Erasmus School of Economics

ESG and Executive Compensation contracts

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Esther Boelens (572528)
Supervised by dr. Michael H.R. Erkens
Second Assessor: Jilde Garst

ABSTRACT

The term ESG is increasingly appearing on company's websites and in company's statements, news articles, and the academic literature. ESG stands for Environmental, Social, and Governance, which is closely related to the term CSR which stands for Corporate Social Responsibility. Shareholders put great importance on ESG issues, which is reflected in the attention paid to the subject by proxy advisory firms, as well as by standard setters who try to create common standards for ESG reporting. Companies are trying to find ways to improve their ESG performance, one of them being to tie ESG performance indicators to compensation. In this way, companies aim to hold management accountable for ESG results and improve the alignment of interests between managers and shareholders. This paper examines the type of companies using ESG-related compensation and analyzes the relation between ESG-related compensation and a company's ESG performance, where ESG performance is measured by Thomson Reuter's overall ESG score. The results show that companies operating in emission-intensive industries are more likely to use ESG-related compensation and that this type of compensation is positively related to a company's overall ESG score. The relation is slightly moderated when a company has a control mechanism in the form of a CSR committee or an audit on the CSR report in place. These findings confirm the expectations from an agency theory perspective and could have important implications for companies and standard setters in developing their strategies and standards.

Keywords: CSR · ESG · Executive compensation · Remuneration plans · Nonfinancial performance measures

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1 | INTRODUCTION

More and more companies have been reporting on CSR and ESG performance. A research carried out by the Governance & Accountability Institute (2018) shows that already 85% of S&P 500 companies published reports on CSR and ESG performance in 2017, while this was only 20% in 2011. Although the terms ESG and CSR are used interchangeably, they are not entirely the same (Gillan et al., 2021). CSR is seen as a form of self-regulation, where companies try to ensure their actions have a positive impact on the environment, employees and customers. The governance factor is not incorporated here. This term is often used by companies and business schools as they speak of 'developing CSR policies' and 'CSR reports'. ESG criteria, on the other hand, are performance indicators that make firms' efforts measurable. Think of measuring a company's carbon footprint and making sure a system is in place to ensure accountability. The public using the term 'ESG' are often investors and asset managers who assess corporate behavior. CSR and ESG are closely related in terms of their long-term thinking, and therefore, CSR-CSP research can be used to determine the possible relation between ESG-compensation and ESG performance. For this reason, the terms are used interchangeably throughout this study.

A bibliometric analysis by Widyawati (2019), shows that the number of Socially Responsible Investment (SRI) studies over the last decade increased significantly with a peak during the period 2014-2016. This indicates that this topic is becoming more and more important over the last decade. Likewise, the increasing importance of ESG information to investors is highlighted by four investment portfolio managers at a Symposium in New York (Ailman et al., 2017). Although there is no empirical evidence for their statements, they do have a lot of experience in the field to make theoretical arguments. Chris Ailman, Michelle Edkins, Ted Eliopolous and Kristi Mitchem (2017)[1] all agree that ESG information is particularly important to investors as it is forward-looking and tends to impact value over the longer term instead of looking at the financial statements, which are just a snapshot of a single moment in time. It helps to get a sense of the risks and opportunities in the business. Kristi Mitchem (2017) states that ESG information tells us about risks that are not captured by traditional risk factors and therefore can explain a lot about the volatility in stocks. Academic research confirms that more asset managers and institutional investors are stressing the importance of decision-useful and comparable ESG disclosure by their portfolio companies (Fleming & Ledbetter, 2020). The demand for ESG disclosure can therefore not be dismissed anymore as the reasonable investor is concerned about long-term value creation.

Standard setters are also aware of the demand for sustainability information (Guillot, 2020). Janine Guillot (2020), CEO of the SASB, highlights a new report from the US Government Accountability Office which finds that investors ask for information about

[1] Chris Ailman is Chief Investment Officer CalSTRS and manages an investment portfolio of about $200 billion Michelle Edkins is Managing Director BlackRock & Global Head Investment Stewardship team and is responsible for the investments her team makes on behalf of clients. Ted Eliopolous is Chief Investment Officer CalPERS and of about $300 billion. Kristi Mitchem is President & CEO of Wells Fargo Asset Management, which manages over $480 billion in assets.

sustainability-related risks and opportunities more frequently, since investors agree that key sustainability performance could be a valuable indicator of a firm's long-term financial performance. Although companies already disclose ESG information, the SASB is still working on setting standards that improve the consistency, comparability and reliability of these disclosures (SASB, 2021). The SASB and GRI have a collaborative work plan and aim to provide compatible standards for sustainability information. "In a post-COVID world, companies will increasingly be expected to disclose their performance on a range of ESG topics," says Janine Guillot, CEO of SASB (2020). This view seems to hold in practice as well, as sustainable funds are performing well relative to conventional funds in the US due to the global pandemic (Morningstar, 2020).

We can see companies react to this demand, as they are finding ways to incentivize management to pay more attention to ESG goals by integrating sustainability goals in their performance plans. Apple announced that it will adjust 2021 executive bonuses by up to 10% based on the ESG modifier, which is subsequently based on their core values (Dean, 2021). Unilever created its own 'Sustainability Progress Index', and put a 25% weight on it in its long-term incentive plans (Unilever, 2021). As a last example, Siemens introduced a 'Siemens-internal ESG/sustainability index', which is a performance criterion for long-term variable compensation (Siemens, 2020).

As can be seen from the literature as well as in practice, incorporating ESG goals in compensation contracts is a well-discussed topic at this moment. As of today, only one study specifically focused on the relation between ESG-related compensation and ESG scores instead of looking at CSP, which does not include governance aspects (Baraibar-Diez et al., 2019). The reason for little research in this area could be a result of a lack of data on the incorporation of ESG goals in compensation contracts. However, as the demand for ESG disclosure is growing, rating providers have been working hard to provide an interpretation of a company's ESG performance.

The main question to be answered in this study is whether a relation between ESG-related compensation and ESG scores exists and how this relation changes when a company has a CSR Committee in place, using the most recent data from Thomson Reuter's ESG database. In addition, I investigate what kind of companies are using ESG-related compensation and how the relation between ESG-compensation and ESG performance is affected when a company's CSR-report is audited. I find that companies in emission-intensive industries are more likely to include ESG criteria in performance plans and a company's ESG score tends to be higher when executives get paid based on ESG performance. This effect tends to be stronger when a CSR Committee is in place or a company's CSR report is audited. Lastly, I perform a robustness check using lagged independent variables to check for the long-term effect of ESG-related compensation.

This paper contributes to the literature and practice in several ways. First of all, although several studies find a positive relation between CSR-related compensation and CSP, this relation is barely tested incorporating the governance aspects as reflected by ESG-related compensation and ESG scores. The studies previously conducted often use hand-

collected data over a relatively small sample period. This makes it interesting to look at whether the results hold using a bigger sample and broader sample period as more and more companies are incorporating sustainability goals in performance plans. (Dean, 2021; Unilever, 2021; Siemens, 2020). In addition, it would be interesting for companies to know whether their efforts to align management's interests and shareholder interests lead to better scores and eventually long-term value creation (Cordeiro & Sarkis, 2008; Flammer et al., 2019). Investors want the same consistency and transparency in a company's sustainability reporting as in its financial reporting, as sustainability performance is potentially becoming a leading indicator of financial performance. This idea can be further enabled if compensation is tied to ESG metrics (Barker et al., 2020). Standards for reporting on ESG will make it possible for firms to determine the compensation for board members, executives and investors (Barker et al., 2020).

The remainder of this paper is organized as follows. Section 2 provides a theoretical background on the incentives and effects of ESG-related compensation policies and defines the hypotheses. Section 3 describes the research design of the study including sample selection and methodology. Section 4 describes the empirical results and section 5 concludes by giving an overview of the main findings, implications, and possible areas for further research.

2 | THEORETICAL BACKGROUND & HYPOTHESES DEVELOPMENT

2.1 Incentives for using ESG/CSR-related compensation policies

Before discussing the relation between ESG-related compensation and ESG scores, it is important to know the incentives for companies to use these types of contracts. A large amount of literature states that the reason why companies include ESG indicators in compensation contracts is to align management's incentives to those of shareholders (Maas, 2018; Ikram et al., 2019; Winschel & Stawinoga, 2019; Cordeiro & Sarkis, 2008; Cavaco et al., 2020). Early literature looks at the separation of ownership and control where management controls the actions and strategy of a firm on behalf of its shareholders (Fama & Jensen, 1983). This could lead to several agency problems such as moral hazard and adverse selection where management does not always act in the best interests of the shareholders (Fama, 1980). Management, for example, could have a contracting incentive to focus on short-term performance goals to get their quarterly or annual bonus or meet earnings forecasts (Healy & Wahlen, 1999). An information problem arises where the shareholders do not have the same information as managers which could lead to differences in interests and agency costs (Fama & Jensen, 1983). This difference in interests due to a lack of information could be partly resolved by using compensation schemes that take into account management's performance (Fama, 1980).

A more recent research by Winschel and Stawinoga (2019) provides a structured literature overview of most empirical research regarding the determinants and effects of

sustainable CEO compensation. The researchers see an increase in the number of publications from 2010 onwards, which reflects the growing relevance of CSR-related compensation. From a theoretical background, the researchers argue that CSR-related compensation can be used as a corporate governance instrument to align management's interests with those of the shareholders/stakeholders and therefore mitigate agency costs, which coincides with previous literature (Fama, 1980; Fama & Jensen, 1983). Furthermore, from a behavioral agency theory perspective, it is argued that individual CEOs' insights and risk-related attitudes towards CSR activities enhances CEOs' intrinsic motivation and CSR performance (Winschel & Stawinoga, 2019; Francoeur et al., 2017). CEOs having the intrinsic motivation to improve environmental performance is seen as the stewardship theory which is confirmed by the finding that environmentally friendly firms pay less to their CEOs and use less incentive-based compensation compared to environment careless firms (Francoeur et al., 2017).

