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The interplay between board and CEO compensation with an ESG-focus

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Abstract

ESG has become increasingly important for a company's performance as more legal requirements are needed, and awareness has increased from investors and consumers. Furthermore, is transparency in compensation plans and the art of getting rid of short-term incentives key factors in avoiding future financial crises. Hence, this paper empirically studies the interplay between CEO- and board compensation with an ESG focus. We model three models to gain an understanding of the determinants and the relationship between board compensation, CEO compensation, and ESG rating. Based on a sample of 475 companies from the S&P 500 Index in the years 2017-2021 (2,287 observations), we find significant evidence for *the fat cat problem*, *mutual backscratching theory,* and *resource dependence theory.* These findings align with previous research (Lin et al., 2013; Lin & Lin, 2014; Brick et al., 2006). However, more importantly, we find significant evidence of the fact that the ESG perspective can challenge these theories. The environmental factor is significant in explaining both CEO- and board compensation, implying that including ESG measures in the pay-for-performance can help align the CEO's and the board's interests. We argue that companies use ESG as a window-dressing strategy to attract investors. Moreover, we suggest that future research investigate how to include social and governance measures in the compensation plans, as those measures have the most significant impact on ESG ratings but are insignificant in the current compensation plans.

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1. Introduction

The goal of the introductory section is to inform the readers about what has sparked the motivation for writing about this exact topic, why this thesis is interesting from a historical context, and that the purpose of this paper is to be relevant and apply interesting findings to existing literature. Finally, the structure of the paper will be explained to help the readers navigate across information and findings.

1.1 Thesis motivation

Corporate governance, incentive plans, compensation packages, and performance measurements are challenging practices in all institutions and companies worldwide. This difficulty in structuring compensation plans that both increase incentives and align the interests of shareholders and management has raised questions that are the focus of this paper. For example, what are the drivers of compensation in modern companies? What is the most common compensation plans in modern companies? Do compensation packages differ across industries? How do companies avoid agency problems? Questions like these have sparked the motivation of this thesis, together with a keen interest in environmental, social, and governance (later referred to as ESG) factors. Gen Z, the first generation to grow up in the digital age, has proven to care more about ESG than any other generation because of greater awareness of climate change (Versace & Abssy, 2022). We, as a part of Gen Z, are no exception. That is why we find it interesting to analyze what modern companies do to cope with environmental, social, and governance issues – including ESG performance in the compensation packages could be one step in facing the issues.

Concepts and theories such as *agency theory, the fat cat problem*, *mutual backscratching, resource dependence theory,* and *corporate governance practices* introduced in papers such as Lin & Lin (2014), Lin et al. (2013), and Brick et al. (2006) have been tested widely on the US market. Papers within this research area find that many bad habits exist in the compensation market and often concern the interplay between chief executive officer (Later referred to as CEO)- and board compensation. Furthermore, these bad habits sparked the motivation for writing the thesis within this field. Based on our knowledge and research, the theories have never been tested from an ESG performance perspective. The negative findings within compensation could be a good reason for the companies to include ESG performance in the compensation packages to convert focus to something positive. Even though most companies

in the S&P 500 already state that they include ESG performance in compensation (Spierings, 2022), also called ESG pay. It is interesting if ESG can be statistically proven to be part of the compensation schemes or if companies just use it as a window-dressing strategy to attract investors, by signaling that the company is committed to ESG. The final goal of this paper is to contribute to existing literature by covering the relationships between board compensation, CEO compensation, and ESG performance. The area has yet to be widely tested, which underlines the relevance of this research.

1.2 Research question

The research question will be addressed and analyzed by conducting hypothesis testing following a hypothetico-deductive research approach and applying existing theoretical concepts and literature when interpreting the results (Lawson, 2015, pp. 471-472). Based on the thesis motivation, this paper seeks to answer the research question:

What interesting findings can an ESG perspective add to the existing literature on the interplay between CEO- and board compensation?

The interplay between CEO- and board compensation will be analyzed in-depth by testing how significant impact corporate governance and firm characteristics have. This analysis will increase the overall understanding of how companies in the S&P 500 Index structure their compensation plans. It will further increase the validity of the dataset if there is alignment between findings and previous research. The ESG perspective will be included when testing how ESG performance impacts compensation and how compensation other corporate governance- and firm characteristics, impact the ESG rating. Three models will be built to explain the interplay between CEO- and board compensation from an ESG perspective:

- Model 1: Board compensation as the dependent variable
- Model 2: CEO compensation as the dependent variable
- Model 3: ESG rating as the dependent variable

Eight hypotheses in total across the three models will then be stated based on findings from previous literature. By adding ESG rating as an independent variable in models 1 and 2, it will be possible to test if companies in S&P 500 tie ESG performance to the compensation. Including a model with ESG rating as the dependent variable will give an overview of what

corporate governance and firm characteristics affects the ESG ratings. Finally, this should give an extensive overview and knowledge to achieve the goal of this paper, namely, to address if the ESG perspective, in some way, can supplement existing academic findings about CEO- and board compensation.

1.3 Historical context and relevance

Understanding the historical context of ESG & compensation is essential to give the reader a deeper understanding of the subject. Furthermore, it helps clarify the interests behind the phenomena studied throughout this paper. Furthermore, the relevance of this paper is essential as it helps to establish the significance of applying an ESG focus to the interplay between CEO and board compensation. Furthermore, describing the relevance helps shed light on how the research is academically relevant and meaningful for external counterparts such as politicians, environmentalists, investors, and other stakeholders. The following sections describe the historical context of ESG and compensation and the relevance of this study.

1.3.1 ESG reporting

ESG comes from the three factors; Environmental, Social, and Governance and is used by companies to show how they deal with issues within each category. ESG is often compared with CSR (Corporate Social Responsibilities). However, where CSR is referred to as a strategy on how companies carry out their business ethically, ESG is a criterion to assess a company's overall sustainability and resilience against sustainability issues. The environmental aspect includes climate change, natural resources, pollution & waste, and environmental opportunities. The social aspect includes human capital, product liability, stakeholder opposition, and social opportunities. While finally, the governance aspect includes corporate governance and corporate behaviour (MSCI, n.d.-c).

In the 1960s, the practice of investing on behalf of ESG began. At that time, it was especially tobacco production and companies involved in the South African apartheid regime that investors excluded from their portfolios (Ibid.). Globalization and digitalization have made ESG an unavoidable aspect of today's investors, big or small.

Even though the focus on ESG has increased rapidly since the 1960s, it has always only been private investors pushing companies to invest in ESG and has never been regulated by law. However, In March 2022, the US Securities and Exchange Commission (later referred to as

SEC) issued a proposed plan called "*The Enhancement and Standardization of Climate-Related Disclosures for Investors*" (Deloitte, n.d.). The plan aims to enhance and standardize climate disclosures for publicly listed SEC reporting companies (including S&P 500 companies) as a new legal ESG standard. According to Brightest (2023), the new legal ESG standard will include the following climate disclosure information:

1. A summary of a company's climate-related risks likely to have a material impact on its business, operations, or financial condition.
2. Disclosure of corporate greenhouse gas emissions (GHG) that reflects the organization's latest carbon accounting.
3. Disclosure of other yet-to-be-determined climate-related financial metrics in a registrant's audited financial statements.

Even though more than 90 percent of S&P500 companies publish ESG reports in some form (Pérez et al., 2022) above SEC rules show that also the government takes ESG performance seriously and is a symbol of how much ESG has developed throughout the years. If the proposal is finalized, sustainability reporting will move from highly voluntary to regulated, like financial accounting reporting. To prepare companies for the disclosures, Deloitte advises companies to consider linking ESG or climate performance to compensation to a greater extent than what is seen so far (Deloitte, n.d.).

Another vital factor for the rise of ESG is globalization and digitalization. Whistle-blowers and non-governmental organizations such as Greenpeace or WWF can easily reach a large population through media. ESG scandals can harm companies' market value as bad news spreads quickly worldwide. A classic example is the Volkswagen scandal from 2015. Volkswagen was caught cheating with emissions tests for their diesel engines resulting in a 40% drop in the company's share (Jung & Sharon, 2019). The aftermath of the scandal was numerous lawsuits and fines. These scandals and the extensive media attention have furthermore led to the rise of ESG, as companies focus on ESG to avoid getting the attention of green movements and the media.

1.3.2 Compensation

Compensation refers to the payment and reward companies give in exchange for work and services. In the US it is required by law to publish compensation for the board and executives.

The compensation committee can regulate what the CEO strives towards by setting up pay-for-performance goals for the CEO, where the compensation is an extrinsic motivation to increase the incentive of a CEO to act in the same interest as the board of directors. Therefore, it is essential to align the goals of the principal and agent to avoid problems. Share compensation has become a more significant part of the compensation as companies seek to increase motivation by offering more ownership. However, the challenge of setting up an effective and fair pay-for-performance is affected by many factors, leading to several theoretical misunderstandings. These issues will be discussed further and analyzed throughout the thesis.

Compensations are used to incentivize, award, recruit and retain executives and directors who are qualified for the job. It takes talent and skills to occupy these positions in the US largest firms alongside bearing a risk of failing the company and shareholders. CEO and board compensation often exceeds average wages with high percentages. The latest research shows that the average CEO at the top 350 firms in the US was paid 399 times as much as a typical worker in 2021 (Bivens & Kandra, 2022). The same research finds that CEO compensation has skyrocketed by 1,460% since 1978 after adjusting for inflation. The massive increase is not a problem but is rather a symbol of the increasing talent needed to be a CEO. The problem arises with compensation packages when it is no longer skills and talent that define the compensation but instead power differentials and the lack of transparency. Rohde (2011), who has written a journal article about lessons learned from the financial crisis, asserts that transparent compensation plans are one of the most important initiatives to prevent future systemic financial crises. The financial crisis in 2008 indeed shed light on whether rewarding executives for short-term results can produce incentives to take excessive risks (Demirgüç-Kunt, 2012). This discussion could also be why the *Dodd-Frank Wall Street Reform and Consumer Protection Act* was passed shortly after the crisis in 2010. The Dodd-Frank reform requires public companies to present a clear, concise, and understandable disclosure about the relationship between the company's financial performance and the compensation paid to the named executive officers and is indented to prevent excessive risk-taking (Dodd-Frank Wall Street Reform and Consumer Protection Act, 2010; Fein, 2010). Besides CEO compensation, there has also been a massive shift in how directors of the board have been paid over the past 20 years. Lerner (2017) argues that the shift has primarily been fuelled by changes in corporate governance practices implying that directors have received more responsibilities. Scholars, furthermore, find that new federal and state legislations, new SEC regulations, and new stock exchange listing rules all together have caused directors to work harder, longer, and more

carefully than ever before, which has caused the board compensation to increase over the past years (Friestedt et al., 2020; Reda & Glass, 2018).

Finally, compensation plans have changed a lot over the years. They started from being simple and mainly consisting of cash bonuses to becoming a complex parameter of companies' corporate governance. The complexity arises due to companies trying to figure out the optimal way of compensating CEO and board members to align the interests of all stakeholders. For example, CEO compensations in S&P 500 companies nowadays consist primarily of stock awards to tie the compensations to shareholder returns and align interests (Choe, 2022). Furthermore, compensation can include stock option awards, bonuses such as long-term incentive plans (LTIP), retirement benefits, and cash salary which are all combined to design an optimal compensation plan.

1.3.3 Relevance

The relevance of the paper is broad. First and foremost, it can create valuable insights into the relationship between CEO- and board compensation and ESG performance. ESG has become increasingly important to investors, and there has been an increased focus on legal ESG reporting from the US SEC. Therefore, understanding how compensation incentives affect ESG performance can help companies align their strategies and goals. Secondly, it can create valuable insights into whether the current compensation packages are effective and if they compensate for what satisfy share- and stakeholders. For example, questions can be asked if they are compensated based on ESG performance or whether it is a window-dressing strategy.

Finally, the paper contributes to the overall academic discourse on the role of corporations in addressing ESG challenges. It can inform investors, stakeholders, and climate activists about what is done in practice in modern companies. The companies can further use the knowledge to improve their ESG profile and prevent bad reputation. Additionally, inform the government and policymakers and help propose new regulations. Overall, the authors of this academic thesis consider it as value-adding to existing literature and useful for all parts involved in the compensation structures.

1.4 Structure of this paper

To give the reader a clear overview, this section gives an overview of the structure of this paper. Hence, the purpose of this section is to serve the readers with a guide to the flow of the research. By providing this clear structure, readers can navigate through the paper and locate information easily and quickly. To answer the proposed research questions thoroughly, the structure of this thesis is laid out as follows: 1) Introduction 2) Theoretical background 3) Literature review and hypothesis development 4) Methodology 5) Data description 6) Empirical findings 7) Conclusion 8) Future research.

2. Theoretical background

The following section introduce theories and concepts used throughout this paper and to provide the reader with an understanding of how theories are connected to the interplay between CEO and board compensation. Based on previous research, these theories are recurring when the interplay is analyzed (Lin & Lin, 2014; Lin et al., 2013; Brick et al., 2006). A comprehensive explanation of the theories and having them in mind will enable a better argument for hypothesis development and interpretation of the empirical findings.

2.1 Agency theory

Agency theory is a fundamental aspect of management theory and corporate governance, where it has played an important role for decades (Wasserman, 2006). Agency theory was first and famously introduced in 1776 by Adam Smith in his book "*The Wealth of Nations*" (Smith, 1776). Since the contribution from Adam Smith, the area has been heavily discussed, and different actors have given their interpretation of what lies within agency theory and what today, in general, is known as the principal-agent theory. Agency theory generally addresses the challenges between actors within an organization and the different ways individuals act in their best interest. Some of the most influential interpretations are introduced in the following section, which covers the perspective of principal-agent theory, moral hazard, adverse selection, and information asymmetry. Further, theories such as mutual back scratching, resource dependence theory, and the fat cat problem are also related to agency theory and will therefore be explained as well.

2.1.1 Principal agent theory

The concept of the principal-agent problem explores the relationship between two actors, the principal, and the agent. The principal hires or expects an agent to perform a specific task, which can cause many conflicts (Jensen & Meckling, 1976). The prominent example used throughout the thesis is the CEO as the agent, whereas the board of directors represents the shareholders who act as the principal. Both actors will have different agendas to strive towards, which is why conflicts can occur. The board and shareholders, e.g., want a maximum output of their investments. Conversely, the CEO can have other, more personal agendas, such as maximizing compensation or striving toward prestige in a different way than what is expected of the executive. The primary focus of agency theory is to address the issues that arise when the goals and interests of the principal and agent are not aligned. This misalignment is referred

to as the agency problem (Eisenhardt, 1989). Agency theory provides a framework to understand how to manage these relationships and problems to ensure agents act in the principal's best interest.

According to Fox & Lorsch (2012), the general problem arises as CEOs manage other people's money, so they make decisions with the same care and risk aversion if it was their own. When the compensation is paid in shares, it will increase the agent's motivation, as the performance and share price will impact the size of the compensation and the personal wealth from shareholdings.

2.1.2 Asymmetrical information

Information asymmetry is the concept of one part knowing more or possessing better information than the other (Thomsen & Conyon, 2012). It was first described by Akerlof (1970) in his paper “The Market for Lemons.”. He explains the asymmetrical information and quality uncertainty in the car market, where “lemons” describe cars in poor condition. He further explains that the problem is often seen between seller and buyer, where the seller has more information than the buyer and thus has an advantage in the deal (Ibid.). Information asymmetry most often arises due to moral hazard or adverse selection, and the goal is the same – to reach targets easier. Targets can be sales targets, budgets, or other financial targets. In mergers and acquisitions, thorough due diligence is typically reviewed to find what the seller is trying to hide.

Concerning CEO and board compensation, Hölmstrom (1979) formulated the informativeness principle: "*Pay should depend on any freely available measure that is' informative' about the agent's effort provision*". The principle suggests it is essential to include compensation that reveals information about the agent's actions when designing compensation packages. Revealing this information would enhance better monitoring of the CEO and incentives to take actions to align the interests of the CEO and board of directors. Examples of compensations that reveal information about the CEO's (agents) actions and align the interests of shareholders and managers could be performance bonuses or stock options, as they are compensated on behalf of their performance. CEO with high tenure and a board of few directors to regulate the compensation schemes can increase the risk of information asymmetry.

2.1.3 Moral hazard and Adverse selection

The theoretical concepts of moral hazard and adverse selection practically descend from information asymmetry. Moral hazard and adverse selection are two methods of manipulating performance measures and maximizing self-interests rather than company interests arising from agency problems. (Zimmerman, 2016). Moral hazard is referred to as the concept of acting differently after signing a contract to take self-interested actions (Ibid.). Moral hazard is often seen in insurance, but the concept is broad and can be found within all organizations or situations with a principal-agent relationship (Holmström, 1979).

Adverse selection refers to the tendency of individuals to have information that the other party does not have. This information can typically be used as an advantage to benefit themselves (Zimmerman, 2016). Again, this is often seen in insurance, where the insurance holder hides information that could increase the price of the insurance, e.g., being a smoker (Akerlof, 1970). To protect themselves, companies assess the medical exams of everyone.

Moral hazard and adverse selection can both be used to manipulate performance measures and is a factor that might increase the costs of pay-for-performance. Poorly designed incentive systems typically cause the problem. In this research, the concepts of moral hazard and adverse selection will be evaluated when assessing the relationship between CEO and directors. It can be assumed that CEOs hide knowledge or actions against the board of directors to reach targets and achieve compensation.

2.1.4 Fat cat problem

The fat cat problem is defined as firms with poor performance, still awards the CEOs with a high compensation (Lin et al., 2013). The problem mainly occurs due to poorly structured compensation plans allowing executives to receive high compensation, even though the company performs poorly. It is part of the agency problem as shareholder and CEO interests are not aligned when the fat cat problem exists. An example of the fat cat problem is that the former CEO of The Walt Disney Company received 737 million dollars over five years in the late 1990s. In the same period, the company's net income shrank by an average of 3.1% each year (Mitchell, 2023). A more recent example is Tesla's CEO, Elon Musk, who received 595.3 million dollars in 2020, despite losing nearly 1 billion dollars in fiscal year 2019 (Ibid.). Scholars strongly agree that wrong incentives in compensation plans are one of the most fundamental causes of financial crises (Lin et al., 2013; Rohde, 2011). This causality is

explained by the fact that many organizations link incentives and compensation of CEOs to short-term performance leading executives to focus on short-term goals instead of sustainable growth (Lin et al., 2013). Experts blame financial institutions for causing the financial crisis in 2008 because they did not know that high incentives could lead to uncontrollable risk-taking (Ibid.). The fact that executive pay has far exceeded the increase in firm performance over decades has brought much attention to the pay-for-performance relationship and compensation contracts from researchers and policymakers (Lin et al., 2013; Dong & Ozkan, 2008; Gregg et al., 2005).

2.1.5 Mutual backscratching

The theoretical origin is by Jensen (1993), giving the foundation of the agency problems arising between the board of directors and CEO. The board of directors is employed and expected to act in the best interest of the shareholders, whereas the CEO only has their own interest in mind. Directors fail to effectively monitor the CEO due to a culture inhibiting constructive criticism and information asymmetry between CEO and the board (Jensen, 1993). Jensen (1993) furthermore argues that this often happens when CEO is involved in the selection of the directors. The concept or theory was later named mutual backscratching or cronyism by Brick et al. (2006). It is described as the CEO receiving higher compensation when the board compensation increases (Lin & Lin, 2014).

For example, when the CEO is also a chairman of the board and thereby involved in the selection of the board, then the CEO might favour directors with personal loyalty toward him/her. Those directors with personal loyalty will then conduct less monitoring of the CEO or support decisions that benefits the CEO. Personal loyalty could lead to an increase in CEO compensation if the CEO takes advantage of the situation. This advantage will eventually lead to an increase in board compensation as the CEO will pay them more to stay or because the general compensation level increases. Due to mutual backscratching, it is often advised to separate the CEO and chair positions to strengthen the overall integrity of the company (Mohr, 2023).

2.2 Resource dependence theory

Resource dependence theory is a theory about how external dependencies affect the behaviour of organizations. External dependencies refer to companies relying on external sources to carry

out their strategy or responsibilities (Hillman et al., 2009). Even though external dependencies have affected organizations since always and always has been an essential part of companies' strategy, the concept was first formalized in the 1970s by Pfeffer and Salancik (1978) in their book "The External Control of Organizations: A Resource Dependence Perspective" (Hillman et al., 2009; Pfeffer and R. Salancik, 1978). Pfeffer and Salancik (1978) propose five options companies can do to minimize environmental dependences:

1. Mergers/vertical integration
2. Joint ventures and other inter-organizational relationships
3. Board of directors
4. Political action, and
5. Executive succession

It is especially option number three that has been studied thoroughly and is also the point that will be analyzed in this paper. Namely, how the composition of the board of directors can help reduce the dependencies by gaining resources (Ibid.). Companies can, for example, give higher compensations to retain talented directors or increase the number of directors on the board to better divide the dependencies between management. In addition, following ESG, companies may rely on external dependencies such as experts to cope with the ESG issues.

2.3 Corporate governance practices

Corporate governance practices are instruments to mitigate agency problems and are defined as the control and direction of companies by ownership, boards, incentives, company law, and other mechanisms (Thomsen & Conyon, 2012, p. 4). Given this paper's focus on S&P 500, the focus throughout this paper will only be on corporate governance practices in the US. On the US market, the state corporate law and federal securities laws, hereunder SEC, enforce securities laws against market manipulation to protect investors (Rosenbaum & Hoang, 2017; SEC, 2013). A total of 8 acts and laws provide the basement of US corporate governance practices. The *Dodd-Frank Wall Street Reform and Consumer Protection Act* of 2010, described earlier, focuses, among other things, on the transparency in CEO compensation, while the *Sarbanes-Oxley Act of 2002*, among other things, has mandated several reforms to enhance corporate responsibility (Ibid.). All these legislations are reviewed and updated occasionally to increase transparency and good corporate governance among US-listed companies. Furthermore, New York Stock Exchange (NYSE) and NASDAQ require

listed companies to comply with their listing standards, which include corporate governance practices (Rosenbaum & Hoang, 2017).

The board of directors

The board of directors' role is to mediate between shareholders and management. They are chosen by the shareholders and are responsible for assessing the overall direction and strategy of the business. Thomsen & Conyon (2012) define three primary functions that boards serve, i.e., *control, consulting*, and *contact*. SEC furthermore provide a guideline for companies where they state the goals and responsibilities of the board (SEC, n.d.-a). The board's goal is to build long-term value for the shareholders, assure the well-being of its customers and employees, and finally act in the company's best interest in decision-making. The responsibilities of the board include, for example:

- ”*Adopting a strategic planning process and approving, on at least an annual basis, a strategic plan which takes into account, among other things, the opportunities and risks of the business*.” (Ibid.)

- “*Monitoring the performance of the Company in relation to its goals, strategy and competitors and the performance of the Chief Executive Officer, offering him or her constructive advice and feedback, and, when appropriate or necessary, removing the Chief Executive Officer*.” (Ibid.)

- “*Adopting a written code of business conduct and ethics, including conflicts of interest, including transactions and agreements in respect of which a director or executive officer has a material interest.*” (Ibid.)

