

# **Paychecks with a Purpose: Evaluating the Effectiveness of CEO Equity and Cash Compensation for the Triple Bottom Line**

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## **Abstract**

This study evaluates the effectiveness of the equity and cash component of CEO packages for the triple bottom line objective. By distinguishing between the equity and cash components of CEO compensation, we examine their relationship with symbolic (intentions) and substantial (outcomes) Corporate Social Responsibility (CSR). We argue that the market tends to appreciate symbolic CSR in the presence of information asymmetry and investor opacity. In contrast, substantial CSR investments may not immediately be recognized as value-enhancing. This dynamic may discourage CEOs from allocating resources to enhance especially the firm's environmental outcome performance when they depend on the market for a large part of their compensation. We discover that equity compensation does not motivate improved environmental outcomes. Conversely, equity compensation exhibits positive associations with environmental intentions, social intentions, social outcomes, and an ESG score, typically associated with initiatives characterized by short-term horizons and moderate costs. In contrast, we find a positive relationship between cash compensation and environmental outcomes, which particularly concern long-term, resource-intensive investments. This relationship becomes stronger when the influence of the market is further diminished by having a board with more non-executive board members. These findings challenge the conventional assumption that equity compensation invariably promotes CEOs' long-term perspectives, as it appears not to hold for sustainability investments.

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## I. INTRODUCTION

*“It is not about how much you pay, but how you pay”.*

(Jensen & Murphy, 1990)

Firms play an important role in shaping environmental and social outcomes through their operations, resource use,<sup>1</sup> and emissions (Causes of Climate Change – European Commission, n.d.). As economic actors with significant environmental footprints, they are increasingly seen as key contributors to, but also potential mitigators of, global sustainability challenges.<sup>2</sup> Corporate social responsibility (CSR) has gained prominence as a framework for encouraging firms to take into account not only their financial performance, but also their social and environmental impact. The triple bottom line principle captures this broader orientation by highlighting the importance of balancing ‘profit’ with considerations for ‘people’ and the ‘planet’ (Elkington, 1998). This approach encourages firms to adopt a stakeholder perspective and align long-term business success with sustainable development goals.

Although this broader stakeholder view is becoming more widely accepted, a major unanswered question is how corporations can be motivated and incentivized to adopt this broader view. By having to focus not only on profit but also on people and the planet, the principal-agent problem of multifaceted optimization arises (Holmstrom & Milgrom, 1991), where, especially when objectives differ in tangibility, one would focus on the more tangible, usually financial, objectives and disregard the less tangible ones. Extant literature predominantly focuses on the role of shareholders and how they encourage firms to pursue a triple bottom line objective (e.g., Edmans, 2011; Flammer, 2013; Krüger et al., 2020) or the board (e.g., Dodd et al., 2022; Harjoto & Wang, 2020). Yet, there is insufficient research on incentivizing CEOs through their compensation to achieve this broader perspective.

While designing executive compensation packages is becoming increasingly challenging, the significance of compensation remains paramount. Edmans et al. (2022a) find that 34% of directors and 51% of investors consider the design of a motivating incentive structure as the primary objective of CEO compensation. Traditional executive compensation literature predominantly focuses on the minimization of agency problems and alignment of

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<sup>1</sup> Nearly two-thirds of all water consumption going into producing ingredients for corporate supply chains (*Corporate Water Use*, n.d.).

<sup>2</sup> 80% of the world’s greenhouse gas emissions since 2016 are produced by only 57 companies. Note that this percentage included first, second and third scope emissions (Watts & editor, 2024). 20 companies are responsible for producing over 50% of single-use plastic (Gardner & Rylander, 2021).

interests concerning financial performance. Recently, it has become popular to include CSR targets in CEOs' compensation. Yet, this implementation does not have the desired effect on sustainability performance (Bebchuk & Tallarita, 2022; Fabrizi et al., 2014; Maas, 2018). Hence, there is a need to examine different ways in which firms can structure compensation packages to incentivize not only for profit but also for social and environmental aspects.

In this paper, we address the relevance of CEO compensation in the context of recent corporate sustainability developments. In a sample of 1,481 US-listed firms over the period 2006-2020 (10,398 firm-year observations), we investigate how the main compensation elements, cash (salary and bonus), and equity (stock and options), relate to sustainability strategy. Using 333 separate social and environmental metrics at the firm-year level from Refinitiv, we create four CSR scores (*Environmental* and *Social Outcomes*, which relate to substantial actions (Donia et al., 2019); and *Environmental* and *Social Intentions* which are more symbolic (Donia et al., 2019)) using Wittkowski et al.'s (2004) multi-criteria rank ordering algorithm.<sup>3</sup> The algorithm ranks each firm-year relative to others based on a weak dominance principle, assigning a higher rank when a firm performs at least as well on all dimensions and better on at least one. The *Outcome* variables include measurable output performances while the *Intention* variables include binary information on policies and targets.

Given that the market sometimes fails to fully appreciate sustainability performance due to information asymmetry and opacity (Edmans, 2011; Harjoto et al., 2017; Lopatta et al., 2022; Walker, 2022; Wang et al., 2008), we question the long-term effectiveness of equity compensation opposed to the short-term orientation of cash compensation in relation to sustainability performance. We find that equity compensation relates positively to *Environmental Intentions*, *Social Intentions*, and *Social Outcomes*, strategies that are typically associated with short-term horizons and moderate costs. Equity compensation also positively relates to the overall *ESG Score* but is not related to *Environmental Outcomes*. By further disentangling the equity proportion of compensation in stock and option grants, we find that offsetting effects drive this non-result. The more risk-discouraging stock grants are negatively related to *Environmental Outcomes*, while option grants relate positively. The proportion of cash compensation also relates positively to *Environmental Outcomes*, which particularly concern long-term, resource-intensive sustainability investments. An industry-specific analysis

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<sup>3</sup>The 333 metrics are either attributed to social or environmental intentions, which include reporting, monitoring, targets and activity metrics, whereas social and environmental outcomes include performance and controversy metrics. The appendix provides an example of the breakdown of the environmental intentions and outcomes, and social intentions and outcomes variables.

shows that this relationship is driven by manufacturing-oriented industries, rather than service-oriented industries.

To interpret these findings, we argue that when the influence of the market is reduced through lower equity-based compensation, the role of internal governance becomes more pronounced. In such situations, CEOs may be more inclined to pursue long-term, resource-intensive CSR strategies that emphasize *Environmental Outcomes*. To test this mechanism, we interact compensation structures with the proportion of non-executive board members, who represent internal oversight not directly affected by market pressures. Our results support the hypothesis that *Environmental Outcomes* improve further when internal board influence is high and equity-based incentives are low. In contrast, when equity compensation is the primary incentive, the influence of the board does not appear to affect outcomes, suggesting that the CEO's market-oriented incentives dominate. The mechanism is robust to using an alternative measure of internal governance based on gender diversity. Our findings challenge the conventional view that equity compensation promotes a long-term perspective among CEOs. Additional robustness checks confirm that the relationship between compensation and CSR holds over multiple years, is not driven by newly appointed CEOs, and is not explained by the inclusion of CSR metrics in compensation packages. Finally, we find that stated CSR intentions do not reliably predict future CSR outcomes.

Our study contributes to several strands of literature. First, it expands the CEO compensation literature (e.g. Baker et al., 1988; Bebchuk and Fried, 2003; Edmans et al., 2022a; Frey and Jegen, 2001; Holmstrom and Milgrom, 1991) by broadening the objective of CEO incentives beyond financial performance to include environmental and social considerations, as captured by the triple bottom line. CEO compensation is a key mechanism for aligning managerial behavior with firm goals, traditionally designed to promote financial value creation and reduce agency problems. Holmstrom and Milgrom (1991) argue that multidimensional tasks are common in corporate settings and that it is difficult to design incentive structures that address all objectives simultaneously. Incentivizing one dimension may unintentionally discourage effort on others. We apply this perspective to the triple bottom line and show that different compensation components influence sustainability dimensions in distinct ways. While equity compensation is often viewed as encouraging long-term thinking, our findings suggest that it does not necessarily support environmental or social outcomes. In contrast, cash compensation, typically associated with short-term focus, shows positively related to certain sustainability achievements. Our results contribute to this line of thinking by indicating that

compensation forms may not only be ineffective for sustainability goals but might also reflect preferences misaligned with broader stakeholder interests.

Second, we contribute to the CSR literature by moving beyond the common practice of relying on a single, aggregated sustainability score by decomposing sustainability into its key components, thereby enabling a more nuanced examination of how different types of CEO compensation relate to the distinct dimensions of the triple bottom line. Based on Donia et al. (2019), Dyck et al. (2024), and Bolton and Kacperczyk (2023), we distinguish between substantial sustainability, reflecting genuine commitment, and symbolic actions aimed at enhancing legitimacy. This disaggregated approach addresses concerns about the ambiguity and inconsistency of existing ESG ratings, as raised by Berg et al. (2022) and Billio et al. (2021), and contributes to a more precise framework for capturing firms' strategic orientations toward sustainability. While Karim et al. (2018) link compensation to overall sustainability scores and find that social performance is negatively associated with cash-based compensation and positively associated with equity-based compensation, we extend their approach by constructing separate environmental and social performance indicators. We further distinguish between substantial and symbolic CSR to account for variation in the authenticity and impact of sustainability efforts, and we refine compensation measures by separating equity-based pay into stock and option grants, allowing for a more detailed analysis of how incentive structures shape corporate sustainability behavior.

The remainder of the paper is organized as follows. Section 2 reviews prior literature and develops our hypotheses. Section 3 details the sample and research methodology. Section 4 presents the empirical results, and section 5 discusses and concludes.

## II. LITERATURE & HYPOTHESES

In this section, we discuss CSR and its role in financial markets. Since literature shows that investors do not consider every type of sustainability investment as value-enhancing, we discuss how investor valuations of CSR can influence a firm's sustainability strategy through a CEO's compensation package. Linking a large proportion of compensation to the stock price through equity compensation is still the prevailing approach and could discourage a CEO from pursuing substantial and riskier sustainability investments. Cash compensation does not suffer from these potential opportunity costs.

### *Corporate Social Responsibility*

Friedman's (1970) separation theorem states that a company's sole responsibility is to maximize profits and that investors are free to do with those profits as they see fit. Hart and Zingales (2017) argue that this view does not hold in a world where investors internalize externalities and the costs of reducing such externalities are lower for companies than for investors. For example, it is cheaper to reduce plastic waste than to clean it up afterward; or, it is easier to abort the arms supply to Russia than to care for injured Ukrainian soldiers.

When it comes to a firm's overall CSR performance, it is hard to measure the costs of externalities, and who is willing to pay for them. From an academic perspective, the relationship between financial performance or firm value and various sustainability aspects is relevant (e.g., Albuquerque et al., 2019; Awaysheh et al., 2020; Barnett & Salomon, 2012; Freiberg et al., 2020; Lopatta et al., 2022; Pástor et al., 2021; Wang et al., 2008). This research explores who bears the cost of externalities and how investors choose companies to invest in (Edmans et al., 2022b; Krüger et al., 2020). The relationship is likely conditional, as there are multiple factors influencing the effect of CSR on a firm's financial performance (Ahn et al., 2024; Becker-Olsen et al., 2006; Lins et al., 2017; Pástor et al., 2021). Furthermore, the preference between profit or welfare maximization is likely a balanced consideration.

Investors have a strong influence on a company's strategy as they decide on its market value. However, how they value CSR has shown to be inconsistent. Krüger et al. (2020) argue that investors value positive CSR news after a history of poor CSR performance. Flammer (2013) finds that a strong CSR strategy has an insurance-like effect where it mitigates shareholders' negative reaction to the announcement of eco-harmful events. Over time, the market response to positive events has weakened, while the reaction to negative events has intensified. This asymmetry suggests that the negative effects increasingly outweigh the positive, reflecting diminishing marginal returns. Investors may be less impressed by repeated or expected positive signals, while continuing to penalize firms strongly for adverse developments. This insurance-like feature became visible in the 2008-2009 crisis when firms with high social capital outperformed those with low social capital (Lins et al., 2017). Similarly, Fu et al. (2019) show that CSR activities are driven by institutional investors with long investment horizons, and that this is due to the reputation insurance that CSR spending provides.

An investor's time horizon has, next to past performance, an effect on the valuation of sustainability. Kim et al. (2019) find that firms with long-term institutional investors engage in more CSR activities than firms with short-term investors. This suggests that investors who are

more focused on the firm's long-term profitability are more likely to invest in sustainable firms. Drobetz et al. (2023) add to this that institutional investor ownership is negatively related to corporate environmental costs. Li et al. (2025) find firms in China with a higher level of ownership by foreign institutional investors are associated with a more positive relation between CSR performance and firm value. Although investors care about investing sustainably, Heeb et al. (2023) find, in their experiment, an unwillingness to pay more for more impact. Given this result, they see a prosocial investor as a "warm glow" optimizer. I.e., it is more important for investors to invest sustainably, than what the actual impact of that investments is. Besides being unwilling to pay more, Hartzmark and Shue (2022) find that sustainable investing is often directed to those firms that are already performing well which reduces the potential sustainable impact this capital has.

While these studies highlight that shareholders value some level of corporate sustainability, there are different ways and levels of being sustainable. People are motivated to do the right thing more often than not. But this highly depends on the cost they have to bear. Hart et al. (2022) investigate how survey participants in various settings act on the possibility of sanctioning Russia for the war. Results show that 30% of the participants consider it only the government's responsibility to impose sanctions. Although the willingness to punish and thereby do good is high among participants, it depends strongly on their personal costs (Hart et al., 2022). In the case of abnormal CSR (Lopatta et al., 2022), the marginal costs for doing good might be too high, unlike normal CSR, where the marginal costs are acceptable for the additional effect on CSR. Similarly, Harjoto et al. (2017) find that institutional investors do not consider CSR a strictly value-enhancing activity. The level of institutional ownership is a concave function of CSR. The costs and benefits of being sustainable appear to be relative to previous performance (Flammer, 2013; Harjoto et al., 2017; Krüger, 2015; Krüger et al., 2020; Lins et al., 2017; Lopatta et al., 2022).

A firm must, in its internal decision-making, take investor preferences into account, since they greatly affect the company's strategy and value. Nonetheless, it is evident from the aforementioned literature that there is a lack of consensus when it comes to determining the value and objectives of CSR. Gostlow (2021) and Krüger et al. (2020) show that there is mispricing in the market as climate risk is not priced completely. Edmans (2011) finds that it can take up to four years for different forms of intangible assets to be correctly priced by the market. This potentially demotivates companies to initiate large investments in sustainable

improvements, especially when a large part of the compensation of decision-makers is linked to the stock price.

Sustainability has become a central concern for modern businesses, prompting a shift from a purely profit-oriented focus toward broader environmental and social responsibilities. While investors increasingly recognize the value of sustainability strategies, the relationship between sustainability and firm value is not always direct or predictable. Some investments in sustainability may not lead to immediate financial gains, making the role of internal decision-making particularly important. In this context, compensation emerges as a key mechanism through which sustainability goals can be promoted. If the board is committed to improving a firm's social and environmental performance, adjusting the compensation structure provides a powerful tool to steer executive decision-making toward those goals. Understanding how these internal and external forces shape sustainability strategies is essential for building a strong triple bottom line.

### *Compensation*

Besides tying manager compensation to firm financial performance, supporters of stakeholder theory suggest tying it to environmental, social, and governance goals. This should encourage managers to enhance stakeholder well-being; however, recent literature contradicts this notion. Bebchuk and Tallarita (2022) identify two structural problems with the inclusion of ESG metrics in compensation structures. First, ESG metrics often cover limited welfare dimensions for a restricted subset of stakeholders. This creates a multitasking problem, which entails that by identifying a measurable goal and incentivizing that goal, one diverts attention and effort from other tasks. In other words, managers will be disincentivized to focus on hard-to-measure tasks. Second, by linking CEO pay to ESG metrics, one overlooks the agency problem within executive compensation, as ESG metrics used for compensation packages are very difficult to assess. Hence, the inclusion of ESG metrics in CEO compensation likely serves the interests of executives, not of stakeholders.

ESG metrics (or targets) applied in CEO compensation structures prove to be ineffective (Derchi et al., 2021; Fabrizi et al., 2014; Maas, 2018). In most cases, the inclusion of corporate social performance targets in executive compensation does not lead to better CSR performance. Maas (2018) finds that only hard quantitative targets potentially mitigate corporate social performance weaknesses to some extent. Fabrizi et al. (2014) find that monetary incentives designed to align a CEO's interests with the shareholders interests hurt CSR. Walker (2022)

explains this, by challenging the economic significance of ESG-based pay, stating that the 4.2% found by Flammer et al. (2019) overstates the economic significance under a standard economic approach. This is mostly due to the difference between looking at the “flow” incentives which include only the amount of compensation that was given within a year, and taking into account the entire raft of share-based incentives which also include stock and option grants from previous years. The latter may not count as compensation as such for a particular year, but would still affect the incentive structure for a CEO (Walker, 2022). Findings by Derchi et al. (2021) are a bit more positive as they show that from the third year onwards, there is some improvement in CSR performance as a firm gains experience. Ikram et al. (2023) also find a positive relationship between both objective and subjective CSR contracting and the CSR rating. However, it is unclear what exactly the sustainability rating measures of both articles, and the CSR contracting variable is likely included in the rating.