Some research finds that CSR-related compensation is more prevalent in emission-intensive industries such as mining, oil extraction, and transportation (Flammer et al., 2019). This insight is confirmed by Ikram et al. (2019), who, in addition, find that these CSR-related components are mainly focused on Safety, Health, and Environment concerns. Cordeiro and Sarkis (2008) state that, in order to align management incentives and organizational environmental goals, top management compensation should be linked to environmental performance. A reason to link CEOs' compensation to environmental performance especially in emission-intensive industries is because this would enhance social legitimacy (Berrone & Gomez-Mejia, 2009).

Berrone and Gomez-Mejia (2009) state that several factors contribute to the adoption of environmental compensation schemes to fight moral hazard and adverse selection problems. As environmental strategies are often complicated, environmental pay can be used as a substitute for close observation over actions that are difficult to monitor. Furthermore, environmental strategies are often seen as risky investments for CEOs as they can impair short-term financial performance. Therefore, CEOs want to be compensated for taking this risk. A third factor contributing to environmental pay is the level of control CEOs have over performance criteria. Since CEOs do have control over the environmental strategies of a company, they also should be paid according to their performance in this area. Therefore, the researchers hypothesize and find that environmental performance has a positive effect on CEO compensation (Berrone & Gomez-Mejia, 2009).

Overall, incentives to use ESG/CSR-related compensation especially come from agency theory and stewardship theory where these incentives seem to be stronger in emission-intensive industries. This is a result of dealing with increased scrutiny of both regulators and investors as the environment is becoming more and more important nowadays (Eccles & Klimenko, 2019; Berrone & Gomez-Mejia, 2009). Excessive reliance on short-term financial performance in executive compensation is not socially accepted anymore, especially during a period of economic slow-down due to COVID-19 (ICGN, 2020). As the use of ESG/CSR-related compensation policies seems to differ across industries and

seems to be more prevalent in emission-intensive industries, it is important to control for these effects in the analysis presented in this paper. Based on the literature presented above, the following hypothesis is developed:

Hypothesis 1: The adoption of ESG criteria in executive compensation is more prominent in emission-intensive industries.

2.2 ESG/CSR-related compensation policies & ESG performance

The term ESG can be found easily on shareholder platforms nowadays. Two of the most prominent proxy advisory firms in the U.S., ISS (2021) and GL (2020), devote specific sections to ESG recommendations in their 2021 guidelines and give a general advice to companies to disclose ESG information (GL, 2021; ISS, 2021). In addition, ISS (2020) recommends linking executive compensation to sustainability criteria to hold management accountable for ESG results. Considering the attention given to ESG in proxy advisory firms' guidelines, it can be concluded that investors think that ESG matters are of great importance.

The idea of incorporating CSR or ESG goals in compensation contracts is a popular topic for Academia, although it is not always that easy to obtain data on ESG/CSR components of compensation contracts. Some researchers manually search through compensation data to determine whether CSR activities are included in compensation plans (Hong et al., 2016; Flammer et al., 2019) or use proxy statements to obtain information on CSR-related compensation (Maas, 2018; Ikram et al., 2019). However, finding a single measure of ESG-related compensation seems to be hard as ESG comprises many components, from emissions to workforce and CSR strategy (Thomson Reuters, 2020).

Cavaco et al. (2020) look into how CSR contracting affects financial performance. They distinguish between firms with a shareholder and a stakeholder corporate governance model and find that including CSR criteria in executive compensation programs negatively impacts financial performance, but positively impacts the customer-supplier relationship and community involvement. It seems that a trade-off exists between financial- and non-financial performance, although it should be pointed out that extensive literature can be found on traditional "pay for financial performance plans", but little is known regarding "pay for extra-performance plans" (Cavaco et al., 2020). A literature review using SRI studies also finds that research is dominated by performance studies, but they state that SRI's ultimate goal of changing corporate behavior is overlooked (Widyawati, 2019). However, this might be a result of a mismatch between the short-term goals of financial markets and the more long-term goals of ESG criteria.

From a behavioral and stewardship theory point of view, several effects on CSR could occur (Winschel & Stawinoga, 2019; Francoeur et al., 2017). When monetary equity-incentives are in place, CEOs are less likely to engage in CSR as their private interests are closely related to financial performance (Fabrizi et al., 2014). Furthermore, when a CEO is

new to a firm, it turns out the CEO engages significantly more in CSR, which could have to do with the legitimacy the CEO wants to gain towards a broad group of stakeholders for a longer period (Berrone & Gomez-Mejia, 2009; Cavaco et al., 2020; Fabrizi et al., 2014). Also, when a CEO has low career concerns, for example when the CEO is older, he or she is more likely to engage in CSR (Fabrizi et al., 2014).

Several studies find evidence for increased sustainable performance when adding CSR targets in executive compensation schemes (Flammer et al., 2019; Maas, 2018). Flammer et al. (2019) add to the literature by constructing a novel CSR contracting database and subsequently exploring how tying CSR goals to social and environmental performance affect firm outcomes. The researchers find that CSR contracting reduces emissions and increases a firm's long-term orientation, firm value, the number of social and environmental initiatives taken, and green innovations. Similarly, Maas (2018) finds that Corporate Social Performance (CSP) improves when CSP targets are used in executive compensation. These findings coincide with the agency theory perspective of using executive compensation to align management's incentives with firm goals (Maas, 2018; Ikram et al., 2019; Fama, 1980). However, Maas' (2018) proposed hypothesis that firms with weak CSP results would be more likely to use CSP targets in executive compensation is not confirmed, making the effectiveness of CSP targets questionable. Some researchers therefore make a distinction between hard targets with a clear underlying quantitative measure and qualitative soft targets which are less controllable (Maas, 2018; Ikram et al., 2019). It turns out that hard targets are effective in improving CSP while soft targets cannot be directly linked to CSP results (Maas, 2018). In other words, targets with a clear underlying remuneration ex-ante, are likely to be more effective to improve CSR outcomes (Ikram et al., 2019).

Another point of view is that CSR-related compensation is merely symbolic as managers often have power and just use this compensation to make more money (Ikram et al., 2019; Hong et al., 2016). Although researchers find that CSR compensation contracts lead to more CSR activities, they also find that when governance is less focused on shareholders and managers have greater individual power within the firm, executive compensation is less likely to be tied to CSR outcomes (Hong et al., 2016). Power of managers in a say on their pay could simply increase their compensation by adding a CSR component, as those metrics are potentially easy to manipulate (Ikram et al., 2019). However, the empirical results suggest that it is unlikely that CSR-contingent contracts are the result of managerial power (Ikram et al., 2019). Winschel and Stawinoga (2019) argue that in the end it remains unclear whether including CSR-related objectives in CEO compensation lead to better performance in this area, or are merely a means to contribute to the ongoing growth of CEO compensation levels.

Until now, there is only one study using a single measure for ESG-related compensation, which is obtained from the ESG Datastream database (Baraibar-Diez et al., 2019). Using data from Spain, France, Germany and the United Kingdom for the period 2005-2015, Baraibar-Diez et al. (2019) find evidence that ESG-related incentives in compensation affect ESG scores, but only when firms have a CSR Committee in place. Without a monitoring

mechanism in place, it seems that management's incentives to meet their short-term performance targets overrule incentives to meet their long-term performance targets. However, this finding could be the result of several factors such as the amount of compensation related to ESG goals, cultural differences, or other factors that affect ESG performance that are not taken into account.

Overall, although the literature provides contradicting evidence, it seems that the most prevalent view for the compensation-performance relation is the agency perspective. The main argument therefore is that ESG/CSR-related compensation gives an incentive to management to align its interests with shareholders leading to better performance in this area. This leads to the following hypothesis:

Hypothesis 2: The adoption of ESG criteria in executive compensation has a positive impact on the overall ESG score of a company.

2.3 Control mechanisms

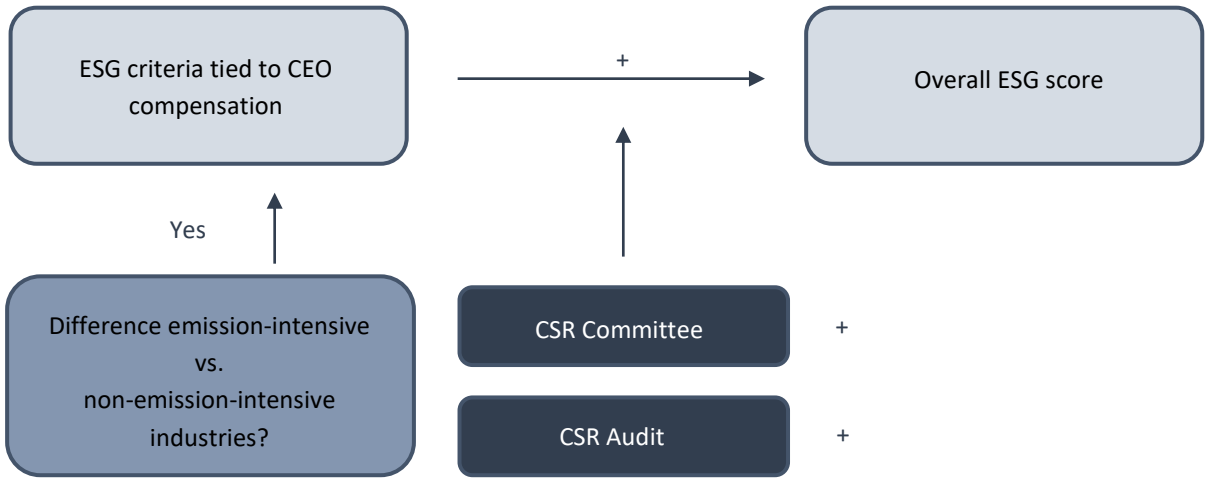
2.3.1 CSR Committee

Firms can achieve effective people control by either selecting people who fit the organization's needs exactly, or by putting in place a managerial system to monitor and evaluate performance (Ouchi, 1979). Since it is quite hard to find the perfect match and employee turnover can lead to high searching costs, often control mechanisms are put in place to make sure employee's interests are aligned with organizational goals. As stated in the previous section, Baraibar-Diez et al. (2019) find that sustainable compensation affects ESG scores, only when firms have a control mechanism, e.g. a CSR committee in place. CSR committees have a moderating role and positively contribute to the corporate structure and firm performance (Uyar et al., 2021). The reasoning behind installing a separate CSR committee is to have sustainability-related board expertise which could contribute substantively to a firm's CSR activities (Velte & Stawinoga, 2020).