These three from a total of thirteen are responsibilities that largely reflect the job of a board and the corporate governance practices they must follow. Furthermore, the responsibilities show that the corporate governance practices of the board are essential to comply with the theories stated earlier. Monitoring the company's performance to the performance of the CEO can, for example, be related to *mutual backscratching theory* and the *fat cat problem*. While adopting a written code of business conduct and ethics, including conflicts of interest, can be related to *agency theory,* and can be seen as a responsibility to align interests between shareholders and executives. Finally, concerning ESG, the board of directors is responsible for

strategic planning and assessing the risk of the business. ESG has shown to be increasingly important, referring to the introduction, why it is part of the corporate governance practices to comply with ESG risks.

The CEO

The board of directors hires the CEO, who is the highest-ranked executive. The CEO is responsible for overseeing the day-to-day operations of the company. Even though the responsibilities of a CEO vary, depending on firm size, expectations, and needs, Peterdy (2023) defines five primary responsibilities of a CEO:

1. Setting and executing organizational strategy.
2. Building the senior leadership team and ensure diversity.
3. Making capital allocation decisions.
4. Setting vision, values, and corporate culture.
5. Communicating effectively with all stakeholders.

The CEO's responsibility is generally to carry out the board's strategy by structuring and managing the company's day-to-day operations. In addition, the CEO can affect the structure, culture, or strategy to ensure the company lives up to its responsibilities. Interaction with the board is essential to avoid agency problems in the organization. The tool for the board, as mentioned earlier, is compensation. The CEO compensation components typically consist of salary, bonus, stocks, options, non-equity incentive plans, long-term incentive plans (LTIP), and pensions according to Wharton Research Data Services.

The CEO compensation has attracted vast attention after the financial crisis. The attention is due to big compensation awards, despite bad company performance, as *the fat cat problem* finds evidence of and discusses (Lin et al., 2013). To avoid agency theory problems, the CEO should in accordant to the board and thereby the shareholders. Today, stock awards are a more significant part of compensation, increasing the incentive and motivation for CEOs to increase the stock price. By creating this incentive, CEOs are more likely to live up to their responsibilities in accordance with shareholders' interests and thereby eliminate principal-agent problems.

Compensation Committee

The New York Stock Exchange and NASDAQ requires all listed companies to have a compensation committee composed entirely of independent directors (Segal et al., 2015). According to the Compensation Committee Guide provided by Deloitte, a compensation committee must a) review and approve goals and objectives relevant to the CEO, b) evaluate the CEO's performance considering such goals and objectives, and c) either as a committee or together with the other independent directors determine and approve the CEO's compensation based upon such evaluation (Segal et al., 2015). Hence, the CEO is not allowed to be part of the compensation committee as he/she cannot be involved in structuring his goals and compensation. Thus, the goal of the committee is to construct compensation packages that are both fair and competitive to attract and retain talented executives. Aligning interests and setting executive compensation based on performance evaluation and risk management can be challenging because agency problems easily arise. Therefore, the independent directors presented in the compensation committee possess significant responsibilities.

3. Literature review and hypothesis development

In modern economies, companies often divide ownership and management between the board of directors and top executives. Conflicts of interests and agency problems occur due to this division between ownership and management. The board are more concerned with maximizing shareholder value, while executives may be more concerned with their own compensation and job security. From an ESG perspective, ESG ratings can be used as a monitoring mechanism to align the interests of the principal (e.g., the board of directors) and the agent (e.g., management). Furthermore, reviewing compensation packages from an ESG perspective can help address the problem of information asymmetry between the principal and the agent because transparency is an essential factor in the ESG rating. Hence, it can reduce management's information advantage over the board.

This paper seeks to find what factors drive the compensations of directors and CEOs and especially if ESG ratings can explain their compensations. Variables used to analyze the hypotheses below will be stated later in Section 5.3. After a thorough description of chosen variables and the statistical approach for analyzing the hypotheses, the empirical findings will be stated and interpreted in Section 6. The hypotheses stated in the hypothesis overview below are developed primarily in accordance with scholars such as Lin & Lin (2014), and Brick et al. (2006), but as the ESG performance perspective has received little attention from scholars a wide range of different scholars have been used to review previous literature. Lastly, the following sections will review existing literature and findings within the research of the stated hypothesis.

Table 1: Hypothesis overview

Variable	Hypothesis
Model 1: Board compensation	
ESG rating	*H1.1: ESG rating will contribute to an increase in board compensation.*
Board size	*H1.2: The number of directors will impact board compensation positively.*
Model 2: CEO compensation	
ESG rating	*H2.1: ESG rating will contribute to an increase in CEO compensation.*
CEO Tenure	*H2.2: CEO tenure will have a positive impact on CEO compensation.*
Company performance (Net income$_{t-1}$, ROE$_{t-1}$, ROA$_{t-1}$)	*H2.3: Company performance will have a negative or no effect on CEO compensation.*
Board compensation	*H2.4: Board compensation will have a positive impact on CEO compensation.*
Model 3: ESG Rating	
Board size	*H3.1: Board size will be positively related to ESG ratings.*
CEO Ownership	*H3.2: CEO ownership will have a positive impact on ESG ratings.*

Source: Created by the authors (2023). The table gives an overview of the eight hypotheses tested throughout the thesis.

3.1 Board compensation

Board compensation is the dependent variable in Model 1. Three hypotheses have been developed: one about how ESG performance affects board compensation, one about how board size affects board compensation, and finally, one about how CEO compensation affects board compensation. These three hypotheses will create a basic understanding of what factors drive the general board compensation. Many other variables have also been included, which will serve as control variables, as explained in section 3.4. Our findings from Model 1 will be held up against the previous research stated under each hypothesis.

3.1.1 ESG rating

The intensified focus on ESG issues driven by investors, employees, consumers, and the government significantly impacts firms' and stakeholders' expectations to incorporate ESG performance measures in the compensation plans (Spierings, 2022). However, based on publications from CBS' research portal and ResearchGate, more research needs to be done on ESG rating's impact on board compensation. Even though not much research has been done on the area, it is highly assumed that a significant relationship between the two variables can be proven. Different methods and approaches can be attained when testing the relationship between ESG rating and board compensation.

Kang et al. (2022) based their findings on data from listed firms on the Korea Stock Exchange, find that the compensation of independent directors is positively correlated with ESG performance, and that the compensation of independent directors is one of the key factors that can significantly affect ESG performance. Thus, this positive relationship implies that higher compensation leads to higher motivation to reach ESG goals.

On contrary to ESG ratings impact on board compensation, much research has been done on ESG rating's impact on firm performance. Additionally, firm performance is one of the most well-documented determinants of board compensation (Leblanc, 2020). Scholars find that ESG scores are positively and significantly related to firm performance. Hence, a company with terrible ESG ratings will eventually receive negative publicity and a loss of consumer trust (Aydoğmuş et al., 2022; Naeem et al., 2022). This can result in decreased sales and revenue, negatively impacting the company's financial performance and reducing the amount of compensation available to board members. Vice versa, will an increase in ESG ratings lead to an increase in firm performance, leading to an increase in board compensation.

Another exciting aspect is the motivational factor. Companies use ESG as a workforce strategy to attract employees, and literature indicates that ESG performance importance in attracting and retaining talent has increased over the last years and will continue to increase as Gen Z, that place greater importance on ESG, take a bigger part in the global workforce (Bailey et al., 2020). This workforce strategy implies that companies with high ESG rating can attract highly profiled directors for less compensation due to the intrinsic motivation of working within an environmental-, social-, and governance-improving company. This paper seeks to answer how ESG performance impacts board compensation and is in line with the theory stated by

Aydoğmuş et al. (2022) and Naeem et al. (2022). ESG ratings affect firm performance, which affects board compensation. Therefore, the hypotheses are stated as follows:

H1.1: ESG rating will contribute to an increase in board compensation.

3.1.2 Board size

In contrast to the ESG rating's impact on board compensation, much research has taken place on board size's impact on board compensation. However, the interpretation of results and conclusions varies among the literature, mainly because the research methods differ. Two main perspectives can, however, be deduced: One perspective finds that board size is negatively related to board compensation because more directors can cause inefficiencies and are thereby compensated less (Andreas et al., 2012; Ryan & Wiggins, 2004; Ertugrul & Hegde, 2008). The argument for inefficiency is that more board members will cause coordination issues, and the probability of free-riding problems occurring is higher (Conyon, 2014).

The other perspective finds that board size positively relates to board compensation because of the *resource dependence theory* (Lin & Lin, 2014). The reasoning behind the theory is that board size can reflect the resource richness of the board (Boyd, 1996). In other words, companies may offer competitive compensation packages to attract experienced and talented directors who can provide valuable advice and guidance and manage their external resource dependencies. Additionally, companies may use compensation to retain directors who have established relationships with key external stakeholders. Hypothesis two is stated below and can be used as a robustness test for the significance between ESG performance and director compensation.

H1.2: The number of directors will impact board compensation positively.

3.2 CEO compensation

In Model 2, CEO compensation serves as the dependent variable. Again, a deeper understanding of which factors drive CEO compensation is needed to fully understand and examine the interplay between CEO- and board compensation. Three hypotheses are stated: first hypothesis regarding how ESG performance affects the CEO compensation, one on how the CEO tenure affects the CEO compensation, and finally, a hypothesis on how company

performance affects the CEO compensation. Control variables are also added for Model 2, and the previous literature for each hypothesis is stated in each section below.

3.2.1 ESG ratings

Most S&P 500 companies are tying executive compensation to some form of ESG performance nowadays (Spierings, 2022). Linking executive compensation to ESG ratings is an excellent way to incentivize the CEO to prioritize ESG initiatives, which can result in aligning the interests of shareholders, stakeholders, and executives. Additionally, ESG ratings can impact a company's reputation, which can impact its ability to attract customers, employees, and investors (Gosling et al., 2021a). This would suggest that executives should be paid based on ESG performance. However, besides these positive things, ESG pay can cause, studies also show that ESG in executive pay is not always correct, and adding the wrong ESG metric into executive incentives can be unproductive and, even worse, counterproductive (Ibid). Spierings (2022) states four reasons not to include ESG measures in executive pay:

1. Difficulty in defining specific goals,
2. Concern about the ability to measure and report actual performance against ESG goals,
3. Scepticism about whether such goals are effective in driving performance,
4. The fact that ESG performance is already covered by existing performance measures.

Whether to include or not include ESG performance in CEO compensation is an extensive discussion with pros and cons for both sides. From the board and executive perspective, there is no doubt that strong ESG performance contributes to the organizational value and financial performance (Gosling et al., 2021a). However, on the other side, studies from international publicity trade firms find that adopting ESG pay improves key ESG outcomes but does not improve financial performance (Cohen et al., 2022). These mixed findings suggest for hypothesis testing of whether ESG ratings impact CEO compensation either indirectly through financial performance or directly through ESG performance:

H2.1: ESG rating will contribute to an increase in CEO compensation.

3.2.2 CEO tenure

Tenure describes for how long the CEO has been employed in the position. Researchers find that the rapid rise in CEO compensation discovered in the past years reflects not a rise in skill, but rather CEOs' use of their power to set their pay (Bivens & Kandra, 2022). Longer tenure and higher age help CEOs build a "power base" over the board, and CEO tenure is strongly correlated with years of experience (Hill & Phan, 1991; Lin & Lin, 2014). This "power base" means that the board have fewer incentives to monitor management, and CEOs gain voting control and can demand compensation packages that serve their interests rather than the shareholders (Hill & Phan, 1991; Lin & Lin, 2014). Hence, much research has shown that CEO tenure is positively related to CEO compensation.

Additionally, Lin et al. (2013) find that CEO tenure is significantly positively associated with CEO compensation only in companies where *the fat cat problem* exists. *The fat cat problem* could be related to bad corporate governance, meaning companies with *the fat cat problem* would have lower ESG ratings than peers without *the fat cat problem*. This assumption about the relationship between ESG ratings and *the fat cat problem* implies that CEO tenure is only positively associated with compensation in companies with bad ESG ratings. While *the fat cat problem* and the effect on CEO compensation will be tested in Hypothesis H2.3, the following hypothesis of how CEO tenure is related to compensation creates another essential aspect of the robustness test of how ESG ratings affect compensation as it can validate our data if findings match previous literature findings.

According to the above previous literature, CEOs with longer tenures are assumed to focus more on long-term sustainable growth, which means that long CEO tenure equals higher ESG ratings. Therefore, this paper seeks to add research to the existing literature by testing if CEO tenure is positively related to CEO compensation, and later if the tenure is related in some way to the ESG ratings:

H2.2: CEO tenure will have a positive impact on CEO compensation.

3.2.3 Company performance

As mentioned earlier, a company's financial performance's impact on compensation has been widely researched. In the 1970s, scholars started to discuss whether leaders and executives

were rewarded for their rank rather than their performance (Jermier & Berkes, 1979). The discussion leading back to the 1970s states that *the fat cat problem* has been an issue for a long time in companies. It has later been researched throughout the years by different scholars. However, the financial crisis of 2008 highlighted *the fat cat problem* again, and studies show that CEO compensations had a significant drop in the years following the crisis (Lin et al., 2013; Lin & Lin, 2014: Gregg et al., 2005). The latest research shows that CEO compensation has grown 37% faster than the stock market growth from 1978-2021 (Bivens & Kandra, 2022). Whether this exceeded growth is a symbol of the fat cat problem, or it takes more talent and skills to become CEOs today is discussed thoroughly worldwide. For example, Bivens & Kandra (2022) argue that the rise is not a reflection of a rise in skills but rather a power question. This hypothesis will be tested in *Hypothesis H2.2,* where CEO tenure is a proxy of power.
As with any of the other hypotheses, the authors of this paper seek to find if ESG performance has anything to say on a company's performance impact on CEO compensation. This relationship will be evaluated by checking the ESG rating's impact on CEO compensation. However, clarifying if the fat cat problem is still an issue in modern companies in S&P 500 will robust our findings even if it cannot be linked to ESG. Therefore, the hypothesis follows Lin & Lin's (2014) point of view:

H2.3: Company performance will have a negative or no effect on CEO compensation.

3.2.4 CEO compensation

Cronyism, or *mutual backscratching*, is a well-documented phenomenon between the board of directors and the CEO (Lin & Lin, 2014; Brick et al., 2006). It is an argument, if the board of directors are highly compensated, they are less likely to conduct critical monitoring of the CEO. Less effective monitoring happens when the CEO is involved in the selection of directors (Jensen, 1993). As we know from the *agency theory*, less critical or practical monitoring of the CEO will eventually lead to entrenchment, where CEOs act in ways that only benefit themselves and not the shareholders. A way to mitigate this problem is by structuring the CEO compensation package to consist of options pay which makes it costly to falsely assert that the firm's future is promising (Inderst & Mueller, 2005). This study relies on a single measure, namely total annual compensation, which is why different compensation packages will not be tested out. However, CEO ownership is part of the control variables. Hence, it will be tested as

other findings and can thereby add valuables findings to Inderst & Muellers' (2005) theory about CEO ownership mitigating entrenchment.

However, this hypothesis focus is not centered on how to mitigate the entrenchment problem but rather on testing if *mutual backscratching* is still an issue in modern times for some of the largest companies in the US. Additionally, this study contributes to the existing literature by examining CEO- and board compensation from an ESG perspective. If a relationship is found, the ESG perspective can indicate if the compensations are positively related due to *mutual backscratching* or having the same goals. Based on existing literature, CEO compensation is expected to be positively related to board compensation due to *mutual backscratching*. The hypothesis is stated as follows:

H2.4: Board compensation will have a positive impact on CEO compensation.

3.3 ESG Rating

The final model is Model 3, with ESG ratings as the dependent variable. The ESG ratings serve as a proxy for companies' ESG performance. Testing what corporate governance characteristics and firm-specific factors impact ESG performance is essential to state if ESG performance can add interesting findings on the interplay between CEO- and board compensation. Two hypotheses are stated below, one concerning the board by testing how the board size affects the ESG ratings and one concerning the CEO by testing how CEO ownership (CEO percentage of shares) affects the ESG ratings.

3.3.1 Board size

An increasing focus on ESG from investors, consumers, other stakeholders, and SEC has forced companies and boards to meet expectations and the newest regulations (Sullivan et al., 2022). Teigland and Hobbs (2022) have, together with Ernst & Young, researched how boards can strengthen governance practices to accelerate their ESG journey with evidence from the European market. They state the importance of addressing ESG issues to unlock new sources of value creation, implying that ESG factors can impact the company's performance. 86% of the sample in Teigland and Hobbs's (2022) research furthermore state that focusing on ESG and sustainable growth is a critical success factor when building trust with stakeholders in uncertain times. However, addressing the ESG issues is costly in terms of resources for boards.

Thus, it makes sense to draw on Boyd's (1996) theory about board size's reflection of the resource richness of the board and the *resource dependence theory*. Companies must attract talent and possibly increase board size to manage these ESG issues. The difficulty in finding the right board size can be why rethinking the board and committee composition is one of the central corporate governance changes modern companies prioritize for the next two years, according to Teigland and Hobbs (2022). The area of board size's impact on ESG ratings is scarcely researched, even though the topic seems increasingly essential for companies. However, a few prior studies find evidence of larger boards having a significantly positive impact on ESG performance (Aksoy et al., 2020; Almaqtari et al., 2023; Husted & Sousa-Filho, 2018). This is likely due to larger boards being more effective in terms of diversity, responsibility allocation, and workload and is in line with resource dependence theory (Almaqtari et al., 2023; Jizi et al., 2014). Based on previous research and given the lack of research within the area, the following hypothesis is formulated:

H3.1: Board size will be positively related to ESG ratings.

3.3.2 CEO Ownership

CEO ownership refer to the percentage of shares owned by the CEO and has been proven to be an effective incentive method to align the interests of shareholders and the CEO (Choe, 2022). A recent study shows an increased investor focus on how companies operationalize their ESG goals across their organizations (Teigland & Hobbs, 2022). The same study finds that one of the most significant changes companies wish to perform is to enhance leadership accountability on sustainability in executive compensation plans (Ibid.) Jang et al. (2022) find evidence of managers caring less about ESG performance if they are not compensated on behalf of it. Less incentive to improve ESG performance could be why changing the approach and structure for reward and incentive systems for executives has been found to be the most prominent corporate governance change companies will undertake soon (Teigland & Hobbs, 2022). While alignment of ESG performance and CEO compensation seems like a great strategy to align the interests of shareholders and CEO, it is essential to note that it is not a remedy that will solve every sustainability issue (Ibid.). However, focusing on ESG and long-term value is a great start, and adding incentives to achieve this in the compensation structure is optimal. Jensen and Murphy (1999) argue that compensation policy is one of the essential factors in an organization's success as it shapes how top executives behave and determine what kinds of

executives an organization attracts. The most powerful link between shareholder wealth and executive wealth is direct stock ownership by the CEO (Jensen & Murphy, 1999). The increased focus on ESG has made good ESG performance connected to shareholder wealth. The hypothesis is therefore stated as follows:

H3.2: CEO ownership will have a positive impact on ESG ratings.

3.4 Control Variables

Control variables are independent variables backing up other independent variables. They are not directly linked to a hypothesis but included to control for other significant findings. They are further included to test how well our model is estimated in relation to previous research, and if findings are equal findings to strengthen the argument of a strong multiple regression model. Control variables should be added to properly account for the relationship between the dependent and independent variables. Comparing the empirical results from our models with previous findings can make our findings more trustworthy if data shows the same. For the models in this paper, three firm size control variables have been included, i.e., Total revenue, Total assets, and Market capitalization. Larger firms are typically more complex and will, therefore, require directors to spend more time and put more effort into monitoring their responsibilities, which is why they will also desire higher compensations (Lin & Lin, 2014). Likewise, CEOs demand higher compensation as complexity and responsibilities increase (Smith & Watts, 1992; Core et al., 2005; Lin & Lin, 2014). Hence, firm size is expected to affect CEO- and board compensation positively. Concerning ESG, firm size is expected to affect ESG performance negatively. This negative relationship is assumed because complexity makes it challenging to implement change in organizations.

Industry dummies have been added, as Hilburn (2010) reports that directors of companies in the technology industry receive higher pay than other industries (Lin & Lin, 2014). Adding industry dummies can provide exciting insights about compensation and ESG on an industry level. Furthermore, year dummies have been added to the models to control for unobserved differences between years and see the development within compensation and ESG performance. By adding these industry and year dummies, it is possible to capture the factors driven by industry or economy-wide effects such as the covid-19 pandemic.

4. Methodology

The methodology of this paper will be reviewed by examining the research methodology, reliability and validity, limitations and delimitations, and the statistical approach. A review of those areas will ensure replicability, transparency, and considerations of this paper.

4.1 Research methodology

In the following sections, *The Research Onion* (Appendix 1), developed by Saunders et al. (2007), has been used to ensure coverage of the research methodology used throughout this paper. The idea behind the research onion is to provide an organized and well-designed approach for developing a credible research design and, thereby, a credible project. The research onion consists of six layers; research philosophy, research approach, methodological choice, strategy, time horizon, and data collection techniques (Saunders et al., 2012, p. 126).

4.1.1 Research philosophy

To enhance the understanding of ways to approach the study of CEO and board compensation in the S&P 500 with an ESG focus, an examination of the research philosophy is critical, as it works as a foundation for later choices such as methodological choice, strategy, and data collection techniques (Saunders et al., 2012, p. 129). This paper uses existing theory to develop hypotheses that will be tested and be the foundation for further research, which highly speaks for *positivism*. The philosophy of positivism concerns collecting data about an observable reality and searching for regularities and causal relationships in the data, which is precisely the case for this study (Saunders et al., 2012, p. 134). *Ontology, epistemology*, and *axiology* are philosophies often used to describe and compare existing ideologies (Saunders et al., 2012, p. 140). The *ontology* describes the researcher's view of the nature of reality or being (Ibid.). The positivist approach to ontology supports the research philosophy of this paper as this study is external, objective, and independent of social actors in its approach. *Epistemology* describes the researcher's view regarding what constitutes adequate knowledge, and the positivist approach to epistemology is described as only observable phenomena that can provide credible data (Ibid.). This positivist epistemological approach supports the research philosophy of this paper, as our findings are based on statistical facts from observable phenomena. In other words, we do not assess a phenomenon that is difficult to research due to a lack of statistical evidence but is building upon existing literature with recent data from an unusual ESG perspective. Finally, the *axiology* describes the researcher's view of the role of values in research, where the

positivist undertakes the research in a value-free way, is independent of the data, and maintains an objective stance (Ibid.). We, as researchers, have approached this academic paper with no personal bias and are independent of the data retrieved. Hence, this paper makes use of positivism as a research philosophy.

4.1.2 Research approach

To answer the research question and the hypotheses stated in this study, we follow a hypothetico-deductive approach based on quantitative data. Zikmund et al. (2010) describe five key steps in the hypothetico-deductive approach where researchers can ensure that their findings are based on rigorous testing and contribute to advancing business knowledge. These are also the five steps that have shaped the research design of this paper:

1. Formulating a research question and hypotheses: Identifying problems and developing clear and testable hypotheses.
2. Designing the study: Selecting the appropriate design, sampling method and data collections methods.
3. Collecting data: Collecting data according to procedure in the previous step
4. Analysing the data: Using appropriate statistical techniques to test the hypotheses and answer the research question.
5. Drawing conclusions: Interpret the results of the analysis and determine whether the hypothesis can be supported or rejected.