The original intent of tying a portion of an executive's compensation to firm performance is to reduce the agency problem. Baker et al. (1988) show that financial incentives are substantial drivers of corporate decision-making. Diverse compensation structures stem from various incentive theories, where specific priorities necessitate corresponding strategies and incentive structures. Numerous studies have already investigated the effectiveness of executive compensation packages (e.g. Bebchuk and Fried, 2006; Cheng and Farber, 2008; Cheng, 2004; Frey and Jegen, 2001; Gopalan et al., 2014; Prendergast, 1999). Edmans et al. (2022a) find that 34% of directors and 51% of investors state that the priority of a compensation structure is to motivate the CEO. In the same survey, 42% of directors report that ‘the CEO is less motivated’ when CEO pay is reduced. This finding demonstrates the importance of CEO pay as a motivator.

The agency problem which arises when ESG metrics and targets are tied to CEO compensation (Bebchuk & Fried, 2003) is partly due to the economics of multitasking (Holmstrom & Milgrom, 1991) and partly due to the disclosure of these metrics (Bebchuk & Tallarita, 2022). The job of a CEO is complex, and specific tasks differ in their tangibility. Tangible activities likely get more attention because of better measurement availability. Thus, non-financial performance criteria may go unnoticed. CSR performance, and especially substantial performance, falls mostly in the latter category. To structure a proper compensation package that encompasses sustainability is challenging. Furthermore, Bebchuk and Tallarita (2022) find that most of the companies that disclose the use of ESG performance goals do not specify what those goals are or else use vague and underspecified concepts. The aspects and

facets of the interest of stakeholders are manifold. Stakeholders, unlike shareholders whose common interest in the company is captured largely by a single metric, can be affected by corporate decisions in many different ways and along multiple dimensions (Bebchuk & Tallarita, 2022). In their study, Martin et al. (2020) find that equity incentives, intended to align CEO interests with shareholders, may inadvertently encourage behavior detrimental to employee well-being. For all those different stakeholder interests, ESG metrics and targets commonly used, are inevitably limited and narrow (Edmans, 2021).

Walker (2022) states that “compensation would be tied to E&S performance because the board and/or executives believe that insufficient attention would otherwise be paid to these matters. They either conflict with shareholder value maximization or the equity markets may not immediately recognize the value proposition and fail to reward such efforts through an increase in share price” (Walker, 2022, p. 13). The first part of this argument, which proposes that E&S investments would conflict with shareholder value maximization, is difficult to prove as uncertainty exists about which time horizons to consider. However, according to Edmans et al. (2022a), directors believe that shareholder directives regarding executive compensation hurt shareholder value. Directors and investors share the same objectives, i.e., shareholder value, but view the world differently. The second part of the argument, which claims that equity markets might not immediately recognize the value of E&S investments is supported by Edmans (2011).

When the market does not value intangibles, stock price-linked compensation may be ineffective for these assets. Equity compensation can create an opportunity cost for CEOs when they are focusing their efforts and investments on these intangibles or secondary tasks (Walker, 2022). This argument aligns with the notion that directors and investors see the world differently and therefore value strategies in different ways (Edmans et al., 2022a). Thus, Walker (2022) proposes to either significantly increase the incentives linked to E&S, or simply reduce incentives linked to primary tasks, i.e., equity compensation, thereby reducing the opportunity cost of the CEO to advance in secondary tasks. This argument may be counterintuitive, as equity compensation is commonly known to incentivize against myopic behavior and to favor a long-term perspective. However, consistent with Lopatta et al. (2022), excessive CSR investments harm short-term financial performance. Because of the inability of investors to accurately assess the effect of long-term sustainability initiatives (Edmans, 2011; Harjoto et al., 2017; Wang et al., 2008), the market would likely penalize the company. CEOs require a different

compensation package to address stakeholder needs effectively, enabling them to adopt a sufficiently long-term perspective while remaining unaffected by short-term investors' biases.

Even if the argument is that it is not mispricing but rather that the investments are simply heavily discounted, CEOs still need to be adequately compensated for the risks they are taking. Although the literature on incentives to improve CSR performance is rather young and limited, comparisons can be drawn with the research and development (R&D) literature. Indeed, what are CSR improvements, but innovation brought forward by research and development, with a specific focus? O'Connor et al. (2013) show the same agency problems caused by information asymmetry between shareholders and executives. In their study, they find that equity compensation is associated with lower levels of firm R&D expenditures. In their findings, it is also cash compensation which reduces the sensitivity of R&D expenditures to financial market frictions. We expect a similar relationship between equity, cash compensation, and CSR performances.

### *Hypotheses Development*

Most CEO compensation packages consist mainly of a cash and an equity component. Equity compensation's emphasis on long-term perspectives primarily centers around profit, often overlooking both social and environmental concerns. The cash part of the compensation is determined within the firm, whereas the market determines the value of the equity part. Although the firm decides how many stocks and stock options are granted, the market eventually determines their value. Because of these different ways in which the final value of compensation is determined, CEOs can be differently motivated by each component of their compensation package. As the market does not see sustainability investments as purely value-enhancing, a CEO can be punished through his or her compensation package when choosing certain sustainable investments. CEOs seek fair pay but also consider the opportunity costs of their strategy concerning their compensation. Following this line of thought, our first hypothesis is as follows:

***H1: A higher proportion of cash compensation in the CEO compensation package positively relates to environmental outcomes.***

We anticipate that in the context of substantial sustainability investments, such as those related to environmental outcomes, the presence of information asymmetry and investors'

challenges in accurately assessing the long-term impact of these investments, leading to opportunity costs for CEOs, outweighs the conventional belief. However, in the case of smaller investments with a shorter pay-off period, the positive effect may continue to apply. Hence, for symbolic sustainability investments like environmental and social intentions, we expect a positive effect from profit-sharing compensation through equity. As investments for social outcomes are, on average, smaller and more tangible, we expect that equity compensation will be the relevant incentive. Therefore, our second hypothesis is as follows.

*H2: A higher proportion of equity compensation in the CEO compensation package positively relates to environmental intentions, social intentions, and social outcomes.*

While Karim et al. (2018) treat equity compensation as a unified factor, prior research has indicated that stocks and stock options can influence the risk-taking behavior of recipients differently.<sup>4</sup> The direct correlation between CEO wealth and firm value for stock holdings introduces potential downside risks that could deter risk-taking. Stock option compensation does not result in a real and immediate wealth reduction if the stock price drops (Wu & Tu, 2007). Stock options can motivate CEOs to take on more risk by amplifying their compensation's convexity, referred to as Vega, a phenomenon demonstrated by Coles et al. (2006) and Guay (1999). Vega incentives measure the dollar change in option holdings for a 1% shift in stock price volatility, while Delta incentives establish a direct link between firm value and CEO wealth, aligning CEO interests with company shareholders. However, due to limited portfolio diversification, this alignment may decrease the CEO's willingness to undertake risky investments, as observed by Coles et al. (2006). Research in the R&D domain explores the impact of Vega and Delta incentives on investments. O'Connor et al. (2013) find that a higher Delta in the executive's compensation package corresponds to reduced R&D spending, although no significant effect is found for Vega incentives.

Considering the distinct impacts of Vega and Delta incentives on risk-taking, as highlighted by, e.g., Armstrong and Vashishta (2012), Dong et al. (2010), Chava and Purnanandam (2010), Coles et al. (2006), and Guay (1999), we anticipate that the expected negative relationship between equity compensation and environmental outcomes primarily arises from the proportion of stock grants. In Hypothesis 1, we propose that a low proportion

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<sup>4</sup> The theoretical literature does not agree on whether stock options can motivate risk taking and shows that it depends on the characteristics of the options. See e.g. Ross (2004)

of cash, and thereby a high proportion of equity compensation leads to a negative effect on environmental outcomes, due to the opportunity costs associated with information asymmetry. However, since stock options enhance the convexity of a CEO's compensation and their willingness to embrace risk, we hypothesize that a higher proportion of stock options will indeed enhance environmental outcomes. This expectation is grounded in the observation that investments aimed at improving environmental performance typically involve larger-scale projects with extended payback periods and higher levels of uncertainty. Therefore, our third hypothesis is as follows.

**H3:** *A higher proportion of stock option grants in a CEO's compensation package positively relates to environmental outcomes.*

Furthermore, we hypothesize that the equity heavy compensation structure has the same relation to the Refinitiv ESG score. As investors often use ESG ratings to judge the firm's sustainability performance during our sample period, we expect a high level of equity compensation to positively affect the Refinitiv ESG score. In particular, we expect CEOs to primarily use the ESG intentions channel to improve the firm's ESG rating. Therefore, our fourth hypothesis is as follows.

**H4:** *A higher proportion of equity compensation in a CEO's compensation package positively relates to the Refinitiv ESG score.*

The rationale behind the first hypothesis is that when the impact of the market and, consequently, the stock price is diminished, and the influence of internal agents within the firm is more significant, CEOs are inclined to opt for a CSR strategy emphasizing environmental outcomes. In line with this rationale, we expect this relationship to become stronger when the influence of the market is further diminished. The board of directors is, next to the CEO, an important segment of the organization. The composition of the board is known to influence all types of firm strategies (e.g., (Dodd et al., 2022; Harjoto et al., 2015; Harjoto & Wang, 2020). One element of influence is the share of non-executive board members.<sup>5</sup> An example is the increase in voluntary disclosure (Chen & Jaggi, 2000; Donnelly & Mulcahy, 2008) in firms

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<sup>5</sup> Another would be gender diversity (Harjoto et al. 2015), for which we test in an additional robustness analysis. We find consistent results between non executive board members and gender diversity,

with a larger percentage of non-executives on the board. Although non-executive board members are not necessarily just better informed, they are known to take a broader stakeholder view relative to executive board members. This is also why the amount of non-executive board members on a board has increased as the topic of CSR became more relevant (Ibrahim & Angelidis, 1995).

Because of these reasons, we expect that the percentage of non-executives on the board is a good indicator of the focus on both financial and sustainability performance and thereby the influence of the market within a firm. In firms that not only have a high proportion of cash compensation but also a large percentage of non-executive board members, we would expect a stronger positive relationship with environmental outcomes. However, in the case of a high level of equity, the relationship should not hold, as the incentives of the compensation package of the CEO could outweigh the guidance of the board. To examine this rationale, we explore whether the relationship we predict in Hypothesis 1 intensifies when we reduce the impact of the market and stock price through interaction with the level of non-executive board members. Therefore, our fifth hypothesis is as follows.

***H5a:** The positive relationship between the proportion of cash compensation and environmental outcomes is stronger for firms with a high proportion of non-executive board members.*

***H5b:** The negative relationship between the proportion of equity compensation and environmental outcomes is not influenced by the proportion of non-executive board members.*

These hypotheses guide our empirical investigation into the links between CEO pay design and firm sustainability behavior. The following chapter outlines the data sources, variable construction, and empirical methodology used to test these relationships.

### III. DATA & METHODOLOGY

This section presents our data, details the construction of sub-scores for our CSR variables, and presents summary statistics on various firm, board, and CEO characteristics.

#### *Data description*

Our analysis focuses on US-listed firms. To examine the relationship between CEO compensation and CSR, we merge several databases. We obtain data on environmental and social variables from Refinitiv ESG from 2006 to 2020. Refinitiv ESG data include 136 environmental and 197 social variables. Variables for environmental performance include '*policy for water efficiency*', '*whether the company has an environmental management team*', and '*CO2 emissions*'. Social performance variables include '*health & safety policy*', '*the salary gap between the CEO's compensation and that of the average of the firm*', and '*the percentage of female employees*'. We also collect several governance variables from Refinitiv to control for different board structures that potentially influence the relationship we examine. One of these variables identifies whether a CEO's compensation package includes ESG targets. Besides individual variables, Refinitiv ESG also provides standardized ESG scores and sub-scores.

We merge Refinitiv ESG data with ExecuComp. We determine the compensation package structure using several compensation variables from ExecuComp. We calculate total compensation as the sum of salary, bonus, total value of restricted stock and stock options, long-term non-equity incentive pay-outs, and all other compensation. Next, we calculate cash- and equity-based compensation following Karim et al. (2018) and Rekker et al. (2014). Cash compensation is the sum of salary and bonus. Equity compensation is the sum of restricted stocks and stock options granted during the fiscal year. Using the dollar amounts of cash and equity compensation, we calculate the proportions of cash- and equity-based compensation over total compensation as in Karim et al. (2018). We also introduce a dummy variable (*SustComp*) that indicates whether the CEO's compensation package contains any form of CSR-based compensation.

Finally, we obtain data on other company characteristics from CRSP and Compustat. Appendix Table 1A provides variable definitions. After excluding firms for which either

compensation or ESG data are missing, the final sample contains 1,481 unique firms representing 10,398 firm-year observations.

### *Constructing Environmental and Social Sub-scores*

From the raw Refinitiv ESG variables, we create sub-scores for *Environmental Outcomes* and *Intentions*, and *Social Outcomes* and *Intentions*. In some cases, we take the negative value of the variables to ensure that a higher value implies a positive sustainability effect. We group these variables into six categories: policy, reporting, target, activity, performance, and controversy following Bams and Van der Kroft (2022). We define *Environmental Outcomes* variables as environmental variables that belong to the categories *performance* or *controversy* and *Environmental Intentions* variables as environmental variables that belong to the categories *activity*, *policy*, *reporting*, or *target*. The *Social Outcomes* and *Social Intentions* variables are defined analogously. We separate the binary variables included in the *Intentions* variables from the measurable performance (*Outcomes*) variables following Bolton and Kacperczyk (2023), as they identify these as potentially ‘mostly empty promises’, and Dyck et al. (2024b). We construct our sustainability variables for each firm in our sample on an annual basis. Appendix Table 2A provides examples of the different categories.

To compute scores for the four sub-dimensions, we apply Wittkowski's (2004) multi-criteria rank-ordering algorithm. This algorithm ranks each firm's annual output values relative to all other firm's output values in that year. Comparison hence occurs over firms and years. The algorithm follows a weak dominance principle, i.e., a firm-year is strictly higher in ranking if it scores at least as good as another firm-year on all aspects and is strictly better on at least one aspect. A firm-year is strictly lower in ranking if it scores at least strictly worse on one aspect than another and is never strictly better. In all other cases, two firm-years are neither superior nor inferior to each other. The algorithm accounts for missing observations. In such a case, comparing two firm-years follows from all remaining available variables.<sup>6</sup>

The final rank of a firm-year follows from the sum of strict higher rankings minus the sum of strict lower rankings. Wittkowski et al. (2004) show that the resulting ranking asymptotically converges to a normal distribution, when the number of firm-years get large,

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<sup>6</sup>This is one of the aspects of this algorithm that makes this method preferable to others. Especially when using E/S data, there are a considerable number of missing observations. Furthermore, this method does not assume or require any weights being attributed to variables. The only weights that are added by design through the algorithm is based in data availability. Variables for which more data points are available will have a slightly stronger weight which is desirable as this variable is more likely to represent the underlying performance of the companies.

allowing the ranking to be interpreted as a score. We standardize the rankings on a 0 to 10 scale, where 0 means the firm scores poorly on a particular aspect, and 10 means it scores excellent.

Using this algorithm, we compute scores for *Environmental Outcomes*, *Environmental Intentions*, *Social Outcomes*, and *Social Intentions*. This type of distinction is important as each of them requires a different level of firm investment, has a different investment horizon, and has a different sustainability impact. For example, *Environmental Intentions* are relatively cheap to achieve within a short timeframe. Their resulting environmental impact is limited. *Environmental Outcomes* are costly and have long investment horizons. The subsequent environmental impact can be high.

As a fifth CSR variable, we add the Refinitiv *ESG score*. The information the market uses most is standardized ESG scores provided by companies such as MSCI, FTSE, S&P, Sustainalytics, and Moody's. Although ESG ratings from these different agencies differ, with correlations ranging from 0.38 to 0.71 (Berg et al., 2022), they have been widely used to make investment decisions. The rating we use may not align with the anticipated or actual corporate sustainability effort. However, it is a proxy for the market's perception, especially during our sample period, and therefore we include it in our analyses as a reference point.

#### *Descriptive statistics*

Following Maas (2018), Karim et al. (2018) and Fabrizi et al. (2014), our control variables include firm size (*Size*) as the log market value of equity, profitability using return on equity (*ROE*) and return on assets (*ROA*), and growth potential as the book-to-market ratio (*BM*). These variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile. With regard to CEO characteristics, we include *Age* and *Gender* as per Karim et al. (2018) and Fabrizi et al. (2014). We control for board structure using *Board size*, board independence (percentage of non-executive board members, *Non exec*), and CEO power (*CEO duality*) also following Karim et al. (2018). Last, we control for total compensation (*Total comp*). To be able to better interpret the coefficients, we scale the variable using the z score.

Table 1 provides summary statistics for the CSR, compensation, and control variables. All CSR variables range between 0 and 10. Both the constructed CSR variables and the ESG score show significant dispersion, which suggests sufficient cross-sectional variation in CSR activities at the firm level. On average, 24% of compensation packages are paid out in cash (bonus and salary), while 50% are paid out in equity (stocks and options). This deviation between equity and cash compensation is stable over industries and time. Further, 22% of our

firms include sustainability criteria in the CEOs' compensation packages. The companies in the sample are, on average, larger than the average firm in the market. This is due to the selection effect of reporting/being reported on by Refinitiv. The board characteristics of our sample are representative for the average size firm in the sample. The average CEO age is 57, and 96% of the CEOs are male.