However, other researchers do not find evidence to their hypothesis that the relation between environmental-based compensation and environmental performance is expected to be stronger when an environmental committee and a policy for environmental-based compensation is in place (Berrone & Gomez-Mejia, 2009). This finding suggests that these control mechanisms are merely symbolic. Nonetheless, this study only focuses on the environmental pillar in which the intrinsic motivation of CEOs to do the right thing also plays a role (Francoeur et al., 2017). Overall, it seems that CSR committees moderate the effect of ESG-related compensation on firm performance, which leads to the third hypothesis:

Hypothesis 3: The effect of adopting ESG criteria in executive compensation on the ESG score of a firm is stronger when the company has a CSR committee (control mechanism) in place.

Figure 1: Theoretical Framework – relations



2.3.2 Audited CSR reports

In the absence of reporting standards, companies can rely on external audits to assure their sustainability reporting. Del Giudice and Rigamonti (2020) measure how valuable these audits on ESG reports are by looking at the change in ESG scores before and after corporate scandals. Using controversies as a quasi-natural experiment, they find that companies with audited ESG reports experience no significant change in ESG scores. On the contrary, firms without an external audit on ESG reports experience a significant change in ESG scores. This implies that external verification enhances the reliability of ESG scores, which helps to bridge the credibility gap between the firm and the market about ESG reporting (Del Giudice & Rigamonti, 2020). This leads to the fourth hypothesis:

Hypothesis 4: The effect of adopting ESG criteria in executive compensation on the ESG score of a firm is stronger when the company has its CSR report (control mechanism) audited.

Figure 1 provides an overview of the hypothesized relations. The next section describes the sample selection procedure and operationalization of the theoretical concepts.

3 | RESEARCH DESIGN

3.1 Sample

ESG data is obtained from Thomson Reuters' Datastream, while the financial data (Total assets, ROA, Debt-to-equity ratio) is obtained from Compustat for the period 2002-2020. no The sample period chosen is a result of data availability. Datastream includes 8700 publicly listed companies, but not all information is available for all companies. With regard to the financial data from Compustat, some duplicate firm-year observations exist because some companies change fiscal years during the sample period. For these observations, only the latest reported financial numbers are included. After merging the data from Datastream and

Compustat and removing the duplicates and missing values, the sample consists of 16,114 firm-year observations.

3.2 Operationalization

3.2.1 Dependent & Independent variables

In 2019, thirteen new ESG scores have been added to Datastream. Among them, an overall ESG score based on companies' self-reported information is added. Thomson Reuters gathers publicly available information that is carefully checked and audited to ensure data quality and produce ESG scores that are a replacement and enhancement to the widely used ASSET4 ratings.[2] The dependent variable, ESG performance, is operationalized using the overall ESG score (TRESG) which comprises an environmental, social, and governance pillar. This overall score measures a company's relative ESG performance across ten topics based on company reported data and includes over 450 metrics. The overall ESG score captures a lot of aspects, which makes it a complete measure of ESG performance.

To test the first hypothesis of whether a difference exists between companies operating in emission-intensive and non-emission-intensive industries in adopting ESG-related compensation policies, a variable 'Emission' is created. 'Emission' is a variable with a value of one when a company is classified as operating in an emission-intensive industry and zero otherwise. Following Flammer et al. (2019), industries are classified as begin emission-intensive, when they fall under SIC codes 10-14 and 40-49.

Consistent with Baraibar-Diez et al. (2019), the main independent variable for the second-to-fourth hypothesis is a dummy variable responding to either the question "Does the company have an ESG related compensation policy?" or "Is the senior executive's compensation linked to CSR/H&S/Sustainability targets?" (Thomson Reuters, 2019). The reason for using the second question as well to determine whether a company has an ESG-related compensation policy is that some companies use terms other than ESG in their compensation plan while the actual goal of the compensation plan is the same; think long-term. This governance variable is actually part of the overall ESG score calculation. However, the governance pillar from the overall ESG score consists of 68 KPI's. Therefore, the two Boolean variables used for the independent variable are only a small part of the overall score. This is of course not optimal and could possibly lead to severe multicollinearity problems. Multicollinearity will be checked for in the results section.

3.2.2 Control variables

Following Baraibar-Diez et al. (2019), several board characteristics need to be controlled for as they could affect CEO compensation or ESG performance. Controls for the following board characteristics are in place: board independence, percentage of non-executive board

[2] For more information, check the methodology used in defining ESG scores: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

members, board size, and CEO-chairman separation. Several empirical papers show that board independence and the percentage of non-executive board members, as a signal of better governance, affects the use of ESG-related compensation (Baraibar-Diez et al., 2019; Ikram et al., 2019). Furthermore, when the CEO simultaneously chairs the board, the effectiveness of the monitoring role of the board is reduced, which could affect CEO compensation (Baraibar-Diez et al., 2019; Berrone & Gomez-Mejia, 2009).

There is also a need to control for firm size, leverage, and financial performance as those are important determinants of CEO pay (Baraibar-Diez et al., 2019; Berrone & Gomez-Mejia, 2009; Fabrizi et al., 2014; Francoeur et al., 2017; Hong et al., 2016; Maas, 2018). Firm size is important to control for as larger firms tend to have larger resources. Firm size is measured as the natural logarithm of a firm's total assets (SIZE). On the contrary, when a company has higher leverage, it has fewer resources available to engage in ESG activities. Therefore, there is a need to control for leverage, which is measured by the debt-to-equity ratio (LEV) (Baraibar-Diez et al., 2019; Fabrizi et al., 2014; Francoeur et al., 2017; Hong et al., 2016). A last control for firm characteristics is financial performance, which is measured as the return on assets (ROA).

For hypothesis three and four, two extra control variables are added. The first control is a dummy variable that equals one when a company has a CSR committee in place, and zero otherwise. The second control is a dummy variable that equals one when a company has its CSR report audited, and zero otherwise. These control variables are added to investigate whether control mechanisms are merely symbolic or actually help to align management's interests with organizational goals (Berrone & Gomez-Mejia, 2009).

Lastly, firm-fixed effects and year-fixed effects are included to control for factors that are constant across entities and over time. Firm-fixed effects are important to control for as the use of ESG-related compensation seems to be more prevalent in certain industries (Berrone & Gomez-Mejia, 2009; Flammer et al., 2019; Ikram et al., 2019). Including fixed effects eliminates omitted variable bias by controlling for unobserved variables that are constant over time.

3.2.3 Regression models

To test the first hypothesis, the following conditional logistic regression model (equation 1) will be used. Full variable definitions are given in *Appendix A*. Firms are either classified as 'Emission-intensive' or not emission-intensive. Following the SIC, firms are classified as 'Emission-intensive' when they fall under the industries "Mining" (SIC 10-14) or "Transportation & Public Utilities" (40-49) (SICCODES, 2020). Other industries are classified as not emission-intensive. Furthermore, the model includes controls for board & firm characteristics as well as time-fixed effects to control for factors that stay constant over time.

$$ESG_{COMPit} = \beta_0 + \delta_i + \beta_1 Emission_{it} + \beta_2 B_{INDit} + \beta_3 B_{NONEXit} + \beta_4 B_{SIZEit} + \beta_5 B_{SEPit} + \beta_6 SIZE_{it} + \beta_7 ROA_{it} + \beta_8 LEV_{it} \quad (1)$$

The regression model to test the second hypothesis can be found below (equation 2). The independent variable is an indicator variable indicating whether a company uses ESG-related compensation or not. The dependent variable is the company's overall ESG score which can range from 1-100. Similarly to the previous model, control variables for board & firm characteristics are included. In addition, the model incorporates both firm- and time-fixed effects. As ESG performance goals are aimed to give long-term incentives, the regression, as a robustness check, is repeated with lags in the independent variable. The regression will be repeated until five lags, as companies often include ESG criteria in three- to five-year performance plans.

$$Overall_{score} = \beta_0 + \alpha_i + \delta_i + \beta_1 ESG_{COMPit} + \beta_2 B_{INDit} + \beta_3 B_{NONEXit} + \beta_4 B_{SIZEit} + \beta_5 B_{SEPit} + \beta_6 SIZE_{it} + \beta_7 ROA_{it} + \beta_8 LEV_{it} \quad (2)$$

To test the third hypothesis of whether having a CSR committee in place enhances the effect of ESG-related compensation on a company's ESG score, the independent dummy variable CSR committee will be added to the previous model (equation 3). Consequently an interaction term between ESG-related compensation and CSR committees will be added in order to check whether having a CSR committee in place affects ESG scores (equation 4). Board and firm characteristics have been controlled for, as well as firm- and time-fixed effects. This leads to the following equations:

$$Overall_{score} = \beta_0 + \alpha_i + \delta_i + \beta_1 ESG_{COMPit} + \beta_2 CSR_{COMit} + \beta_3 B_{INDit} + \beta_4 B_{NONEXit} + \beta_5 B_{SIZEit} + \beta_6 B_{SEPit} + \beta_7 SIZE_{it} + \beta_8 ROA_{it} + \beta_9 LEV_{it} \quad (3)$$

$$Overall_{score} = \beta_0 + \alpha_i + \delta_i + \beta_1 ESG_{COMPit} + \beta_2 CSR_{COMit} + \beta_3 (ESG_{COMPit} * CSR_{COMit}) + \beta_4 B_{INDit} + \beta_5 B_{NONEXit} + \beta_6 B_{SIZEit} + \beta_7 B_{SEPit} + \beta_8 SIZE_{it} + \beta_9 ROA_{it} + \beta_{10} LEV_{it} \quad (4)$$