Our research questions and hypotheses started with inspirations developed from readings of academic literature, such as Lin et al. (2013) and their research on *the fat cat problem*, Brick et al. (2006) and their research on *mutual backscratching* and Hillman et al. (2009) and their research on *resource dependence theory*. After reading papers like these, we designed a research strategy for the study to test the same theories on S&P 500 but with an ESG focus. This focus was intended to bring a new perspective to an extensively researched area. We then proceeded to step number three to determine if it was even possible to test our hypotheses and if data was available to answer the research question. When all data was collected and prepared, it was analyzed using statistical techniques described in the section below. Finally, step five of interpreting and drawing a conclusion has been done. Following these five steps speaks for the deductive approach, according to Saunders et al. (2012).

4.1.2.1 Statistical techniques

According to the key step number 4, mentioned above, it is vital to use appropriate statistical techniques when analysing the data and testing the hypotheses. This paper uses R-programming language and R Studio as statistical software to evaluate the hypotheses outlined in Section 3. R is a software environment for statistical computing and graphics, allowing advanced data analysis functions (R: The R Project for Statistical Computing, n.d.). The statistical techniques have been explained further in section 4.3 Statistical approach.

4.1.3 Methodological choice

The methodological choice for examining the hypotheses and the research question has been to use quantitative data. Quantitative research is useful for testing theories and hypotheses because it allows researchers to examine relationships between variables and quantify the strength and direction of those relationships (Saunders et al., 2012, p. 162). Statistical techniques can then be used to test the validity of hypotheses and theories. Because data are collected in a standard manner, the sample, hypotheses, and variables must be clearly stated so all readers understand them in the same way (Ibid.). To ensure clarity, the sample, hypotheses, and variables are therefore explained in-depth, and it has been made sure that the authors are independent of the companies being researched.

The thesis aims to establish a causal relationship between the variables and conclude with the hypotheses. This paper can therefore be categorized as an explanatory study (Saunders et al., 2012, p. 172).

4.1.4 Research strategy

The research strategy is vital because it intends to work as a plan of action to achieve a goal (Saunders et al., 2012, p. 173). The most appropriate strategy depends on which research philosophy and approach was chosen earlier. *Action research* is, by example, more appropriate for qualitative analysis, and *experiments* more suitable for quantitative analysis (Ibid.). Hence, the research strategy chosen for this paper is an *experiment.* This research strategy has been chosen because of the hypotheses and theory testing performed throughout this paper. Experiments tend to be used in explanatory studies to answer ‘what’, ‘how’, and ‘why’ questions (Saunders et al., 2012, p. 175). The goal is to answer the research questions about ‘how’ the interplay between CEO and board compensation is, ‘how’ corporate governance

characteristics impact ESG ratings, and 'if' an ESG perspective adds interesting findings to the existing literature on the interplay between CEO and board compensation. Saunders et al. (2012) further state that an *experiment* uses predictive hypotheses rather than open research questions. Even though this paper has an open research question, the research questions are answered on behalf of hypothesis and theory testing why a claim of an *experiment* as a research strategy is maintained.

4.1.5 Time horizon

On one hand, it is important that the sample does not represent outdated data, as this would not give a credible insight into what practices companies in S&P 500 are practicing today. On the other hand, data must represent sufficient historical data so that recent and anomalous fluctuations, such as the covid-19 pandemic, are eliminated as extensively as possible. Thus, a time horizon of 5 years has been chosen based on this challenging balance. Further, the years tested are from 2017 to 2021, as all key figures of 2022 are not published and yet possible to extract.

4.1.6 Data collection

The data sources in the thesis are from external providers, meaning all data is secondary. The data is further split into three categories of secondary data; documentary-, survey-, and multiple-source based. The documentary-based secondary data are retrieved from sources such as newspapers, articles, reports, and so on (Saunders et al., 2007, p. 248-249). The documentary secondary data are the primary source for collecting data in this paper. The survey-based secondary type of data refers to data collected using a survey strategy and helps get insights from a company's point of view (Ibid.). For example, other researchers, such as Teigland and Hobbs (2022), have conducted survey questionnaires for companies regarding compensation and ESG. The survey findings from their study are used throughout this paper to gain a broader understanding of the subject. Finally, multiple-sourced-based secondary data is a secondary source that combines data from multiple sources (Saunders et al., 2007, p. 251). This can imply combinations of entirely documentary or survey data but is most often a mix of documentary- and survey-based secondary data (Ibid.). Databases such as Standard & Poors Capital IQ (S&P), Wharton Research Data Services (WRDS), and Morgan Stanley Capital International (MSCI) used for the data collection of this paper, are examples of multiple-

sourced based databases. They can be used to extract raw data for different research purposes and are often suitable for comparability between companies, sectors, or years.

As described earlier, the data collected fur hypothesis testing is mainly quantitative. However, information from previous studies and articles adds a qualitative aspect. Therefore, both quantitative and qualitative data are used for argumentation and as evidence of legitimate findings in the thesis. An advantage of secondary data and databases is that the quality of data is often higher than what could be obtained by collecting our own (Saunders et al., 2007, p. 258). Furthermore, Ghauri and Grønhaug (2005) state that secondary data collection is cheaper and more accessible and saves researchers enormous savings in resources such as time and money (Saunders et al., 2007, p. 258).

The main disadvantage of secondary data is that it may have been collected with a purpose that might not match what is investigated in the research paper (Saunders et al., 2007, p. 260). Thus, extensive data preparation has been assessed to ensure that data is optimal for testing the stated hypotheses and thereby increase validity. Furthermore, we have no control over the data quality. So even though it is stated as an advantage that data quality is often higher than what we could obtain, this is not absolute. Thus, thoroughly examining the data and sources has been assessed carefully to comply with this disadvantage and ensure good data quality. Another shortcoming of secondary data is that retrieving specific data through sources can be costly. Copenhagen Business School pays and provides access to primary sources of information, from articles to financial data sources, which is why the risk of costly data has been neutralized. Further, this thesis investigates company performances and key figures listed in accessible databases and why most needed information is attainable and accurate.

The sources used for data collection are acknowledged databases containing different kinds of information about the companies and their employees. The most used sources of this paper are S&P Capital IQ and Wharton Research Data Services (WRDS). S&P Capital IQ is excellent in financial data and has therefore been used in retrieving data about the financial performance of the companies. WRDS specializes more in corporate governance characteristics of firms, which is why this database has been used for collecting data regarding the CEO and board of directors. Finally, Morgan Stanley Capital International (MSCI) strives to bring greater transparency and enable better decisions for a better world, making them unique in their collection of ESG data (MSCI, n.d.-b). All specified ESG data from MSCI was acquired directly from the CBS library

on a USB plug, which allows for high data validity. The MSCI database has provided industry data based on the Global Industry Classification Standard (GICS). Below in table 2 is shown an overview of where all variables have been extracted:

Table 2: Overview of variables

Variable Type	Variable	Source
Dependent (Model 1)	ESG	MSCI (CBS library)
Dependent (Model 2)	Board compensation	WRDS - Director Compensation
Dependent (Model 3)	CEO compensation	WRDS - Annual Compensation
Independent variables	Environmental (E)	MSCI (CBS library)
	Social (S)	MSCI (CBS library)
	Governance (G)	MSCI (CBS library)
	CIGS Sector	MSCI (CIGS)
	Total Revenue t-1	S&P - Capital IQ
	Total Assets t-1	S&P - Capital IQ
	Total Equity t-1	S&P - Capital IQ
	Market Capitalization t-1	S&P - Capital IQ
	ROE t-1	S&P - Capital IQ
	ROA t-1	S&P - Capital IQ
	Net Income t-1	S&P - Capital IQ
	Board members	WRDS - Director Compensation
	Tenure	WRDS - Annual Compensation
	Age	WRDS - Annual Compensation
	Gender	WRDS - Annual Compensation
	Salary	WRDS - Annual Compensation
	Ownership	WRDS - Annual Compensation

Source: Created by the authors (2023). The model gives an overview of all variables included in the research, and from where data are retrieved.

4.2 Reliability and validity

Reliability and validity are critical characteristics of the research quality, and focusing on the terms is essential to ensure that data is replicable, and the results are accurate. Reliability refers to whether the data collection techniques and analytic procedures would produce consistent findings if repeated on another occasion or replicated by a different researcher (Saunders et al., 2012, p. 192). This paper does not make use of interviews or any other type of data, where

participants could change their minds or behaviour. Hence, the threat of participant errors or bias can be eliminated. However, researcher error and bias are threats to reliability that have been consistently assessed when interpreting the empirical findings. Researcher error refers to the misunderstanding of results, while researcher bias refers to the mistake of allowing personal and subjective opinions to interpret the empirical findings (Ibid.). An objective approach has been used throughout the paper to avoid these threats, and all the results have been discussed thoroughly between the authors and their surroundings. Furthermore, the findings have been compared to previous research, ensuring the interpretations are not entirely different. Triangulating our findings with previous literature is used to assess the generalisability of our findings implying if our findings are representative of the total population, which increases validity and reliability. Furthermore, reanalysing secondary data or previous research from other perspectives can lead to unforeseen or unexpected new discoveries (Saunders et al., 2007, p. 259).

Validity concerns the extent to which the research measures what it intends to measure, which in this paper are the research question and hypotheses (Saunders et al., 2012, p. 193). In general, quantitative data possess validity to a great extent. However, several reasons, such as instrumentation or the need for clarity about cause-and-effect relationships between variables, might still threaten the validity of this paper. Instrumentation is described as the impact of a change in a research instrument between different stages of a research project affecting the comparability of results (Ibid.). In addition, our data is different and possibly extracted from other data sources than existing literature, which could decrease the paper's validity. However, a throughout review of data and providing sources has been carried out, ensuring that the variables and findings are comparable with previous literature.

4.3 Limitations and delimitations

During the methodological assessment of this paper, a few limitations and delimitations must be faced as they will help define the paper's scope and set boundaries around what will be covered and what will not. Recognizing the limitations will give an overview of the potential shortcomings of the paper, while stating the delimitations will ensure that the thesis will be narrowed down to its focus area. Overall, stating the limitations and delimitations is essential to conduct rigorous and transparent research that contributes to existing literature within the field.

4.3.1 Limitations

The limitations of this paper are mostly connected to the data collection process. Our first thoughts on the thesis can exemplify this limitation. We wanted to test the interplay between CEO and board compensation in the Scandinavian market, as this market has yet to be extensively researched. However, after spending numerous hours looking through different databases and multiple meetings with CBS' librarian, we faced that the data available in Scandinavia was too limited. Not because the transparency is lower than in the US, but because of a limited access to the databases with the information through the CBS library. The manual collection of data and, therefore, time consumption needed to get a dataset representing the Scandinavian market allowed us to choose the S&P 500 index representing the American market instead.

Another data collection-connected limitation of the paper has been to extract the same variables as we have seen in the existing literature. *CEO duality,* which explains whether the CEO is also the chair of the board, is one of the variables we have been limited in retrieving. Missing this variable is unsuitable when examining the interplay between CEO- and board compensation in relation to the concept of mutual backscratching, as it will not be possible to see the difference between CEOs serving as chairman and not. Other variables regarding the board have also been limited in retrieving. It would have been interesting to look further into the *gender split between board members* and *the average age* of the board, which could explain something about diversity in the companies. Including those variables could have led to relevant testing of the diversity within companies and their effect on both compensation and ESG. The reason for leaving out these variables is due to the limited access through the CBS library, the number of hours needed to collect everything manually, and no guarantee of finding data from all companies. Some variables from previous research are assessed as not bringing value to the research of this paper, which is why they have been omitted. Overall, information about the CEO has been easier to extract, which is why most of the hypotheses stated earlier are related to CEO characteristics.

The lack of research on the ESG perspective on compensations has entailed using grey literature. The literature on this area could be better, as grey literature is less reliable. However, it is the best option when entering research that has yet to be extensively researched. Furthermore, quantitative data reduce the possibility of in-depth analysis of compensation and ESG as it is complex to dig down into each company. Statistical regression models are limited

as they often simplify the reality to make subjects more interesting (Wooldridge, 2012). The aim is to find overall specifics on the sample size to give an interpretation of what characteristics are found in the overall American market when it comes to the interplay between compensation and ESG.

One of Spiering's (2022) reasons for not including ESG ratings in compensation is that ESG performance is difficult to measure. One could therefore be questioning the usefulness of relying on this measure, but the variable has been kept maintaining the ESG focus. Lastly, the authors are aware of the confirmation bias when interpreting the empirical findings. The bias arises when authors unintentionally or intentionally interpret information consistent with existing beliefs or expectations (Casad & Luebering, 2023).

4.3.2 Delimitations

The delimitations of this paper have primarily been done to the geographical area, and the time horizon of the research. The geographical delimitation has been cut down to the US market. Further, we have chosen to reduce the US market to the S&P 500 Index as the sample used for testing. Narrowing down the population has been done to ensure the scope of this paper. The S&P 500 Index has been used as it is one of the most widely used indexes for the US stock market and the US economy because of its wide range of different companies in different sectors (Kenton, 2023). However, it is critical to be aware of transferring conclusions from S&P 500 to the US market. Not being aware of this can cause false interpretations but indicates what happens on the market, as the S&P 500 Index represents a diverse range of companies based on market capitalization. It can be assumed that the CEO and directors at companies from S&P 500 are under greater scrutiny from investors, media, and the government.

We refer to *Section 4.1.5, Time Horizon,* for the explanation and reasoning for delimiting the time horizon to five years from 2017-2021. In relation to *agency theory,* we only focus on the CEO as the "agent" of this paper. Other executives, such as the CFO or COO, may also provide valuable insights as they receive similar compensation as the CEO. Thus, the area of agency theory can be more complicated than expressed in this paper. Finally, not measurable skills such as the CEO's human capital can affect the compensation. These skills have yet to be considered throughout this paper as it would require more qualitative data and interviews to understand each executive, their values, and beliefs. This would increase complexity and lead to a nearly impossible data collection process.

4.4 Statistical approach

Ordinary Least Square (OLS) regression analysis will be used as a statistical approach throughout this empirical research to estimate the relationship between CEO- and board characteristics and ESG performance. Using multiple regression and OLS estimates to determine the significant variables in each model will make it possible to interpret the interplay between CEO and board compensation with an ESG focus. The advantage of multiple regression analysis is the partial effect interpretation that allows making interpretations of the variables holding all other variables fixed (Wooldridge, 2012, p. 76). Before building the models, the classical linear model (CLM) assumptions for cross-sectional regression will be assessed carefully to ensure they are satisfied. CLM assumptions are referred to as the Gauss-Markov assumptions plus an assumption of normality in the error term, and it is essential that they are satisfied to make sure the OLS estimates have the smallest variance and are the Best Linear Unbiased Estimators (BLUE) (Wooldridge, 2012, pp. 102-119). For the three models in this paper, BLUE OLS estimates denote that no unbiased estimators are better at assessing CEO compensation, board compensation, and ESG performance and that the models have reached maximum consistency and efficiency (Ibid.). In practice, it can be challenging to ensure that all the CLM assumptions hold as models tend to get big and contain a lot of independent variables. However, diagnostics tests can help ensure the models meet the assumptions as closely as possible. To briefly summarize the role of each assumption, they are stated below, together with a justification of why the models satisfy the assumption.

Assumption MLR. 1 – Linear in parameters

The first assumption about linearity in parameters assumes that the model in the population can be written as:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u,$$

The model is flexible and allows *y* and the independent variables to be arbitrary functions of the underlying variables of interest (Wooldridge, 2012, p. 83). Thus, the argument for treating the dependent variables, Board compensation and CEO compensation, with the natural logarithm is to enhance the satisfaction of linearity in parameters as those variables show high variances before treating them with the log.

Assumption MLR. 2 – Random sampling

The second assumption assumes that a random sample of *n* observations is used for the model stated in Assumption MLR. 1 (Wooldridge, 2012, p. 84). We have 2,500 observations from S&P 500 in this paper, which comes from the 5 years of data of 500 different companies. Moreover, S&P 500 represents all the different CIGS sectors, implying the randomness of the sample. These facts held up against our objective interpretation, and having no personal bias when retrieving the data, it can be concluded that this paper's sample is random.

Assumption MLR. 3 – No perfect collinearity

The assumption of no perfect collinearity in the sample presumes that none of the independent variables are constant or have an exact linear relationship with each other (Ibid.). Independent variables have an exact linear relationship when R_j^2 is equal to ±1, as R_j^2 represents the proportion of the total variation in x_j that can be explained by other independent variables appearing in the model (Wooldridge, 2012, p. 95). In Appendix 2 a correlation matrix between is showing the R_j^2 between the variables used throughout this paper. The matrix shows that the biggest correlation can be found between Market Capitalization and Net Income showing a correlation of 0.75. Even though it is important to note that perfect collinearity does not exist unless R_j^2 is equal to ±1, a thumb rule of the term not being above or below ±0.9 is often used. Thus, assumption MLR. 3 can be confirmed satisfied based on the correlation matrix.

Assumption MLR. 4 – Zero conditional mean

The final and key assumption needed to conclude the unbiasedness of OLS is the zero conditional mean assumption (Wooldridge, 2012, p. 84). The assumption supposes the error term *u* has an expected value of zero given any values of the independent variables and can be mathematically written as:

$$E(\mu|x_1, x_2, \dots, x_k) = 0$$

The equation implies that the assumption fails if any of the independent variables correlate with the error term. However, on the other side, if the equation holds and the assumption is satisfied, the models are said to consist of exogenous variables, and the error term can be removed from the final model (Wooldridge, 2012, p. 86). The omitted variable bias or using log transformations can cause the assumption to fail if one is not careful when interpreting the results (Ibid.).

Under the assumption MLR.1-4, OLS estimates are considered unbiased, implying that the sample estimates obtained from the data correctly reflect the true population (Wooldridge, 2012, p. 87). However, in practice, it is impossible to say that OLS is unbiased because those unbiased estimators have no chance of saying something about a whole population. Nevertheless, it is still an essential assumption as we hope to have obtained a sample that can estimate the population (Wooldridge, 2012, p. 88). Finally, to avoid including irrelevant variables in the models that have no partial effect on the dependent variable *y,* the models are reassessed after running the first time. This reassessment will lower the chance of omitted variable bias and overspecified the model (Ibid.).

Assumption MLR. 5 – Homoskedasticity

The assumption of homoskedasticity assumes a constant error variance given any values of the independent variables and can be written with the following equation:

$$Var(u|x_1, \dots, x_k) = \sigma^2$$

The assumption MLR. 5 is not needed to conclude that OLS is unbiased. However, the assumption is needed to conclude something about the variance and ensure that OLS has an important efficiency property (Wooldridge, 2012, pp. 93-94). Assumption 5 says that the variance of *y*, given *x*, does not depend on the values of the independent variables, and the size of the variance is particularly important as a larger variance translates into a less precise estimator, which, in turn, causes less accurate hypotheses tests (Ibid.). Taking the log of variables can help to stabilize the variance and improve the homogeneity across the range of values. Thus, this is another reason for why the log has been taking of CEO- and board compensation. The natural logarithm is further applied to all firm size variables. Satisfying assumption MLR.1-5 also known as the Gauss-Markov assumptions implies that $\hat{\beta}_0, \hat{\beta}_1, \dots, \hat{\beta}_k$ are the best linear unbiased estimators of $\beta_0, \beta_1, \dots, \beta_k$, which is ideal when running multiple regressions analysis (Wooldridge, 2012, p. 102). To make standard errors more robust in relation to heteroskedasticity, the 'coeftest()' function is applied in R.

Assumption MLR. 6 – Normality

The normality assumption in errors assumes that the unobserved error is normally distributed in the population. This implies that the population error *u* is independent of the independent

variables and is normally distributed with zero mean and variance (Wooldridge, 2012, p. 118). This can be described with the following equation:

$$\sigma^2 : u \sim Normal(0, \sigma^2)$$

If the above equation is satisfied, this naturally satisfies assumption MLR.4-5 as well. However, as it is known that assumption MLR. 6 plays no role in concluding that the OLS are BLUE, it is important to note that for larger sample sizes where $n \to \infty$ the satisfaction of the assumption is not that important (Wooldridge, 2012, p. 175). It is not important because of the asymptotic normality of OLS, stating that when the sample size increases, the distribution of the sample means it approaches a normal distribution, regardless of the distribution of the original population (Ibid.). After a clarification of the functional form misspecifications, which will be explained in the next section, it can finally be concluded that under the CLM assumptions MLR.1-6, the OLS estimates are BLUE, consistent, and normally distributed, which, in turn, allows us to infer something about the population from a random sample (Wooldridge, 2012, p. 120)

Functional form misspecifications

Multiple regression models suffer from functional form misspecification when they do not adequately account for the relationship between the dependent and the observed independent variables. It is critical to use the correct functional form to improve the consistency of the models (Wooldridge, 2012, p. 304). Omitting variables or falsely using natural logarithm can cause functional form misspecification if one is unaware that the true model already satisfies the Gauss-Markov assumptions (Ibid.). However, manipulating the data makes results more appealing but does not change any conclusions. The log is often used for positive variables where the variation is extensive, as the functional form yields a distribution closer to normal (Wooldridge, 2012, p. 216). Thus, models with log(y) as the dependent variable have a better chance of satisfying the CLM assumptions because the functional form can mitigate the problem of not being linear, heteroskedasticity, and skewed conditional distribution (Ibid.). The histograms visualized in appendix 5 strongly shows the right-skewness of the dependent variables in model 1 and 2, i.e., Board Compensation and CEO Compensation, resulting in a needed log transformation. Effectually, the models will have the following equation:

$$\log(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + \mu$$

Using log(y) does not change any conclusion; the results must just be interpreted with a semi-elasticity of y with respect to x. The semi-elasticity is the percentage change in y when x increases by one unit; the equation can be shown below (Wooldridge, 2012, p. 715).

$$\%\Delta y \approx (100 * \beta_j)\Delta x$$

The omitted variable bias is vital as the risk of excluding relevant variables and causing bias in OLS estimators arises (Wooldridge, 2012, pp. 88-89). Some key steps have been assured to reduce the risk of omitted variable bias in our models. First off, only insignificant variables have been removed. Further, a thorough review of the insignificant variables' theoretical relevance and potential confounding effects, such as correlation, has been evaluated. Finally, the omitted variables are excluded in the three models and will be described later in section 5.2 Data regulations.

5. Data description

The data used to test the previously stated hypotheses is the strongest argument for what happens in the S&P 500 and, thereby, the US market. With a time horizon of 5 years in this empirical research, we deal with panel data. Panel data combines cross-sectional and time-series dimensions and is also known as longitudinal data (Wooldridge, 2012, p. 448). The cross-sectional aspect refers to the wish to take a "snapshot" that can provide valuable insights into the interplay between CEO- and board compensation from an ESG perspective (Saunders et al., 2012, p. 190). Adding the time-series dimension allows us to see the development over a 5-year span. Hence, panel data allows us to study a particular phenomenon over a specific period. This paper aims to see if the findings have changed since other scholars did the same research and if the ESG perspective can explain some of the historical findings. Next, the sample and our choices for striving towards the best possible dataset are explained. Ensuring the quality of the data helps ensure that the empirical findings are valid and interpreted without misunderstandings.