Table 2 shows the correlations between the main variables. Notable is the negative correlation between the aggregate Refinitiv *ESG rating* and the constructed *Environmental Outcomes* score. The correlations between Refinitiv's *ESG Score* and *Environmental Intentions*, *Social Intentions*, and *Social Outcomes* are positive and significant. This suggests that the aggregate Refinitiv ESG rating mostly captures easy-to-implement low-cost initiatives. ESG ratings provide noisy assessments of a firm's sustainability performance at best (Berg et al., 2022). However, in our analyses, we exclude governance variables which could explain at least part of the divergence between the aggregate ESG score, and our environmental and social scores. Table 2 also shows a positive correlation between the proportion of cash and *Environmental Outcomes*, while the proportion of equity is negatively correlated. This correlation reverses in the case of *Environmental Intentions*, *Social Intentions*, *Social Outcomes*, and the Refinitiv *ESG* score. Last, there is a strong negative correlation between firm size and *Environmental Outcomes* and positive correlations with all other CSR scores, suggesting that larger firms perform worse than smaller firms on *Environmental Outcomes*.

## IV. RESULTS

In this section, we first document that the inclusion of CSR metrics and targets in compensation packages does not enhance every aspect of sustainability performance confirming previous studies. Subsequently, we present our main findings, examining the relationship between cash and equity compensation and various aspects of sustainability performance. We expand this analysis by looking at which industries drive the relationship we find. Also, we subdivide equity compensation further into stock and option compensation to provide a detailed explanation of our key findings. Additionally, we test the non-executive board member channel as a validation for our hypotheses. Lastly, we include robustness checks to support our findings.

### *CEO compensation package including CSR metrics*

We examine the effect of CSR metrics and targets inclusion in the CEO compensation package on CSR performance (see also Maas, 2018 & Fabrizi et al., 2014). To do this, we estimate the following regression:

$$CSR_{it} = \beta_0 + \beta_1 SustComp_{i,t-1} + \gamma' Controls_{i,t-1} + D_t + S_i + \varepsilon_{it} \quad (1)$$

The dependent variable,  $CSR_{it}$ , in Equation (1) is one of the following five: *Environmental Outcomes*, *Environmental Intentions*, *Social Outcomes*, *Social Intentions*, or the *Refinitiv ESG score*. Since the relationship between CEO compensation and CSR strategy potentially suffers from endogeneity issues (Callan & Thomas, 2011), the regression uses one-year lagged explanatory variables as well as a two-year lag in the robustness analysis.  $Controls_{i,t-1}$  is the vector of lagged control variables,  $D_t$  denotes the year fixed effect for year  $t$  and  $S_i$  the industry fixed effect for firm  $i$ . We use the Standard Industrial Classification one digit code system for the industry classification. The lagged CSR-based compensation incentives dummy variable,  $SustComp_{i,t-1}$ , for firm  $i$  at time  $t-1$  equals 1 if the CEO's compensation package includes some sort of CSR-based compensation.

Table 3 reports a negative and highly significant relationship between the 1-year lagged dummy variable for the inclusion of CSR-based compensation and next year's *Environmental Outcomes*. The relationship between *Environmental Intentions*, *Social Intentions*, and Refinitiv's *ESG score* is significantly positive. These findings suggest that CSR-based compensation relates to intentions that are easy to achieve at low cost, and negatively relates to actual *Environmental Outcomes*.<sup>7</sup> The relationship with *Social Outcomes* is insignificant. Overall, we conclude that the inclusion of CSR-based compensation in compensation packages does not affect all sustainability aspects positively. Our findings confirm those of Maas (2018) and Bebchuk & Tallarita (2022) who document that CSR metrics and targets in executive compensation do not automatically lead to better corporate social performance. Hereby, we not only confirm these earlier findings using recent data but also provide evidence supporting the reliability of our sub-score construction. By validating our approach, we ensure that the sub-scores accurately reflect the underlying constructs they are intended to measure. This dual

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<sup>7</sup> In Table 7, we test for the relationship between intentions and outcomes. We find that intentions are no predictor for outcomes.

contribution strengthens both the consistency of the results and the robustness of our methodology.

### *Cash and equity compensation*

The previous section shows that CSR-based compensation does not improve *Environmental Outcomes*, but in fact worsens it, as CEOs likely target cheap and easy to implement CSR policies. The issue at hand is identifying what enhances *Environmental Outcomes*. Dissecting compensation into a cash and equity component may identify what the effect is of the form of payment, while controlling for the total amount. To do so, we start by estimating the following model for the full sample,

$$CSR_{it} = \beta_0 + \beta_1 \%Comp_{i,t-1} + \gamma' Controls_{i,t-1} + D_t + S_i + \varepsilon_{it} \quad (2)$$

The dependent and control variables in Equation (2) are the same as in Equation (1). The *%Comp* variable reflects either the proportion of cash (*%cash*) or the proportion of equity (*%equity*) of total compensation.<sup>8</sup> In addition, we include year and industry fixed effects to control for environmental and social scores development over time, and for differences between industries. All standard errors are clustered at the firm and year level.

Table 4, Panel A, documents a positive and significant relation between *%cash* and *Environmental Outcomes*. The first column includes only the proportion of cash as explanatory variable. Adding total compensation, together with the CEO-level control variables to the model (column 2) does not affect the positive relationship between *%cash* and *Environmental Outcomes*. After adding board (column 3) and firm controls (column 4) the relationship also remains. By including year (column 5) and industry fixed effects (column 6), the coefficient becomes smaller but remains positive and significant. These results show that within an industry-year, and after controlling for company, board, and CEO characteristics, companies who pay their CEO more in cash compensation (*%cash*) perform better in terms of *Environmental Outcomes*. The finding that a high proportion of cash compensation is positively related to *Environmental Outcomes* supports Hypothesis 1. This finding is in line with the notion that CEOs would lose part of the value of their equity compensation if they make large and high-risk investments to improve the firm's *Environmental Outcomes*. That is why, through a higher proportion of cash compensation, CEOs are not limited by the opportunity costs of

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<sup>8</sup> We do not test for the relationship between total compensation and CSR strategies because total compensation is strongly correlated with firm size. However, total compensation is included as a control variable.

their compensation when focusing on *Environmental Outcomes*. By receiving a greater share of cash compensation, CEOs can be sufficiently compensated for the risks taken, as the value of cash compensation is completely set within the firm and is not sensitive to information asymmetry and opaqueness. As per the previously mentioned literature, the market does not consistently value all investments aimed at enhancing sustainability.

In Panel B of Table 4, we conduct the same stepwise regressions for the proportion of equity (*%equity*) and *Environmental Outcomes*.<sup>9</sup> The coefficients are consistently negative and significant, except for the case of the complete model including industry fixed effects. In subsequent analyses, we further disentangle equity compensation, explaining how the stock and option elements have off-setting effects to explain the loss in significance in the complete model.

In Table 5, we expand our initial analysis of *Environmental Outcomes* to *Environmental Intentions*, *Social Outcomes* and *Intentions*, and the *ESG score* for both the proportion of cash and the proportion of equity. The results in Panel A show again the positive relationship between the proportion of cash compensation and *Environmental Outcomes*. The strongest negative relations can be seen between cash compensation and both *Environmental* and *Social Intentions*, and the *ESG score*. The results in Panel B are mostly in line with Hypothesis 2, showing that a high proportion of equity has a positive relationship with the *ESG score*, *Environmental Intentions*, and *Social Intentions*. These findings suggest that equity compensation incentivizes a CEO to pursue strategies that are recognized and rewarded by the market. A high proportion of equity is not significantly related to *Social Outcomes*, which is not in line with Hypothesis 2. These analyses all include CEO, board, and company control variables, and industry and year fixed effects.

Overall, hypothesis 2 can be confirmed. The results show that the proportion of equity compensation has a positive relation with *Environmental* and *Social Intentions*; although, the relationship with *Social Outcomes* is not confirmed. These findings contribute to the literature showing how the market values sustainable investments. Consistent with the existing literature, only a moderate level of sustainability is appreciated. But when sustainability investments become ‘abnormal’ the market evaluates this as value diminishing. This could explain why CEOs with a higher proportion of equity compensation focus mostly on *Social* and *Environmental Intentions*. The Refinitiv *ESG score* is mostly driven by intentions, which likely

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<sup>9</sup> These analyses are done separately as the correlation between the proportion of cash and equity is high (-0.655), but they are not identical substitutes. This is due to elements not included in either the cash or equity portion.

explains the positive relationship. In line with this correlation, Hypothesis 4 can be confirmed as we find that a higher proportion of equity compensation has a positive relation with the Refinitiv *ESG score*.

#### *Industry-level Analysis*

A comparison of columns (5) and (6) in Table 4 Panel A highlights that industry fixed effects contribute significantly to the model's explanatory power. While for the relationship between environmental outcomes and *%cash*, the R-squared with only year fixed effects is 34.6%, the industry fixed effects almost double the explained variance. This indicates that the effect is likely driven by some industries, instead of by all industries equally. Hence, we carry out an industry-level analysis, to more accurately determine the relation between cash compensation and *Environmental Outcomes*.

Table 6 shows the regression results at the industry level. When *%cash* is the explanatory variable, the positive significant relationship is mostly driven by two industries, Manufacturing, and Transportation & Public Utilities. The other industries display no significant relationship. The relationships are economically significant as a one standard deviation difference in cross-sectional variation in *%cash* leads to a 5% standard deviation variation in *Environmental Outcomes* for Manufacturing and a 15% standard deviation for Transportation & Public Utilities. Construction also shows a positive, yet insignificant relationship, possibly because of the smaller sample size of this industry.

To summarize, the positive relationship is mostly evident in the industries which are by design more polluting. These results are intuitive, as these industries, which is inherently the most polluting, has the greatest potential for improvement and therefore stands to benefit the most from a compensation structure that encourages substantial investments in enhancing environmental outcomes.

#### *Intentions and Outcomes*

In our analysis, we differentiate between sustainability intentions and outcomes. One would expect that current intentions lead to improved future outcomes. As we have already seen a negative correlation between these two dimensions of sustainability, we also test for the relationship between intentions and outcomes in a regression framework. For this, we employ the following model.

$$Outcomes_{it} = \beta_0 + \beta_1 Intentions_{i,t-i} + \gamma' Controls_{i,t-1} + D_t + F_i + \varepsilon_{it} \quad (3)$$

The dependent variable (*Outcomes*) is in this case either *Environmental* or *Social Outcomes*. The predicting variable is for the case of *Environmental Outcomes*, *Environmental Intentions*, and for *Social Outcomes*, *Social Intentions*. The intentions are lagged by both one and two years in separate analyses, i.e.,  $i = 1$  or  $2$ .  $Controls_{i,t-1}$  is the vector of lagged control variables,  $D_t$  denotes the year fixed effect for year  $t$  and  $F_i$  the firm fixed effect for firm  $i$ . Whereas earlier analyses control for industry-level heterogeneity through industry fixed effects, we employ firm fixed effects to identify the within-firm relationship between CSR intentions and outcomes.

Table 7 reports the results and shows that an increase in *Environmental Intentions* does not result in an improvement in *Environmental Outcomes* at a one-year time lag. The regression results show a small negative relation between intentions and outcomes. *Social Intentions* also do not predict future *Social Outcomes*. This analysis includes both year and firm fixed effects, as well as clustered standard errors at the firm and year level. When the intentions variables are lagged by 2 years, the relationship remains the same. This suggests that within a firm, over 2 years, *Environmental* and *Social Intentions* do not lead to better *Environmental* and *Social Outcomes*. The inclusion of firm fixed effects leads to a substantial increase in the explanatory power of the model, particularly for *Environmental Outcomes*, with the R-squared rising to 0.954 and 0.958, respectively.

#### *Stock versus option awards*

Next, we differentiate between stock and option awards within the equity compensation component to explain the insignificant results in Table 4, Panel B. The literature suggests that these two compensation elements can have a different effect on risk-taking behavior (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999). We repeat the analysis in Equation (2) but use the proportion of stock awards ( $\%stock$ ) and the proportion of option awards ( $\%option$ ) instead of the proportion of equity. Table 8 documents that stock awards have a strong negative relation with *Environmental Outcomes* whereas option awards show a positive relationship. As option awards, unlike stock awards, have no downside risk, CEOs take more risk when part of their compensation is in the form of options (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999; Sanders & Hambrick, 2007). In contrast, stock awards are sensitive to downside risk and thereby to mispricing in the market due to information

asymmetry and opaqueness. Therefore, our results are in line with the literature showing that stock awards motivate less risk-taking behavior. The off-setting results of stock and option awards are a potential explanation for the insignificant relationship between equity compensation and *Environmental Outcomes* as reported in Tables 4 and 5.

Consequently, Hypothesis 3 is supported by these findings. Improving *Environmental Outcomes* requires bigger investments with a longer payback time, which are therefore riskier. Our results suggest that CEOs who have a higher proportion of option awards perform better on *Environmental Outcomes*. This is in line with previous findings that option awards promote more risk taking. Stock awards are known to promote a more conservative strategy as they are more sensitive to downside risk. This is in line with the finding that CEOs with a higher proportion of stock awards in their compensation focus more on investments with a lower risk profile like *Social* and *Environmental Intentions*.

#### *The Role of Non-Executive Board Members*

In Section 2, we argued that equity compensation has a negative relation with *Environmental Outcomes* because the market does not value larger and more risky investments, leading to lower equity value. In contrast, cash compensation is set within the firm by internal agents who are better informed about the firm and its sustainability strategy. Cash compensation is therefore better equipped to incentivize such riskier investments. In short, when the influence of the market on CEO compensation diminishes and the impact of internal agents is larger, CEOs can be instructed to follow a CSR strategy focusing on *Environmental Outcomes*. To test for this channel, we analyze whether the relationship in our main analysis strengthens if the influence of the market is further reduced and the internal governance is stronger. We do this by including the proportion of non-executive board members (high versus low) and see whether this affects the relationship between compensation structure and CSR strategy. For this analysis, we create a dummy variable (*Non exec D*) to distinguish between firms with high and low levels of non-executive board members relative to the median level.<sup>10</sup> We estimate the following regression:

$$CSR_{it} = \beta_0 + \beta_1 pComp_{i,t-1} + \beta_2 Non\ exec\ D_{i,t-1} + \beta_1 pComp_{i,t-1} \times \beta_2 Non\ exec\ D_{i,t-1} \\ + \gamma' Controls_{i,t-1} + D_t + S_i + \varepsilon_{it} \quad (4)$$

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<sup>10</sup> The findings are robust to either separating on the mean instead of median, and using two (low, medium, high), and three (low, low-medium, high-medium, high) dummies.

Table 9, Panel A shows that, for a company with both a high proportion of cash compensation and a high level of non-executive board members, there is a positive relation with *Environmental Outcomes*. Moreover, a heightened presence of non-executive board members exhibits a favorable relationship with *Social Intentions* and the *ESG score*. This positive relation mitigates the adverse association between the proportion of cash compensation and these sustainability metrics. This is evident in columns (4) and (5), where the significance levels notably diminish when combining the proportion of cash and the level of non-executive board members. While the initial analysis in Table 5 indicates a negative relationship between the proportion of cash and *Environmental Intentions* and *Social Outcomes*, Table 9 Panel A demonstrates that in the presence of a high level of non-executive board members within a company, this significant negative effect disappears.

Table 9, Panel B shows that only in the case of *Environmental Outcomes*, the level of non-executive board members interacted with *%equity* has a significant negative effect on the CSR strategy of the firm. In all other cases, the relation between the proportion of equity compensation and the CSR strategy outweighs the effect of non-executive board members. As shown before, the stock and option elements of equity have different relationships to CSR strategies. Therefore, we include an additional analysis separating the stock and option component of *%equity*. Table 9, Panels C and D, show that the significant interaction effect between *%equity* and *Environmental Outcomes* vanishes when we further divide the equity holdings into a stock (*%stock*) and option component (*%option*). Otherwise, the interaction effects remain unchanged, showing that when a CEO gets a high proportion of his or her compensation in the form of stocks or options, the level of non-executive board members does not influence the firm's sustainability strategy.

These findings confirm Hypothesis 5a. By including the interaction effect of the level of non-executive board members, the relationship we find for Hypothesis 1 becomes stronger. This shows that, when the impact of the market is further diminished by a high level of non-executive board members, together with a large proportion of cash compensation for the CEO, the CEO will be more inclined to aim for a strategy focusing on environmental outcomes. Besides focusing more on *Environmental Outcomes*, boards with a high level of non-executive members focus in general more on all sustainability aspects, including *Social Outcomes* and *Social* and *Environmental Intentions*. Also, Hypothesis 5b can be confirmed as we do not find an additional effect of the level of non-executive board members on the relationship between

equity compensation and sustainability performance. This is in line with the notion that the CEO's decision power, which is influenced by a high proportion of equity compensation, outweighs the influence of the board.

### *Robustness Analyses*

To support our findings and test for alternative channels, we perform several robustness tests. We start by employing a propensity score matching to specify the relationship between the inclusion of CSR metrics and targets in a CEO's compensation package and CSR performance. Next, we test whether the relationship between cash/equity compensation and sustainability performance holds if we include a dummy variable which shows if there is some form of CSR-based compensation. Furthermore, we test for the relationship between environmental and social, intentions and outcomes. Also, we redo our main analysis using a two-year lag instead of a one-year lag for all independent variables. Next, we investigate if the effect in our main regression is driven by the appointment of a new CEO. Lastly, we employ gender diversity as an alternative proxy for internal governance strength.