To test the fourth hypothesis of whether having a company's CSR report audited enhances the effect of ESG-related compensation on a company's ESG score, the independent dummy variable CSR Audit will be added to equation 3. Consequently an interaction term between ESG-related compensation and CSR Audit will be added in order to check whether having a CSR committee in place affects ESG scores (equation 4). Again, board and firm characteristics have been controlled for, as well as firm- and time-fixed effects. This leads to the following equations:

$$Overall_{score} = \beta_0 + \alpha_i + \delta_i + \beta_1 ESG_{COMPit} + \beta_2 CSR_{AUDITit} + \beta_3 B_{INDit} + \beta_4 B_{NONEXit} + \beta_5 B_{SIZEit} + \beta_6 B_{SEPit} + \beta_7 SIZE_{it} + \beta_8 ROA_{it} + \beta_9 LEV_{it} \quad (5)$$

$$Overall_{score} = \beta_0 + \alpha_i + \delta_i + \beta_1 ESG_{COMPit} + \beta_2 CSR_{AUDITit} + \beta_3 (ESG_{CPit} * CSR_{AUDITit}) + \beta_4 B_{INDit} + \beta_5 B_{NONEXit} + \beta_6 B_{SIZEit} + \beta_7 B_{SEPit} + \beta_8 SIZE_{it} + \beta_9 ROA_{it} + \beta_{10} LEV_{it} \quad (6)$$

In all models, robust standard errors (White-Huber HC0) will be applied to obtain heteroskedasticity-consistent standard errors which are unbiased and consistent. In addition, winsorization at the 99 percent level is applied to the following variables: Overall_Score, B_{IND}, B_{NONEX}, B_{SIZE}, SIZE, ROA, and LEV. This reduces the effect of outliers and enhances the robustness of the sample.

3.2.4. Endogeneity concerns

The models presented above are subject to several endogeneity concerns. First of all, as a company's ESG-compensation policy could be influenced by many things, there is a possibility of omitted variable bias. Although theoretically sound control variables are added which improve the predictive power of the models, omitted variable bias could affect the coefficients of the variables included. A second endogeneity concern is the reverse causality problem. ESG-related compensation could lead to a higher ESG score, but a higher ESG score could also stimulate companies to pay executives based on this result. Both the omitted variable and reverse causality problem will bias the coefficients, making it difficult to generate causal inferences.

To mitigate the endogeneity problem, both firm- and time-fixed effects are included. These fixed effects control for unobserved variables that stay constant over time and therefore mitigate omitted variable bias. Although it will not be possible to make causal inferences, it is possible to see whether a correlation and thus relation between ESG-related compensation and a company's ESG score exists.

4 | EMPIRICAL RESULTS & ANALYSIS

4.1 Descriptive statistics & Correlation Matrix

Table 1 shows the descriptive statistics of the variables used in this study. The overall ESG scores range from 3.1 to 94.7 with an average of 57. It appears that only 33 percent of the companies have some sort of ESG-policy element in their compensation plans. This is consistent with Deloitte's finding that only 40% of the Fortune 100 companies include ESG criteria in their compensation plans (Sullivan et al., 2021). Looking at the board characteristics, it can be seen that on average the boards have twelve members. Around 48 percent of the board members is independent and 73 percent non-executive, while 27 percent of the CEO's simultaneously chair the board. Noteworthy to mention is that 74 percent of the companies have a CSR committee in place and 68 percent of the companies have their CSR-reports audited. Overall, these descriptive statistics indicate that although companies take CSR seriously by installing CSR committees and letting their CSR reports being audited, holding management accountable for ESG results via compensation is not common practice yet.

Table 1: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
$Overall_{Score}$	16,114	57.07	18.18	3.11	94.68
ESG_{COMP}	16,114	0.33	0.47	0	1
B_{IND}	16,114	47.85	25.83	0.00	100.00
B_{NONEX}	16,114	72.90	23.59	0	100
B_{SIZE}	16,114	11.27	3.96	1	39
B_{SEP}	16,114	0.27	0.44	0	1
CSR_{COM}	16,114	0.74	0.44	0	1
CSR_{AUDIT}	16,114	0.68	0.47	0	1
SIZE	16,114	10.87	2.89	2.37	21.07
LEV	16,114	1.08	4.51	-251.31	156.00
ROA	16,114	4.61	6.95	-134.64	89.78
SIC	16,114	43.34	18.96	10	99

Table 2: Pearson Correlation Matrix

	SIC	$Overall_{Score}$	ESG_{COMP}	B_{IND}	B_{NONEX}	B_{SIZE}	B_{SEP}	CSR_{COM}	CSR_{AUDIT}	SIZE	LEV	ROA
SIC	1.00	-0.03***	-0.04***	0.05***	0.08***	0.02***	-0.04***	-0.07***	-0.05***	0.04***	0.05***	-0.05***
$Overall_{Score}$		1.00	0.34***	0.25***	0.20***	0.16***	0.00	0.50***	0.51***	0.27***	0.02***	-0.08***
ESG_{COMP}			1.00	0.32***	0.25***	-0.01	-0.09***	0.23***	0.21***	-0.15***	0.00	-0.05***
B_{IND}				1.00	0.50***	-0.23***	-0.15***	0.05***	0.07***	-0.24***	0.01	0.02***
B_{NONEX}					1.00	-0.04***	-0.18***	-0.01	0.01	-0.30***	0.02***	0.02**
B_{SIZE}						1.00	0.10***	0.12***	0.16***	0.27***	0.04***	-0.12***
B_{SEP}							1.00	0.01*	0.01	0.13***	0.01	-0.02**
CSR_{COM}								1.00	0.42***	0.20***	0.01	-0.09***
CSR_{AUDIT}									1.00	0.26***	0.02**	-0.10***
SIZE										1.00	0.07***	-0.15***
LEV											1.00	-0.08***
ROA												1.00

*p<0.1;**p<0.05;***p<0.01

The results in Table 2 show some moderate but not extreme correlations, indicating it is not likely that a severe multicollinearity problem is present. This result is especially important for the correlation between ESG_{COMP} & $Overall_{Score}$ as the indicators used to determine whether a company adopts ESG-related compensation, are part of the overall ESG score. Only a moderate multicollinearity problem exists, which makes the coefficient estimates less precise but not impossible to interpret. Another result that stands out is that there is a very low correlation of -0.09 between CEO-Chairman separation (B_{SEP}) and ESG-related compensation (ESG_{COMP}) and 0 correlation with a company's ESG score ($Overall_{Score}$). Also, Board size (B_{SIZE}) is not significantly correlated to ESG-related compensation (ESG_{COMP}). Those results make it questionable whether CEO-Chairman separation (B_{SEP}) and Board size (B_{SIZE}) should be included as control variables in the regression models.

4.2 Main Results

Table 3 column 1 presents the results of the fixed-effects model used to test Hypothesis 1, regarding the type of companies using ESG-related compensation. The positive and significant coefficient for 'Emission-intensive' of 0.211, reflects that the odds for companies operating in emission-intensive industries are about 24 percent ($e^{0.211} = 1.24$) higher than the odds for companies not operating in emission-intensive industries to adopt ESG-related compensation policies. The first hypothesis can therefore be accepted. This result is consistent with previous findings, which state that environmental-based compensation enhances social legitimacy (Berrone & Gomez-Mejia, 2009; Flammer et al., 2019). Another thing that can be observed from the results is that all control variables, except for CEO-Chairman separation (B_{SEP}) and leverage (LEV), are significant. Although the coefficients are relatively small, the control variables will be included in subsequent models as from a theoretical perspective board and firm characteristics seem to influence compensation structures (Baraibar-Diez et al., 2019; Berrone & Gomez-Mejia, 2009; Fabrizi et al., 2014; Flammer et al., 2019; Francoeur et al., 2017; Hong et al., 2016; Maas, 2018).

Table 3 column 2 presents the results of the fixed-effects models used to test hypothesis 2, regarding the influence of ESG-related compensation on a company's overall ESG score. Model 2 reflects the original model where the relation between ESG-related compensation and a company's overall ESG score is measured. As expected, the coefficient for ESG-related compensation is positive and significant and thus, the null hypothesis of no relation being present can be rejected. The coefficient is 3.763, which means that companies that include ESG performance indicators in their compensation plans, on average, tend to have an ESG score of 3.763 points higher compared to companies that do not include ESG criteria in their compensation plans. This result coincides with agency theory, which states that executive compensation is used to align management's interests with shareholder's interests (Fama, 1980; Flammer et al., 2019; Maas, 2018; Ikram et al., 2019).