5.1 Sample (beginning dataset)

Our sample in this paper includes 500 companies from the Standard & Poor's 500 Index. The index is weighted by market capitalization (Kenton, 2023), and all the leading publicly traded companies must report a wide range of financial performance and compensation information. There has been much previous research on compensation in the US, which is why it has been chosen as the area where to expand the literature. The availability of data and the statement from Standard and Poor's website spglobal.com, "*The S&P 500 is widely regarded as the best single gauge of large-cap US equities*". Public and professional investors widely acknowledge the index as a benchmark for the general development of the American market. It is, therefore, possible to say that our findings throughout this paper can be used as a benchmark for the whole American market.

The 500 companies are traced over five years, from 2017 to 2021. This gives a total of 5*500 = 2,500 observations/firm years. The following section will describe the variables collected for each company to examine the interplay between CEO- and board compensation with an ESG focus. Additionally, a statement of missing observations due to missing data from databases or outliers will be carried out. After removing outliers and stating omitted variables, it will eventually give us our final dataset, which is ready for testing.

5.2 Data regulations

In the following section, all regulations of the dataset will be explained with an argument of the choices made. Data regulations are generally used to get the best possible dataset, improve the models, and increase the interpretation and precision of empirical findings. Values are either found to be missing or incorrect, which is why adjustments and regulations are necessary for building the best possible dataset. The different adjustments and regulations made throughout this paper are the detection of missing values, detection of outliers, and omitted variables, which, after being dealt with, will eventually give us the final dataset.

5.2.1 Missing values

Missing values refer to values missing from the databases. Usually, only a few values are missing from the databases, which makes it easy to regulate. However, it is still critical to detect those values to ensure the data quality. Data is retrieved from different sources, whereas not all sources provide sufficient data for the same variables. The insufficiencies from different external providers are explained below with an argument for regulating or removing the row from the set.

ESG data from MSCI is very complex and does not cover all companies. Retrieving, valuing, and rating companies based on all ESG criteria is costly and time-consuming. Hence, it was only possible to extract ESG ratings for 475 companies from our sample of 500 companies. ESG ratings are one of the dependent variables and, thus, essential for the hypothesis development and multiple regression model. In total, 25 companies and 125 rows have been left out, one row equals one firm year. When digging deeper into ESG ratings over the years and including the score of E, S, and G separately, an extra 54 rows have been excluded from the set. For example, one company where rows have been excluded is Moderna. Moderna was not given an ESG score from 2017-2019, most likely due to its small size and impact on the general market. However, after covid-19, Moderna developed a vaccine to prevent people from being infected with the virus, which is why the company grew in both size and impact. As a result, in 2020, Moderna was assigned an ESG score of ‘B’ and improved its score to ‘BB’ in 2021. The two rows of data for Moderna from 2020-2021 have been included in the dataset, while the three years from 2017-2019 have been excluded due to missing values from MSCI. The missing ESG ratings from MSCI accounted for 179 rows left from the final dataset.

Wharton Research Data Services (WRDS) had minor issues explaining the compensations. The missing 'Executive' data covered all variables, Tenure, Gender, Age, Salary, Ownership, and CEO Compensation. Seven rows were excluded due to missing executive information. Missing board compensation accounted for 20 missing rows. The information needed was regarding the number of directors and board compensation. It was possible to retrieve data manually for 16 rows with information about board members and board compensation from the respective company's DEF 14 A, SEC filings report. After the 16 retrieved rows, only four rows with director information were excluded. 17 companies in specific years did not have either executive or director data available, so they were chosen to be left out. WRDS had insufficient data for 28 rows, leaving them out of the dataset.

Finally, S&P Capital IQ provides satisfying financial data where only five rows on Market Capitalization were missing and have been left out of the data.

5.2.2 Outliers

Outliers are classified as extreme values that can be distinguished as either valid or invalid observations. Most outliers detected throughout this paper have been classified as valid, meaning they have not been treated as missing values but have instead been distinguished as valid observations. Hence, they stand out but are not out of proportion to what is expected. However, on the other side, invalid observations should be removed from the dataset as they are not legitimate in saying something about the population (Baesens, 2014, pp. 20-22). One invalid outlier has been excluded due to disturbances in the dataset. This exclusion has been done to get a model with high generalization and a robust dataset. The outlier was found under CEO compensation from Tesla in 2018. The CEO and founder of Tesla Motors, Elon Musk, received a compensation of $2,284,044,880 in 2018, 7.7 times larger than the second-highest compensation reward in 2017-2021 and 150 times higher than the average compensation. It has been left out due to its size and possible impact on models.

The final adjustments add up to a total of 213 removed variables due to missing data and leave a final number of 2,287 observations used for future model estimation and testing. Table 3, shows an overview of observations left out of the sample.

Table 3: Data regulations

Reason - Missing data	Rows
ESG ratings - (MSCI)	125
E, S or G - (MSCI)	54
CEO - (WRDS)	7
Board - (WRDS)	4 (20)
Board and CEO - (WRDS)	17
Market Capitalization - (S&P Capital IQ)	5
Outliers (Tesla, 2018)	1
Total left out observations	213
Total number of observations	**2,287**

Source: Created by the authors (2023). Overview of data regulations.

5.2.3 Omitted variables (dummy)

It is impossible to add specific and only significant sectors, as R only allows all or no sectors. A model for the sectors is therefore run separately to avoid noise. The dummy variables of the sector are all based on the Communication Services sector, which is the base sector of the model. To avoid multicollinearity and the dummy variable trap, the sector Communication Services are removed from the model (Wooldridge, 2012, p. 230). Removing Communication Services means that all findings of the industry impact on the dependent variable are based on this sector variable. For example, as seen in Table 8, one could interpret that all sectors significantly explain ESG ratings. However, this only explains the effect of the sector on the dependent variable in relation to Communication Services. Summary statistics of each sector and its performance on the dependent variables are therefore chosen over a statistical model. The sector is therefore not categorized as a valid variable and therefore be excluded from future statistical models.

It is, on the other hand, possible to split up the year, which is why the significant year is included in the models. A summary statistic of years is also included to see the annual results and effects of the dependent variables.

5.2.4 Final Sample

After all data regulations have been made, the final and best possible dataset are identified. The summary statistics of all variables in the final sample used for model estimation are listed in the following table 4.

Table 4: Variable Characteristics

Type	Category	Variable	Unit	Mean	Std
Dependent (Model 1)	Board Characteristics	Board Comp	$'000	3,124.19	1,711.82
		log(Board)	*log()*	*7.97*	*0.42*
Dependent (Model 2)	CEO Characteristics	CEO Comp	$'000	15,210.54	15,032.11
		log(CEO)	*log()*	*9.40*	*0.85*
Dependent (Model 3)	ESG Characteristics	ESG	(1-7)	4.19	1.37
Independent	ESG Characteristics	Environmental	(0-10)	5.87	2.31
	ESG Characteristics	Social	(0-10)	4.59	1.58
	ESG Characteristics	Governance	(0-10)	5.30	1.30
	Firm size	Total Revenue	$'000,000	22,547.40	43,061.03
		log(TR)	*log()*	*9.18*	*1.25*
	Firm size	Total Assets	$'000,000	73,124.25	235,460.59
		log(TA)	*log()*	*9.98*	*1.42*
	Firm size	Market Cap	$'000,000	51,660.76	111,255.82
		log(MC)	*log()*	*10.17*	*1.06*
	Firm performance	ROA	%	6.25	5.33
	Firm performance	ROE	%	26.05	596.55
	Firm performance	Net Income	$'000,000	2,057.31	4,820.58
	Board Characteristics	Board member	#	10.78	2.43
	CEO Characteristics	Tenure	Years	7.19	6.77
	CEO Characteristics	Age	Years	58.12	6.42
	CEO Characteristics	Gender	1=F, 0=M	0.05	0.23
	CEO Characteristics	Salary	$'000	1,329.18	730.64
	CEO Characteristics	Ownership	%	0.55	2.61

Source: Created by the authors (2023). Overview of data characteristics of each variable. Data from: MSCI, S&P capital IQ & WRDS.

5.3 Definition of variables

All variables used throughout the three models are described in the following section. The data are categorized into different sections to understand how the different elements contribute to explaining the response variables. First, the three dependent variables throughout the three models will be explained, followed by an examination of the independent variables. This examination includes reasoning for the variables being relevant for the context of this paper, together with a basic explanation of what the variable says something about and how the variable is calculated or retrieved.

5.3.1 Dependent variables

A dependent variable is the researched variable. The model then includes all the independent variables to explain and see their significant impact on the dependent variable. The dependent

variables used for the three models are Board Compensation (Model 1), CEO Compensation (Model 2), and ESG Rating (Model 3).

Board Compensation

The board compensation data is retrieved from Wharton Research Data Services (WRDS) and are provided directly from each company's annual proxy according to the SEC form, DEF14A. American companies must list the board compensation in the SEC filings report. Board compensation covers the total compensation of all directors of the board. The value of each director's compensation consists of cash fees, stock awards, option awards, non-equity incentive plans, changes in pension value, and other compensation (WRDS, 2023). The total board compensation ranges from $38 to $60,943 thousand, with an average of $3,124 thousand (Table 4).

There are two main reasons for choosing board compensation as the dependent variable in the first model. First, it is used as a measure in existing literature (Lin & Lin, 2014), why a comparison with previous research is possible. The second reason is that the board's power depends not on the individual director but the entire board and their total consulting, control, and contact. Per previous arguments, the total board compensation is transformed using the natural logarithm formula in Excel $= LN( )$, to meet the six CLM assumptions.

CEO Compensation

CEO compensation packages are typically tailored to the individual and their specific role, industry, and experience level. The variable includes the total value of all compensation measures according to WRDS; salary, bonus, stock awards, option awards, non-equity incentive plans, change in pension value, and other compensation. The total CEO compensation ranges from 0 to $296,248 thousand, and the average CEO Compensation is $15,202 thousand, according to our sample and as shown in table 4. The variable is retrieved from WRDS and contains data in accordance with what is required from SEC (SEC, n.d.-b):

”The federal securities laws require clear, concise, and understandable disclosure about compensation paid to CEOs, CFOs and certain other high-ranking executive officers of public companies.”

There are many different interpretations of total CEO compensation. The primary argument for choosing total CEO compensation as the dependent variable of model 2 per SEC requirements is the expected data accuracy. Further, the comparison between firms is better, as all companies face the same SEC requirements. Finally, using the total CEO compensation allows for comparing the findings with previous research using total CEO compensation as well (Brick et al., 2006; Lin & Lin, 2014). The data on CEO compensation is transformed by the natural logarithm $= LN()$ in Excel, like the Board Compensation, to fulfil the six CLM assumptions.

ESG Rating

The ESG ratings are provided by MSCI (2017-2021), and the score consists of three components: Environmental (E), Social (S), and Governance (G). In addition, all the scores are weighted based on the industry and company characteristics, as it is shown in the following example from 2021:

Table 5: ESG rating comparison

Company	E-Score	E-Weight	S-Score	S-Weight	G-Score	G-Weight	ESG-rating
Apple	3.70	20%	5.90	47%	4.00	33%	BBB
Netflix	10.00	5%	4.50	47%	2.10	48%	BB
Otis	4.90	33%	2.10	20%	6.90	47%	BBB

Source: Created by the authors (2023). The table compares the ESG scores and ratings of three different companies: Apple, Netflix, and Otis. Data from MSCI

Three random companies are chosen for this comparison. It is seen that different companies have different weights, where the streaming service company Netflix's Environmental score only weighs 5%, and the escalator manufacturer Otis has an Environmental weight of 33%. The weights are based on the company's operations. Netflix, for example, has a minimal environmental impact as they are a streaming service company. Otis has a much more significant impact due to their immense production of escalators. Apple, too, is a production company, but its social score is massive due to the safety requirements of its products to protect consumers. A massive social score is also the case for Netflix, as they are creating movies and showing content that might affect users and society. Finally, the governance weighs a lot on Netflix and Otis because of the need to prevent cyber risks and systems. Even though Netflix has the highest total score of the three companies, 16.6, compared to Apple's 13.6 and Otis's 13.9, the ESG rating is lower due to different weights.

MSCI (2023) has provided the framework for the ESG ratings. The ratings range from 'CCC' as the worst to 'AAA' as the best, where all scores are relative to industry peers. The 'CCC' and 'B' are categorized as "Laggard," meaning the company struggles to manage significant ESG risks. The score 'BB', 'BBB', and 'A' are categorized as "Average," where the company manages the most significant ESG risks and opportunities but nothing remarkably good or bad. 70% of the companies are rated as "Average". The last category is the "Leader", where the company manages the most significant opportunities and risks. The leaders are rated 'AA' and 'AAA'. The scores have been transformed into a 1–7 scale rating, where 1 = lowest and 7 = highest. The rescaling has been done to quantify qualitative data by assigning a score indicating the strength or intensity of each identified rating (Mehl-Madrona et al., 2004). The count for each rating is shown below in table 6. The table furthermore shows that the data is normally distributed. There can be referred to table 8 and table 9 to see ESG ratings average across industries and years.

Table 6: Distribution of ESG ratings

ESG ratings	Value	Count	%
AAA	7	71	3%
AA	6	368	16%
A	5	503	22%
BBB	4	633	28%
BB	3	458	20%
B	2	199	9%
CCC	1	56	2%

Source: The table is created by the authors (2023). The distribution of ESG ratings. (MSCI data)

5.3.2 Independent variables

The following section covers the independent variables throughout the three models. Seventeen independent variables have been included in the total, and the variables differ between company characteristics, firm size characteristics, firm performance characteristics, board characteristics, and CEO characteristics. All variables are included across the three models and used for the general model estimation of the first model.

Board Compensation, CEO Compensation & ESG Ratings

The dependent variables, explained in the previous section, board compensation, CEO compensation, and ESG rating, are used as independent variables in the models, where they are not dependent. They are used for modelling to investigate significant impacts and their interplay. Board compensation is expected to positively affect CEO compensation due to the mutual backscratching theory, which, vice versa, is expected to be the same. Further, board compensation is expected to have an ESG rating, as it influences the governance part of ESG. The same effect is expected of CEO compensation on the ESG rating. ESG ratings are expected to positively impact both CEO and Board compensation because the focus on ESG is increasing and has assumingly become part of the compensation plans.

Years

Dummies have been created for the variable years and have been added to test for changes across the sample period. The variable takes the value of 1 for the given year and leaves the other dummy variables with a value of 0. The dummy variable is created on the base of the year 2021. Thus, 2021 is left out of the models to avoid multicollinearity (Kaggle, 2022). Each year variable accounts for approximately 1/5 of the dataset with small regulations.

Year dummies have previously been incorporated into the models to test for differences between years (Brick et al., 2006; Lin & Lin, 2014). The years may affect board compensation. Due to reporting differences, the year dummies capture financial years and not calendar years. As the focus on ESG has increased exponentially in the past years, the year dummies are expected to impact the ESG rating positively. Covid-19 greatly impacted firm size (market cap) as the share prices went down. Further, it hurt companies' performance, which is why the years 2019 and especially 2020 are expected to have a negative effect on compensation. The fat cat problem argues that the pandemic might not affect compensation much, as company performance is not linked to compensation (Lin et al., 2013).

5.3.2.1 Company characteristics

The company characteristics category covers each ESG measure, i.e., environmental, social, and governance. Furthermore, the sector variable is described in this section. The data is used to tell what company characteristics are influential and how each E, S, and G factor contributes to the total ESG rating and compensations.

Environmental

The ‘Environmental’ portion of ESG measures the company’s sustainability and effect on the environment. The score area ranges from 0 to 10. The average Environmental score is 5.87 (Table 4). It is valued based on how significant an impact the company has on the environment, and its ability to decrease the utilization of natural resources, both in direct operations and across its value chain. Natural resources are valued in areas such as greenhouse gas emissions, water use, waste, pollution, land use, and biodiversity (S&P Global, 2019). With a narrow focus on the environmental aspect, the company will be exposed to greater financial risk. Neglecting the importance of ESG can cause a lot of damage to the company, such as increasing governmental regulations, criminal prosecution, and damage to the company’s reputation, which will all have a negative impact on shareholder value. Many non-profit organizations (NGOs), such as Greenpeace and WWF, are environmental groups that increase awareness of environmental importance worldwide.

Social

The 'Social' part of ESG is how a company manages its relationships with the political environment, its workforce, and the societies in which it operates. The workforce is explained by the terms and conditions for employees within the organization, e.g., if they are paid enough, their insurance policy, and how they are treated in general. The company will also be interested in avoiding labour strikes or consumer protests, as they can damage both financial aspects and the company's reputation (S&P Global, 2019). Further, the company needs to ensure that the society buying the products will be exposed to as little risk as possible. Walmart is an example of this risk reduction. After several shootings with a type of firearm, they stopped the sale of the firearm. Due to the reduced risk of selling specific ammunition, people were more likely to shop at Walmart (Hudgins et al., 2019). The score for S ranges from 0 to 10, with an average score of 4.59 (Table 4).

Governance

‘Governance’ is often an overlooked component when talking about ESG. Nonetheless, the distribution of rights and responsibilities among participants in the corporation, such as the board of directors, managers, shareholders, and stakeholders, is crucial (S&P Global, 2019). The distribution of the scores ranges from 0 to 10, with an average score of 5.3 (Table 4).

Four factors assess companies’ governance performance: Transparency, Code and Values, Cyber Risk and Systems, and Structure and Oversight, according to S&P Global (2019). In

addition, diversity and equality are another big part of governance, where especially gender diversity among CEOs has been heavily discussed for a long time, which will be looked further into in the CEO gender variable.

All three specification scores, Environmental, Social, and Governance, positively impact ESG rating. An increase in one of the three must increase the overall rating ceteris paribus. The ESG rating, in general, is expected to have a positive impact on compensation, which is why each of the individual scores is expected to have the same positive impact. The three scores are included to investigate what part(s) of ESG is more valuable regarding compensation.

GICS Sector

The global industry classification standard was developed in 1999 by MSCI and S&P Dow Jones Indices (S&P Global, n.d.). It was designed to standard industry definitions as wholly and accurately as possible, with the purpose of the classification to offer an investment tool that captured both breadth, depth, and evolution of different industry sectors (MSCI, n.d.-a). As a result, it is possible to analyze how companies with similar characteristics perform across sectors. It is an ongoing and time-consuming process to keep the data accurate, and S&P Global (n.d.) says that "It is the result of numerous discussions with asset owners, portfolio managers, and investment analysts around the world.". Hence, the GICS is a widely accepted and acknowledged industry analysis framework, supplying the market with transparency, efficiency, and trends toward sector-based investing.

The classification system is hierarchical, with four different levels of complexity. It is illustrated as a pyramid, getting increasingly complex for each layer moving down and closer to the bottom (Appendix 3). All companies have a sector, industry group, industry, and sub-industry. First, the 'Sectors' account for the most general classification, where the companies are split into 11 different sectors. Then, moving down in the pyramid is the Industry Groups, where the sector is split into 25 groups. As an example, the 'Information technology' sector is split into three new sub-industries: 'Semiconductors & Semiconductor Equipment', 'Technology hardware & equipment' and 'Software and services'.

After the industry groups, the companies are divided into industries, with 74 different industries. To continue the previous example, the 'Software and services' industry group is split into two industries: 'IT Services' and 'Software'. The most complex and final categorization of

companies is within the sub-industry, split into 163 categories. An example of the sub-industry split is based on the previous industry. 'Software', is split into two sub-industries: 'Application software' and 'Systems software'. The first level, Sectors, is used throughout the thesis to give the most substantial base for the models and investigate general industry trends. The sectors included are all listed below with the following observation characteristics:

Table 7: Sector distribution

GICS Sector (MSCI)	Companies	Company years	% of observations
Industrials	69	317	13.86%
Health Care	60	294	12.86%
Communication Services	18	81	3.54%
Consumer Discretionary	62	301	13.16%
Utilities	29	143	6.25%
Financials	59	286	12.51%
Materials	26	121	5.29%
Real Estate	28	136	5.95%
Consumer Staples	32	159	6.95%
Energy	21	102	4.46%
Information Technology	71	347	15.17%
Total	**475**	**2.287**	**100%**

Source: Created by the authors (2023). The models show the distribution of sectors. (MSCI data, in accordance with GICS)

Table 7 shows that Communication Services accounts for the least observations of 81 total company years and only 3.54% of the total observations. Conversely, Information Technology is the biggest part of the data, with 15.17% and 349 observations.

5.2.3.4 Firm size

Three measures of firm size are included in the dataset: Total revenue, total assets, and market capitalization. The variables are included to explain compensation if the compensation level is related to firm size. In addition, the natural logarithm is added to all firm size variables. Some companies are much bigger relative to others, why the natural logarithm is added to the variable to reduce the effect of outliers.

The variables in firm size are all lagged by one year. The compensation determination process is more affected by last year's size and performance. Thus, the argument for the firm size in time minus one year is the most appropriate measure. The argument is widely supported by previous literature, as most compensation research includes a one-year lagged control variable of firm size (Brick et al., 2006; Lin & Lin, 2014). It is interesting to test the firm size on ESG further to see if it impacts the ESG rating. Firm size is expected to negatively impact ESG as bigger companies' behaviour is more challenging to change.

Total Revenue$_{t-1}$

Revenue is generated from selling products or services, where each product has a revenue stream. The total revenue is how much income is generated in the period from all products or services in the company and will, therefore, always be positive. The measure is an excellent estimate to see if the company is growing, especially for companies in the start-up phase (Finmark, 2021). Total revenue is the total income without considering the costs. It is used in multiple regression models to measure firm size and performance. Using it as a proxy for firm size is supported by previous research, which uses total revenue as the main variable for measuring firm size (Brick et al., 2006). According to previous studies, total revenue will be used as the preferred measure of firm performance.

The variable is included in the three models to investigate any significance in relation to CEO or board compensation and if companies with a high revenue tend to improve ESG performance. The lowest total revenue of the dataset is $60 million ranging to $523,964 million, with an average revenue of $22,542 million.

Total Assets$_{t-1}$

Total assets are the sum of a company's monetary and non-monetary resources. Previous research has used total assets as the main measure of firm size (Andreas et al., 2012; Lin & Lin, 2014). Total assets are referred to as the company's book value, which is why it is included in this model estimation as a measure of firm size. Assets appear as one of the sides of the balance sheet, where the counterpart is the sum of equity and liabilities. Assets can be either current or non-current and generate either short- or long-term economic benefits. Current assets can be converted into cash or cash equivalents within one year of acquisition. Current assets include, for example, accounts receivables, cash, inventories, and prepaid expenses (Dubey, 2023). Non-current assets include, for example, machinery, buildings, cars, furniture, and

goodwill. Total assets range from a minimum of $340 million to $3,384,757 million. The average of total assets across the data is $73,105 million.

Market Capitalization$_{t-1}$

Market Capitalization is the market value of the company and can be calculated with the following formula (Fernando, 2023):

$$Current\ Share\ Price\ *\ Total\ Number\ of\ Shares\ Outstanding$$

The companies on S&P 500 are valued based on market capitalization, which is why it has been included as a measure of firm size. However, previous research using market capitalization to measure firm size has yet to be identified. The average market capitalization on the S&P 500 Index is $51,658 million, and values range from $901 million to $2,037,907 million.