First, to further analyze the effect of the sustainability compensation incentive on CSR activities, we follow a propensity score matching approach. The propensity score matching will clarify the economic significance of the inclusion of CSR metrics and targets. We employ a two-step approach, where we first perform the “nearest neighbor 1 to 1” matching procedure on the firms in the treatment and control groups. The treatment group is defined by the presence of CSR metrics and targets in the CEO compensation package, and the control group by their absence. The sample is matched using the variables: *year*, *industry*, *gender*, *age*, *size*, *Book-to-Market*, *ROA*, and *ROE* in this order of importance. In the second step, we perform a *t*-test on the difference between the average CSR score in the matched control group versus the treated group.

Table 10 reports the *t*-test results for the matched sample. We find an average difference for *Environmental Outcomes* of 0.899, in favor of not including CSR metrics and targets in the CEO's compensation package. Since the score by design ranges from 0 to 10, this is a substantial difference. The difference in the case of *Environmental Intentions* is -0.261 in favor of including it. This is of the same magnitude as *Social Intentions* (-0.327). The difference in *Social Outcomes* is again insignificant. The *ESG score* indicates a difference of -0.680, favoring the incorporation of CSR metrics and targets into the CEO compensation package. Consistent

with Table 3, CSR inclusion in compensation packages favors low-cost easy-to-implement CSR strategies and discourages high-cost substantial *Environmental Outcomes* investment.

In Table 11, we expand Equation 1 by including firm fixed effects instead of industry fixed effects. The negative relationship with *Environmental Outcomes* remains but becomes insignificant. The relationship with *Environmental Intentions* loses its significance. Columns (4) and (5) show that within a firm, the inclusion of CSR metrics and targets in compensation packages positively relates to both *Social Intentions* and especially the *ESG score*. Also, when the independent variables are lagged by two years instead of one, the relationship holds.

Our main analysis relates to the regression outcomes of Equation (2) in Table 5. As additional robustness analysis, we compare the relationship between the inclusion of CSR metrics and targets in the compensation package of a CEO on CSR performance and the relationship between the compensation components cash and equity on CSR performances. The correlation between CSR compensation inclusion and the proportion of cash and equity compensation is low. Therefore, we expect that adding the sustainable compensation dummy does not affect the relationship between the compensation components and CSR performance. We hence estimate the following regression:

$$CSR_{it} = \beta_0 + \beta_1 pComp_{i,t-1} + \beta_2 SustComp_{i,t-1} + \gamma' Controls_{i,t-1} + D_t + S_i + \varepsilon_{it} \quad (5)$$

Table 12, Panels A and B show that the inclusion of the sustainability compensation factor has a similar effect as we observed earlier when it was the sole explanatory variable, see Table 3. The relationship with the proportion of cash and equity in the compensation package still holds. Overall, the implications remain unchanged.

As the next robustness analysis, we rerun the regression in Equation (2) but use a two-year lag for all independent variables. Table 13 shows that the results are in line with Table 5. This confirms that the relationship between the proportion of cash and equity compensation and CSR performance also holds over two years.

Next, as the composition of compensation packages mostly changes with the appointment of a new CEO, we check whether this drives our results. Using a dummy for the appointment of a new CEO for either one, two, or three years ago, Table 14 shows that we find no effect on any of the CSR scores, besides *Social Outcomes* and the Refinitiv *ESG score*. This relation is however negatively significant. In the second and third years after the appointment of a new CEO, this effect disappears for the *ESG score* but remains present for *Social Outcomes*.

Lastly, as a robustness check, we replicate the interaction analysis using Refinitiv's Gender Diversity Score as an alternative proxy for internal governance strength. While our main analysis uses the percentage of non-executive board members to capture the influence of internal agents less exposed to market pressure, the Gender Diversity Score provides a complementary perspective. Gender diversity is one of the drivers of firms' CSR activities (Harjoto et al., 2015). It reflects the firm's commitment to board and executive diversity, a governance dimension often associated with broader stakeholder orientation and long-term strategic focus. Due to the skewed distribution of the Gender Diversity Score, with a substantial share of firms exhibiting low values, we construct a dummy variable equal to one for firms at or above the 75th percentile of the score distribution and zero otherwise. The results are presented in Table 15. Consistent results across these specifications support the validity of our proposed mechanism, suggesting that greater internal governance emphasis whether through board independence or gender diversity amplifies the relationship between compensation structure and sustainability outcomes.

## V. CONCLUSION

This study examines the relationship between the cash and equity components in CEO compensation and a firm's sustainability strategy. We find that CEOs are more inclined to opt for a CSR strategy emphasizing *Environmental Outcomes* when they receive a larger proportion of their compensation in cash. This relation is strongest in industries that pollute more by design (manufacturing, transportation, and construction). Although one would expect an improvement in outcomes to follow after an improvement in intentions, additional tests show that intentions have no predictive power for outcomes. This is one reason why it is important to distinguish between the different aspects of sustainability. Based on literature, we argue that cash compensation motivates *Environmental Outcomes* due to the rationale that when the impact of the market, and, consequently, the stock price is diminished, CEOs do not bear opportunity costs through their compensation packages.

Considering the relation between the proportion of equity compensation and CSR strategy, we find some inconsistent results. Additional analyses, however, show this is partly due to differences between the elements of equity compensation, namely stocks and options. While the proportion of option compensation is beneficial for a CSR strategy which focuses on outcomes, the proportion of stock compensation motivates a focus on intentions. These findings

are in line with the literature which shows that option compensation is less sensitive to downside risk, resulting in increased CEO risk taking, while stock awards are sensitive to downside risk, which makes CEOs take less risk (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999) and that the market, represented by the stock price, values a lower level of CSR strategy investments. CSR strategies regularly focus on intentions which are often also most strongly represented in an ESG score.

In contrast to equity compensation, the value of cash compensation is set within the firm by agents who have superior information regarding sustainable strategies. We therefore test whether, in contexts where internal decision-makers have greater influence and market pressures are weaker, CEOs receiving a higher proportion of cash compensation are more likely to adopt a CSR strategy focused on *Environmental Outcomes*. Our results are in line with this channel, as we find that a high level of non-executive board members, together with more cash compensation strengthens the positive relation with *Environmental Outcomes*. Besides strengthening the positive relation between cash compensation and *Environmental Outcomes*, a high level of non-executive board members also mitigates the negative relation between cash compensation and *Environmental Intentions*, *Social Outcomes* and *Intentions*, and the *ESG score*. Furthermore, for a CEO who receives a larger proportion of his/her compensation through stocks and options, the amount of non-executive board members does not have an effect. This is in line with the notion that a CEO's incentives outweigh the influence of the board.

In conclusion, our study shows that the prevailing approach of compensation packages focusing on equity compensation does not promote the triple bottom line principle. In contrast, when CEOs receive higher cash or option components in their compensation packages, they are more inclined to opt for CSR strategies focusing on *Environmental Outcomes*. This especially applies in combination with a high level of non-executive board members. Hence, if a board wants to improve the non-financial performance of a firm, this could be achieved by putting more focus on the proportion of cash compensation and more non-executive members in the board. Through this channel, the influence of the market on sustainability strategies is reduced. As research shows, the market does not value all elements of corporate social responsibility.

This study contributes to several fields of research. First, it contributes to the compensation and incentive literature by analyzing the way to align the firm's strategy with normative requirements (Flammer, 2013; Hart & Zingales, 2017; Kim et al., 2019; Lopatta et al., 2022; Statman, 2004; Wang et al., 2008). We show that the opportunity costs of investing

in environmental outcome performance when a CEO has a high proportion of equity compensation is a reason for the CEO to focus elsewhere on the sustainability range. These findings show that for a triple-bottom-line ambition, the prevailing approach of focusing on equity pay in compensation packages does not suffice. Furthermore, this research contributes to the CSR literature by advancing how sustainability is assessed within corporate governance (Bebchuk & Fried, 2003; Francoeur et al., 2017; Karim et al., 2018; Stanwick & Stanwick, 2001; Velte, 2019). Specifically, we offer a methodological contribution by distinguishing between substantial and symbolic forms of CSR. This separation allows for a more precise understanding of how CEO compensation relates not just to the presence of CSR initiatives, but to their extent.

With our dataset, we cannot employ a natural experiment with random assignment of the structure of compensation packages, and so the data provide non-causal explanations. Although we attempt to address endogeneity in our empirical analyses to make causality plausible, we cannot prove it.

## REFERENCES

- Ahn, B. H., Patatoukas, P. N., & Skiadopoulos, G. S. (2024). Material ESG alpha: A fundamentals-based perspective. *The Accounting Review*, 99(4), 1–27. <https://doi.org/10.2308/TAR-2022-0256>
- Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, 65(10), 4451–4469. <https://doi.org/10.1287/mnsc.2018.3043>
- Armstrong, C., & Vashishta, R. (2012). Executive stock options, differential risk-taking incentives, and firm value. *Journal of Financial Economics*, 104(1), 70–88. <https://doi.org/10.1016/j.jfineco.2011.11.005>
- Awaysheh, A., Heron, R. A., Perry, T., & Wilson, J. I. (2020). On the relation between corporate social responsibility and financial performance. *Strategic Management Journal*, 41(6), 965–987. <https://doi.org/10.1002/smj.3122>
- Baker, G. P., Jensen, M. C., & Murphy, K. J. (1988). Compensation and incentives: Practice vs. theory. *Journal of Finance*, 43(3), 593–616. <https://doi.org/10.1111/j.1540-6261.1988.tb04593.x>
- Bams, D., & van der Kroft, B. (2022). *Tilting the wrong firms? How inflated ESG ratings negate socially responsible investing under information asymmetries* (SSRN Scholarly Paper 4271852). <https://doi.org/10.2139/ssrn.4271852>
- Barnett, M. L., & Salomon, R. M. (2012). Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. *Strategic Management Journal*, 33(11), 1304–1320. <https://doi.org/10.1002/smj.1980>
- Bebchuk, L., & Fried, J. M. (2003). Executive compensation as an agency problem. *Journal of Economic Perspectives*, 17(3), 71–92. <https://doi.org/10.1257/089533003769204362>
- Bebchuk, L., & Fried, J. M. (2006). Pay without performance: Overview of the issues. *Academy of Management Perspectives*, 20(1), 5–24. <https://doi.org/10.5465/AMP.2006.19873407>
- Bebchuk, L., & Tallarita, R. (2022). The perils and questionable promise of ESG-Based compensation. *Journal of Corporate Law*. <http://dx.doi.org/10.2139/ssrn.4048003>
- Becker-Olsen, K., Cudmore, B., & Hill, R. (2006). The impact of perceived corporate social responsibility on consumer behavior. *Journal of Business Research*, 59, 46–53. <https://doi.org/10.1016/j.jbusres.2005.01.001>
- Bénabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, 77(305), 1–19. <https://doi.org/10.1111/j.1468-0335.2009.00843.x>
- Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. *Review of Finance*, 26(6), 1315–1344. <https://doi.org/10.1093/rof/rfac033>
- Billio, M., Costola, M., Hristova, I., Latino, C., & Pelizzon, L. (2021). Inside the ESG ratings: (Dis)agreement and performance. *Corporate Social Responsibility and Environmental Management*, 28(5), 1426–1445. <https://doi.org/10.1002/csr.2177>

- Bolton, P., & Kacperczyk, M. (2023). Global pricing of carbon-transition risk. *Journal of Finance*, 78(6), 3677–3754. <https://doi.org/10.1111/jofi.13272>
- Callan, S. J., & Thomas, J. M. (2011). Executive compensation, corporate social responsibility, and corporate financial performance: A multi-equation framework. *Corporate Social Responsibility and Environmental Management*, 18(6), 332–351. <https://doi.org/10.1002/csr.249>
- Chava, S., & Purnanandam, A. (2010). CEOs versus CFOs: Incentives and corporate policies. *Journal of Financial Economics*, 97(2), 263–278. <https://doi.org/10.1016/j.jfineco.2010.03.018>
- Chen, C. J. P., & Jaggi, B. (2000). Association between independent non-executive directors, family control and financial disclosures in Hong Kong. *Journal of Accounting and Public Policy*, 19(4), 285–310. [https://doi.org/10.1016/S0278-4254\(00\)00015-6](https://doi.org/10.1016/S0278-4254(00)00015-6)
- Cheng, Q., & Farber, D. B. (2008). Earnings restatements, changes in CEO compensation, and firm performance. *The Accounting Review*, 83(5), 1217–1250. <https://doi.org/10.2308/accr.2008.83.5.1217>
- Cheng, S. (2004). R&D expenditures and CEO compensation. *The Accounting Review*, 79(2), 305–328. <https://doi.org/10.2308/accr.2004.79.2.305>
- Coles, J. L., Daniel, N. D., & Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of Financial Economics*, 79(2), 431–468. <https://doi.org/10.1016/j.jfineco.2004.09.004>
- Derchi, G., Zoni, L., & Dossi, A. (2021). Corporate social responsibility performance, incentives, and learning effects. *Journal of Business Ethics*, 173(3), 617–641. <https://doi.org/10.1007/s10551-020-04556-8>
- Dodd, O., Frijns, B., & Garel, A. (2022). Cultural diversity among directors and corporate social responsibility. *International Review of Financial Analysis*, 83, 102337. <https://doi.org/10.1016/j.irfa.2022.102337>
- Dong, Z., Wang, C., & Xie, F. (2010). Do executive stock options induce excessive risk taking? *Journal of Banking & Finance*, 34(10), 2518–2529. <https://doi.org/10.1016/j.jbankfin.2010.04.010>
- Donia, M. B. L., Ronen, S., Tetrault Sirsly, C.-A., & Bonaccio, S. (2019). CSR by any other name? The differential impact of substantive and symbolic CSR attributions on employee outcomes. *Journal of Business Ethics*, 157(2), 503–523. <https://doi.org/10.1007/s10551-017-3673-5>
- Donnelly, R., & Mulcahy, M. (2008). Board structure, ownership, and voluntary disclosure in Ireland. *Corporate Governance: An International Review*, 16(5), 416–429. <https://doi.org/10.1111/j.1467-8683.2008.00692.x>
- Drobertz, W., El Ghoul, S., Fu, Z., & Guedhami, O. (2024). Institutional investors and corporate environmental costs: The roles of investment horizon and investor origin. *European Financial Management*, 30(2), 727–769. <https://doi.org/10.1111/eufm.12444>
- Dyck, I. J. A., Lins, K. V., Roth, L., Towner, M., & Wagner, H. F. (2024). Family-controlled firms and environmental sustainability: All bite and no bark (SSRN Scholarly Paper 4829162). <https://doi.org/10.2139/ssrn.4829162>

- Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, 101(3), 621–640. <https://doi.org/10.1016/j.jfineco.2011.03.021>
- Edmans, A. (2021). Why companies shouldn't tie CEO pay to ESG metrics. *Wall Street Journal*. <https://www.wsj.com/articles/why-companies-shouldnt-tie-ceo-pay-to-esg-metrics-1162466982>
- Edmans, A., Gosling, T., & Jenter, D. (2023). CEO compensation: Evidence from the field. *Journal of Financial Economics*, 150(3), 103718. <https://doi.org/10.1016/j.jfineco.2023.103718>
- Edmans, A., Levit, D., & Schneemeier, J. (2023). Socially Responsible Divestment (SSRN Scholarly Paper 4093518). <https://doi.org/10.2139/ssrn.4093518>
- Ehrenberg, R. G., & Milkovich, G. T. (1987). Compensation and firm performance. *NBER Working Papers*, Article 2145. <https://ideas.repec.org/p/nbr/nberwo/2145.html>
- Fabrizi, M., Mallin, C., & Michelon, G. (2014). The role of CEO's personal incentives in driving Corporate Social Responsibility. *Journal of Business Ethics*, 124(2), 311–326. <https://doi.org/10.1007/s10551-013-1864-2>
- Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *The Academy of Management Journal*, 56(3), 758–781. <https://doi.org/10.5465/amj.2011.0744>
- Flammer, C., Hong, B., & Minor, D. (2019). Corporate governance and the rise of integrating corporate social responsibility criteria in executive compensation: Effectiveness and implications for firm outcomes. *Strategic Management Journal*, 40(7), 1097–1122. <https://doi.org/10.1002/smj.3018>
- Francoeur, C., Melis, A., Gaia, S., & Aresu, S. (2017). Green or greed? An alternative look at CEO compensation and corporate environmental commitment. *Journal of Business Ethics*, 140(3), 439–453. <https://doi.org/10.1007/s10551-015-2674-5>
- Freiberg, D., Rogers, J., & Serafeim, G. (2020). How ESG issues become financially material to corporations and their investors (*Harvard Business School Working Paper* 3482546). <https://doi.org/10.2139/ssrn.3482546>
- Frey, B. S., & Jegen, R. (2001). Motivation crowding theory. *Journal of Economic Surveys*, 15(5), 589–611. <https://doi.org/10.1111/1467-6419.00150>
- Friedman, M. (1970, September 13). A Friedman doctrine-- The social responsibility of business is to increase its profits. *The New York Times*. <https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html>
- Fu, X., Tang, T., & Yan, X. (2019). Why do institutions like corporate social responsibility investments? Evidence from horizon heterogeneity. *Journal of Empirical Finance*, 51, 44–63. <https://doi.org/10.1016/j.jempfin.2019.01.010>
- Gardner, T., & Rylander, Y. (2021). 20 companies responsible for most single-use plastic waste. *SEI*. <https://www.sei.org/features/20-companies-responsible-for-most-single-use-plastic-waste/>

