (-0,74)
CEO pay		0,357** (3,35)		0,252** (2,48)		0,452*** (4,76)		0,337 (1,07)
CFO pay		-0,143 (-0,66)		-0,286 (-0,89)		-0,169 (-0,59)		0,077 (0,25)
Female CEO		0,523 (1,14)		1,944** (2,93)		-0,609 (-1,07)		0,828 (1,41)
Female CFO		0,064 (-0,23)		-0,184 (-0,44)		-0,374** (-2,39)		0,974 (1,71)
Constant	28,281*** (9,89)	27,98*** (6,83)	0,040 (0,01)	-1,028 (-0,16)	31,26*** (12,08)	30,91*** (7,71)	42,891*** (7,81)	40,865*** (6,58)
Firm fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of observations	9 229	9 067	9 229	9 067	9 229	9 067	9 229	9 067
Adjusted R2	0,86	0,86	0,87	0,87	0,84	0,84	0,70	0,70
Adjusted r2 excl. Fixed effects	0,42	0,44	0,45	0,47	0,35	0,39	0,10	0,12
F-statistic	40,68***	40,26***	50,13***	43,11***	34,71***	34,64***	15,80***	15,51***

*The table presents the results for the re-estimate versions of the main regressions, where the sample period is 2015–2023. The dependent variables, the test variables of interest, and control variables remain the same as in Table 4. The control variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles except for female CEO and Female CFO.*

## 7 Conclusions

This thesis examined whether the age of top executives is associated with firms' ESG performance. More specifically, the study investigated whether the ages of CEOs and CFOs affect the ESG scores of S&P 1500 firms during the period 2006–2023. The analysis was motivated by upper echelons theory, which suggests that executives' personal characteristics influence corporate decision-making. Since ESG-related investments often involve executive-level, long-term strategic decisions, uncertainty, and resource planning, executive age may influence how firms approach sustainability initiatives.

The empirical analysis was conducted using fixed-effects panel regressions with firm and year fixed effects. The study utilized ESG scores obtained from LSEG, while executive characteristics were sourced from ExecuComp. The sample consisted of 13,033 firm-year observations from non-financial S&P 1500 firms. In addition to the combined ESG score, the analysis separately examined pillar scores for environmental, social, and governance to determine whether executive age affects specific dimensions of ESG performance differently.

The study's findings suggest that CEO age is negatively associated with firms' ESG performance. The results show that older CEOs are associated with lower overall ESG scores and lower governance scores. These findings are generally consistent with prior literature suggesting that older executives tend to be more risk-averse, less willing to undertake long-term uncertain investments, and less keen on implementing strategic changes compared to younger executives (Bertrand & Schoar, 2003; Serfling, 2014; Li et al., 2017; Yousaf & Nguyen, 2025). The results also support the predictions of upper echelons theory, which argues that executives' demographic characteristics influence strategic choices and organizational outcomes.

The results for CFO age are more mixed. Older CFOs are associated with lower environmental scores, but are positively associated with social scores. These findings suggest that CFOs may influence ESG dimensions differently depending on the nature of the

investment or decision involved. Since CFOs are primarily responsible for resource allocation and financial planning, older CFOs may be more cautious about environmental investments, which often require long-term capital commitments that may extend beyond their tenure. In addition, the future financial returns from those investments are not guaranteed. At the same time, the results suggest that older CFOs may pay more attention to social stability, workforce-related matters, and stakeholder relationships.

The study also illustrates the importance of firm-specific characteristics in explaining ESG performance. Firm size is consistently positively associated with ESG scores across all model specifications, indicating that larger firms tend to achieve higher ESG performance. This finding is consistent with previous literature suggesting that larger firms have greater resources, visibility, and incentives to engage in ESG reporting and sustainability initiatives (Drempetic et al., 2020). In contrast, leverage is negatively associated with ESG performance, suggesting that highly leveraged firms may face financial restrictions that limit ESG-related investments. Furthermore, firms with stronger sales growth tend to have lower ESG scores, suggesting that rapidly growing firms may prioritize operational expansion over sustainability-related initiatives.

To address endogeneity, selection concerns, and robustness, the study conducts a few additional tests. The matched sample in PSM regressions provides weaker evidence of the relationship between executive age and ESG scores. After matching firms with younger and older executives based on observable firm characteristics, most of the statistically significant relationships disappear. However, the negative association between CEO age and governance score remains statistically significant, while a new positive relationship appears between CFO age and governance score. This evidence suggests that some of the relationships observed in the main regressions may partly reflect firm selection bias or other unobserved characteristics rather than executive age alone. Furthermore, the robustness checks indicate that the relationship between executive age and ESG scores appears to be partially dependent on the sample period and firm size.

Overall, the findings of this thesis provide only partial support for the hypotheses that executive age is negatively associated with ESG performance, even though the economic magnitudes of the effects remain relatively modest. While the main regressions suggest that older executives, especially CEOs, are associated with lower ESG performance, the PSM regressions and robustness checks indicate that the relationships are not fully robust across all model specifications. Therefore, the results should be interpreted with caution.

Nevertheless, the findings contribute to the existing literature by providing new evidence on how executive demographic characteristics may influence firms' ESG performance. The study expands the prior literature by examining the effect of age on both the CEO and the CFO and by separately analyzing ESG pillar scores alongside the overall ESG score to assess the association between the age of top executives and a firm's ESG performance. As ESG considerations continue to gain importance among investors, regulators, and other stakeholders, understanding how executive characteristics may influence firms' sustainability-related decisions becomes increasingly relevant.

## **7.1 Limitations**

Like many other studies, this study has limitations that should be considered when evaluating its results. In addition to the ESG controversies and the endogeneity and selection biases discussed earlier, other aspects should be mentioned.

Firstly, the study's sample consists only of S&P 1500 firms, excluding smaller firms and companies outside the US. Therefore, results for smaller companies in the US or for firms in Europe or Asia might differ significantly from those of this study.

Even though the study includes multiple variables, there may still be variables that are affecting a firm's ESG score that are not captured in this study. Several potential control variables, including R&D expenditures, firm age, and CEO and CFO tenures, which are

commonly used in prior literature, were considered in the research design. However, these variables were excluded from the final regression specification for a couple of reasons. First, including them would have significantly reduced the sample size due to missing observations in the dataset, especially R&D, which had many missing values. Secondly, the CFO tenure was excluded because the initial appointment dates for CFOs were missing in Execucomp. CEO and CFO tenures could theoretically have been approximated by assigning a tenure of 1 to all executives in the first observation year of the sample (2006), but this approach would not accurately reflect the true tenure of executives who joined their firms before the beginning of the sample period. Such a proxy could lead to measurement errors, weakening the validity of the results; therefore, it was excluded.

## **7.2 Suggestions for Further Studies**

For future research, it would be beneficial to conduct a similar study in other major markets, such as Europe, Asia, and the Nordics, to determine whether similar results persist or different dominant variables emerge. In addition, as the study examines only large firms (S&P 1500), it would be interesting to see whether the results differ for SMEs. However, as previously discussed in this study, firm size appears to be one of the key drivers of ESG scores, given data availability and the ESG scoring methodology. As this study focuses on the ESG score and its pillar scores, it leaves room to study the LSEG's ten individual ESG category scores (Resource use, Emissions, Innovation, Workforce, Human rights, Community, Product responsibility, Management, Shareholders, and CSR strategy) to test which factors are driving the results of this study. Lastly, investments in ESG matters may take a long time, and some executives may prioritize short-term personal financial gain and future career opportunities over long-term ESG investments; it would be relevant to examine the effects of CEO and CFO tenures.

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