Pay-checks with a Purpose: Exploring the Link between CEO Compensation and Corporate Sustainability

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Abstract

This study explores the impact of CEO compensation structure on corporate sustainability practices. Prior research has shown that incorporating CSR metrics into compensation packages does n**o**t yield desired outcomes and our analysis aligns with these findings. Consequently, our investigation delves into which compensation attributes effectively enhance substantial sustainability strategies. By distinguishing between the cash and equity components of CEO compensation, we scrutinize their influence on intentions and outcomes of sustainability behaviors. Given the presence of information asymmetry and investor opacity, the market tends to appreciate symbolic corporate sustainability gestures, whereas significant sustainability investments may not be promptly recognized as value-enhancing. This dynamic may discourage CEOs from allocating resources to enhance the firm's substantial environmental performance. Employing an empirical approach, we discover that equity compensation is indeed negatively related to environmental outcomes. Furthermore, at a detailed level, it exhibits positive associations with environmental intentions, social intentions, social outcomes, and an ESG score, typically associated with sustainability initiatives characterized by short-term horizons and moderate costs. In contrast, cash incentives show a positive relationship with environmental outcomes, particularly concerning long-term, resource-intensive sustainability investments. 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)

The world we know today will no longer exist if financial performance remains the only focus of financial markets and thereby of firms. Disregarding the externalities firms produce will eventually create a world full of environmental disasters which will negatively affect all of humankind. As firms generate a large part of emissions, use massive amounts of clean water and produce a lot of waste, this group is uniquely qualified to make a change which will significantly improve the world we will live in tomorrow. The triple bottom line principle emphasizes not only 'profit' but also 'people' and the 'planet'. This principle demands that firms not only seek financial but also sustainability performance, and pursue a broader stakeholder value maximization strategy.

Although this broader stakeholder view is becoming more widely accepted, a major unanswered question is how corporations can be motivated to assume this broader view. By having to focus not only on profit but also on people and the planet, the problem of simultaneously targeting multiple objectives arises (Holmstrom & Milgrom, 1991). Especially when the different tasks differ in their tangibility, one would focus on the more tangible tasks while disregarding the more intangible tasks. Much of the literature has focused on the role of shareholders (e.g., Edmans, 2011; Flammer, 2013; Krueger et al., 2020) or the board (e.g., Dodd et al., 2022; Harjoto & Wang, 2020) and how they encourage firms to pursue a broader perspective. Yet, there is little research on incentivizing CEOs through their compensation packages to achieve this. The traditional executive compensation literature predominantly focuses on the minimization of agency problems and alignment of interest concerning financial performance (Baker et al., 1988; Ehrenberg & Milkovich, 1987; Indjejikian, 1999). How CEOs can be incentivized financially to take a broader view, has received limited attention in extant literature. Therefore, there is a need for research to examine in which ways firms can construct a compensation scheme to incentivize not only for profit but also for people and the planet.

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 and equity, differently affect sustainability behaviour. 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; and environmental and social *intentions* which are more *symbolic*.) using Wittkowski et al.'s (2003) multi-criteria rank ordering algorithm.[1] We find that at a granular level, a large proportion of equity compensation relates positively to environmental intentions, social intentions, and social outcomes, activities that are typically associated with short-term horizons and moderate costs. Equity compensation also positively relates to the overall ESG rating. In contrast, the proportion of cash compensation relates positively to environmental outcomes, particularly concerning long-term, resource-intensive sustainability investments. By further disentangling the equity proportion of compensation in stock and option grants, we find that the more risk-discouraging stock grants drive the negative relation between equity compensation and environmental outcomes.

The rationale behind these findings is that when the impact of the market and, consequently, the stock price is diminished, and thereby the influence of internal agents is more significant, CEOs are more inclined to opt for a long-term resource-intensive CSR strategy emphasizing environmental outcomes. We test this channel by interacting the compensation variables with the percentage of non-executive board members and find conforming results. An increase in influence of internal agents that are not affected by the market strengthens the effect of a high proportion of cash compensation. Overall, our findings challenge the conventional wisdom that equity compensation invariably promotes CEOs' long-term perspectives. Further robustness tests show that the relationship between compensation and CSR variables also holds over more years, is not driven by the appointment of a new CEO, and is not related to the inclusion of CSR metrics in the compensation schemes. We also find that intentions do not predict future outcomes.

CEO compensation schemes drive various aspects of corporate decision-making. In particular, they incentivize financial value creation and eliminate or reduce agency problems. Baker et al. (1988) describe how different internal incentive structures influence corporate behaviour. They argue that traditional economic theory poorly explains incentive systems and find that incentive structures often do not yield the desired result (Baker et al., 1988). Holmstrom and Milgrom (1991) explain that multi-dimensional tasks are ubiquitous in business. As such, it is challenging to create an incentive structure that meets all dimensions of the triple bottom line simultaneously. By incentivizing one dimension, one potentially

[1]The 333 metrics are either attributed to social and environmental intentions include reporting, monitoring, targets and activity metrics, whereas social and environmental outcomes include performance and controversy metrics. The appendix provides a detailed breakdown of the variables environmental intentions and outcomes, and social intentions and outcomes.

discourages others (Holmstrom & Milgrom, 1991). In our case, managers seek to meet financial and sustainability objectives simultaneously. Bebchuk and Fried (2003) provide the managerial rent-seeking perspective, where the incentive structure is part of the agency problem itself as it becomes the focus, instead of a means to it. Besides the multitasking problem of executive compensation, Bebchuk and Tallarita (2022) discuss the problem of outside reviewability. When goals are hard to define and as a result even harder to measure, control from an outside agent becomes very difficult.