Table 4 presents the results of the fixed-effects models used to test hypotheses 3 and 4. In the third model, a variable indicating whether a company has a CSR committee (CSR_{COM}) in place is added. The coefficient for this indicator variable is positive and significant, which

Table 3: Regression results main models to test Hypothesis 1-2

	Dependent variable:	
	ESG_comp	Overall_score
	conditional Logistic model	*panel Linear model*
	(1)	(2)
Emission	0.211***	
ESG_{COMP}		3.763***
		(0.346)
CSR_{COM}	0.610***	
CSR_{AUDIT}	0.395***	
B_{IND}	0.014***	0.062***
		(0.009)
B_{NONEX}	0.007***	0.028*
		(0.016)
B_{SIZE}	0.021***	-0.055
		(0.071)
B_{SEP}	-0.085*	-0.489
		(0.412)
SIZE	-0.098***	1.763***
		(0.372)
LEV	0.065**	0.355
		(0.362)
ROA	-0.006	-0.033
		(0.034)
Firm-fixed effects	No	Yes
Year-fixed effects	Yes	Yes
Observations	16,114	16,114
R^2	0.108	0.041
F Statistic		72.737*** (df = 8; 13538)
Wald Test	1,655.550*** (df = 10)	
LR Test	1,834.861*** (df = 10)	
Score (Logrank) Test	1,727.107*** (df = 10)	
Note:		*p<0.1;**p<0.05;***p<0.01
		SE = Robust White standard errors

is also the case for the main independent variable (ESG_{COMP}). This means that adding this indicator variable to the model is very important as having a CSR committee in place has a significant impact on a company's ESG score. This is also reflected in the R^2 of model 3 compared to model 2, which increases by 3.9 percent to 8 percent. To determine whether having a CSR committee in place has a moderating effect, an interaction term is included in the fourth model. From the results, we can see that both the coefficients for ESG_{COMP} and

Table 4: Regression results control mechanisms to test Hypothesis 3-4

	Dependent variable:			
	$Overall_{Score}$			
	(3)	(4)	(5)	(6)
ESG_{COMP}	3.583***	4.609***	3.601***	5.435***
	(0.338)	(0.722)	(0.336)	(0.647)
CSR_{COM}	6.046***	6.298***		
	(0.406)	(0.440)		
ESG_{COMP} * CSR_{COM}		-1.216*		
		(0.727)		
CSR_{AUDIT}			5.303***	5.873***
			(0.437)	(0.461)
ESG_{COMP} * CSR_{AUDIT}				-2.373***
				(0.669)
B_{IND}	0.063***	0.063***	0.058***	0.057***
	(0.009)	(0.009)	(0.009)	(0.009)
B_{NONEX}	0.033**	0.033**	0.032**	0.032**
	(0.015)	(0.015)	(0.015)	(0.015)
B_{SIZE}	-0.083	-0.084	-0.078	-0.076
	(0.068)	(0.068)	(0.070)	(0.069)
B_{SEP}	-0.477	-0.481	-0.553	-0.541
	(0.398)	(0.399)	(0.402)	(0.402)
SIZE	1.576***	1.567***	1.696***	1.654***
	(0.358)	(0.356)	(0.355)	(0.356)
LEV	0.264	0.264	0.347	0.366
	(0.357)	(0.356)	(0.355)	(0.354)
ROA	-0.030	-0.030	-0.033	-0.033
	(0.033)	(0.033)	(0.034)	(0.034)
Firm-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	16,114	16,114	16,114	16,114
R^2	0.080	0.080	0.072	0.074
F Statistic	130.829*** (df = 9; 13537)	118.465*** (df = 10; 13536)	116.053*** (df = 9; 13537)	107.958*** (df = 10; 13536)

Note: *p<0.1;**p<0.05;***p<0.01

SE = Robust White standard errors

CSR_{COM} as well as the interaction term between the two variables are significant, which makes them interpretable. The negative coefficient on the interaction term of -1.216 is only significant at the 10 percent level, and indicates that the combined action of having ESG-related compensation and a CSR committee in place is less than the sum of the individual effects. However, at the same time, the coefficient of ESG_{COMP} increases from 3.583 to 4.609 and the coefficient of CSR_{COM} increases from 6.046 to 6.298. Together, this is a 1.314 increase of both the variables ESG_{COMP} and CSR_{COM} which outweighs the -1.216 of the interaction term. Overall, it can be stated that having a CSR committee in place slightly

moderates the relation between ESG-related compensation and a company's ESG score. The third hypothesis can therefore be accepted.

Model 5 and 6 in table 4 present the results of the fixed-effects models used to test hypothesis 4, for which the reasoning for the variable CSR_{AUDIT} is the same as for the variable CSR_{COM}. The interaction term ESG_{COMP}*CSR_{AUDIT} is negative and significant at the 1 percent level. The total increase of 2.413 of the separate coefficients ESG_{COMP} and CSR_{AUDIT} slightly outweighs the negative coefficient of the interaction term of -2.373. Similar to a CSR committee as a control mechanism, an audit on a company's CSR report slightly moderates the relation between ESG-related compensation and a company's ESG score. The fourth and last hypothesis therefore can be accepted.

Contrary to the results found by Baraibar-Diez et al. (2019), ESG-related compensation is significantly positively related to a company's overall ESG score in all models and not only in the model where an interaction term between ESG-related compensation and CSR committee is included. This difference could be the result of a broader sample period and having a sample including multiple countries instead of selecting several European countries. Overall, the results provide evidence for ESG-compensation being related to a company's ESG score. This counters the argument that ESG-compensation is merely symbolic and just a measure for managers to increase their bonuses (Ikram et al., 2019; Hong et al., 2016). In addition, evidence is provided that control mechanisms such as having CSR committees in place or having CSR reports audited, indeed moderate the relation between ESG-related compensation and a company's ESG score. This is in line with the idea that control mechanisms help to align employee's interests with organizational goals (Ouchi, 1979).

4.3 Robustness check – lagged independent variables

As ESG performance indicators are often included in compensation contracts to meet longer-term goals, the regression performed for model 4 is repeated using lagged independent variables. The regression is repeated with one to five lags, since the typical time horizon for ESG performance indicators is three- to five years (Sullivan et al., 2021). In this timeslot, companies are able to conduct trend analyses and measure progress towards longer-term objectives.

Table 5 and 6 present the results of the models with lagged independent variables as well as the interaction terms including CSR_{COM} and CSR_{AUDIT}. What can be observed is that all coefficients for the main variables, ESG_{COMP} and the interaction terms ESG_{COMP}*CSR_{COM} and ESG_{COMP}*CSR_{AUDIT} are significant until the third lag. For the fourth and fifth lag, only the interaction term is significant. The coefficients for ESG_{COMP} become smaller and the coefficients for the interaction terms become bigger the higher the lag included. In the original model (model 4), the coefficient for ESG_{COMP} is 4.609, while these are 2.870 and 3.801 for the models with a 1-year lag, including CSR_{COM} and CSR_{AUDIT} respectively. The coefficients continue to decrease the higher the lags and the interaction terms even become

Table 5: Regression results with lagged independent variables - Control CSR Committee

	Dependent variable:				
	$Overall_{Score}$				
	(1)	(2)	(3)	(4)	(5)
ESG_{COMP} t-1	2.870***				
	(0.734)				
ESG_{COMP} t-1* CSR_{COM}	-1.288*				
	(0.740)				
ESG_{COMP} t-2		2.542***			
		(0.858)			
ESG_{COMP} t-2* CSR_{COM}		-2.134**			
		(0.860)			
ESG_{COMP} t-3			2.154**		
			(0.970)		
ESG_{COMP} t-3* CSR_{COM}			-2.686***		
			(0.966)		
ESG_{COMP} t-4				1.082	
				(0.996)	
ESG_{COMP} t-4* CSR_{COM}				-2.192**	
				(1.011)	
ESG_{COMP} t-5					0.972
					(1.024)
ESG_{COMP} t-5* CSR_{COM}					-2.178**
					(1.030)
CSR_{COM}	5.817***	5.625***	5.540***	5.219***	5.124***
	(0.478)	(0.533)	(0.594)	(0.638)	(0.696)
B_{IND}	0.058***	0.050***	0.043***	0.052***	0.044***
	(0.010)	(0.010)	(0.011)	(0.012)	(0.013)
B_{NONEX}	0.029*	0.028*	0.039**	0.050***	0.058***
	(0.016)	(0.017)	(0.017)	(0.019)	(0.020)
B_{SIZE}	-0.115	-0.111	-0.144*	-0.163**	-0.179**
	(0.071)	(0.072)	(0.075)	(0.080)	(0.085)
B_{SEP}	-0.509	-0.516	-0.692	-0.276	-0.173
	(0.422)	(0.441)	(0.459)	(0.493)	(0.511)
SIZE	1.801***	1.964***	2.092***	2.033***	2.422***
	(0.388)	(0.427)	(0.460)	(0.538)	(0.637)
LEV	0.169	0.129	0.022	-0.163	-0.153
	(0.376)	(0.387)	(0.393)	(0.397)	(0.388)
ROA	0.014	0.040	0.045	0.059	0.074*
	(0.034)	(0.035)	(0.038)	(0.039)	(0.043)
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	13,564	11,405	9,619	8,124	6,811
R^2	0.058	0.049	0.048	0.049	0.051
F Statistic	70.541*** (df = 10; 11378)	49.541*** (df = 10; 9593)	40.446*** (df = 10; 8099)	35.328*** (df = 10; 6787)	30.227*** (df = 10; 5608)

Note: *p<0.1;**p<0.05;***p<0.01

SE = Robust White standard errors

insignificant. This means that the longer-term nature of achieving ESG results is not very apparent in the results. A possible explanation could be that executives want to enhance

Table 6: Regression results with lagged independent variables - Control Audited CSR Report

	Dependent variable:				
	$Overall_{Score}$				
	(1)	(2)	(3)	(4)	(5)
ESG_{COMP} t-1	3.801***				
	(0.689)				
ESG_{COMP} t-1* CSR_{AUDIT}	-2.621***				
	(0.724)				
ESG_{COMP} t-2		3.030***			
		(0.788)			
ESG_{COMP} t-2* CSR_{AUDIT}		-2.870***			
		(0.817)			
ESG_{COMP} t-3			2.214***		
			(0.831)		
ESG_{COMP} t-3* CSR_{AUDIT}			-2.883***		
			(0.856)		
ESG_{COMP} t-4				1.197	
				(0.877)	
ESG_{COMP} t-4* CSR_{AUDIT}				-2.354**	
				(0.919)	
ESG_{COMP} t-5					1.111
					(0.831)
ESG_{COMP} t-5* CSR_{AUDIT}					-2.299***
					(0.888)
CSR_{AUDIT}	5.657***	5.357***	4.807***	4.213***	3.645***
	(0.501)	(0.558)	(0.609)	(0.659)	(0.742)
B_{IND}	0.054***	0.046***	0.040***	0.051***	0.044***
	(0.010)	(0.011)	(0.011)	(0.012)	(0.014)
B_{NONEX}	0.027*	0.026	0.036**	0.047**	0.054***
	(0.016)	(0.017)	(0.018)	(0.019)	(0.020)
B_{SIZE}	-0.101	-0.095	-0.128*	-0.147*	-0.176**
	(0.072)	(0.073)	(0.077)	(0.082)	(0.088)
B_{SEP}	-0.600	-0.600	-0.746	-0.303	-0.197
	(0.424)	(0.446)	(0.466)	(0.501)	(0.521)
SIZE	1.866***	1.968***	2.117***	2.026***	2.447***
	(0.394)	(0.437)	(0.467)	(0.543)	(0.621)
LEV	0.314	0.357	0.240	-0.027	-0.051
	(0.371)	(0.379)	(0.381)	(0.384)	(0.382)
ROA	0.007	0.042	0.052	0.064	0.076*
	(0.035)	(0.036)	(0.038)	(0.040)	(0.043)
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	13,564	11,405	9,619	8,124	6,811
R^2	0.056	0.047	0.042	0.042	0.041
F Statistic	67.464*** (df = 10; 11378)	47.785*** (df = 10; 9593)	35.632*** (df = 10; 8099)	29.444*** (df = 10; 6787)	23.835*** (df = 10; 5608)

Note: *p<0.1;**p<0.05;***p<0.01

SE = Robust White standard errors

their social legitimacy directly and thus work hard to improve ESG results (Berrone & Gomez-Mejia, 2009).