- Gopalan, R., Milbourn, T., Song, F., & Thakor, A. V. (2014). Duration of executive compensation. *Journal of Finance*, 69(6), 2777–2817. <https://doi.org/10.1111/jofi.12085>
- Gostlow, G. (2021). Pricing physical climate risk in the cross-section of returns. (*SSRN Scholarly Paper 3501013*). <http://dx.doi.org/10.2139/ssrn.3501013>
- Guay, W. (1999). The sensitivity of CEO wealth to equity risk: An analysis of the magnitude and determinants. *Journal of Financial Economics*, 53(1), 43–71. [https://doi.org/10.1016/S0304-405X\(99\)00016-1](https://doi.org/10.1016/S0304-405X(99)00016-1)
- Harjoto, M. A., & Wang, Y. (2020). Board of directors network centrality and environmental, social and governance (ESG) performance. *Corporate Governance: The International Journal of Business in Society*, 20(6), 965–985. <https://doi.org/10.1108/CG-10-2019-0306>
- Harjoto, M., Jo, H., & Kim, Y. (2017). Is institutional ownership related to corporate social responsibility? The nonlinear relation and its implication for stock return volatility. *Journal of Business Ethics*, 146(1), 77–109. <https://doi.org/10.1007/s10551-015-2883-y>
- Harjoto, M., Laksmana, I., & Lee, R. (2015). Board Diversity and Corporate Social Responsibility. *Journal of Business Ethics*, 132(4), 641–660.
- Hart, O., Thesmar, D., & Zingales, L. (2024). Private sanctions. *Economic Policy*, 39(117), 203–268. <https://doi.org/10.1093/epolic/eiad041>
- Hart, O., & Zingales, L. (2017). Companies Should Maximize Shareholder Welfare Not Market Value. *Journal of Law, Finance, and Accounting*, 2(2), 247–275. <https://doi.org/10.1561/108.00000022>
- Hartzmark, S. M., & Shue, K. (2022). Counterproductive Sustainable Investing: The Impact Elasticity of Brown and Green Firms (*SSRN Scholarly Paper 4359282*). <https://doi.org/10.2139/ssrn.4359282>
- Heeb, F., Kölbel, J. F., Paetzold, F., & Zeisberger, S. (2023). Do Investors Care about Impact? *Review of Financial Studies*, 36(5), 1737–1787. <https://doi.org/10.1093/rfs/hhac066>
- Holmstrom, B., & Milgrom, P. (1991). Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design. *Journal of Law, Economics, & Organization*, 7, 24–52. [https://doi.org/10.1093/jleo/7.special\\_issue.24](https://doi.org/10.1093/jleo/7.special_issue.24)
- Hosmer, L. T. (1995). Trust: The connecting link between organizational theory and philosophical ethics. *The Academy of Management Review*, 20(2), 379–403. <https://doi.org/10.2307/258851>
- Ibrahim, N. A., & Angelidis, J. P. (1995). The corporate social responsiveness orientation of board members: Are there differences between inside and outside directors? *Journal of Business Ethics*, 14(5), 405–410. <https://doi.org/10.1007/BF00872102>
- Ikram, A., Li, Z., & Minor, D. (2023). CSR-contingent executive compensation contracts. *Journal of Banking & Finance*, 151, 105655. <https://doi.org/10.1016/j.jbankfin.2019.105655>
- Indjejikian, R. (1999). Performance evaluation and compensation research: An agency perspective. *Accounting Horizons*, 13, 147–157. <https://doi.org/10.2308/acch.1999.13.2.147>

- Jensen, M. C., & Murphy, K. J. (1990). CEO incentives—It's not how much you pay, but how. *Journal of Applied Corporate Finance*, 3(3), 36–49. <https://doi.org/10.1111/j.1745-6622.1990.tb00207.x>
- Karim, K., Lee, E., & Suh, S. (2018). Corporate social responsibility and CEO compensation structure. *Advances in Accounting*, 40, 27–41. <https://doi.org/10.1016/j.adiac.2017.11.002>
- Kim, H.-D., Kim, T., Kim, Y., & Park, K. (2019). Do long-term institutional investors promote corporate social responsibility activities? *Journal of Banking & Finance*, 101, 256–269. <https://doi.org/10.1016/j.jbankfin.2018.11.015>
- Krüger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *Review of Financial Studies*, 33(3), 1067–1111. <https://doi.org/10.1093/rfs/hhz137>
- Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, 115(2), 304–329. <https://doi.org/10.1016/j.jfineco.2014.09.008>
- Li, Y., Liu, Y., Miletkov, M., & Yang, T. (2025). Creating value through corporate social responsibility: The role of foreign institutional investors in Chinese listed firms. *Journal of Empirical Finance*, 82, 101621. <https://doi.org/10.1016/j.empfin.2025.101621>
- Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance*, 72(4), 1785–1824. <https://doi.org/10.1111/jofi.12505>
- Lopatta, K., Canitz, F., & Tideman, S. A. (2022). Abnormal CSR and financial performance. *European Accounting Review*, 1–27. <https://doi.org/10.1080/09638180.2022.2084134>
- Maas, K. (2018). Do corporate social performance targets in executive compensation contribute to corporate social performance? *Journal of Business Ethics*, 148(3), 573–585. <https://doi.org/10.1007/s10551-015-2975-8>
- Martin, G. P., Wiseman, R. M., & Gomez-Mejia, L. R. (2020). The ethical dimension of equity incentives: A behavioral agency examination of executive compensation and pension funding. *Journal of Business Ethics*, 166(3), 595–610. <https://doi.org/10.1007/s10551-019-04134-7>
- O'Connor, M., Rafferty, M., & Sheikh, A. (2013). Equity compensation and the sensitivity of research and development to financial market frictions. *Journal of Banking & Finance*, 37(7), 2510–2519. <https://doi.org/10.1016/j.jbankfin.2013.02.005>
- Pástor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics*, 142(2), 550–571. <https://doi.org/10.1016/j.jfineco.2020.12.011>
- Prendergast, C. (1999). The provision of incentives in firms. *Journal of Economic Literature*, 37(1), 7–63. <https://doi.org/DOI: 10.1257/jel.37.1.7>
- Ross, S. A. (2004). Compensation, incentives, and the duality of risk aversion and riskiness. *Journal of Finance*, 59(1), 207–225. <https://doi.org/10.1111/j.1540-6261.2004.00631.x>
- Sanders, Wm. G., & Hambrick, D. C. (2007). Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *The Academy of Management Journal*, 50(5), 1055–1078. <https://doi.org/10.5465/amj.2007.27156438>

- Stanwick, P. A., & Stanwick, S. D. (2001). CEO compensation: Does it pay to be green? *Business Strategy and the Environment*, 10(3), 176–182. <https://doi.org/10.1002/bse.284>
- Statman, M. (2004). What do investors want? *The Journal of Portfolio Management*, 30(5), 153–161. <https://doi.org/10.3905/jpm.2004.442641>
- Velte, P. (2019). Do CEO incentives and characteristics influence corporate social responsibility (CSR) and vice versa? A literature review. *Social Responsibility Journal*, 16(8), 1293–1323. <https://doi.org/10.1108/SRJ-04-2019-0145>
- Walker, D. (2022). The economic (in) significance of executive pay ESG incentives. *Stanford Journal of Law, Business & Finance*, 27(2), 318. <http://dx.doi.org/10.2139/ssrn.4034877>
- Wang, H., Choi, J., & Li, J. (2008). Too little or too much? Untangling the relationship between corporate philanthropy and firm financial performance. *Organization Science*, 19, 143–159. <https://doi.org/10.1287/orsc.1070.0271>
- Watts, J. (2024, April 3). Just 57 companies linked to 80% of greenhouse gas emissions since 2016. *The Guardian*. <https://www.theguardian.com/environment/2024/apr/04/just-57-companies-linked-to-80-of-greenhouse-gas-emissions-since-2016>
- Wittkowski, K. M., Lee, E., Nussbaum, R., Chamian, F. N. and Krueger, J. G. (2004). Combining several ordinal measures in clinical studies. *Statistics in Medicine*, 23(10), 1579 – 1592. <https://doi.org/10.1002/sim.1778>
- Wu, J., & Tu, R. (2007). CEO stock option pay and R&D spending: A behavioral agency explanation. *Journal of Business Research*, 60(5), 482–492. <https://doi.org/10.1016/j.jbusres.2006.12.006>
- Causes of climate change—European Commission.* (n.d.). Retrieved 20 January 2024, from [https://climate.ec.europa.eu/climate-change/causes-climate-change\\_en](https://climate.ec.europa.eu/climate-change/causes-climate-change_en)
- Consequences of climate change—European Commission.* (n.d.). Retrieved 20 January 2024, from [https://climate.ec.europa.eu/climate-change/consequences-climate-change\\_en](https://climate.ec.europa.eu/climate-change/consequences-climate-change_en)
- Corporate Water Use.* (n.d.). Retrieved 19 August 2024, from <https://www.conervationgateway.org/ConservationPractices/Freshwater/CorporateWaterUse/Pages/corporate-water-use.aspx>

## TABLES

**Table 1**  
Descriptive statistics.

	N	Mean	Median	St Dev	Minimum	25th perc.	75th perc.	Maximum
<b>CSR Variables</b>								
E outcomes	152731	5.378	5.746	2.635	0.005	3.138	7.61	9.786
E intentions	152731	4.857	5.294	1.817	0.685	3.402	6.305	8.017
S outcomes	152731	5.15	4.995	1.831	0.999	3.959	6.375	9.992
S intentions	152731	5.081	5.142	1.188	0.422	4.683	5.871	8.796
ESG score	152612	4.318	4.054	1.903	0.045	2.83	5.697	9.515
<b>Compensation Variables</b>								
Cash	152731	1182.79	970	1519.71	0	750	1200	77926
Equity	151827	4684.06	3197.57	7082.17	0	1186.38	6177.358	277000
%cash	152731	0.239	0.166	0.212	0	0.109	0.282	1
%equity	152731	0.496	0.562	0.267	0	0.347	0.692	1
Total Comp	152731	0	-0.225	1	-0.915	-0.535	0.241	32.234
Sust incent	152731	0.221	0	0.415	0	0	0	1
<b>Control Variables</b>								
Size	152731	8.561	8.45	1.509	0	7.538	9.544	12.309
BM	147456	0.542	0.436	0.415	0.029	0.25	0.727	2.345
ROA	152252	0.132	0.124	0.096	-0.145	0.074	0.18	0.448
ROE	147331	0.132	0.116	0.228	-0.739	0.06	0.197	1.223
Board size	152731	10.105	10	2.494	0	8	12	35
Non exec	152731	83.56	85.714	9.632	0	80	90.909	100
CEO duality	152731	0.657	1	0.475	0	0	1	1
Age	152339	57.15	57	6.786	28	53	61	90
Gender	152731	0.043	0	0.204	0	0	0	1

Note: This table provides descriptive statistics for the variables used in our analysis over the sample period. The sample consists of 152731 observations over fiscal years 2006 to 2020. The observations are monthly. The final sample contains 1,481 unique firms representing 10,398 firm-year observations. The compensation variables cash and equity are in thousand\$. All company control variables are winsorised on the 1st and 99th percentile. The natural logarithm is taken for the size variable Market Value of Equity. The Total compensation variable is scaled by use of z score. The variable gender is coded that 0=male and 1=female. All variables are defined in the Appendix in Table 1A.

**Table 2**

Pearson correlation.

Variables	1	2	3	4	5	6	7	8	9	10
(1) E outcomes	1									
(2) E intentions	-0.404*	1								
(3) S outcomes	-0.003	0.033*	1							
(4) S intentions	-0.315*	0.540*	0.063*	1						
(5) ESG Score	-0.394*	0.530*	0.111*	0.609*	1					
(6) Cash	-0.126*	0.073*	-0.020*	0.035*	0.125*	1				
(7) Equity	-0.170*	0.143*	0.037*	0.128*	0.224*	0.193*	1			
(8) %cash	0.227*	-0.233*	-0.063*	-0.227*	-0.249*	0.152*	-0.354*	1		
(9) %equity	-0.167*	0.176*	0.041*	0.178*	0.203*	-0.015*	0.475*	-0.655*	1	
(10) Total comp	-0.230*	0.183*	0.034*	0.155*	0.278*	0.356*	0.926*	-0.372*	0.361*	1
(11) Size	-0.499*	0.327*	0.127*	0.290*	0.556*	0.220*	0.362*	-0.301*	0.203*	0.447*
(12) BM	-0.070*	0.020*	-0.212*	0.011*	-0.048*	0.032*	-0.087*	0.088*	-0.071*	-0.084*
(13) ROA	-0.148*	0.075*	0.131*	0.058*	0.041*	-0.024*	0.058*	-0.111*	0.061*	0.065*
(14) ROE	-0.079*	0.092*	0.134*	0.066*	0.138*	0.035*	0.065*	-0.099*	0.023*	0.104*
(15) Board size	-0.268*	0.164*	-0.011*	0.162*	0.339*	0.188*	0.143*	-0.087*	0.047*	0.203*
(16) Non exec	-0.210*	0.136*	-0.003	0.181*	0.291*	0.056*	0.068*	-0.140*	0.110*	0.098*
(17) CEO duality	-0.135*	0.058*	0.020*	0.036*	0.013*	0.041*	0.002	0.014*	-0.054*	0.038*
(18) Sust incent	-0.332*	0.197*	0.001	0.227*	0.334*	0.049*	0.087*	-0.127*	0.111*	0.111*
(19) Age	-0.019*	-0.025*	-0.024*	-0.027*	-0.016*	0.067*	-0.025*	0.081*	-0.127*	0.018*
(20) Gender	-0.022*	0.032*	-0.016*	0.061*	0.077*	-0.008*	0.017*	-0.021*	0.021*	0.012*

Note: This table reports the Pearson correlation among variables for the 152 731 observations over fiscal years 2006 to 2020. The '\*' indicates significance level at 1%.

**Table 3**  
Sustainable Compensation incentives.

	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score
Sust incent $t-1$	-0.720*** (0.035)	0.218*** (0.026)	0.016 (0.030)	0.295*** (0.021)	0.831*** (0.038)
Total comp $t-1$	0.032 (0.024)	0.082** (0.030)	-0.048*** (0.016)	0.027* (0.013)	0.060** (0.025)
Size $t-1$	-0.799*** (0.022)	0.390*** (0.020)	0.118*** (0.019)	0.240*** (0.011)	0.678*** (0.012)
BM $t-1$	-1.271*** (0.056)	0.609*** (0.096)	-0.745*** (0.060)	0.263*** (0.034)	0.413*** (0.027)
ROE $t-1$	-0.028 (0.051)	0.133 (0.089)	0.146** (0.064)	-0.096** (0.035)	0.111 (0.075)
ROA $t-1$	-0.129 (0.302)	0.022 (0.438)	0.674*** (0.172)	0.436*** (0.123)	-0.773*** (0.202)
Board size $t-1$	-0.075*** (0.009)	0.030*** (0.008)	-0.043*** (0.007)	0.024*** (0.006)	0.067*** (0.008)
CEO duality $t-1$	-0.179*** (0.026)	0.093*** (0.022)	-0.025 (0.023)	0.055** (0.019)	-0.211*** (0.022)
Non exec $t-1$	-0.011*** (0.002)	0.003 (0.002)	0.003* (0.002)	0.010*** (0.001)	0.022*** (0.003)
Age $t-1$	-0.005** (0.002)	-0.013*** (0.002)	-0.005 (0.004)	-0.010*** (0.001)	-0.013*** (0.001)
Gender $t-1$	-0.011 (0.074)	0.043 (0.071)	-0.130 (0.117)	0.113*** (0.025)	0.286*** (0.048)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018
R-squared	0.634	0.230	0.077	0.283	0.449

Note: This table documents the regression results from the relationship between the inclusion of CSR metrics (Sust incent) in the CEO's compensation scheme as dummy variable, and the firm's CSR performance. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). In this analysis, robust standard errors are clustered at year and firm level.

**Table 4**

Stepwise Regression of compensation structure on environmental outcomes.