5.2.3.5 Firm performance

Firm performance includes three variables: net income, return on assets (ROA), and return on equity (ROE). All variables in firm performance are lagged by one year, as seen in the previous section on firm size. The argument still holds that last year's performance affects the compensation determination process more than the current year's performance. Additionally, more measures are included to support the findings' robustness and determine which measure affects the compensation. Three measures are included to support the findings' robustness and the difficulties of accurately measuring firm performance. Different CEOs and directors have different pay-for-performance measures, which is why more measures give different perspectives on what measures influence compensation and ESG, if any. According to previous research, ROA is chosen as the main measure of firm performance in the multiple regression models (Brick et al., 2006; Lin & Lin, 2014).

ROA$_{t-1}$

ROA is the company's ability to utilize its assets, calculated by the following formula:

$$ROA_{t-1} = \frac{Net\ income_{t-1}}{Total\ assets_{t-1}}$$

The formula shows how much net income is generated relative to total assets. ROA has, in previous studies, been the preferred measure for firm performance (Brick et al., 2006; Lin & Lin, 2014). The maximum return on assets in the dataset is 45.2%, where the minimum ROA is -19.2%. The average return is 6.25%.

The ROA will be used as the preferred measure of firm performance following previous studies. ROA is not expected to significantly impact either board or CEO compensation, as the fat cat problem implies (Lin et al., 2013). ROA is, on the other hand, expected to impact ESG ratings positively. With a higher ROA, the company is growing relative to its size and will have better opportunities to improve its ESG profile.

ROE_{t-1}

ROE is a performance measure indicating the company's ability to generate shareholder returns. The following formula calculates ROE:

$$ROE_{t-1} = \frac{Net\ income_{t-1}}{Shareholders\ equity_{t-1}}$$

There are some considerable variations in the ROE, possibly due to some companies' low shareholders' equity. However, the average ROE is 26.05%. ROE as a performance measure is relevant in relation to the board compensation because the director's job is to handle the interest of the shareholders. This responsibility should further affect the CEO's compensation, as the compensation schemes should be aligned due to the principal-agent theory. Based on the fat cat problem theory, this performance measure is not expected to affect either board or CEO compensation positively. However, last year's ROE performance will improve the value of the owner's shares, so a higher value eventually will result in more liquidity to spend on environmental, social, or governance improvements. Therefore, ROE is expected to have a positive impact on ESG ratings.

Net $Income_{t-1}$

When all costs are subtracted from total revenue, the profit or net income is left and given by the following formula:

$$Total\ Revenue_{t-1} - Total\ cost_{t-1}$$

Net income is the company's final measure of profitability. A negative net income equals a loss and too high expenses compared to revenue. Net income is solely a performance measure of

real numbers and not a rate of percentage. Previous research on net income has yet to be identified. However, it is included as a measure due to its effect on ROA and ROE and to see if the company's profitability influences compensation and ESG ratings. The lowest net income was a loss of $22,440 million, and the biggest was a profit of $59,531 million, where the average net income is $2,056 million.

5.3.2.2 Board characteristics

Board characteristics include all data related to the board of directors. The variables included are board size, and board compensation, explained earlier under the dependent variables.

Board size

The size of the board is calculated by the total number of directors, also known as board members. The board represents the shareholders, which is why it is essential to have a board with different perspectives and competencies to obtain shareholders' interest. The ideal board size in previous research was 7-8 directors (Jensen, 1993). The average board size in the dataset is a board of 11 directors and ranges from a minimum of 4 board members to the biggest board with 26 members.

A complex firm tends to have more directors, as resource dependence theory suggests, to have enough people to track the efficiency of all business units and areas. However, more directors expose the risk of free riding (Conyon, 2014). Free riding becomes a problem when there are more people than the amount of work needed. As a result, directors tend to do less than expected simply because there is not enough work, or they can hide behind other hard-working board members. Further, it is suggested to have an odd number of directors to avoid an equal vote.

The board size is included to test the impact on board compensation, which is expected to be positive, as more people getting a bonus will increase the total amount of compensation. The free-riding tendency for boards with more directors is an argument for a lower board compensation on the average director, as there is less work to be done. Further, with more directors to manage their responsibilities, bigger boards are assumed to impact ESG positively. On the other hand, board size is expected to negatively impact CEO compensation, as more directors equal more knowledge within the company and eliminate information asymmetry to a greater extent. This knowledge can prevent the CEO from taking advantage.

5.3.2.3 CEO characteristics

CEO characteristics include different perspectives on the CEO, tested to see significant effects on the dependent variables. The variables include CEO compensation, explained earlier as the dependent variable, CEO tenure, CEO age, CEO gender, CEO salary, and CEO ownership. It is interesting to see what CEO characteristics influence the CEO- or board compensation. Likewise, some CEO characteristics can be assumed to affect ESG performance.

CEO Tenure

The CEO tenure shows how long the CEO has been assigned to the title. The variable is calculated as the year's end date, e.g., in 2017, the date is 31.12.2017. Then, the end year date is subtracted from the date the person became CEO by the Excel formula *=YEARFRAC()*.
An example is the CEO of Adobe Inc., Shantanu Narayen, who became CEO the 01.12.2007. In data from 2017, he was employed for 10.1 years, from 01.12.2007 to 31.12.2017. When two persons are assigned the CEO title in one year, the current CEO is chosen on behalf of who is CEO at year-end. Hence, both CEOs will then be included in the sample. E.g., Robert Holmes Swan was appointed CEO of Intel Corp the 01.06.2018. Therefore, he was included in the sample in 2018 with a tenure of 0.5 years. The maximum CEO tenure is 43 years, and the minimum is less than one year, where the average tenure is 7.19 years (Table 4).

Furthermore, the title variable is essential as it shows how long the CEO has been in the position and can give insight into compensations. It is assumed that the more time managing as CEO, the higher compensation. This assumption is based on the fact, that CEOs with higher tenures have had more time to set the strategic direction to achieve the targets. It is also due to information asymmetry and the assumption that CEOs with higher tenure have more information about the company and where to hide information from the board. CEO tenure and its expected increase in CEO compensation will positively impact board compensation due to mutual backscratching. The argument for decreased CEO and board compensation is that the negative impact on operating performance and stock returns is significantly lower for a CEO with a high tenure (Colak & Liljeblom, 2022). CEO tenure is assumed to have a negative impact on the ESG rating as they are assumed to be more conservative regarding changes. The argument for a positive impact is that a CEO with high tenure is longer in the transformation process toward his visions for the company compared to a newly assigned CEO. On the other hand, a newly assigned CEO might have new and more ESG-friendly visions for the company, and he or she is motivated to apply.

Age

Becoming a CEO requires a lot of experience and knowledge, so the average CEO is 58.1 years old (Table 4). However, the age of the CEOs in the S&P 500 Index ranges from 36 years to 87 years of age, according to the extracted data. The dataset includes the variable to test whether CEO age affects CEO compensation, board compensation, or ESG rating. Older CEOs with more experience are assumed to be higher compensated. Regarding the mutual backscratching theory, CEO age is expected to impact board compensation positively. On the contrary, CEO age is expected to negatively impact the ESG ratings, as younger people, in general, have more focus on ESG.

Gender

The CEO gender is a binary explanatory variable with only two possible outcomes. If the value is 1, the gender of the CEO is female, and if the value is 0, the CEO is male. The general discussion in society is if men are favored as leaders, referred to as gender discrimination. Part of the ESG ratings is the gender equality and split in the cooperation within the social part. Companies should not have significant differences in compensation to women and men.

This paper focuses only on the CEO rather than all the executives, why it is impossible to test for gender equality on a firm level. However, previous studies from US companies in the 90s show that gender inequality is an issue in companies. Bertrand & Hallock (2001) found that women at that time were underpaid by 45% compared to men. They argued that gender discrimination could not be concluded as women only presented 3% of their sample and that most of the gap existed because women typically managed smaller companies. Skalpe (2007) also finds evidence of gender discrimination but has the same conclusion as Bertrand & Hallock (2001), namely that the discrimination can be explained by females being more represented in smaller companies. Finally, Lin & Lin (2014) argue that males receive higher compensation due to men dominating the CEO market. Their paper sample consists of 96.6% males, while the sample of this paper consists of 94.58% males. This similarity suggests that if this paper finds evidence of gender discrimination in the S&P 500, following Lin & Lin's (2014) intuition, it would be due to the dominance of males. Nevertheless, it is essential to mention that Lin & Lin's (2014) findings could only be statistically proven when CEO compensation was measured as total cash compensations and not on total CEO compensation. From our models, it will be possible to test whether having a woman as a CEO will affect the ESG ratings and if there is an actual pay gap between CEOs with a different gender.

Only 124 observations, or 5.42% of CEOs, are women in the dataset. This contributes to a heated debate on the subject. It will be investigated if differences between genders influence the compensation. Further, it is investigated if companies with a female CEO will impact the ESG rating and if there is a compensation difference in boards where the CEO is female.

Salary

CEO salary is the annual fixed salary in thousands in the dataset. The CEO's salary ranges from 0 USD to $20,650 thousand, with an average annual salary of $1,329,622. It can be assumed that risk-seeking CEOs rely solely on their earnings on pay-for-performance, which is why the salary sometimes equals 0. On the other hand, some CEOs might hold back vital information to reduce the risk and increase the expected earnings from compensation due to asymmetric information. Salary is affected by many factors, including being the founder, CEO share ownership, demand of competencies, risk aversion, and firm size.

A higher fixed salary is assumed to have a negative impact on the compensation. The argument for a lower compensation in relation to a higher salary is the risk aversion of a high salary and fewer bonus components included in the compensation package. CEO salary is expected to have a negative impact on board compensation because of mutual backscratching. CEO salary, on the other hand, is expected to have a positive impact on ESG ratings due to the governmental aspect. Higher salaries create a safety net for the future CEO.

Ownership

Ownership is the percentage of shares owned by the CEO. The highest ownership of shares is the CEO of Las Vegas Sands Corp., Sheldon Gary Adelson, who owns 54.5% of the company's shares. The average CEO shareholding is 0.554%. The variable captures the CEO's incentive to maximize shareholder value, as more ownership will result in higher external wealth. It would also increase the value of options to be exercised, which is why the motivation to perform great is assumed to increase.

A significant CEO shareholding can help reduce the principal-agent problem, as the goals will be aligned to a greater extent. Previous studies have used CEO shareholding as an independent variable when explaining CEO compensation (Brick et al., 2006; Lin & Lin, 2014). The measure only considers the percentage of ownership, why the measure indicates how ownership impacts compensation rewards, and ESG rating. Ownership is expected to positively

impact CEO compensation, as more ownership increases the motivation of the CEO to increase the share price. However, it is not expected to affect board compensations significantly. More ownership is expected to impact ESG positively due to a greater incentive to be part of a company with a strong reputation and sustainable growth.

5.4 Summary statistics

Tables 8 and 9 provide the key figures and summary statistics on the dependent variables on a sector and year levels. The summary statistics are provided to give a clear and concise overview of the dependent variables before the statistical models are built and interpreted. Comments on the statistics will be conducted throughout the sections below. The statistics are based on the two dummy variables included in the dataset.

Sectors

The sector summary statistics include an average of the board compensation, CEO compensation, and ESG rating on each of the 11 Sectors. The data distribution ranges from 3.54% of the observations in the Communication Services sector to 15.17% in Information Technology, indicating a somewhat evenly distributed base on the eleven sectors, as found previously in Table 7.

A ranking of the sectors is created in table 8 with the Excel function =RANK(). The ranking is based on the performance of each sector within the three variables. The lowest ranking is awarded to the sector with the highest average compensation and ESG rating compared to the other sectors. It is found that health care is overall the best-rated sector, as they score third best in board compensation, fourth best in CEO compensation, and fifth best in ESG ratings. The highest-ranked sector in both board- and CEO compensation are Communication Services, where the limited number of observations might influence the outcome in this sector. The sector has an average board compensation of $3,706.76 thousand and a CEO compensation of $25,926.99 thousand. Communication Services have the lowest average ESG rating of all sectors of 3.11, which approximately equals a score of 'BB,' which is at the low end of the average. This low rating indicates that ESG might not positively impact compensation levels but instead seems to have a negative effect. The highest ESG-rated sector is Utilities at 4.62, which also has the second lowest CEO compensation; this finding indicates that ESG might have a negative impact on compensation or vice versa. Nevertheless, the three multiple

regression models will further test these impacts in the following sections. At the lowest end of the scale, Real Estate is found. The sector has the lowest board and CEO compensation of all industries, with an average board compensation of $2,558.39 thousand and an average CEO compensation of $10,851.48 thousand. In addition, the ESG rating in the sector comes in sixth, which ranks this sector as 11 and is thereby the worst-performing sector.

Table 8: Industry statistics

Sector	Board Compensation	CEO Compensation	ESG Rating	Ranking
Industrials	2,929.14	12,937.27	4.47	8
Health Care	3,437.77	15,680.41	4.20	1
Communication Services	3,706.76	25,926.99	3.11	2
Consumer Discretionary	2,962.84	15,322.35	3.86	9
Utilities	3,088.68	12,161.99	4.62	5
Financials	3,535.68	14,777.92	3.94	5
Materials	2,802.99	13,229.28	4.02	10
Real Estate	2,558.39	10,851.48	4.19	11
Consumer Staples	3,086.71	14,225.80	4.60	4
Energy	3,249.12	15,843.29	3.84	7
Information Technology	3,030.35	18,568.07	4.44	2
Average	**3,124.19**	**15,210.54**	**4.19**	

Source: Created by the authors (2023). Sector statistics related to the dependent variables. (MSCI data)

Year

The year summary statistics provide an average and the yearly change of the board compensation, CEO compensation, and ESG rating each year. In general, there is an increasing tendency in the average of all dependent variables over time. The year variable and its effect on the three researched dependent variables are listed below in Table 9.

Table 9: Year statistics

	Board compensation		CEO compensation		ESG ratings	
Year	*Mean*	*Change*	*Mean*	*Change*	*Mean*	*Change*
2017	2,987.61	-	13,640.85	-	3.88	-
2018	3,161.94	5.84%	13,814.05	1.27%	4.02	3.63%
2019	3,130.73	-0.99%	14,598.44	5.68%	4.16	3.53%
2020	3,090.26	-1.29%	15,569.72	6.65%	4.27	2.69%
2021	3,242.91	4.94%	18,230.19	17.09%	4.57	6.83%
Sample	**3,124.19**	***8.55%**	**15,210.54**	***33.64%**	**4.19**	***7.91%**

Source: Created by the authors (2023). Year statistics related to the dependent variables. '*' symbols the total increase from 2017-2021.

All variables are increasing throughout the whole period 2017-2021. The board compensation variable experience a negative development from 2018-2019 and again from 2019-2020. This negative development from 2019 to 2020 can be related to the covid-19 pandemic. Covid-19 started to impact the stock market and share prices due to uncertainty and bad company performance (Bradley & Stumpner, 2021). Board members represent the shareholders, which is why bad company performance and a general drop in share price are assumed to have a negative impact on board compensation. In 2021 the covid-19 threat was reduced, which could explain the bounce back to positive development in board compensation.

Covid-19 does not have a negative impact on CEO compensation. The fat cat problem can explain the argument for this as Lin et al. (2013) state that CEOs are not paid on behalf of firm performance. CEO compensation grows continuously over time, with a significant rise in the reward from 2020 to 2021 of 17.09%. CEO Compensation increased by 33.64% over the five years, influenced by uncertainties from covid-19. Arguing against the *fat cat problem* theory could explain the increase in CEO compensation. If companies set goals based on the previous year's firm performance, it can be assumed that goals for 2021 were low due to the uncertainties experienced in 2020. The constant increase in CEO compensation follows the increase in ESG ratings over time. This correlation could indicate that CEO compensation is related to ESG performance. Finally, evidence of an increased focus on ESG is also found in the dataset, with a continuous increase in ESG ratings over the five years.

5.5 Statistical models

In this section, the three statistical models will be constructed. The models will be run separately with all variables included. All model variables are tested with the null hypothesis $H_0: \beta_j = 0$ and the alternative hypothesis $H_1: \beta_j \neq 0$, where j corresponds to any of the k independent variables (Wooldridge, 2012, p. 122). The alternative hypothesis will be the significant argument for what impacts the board compensation, CEO compensation, and ESG rating, both positively or negatively. All three models are run in R by the 'lm()' function and after regulated by the 'coeftest()' to robust standard errors. See Appendix 4 for the full R-code. The first three models are estimated below in Table 10, and the significant values are identified. The significance in () is negative:

Table 10: Significant values in the first model

Variable	Board Compensation	CEO Compensation	ESG Rating
ESG rating	***		-
Environmental		***	***
Social			***
Governance			***
Total Revenue		***	*
Total Assets	.		(***)
Market Capitalization	***		**
Net Income	(*)		
ROA		(**)	(.)
ROE			***
CEO Tenure		*	
CEO Age	(*)	*	
CEO Gender	.		
CEO Salary		**	
CEO Ownership		(*)	*
CEO Compensation	.	-	
Board Members	***		***
Board Compensation	-	**	***
Industrials			***
Health Care		.	***
Consumer Discretionary	(.)	.	***
Utilities	(.)		***
Financials			***
Materials	(.)	*	***
Real Estate	(*)		***
Consumer Staples	(*)		***
Energy			**
Information Technology		**	***
Communication Services (Base sector)	-	-	-
Year_2017		(***)	(***)
Year_2018		(**)	(***)
Year_2019	*	(***)	(***)
Year_2020	.	(*)	
Year_2021 (Base year)	-	-	-

Source: Created by the authors (2023). The first models include all variables and their significance levels: p<0.001 = '***', p<0.01 = '**', p<0.05 = '*', p<0.1 = '.'

The first modelling of all three models is estimated and run, with all variables included, to find and extract relevant independent variables only. Relevant variables used for the re-estimated models are either; 1) significant variables that are used to explain the models or 2) relevant variables for the stated hypothesis. The insignificant variables are identified by testing the null hypothesis $H_0: \beta_j = 0$ for each variable. If the null hypothesis is accepted, the variable can be excluded. In other words, the variables with a p-value higher than 0.1 do not have a statistical argument for an impact on the dependent variable, why they are excluded.

Insignificant variables are excluded from the models as they can lead to biased or misleading findings. Only the relevant independent variables will influence the dependent variable when the variables are excluded. Effects caused by the omitted variable are eliminated, and the best possible model is estimated. The models are re-estimated in the following sections.

5.5.1 Model 1 – Board Compensation

The significant values for model 1 illustrated in Table 10 have been included in the re-estimated model 1. Additionally, the environmental, social, and governance factors are included even though they show insignificance in the first model. This is due to their relevance for hypothesis 1.1 when testing ESG rating's impact on board compensation. After omitting insignificant variables from the first model to remove unnecessary noise, the final model for estimating board compensation is given by the following formula:

$$
\begin{aligned}
&log(Board\ compensation) \\
&\quad = \beta_1 ESG + \beta_2 Environmental + \beta_3 Social + \beta_4 Governance \\
&\quad + \beta_5\, log(Total\ Assets) + \beta_6\, log(Market\ capitalization) \\
&\quad + \beta_7 Net\ income + \beta_8 Age + \beta_9 Gender + \beta_{10} log(CEO\ compensation) \\
&\quad + \beta_{11} Board\ members + \beta_{12} Year_{2019} + \beta_{13} Year_{2020}
\end{aligned}
$$

Significant values for the final model for board compensation are shown below in Table 11, together with the R^2. The R^2 indicates the goodness-of-fit, which explains the fraction of the sample variation in y explained by x (Wooldridge, 2012, p. 38). In other words, the independent variables in Model 1 explain 41.86% of the board compensation. The results of the final model 1 are later discussed and interpreted in the empirical findings section.

Table 11: Model 1 - Board Compensation

Variable	Estimate	Std. Error	P-value	Significance level
(Intercept)	5.6454	0.2062	0.0000	***
ESG rating	0.0109	0.0074	0.1424	
Environmental	0.0062	0.0027	0.0224	*
Social	0.0021	0.0064	0.7431	
Governance	0.0009	0.0060	0.8764	
Total Assets	0.0199	0.0077	0.0100	*
Market Capitalization	0.0804	0.0180	0.0000	***
Net Income	-0.0000	0.0000	0.0235	*
Age	-0.0034	0.0013	0.0075	**
Gender	0.0351	0.0238	0.1408	
CEO Compensation	0.0688	0.0346	0.0468	*
Board Members	0.0704	0.0044	0.0000	***
Year 2019	0.0266	0.0157	0.0906	.
Year 2020	0.0231	0.0144	0.1076	
Multiple R-squared: 0.4186, Adjusted R-squared: 0.4153				
*Significance level: p<0.001 = '***', p<0.01 = '**', p<0.05 = '*', p<0.1 = '.'*				

Source: Created by the authors (2023). The table shows the significance levels of all variables included in model 1.

5.5.2 Model 2 – CEO Compensation

The significant values for model 2 illustrated in Table 10 have been included in the re-estimated model 2. Additionally, the variables ESG, social, and governance are included even though they show insignificance in the first model. This is due to their relevance for hypothesis 2.1 when testing ESG rating's impact on CEO compensation. Further, the two firm performance indicators, net income and ROE, are included in the final model due to their relevance in hypothesis 2.3, even though they show insignificance in Table 10. Thus, the final model for estimating CEO compensation is given by the following formula:

$$log(CEO\ compensation)$$
$$= \beta_1 ESG + \beta_2 Environmental + +\beta_3 Social + \beta_4 Governance$$
$$+ \beta_5\, log(Total\ Revenue) + \beta_6 Net\ income + \beta_7 ROA + \beta_8 ROE$$
$$+ \beta_9 Tenure + \beta_{10} Salary + \beta_{11} Shares\ owned$$
$$+ \beta_{12}\, \log(Board\ Compensation) + \beta_{13} Year_{2017} + \beta_{14} Y_{2018} + \beta_{15} Y_{2019}$$

Significant values for the final model for CEO compensation are shown below in Table 12, together with the R^2. The independent variables in Model 2 explain 17.78% of the CEO compensation. This indicates that it is much more challenging to determine what impacts the CEO compensation compared to the board compensation. The values found below will be interpreted and discussed in the empirical findings section.

Table 12: Model 2 - CEO Compensation

Variable	Estimate	Std. Error	P-value	Significance level
(Intercept)	4.8787	0.9355	0.0000	***
ESG rating	-0.0129	0.0189	0.4953	
Environmental	0.0217	0.0066	0.0010	**
Social	0.0250	0.0167	0.1352	
Governance	0.0030	0.0142	0.8324	
Total Revenue	0.1112	0.0236	0.0000	***
ROA	-0.0046	0.0029	0.1176	
ROE	-0.0000	0.0000	0.9681	
Net Income	0.0000	0.0000	0.1164	
Tenure	0.0122	0.0031	0.0001	***
Salary	0.0002	0.0001	0.0031	**
Ownership	-0.0358	0.0187	0.0559	.
Board Compensation	0.3819	0.1347	0.0046	**
Y2017	-0.0994	0.0466	0.0330	*
Y2018	-0.0591	0.0394	0.1335	
Y2019	-0.1054	0.0443	0.0175	*
Multiple R-squared: 0.1778, Adjusted R-squared: 0.1724				
*Significance level: p<0.001 = '***', p<0.01 = '**', p<0.05 = '*', p<0.1 = '.'*				

Source: Created by the authors (2023). The table shows the significance levels of all variables included in model 2.