5 | CONCLUSION & DISCUSSION

Incorporating ESG performance into executive compensation plans has become more popular as positive ESG results seem to drive long-term shareholder value. By tying ESG performance to executive compensation, the board can hold management accountable for progress against the company's strategy. In addition, the company can signal the importance that is placed on ESG to stakeholders. However, some argue that ESG-related compensation is just a tactic to increase management's bonuses (Ikram et al., 2019; Hong et al., 2016).

In this study, the relation between ESG-related compensation and ESG performance is analyzed, including possible moderating effects from control mechanisms in the form of CSR committees and audited CSR reports. Despite the fact that quite some research in this area exists, there is no study using a comprehensive dataset including most recent data to test this relation. Most academic research uses hand-collected data from proxy statements to determine whether a company has a policy for ESG-related compensation and test the relation between CSR-related compensation and CSP without the governance aspect. Hand-collected data is always prone to errors, which may bias the results. As data providers are working hard to provide a comprehensive and reliable set of information, more data is available now.

This paper confirms several findings from previous literature using one comprehensive set of data and a relatively broad sample. First of all, companies operating in emission-intensive industries are more likely to adopt ESG-related compensation compared to companies not operating in emission-intensive industries. This aligns with the idea that companies operating in emission-intensive industries are more prone to enhance their social legitimacy (Berrone & Gomez-Mejia, 2009; Cordeiro and Sarkis, 2008; Flammer et al., 2019; Ikram et al., 2019). A second finding is the positive relation between ESG-related compensation and ESG performance, which is enhanced when a control mechanism in the form of a CSR committee or audited CSR reports is in place. This finding coincides with the agency theory perspective of aligning management's and shareholders' interest (Fama, 1980; Fama & Jensen, 1983). A last finding that stands out, is that the longer-term nature of ESG-related compensation does not seem to be very apparent. This is a finding contradicting expectations, since ESG-performance plans often cover a time-horizon of three- to five years (Sullivan et al., 2021).

The results presented are subject to several caveats of which some could be addressed by further research. First of all, the control variables included in the regressions are limited to several board characteristics and measures for firm size & firm performance. However, many factors could influence whether to adopt ESG indicators in compensation plans or not. For example, a country's level of development, the development of equity markets, but also the cultural acceptance of hierarchical power structures could affect CEO pay (Gavett, 2015). As it is hard to include all possible determinants of ESG-related compensation, it is likely that there are omitted variables. Together with the reverse causality problem, the endogeneity issues are hard to overcome. What could be a solution

for further research is to adopt an instrumental variable approach to improve internal validity.

A second caveat is that the independent variable is a dummy variable. Although it is a good start to determine whether there actually is a difference between adopting ESG-related compensation or not, and its effect on ESG performance, it would be interesting to know the impact of the amount of compensation dedicated to ESG performance. At this point in time, no database is available providing this information in a convenient and reliable way. I encourage data providers to create this information, as this can be very useful for companies to create an effective ESG-compensation policy. Once available, researchers could determine whether a higher amount of compensation dedicated to ESG leads to better ESG performance, or whether a certain percentage of total bonuses dedicated to ESG is most effective. In addition, it would be interesting to know whether companies have hard targets set with regard to ESG results or soft targets and whether it is indeed the case that hard targets are more effective in handling the agency problem, leading to better ESG performance compared to soft targets (Maas, 2018; Ikram et al., 2019). If data providers would include this information in one comprehensive dataset, it would be easier to analyze what kind of targets are most effective, which helps companies and standard setters to determine the most effective ESG-compensation policy.

A third caveat is a possible firm size bias using the Thomson Reuter's overall ESG score. A recent study finds an positive relation between firm size and a company's overall ESG score (Drempetic et al., 2019). This would be the result of larger companies having more resources available to spend on ESG and therefore providing more information in their ESG reporting. Since rating agencies use the information provided in company's ESG reports, the scores are subject to firm size bias. A possible solution to prevent this bias from happening, is to have common standards for all companies, both smaller and larger companies for ESG reporting. Luckily, the SAASB is already busy creating these common standards, which will hopefully be adopted in the near future (SASB, 2021). The fourth and last caveat is the use of an unbalanced sample, meaning that each firm has a different number of observations due to data availability in certain years. This problem is hard to overcome when using panel data, and leads to a less reliable fixed effects model.

Overall, this study succeeds in confirming the results found in previous papers that a relation exists between ESG-related compensation and ESG performance. This finding has important implications for companies and standard setters in determining their strategies and standards regarding ESG-related compensation. In order for ESG-compensation to be effective, companies should think about what measures to use and how to evaluate performance. What are the most relevant ESG topics for the company? Which have the most impact on value creation? How can performance be reliably measured? These are the follow-up questions that could be addressed in next steps.

6 | APPENDIX

Appendix A – Variable definitions

$Overall_{Score}$	As defined by Thomson Reuters: ESG Score is an overall company score based on the self-reported information in the environmental, social and corporate governance pillars.
α_i	Firm-fixed effects[3]
δ_i	Year-fixed effects[3]
$Emission$	Dummy variable (yes = 1/no = 0) responding to the question "Does the company operate in an emission-intensive industry, as classified under SIC codes 10-14 and 40-49?"
ESG_{COMP}	Dummy variable (yes = 1/no = 0) responding to either the question "Does the company have an ESG related compensation policy?" (variable Policy ESG-Related Compensation) or "Is the senior executive's compensation linked to CSR/H&S/Sustainability targets?" (variable Sustainability Compensation Incentives)[3]
CSR_{COM}	Dummy variable (yes = 1/no = 0) responding to the question "Does the company have a CSR committee or team?" (variable CSR Sustainability Committee)[3]
CSR_{Audit}	Dummy variable (yes = 1/no = 0) responding to the question "Does the company have its CSR report Audited?" (variable CSR Audit)
B_{IND}	Percentage of independent board members as reported by the company (variable Independent Board Members)[3]
B_{NONEX}	Percentage of non-executive board members (variable Nonexecutive Board Members)[3]
B_{SIZE}	Total number of board members at the end of fiscal year (variable Board Size)[3]
B_{SEP}	Dummy variable (yes = 1/no = 0) responding to the question "Does the CEO simultaneously chair the board?" (variable CEO-Chairman Separation)[3]
$SIZE$	Firm size, calculated as the natural logarithm of 'Assets – Total'[4]
ROA	Return on assets, calculated as: 'Income before Extraordinary items' / 'Assets – Total'[4]
LEV	Debt to equity ratio calculated as: ('Debt in Current Liabilities – Total' + 'Long-term debt – Total') / 'Common/Ordinary Equity – Total'[4]

[3] Following Baraibar-Diez et al. (2019)
[4] Obtained from Compustat

Appendix B – R-code

Library's used

```
library(dplyr)
library(tidyverse)
library(stargazer)
library(knitr)
library(fs)
library(psych) #for more detailed summary stats
library(Hmisc) #needed for correlation matrix
library(flextable)
library(purrr)
library(foreign) # for panel data regression output
library(car) # for panel data regression output
library(plm) # for panel data regression
library(utils)
library(lmtest) # for robust se
library(sandwich) # for robust se
library(robustHD) # for winsorization
library(survival) # for fixed effects logit model
```

Load data

```
# Load ESG data
 ESG_data <- read_csv2("./0. ESG Data input R.csv")

# move years in 1 column
 ESG_data <- pivot_longer(ESG_data, c("2002":"2021"),
    names_to = "Year",
    values_to = "Value")

# ESG variable data
 ESG_data <- pivot_wider(ESG_data,
    names_from = "Variable",
    values_from = "Value")

# select relevant columns
 ESG_data <- subset(ESG_data, select=c(2:19))

# rename columns
 ESG_data <- ESG_data %>%
    rename(
      Company = "Company Name",
      IND = "IND. GROUP MNEM",
      CSR_Com = "CSR Sustainability Committee",
      CSR_Audit = "CSR Sustainability External Audit",
      ESG_comp_1 = "Sustainability Compensation Incentives",
      ESG_comp_2 = "Policy Executive Compensation ESG Performance",
      B_ind = "Independent Board Members",
      B_nonex = "Non-Executive Board Members",
      B_size = "Board Size",
      B_sep = "CEO-Chairman Separation",
      Overall_score = "ESG Score",
      )

# Load Compustat data
 Compustat_data <- read_csv2("./0. Compustat input R csv.csv")
```

```
# Rename columns
 Compustat_data <- Compustat_data %>%
    rename(
      C_Debt = "Debt in Current Liabilities - Total",
      NC_Debt = "Long-Term Debt - Total",
      Equity = "Common/Ordinary Equity - Total",
      ISIN_Code = "International Security Identification Number",
      Year = "Data Year - Fiscal",
      TA = "Assets - Total",
      Income = "Income Before Extraordinary Items",
      SIC = "Standard Industry Classification Code"
      )

# Create Debt-to-equity ratio (DE_ratio) & Return on Assets (ROA)
 Compustat_data <- mutate(Compustat_data, LEV = (C_Debt+NC_Debt)/Equity)
 Compustat_data <- mutate(Compustat_data, ROA = (Income/TA)*100)

# Create two-digit SIC code
 Compustat_data$SIC = substr(Compustat_data$SIC, start = 1, stop = 2)

# select relevant columns
 Compustat_data <- subset(Compustat_data, select=c(6, 8, 14, 17:19))

# Convert "Year" to character so it has the same format as in ESG_Data
 Compustat_data$Year = as.character(Compustat_data$Year)
```