	Panel A						Panel B										
	E outcomes						E outcomes										
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)					
%cash <sub>t-1</sub>	2.837*** (0.034)	1.961*** (0.036)	1.838*** (0.035)	1.019*** (0.031)	1.095*** (0.241)	0.508** (0.186)	-1.748*** (0.027)	-0.990*** (0.029)	-1.041*** (0.028)	-0.870*** (0.025)	-0.901*** (0.178)	-0.218 (0.133)					
%equity <sub>t-1</sub>							-0.584*** (0.008)	-0.423*** (0.008)	0.057*** (0.008)	0.060 (0.046)	0.054 (0.046)						
Total comp <sub>t-1</sub>		-0.520*** (0.008)	-0.377*** (0.008)	0.039*** (0.008)	0.044 (0.047)	0.067 (0.046)		-0.009*** (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.006 (0.007)	-0.005 (0.005)					
Age <sub>t-1</sub>			-0.009*** (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.004 (0.007)			-0.009*** (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.006 (0.007)					
Gender <sub>t-1</sub>				-0.242*** (0.036)	-0.325*** (0.034)	-0.283*** (0.030)	-0.356 (0.213)	-0.053 (0.158)		-0.257*** (0.036)	-0.339*** (0.034)	-0.286*** (0.030)	-0.357 (0.213)				
CEO duality <sub>t-1</sub>					-0.600*** (0.015)	-0.357*** (0.013)	-0.307** (0.119)	-0.199** (0.083)			-0.613*** (0.015)	-0.368*** (0.013)	-0.318** (0.118)				
Non exec <sub>t-1</sub>					-0.030*** (0.001)	-0.022*** (0.001)	-0.021*** (0.005)	-0.012** (0.004)			-0.032*** (0.001)	-0.022*** (0.001)	-0.021*** (0.005)				
Board size <sub>t-1</sub>						-0.188*** (0.003)	-0.024*** (0.003)	-0.014 (0.032)	-0.084*** (0.025)		-0.189*** (0.003)	-0.023*** (0.003)	-0.013 (0.032)				
Size <sub>t-1</sub>							-0.869*** (0.005)	-0.849*** (0.048)	-0.824*** (0.041)			-0.886*** (0.005)	-0.868*** (0.048)	-0.834*** (0.040)			
BM <sub>t-1</sub>							-1.649*** (0.017)	-1.598*** (0.202)	-1.336*** (0.130)				-1.659*** (0.017)	-1.608*** (0.201)	-1.340*** (0.132)		
ROE <sub>t-1</sub>								1.294*** (0.030)	1.183*** (0.215)	-0.047 (0.162)				1.243*** (0.030)	1.132*** (0.214)	-0.056 (0.164)	
ROA <sub>t-1</sub>									-6.491*** (0.083)	-5.999*** (0.760)	-0.003 (0.572)				-6.527*** (0.082)	-6.046*** (0.762)	-0.047 (0.581)
Constant	4.590*** (0.011)	5.353*** (0.060)	9.722*** (0.083)	16.429*** (0.082)	16.172*** (0.674)	15.288*** (0.507)	6.128*** (0.015)	6.299*** (0.064)	10.866*** (0.085)	17.362*** (0.082)	17.154*** (0.687)	15.634*** (0.507)					
Year FE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes					
Industry FE	No	No	No	No	No	Yes	No	No	No	No	No	Yes					
Observations	133,089	133,089	133,089	133,089	133,089	133,089	133,089	133,089	133,089	133,089	133,089	133,089					
R-squared	0.050	0.081	0.151	0.336	0.346	0.625	0.030	0.068	0.142	0.337	0.347	0.624					

Note: This table documents the regression results from the relationship between the proportion of cash (Panel A) and equity (Panel B) compensation and environmental outcomes. Model 1 only includes the proportion of cash as a predicting variable. Model 2 includes the CEO control variables. Model 3 adds board-level control variables. Model 4 includes additional firm control variables. Lastly, in models 5 and 6, year and firm fixed effects are added respectively. All independent variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). In this analysis, robust standard errors are clustered at year and firm level.

**Table 5**

Regression of relationship between Compensation and CSR performances.

	Panel A					Panel B				
	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score	(6) E outcomes	(7) E intentions	(8) S outcomes	(9) S intentions	(10) ESG score
%cash <sub>t-1</sub>	0.508** (0.186)	-0.856*** (0.178)	-0.374** (0.155)	-0.513*** (0.123)	-0.531*** (0.156)					
%equity <sub>t-1</sub>						-0.218 (0.133)	0.388*** (0.116)	0.132 (0.098)	0.299*** (0.068)	0.442*** (0.121)
Total comp <sub>t-1</sub>	0.067 (0.046)	0.023 (0.041)	-0.074** (0.027)	-0.008 (0.021)	0.024 (0.038)	0.054 (0.046)	0.043 (0.042)	-0.061** (0.026)	-0.003 (0.021)	0.016 (0.039)
Age <sub>t-1</sub>	-0.006 (0.005)	-0.011** (0.005)	-0.004 (0.004)	-0.009*** (0.003)	-0.011** (0.005)	-0.005 (0.005)	-0.012** (0.005)	-0.005 (0.004)	-0.009** (0.003)	-0.011** (0.005)
Gender <sub>t-1</sub>	-0.053 (0.158)	0.050 (0.165)	-0.132 (0.154)	0.128* (0.069)	0.334** (0.132)	-0.056 (0.159)	0.054 (0.167)	-0.130 (0.154)	0.130* (0.070)	0.336** (0.133)
CEO duality <sub>t-1</sub>	-0.199** (0.083)	0.111 (0.070)	-0.018 (0.050)	0.068 (0.042)	-0.189** (0.068)	-0.197** (0.084)	0.109 (0.070)	-0.020 (0.050)	0.070 (0.042)	-0.183** (0.068)
Non exec <sub>t-1</sub>	-0.012** (0.004)	0.002 (0.003)	0.003 (0.002)	0.010*** (0.002)	0.024*** (0.004)	-0.013*** (0.004)	0.002 (0.003)	0.003 (0.002)	0.010*** (0.002)	0.024*** (0.004)
Board size <sub>t-1</sub>	-0.084*** (0.025)	0.035* (0.018)	-0.042*** (0.012)	0.029*** (0.010)	0.077*** (0.021)	-0.083*** (0.025)	0.033* (0.018)	-0.043*** (0.012)	0.028** (0.010)	0.076*** (0.021)
Size <sub>t-1</sub>	-0.824*** (0.041)	0.380*** (0.035)	0.109*** (0.028)	0.243*** (0.021)	0.708*** (0.033)	-0.834*** (0.040)	0.398*** (0.035)	0.118*** (0.028)	0.253*** (0.020)	0.717*** (0.032)
BM <sub>t-1</sub>	-1.336*** (0.130)	0.618*** (0.129)	-0.749*** (0.086)	0.285*** (0.060)	0.490*** (0.087)	-1.340*** (0.132)	0.626*** (0.134)	-0.745*** (0.087)	0.289*** (0.060)	0.492*** (0.087)
ROE <sub>t-1</sub>	-0.047 (0.162)	0.138 (0.156)	0.146 (0.098)	-0.088 (0.091)	0.133 (0.129)	-0.056 (0.164)	0.155 (0.160)	0.152 (0.099)	-0.075 (0.092)	0.152 (0.131)
ROA <sub>t-1</sub>	-0.003 (0.572)	-0.069 (0.604)	0.644* (0.353)	0.362 (0.266)	-0.911** (0.411)	-0.047 (0.581)	0.005 (0.626)	0.675* (0.350)	0.408 (0.273)	-0.859* (0.417)
Constant	15.288*** (0.507)	1.683*** (0.513)	5.029*** (0.444)	2.404*** (0.271)	-3.636*** (0.470)	15.634*** (0.507)	1.089* (0.542)	4.790*** (0.443)	2.012*** (0.287)	-4.114*** (0.475)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018	133,089	133,089	133,089	133,089	133,018
R-squared	0.625	0.236	0.079	0.280	0.424	0.624	0.230	0.078	0.277	0.424

Note: This table documents the regression results of the relationship between CEO compensation and Corporate Social Responsibility (CSR). The dependent variable in each regression is a different CSR performance measure. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. Models (1)-(5) take proportion cash as predicting variable whereas models (6)-(10) take proportion equity as predicting variable. As the correlation between the proportion of cash and equity is not -1 because of other elements of total compensation, both explanatory variables are relevant. Coefficient estimates are provided in the top row. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year.

**Table 6**

Regression per industry of relationship between Cash Compensation and Environmental Outcomes.

	(1) Agriculture, Forestry, Fishing	(2) Mining	(3) Construction	(4) Manufacturing	(5) Transportation & Public Utilities	(6) Wholesale Trade	(7) Retail Trade	(8) Finance, Insurance, Real Estate	(9) Services	(10) Conglomerate
%cash <sub>t-1</sub>	6.896*** (0.000)	-0.337 (0.546)	1.163 (1.194)	0.639** (0.219)	1.844** (0.808)	-0.000 (0.617)	0.253 (0.319)	-0.242 (0.236)	-0.075 (0.400)	-0.505* (0.161)
Total comp <sub>t-1</sub>		-0.105 (0.092)	0.935 (0.625)	0.055 (0.056)	0.440*** (0.069)	0.313 (0.278)	-0.007 (0.049)	-0.178 (0.108)	-0.009 (0.089)	-0.030 (0.061)
Age <sub>t-1</sub>		0.012 (0.012)	0.002 (0.027)	-0.007 (0.008)	0.012 (0.019)	-0.060*** (0.019)	0.007 (0.010)	0.019** (0.008)	-0.035** (0.012)	-0.028* (0.007)
Gender <sub>t-1</sub>		0.134 (0.348)	0.634** (0.286)	-0.052 (0.219)	0.060 (0.560)	-0.107 (0.283)	-0.172 (0.308)	-0.008 (0.242)	-0.040 (0.455)	
CEO duality <sub>t-1</sub>		0.192 (0.178)	1.062* (0.499)	-0.322** (0.130)	0.003 (0.271)	0.965*** (0.272)	-0.254 (0.209)	-0.010 (0.112)	-0.249 (0.158)	
Non exec <sub>t-1</sub>		-0.005 (0.009)	-0.035 (0.028)	-0.020*** (0.006)	-0.015 (0.013)	-0.037** (0.016)	-0.008 (0.009)	-0.006 (0.005)	0.009 (0.009)	0.034 (0.012)
Board size <sub>t-1</sub>		-0.079* (0.044)	0.039 (0.082)	-0.193*** (0.036)	-0.082 (0.050)	-0.089 (0.075)	-0.203*** (0.051)	0.063** (0.022)	-0.271*** (0.050)	0.005 (0.027)
Size <sub>t-1</sub>		-0.821*** (0.125)	-0.954** (0.368)	-0.737*** (0.056)	-1.047*** (0.144)	-0.760*** (0.212)	-1.005*** (0.069)	-0.931*** (0.090)	-0.668*** (0.101)	-0.426** (0.097)
BM <sub>t-1</sub>		-0.605*** (0.199)	-0.513 (0.976)	-2.526*** (0.219)	-0.988** (0.352)	-3.524*** (0.717)	-0.396* (0.214)	-0.046 (0.134)	-1.929*** (0.415)	1.688 (0.598)
ROE <sub>t-1</sub>		-0.805 (0.834)	2.213*** (0.508)	-0.834*** (0.223)	0.657 (0.535)	-1.434 (1.071)	0.018 (0.428)	1.348*** (0.384)	0.108 (0.436)	1.951* (0.595)
ROA <sub>t-1</sub>		3.126* (1.551)	-6.087** (2.351)	0.614 (0.876)	-0.328 (2.799)	2.275 (1.576)	4.558*** (0.952)	-0.531 (1.033)	-1.466 (0.971)	-0.587 (1.846)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	52	6,667	2,452	52,073	14,592	4,095	9,544	23,690	19,420	504
R-squared	1.000	0.599	0.412	0.476	0.449	0.500	0.715	0.619	0.498	0.843

Note: This table documents the regression results of the relationship between CEO compensation and Corporate Social Responsibility (CSR) per industry. The dependent variable in each regression is Environmental Outcomes. Due to the limited amount of observations in the industry 'Agriculture, Forestry, Fishing', this model is omitted. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level.

**Table 7**  
Regression between Intentions and Outcomes.

	(1) E outcomes	(2) S outcomes	(3) E outcomes	(4) S outcomes
E intentions $t^{-1}$	-0.010 (0.014)			
S intentions $t^{-1}$		-0.000 (0.029)		
E intentions $t^{-2}$			-0.016 (0.013)	
S intentions $t^{-2}$				-0.008 (0.047)
CEO Controls	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes
Company Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	133,089	133,089	115,565	115,565
R-squared	0.954	0.372	0.958	0.382

Note: This table documents the regression results of the relationship between environmental or social intentions and environmental and social outcomes. In this model, we use firm-fixed effects instead of industry-fixed effects to get a within-firm perspective. The intentions variables, together with all control variables, are lagged both by one and two years. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level.

**Table 8**

Regression relationship Stocks and Options on CSR performances.

	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score
%stock <sub>t-1</sub>	-0.385** (0.139)	0.511*** (0.128)	0.095 (0.108)	0.390*** (0.071)	0.570*** (0.128)
%option <sub>t-1</sub>	0.351* (0.190)	0.116 (0.169)	0.258* (0.120)	0.112 (0.101)	0.082 (0.150)
Total comp <sub>t-1</sub>	0.051 (0.045)	0.045 (0.043)	-0.062** (0.026)	-0.001 (0.022)	0.020 (0.038)
Age <sub>t-1</sub>	-0.005 (0.005)	-0.012** (0.005)	-0.004 (0.004)	-0.009*** (0.003)	-0.011** (0.005)
Gender <sub>t-1</sub>	-0.028 (0.158)	0.043 (0.166)	-0.123 (0.154)	0.122* (0.069)	0.320** (0.130)
CEO duality <sub>t-1</sub>	-0.201** (0.083)	0.113 (0.071)	-0.026 (0.050)	0.069 (0.041)	-0.180** (0.068)
Non exec <sub>t-1</sub>	-0.013*** (0.004)	0.003 (0.003)	0.003 (0.002)	0.010*** (0.002)	0.024*** (0.005)
Board size <sub>t-1</sub>	-0.080*** (0.025)	0.031 (0.018)	-0.042*** (0.012)	0.027** (0.010)	0.075*** (0.021)
Size <sub>t-1</sub>	-0.833*** (0.040)	0.396*** (0.035)	0.116*** (0.028)	0.251*** (0.020)	0.713*** (0.031)
BM <sub>t-1</sub>	-1.302*** (0.130)	0.598*** (0.131)	-0.736*** (0.088)	0.271*** (0.059)	0.461*** (0.087)
ROE <sub>t-1</sub>	-0.035 (0.163)	0.151 (0.159)	0.161 (0.101)	-0.077 (0.093)	0.146 (0.129)
ROA <sub>t-1</sub>	-0.118 (0.572)	0.023 (0.632)	0.652* (0.352)	0.418 (0.275)	-0.843* (0.415)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	132,185	132,185	132,185	132,185	132,114
R-squared	0.627	0.232	0.078	0.278	0.425

Note: This table documents the regression results from the relationship between the proportion of stock awards and the proportion of option awards separately and the CSR variables. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The compensation variables are measured as the proportion of stock and options over the total value of an executive's compensation. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level.

**Table 9**

Interaction effect with compensation and percentage of non executives in the board.

<i>Panel A</i>	E outcomes (1)	E intentions (2)	S outcomes (3)	S intentions (4)	ESG Score (5)
%cash <sub>t-1</sub>	0.127 (0.178)	-0.813*** (0.190)	-0.300 (0.172)	-0.368*** (0.121)	-0.368* (0.178)
Non exec D <sub>t-1</sub>	-0.397*** (0.104)	0.072 (0.091)	0.036 (0.075)	0.156** (0.058)	0.322*** (0.093)
Non exec D <sub>t-1</sub> x %cash <sub>t-1</sub>	1.026*** (0.266)	-0.112 (0.277)	-0.203 (0.203)	-0.388* (0.199)	-0.421* (0.221)
R-squared	0.627	0.236	0.079	0.282	0.426
<i>Panel B</i>	(6)	(7)	(8)	(9)	(10)
%equity <sub>t-1</sub>	-0.038 (0.142)	0.455*** (0.139)	0.193 (0.129)	0.320*** (0.076)	0.395** (0.142)
Non exec D <sub>t-1</sub>	0.036 (0.122)	0.132 (0.110)	0.066 (0.116)	0.100 (0.073)	0.182* (0.095)
Non exec D <sub>t-1</sub> x %equity <sub>t-1</sub>	-0.406** (0.146)	-0.164 (0.173)	-0.144 (0.154)	-0.058 (0.105)	0.086 (0.157)
R-squared	0.625	0.230	0.078	0.277	0.426
<i>Panel C</i>	(11)	(12)	(13)	(14)	(15)
%stock <sub>t-1</sub>	-0.362** (0.141)	0.574*** (0.153)	0.051 (0.111)	0.434*** (0.084)	0.533*** (0.137)
Non exec D <sub>t-1</sub>	-0.052 (0.105)	0.124 (0.105)	0.028 (0.085)	0.139* (0.066)	0.225** (0.096)
Non exec D <sub>t-1</sub> x %stock <sub>t-1</sub>	-0.300 (0.181)	-0.227 (0.211)	-0.097 (0.165)	-0.185 (0.121)	0.000 (0.165)
R-squared	0.627	0.232	0.077	0.279	0.427
<i>Panel D</i>	(16)	(17)	(18)	(19)	(20)
%option <sub>t-1</sub>	0.641*** (0.172)	-0.224 (0.165)	0.279* (0.137)	-0.186* (0.099)	-0.289 (0.178)
Non exec D <sub>t-1</sub>	-0.160 (0.104)	0.041 (0.072)	0.011 (0.088)	0.058 (0.045)	0.230** (0.076)
Non exec D <sub>t-1</sub> x %option <sub>t-1</sub>	-0.114 (0.265)	0.064 (0.247)	-0.156 (0.249)	0.131 (0.127)	0.047 (0.284)
R-squared	0.626	0.228	0.078	0.272	0.423
CEO Controls	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes
Company Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	132,585	132,585	132,585	132,585	132,514

Note: This table documents the regression results including an interaction effect of the relationship between the proportion of cash compensation (Panel A), equity compensation (Panel B), stock compensation (Panel C), and option compensation (Panel D), the level of non-executive board members on the board and the five different CSR variables. The independent variables, together with the control variables are lagged by one year. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. The dummy variable for the level of non-executive board members is defined by separating the sample on the median level of the percentage of non-executive board members in a high level and low level. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level. Please find this table including all control variables reported in the appendix

**Table 10**

T test after propensity score matching.