5.5.3 Model 3 – ESG Rating

Finally, the significant values for model 3 illustrated in Table 10 have been included in the re-estimated model 3. No insignificant variables needed for the hypothesis testing have been discovered in this model. Thus, the final model for estimating the ESG rating is given by the following formula:

$$\begin{aligned} ESG\ Rating = {} & \beta_1 Environmental + \beta_2 Social + \beta_3 Governance \\ & + \beta_4 log(Total\ Revenue) + \beta_5 log(Total\ Assets) \\ & + \beta_6 log(Market\ Capitalization) + \beta_7 ROA + \beta_8 ROE + \beta_9 Shares\ owned \\ & + \beta_{10} Board\ members + \beta_{11} Log(Board\ compensation) + \beta_{12} Year_{2017} \\ & + \beta_{13} Year_{2018} + \beta_{14} Year_{2019} \end{aligned}$$

Significant values for the final model for ESG ratings are shown below in Table 13, together with the R^2. The independent variables in Model 3 explain 52.93% of the ESG rating. This is the highest goodness-of-fit and can be explained by the fact that each measure, E, S, and G are included in the model. The values below will be interpreted and discussed in the empirical findings section.

Table 13: Model 3 – ESG Rating

Variable	Estimate	Std. Error	P-value	Significance level
(Intercept)	-2.2907	0.4958	0.0000	***
Environmental	0.1495	0.0090	0.0000	***
Social	0.4629	0.0142	0.0000	***
Governance	0.3860	0.0159	0.0000	***
Total Revenue	0.0742	0.0254	0.0036	**
Total Assets	-0.1752	0.0288	0.0000	***
Market Capitalization	0.1006	0.0308	0.0011	**
ROA	0.0010	0.0047	0.8289	
ROE	0.0000	0.0000	0.0000	***
Ownership	0.0178	0.0065	0.0063	**
Board Members	0.0662	0.0104	0.0000	***
Board Compensation	0.1179	0.0740	0.1114	
Year 2017	-0.2218	0.0573	0.0001	***
Year 2018	-0.4202	0.0547	0.0000	***
Year 2019	-0.3568	0.5421	0.0000	***
Multiple R-squared: 0.5293, Adjusted R-squared: 0.5264				
*Significance level: p<0.001 = '***', p<0.01 = '**', p<0.05 = '*', p<0.1 = '.'*				

Source: Created by the authors (2023). The table shows the significance levels of all variables included in model 3.

6. Empirical findings

The following sections will compare our empirical findings to previous findings within the area. The section will follow the same structure as section 3, literature review and hypothesis development. First, model 1 regarding board compensation will be covered by discussing and comparing our findings with previous literature. Then, the findings from model 2, with the dependent variable CEO compensation, will be interpreted and discussed. Next, model 3, with ESG rating as the dependent variable, will be interpreted and discussed. The following table gives an overview of the expected findings against the empirical findings in our models within each hypothesis.

Table 14: Hypothesis results

Model	Hypothesis	Variable	Expected	Findings	Conclusion
Board Compensation	1.1	ESG rating	+	0	Not Supported
	1.2	Board Size	+	+	Supported
CEO Compensation	2.1	ESG rating	+	0	Not Supported
	2.2	CEO tenure	+	+	Supported
	2.3	Company performance	≤0	0	Weakly Supported
	2.4	Board compensation	+	+	Supported
ESG Rating	3.1	Board Size	+	+	Supported
	3.2	CEO Ownership	+	+	Supported

Source: Created by the authors (2023). The table shows all findings from testing the hypotheses.

6.1 Model 1 – Board compensation

Hypothesis 1.1:

Kang et al. (2022) find evidence of independent directors being compensated on behalf of ESG. However, no previous research has studied the impact of ESG on compensations plans for the complete board, why the big focus on ESG and its increasing part of compensation plans has increased the interest within the area, which led to the first hypothesis:

ESG rating will contribute to an increase in board compensation.

Model 1 finds that ESG ratings do not have a significant impact on board compensation. The null hypothesis $H_0: \beta_j \leq 0$ is therefore accepted and alternative hypothesis $H_1: \beta_j > 0$ rejected.

This means we do not have statistically argument to accept that ESG performance impacts the board compensation.

When investigating each ESG measure, the environmental score is significant and positively related to board compensation, whereas social and governance are insignificant. The environmental variable is significant at a 0.05 significance level with a p-value of 0.0224. Therefore, in the environmental hypothesis, we reject the null hypothesis and accept the alternative hypothesis, saying the environmental score significantly impacts board compensation. The impact of the environmental score on board compensation is (0.0062 * 100) = 0.62%. When the environmental score increases by one unit, the compensation will increase by 0.62%. Recalling the average board compensation of $3,124,191 in table 4, the increase of a rating by one will lead to an increase of (3,124,191 * 0.0062) = $19,370 in board compensation.

The ESG rating is regulated in accordance with company specifics, industry weights, and benchmarks, which is why the rating is not just a total of $Environmental + Social + Governance$. Environmental is the only significant variable in board compensation of the three underlying ESG measures. This implies that the board is only compensated on behalf of the E score and no other ESG measures. Currently, there is a big focus on reducing CO2 emissions and preventing climate change, which could cause a pay-for-performance measure for directors based on the environmental impact. Furthermore, the environmental part of ESG might be the easiest to keep track of and measure compared to social and governance criteria. Carbon emissions are easier traced and measured than market considerations and transparency. Spierings (2022, p. 23) suggests that companies should refrain from using ESG as a pay-for-performance measure, as keeping track of those measures is challenging, if not impossible. On the other hand, the increased focus on the environment has linked the environmental score to board compensation, which increases the focus on reducing carbon emissions. It is argued that social and governance characteristics should not be linked to board compensation, but environmental should remain a pay-for-performance measure. To consider if social and governance should be part of the future board compensation, relevant, strong, and measurable goals should first be identified.

Hypothesis 1.2:

Different findings for hypothesis 1.2 was found in previous research. On the one hand, scholars argued that larger boards are inefficient and thereby compensated less (Andreas et al., 2012; Ryan & Wiggins, 2004; Ertugrul & Hegde, 2008). This what furthermore supported by Conyon (2014), who stated that the problem of free-riding arises with larger boards. Disregarding those findings, we followed Lin & Lin's (2014) perspective from *resource dependence theory*. These theorists say that the board can attain bigger compensation when the board is larger, which led to the following hypothesis:

The number of directors will impact board compensation positively.

The null hypothesis $H_0: \beta_j \leq 0$ is rejected and accept the alternative hypothesis $H_1: \beta_j > 0$, that the number of directors have a positive impact on board compensation at a significance level of 0.001.

The findings show that when the board size increases by one director, the board compensation increases by 7.04%. Given the average total board compensation, this equals an increase in board compensation of (3,124,191 * 0.0704) = $219,943. Intuitively, this makes sense as more directors can attain larger board compensation because there is a larger number of individuals receiving compensation. The number of directors has its highest correlation with total assets, which is a proxy for firm size. This implies that larger companies need more board members to manage their responsibilities. This is in line with the theory stating that board size reflects the resource richness of the board and resource dependence theory (Boyd, 1996; Lin & Lin, 2014).

Other significant findings from model 1:

Some other significant findings have been located among the control variables added to the models. According to Lin & Lin (2014), earlier research has found that firm size is significant in explaining board compensation. This is because larger firms have more complexity demanding directors to use more time and effort, which is why they will require higher compensation in response. Two out of three of the proxies for firm size in our model, i.e., Total Assets and Market Capitalization, have shown significance in explaining the board compensation. Total assets are significant at a 0.05 significance level, while the market cap is significant at a 0.001 significance level. This implies that when total assets increase by 1%, the

board compensation increases by 1,99% (3,124,191 * 0.0199) $62,171, and when market cap increases by one percentage, the board compensation increases by 8.04%, equivalent to (3,124,191 * 0.0804) = $251,185.

Furthermore, CEO age has shown a significant negative relation to board compensation at a 0.01 significance level. This implies that the younger the CEO, the higher the board compensation and illustrates that younger CEOs do not have power over the board. This strongly supports Hill & Phan's (1991) and Lin & Lin's (2014) argument that CEOs with higher tenure and age build a power base over the board. From the model, it can be said that when the CEO age increases by one year, the board compensation decreases by 0,34%, equivalent to (3,124,191 * 0.0034) = $10,622.

CEO compensation is found to impact board compensation, which is the reverse effect of *mutual backscratching*. This implies a mutual relationship exists between board and CEO compensation. However, it challenges the theory, as other significant factors can be the reason for this similar impact. In relation to agency theory, it could be argued that stock awards, for example, align the interests of CEO and directors and that this type of compensation can explain the positive relationship. In addition, ESG performance could explain the correlation between CEO- and board compensation as it is proven that they are both compensated on behalf of environmental performance. Further, firm size or other characteristics could also be why CEOs and board compensation correlate.

6.2 Model 2 – CEO compensation

Hypothesis 2.1:

According to Spierings (2022), the vast majority of S&P 500 companies are tying executive compensation to ESG performance. However, it has not previously been investigated if ESG has an impact on CEO compensation, which has led to the following hypothesis:

ESG rating will contribute to an increase in CEO compensation.

As it was found in model 1 in relation to board compensation, model 2 finds that ESG ratings do not have a significant impact on CEO compensation. The null hypothesis $H_0: \beta_j \leq 0$ is

therefore accepted and alternative hypothesis $H_1: \beta_j > 0$ rejected. This means we do not have statistically argument to accept that ESG performance impacts the CEO compensation.

Model 2 also shows that only the environmental score is significant and positively impacts the CEO compensation. The social and governance score, on the other hand, does not have a significant impact on CEO compensation. From the previous finding in hypothesis 1.1, there is a tendency to focus on only the environmental part of the ESG rating. As mentioned earlier, this can be explained by more quantifiable objectives and the bigger focus from the public to take care of the environment to prevent global warming and other natural disasters. The fact that companies say they tie ESG measures to the compensation while only focusing on the environmental part can further indicate a tendency toward window dressing.

Window dressing is a strategy term referring to the window of a physical shop looks great, but when entering the shop, it is a different story. In the previously mentioned Volkswagen case, companies will do everything to avoid negative media attention and thereby campaign their products and operations as ESG-friendly, even when they are not. The window dressing takes place when companies say they tie compensation to ESG, but the environmental factor only affects the compensation. Organizations such as Greenpeace and WWF primarily focus on the environment, so the companies only need to improve their Environmental score to avoid negative media attention.

With an environmental variable significant on a 0.01 significance level, the estimate of increasing the environmental score of one unit will increase the CEO compensation by 2.17%. The average CEO compensation, as stated in the description of the dependent variable, is $15,210,538. Therefore, the environmental score's positive effect will be (15,210,538 * 0.0217) = $330,069. Therefore, increasing the Environmental score by one unit will increase the CEO's compensation by $330,069.

Hypothesis 2.2:

A lot of both recent research and older previous research found strong evidence of the fact that the rapid increase in CEO compensation is not due to a rise in skills but is instead a symbol of CEOs with higher tenure have the capability of gaining power in the board and thereby can attain compensation packages that serve their own interests rather than the shareholders

(Bivens & Kandra, 2022 Hill & Phan 1991; Lin & Lin, 2014). Therefore, the hypothesis was stated as below to see if our model would support those findings:

CEO tenure will have a positive impact on CEO compensation.

Our model 2 find strong evidence of tenure being positively related to CEO compensation. The null hypothesis $H_0: \beta_j \leq 0$ is rejected and the alternative hypothesis $H_1: \beta_j > 0$ is accepted. This means that there is statistical evidence, that tenure of the CEO has a positive impact on CEO compensation.

Thereby we find evidence of the CEOs building a power base when they have been in their position for longer. With a significance level of 0.001, it can be interpreted that when the tenure increases by one unit (one year), the CEO compensation increases by 1.22% or (15,210,538 * 0.0122) = $185,569. Again, whether this increase in CEO compensation is due to CEO tenure or other underlying factors can be discussed. CEO age and tenure are correlated with 0.44, implying that younger CEOs also have less tenure. It has further been established earlier in this paper that younger generations care more about ESG than other generations (Versace & Abssy, 2022). This is also assumed to apply to the role of CEO. Hence, less age and tenure equal higher ESG performance and, thereby, higher compensation. However, the CEO's age is not significant in our model. Recalling the summary statistics for CEO age, this could be explained by the fact that the average CEO in S&P 500 is 58 years old. The younger generations who care more about ESG are still too young to be CEOs. This speaks against the assumption that CEO tenure is positively related to CEO compensation due to ESG performance factors. Therefore, it can finally be concluded that CEO tenure is significantly positive in relation to CEO compensation due to the power base they create, which is in line with earlier research.

Hypothesis 2.3:

Scholars have since the 1970s discussed whether leaders and executives were rewarded for their rank rather than their performance, and this phenomenon has later gotten its name as the *fat cat problem* (Jermier & Berkes, 1979; Lin et al., 2013). We stated the below hypothesis based on Lin et al. (2013) findings of firms with poor performance still paying their CEOs high compensations. This hypothesis differs from the rest of the hypothesis, as the null hypothesis is $H_0: \beta_j > 0$ and the alternative hypothesis we want to accept is $H_1: \beta_j \leq 0$.

Company performance will have a negative or no effect on CEO compensation.

The above hypothesis would imply that we reject the null hypothesis $H_0: \beta_j > 0$ for our three proxies for company performance and accept the alternative hypothesis $H_1: \beta_j \leq 0$. This is exactly the case, as net income, ROE, and ROA are all insignificant in explaining CEO compensation. This implies that CEOs are not compensated on behalf of company performance and proves that *the fat cat problem* still exists in modern companies. The financial crisis in 2008 shed light on the problem, and it was later shown that the lack of transparency and pay-for-performance in compensation packages was one of the biggest causes of the crisis (Rohde, 2011). Therefore, one of the reasons for company performance not impacting the compensation must be explained by the fact that CEOs are compensated on behalf of other things, such as environmental performance, which was significant in explaining the compensations. It can also be explained by the possibility that the compensation is based on other key figures not included in this paper. However, these proxies have been chosen as they are popular measures used by other scholars and can therefore be compared with previous research.

Hypothesis 2.4:

Based on previous findings about the concept of *mutual backscratching,* the hypothesis was stated as follows:

Board compensation will have a positive impact on CEO compensation.

Board compensations are found to have a positive impact on CEO compensation, why the null hypothesis $H_0: \beta_j \leq 0$ is rejected and the alternative hypothesis $H_1: \beta_j > 0$ is accepted. Board compensation is found to be significant in explaining the CEO compensation at a 0.01 significance level. This implies that an increase in board compensation leads to an increase in CEO compensation. This is furthermore supported by a positive correlation of 0.3 between the two variables. As board compensation and CEO compensation are both treated with log, the coefficients from the model should be interpreted as elasticities. This means that when board compensation increases by 1%, the CEO compensation increases by 0.38%. Further, this implies that an increase of (3,124,191 * 0.01) = $3,124 in board compensation leads to an increase of (15,210,538 * 0.0038) = $57,800 in CEO compensation.

It can be explained by the *mutual backscratching* theory and the problem of less monitoring of the CEO when the board of directors is highly compensated (Lin & Lin, 2014; Brick et al., 2006). We have no evidence of bad monitoring by the board, and we, therefore, try to challenge the theory. As found in model 1, there is a mutual relationship between board and CEO compensation. It could be due to aligning interests in CEO and board compensation schemes. Firm size or the environmental score that has shown significance in both CEO- and director compensation could explain why CEOs and board compensation correlate.

Other significant findings from model 2:

Among other significant findings from model 2, total revenue, an indicator for firm size, is significant, with a significance level of 0.001 in explaining CEO compensation. When total revenue increases by 1%, the CEO compensation increases by 0.11% or (15,210,538 * 0.0011) = $16,732. Total revenue being significant in explaining CEO compensation is an interesting finding as it is an easy figure to manipulate, enhancing earnings management incentives for the CEO. However, in our paper, revenue is a proxy of firm size, implying that higher revenue equals higher firm complexity, and therefore CEOs require higher compensation to manage such a company. This aligns with findings from other scholars stating that CEOs demand higher compensation as complexity and responsibilities increase (Smith & Watts, 1992; Core et al., 2005; Lin & Lin, 2014). Furthermore, years are significant, showing that the compensation has increased throughout the five-year period in this paper. This combination of firm size being significant and compensation increasing over the five years could indicate that complexity and responsibilities have increased throughout the years, which could be explained by more focus on ESG performance.

Another significant finding from model 2 is that CEO ownership (CEO shares owned) is negatively related to compensation. With a significance level of 0.1, it can be said that when ownership increases by 1%, the CEO compensation decreases by 3.5% or (15,210,538 * 3.5%) = 532,369. This finding is of paramount importance as it supports the argument that modern companies are better at aligning interests and complying with *agency theory* than what is the case in previous research. In addition, offering the CEO more share ownership leads to more focus on the long-term growth and success of the company rather than extracting excessive compensation for themselves. CEO ownership furthermore signals that the CEO is confident in the company's future, which can increase the trust among shareholders and thereby reduce the compensation to incentivize performance. This can also be why CEO ownership is

positively related to ESG performance, which is a crucial parameter for the shareholders and stakeholders. This positive relationship will be explained more in-depth under hypothesis 3.2.

6.3 Model 3 – ESG Ratings

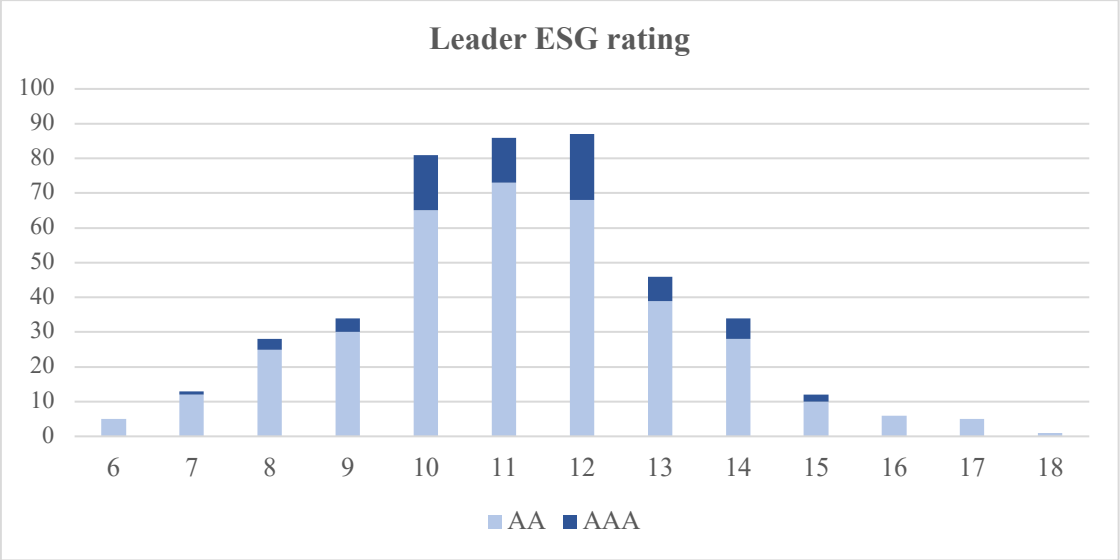
Hypothesis 3.1:

Orozco et al. (2018) found in their paper that larger boards are associated with high performance on corporate reputation, as stated by the resource dependence theory. The combination of this finding and other findings suggesting that larger boards are considered more effective and easier can manage the responsibilities of the board (Almaqtari et al., 2023; Boyd, 1996; Jizi et al., 2014), the hypothesis was stated as follows:

Board size will be positively related to ESG ratings.

Findings from model 3 support that board size is positively related to ESG performance with a significance level of 0.001. why the null hypothesis $H_0: \beta_j \leq 0$ is rejected and the alternative hypothesis $H_1: \beta_j > 0$ is accepted. The model further shows that when holding other variables fixed, one more director on the board will increase the ESG rating by 6.6%. Intuitively, the resources the directors provide will have a diminishing marginal effect. In other words, the 8th director is more value-adding than the 15th, for example. Thus, companies need to assess the optimal number of directors on the board to avoid free-riding problems and coordination issues (Conyon, 2014). Jensen (1993), who did his research based on data from before the 1990s, found that the optimal board size was 7-8. However, the below graph shows that the optimal number of directors to attain a "Leader" ESG score should be 10-12. Most companies have a board of 10-12, so it intuitively makes sense. However, in Appendix 6, it is shown that the relative percentage rate also suggests a board size of 10-12 for obtaining a good score. This can be explained by the fact that boards have more responsibilities today than before the 1990s, due to the increasing focus on ESG from investors and other stakeholders.

Graph 1: Companies and ESG rating



Source: Graph constructed by the authors (2023). X-axis shows board size and Y-axis shows number of companies.

Hypothesis 3.2:

The most powerful link between shareholder wealth and executive wealth is direct stock ownership by the CEO (Jensen & Murphy, 1999). This was further backed up by Jang et al. (2022), finding evidence of managers caring less about ESG performance if they are not compensated on behalf of it. These previous findings led to the eighth hypothesis stating:

CEO ownership will have a positive impact on ESG ratings.

Further, Teigland and Hobbs (2022) found that a change in the approach and structure for reward and incentive systems for executives is the biggest corporate governance change in the nearest future. Thus, testing if this approach can already be seen from our data is exciting. Our model 3 shows significant evidence of CEO ownership having a positive impact on ESG performance. This means that the null hypothesis $H_0: \beta_j \leq 0$ is rejected and the alternative hypothesis $H_1: \beta_j > 0$ is accepted. With a significance level of 0.01, it can be said that one more percentage of CEO share ownership will increase the ESG rating by 1.77%. As ESG performance is associated with better company performance, it is therefore highly suggested that including stock awards in the compensation packages is optimal. This will align the interests of shareholders and the CEO and help avoid the principal-agent problem.

Other significant findings:

Obviously, the Environmental, Social, and Governance factors are all significant in explaining ESG ratings with a positive impact. This means an increase in either of the three factors will increase the ESG rating. Nevertheless, Social has the most significant impact on the ratings, as an increase of one score will impact the ESG rating by 0.463. Governance will have an impact of 0.386, while the Environmental has the lowest impact of 0.149. Environmental was the only significant of the three factors affecting board and CEO compensation. Its minor impact on the ESG rating is interesting due to the extensive focus from external stakeholders. On the other hand, social and governance do not impact the compensation schemes. Thus, these measures should be included to a greater extent in the future pay-for-performance to increase the ESG rating.