Merge data

```
# Merge data
 Merge_data <- left_join(ESG_data, Compustat_data, by=c("ISIN_Code", "Year"))

# Convert binary variables "Y" and "N" to 0 and 1
 Merge_data <- Merge_data %>%
     mutate(CSR_Com = ifelse(CSR_Com == "N",0,1))
 Merge_data <- Merge_data %>%
     mutate(CSR_Audit = ifelse(CSR_Audit == "N",0,1))
 Merge_data <- Merge_data %>%
     mutate(ESG_comp_1 = ifelse(ESG_comp_1 == "N",0,1))
 Merge_data <- Merge_data %>%
     mutate(ESG_comp_2 = ifelse(ESG_comp_2 == "N",0,1))
 Merge_data <- Merge_data %>%
     mutate(B_sep = ifelse(B_sep == "N",0,1))

# create ESG compensation variable & Logged Total Assets
 Merge_data <- mutate(Merge_data, ESG_comp = if_else(ESG_comp_1==1 | ESG_comp_2==1, 1, 0))
 Merge_data <- mutate(Merge_data, Size = log(TA))

# select relevant columns
 Merge_data <- subset(Merge_data, select=c(2, 4, 6:8, 11:15, 20:24))

# make character variables 'clean' so "," is taken into account when making numeric
 Merge_data$B_ind <- gsub(",",".", Merge_data$B_ind)
 Merge_data$B_nonex <- gsub(",",".", Merge_data$B_nonex)
 Merge_data$B_size <- gsub(",",".", Merge_data$B_size)
 Merge_data$Overall_score <- gsub(",",".", Merge_data$Overall_score)
 Merge_data$ROA <- gsub(",",".", Merge_data$ROA)
# Convert numerical variables from character to numeric
 Merge_data$B_ind = as.numeric(Merge_data$B_ind)
 Merge_data$B_nonex = as.numeric(Merge_data$B_nonex)
 Merge_data$B_size = as.numeric(Merge_data$B_size)
 Merge_data$Overall_score = as.numeric(Merge_data$Overall_score)
 Merge_data$ROA = as.numeric(Merge_data$ROA)
 Merge_data$SIC = as.numeric(Merge_data$SIC)
```

```
# Change order of columns
 Merge_data <- relocate(Merge_data, IND, .after = Year)
 Merge_data <- relocate(Merge_data, SIC, .after = Year)
 Merge_data <- relocate(Merge_data, Overall_score, .after = IND)
 Merge_data <- relocate(Merge_data, ESG_comp, .after = Overall_score)
 Merge_data <- relocate(Merge_data, CSR_Com, .after = B_sep)
 Merge_data <- relocate(Merge_data, CSR_Audit, .after = CSR_Com)
 Merge_data <- relocate(Merge_data, Size, .after = CSR_Audit)
```

Clean & Winsorize data

```
# Drop NAs, only keep complete observations
 Reg_data <- drop_na(Merge_data)

# Check duplicates (Company-Year)
 duplicates <- Reg_data[duplicated(Reg_data[,1:2]),]

# Remove duplicates, keep the second observation only
 Reg_data <- Reg_data[!duplicated(Reg_data[,1:2], fromLast=T),]

 # Check whether data ia balanced
  is.pbalanced(Reg_data)


# Winsorization
 Reg_data$Overall_score <- winsorize(Reg_data$Overall_score, probs = c(0.01,0.99))
 Reg_data$B_ind <- winsorize(Reg_data$B_ind, probs = c(0.01,0.99))
 Reg_data$B_nonex <- winsorize(Reg_data$B_nonex, probs = c(0.01,0.99))
 Reg_data$B_size <- winsorize(Reg_data$B_size, probs = c(0.01,0.99))
 Reg_data$Size <- winsorize(Reg_data$Size, probs = c(0.01,0.99))
 Reg_data$LEV <- winsorize(Reg_data$LEV, probs = c(0.01,0.99))
 Reg_data$ROA <- winsorize(Reg_data$ROA, probs = c(0.01,0.99))
```

Industry classification & model – Hypothesis 1

```
# Convert binary variables to factor
 Reg_data$CSR_Com = as.logical(Reg_data$CSR_Com)
 Reg_data$CSR_Audit = as.logical(Reg_data$CSR_Audit)
 Reg_data$ESG_comp = as.logical(Reg_data$ESG_comp)
 Reg_data$B_sep = as.logical(Reg_data$B_sep)

# Convert fixed effects variables to factor
 Reg_data$Year = as.factor(Reg_data$Year)
 Reg_data$Company = as.factor(Reg_data$Company)

# Classify industries using SIC Codes
 Reg_data <- mutate(Reg_data, Industry = ifelse(SIC %in%
  1:9,"Agriculture, Forestry, Fishing", ifelse(SIC %in%
  10:14,"Mining", ifelse(SIC %in%
  15:17,"Construction", ifelse(SIC %in%
  20:39,"Manufacturing", ifelse(SIC %in%
  40:49,"Transportation & Public Utilities", ifelse(SIC %in%
  50:51,"Wholesale Trade", ifelse(SIC %in%
  52:59,"Retail Trade", ifelse(SIC %in%
  60:67,"Finance, Insurance, Real Estate", ifelse(SIC %in%
  52:59,"Services", ifelse(SIC %in%
  91:99,"Public Administration", ""))))))))))

# Change order of columns
 Reg_data <- relocate(Reg_data, Emission, .after = Industry)

# Change emission indicator variable & year to factor
 Reg_data$Emission = as.factor(Reg_data$Emission)
 Reg_data$Year = as.factor(Reg_data$Year)
```

```
# Model Industry - Logistic regression
 reg1 <- clogit(ESG_comp ~ Emission + CSR_Com + CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA + strata(Year),
          method = "approximate",
          data = Reg_data)

 # Robust standard errors
 cov1 <- vcovHC(reg1, type = "HC0")
 robust.se1 <- sqrt(diag(cov1))
```

Models Hypothesis 2-4

```
# Model 2
 reg2 <- plm(Overall_score ~ ESG_comp +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov2 <- vcovHC(reg2, type = "HC0")
  robust.se2 <- sqrt(diag(cov2))

# Model 3
 reg3 <- plm(Overall_score ~ ESG_comp + CSR_Com +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov3 <- vcovHC(reg3, type = "HC0")
  robust.se3 <- sqrt(diag(cov3))

# Model 4
 reg4 <- plm(Overall_score ~ ESG_comp + CSR_Com + ESG_comp*CSR_Com +
          B_ind + B_nonex + B_size + B_sep+ Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov4 <- vcovHC(reg4, type = "HC0")
  robust.se4 <- sqrt(diag(cov4))

# Model 5
 reg5 <- plm(Overall_score ~ ESG_comp + CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov5 <- vcovHC(reg5, type = "HC0")
  robust.se5 <- sqrt(diag(cov5))
```

```
# Model 6
 reg6 <- plm(Overall_score ~ ESG_comp + CSR_Audit + ESG_comp*CSR_Audit +
           B_ind + B_nonex + B_size + B_sep+ Size + LEV + ROA,
                data = Reg_data,
                index = c("Company", "Year"),
                model = "within",
                effect = "twoways"
           )

 # Robust standard errors
  cov6 <- vcovHC(reg6, type = "HC0")
  robust.se6 <- sqrt(diag(cov6))


# Create regression output different models
 # Part 1
  stargazer(reg1, reg2,
        se = list(robust.se1, robust.se2),
        type = "html",
        title = "Table 3: Regression results main models to test Hypothesis 1-2",
        header = F,
        no.space = T,
        order = c("Emission","ESG_comp","CSR_Com","CSR_Audit"),
        font.size = "small",
        add.lines = list(c("Firm-fixed effects", "No", "Yes"),
                  c("Year-fixed effects", "Yes", "Yes")),
        out = "Final_Regression_output_part_1.doc")

 # Part 2
  stargazer(reg3, reg4, reg5, reg6,
        se = list(robust.se3, robust.se4, robust.se5, robust.se6),
        type = "html",
        title = "Table 4: Regression results control mechanisms to test Hypothesis 3-4",
        header = F,
        no.space = T,
        order = c("ESG_comp","CSR_Com", "CSR_Audit", "ESG_compTRUE:CSR_Com","ESG_compTRUE:CSR_Audit"),
        font.size = "small",
        add.lines = list(c("Firm-fixed effects", "Yes", "Yes", "Yes", "Yes"),
                  c("Year-fixed effects", "Yes", "Yes", "Yes", "Yes", "Yes")),
        out = "Final_Regression_output_part_2.doc")

# check observations used in reg model
 obs <- Reg_data[rownames(reg1$model), ]
```