	Mean diff	Obs	SE	t value	deg of fr	diff<0	diff!=0	diff>0	Obs untr	Mean untr	Obs tr	Mean tr
E outcomes	0.899	55592	0.022	41.284	55590	1	0	0	27796	4.679	27796	3.78
E intentions	-0.261	55592	0.012	-21.214	55590	0	0	1	27796	5.335	27796	5.597
S outcomes	-0.004	55592	0.015	-0.289	55590	0.386	0.773	0.614	27796	5.171	27796	5.175
S intentions	-0.327	55592	0.009	-38.375	55590	0	0	1	27796	5.308	27796	5.635
ESG score	-0.680	55266	0.016	-42.176	55264	0	0	1	27633	4.776	27633	5.456

Note: this table documents the results of the T-tests which were run after the propensity score matching. The sample is matched using the variables: year, industry, gender, age, size (lnMVE), book-to-market, ROA, and ROE in this order of importance. The five different dependent ESG variables are presented individually. The values shown under Mean diff present the difference between the Mean treated and Mean untreated. Please note that when the Mean diff is negative, the Mean treated is higher than the Mean untreated. Therefore, the treatment group (firms that have CSR metrics in their compensation package), performs worse for environmental outcomes.

**Table 11**  
Sustainable Compensation incentives using firm fixed effects.

	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG Score
Sust incent $t-1$	-0.016 (0.016)	0.037 (0.037)	-0.080 (0.050)	0.068** (0.025)	0.226*** (0.031)
Total comp $t-1$	0.014** (0.006)	0.018 (0.013)	-0.008 (0.014)	0.015* (0.008)	-0.005 (0.013)
Size $t-1$	-0.269*** (0.039)	0.150*** (0.031)	0.155*** (0.046)	0.084*** (0.016)	0.214*** (0.041)
BM $t-1$	-0.307*** (0.047)	0.161*** (0.040)	-0.721*** (0.079)	0.038 (0.032)	0.021 (0.036)
ROE $t-1$	0.171*** (0.037)	0.068 (0.062)	0.264** (0.110)	-0.070 (0.045)	0.095 (0.068)
ROA $t-1$	-0.282** (0.119)	-0.109 (0.262)	1.473*** (0.473)	-0.038 (0.090)	-0.629** (0.245)
Board size $t-1$	-0.025*** (0.004)	0.017 (0.010)	-0.065*** (0.013)	0.007 (0.005)	0.023*** (0.006)
CEO duality $t-1$	0.026 (0.034)	0.053 (0.033)	-0.080 (0.056)	0.028** (0.011)	-0.170*** (0.031)
Non exec $t-1$	0.003*** (0.001)	-0.003 (0.002)	0.008*** (0.002)	0.001 (0.001)	0.006*** (0.001)
Age $t-1$	-0.001 (0.002)	-0.001 (0.001)	-0.004 (0.005)	0.000 (0.001)	-0.007** (0.002)
Gender $t-1$	0.184*** (0.048)	0.002 (0.053)	-0.036 (0.151)	0.032 (0.030)	0.063* (0.033)
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018
R-squared	0.954	0.789	0.372	0.742	0.857

Note: This table documents the regression results from the relationship between the inclusion of CSR metrics (Sust incent) in the CEO's compensation scheme and the firm's CSR performance. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level.

**Table 12**

The magnitude of the relationship between Sustainable Compensation and Cash and Equity Compensation.

	Panel A					Panel B				
	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score	(6) E outcomes	(7) E intentions	(8) S outcomes	(9) S intentions	(10) ESG score
%cash <sub>t-1</sub>	0.453** (0.179)	-0.840*** (0.176)	-0.373** (0.155)	-0.491*** (0.121)	-0.468*** (0.144)					
%equity <sub>t-1</sub>						-0.164 (0.125)	0.372*** (0.115)	0.131 (0.097)	0.277*** (0.067)	0.381*** (0.113)
Sust incent <sub>t-1</sub>	-0.712*** (0.084)	0.203** (0.070)	0.009 (0.061)	0.286*** (0.040)	0.822*** (0.080)	-0.716*** (0.085)	0.208** (0.070)	0.012 (0.061)	0.287*** (0.040)	0.820*** (0.079)
Total comp <sub>t-1</sub>	0.063 (0.044)	0.024 (0.041)	-0.073** (0.027)	-0.007 (0.021)	0.028 (0.036)	0.048 (0.043)	0.045 (0.042)	-0.061** (0.027)	-0.001 (0.021)	0.022 (0.038)
Age <sub>t-1</sub>	-0.006 (0.005)	-0.011** (0.004)	-0.004 (0.004)	-0.009*** (0.003)	-0.011** (0.005)	-0.005 (0.005)	-0.012** (0.005)	-0.005 (0.004)	-0.009*** (0.003)	-0.011** (0.004)
Gender <sub>t-1</sub>	-0.009 (0.153)	0.038 (0.166)	-0.132 (0.154)	0.111 (0.068)	0.283* (0.132)	-0.011 (0.153)	0.041 (0.168)	-0.131 (0.154)	0.112 (0.069)	0.284* (0.133)
CEO duality <sub>t-1</sub>	-0.187** (0.080)	0.108 (0.069)	-0.019 (0.050)	0.064 (0.041)	-0.203*** (0.065)	-0.184** (0.080)	0.106 (0.070)	-0.021 (0.050)	0.064 (0.041)	-0.198*** (0.065)
Non exec <sub>t-1</sub>	-0.010** (0.004)	0.001 (0.003)	0.003 (0.002)	0.009*** (0.002)	0.021*** (0.004)	-0.011** (0.004)	0.002 (0.003)	0.003 (0.002)	0.009*** (0.002)	0.022*** (0.004)
Board size <sub>t-1</sub>	-0.077*** (0.024)	0.033* (0.018)	-0.042*** (0.012)	0.026** (0.009)	0.069*** (0.019)	-0.075*** (0.024)	0.030 (0.018)	-0.043*** (0.012)	0.025** (0.009)	0.068*** (0.019)
Size <sub>t-1</sub>	-0.788*** (0.040)	0.369*** (0.036)	0.109*** (0.028)	0.228*** (0.020)	0.666*** (0.031)	-0.797*** (0.039)	0.387*** (0.035)	0.117*** (0.028)	0.238*** (0.020)	0.675*** (0.030)
BM <sub>t-1</sub>	-1.264*** (0.128)	0.598*** (0.131)	-0.750*** (0.086)	0.257*** (0.059)	0.407*** (0.083)	-1.269*** (0.129)	0.605*** (0.136)	-0.746*** (0.087)	0.260*** (0.059)	0.409*** (0.084)
ROE <sub>t-1</sub>	-0.028 (0.163)	0.133 (0.156)	0.146 (0.099)	-0.096 (0.089)	0.111 (0.125)	-0.035 (0.164)	0.149 (0.160)	0.152 (0.099)	-0.084 (0.090)	0.127 (0.127)
ROA <sub>t-1</sub>	-0.093 (0.567)	-0.044 (0.605)	0.645* (0.353)	0.398 (0.264)	-0.809* (0.398)	-0.132 (0.576)	0.030 (0.627)	0.677* (0.350)	0.443 (0.270)	-0.764* (0.404)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018	133,089	133,089	133,089	133,089	133,018
R-squared	0.635	0.238	0.079	0.290	0.451	0.635	0.232	0.078	0.286	0.451

Note: This table documents the regression results of the relationship between CEO compensation, including a dummy for inclusion of CSR metrics in the compensation scheme, and Corporate Social Responsibility (CSR). The dependent variable in each regression is a different CSR performance measure. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. Panel A, Models (1)-(5) take proportion cash as predicting variable whereas Panel B, models (6)-(10) take proportion equity as predicting variable. As the correlation between the proportion of cash and equity is not -1 because of other elements of total compensation, both predicting variables are relevant. Coefficient estimates are provided in the top row. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year.

**Table 13**

Regression using 2 year lagged variables.

	Panel A					Panel B				
	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score	(6) E outcomes	(7) E intentions	(8) S outcomes	(9) S intentions	(10) ESG score
%cash <sub>t-2</sub>	0.469** (0.185)	-0.769*** (0.184)	-0.455*** (0.131)	-0.533*** (0.112)	-0.607*** (0.158)					
%equity <sub>t-2</sub>						-0.193 (0.133)	0.304** (0.119)	0.221** (0.102)	0.349*** (0.069)	0.445*** (0.111)
Total comp <sub>t-2</sub>	0.046 (0.042)	0.041 (0.034)	-0.062** (0.031)	-0.015 (0.021)	0.047 (0.039)	0.034 (0.044)	0.063* (0.032)	-0.053* (0.032)	-0.013 (0.020)	0.045 (0.040)
Age <sub>t-2</sub>	-0.007 (0.005)	-0.011** (0.005)	-0.005 (0.004)	-0.009*** (0.003)	-0.013** (0.005)	-0.006 (0.006)	-0.012** (0.005)	-0.006 (0.004)	-0.008*** (0.003)	-0.012** (0.005)
Gender <sub>t-2</sub>	-0.055 (0.168)	0.010 (0.173)	-0.126 (0.139)	0.136* (0.078)	0.330** (0.146)	-0.057 (0.168)	0.013 (0.175)	-0.124 (0.140)	0.137* (0.079)	0.331** (0.147)
CEO duality <sub>t-2</sub>	-0.226*** (0.087)	0.099 (0.076)	-0.037 (0.062)	0.050 (0.043)	-0.156** (0.074)	-0.225** (0.087)	0.097 (0.076)	-0.037 (0.062)	0.053 (0.043)	-0.152** (0.074)
Non exec <sub>t-2</sub>	-0.012*** (0.004)	0.001 (0.003)	0.005** (0.002)	0.010*** (0.002)	0.021*** (0.004)	-0.013*** (0.004)	0.002 (0.003)	0.005** (0.002)	0.010*** (0.002)	0.021*** (0.004)
Board size <sub>t-2</sub>	-0.080*** (0.025)	0.029 (0.018)	-0.033*** (0.012)	0.025*** (0.009)	0.078*** (0.021)	-0.078*** (0.025)	0.027 (0.018)	-0.034*** (0.012)	0.024*** (0.009)	0.077*** (0.021)
Size <sub>t-2</sub>	-0.809*** (0.040)	0.343*** (0.034)	0.078*** (0.026)	0.227*** (0.019)	0.690*** (0.035)	-0.819*** (0.040)	0.359*** (0.033)	0.087*** (0.026)	0.237*** (0.019)	0.700*** (0.035)
BM <sub>t-2</sub>	-1.298*** (0.143)	0.537*** (0.117)	-0.640*** (0.091)	0.255*** (0.061)	0.451*** (0.104)	-1.302*** (0.144)	0.542*** (0.118)	-0.637*** (0.091)	0.256*** (0.062)	0.451*** (0.105)
ROE <sub>t-2</sub>	-0.056 (0.184)	0.160 (0.162)	0.172 (0.123)	-0.053 (0.100)	0.245* (0.136)	-0.068 (0.184)	0.179 (0.164)	0.185 (0.122)	-0.033 (0.100)	0.270** (0.137)
ROA <sub>t-2</sub>	0.114 (0.562)	-0.179 (0.525)	0.320 (0.405)	0.305 (0.280)	-1.009** (0.436)	0.087 (0.567)	-0.136 (0.527)	0.348 (0.403)	0.340 (0.280)	-0.968** (0.436)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	115,565	115,565	115,565	115,565	115,518	115,565	115,565	115,565	115,565	115,518
R-squared	0.625	0.205	0.064	0.253	0.413	0.624	0.200	0.062	0.250	0.412

Note: This table documents the regression results of the relationship between CEO compensation and Corporate Social Responsibility (CSR). The dependent variable in each regression is a different CSR performance measure. The independent variables, together with the control variables are lagged by two years. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. Models (1)-(5) take proportion cash as predicting variable whereas models (6)-(10) take proportion equity as predicting variable. As the correlation between the proportion of cash and equity is not -1 because of other elements of total compensation, both predicting variables are relevant. Coefficient estimates are provided in the top row. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year.

**Table 14**

Regression of relationship new CEO dummy and CSR performances.

	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score
newceo1	0.009 (0.027)	0.028 (0.028)	-0.245*** (0.073)	-0.030 (0.026)	-0.118*** (0.031)
newceo2	0.025 (0.028)	0.018 (0.045)	-0.227*** (0.056)	0.029 (0.029)	-0.057 (0.035)
newceo3	-0.016 (0.024)	0.036 (0.038)	-0.187*** (0.044)	0.054** (0.024)	0.047 (0.043)
Total comp <sub>t-1</sub>	0.014 (0.009)	0.019 (0.015)	-0.014 (0.014)	0.016 (0.010)	-0.005 (0.017)
Age <sub>t-1</sub>	-0.001 (0.003)	-0.001 (0.004)	-0.005 (0.005)	0.002 (0.002)	-0.005 (0.004)
Gender <sub>t-1</sub>	0.184** (0.080)	0.003 (0.113)	-0.038 (0.178)	0.034 (0.064)	0.068 (0.102)
CEO duality <sub>t-1</sub>	0.023 (0.050)	0.053 (0.059)	-0.067 (0.075)	0.030 (0.030)	-0.159** (0.056)
Non exec <sub>t-1</sub>	0.003** (0.001)	-0.003 (0.002)	0.006** (0.002)	0.001 (0.001)	0.006*** (0.002)
Board size <sub>t-1</sub>	-0.025*** (0.007)	0.017 (0.013)	-0.060*** (0.015)	0.008 (0.008)	0.026** (0.011)
Size <sub>t-1</sub>	-0.269*** (0.047)	0.151*** (0.041)	0.149** (0.054)	0.084*** (0.022)	0.212*** (0.050)
BM <sub>t-1</sub>	-0.307*** (0.063)	0.161** (0.060)	-0.716*** (0.093)	0.039 (0.045)	0.025 (0.065)
ROE <sub>t-1</sub>	0.172** (0.058)	0.069 (0.092)	0.260* (0.130)	-0.067 (0.063)	0.100 (0.098)
ROA <sub>t-1</sub>	-0.277 (0.232)	-0.109 (0.387)	1.434** (0.545)	-0.055 (0.192)	-0.683* (0.345)
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018
R-squared	0.954	0.789	0.374	0.742	0.856

Note: This table documents the regression results from the relationship between the appointment of a new CEO dummy and CSR performance. The variable CEO1 is a dummy variable which represents the first year after appointment, CEO2 is the second year after appointment, and CEO3 the third. In this analysis, the robust standard errors are clustered on firm and year level. The independent variables, together with the control variables are lagged by one year. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test).

**Table 15**

Interaction effect with compensation and gender diversity.

<i>Panel A</i>	E outcomes (1)	E intentions (2)	S outcomes (3)	S intentions (4)	ESG Score (5)
%cash <sub>t-1</sub>	0.430** (0.198)	-0.811*** (0.192)	-0.341** (0.156)	-0.464*** (0.125)	-0.465** (0.161)
Gender diversity D <sub>t-1</sub>	-0.026 (0.095)	0.153 (0.091)	0.066 (0.076)	0.194*** (0.047)	0.467*** (0.085)
Gender diversity D <sub>t-1</sub> x %cash <sub>t-1</sub>	0.448* (0.214)	-0.201 (0.270)	-0.164 (0.207)	-0.208 (0.143)	-0.206 (0.247)
R-squared	0.625	0.236	0.079	0.283	0.432
<i>Panel B</i>	(6)	(7)	(8)	(9)	(10)
%equity <sub>t-1</sub>	-0.154 (0.149)	0.389** (0.132)	0.151 (0.109)	0.285*** (0.068)	0.407*** (0.116)
Gender diversity D <sub>t-1</sub>	0.224** (0.098)	0.131 (0.108)	0.079 (0.084)	0.137** (0.061)	0.395*** (0.104)
Gender diversity D <sub>t-1</sub> x %equity <sub>t-1</sub>	-0.301* (0.166)	-0.037 (0.186)	-0.092 (0.139)	0.022 (0.103)	0.049 (0.162)
R-squared	0.624	0.231	0.078	0.280	0.432
CEO Controls	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes
Company Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	133,089	133,089	133,089	133,089	133,018

Note: This table documents the regression results including an interaction effect of the relationship between the proportion of cash compensation (Panel A) and equity compensation (Panel B) the gender diversity indicator and the five different CSR variables. The independent variables, together with the control variables are lagged by one year. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. The dummy variable for the gender diversity is defined by separating the sample on the 75th percentile of the gender diversity score at 22/100. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level. Please find this table including all control variables reported in the appendix

## APPENDIX A

**Table 1A**

Variable Definitions and Data Sources.