The firm size measures are all significant on the ESG rating. Total revenue and market capitalization both have a positive impact on ESG rating. As total revenue is the main measure of firm size, it can be concluded that bigger companies positively impact ESG ratings. ESG ratings increase by 0.074 when total revenue increases by 1% and 0.1 when market capitalization increases by 1%. The size might explain a positive impact because companies invest in research and development to be the market leader and an excellent societal example. Market capitalization includes the share price as the variable measure of why a higher share price positively impacts ESG ratings. This can be explained from an investor's perspective. Empirical results validate that companies with high ESG scores have performed better in terms of stock performance (Steinhaeuser, 2022). This increase in performance is due to a lower risk of reputational damage and monetary fines from environmental shortcomings or workers' rights. Further, ESG ratings are either positive or neutral correlated to financial performance. This indicates that ESG-oriented companies perform better financially (Ibid.).

On the other hand, total assets have a negative impact on ESG ratings. This is because having a large amount of assets makes it difficult and costly to change machinery and production forms, which is why the ESG change will take more time to perform. In addition, the relatively new focus on ESG and the requirements of firms keeps improving, which is why an asset-based company is more time-consuming in the transformation process.

Firm performances are not concluded to impact ESG ratings significantly as the main measure for firm performance, ROA, is insignificant. This could be due to the asset-based companies and their difficulty in improving the company's environmental, social, and governance scores. However, ROE is significant and positively related to ESG ratings implying that firm performance is somehow related to ESG ratings. Companies that perform well have more money to invest in ESG and, therefore, perform better on ESG ratings.

A significant negative impact is further found in the years on ESG rating. With the base year being 2021, a negative score of 2017-2019 means that ESG ratings increase over time. The summary statistics in table 9 support this finding.

7. Conclusion

There has been an increasing focus on ESG from investors, media, the government, and other stakeholders. Per this increasing focus, summary statistics find an increased focus on ESG, as the average ratings increase from 3.88 to 4.57 over the five years analyzed. Likewise, both compensation measures increase over the period, indicating a positive relation between ESG performance and compensation. Other scholars have earlier proved that wrong incentives in compensation plans are one of the most fundamental causes of financial crises. This increasing focus on ESG has, together with the crucial aspect of structuring optimal compensation packages to align the interests of management and owners, led to the research question of the thesis:

What interesting findings can an ESG perspective add to the existing literature on the interplay between CEO- and board compensation?

The authors draw attention to previous research on the area to fully understand the interplay between CEO- and board compensation from an ESG perspective. Based on this previous research, eight hypotheses and three statistical models were developed to answer the research question comprehensively following previous studies. As a result, the findings are broad and either challenge or support the previous findings.

Model 1, with board compensation as the dependent variable, did not find significant evidence of the ESG rating impact on board compensation, even though this was expected. However, a significant positive impact on environmental performance was found. This finding adds interesting new results to existing literature, as boards are compensated based on the environmental aspect of ESG only, which is explained by the fact that environmental performance is the easiest to measure within ESG. Further, it was found that board size significantly positively impacts board compensation. This was presumed and in line with previous research about *resource dependence theory*.

Nor did ESG ratings significantly impact CEO compensation in Model 2. However, as found in Model 1, the environmental score significantly positively impacted CEO compensation. This similarity provided an even stronger argument and an indication that compensation schemes only consider the environmental aspect of ESG. Experts claim that this is due to the difficulty of measuring social and governance performance. The interesting finding sheds light on the

difficulty of incorporating ESG measures in compensation plans. It was found in model 3 that the social and governance part of ESG had a major impact on the ESG rating compared to the environmental part. Social and governance characteristics need to be further analyzed to investigate what pay-for-performance measures could increase the focus on these two measures and include them in future compensation plans.

CEO tenure is found to have a significant positive impact on CEO compensation, which aligns with previous research. The positive impact is explained by the 'power base' that CEOs establish over time, leading to the use of *information asymmetry* in the compensation plans. Company performance is not found to be significant, which is in line with previous research and expected from *the fat cat problem*. Previous research suggests improvements in the compensation structure are needed, as compensation should be based only on how well the CEO performs. Compensation committees are introduced to eliminate the problem, but our findings prove that bad habits still exist in modern companies. Evidence of the positive impact of board compensation on CEO compensation has been proven, suggesting that the *mutual backscratching* theory still holds. However, the theory is challenged by a finding of companies being better at aligning interests suggesting that the correlation between CEO- and board compensation is due to being measured on the same variables rather than mutual backscratching.

Model 3, with ESG ratings as the dependent variable, was included to understand what impacts the ratings. Board size showed a significant positive impact on ESG performance. This was explained with *resource dependence theory*, suggesting that larger boards better manage external responsibilities, including ESG. This is valuable insight as larger boards intuitively also would entail higher board compensation and can therefore be related to findings from Model 1. CEO ownership showed a significant influence on ESG ratings. Thus, it is highly recommended to include stock awards in the compensation plan to make the CEO act in the company's best interest.

Conclusively, the ESG perspective has added interesting findings to the interplay between CEO- and board compensation. Including ESG measures in the compensation plans helps align interests as ESG secures long-term sustainable growth. Furthermore, this paper sheds light on the fact that more research needs to be done within this area to know how to include social and governance measures in the pay-for-performance plans. The interesting findings lead to suggestions for future research.

8. Future research

The suggestions for future research have been made following the limitations and delimitations of this paper. What could have been achieved and concluded without these limitations and delimitations, and how could other perspectives or variables affect or enhance the findings of this paper? Our general interest in compensation and ESG is the base of what future research would be interesting to investigate.

It would be interesting to research other markets where the research on compensation has been done less extensively, preferably the Scandinavian market. The first thoughts of this paper were to extend the literature by adding findings from the Scandinavian compensation. The research in this geographical area could be more extensive. It would be interesting to see what characterizes the Scandinavian compensation schemes and compare it to previous research on other markets. However, it requires a lot of resources to investigate the Scandinavian market. A very limited amount of databases cover data from Scandinavian companies, why it will be difficult and expensive to extract data. Collecting all the data is complex and time-consuming, as many different variables should be collected manually from annual reports for many companies over time.

As concluded, social and governance factors were insignificant for the compensation but simultaneously had the biggest impacts on the ESG rating. It would be very interesting to conduct a future study on how social and governance measures could be included in the pay-for performance incentives, to increase focus on the social and governance aspect. This would require a qualitative study with insights from experts, politicians, management, and other stakeholders to comprehensively answer the questions on how to measure ESG.

Moreover, our models 1, 2, and 3 showed an R^2 of 41.86%, 17.78%, and 52.93% respectively. This relatively low goodness-of-fit implies that many other variables could be added to the models to enhance the understanding of the interplay between CEO- and board compensation and suggest that the area of compensation is more complex than first assumed. Furthermore, we added the ESG perspective to investigate if ESG could explain something new about compensation, yet to be discovered. Finally, we suggest future research to have the same approach to find other interesting findings on complying with bad habits in compensation plans.

Our thesis has shown interesting differences between sectors. However, we do not include a more specific dig down into each sector. This is due to the base sector, disturbing findings in other sectors. However, the explanations for these differences between sectors have yet to be explicitly addressed due to the scope of the paper. For example, table 8 shows that CEOs and boards in the Communication Services sector receive the highest compensation. However, at the same time, companies within this sector receive the lowest ESG ratings. Companies in the Utilities sector receive the highest ESG ratings, while CEOs and directors within Real Estate receive the lowest compensation. What drives these differences across sectors would be interesting to dive into and investigate. Carbon emissions challenge some sectors while working conditions challenge others, so how are the ESG rankings made and evaluated in each sector?

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10. Appendices

Appendix 1 – The Research Onion

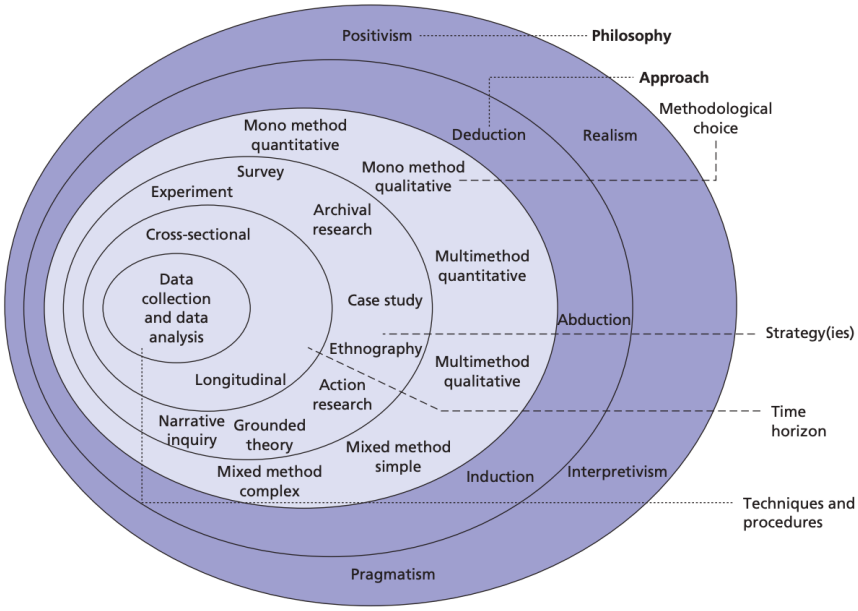


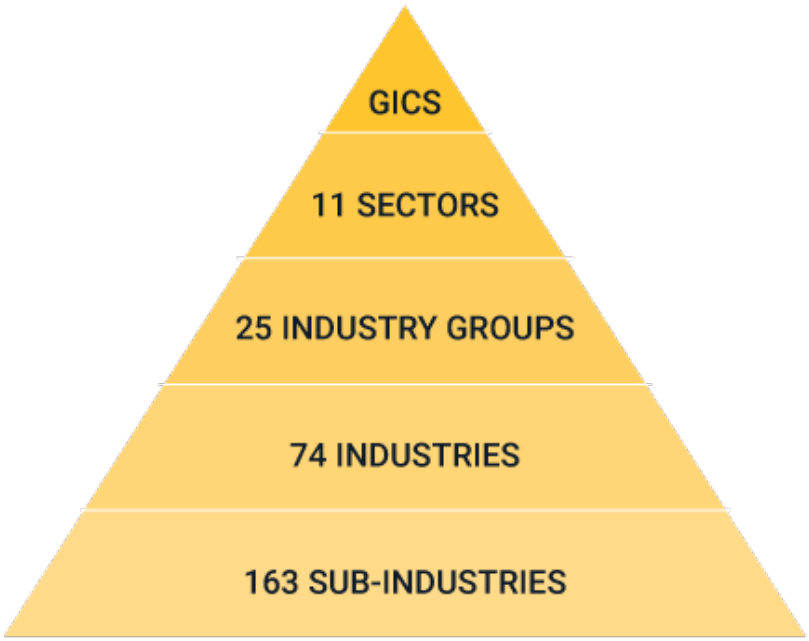
Figure 4.1 The research 'onion'
Source: © Mark Saunders, Philip Lewis and Adrian Thornhill 2011

Retrieved from Saunders et al (2012)

Appendix 2 – Correlation matrix

Correlation - matrix		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	ESG	1																	
2	Environmental	0.2330	1																
3	Social	0.5669	0.0321	1															
4	Governance	0.3312	-0.1419	0.0315	1														
5	Total Revenue	0.0325	0.0757	0.0050	-0.0847	1													
6	Total Assets	-0.0454	0.1475	-0.0496	-0.1349	0.7356	1												
7	Market Cap	0.0812	0.2074	0.0355	-0.1372	0.6608	0.6350	1											
8	ROA	0.1090	-0.0214	0.0366	0.1190	-0.0543	-0.4354	0.0701	1										
9	ROE	0.0313	0.0262	0.0054	0.0063	0.0147	0.0000	0.0168	0.1100	1									
10	Net Income	0.0165	0.1066	0.0245	-0.1224	0.4769	0.4649	0.5917	0.1154	0.0198	1								
11	Board members	0.1143	0.0887	-0.0361	0.0230	0.3577	0.4838	0.3160	-0.1797	0.0188	0.1288	1							
12	BoardComp	0.1259	0.1477	0.0267	-0.0166	0.3834	0.4379	0.4229	-0.1129	0.0057	0.2027	0.5675	1						
13	Tenure	-0.1025	0.0569	-0.0361	-0.1540	0.1555	-0.079	-0.0564	0.0012	0.0028	-0.0194	-0.1669	-0.1098	1					
14	Age	-0.0754	0.0236	-0.0432	-0.0887	0.0709	0.1182	0.0376	-0.0429	0.0229	0.0032	-0.0092	-0.0353	0.4396	1				
15	Gender	-0.0044	-0.0767	-0.0632	0.0499	0.0616	0.0338	0.0404	0.0350	-0.0733	0.0046	0.0401	0.0504	-0.0760	-0.0555	1			
16	Salary	-0.0822	0.0465	-0.0416	-0.2025	0.3168	0.2623	0.2607	-0.0314	0.0113	0.1851	0.1436	0.1625	-0.1669	0.0588	0.0038	1		
17	Shares owned	-0.0450	0.0109	-0.0541	-0.0958	-0.0531	-0.0785	0.0174	-0.0009	-0.0025	-0.0376	-0.1466	-0.1412	0.2950	0.1633	-0.0258	0.0241	1	
18	CEOComp	0.0350	0.1148	0.0425	-0.0770	0.3029	0.2917	0.3121	-0.0648	0.0061	0.1884	0.1597	0.2965	-0.0055	0.0739	0.0119	0.2403	-0.1188	1

Appendix 3 – GICS Sector



Source: MSCI

Appendix 4 – Full R-Code

#Download Packages

```
library(readxl)
library(fastDummies)
library(lmtest)
library(plm)
library(haven)
library(corrplot)
library(openxlsx)
```

###BOARD Compensation###

#Load data

```
companies <- read_excel("Desktop/FINAL data.xlsx")
```

#Prepare data

```
companiesX <- companies[,-1]
companiesXX <- companiesX[,-1]
companiesXXX <- companiesXX[,-1]
companiesXXXX <- companiesXXX[,-1]
companiesXXXXX <- companiesXXXX[,-1]
companies <- companiesXXXXX[,-1]
```

#Dummies

```
companiesX <- companies[,-1]
companiesXD <- dummy_cols(companies,
select_columns=c("Sector"),remove_selected_columns = TRUE)
companiesXD <- dummy_cols(companies,
select_columns=c("Year"),remove_selected_columns = TRUE)
BoardComp <- as.numeric(companies$BoardComp)
companies <- cbind(companiesXD,BoardComp)
```

#Introduction to data

```
summary(companies)
str(companies)
```

#Linear Probability model (LPM)

```
LPM <- lm(companies$BoardComp ~ ., data = companies)
summary(LPM)

coeftest(LPM, vcov = vcovHC(LPM, type = "HC1")) #Robust standard errors
```

#Reestimate model

```
LPM2 <- lm(companies$BoardComp ~ companies$ESG + companies$Environmental +
companies$Social + companies$Governance + companies$`Total Assets` +
companies$`Market Cap` + companies$`Net Income` + companies$Age +
companies$Gender + companies$CEOComp + companies$`Board members` +
companies$Year_2019 + companies$Year_2020, data=companies)
summary(LPM2)

coeftest(LPM2, vcov = vcovHC(LPM2, type = "HC1")) #Robust standard errors
```

###CEO Compensation###

#Load data

```
companies <- read_excel("Desktop/FINAL data.xlsx")
```

#Prepare data

```
companiesX <- companies[,-1]
companiesXX <- companiesX[,-1]
companiesXXX <- companiesXX[,-1]
companiesXXXX <- companiesXXX[,-1]
companiesXXXXX <- companiesXXXX[,-1]
companies <- companiesXXXXX[,-1]
```

#Dummies

```
companiesX <- companies[,-1]
companiesXD <- dummy_cols(companies,
select_columns=c("Sector"),remove_selected_columns = TRUE)
companiesXD <- dummy_cols(companies,
select_columns=c("Year"),remove_selected_columns = TRUE)
CEOComp <- as.numeric(companies$CEOComp)
companies <- cbind(companiesXD,CEOComp)
```

#Introduction to data

```
summary(companies)
str(companies)
```

#Linear Probability model (LPM)

```
LPM <- lm(companies$CEOComp ~ ., data = companies)
summary(LPM)

coeftest(LPM, vcov = vcovHC(LPM, type = "HC1")) #Robust standard errors
```

#Reestimate model

```
LPM2 <- lm(companies$CEOComp ~ companies$ESG + companies$Environmental +
companies$Social + companies$Governance + companies$`Total Revenue` +
companies$`Net Income` + companies$ROA + companies$ROE + companies$Tenure +
companies$Salary + companies$`Shares owned` + companies$BoardComp +
companies$Year_2017 + companies$Year_2018 + companies$Year_2019, data=companies)
summary(LPM2)

coeftest(LPM2, vcov = vcovHC(LPM2, type = "HC1")) #Robust standard errors

###ESG###
```

#Load data

```
companies <- read_excel("Desktop/FINAL data.xlsx")
```

#Prepare data

```
companiesX <- companies[,-1]
companiesXX <- companiesX[,-1]
companiesXXX <- companiesXX[,-1]
companiesXXXX <- companiesXXX[,-1]
companiesXXXXX <- companiesXXXX[,-1]
companies <- companiesXXXXX[,-1]
```

#Dummies

```
companiesX <- companies[,-1]
companiesXD <- dummy_cols(companies,
select_columns=c("Sector"),remove_selected_columns = TRUE)
companiesXD <- dummy_cols(companies,
select_columns=c("Year"),remove_selected_columns = TRUE)
ESG <- as.numeric(companies$ESG)
companies <- cbind(companiesXD,ESG)
```

#Introduction to data

```
summary(companies)
str(companies)
```

#Linear Probability model (LPM)

```
LPM <- lm(companies$ESG ~ ., data = companies)
summary(LPM)

coeftest(LPM, vcov = vcovHC(LPM, type = "HC1")) #Robust standard errors
```

#Reestimate model

```
LPM2 <- lm(companies$ESG ~ companies$Environmental + companies$Social +
companies$Governance + companies$`Total Revenue` + companies$`Total Assets` +
companies$`Market Cap` + companies$ROA + companies$ROE + companies$`Shares
owned` + companies$`Board members` + companies$BoardComp + companies$Year_2017
+ companies$Year_2018 + companies$Year_2019, data=companies)
summary(LPM2)
```

```
coeftest(LPM2, vcov = vcovHC(LPM2, type = "HC1")) #Robust standard errors
```

#Other models and visualization

#Load data

```
companies <- read_excel("Desktop/FINAL data.xlsx")
```

###Histogram###

#Compensation

```
hist(companies$`Total Board Compensation`)
hist(companies$`total CEO Compensation`)
```

#log(Compensation)

```
hist(companies$BoardComp)
hist(companies$CEOComp)
```

###Correlation-Matrix###

#Prepare data

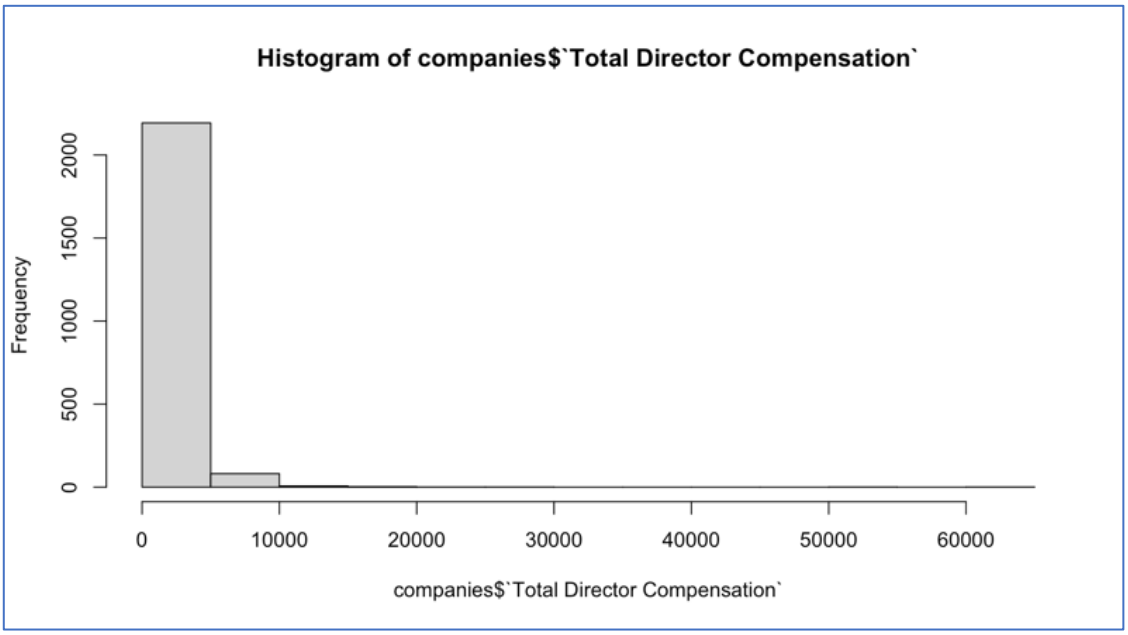
```
companiesX <- companies[,-1]
companiesXX <- companiesX[,-1]
companiesXXX <- companiesXX[,-1]
companiesXXXX <- companiesXXX[,-1]
companiesXXXXX <- companiesXXXX[,-1]
companies <- companiesXXXXX[,-1]
```

#Correlation

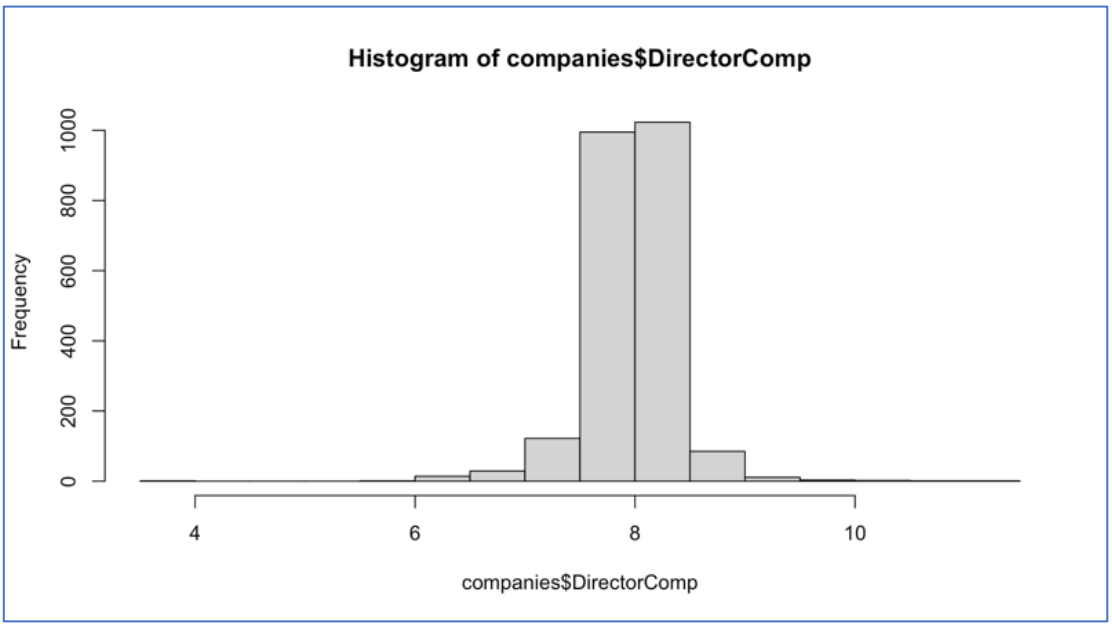
```
corr_matrix <- cor(companies[,-c(5,6)])
decimal_corr <- round(corr_matrix,4)
write.xlsx(companies, file="correlation.xlsx")
```