Descriptive statistics & Correlation table

```
# Create descriptive statistics table based on observations (obs) used in regression
 stargazer(as.data.frame(obs),
        type="html",
        header= F,
        title="Descriptive Statistics",
        digits = 2,
        summary.stat=c("n","mean","sd","min","max"),
        out = "Descriptive_stats_regdata.doc")

# Create function Pearson correlation
 correlation_matrix <- function(obs,
                        type = "pearson",
                        digits = 2,
                        decimal.mark = ".",
                        use = "all",
                        show_significance = T,
                        replace_diagonal = F,
```

```
                    replacement = ""){

# check arguments
 stopifnot({
  is.numeric(digits)
  digits >= 0
  use %in% c("upper")
  is.logical(replace_diagonal)
  is.logical(show_significance)
  is.character(replacement)
 })

 # we need the Hmisc package for this
 require(Hmisc)

# retain only numeric and boolean columns
 isNumericOrBoolean = vapply(obs, function(x) is.numeric(x) |
                       is.logical(x), logical(1))
 if (sum(!isNumericOrBoolean) > 0) {
  cat('Dropping non-numeric/-boolean column(s):',
      paste(names(isNumericOrBoolean)[!isNumericOrBoolean],
          collapse = ', '),
      '\n\n')
 }
 obs = obs[isNumericOrBoolean]

# transform input data frame to matrix
 x <- as.matrix(obs)

# run correlation analysis using Hmisc package
 correlation_matrix <- Hmisc::rcorr(x, type = )
 R <- correlation_matrix$r # Matrix of correlation coefficients
 p <- correlation_matrix$P # Matrix of p-value

# transform correlations to specific character format
 Rformatted = formatC(R,
                 format = 'f',
                 digits = digits,
                 decimal.mark = decimal.mark)

# if there are any negative numbers, we want to put a space before the positives to align all
 if (sum(R < 0) > 0) {
  Rformatted = ifelse(R > 0, paste0(' ', Rformatted), Rformatted)
 }

# add significance levels if desired
 if (show_significance) {

  # define notions for significance levels; spacing is important.
  stars <- ifelse(is.na(p), "   ",
              ifelse(p < .01, "***",
                  ifelse(p < .05, "** ",
                      ifelse(p < .1, "*  ", "   "))))
  Rformatted = paste0(Rformatted, stars)
 }

# build new matrix including formatted correlations significance level stars
 Rnew <- matrix(Rformatted, ncol = ncol(x))
 rownames(Rnew) <- colnames(x)
 colnames(Rnew) <- paste(colnames(x), "", sep =" ")

# replace undesired values
```

```
    if (use == 'upper') {
      Rnew[lower.tri(Rnew, diag = replace_diagonal)] <- replacement
    } else if (use == 'lower') {
      Rnew[upper.tri(Rnew, diag = replace_diagonal)] <- replacement
    } else if (replace_diagonal) {
      diag(Rnew) <- replacement
      }

    return(Rnew)
  }

# Run function and create correlation matrix
 cor_matrix <- correlation_matrix(obs, use = "upper")

# Save correlation matrix function
 save_correlation_matrix = function(df, filename, ...) {
   write.csv2(correlation_matrix(df, ...), file = filename)
 }

# Save correlation matrix
 save_correlation_matrix(df = obs,
                         filename = "Correlation_matrix_Pearson_regdata.csv",
                         digits = 2,
                         use = "upper")

# Create correlation matrix in stargazer layout
 stargazer(cor_matrix,
           header=F,
           type="html",
           title="Correlation Matrix",
           font.size = "small",
           notes = "*p<0.1;**p<0.05; ***p<0.01",
           notes.align = "r",
           out="Correlation_matrix_regdata.doc")
```

Robustness check – Lagged models including control CSR Committee

```
# Create lagged independent variables
 Reg_data <- Reg_data %>%
   group_by(Company) %>%
   dplyr::mutate(ESG_comp_l1 = dplyr::lag(ESG_comp, n = 1, default = NA)) %>%
   as.data.frame()

 Reg_data <- Reg_data %>%
   group_by(Company) %>%
   dplyr::mutate(ESG_comp_l2 = dplyr::lag(ESG_comp, n = 2, default = NA)) %>%
   as.data.frame()

 Reg_data <- Reg_data %>%
   group_by(Company) %>%
   dplyr::mutate(ESG_comp_l3 = dplyr::lag(ESG_comp, n = 3, default = NA)) %>%
   as.data.frame()

 Reg_data <- Reg_data %>%
   group_by(Company) %>%
   dplyr::mutate(ESG_comp_l4 = dplyr::lag(ESG_comp, n = 4, default = NA)) %>%
   as.data.frame()

 Reg_data <- Reg_data %>%
   group_by(Company) %>%
   dplyr::mutate(ESG_comp_l5 = dplyr::lag(ESG_comp, n = 5, default = NA)) %>%
   as.data.frame()
```

```
# Run regression with lagged variables
 reg7 <- plm(Overall_score ~ ESG_comp_l1 + CSR_Com + ESG_comp_l1*CSR_Com +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov7 <- vcovHC(reg7, type = "HC0")
  robust.se7 <- sqrt(diag(cov7))

 reg8 <- plm(Overall_score ~ ESG_comp_l2 + CSR_Com + ESG_comp_l2*CSR_Com +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
               data = Reg_data,
               index = c("Company", "Year"),
               model = "within",
               effect = "twoways"
          )

 # Robust standard errors
  cov8 <- vcovHC(reg8, type = "HC0")
  robust.se8 <- sqrt(diag(cov8))

 reg9 <- plm(Overall_score ~ ESG_comp_l3 + CSR_Com + ESG_comp_l3*CSR_Com +
         B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
              data = Reg_data,
              index = c("Company", "Year"),
              model = "within",
              effect = "twoways"
         )

 # Robust standard errors
  cov9 <- vcovHC(reg9, type = "HC0")
  robust.se9 <- sqrt(diag(cov9))

 reg10 <- plm(Overall_score ~ ESG_comp_l4 + CSR_Com + ESG_comp_l4*CSR_Com +
           B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
              data = Reg_data,
              index = c("Company", "Year"),
              model = "within",
              effect = "twoways"
         )

 # Robust standard errors
 cov10 <- vcovHC(reg10, type = "HC0")
 robust.se10 <- sqrt(diag(cov10))

 reg11 <- plm(Overall_score ~ ESG_comp_l5 + CSR_Com + ESG_comp_l5*CSR_Com +
           B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
              data = Reg_data,
              index = c("Company", "Year"),
              model = "within",
              effect = "twoways"
         )

 # Robust standard errors
 cov11 <- vcovHC(reg11, type = "HC0")
 robust.se11 <- sqrt(diag(cov11))

 stargazer(reg7, reg8, reg9, reg10, reg11,
```

```
        type = "html",
        se = list(robust.se7, robust.se8, robust.se9, robust.se10, robust.se11),
        title = "Table 5: Regression results model 4 with lagged independent variables - Control CSR Committee",
        order = c("ESG_comp_l1","ESG_comp_l2","ESG_comp_l3","ESG_comp_l4",
                "ESG_comp_l5","ESG_comp_l1TRUE:CSR_Com","ESG_comp_l2TRUE:CSR_Com",
                "ESG_comp_l3TRUE:CSR_Com","ESG_comp_l4TRUE:CSR_Com",
                "ESG_comp_l5TRUE:CSR_Com"),
        header = F,
        no.space = T,
        font.size = "small",
        column.sep.width = "0.5pt",
        out = "Robustness_1.doc",
        add.lines = list(c("Firm-fixed effects", "Yes", "Yes", "Yes", "Yes", "Yes"),
                         c("Year-fixed effects", "Yes", "Yes", "Yes", "Yes", "Yes")))
```

Robustness check – Lagged models including control CSR Audit

```
# Run regression with lagged variables
 reg12 <- plm(Overall_score ~ ESG_comp_l1 + CSR_Audit + ESG_comp_l1*CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
                data = Reg_data,
                index = c("Company", "Year"),
                model = "within",
                effect = "twoways"
          )

 # Robust standard errors
  cov12 <- vcovHC(reg12, type = "HC0")
  robust.se12 <- sqrt(diag(cov12))

 reg13 <- plm(Overall_score ~ ESG_comp_l2 + CSR_Audit + ESG_comp_l2*CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
                data = Reg_data,
                index = c("Company", "Year"),
                model = "within",
                effect = "twoways"
          )

 # Robust standard errors
  cov13 <- vcovHC(reg13, type = "HC0")
  robust.se13 <- sqrt(diag(cov13))

 reg14 <- plm(Overall_score ~ ESG_comp_l3 + CSR_Audit + ESG_comp_l3*CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
                data = Reg_data,
                index = c("Company", "Year"),
                model = "within",
                effect = "twoways"
          )

 # Robust standard errors
  cov14 <- vcovHC(reg14, type = "HC0")
  robust.se14 <- sqrt(diag(cov14))

 reg15 <- plm(Overall_score ~ ESG_comp_l4 + CSR_Audit + ESG_comp_l4*CSR_Audit +
            B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
                data = Reg_data,
                index = c("Company", "Year"),
                model = "within",
                effect = "twoways"
          )
```

```
# Robust standard errors
cov15 <- vcovHC(reg15, type = "HC0")
robust.se15 <- sqrt(diag(cov15))

reg16 <- plm(Overall_score ~ ESG_comp_l5 + CSR_Audit + ESG_comp_l5*CSR_Audit +
          B_ind + B_nonex + B_size + B_sep + Size + LEV + ROA,
             data = Reg_data,
             index = c("Company", "Year"),
             model = "within",
             effect = "twoways"
         )

# Robust standard errors
cov16 <- vcovHC(reg16, type = "HC0")
robust.se16 <- sqrt(diag(cov16))

stargazer(reg12, reg13, reg14, reg15, reg16,
        type = "html",
        se = list(robust.se12, robust.se13, robust.se14, robust.se15, robust.se16),
        title = "Table 6: Regression results model 4 with lagged independent variables - Control Audit",
        order = c("ESG_comp_l1","ESG_comp_l2","ESG_comp_l3","ESG_comp_l4",
                "ESG_comp_l5","ESG_comp_l1TRUE:CSR_Audit","ESG_comp_l2TRUE:CSR_Audit",
                "ESG_comp_l3TRUE:CSR_Audit","ESG_comp_l4TRUE:CSR_Audit",
                "ESG_comp_l5TRUE:CSR_Audit"),
        header = F,
        no.space = T,
        font.size = "small",
        column.sep.width = "0.5pt",
        out = "Robustness_2.doc",
        add.lines = list(c("Firm-fixed effects", "Yes", "Yes", "Yes", "Yes", "Yes"),
                    c("Year-fixed effects", "Yes", "Yes", "Yes", "Yes", "Yes")))
```

7 | REFERENCES

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