Variable	Source	Definition
<i>Panel A: Compensation</i>		
<b>Pcash</b>	Calculated from Execucomp	Proportion of cash, calculated by adding salary and bonus, dividing it by total compensation.
<b>Pequity</b>	Calculated from Execucomp	Proportion of equity, calculated by adding stock awards and option awards, dividing it by total compensation.
<b>Pstock</b>	Calculated from Execucomp	Proportion of stock, calculated stock compensation divided by total compensation.
<b>Poption</b>	Calculated from Execucomp	Proportion of options, calculated option compensation divided by total compensation.
<b>Sust Comp Incent</b>	Refinitiv	Dummy variable showing if CSR metrics are included in CEO compensation package.
<b>Total Comp</b>	Execucomp	Salary, bonus, restricted stock and stock options, long-term non-equity incentive pay-outs, and all other compensation. Z score
<i>Panel B: Sustainability Performances</i>		
<b>Environmental Outcomes</b>	Calculated from Refinitiv	
<b>Environmental Intentions</b>	Calculated from Refinitiv	333 granular environmental and social variables are ranked using Wittkowski's method for multivariate ordinal data (Wittkowski, 2003). After all variables have been ranked relative to all other companies in the sample, they have been separated into 4 different categories. Environmental outcomes, environmental intentions, social outcomes, and social intentions. Outcomes for both the environmental and social variables include measurable outcomes and controversies. Intentions for environmental and social variables include targets, actions, policies, and reporting.
<b>Social Outcomes</b>	Calculated from Refinitiv	
<b>Social Intentions</b>	Calculated from Refinitiv	
<b>ESG Score</b>	Refinitiv	Score created by Refinitiv, rating all companies based on their environmental, social, and governance performance.
<i>Panel C: Firm Characteristics</i>		
<b>Firm size</b>	CRSP/Compustat	Market value in millions of US dollars measured at the end of the calendar year; log-transformed and winsorized at 1st and 99th percentile.
<b>ROE</b>	CRSP/Compustat	Return on equity (in%): (Operating income / Shareholders' equity) and winsorized at 1st and 99th percentile.
<b>ROA</b>	CRSP/Compustat	Return on assets (in %): (Operating income / Book value of total assets) and winsorized at 1st and 99th percentile.
<i>Panel D: Board Characteristics</i>		
<b>Boardsize</b>	Refinitiv	Board size of the firm
<b>Non_Exec</b>	Refinitiv	The percentage of non-executive board members in the board.
<b>Dum Non_Exec</b>	Refinitiv	Dummy defined as high or low percentage of non executive members in the board. Separated on the median percentage.
<b>CEO Duality</b>	Refinitiv	Dummy variable of CEO / chairman duality
<b>Dum Gender Diversity</b>	Refinitiv	Dummy equal to one if a firm's Gender Diversity Score falls in the top 25% of the sample distribution, and zero otherwise.
<i>Panel E: CEO Characteristics</i>		
<b>Age</b>	Execucomp	Age of director
<b>Gender</b>	Execucomp	Gender of director (0=male, 1=female)
<b>New CEO</b>	Execucomp	Dummy variables for the first, second and third year after the appointment of a new CEO.

Note: This table contains definitions for all variables employed in our empirical analysis and principal sources of data used to compute their values.

**Table 2A**

Composition CSR Variables Examples.

Environmental			Social		
Number	Category	Variable Name	Number	Category	Variable Name
1	Policy	Resource Reduction Policy	1	Policy	Health & Safety Policy
1	Policy	Policy Water Efficiency	1	Policy	Policy Employee Health & Safety
1	Policy	Policy Energy Efficiency	1	Policy	Policy Supply Chain Health & Safety
1	Policy	Policy Sustainable packaging	1	Policy	Training and Development Policy
1	Policy	Policy Environmental Supply Chain	1	Policy	Policy Skills Training
2	Target	Resource Reduction Targets	2	Target	Targets Diversity and Opportunity
2	Target	Targets Water Efficiency	3	Activity	Employees Health & Safety Team
2	Target	Targets Energy Efficiency	3	Activity	Health & Safety Training
2	Target	Targets Emissions	3	Activity	Supply Chain Health & Safety Training
2	Target	Emission Reduction Target Percentage	3	Activity	Supply Chain Health & Safety Improvements
3	Target	Emission Reduction Target Year	3	Activity	Employees Health & Safety OHSAS 18001
3	Activity	Environment Management Team	4	Performance	Employee Satisfaction
3	Activity	Environment Management Training	4	Performance	Salary Gap
3	Activity	Environmental Materials Sourcing	4	Performance	Salaries and Wages from CSR Reporting
3	Activity	Environmental Supply Chain Management	4	Performance	Net Employment Creation
4	Activity	Real Estate Sustainability Certifications	4	Performance	Number of Employees from CSR Reporting
4	Performance	Total Energy Use to Revenues USD in M	5	Controversy	Wages Working Condition Controversies
4	Performance	Renewable Energy Use Ratio	5	Controversy	Wages Working Condition Controversies Count
4	Performance	Renewable Energy Supply	5	Controversy	Diversity and Opportunity Controversies
4	Performance	Energy Use Total	5	Controversy	Employee Health & Safety Controversies
5	Performance	ESG Assets Under Management	5	Controversy	Recent Wages Working Condition Controversies
5	Controversy	Environmental Controversies	6	Reporting	HIV-AIDS Program
5	Controversy	Environmental Controversies Count	6	Reporting	Human Rights Contractor
5	Controversy	Recent Environmental Controversies	6	Reporting	Human Rights Breaches Contractor
6	Reporting	Toxic Chemicals Reduction	6	Reporting	Crisis Management Systems
6	Reporting	Green Buildings			
6	Reporting	Env Supply Chain Partnership Termination			
6	Reporting	Land Environmental Impact Reduction			
6	Reporting	Biodiversity Impact Reduction			

## ADDITIONAL APPENDIX B

This appendix shows all tables of which in the main table the control variables have been excluded. For the purpose of clarity, the complete output, including control variables, have been added in this section.

**Table 1B**

Regression between Intentions and Outcomes. (Table 7 full)

	(1) E outcomes	(2) S outcomes	(3) E outcomes	(4) S outcomes
E intentions <sub>t-1</sub>	-0.010 (0.014)			
S intentions <sub>t-1</sub>		-0.000 (0.029)		
E intentions <sub>t-2</sub>			-0.016 (0.013)	
S intentions <sub>t-2</sub>				-0.008 (0.047)
Total comp <sub>t-1</sub>	0.014 (0.009)	-0.009 (0.015)	Total comp <sub>t-2</sub>	-0.007 (0.011)
Age <sub>t-1</sub>	-0.001 (0.003)	-0.004 (0.005)	Age <sub>t-2</sub>	-0.001 (0.003)
Gender <sub>t-1</sub>	0.184** (0.081)	-0.038 (0.176)	Gender <sub>t-2</sub>	0.107 (0.078)
CEO duality <sub>t-1</sub>	0.026 (0.049)	-0.081 (0.076)	CEO duality <sub>t-2</sub>	-0.022 (0.043)
Non exec <sub>t-1</sub>	0.003** (0.001)	0.008*** (0.002)	Non exec <sub>t-2</sub>	0.001 (0.001)
Board size <sub>t-1</sub>	-0.025*** (0.007)	-0.065*** (0.016)	Board size <sub>t-2</sub>	-0.025*** (0.007)
Size <sub>t-1</sub>	-0.267*** (0.047)	0.155** (0.055)	Size <sub>t-2</sub>	-0.215*** (0.043)
BM <sub>t-1</sub>	-0.305*** (0.063)	-0.722*** (0.096)	BM <sub>t-2</sub>	-0.228*** (0.059)
ROE <sub>t-1</sub>	0.171** (0.058)	0.262* (0.130)	ROE <sub>t-2</sub>	0.167* (0.079)
ROA <sub>t-1</sub>	-0.281 (0.232)	1.483** (0.557)	ROA <sub>t-2</sub>	-0.331 (0.222)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	133,089	133,089	115,565	115,565
R-squared	0.954	0.372	0.958	0.382

Note: This table documents the regression results of the relationship between environmental or social intentions and environmental and social outcomes. In this model, we use firm-fixed effects instead of industry-fixed effects to get a within-firm perspective. The intentions variables, together with all control variables, are lagged both by one and two years. Total comp presents as a z score, all company controls are winsorized at 1st and 99th percentile. Size is the natural logarithm of market value of equity. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level.

**Table 2B**

Interaction Effect with Compensation and Percentage of Non-Executives on the Board (Table 9 Full).

	Panel A					Panel B				
	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score	(6) E outcomes	(7) E intentions	(8) S outcomes	(9) S intentions	(10) ESG score
%cash <sub>t-1</sub>	0.127 (0.178)	-0.813*** (0.190)	-0.300 (0.172)	-0.368*** (0.121)	-0.368* (0.178)					
%equity <sub>t-1</sub>						-0.038 (0.142)	0.455*** (0.139)	0.193 (0.129)	0.320*** (0.076)	0.395** (0.142)
Non exec D <sub>t-1</sub>	-0.397*** (0.104)	0.072 (0.091)	0.036 (0.075)	0.156** (0.058)	0.322*** (0.093)	0.036 (0.122)	0.132 (0.110)	0.066 (0.116)	0.100 (0.073)	0.182* (0.095)
Non exec D <sub>t-1</sub> x %cash <sub>t-1</sub>	1.026*** (0.266)	-0.112 (0.277)	-0.203 (0.203)	-0.388* (0.199)	-0.421* (0.221)					
Non exec D <sub>t-1</sub> x %equity <sub>t-1</sub>						-0.406** (0.146)	-0.164 (0.173)	-0.144 (0.154)	-0.058 (0.105)	0.086 (0.157)
Total comp <sub>t-1</sub>	0.070 (0.044)	0.023 (0.041)	-0.074** (0.027)	-0.009 (0.021)	0.022 (0.037)	0.053 (0.045)	0.043 (0.042)	-0.061** (0.026)	-0.003 (0.021)	0.016 (0.039)
Age <sub>t-1</sub>	-0.005 (0.005)	-0.011** (0.005)	-0.004 (0.004)	-0.009*** (0.003)	-0.012** (0.005)	-0.005 (0.005)	-0.011** (0.005)	-0.005 (0.004)	-0.009** (0.003)	-0.011** (0.005)
Gender <sub>t-1</sub>	-0.059 (0.159)	0.052 (0.166)	-0.132 (0.154)	0.131* (0.070)	0.341** (0.133)	-0.060 (0.159)	0.056 (0.167)	-0.130 (0.154)	0.133* (0.070)	0.343** (0.133)
CEO duality <sub>t-1</sub>	-0.186** (0.083)	0.110 (0.070)	-0.021 (0.050)	0.064 (0.041)	-0.195** (0.068)	-0.191** (0.084)	0.111 (0.070)	-0.019 (0.051)	0.070 (0.042)	-0.186** (0.068)
Non exec <sub>t-1</sub>	-0.007 (0.005)	0.000 (0.004)	0.003 (0.003)	0.008*** (0.002)	0.016*** (0.005)	-0.007 (0.005)	0.001 (0.004)	0.003 (0.003)	0.008*** (0.002)	0.016*** (0.005)
Board size <sub>t-1</sub>	-0.086*** (0.025)	0.035* (0.018)	-0.042*** (0.012)	0.030*** (0.009)	0.080*** (0.021)	-0.084*** (0.025)	0.033* (0.018)	-0.043*** (0.012)	0.029*** (0.009)	0.079*** (0.021)
Size <sub>t-1</sub>	-0.820*** (0.041)	0.379*** (0.035)	0.109*** (0.028)	0.241*** (0.021)	0.704*** (0.033)	-0.832*** (0.040)	0.397*** (0.035)	0.118*** (0.028)	0.252*** (0.020)	0.714*** (0.031)
BM <sub>t-1</sub>	-1.330*** (0.129)	0.617*** (0.129)	-0.749*** (0.087)	0.283*** (0.060)	0.483*** (0.086)	-1.334*** (0.131)	0.626*** (0.134)	-0.744*** (0.087)	0.288*** (0.060)	0.486*** (0.087)
ROE <sub>t-1</sub>	-0.022 (0.164)	0.133 (0.156)	0.145 (0.099)	-0.098 (0.090)	0.108 (0.128)	-0.048 (0.165)	0.147 (0.160)	0.150 (0.098)	-0.083 (0.091)	0.133 (0.131)
ROA <sub>t-1</sub>	-0.068 (0.574)	-0.055 (0.602)	0.645* (0.354)	0.389 (0.264)	-0.841* (0.407)	-0.066 (0.588)	0.029 (0.625)	0.682* (0.353)	0.431 (0.270)	-0.804* (0.416)
Observations	133,089	133,089	133,089	133,089	133,018	133,089	133,089	133,089	133,089	133,018
R-squared	0.627	0.236	0.079	0.282	0.426	0.625	0.230	0.078	0.277	0.426

**Table 2B (continued)**

Interaction Effect with Compensation and Percentage of Non-Executives on the Board (Table 9 Full).

	Panel C					Panel D				
	(11) E outcomes	(12) E intentions	(13) S outcomes	(14) S intentions	(15) ESG score	(16) E outcomes	(17) E intentions	(18) S outcomes	(19) S intentions	(20) ESG score
%stock <sub>t-1</sub>	-0.362** (0.141)	0.574*** (0.153)	0.051 (0.111)	0.434*** (0.084)	0.533*** (0.137)					
%option <sub>t-1</sub>						0.641*** (0.172)	-0.224 (0.165)	0.279* (0.137)	-0.186* (0.099)	-0.289 (0.178)
Non exec D <sub>t-1</sub>	-0.052 (0.105)	0.124 (0.105)	0.028 (0.085)	0.139* (0.066)	0.225** (0.096)	-0.160 (0.104)	0.041 (0.072)	0.011 (0.088)	0.058 (0.045)	0.230** (0.076)
Non exec D <sub>t-1</sub> x %stock <sub>t-1</sub>	-0.300 (0.181)	-0.227 (0.211)	-0.097 (0.165)	-0.185 (0.121)	0.000 (0.165)					
Non exec D <sub>t-1</sub> x %option <sub>t-1</sub>						-0.114 (0.265)	0.064 (0.247)	-0.156 (0.249)	0.131 (0.127)	0.047 (0.284)
Total comp <sub>t-1</sub>	0.070 (0.042)	0.050 (0.044)	-0.048* (0.025)	0.004 (0.021)	0.023 (0.037)	0.019 (0.043)	0.089** (0.038)	-0.055** (0.024)	0.033 (0.019)	0.067* (0.037)
Age <sub>t-1</sub>	-0.005 (0.005)	-0.012** (0.005)	-0.005 (0.004)	-0.009*** (0.003)	-0.012** (0.005)	-0.003 (0.005)	-0.014*** (0.005)	-0.004 (0.004)	-0.011*** (0.003)	-0.014** (0.005)
Gender <sub>t-1</sub>	-0.042 (0.159)	0.041 (0.166)	-0.129 (0.154)	0.121* (0.068)	0.325** (0.131)	-0.040 (0.157)	0.053 (0.168)	-0.121 (0.153)	0.130* (0.071)	0.337** (0.132)
CEO duality <sub>t-1</sub>	-0.203** (0.083)	0.113 (0.071)	-0.029 (0.050)	0.068 (0.041)	-0.182** (0.068)	-0.188** (0.083)	0.097 (0.071)	-0.028 (0.050)	0.056 (0.042)	-0.199** (0.068)
Non exec <sub>t-1</sub>	-0.007 (0.005)	0.001 (0.004)	0.004 (0.003)	0.008*** (0.002)	0.016*** (0.005)	-0.008 (0.005)	0.002 (0.004)	0.004 (0.003)	0.008*** (0.002)	0.017*** (0.005)
Board size <sub>t-1</sub>	-0.083*** (0.025)	0.031 (0.018)	-0.043*** (0.012)	0.028** (0.010)	0.078*** (0.021)	-0.082*** (0.025)	0.031 (0.018)	-0.043*** (0.012)	0.028** (0.010)	0.078*** (0.021)
Size <sub>t-1</sub>	-0.830*** (0.040)	0.396*** (0.035)	0.118*** (0.029)	0.251*** (0.020)	0.711*** (0.030)	-0.835*** (0.040)	0.400*** (0.035)	0.117*** (0.028)	0.254*** (0.020)	0.716*** (0.030)
BM <sub>t-1</sub>	-1.303*** (0.130)	0.597*** (0.131)	-0.741*** (0.088)	0.268*** (0.059)	0.453*** (0.086)	-1.311*** (0.131)	0.616*** (0.133)	-0.733*** (0.088)	0.283*** (0.061)	0.475*** (0.088)
ROE <sub>t-1</sub>	-0.036 (0.164)	0.141 (0.159)	0.151 (0.100)	-0.089 (0.093)	0.124 (0.129)	-0.009 (0.164)	0.131 (0.158)	0.158 (0.100)	-0.095 (0.093)	0.108 (0.130)
ROA <sub>t-1</sub>	-0.137 (0.576)	0.047 (0.630)	0.660* (0.356)	0.447 (0.273)	-0.785* (0.413)	-0.146 (0.582)	0.012 (0.633)	0.651* (0.354)	0.420 (0.278)	-0.808* (0.416)
Observations	132,185	132,185	132,185	132,185	132,114	132,197	132,197	132,197	132,197	132,126
R-squared	0.627	0.232	0.077	0.279	0.427	0.626	0.228	0.078	0.272	0.423

Note: This table documents the regression results including an interaction effect of the relationship between the proportion of cash compensation (Panel A), equity compensation (Panel B), stock compensation (Panel C), and option compensation (Panel D), the level of non-executive board members on the board and the five different CSR variables. The independent variables, together with the control variables are lagged by one year. The compensation variables are measured as the proportion of cash and equity over the total value of an executive's compensation. The dummy variable for the level of non-executive board members is defined by separating the sample on the median level of the percentage of non-executive board members in a high level and low level. The superscripts \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The model uses robust standard errors clustered on firm and year level. Please find this table including all control variables reported in the appendix