Appendix 5 - Histograms

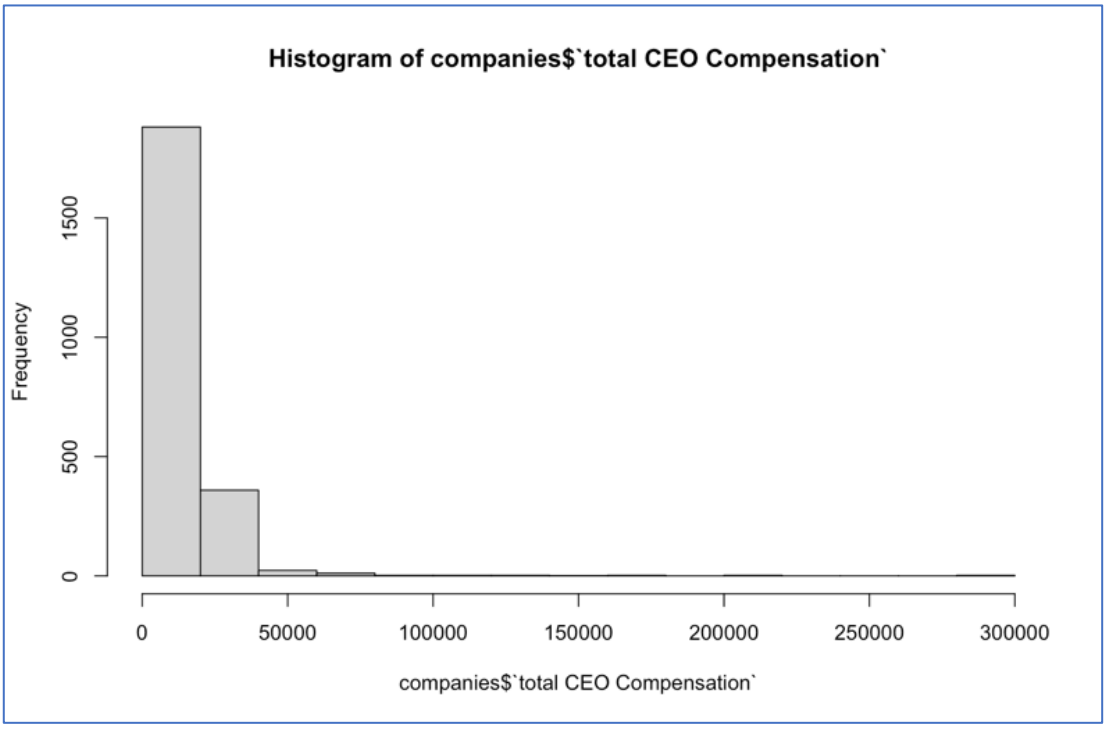
Board compensation before treating it with natural log:



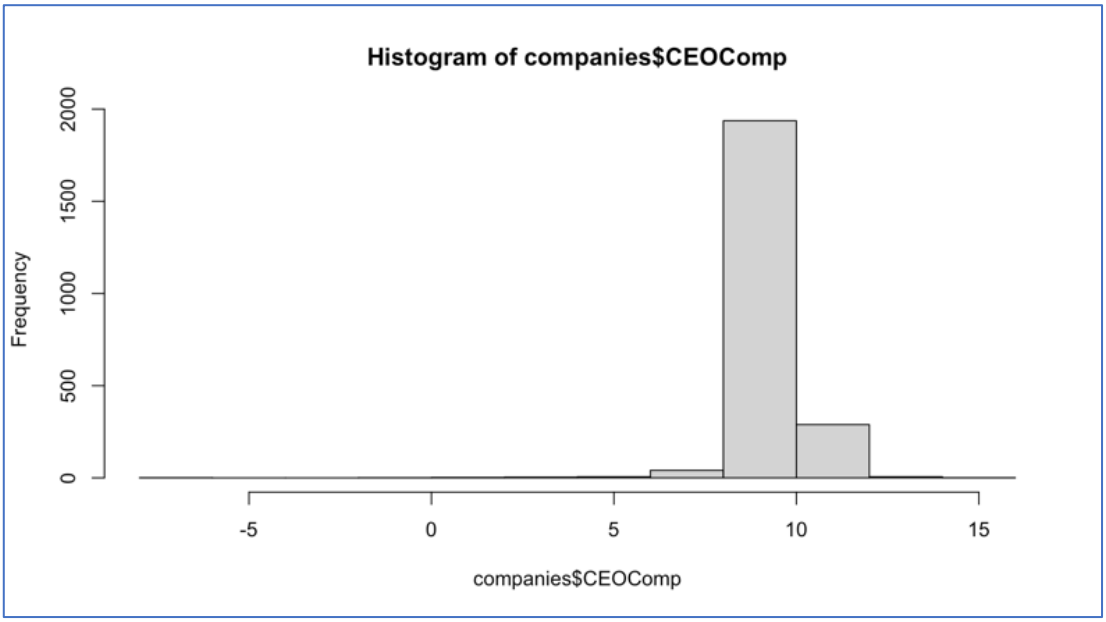
Board compensation after treating it with natural log:



CEO compensation before treating it with natural log:



CEO compensation after treating it with natural log:



Appendix 6 - Board member distribution

Board members	CCC	B	BB	BBB	A	AA	AAA	Leader
4	0%	2%	0%	0%	0%	0%	0%	0%
5	11%	5%	1%	1%	0%	0%	0%	0%
6	7%	4%	2%	1%	1%	1%	0%	1%
7	5%	7%	3%	6%	5%	3%	1%	3%
8	4%	11%	9%	11%	6%	7%	4%	6%
9	16%	8%	11%	15%	11%	8%	6%	8%
10	20%	14%	17%	15%	19%	18%	23%	18%
11	16%	16%	19%	18%	22%	20%	18%	20%
12	5%	17%	15%	13%	17%	19%	27%	20%
13	9%	9%	10%	10%	10%	11%	10%	11%
14	2%	4%	6%	3%	5%	8%	8%	8%
15	2%	4%	2%	4%	2%	3%	3%	3%
16	2%	1%	2%	1%	1%	2%	0%	1%
17	2%	0%	1%	0%	1%	1%	0%	1%
18	0%	0%	1%	0%	0%	0%	0%	0%
19	0%	0%	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%

Appendix 7 - Companies in the dataset

Agilent Technologies Inc, A
American Airlines Group Inc, AAL
Advance Auto Parts Inc, AAP
Apple Inc, AAPL
Abbvie Inc, ABBV
Amerisourcebergen Corp, ABC
Abbott Laboratories, ABT
Accenture Plc, ACN
Adobe Inc, ADBE
Analog Devices Inc, ADI
Archer-Daniels-Midland Co, ADM
Automatic Data Processing, ADP
Autodesk Inc, ADSK
Ameren Corp, AEE
American Electric Power Co, AEP
Aes Corp (The), AES
Aflac Inc, AFL
American International Group, AIG
Assurant Inc, AIZ
Arthur J Gallagher & Co, AJG
Akamai Technologies Inc, AKAM
Albemarle Corp, ALB
Align Technology Inc, ALGN
Alaska Air Group Inc, ALK
Allstate Corp, ALL
Allegion Plc, ALLE
Applied Materials Inc, AMAT
Advanced Micro Devices, AMD
Ametek Inc, AME
Amgen Inc, AMGN
Ameriprise Financial Inc, AMP
American Tower Corp, AMT
Amazon.Com Inc, AMZN
Arista Networks Inc, ANET
Ansys Inc, ANSS
Aon Plc, AON
Smith (A.O.), AOS
Apa Corp, APA
Air Products & Chemicals Inc, APD
Amphenol Corp, APH
Aptiv Plc, APTV
Alexandria R E Equities Inc, ARE
Atmos Energy Corp, ATO
Activision Blizzard Inc, ATVI
Avalonbay Communities Inc, AVB
Broadcom Inc, AVGO
Avery Dennison Corp, AVY
American Water Works Co Inc, AWK
American Express Co, AXP
Autozone Inc, AZO
Bae Systems, BA
Bank Of America Corp, BAC
Baxter International Inc, BAX
Bath & Body Works Inc, BBWI
Best Buy Co Inc, BBY
Becton Dickinson & Co, BDX
Franklin Resources Inc, BEN
Brown Forman Corp, BF.B
Biogen Inc, BIIB
Bio-Rad Laboratories Inc, BIO
Bank Of New York Mellon Corp, BK
Booking Holdings Inc, BKNG
Baker Hughes Co, BKR
Blackrock Inc, BLK
Bristol-Myers Squibb Co, BMY
Broadridge Financial Solutns, BR
Brown & Brown Inc, BRO
Boston Scientific Corp, BSX
Borgwarner Inc, BWA
Boston Properties Inc, BXP
Citigroup Inc, C
Conagra Brands Inc, CAG
Cardinal Health Inc, CAH
Carrier Global Corp, CARR
Caterpillar Inc, CAT
Ace Ltd., CB
Cboe Global Markets Inc, CBOE
Cbre Group Inc, CBRE
Crown Castle Inc, CCI
Carnival Corporation & Plc, CCL
Ceridian Hcm Holding, CDAY
Cadence Design Systems Inc, CDNS
Cdw Corp, CDW
Celanese Corp, CE
Cf Industries Holdings Inc, CF
Citizens Financial Group Inc, CFG
Church & Dwight Inc, CHD
C H Robinson Worldwide Inc, CHRW
Charter Communications Inc, CHTR
Cigna Corp, CI
Cincinnati Financial Corp, CINF
Colgate-Palmolive Co, CL
Clorox Co/De, CLX
Comerica Inc, CMA
Comcast Corp, CMCSA
Cme Group Inc, CME
Chipotle Mexican Grill Inc, CMG
Cummins Inc, CMI
Cms Energy Corp, CMS
Centene Corp, CNC
Centerpoint Energy Inc, CNP
Capital One Financial Corp, COF
Cooper Cos Inc (The), COO
Conocophillips, COP
Costco Wholesale Corp, COST
Campbell Soup Co, CPB
Copart Inc, CPRT
Charles River Labs Intl Inc, CRL
Salesforce Inc, CRM
Cisco Systems Inc, CSCO
Csx Corp, CSX
Cintas Corp, CTAS
Catalent Inc, CTLT
Coterra Energy Inc, CTRA
Cognizant Tech Solutions, CTSH
Corteva Inc, CTVA
Cvs Health Corp, CVS
Chevron Corp, CVX
Caesars Entertainment Inc, CZR
Dominion Energy Inc, D

Delta Air Lines Inc, DAL
Dupont De Nemours Inc, DD
Deere & Co, DE
Discover Financial Svcs, DFS
Dollar General Corp, DG
Quest Diagnostics Inc, DGX
D R Horton Inc, DHI
Danaher Corp, DHR
Disney (Walt) Co, DIS
Dish Network Corp, DISH
Digital Realty Trust Inc, DLR
Dollar Tree Inc, DLTR
Dover Corp, DOV
Dow Inc, DOW
Domino'S Pizza Inc, DPZ
Darden Restaurants Inc, DRI
Dte Energy Co, DTE
Duke Energy Corp, DUK
Davita Inc, DVA
Devon Energy Corp, DVN
Dxc Technology Co, DXC
Dexcom Inc, DXCM
Electronic Arts Inc, EA
Ebay Inc, EBAY
Ecolab Inc, ECL
Consolidated Edison Inc, ED
Equifax Inc, EFX
Edison International, EIX
Estee Lauder Companies Inc, EL
Eastman Chemical Co, EMN
Emerson Electric Co, EMR
Enphase Energy Inc, ENPH
Eog Resources Inc, EOG
Equinix Inc, EQIX
Equity Residential, EQR
Eversource Energy, ES
Essex Property Trust, ESS
Eaton Corp Plc, ETN
Entergy Corp, ETR
Etsy Inc, ETSY
Evergy Inc, EVRG
Edwards Lifesciences Corp, EW
Exelon Corp, EXC
Expeditors Intl Wash Inc, EXPD
Expedia Group Inc, EXPE
Extra Space Storage Inc, EXR
Ford Motor Co, F
Diamondback Energy Inc, FANG
Fastenal Co, FAST
Freeport-Mcmoran Inc, FCX
Fedex Corp, FDX
Firstenergy Corp, FE
F5 Inc, FFIV
Fidelity National Info Svcs, FIS
Fiserv Inc, FISV
Fifth Third Bancorp, FITB
Fleetcor Technologies Inc, FLT
Fmc Corp, FMC
Fox Corp, FOXA
First Republic Bank, FRC
Federal Realty Investment Tr, FRT
Fortinet Inc, FTNT
Fortive Corp, FTV
General Dynamics Corp, GD
General Electric Co, GE
Gilead Sciences Inc, GILD
General Mills Inc, GIS
Globe Life Inc, GL
Corning Inc, GLW
General Motors Co, GM
Generac Holdings Inc, GNRC
Alphabet Inc, GOOGL
Genuine Parts Co, GPC
Global Payments Inc, GPN
Gap Inc, GPS
Garmin, GRMN
Goldman Sachs Group Inc, GS
Grainger (W W) Inc, GWW
Halliburton Co, HAL
Hasbro Inc, HAS
Huntington Bancshares, HBAN
Hanesbrands Inc, HBI
Hca Healthcare Inc, HCA
Home Depot Inc, HD
Hess Corp, HES
Hartford Financial Services, HIG
Huntington Ingalls Ind Inc, HII
Hilton Worldwide Holdings, HLT
Hologic Inc, HOLX
Honeywell International Inc, HON
Hewlett Packard Enterprise, HPE
Hp Inc, HPQ
Hormel Foods Corp, HRL
Henry Schein Inc, HSIC
Host Hotels & Resorts Inc, HST
Hershey Co, HSY
Humana Inc, HUM
Howmet Aerospace Inc, HWM
Intl Business Machines Corp, IBM
Intercontinental Exchange, ICE
Idexx Labs Inc, IDXX
Idex Corp, IEX
Intl Flavors & Fragrances, IFF
Illumina Inc, ILMN
Incyte Corp, INCY
Intel Corp, INTC
Intuit Inc, INTU
Intl Paper Co, IP
Interpublic Group Of Cos, IPG
Ipg Photonics Corp, IPGP
Iqvia Holdings Inc, IQV
Ingersoll Rand Inc, IR
Iron Mountain Inc, IRM
Intuitive Surgical Inc, ISRG
Gartner Inc, IT
Illinois Tool Works, ITW
Invesco Ltd, IVZ
Jacobs Solutions Inc, J
Hunt (Jb) Transprt Svcs Inc, JBHT
Johnson Controls Intl Plc, JCI

Henry (Jack) & Associates, JKHY
Johnson & Johnson, JNJ
Juniper Networks Inc, JNPR
Jpmorgan Chase & Co, JPM
Kellogg Co, K
Keycorp, KEY
Keysight Technologies Inc, KEYS
Kraft Heinz Co, KHC
Kimco Realty Corp, KIM
Kla Corp, KLAC
Kimberly-Clark Corp, KMB
Kinder Morgan Inc, KMI
Carmax Inc, KMX
Coca-Cola Co, KO
Kroger Co, KR
Loews Corp, L
Leidos Holdings Inc, LDOS
Leggett & Platt Inc, LEG
Lennar Corp, LEN
Laboratory Cp Of Amer Hldgs, LH
L3Harris Technologies Inc, LHX
Linde Plc, LIN
Lkq Corp, LKQ
Lilly (Eli) & Co, LLY
Lockheed Martin Corp, LMT
Lincoln National Corp, LNC
Alliant Energy Corp, LNT
Lowe'S Cos Inc, LOW
Lam Research Corp, LRCX
Lumen Technologies Inc, LUMN
Southwest Airlines, LUV
Las Vegas Sands Corp, LVS
Lamb Weston Holdings Inc, LW
Lyondellbasell Industries Nv, LYB
Live Nation Entertainment, LYV
Mastercard Inc, MA
Mid-America Apt Cmntys Inc, MAA
Marriott Intl Inc, MAR
Masco Corp, MAS
Mcdonald'S Corp, MCD
Microchip Technology Inc, MCHP
Mckesson Corp, MCK
Moody'S Corp, MCO
Mondelez International Inc, MDLZ
Medtronic Plc, MDT
Metlife Inc, MET
Mgm Resorts International, MGM
Mohawk Industries Inc, MHK
Mccormick & Co Inc, MKC
Marketaxess Holdings Inc, MKTX
Martin Marietta Materials, MLM
Marsh & Mclennan Cos, MMC
3M Co, MMM
Monster Beverage Corp, MNST
Altria Group Inc, MO
Mosaic Co, MOS
Marathon Petroleum Corp, MPC
Monolithic Power Systems Inc, MPWR
Merck & Co, MRK
Moderna Inc, MRNA
Marathon Oil Corp, MRO
Morgan Stanley, MS
Microsoft Corp, MSFT
Motorola Solutions Inc, MSI
M & T Bank Corp, MTB
Mettler-Toledo Intl Inc, MTD
Micron Technology Inc, MU
Norwegian Cruise Line Hldgs, NCLH
Nasdaq Inc, NDAQ
Nextera Energy Inc, NEE
Newmont Corp, NEM
Netflix Inc, NFLX
Nisource Inc, NI
Nike Inc -Cl B, NKE
Northrop Grumman Corp, NOC
Servicenow Inc, NOW
Nrg Energy Inc, NRG
Norfolk Southern Corp, NSC
Netapp Inc, NTAP
Northern Trust Corp, NTRS
Nucor Corp, NUE
Nvidia Corp, NVDA
Nvr Inc, NVR
Newell Brands Inc, NWL
News Corp, NWSA
Nxp Semiconductors Nv, NXPI
Realty Income Corp, O
Old Dominion Freight, ODFL
Oneok Inc, OKE
Omnicom Group Inc, OMC
Oracle Corp, ORCL
O'Reilly Automotive Inc, ORLY
Otis Worldwide Corp, OTIS
Occidental Petroleum Corp, OXY
Paycom Software Inc, PAYC
Paychex Inc, PAYX
Paccar Inc, PCAR
Healthpeak Properties Inc, PEAK
Public Service Entrp Grp Inc, PEG
Penn Entertainment Inc, PENN
Pepsico Inc, PEP
Pfizer Inc, PFE
Principal Financial Grp Inc, PFG
Procter & Gamble Co, PG
Progressive Corp-Ohio, PGR
Parker-Hannifin Corp, PH
Pultegroup Inc, PHM
Packaging Corp Of America, PKG
Perkinelmer Inc, PKI
Prologis Inc, PLD
Philip Morris International, PM
Pnc Financial Svcs Group Inc, PNC
Pentair, PNR
Pinnacle West Capital Corp, PNW
Pool Corp, POOL
Ppg Industries Inc, PPG
Ppl Corp, PPL
Prudential Financial Inc, PRU
Public Storage, PSA
Phillips 66, PSX

Ptc Inc, PTC
Pvh Corp, PVH
Quanta Services Inc, PWR
Pioneer Natural Resources Co, PXD
Paypal Holdings Inc, PYPL
Qualcomm Inc, QCOM
Qorvo Inc, QRVO
Royal Caribbean Group, RCL
Everest Re Group Ltd, RE
Regency Centers Corp, REG
Regeneron Pharmaceuticals, REGN
Regions Financial Corp, RF
Robert Half Intl Inc, RHI
Raymond James Financial Inc, RJF
Ralph Lauren Corp, RL
Resmed Inc, RMD
Rockwell Automation, ROK
Rollins Inc, ROL
Roper Technologies Inc, ROP
Ross Stores Inc, ROST
Republic Services Inc, RSG
Raytheon Technologies Corp, RTX
Sba Communications Corp, SBAC
Starbucks Corp, SBUX
Schwab (Charles) Corp, SCHW
Sealed Air Corp, SEE
Sherwin-Williams Co, SHW
Smucker (Jm) Co, SJM
Schlumberger Ltd, SLB
Snap-On Inc, SNA
Synopsys Inc, SNPS
Southern Co, SO
Simon Property Group Inc, SPG
S&P Global Inc, SPGI
Sempra Energy, SRE
Steris Plc, STE
State Street Corp, STT
Seagate Technology Holdings, STX
Constellation Brands, STZ
Stanley Black & Decker Inc, SWK
Skyworks Solutions Inc, SWKS
Synchrony Financial, SYF
Stryker Corp, SYK
Sysco Corp, SYY
At&T Inc, T
Molson Coors Beverage Co, TAP
Transdigm Group Inc, TDG
Teledyne Technologies Inc, TDY
Bio-Techne Corp, TECH
Te Connectivity Ltd, TEL
Teradyne Inc, TER
Truist Financial Corp, TFC
Teleflex Inc, TFX
Target Corp, TGT
Tjx Cos Inc (The), TJX
Thermo Fisher Scientific Inc, TMO
T-Mobile Us Inc, TMUS
Tapestry Inc, TPR
Trimble Inc, TRMB
Price (T. Rowe) Group, TROW
Travelers Cos Inc, TRV
Tractor Supply Co, TSCO
Tesla Inc, TSLA
Tyson Foods Inc -Cl A, TSN
Take-Two Interactive Sftwr, TTWO
Texas Instruments Inc, TXN
Textron Inc, TXT
Tyler Technologies Inc, TYL
Under Armour Inc, UAA
United Airlines Holdings Inc, UAL
Udr Inc, UDR
Universal Health Svcs Inc, UHS
Ulta Beauty Inc, ULTA
Unitedhealth Group Inc, UNH
Union Pacific Corp, UNP
United Parcel Service Inc, UPS
United Rentals Inc, URI
Us Bancorp, USB
Visa Inc, V
Vf Corp, VFC
Valero Energy Corp, VLO
Vulcan Materials Co, VMC
Vornado Realty Trust, VNO
Verisk Analytics Inc, VRSK
Verisign Inc, VRSN
Vertex Pharmaceuticals Inc, VRTX
Ventas Inc, VTR
Viatris Inc, VTRS
Verizon Communications Inc, VZ
Wabtec Corp, WAB
Waters Corp, WAT
Walgreens Boots Alliance Inc, WBA
Western Digital Corp, WDC
Wec Energy Group Inc, WEC
Welltower Inc, WELL
Wells Fargo & Co, WFC
Whirlpool Corp, WHR
Waste Management Inc, WM
Williams Cos Inc, WMB
Walmart Inc, WMT
Berkley (W R) Corp, WRB
Westrock Co, WRK
West Pharmaceutical Svsc Inc, WST
Western Union Co, WU
Weyerhaeuser Co, WY
Wynn Resorts Ltd, WYNN
Xcel Energy Inc, XEL
Exxon Mobil Corp, XOM
Dentsply Sirona Inc, XRAY
Xylem Inc, XYL
Yum Brands Inc, YUM
Zimmer Biomet Holdings Inc, ZBH
Zebra Technologies Cp -Cl A, ZBRA
Zions Bancorporation Na, ZION
Zoetis Inc, ZTS