While designing executive compensation schemes is becoming increasingly challenging, the significance of compensation remains paramount. Recently, Edmans et al. (2022) provide survey outcomes on the objectives, constraints, and determinants of CEO pay. In particular, 34% of directors and 51% of investors consider the design of a motivating compensation structure as the primary objective. Two other priorities are keeping the pay level down and attracting the right CEO. Overall, their research underscores the significance of effective incentive structures within compensation packages.

The prevailing approach remains linking a CEO's remuneration to the company's stock-market price via stock or options even though literature indicates that the stock market does not consistently prioritize high sustainability performances. For instance, Edmans (2011) demonstrates that the market does not fully value intangibles, even if information on CSR is transparently available. Markets may take up to four years to reflect their value in stock prices. Recently, it has become popular to include CSR metrics in the performance targets of the CEO. Yet, this implementation does not have the desired effect on sustainability performance (Bebchuk & Tallarita, 2022; Fabrizi et al., 2014; Maas, 2018). Walker (2022) suggests that this is partly due to the insignificance of the size of CSR-linked compensation.

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 orientation of equity compensation and the short-term orientation of cash compensation in relation to sustainability performance. Whereas equity compensation is typically associated with a long-term perspective due to its dependence on the company's market valuation, cash compensation is frequently seen as a short-term motivator.

Not every form of sustainability has the same impact on profit, people and the planet. Improvements in CSR intentions are potentially quick to achieve at relatively low costs but often have limited actual sustainability impact. Improvements in CSR outcomes take longer to

achieve and are costly to realize but have a substantial sustainability impact. Because of information asymmetry and long-term uncertainties, the market may perceive such investments as a cost that negatively impacts the firm's financial performance, while it is considered value-enhancing from the firm perspective.

CEOs that receive a large part of their compensation in the form of equity, may be more sensitive to the response of the market resulting from the potential impact of costly long-term investments. When shareholders do not recognize the long-term benefit, the cost aspect will prevail with a negative effect on equity prices. High cash compensation, combined with low equity compensation, alleviates the burden, or opportunity costs for a CEO, of the market punishing substantial CSR investment, facilitating long-term CSR investments (Walker, 2022). We hypothesize that a low proportion of equity compensation, relative to cash, will result in long-term environmental outcomes improvement, while a high proportion of equity compensation will drive CEOs towards environmental intentions and lower-cost social performance improvements. We anticipate that the adverse impact of equity compensation on environmental outcomes is driven by stock grants, which are known to discourage risk-taking. Our empirical results confirm these hypotheses.

This study contributes to the existing literature in several ways. First, it provides new insights in executive compensation research (Baker et al., 1988; Bebchuk and Fried, 2003; Edmans, Gosling, et al., 2022; Frey and Jegen, 2001; Holmstrom and Milgrom, 1991), as it expands the role of executive compensation from financial performance alone, to a triple bottom line view. This expansion provides a contradicting perspective of the long-term focus of equity compensation and the short-term focus of cash compensation.

Second, although most people agree on the severity of environmental change and the importance of sustainable behaviour, finance research has not yet reached a consensus on what this desirable sustainable behaviour exactly entails, how it should be measured, and how it should be valued. By differentiating between various aspects of sustainability, a concept that has so far mostly been seen as a single metric, we provide a more detailed understanding of how the 'level of sustainability' of a firm is composed, how to measure the different elements in a more objective way, who values which element of sustainability and how that translates into a firm strategy incentivized by the compensation structure. Karim et al. (2018) examine how the compensation elements of equity and cash are connected to a company's comprehensive sustainability performance score. Although we separate CEO compensation in the same way, we study their alternative effects on specific types of sustainability strategy

instead of just considering an overall sustainability score. This is especially relevant as one not only cannot generalize all types of sustainability investments, but also because the existing ESG ratings and their foundations are too ambiguous (Berg et al., 2022a).

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

II. Literature and Hypotheses development

In this section, we introduce corporate social responsibility and its place in today's financial market. We will elaborate on the potential value implications of CSR to a firm from an investor's perspective. We find that investors do not see every type of sustainability investment as value-enhancing. Then, we will show how investors' valuations of CSR can influence a firm's sustainability strategy through the compensation package of a CEO. Linking a large proportion of compensation to the stock price through equity compensation could discourage a CEO from pursuing larger and more risky sustainability investments.

Corporate Social Responsibility

The separation theorem of Friedman (1970) poses 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 afterwards; 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 judge the costs of externalities, and who is willing to pay for them. From an academic perspective, the relationship between financial performance and various sustainability aspects is relevant (Awaysheh et al., 2020; Barnett & Salomon, 2012; Freiberg et al., 2020; Lopatta et al., 2022; Pástor et al., 2021; Wang et al., 2008). This line of research attempts to answer the question of who pays for externalities and how investors decide on which companies to provide capital (Edmans et al., 2022; Krueger et al., 2020). The relationship is likely conditional, as there is a multitude of factors influencing the effect of CSR on a firm's financial performance (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. Krueger et al. (2020) argue that investors value positive CSR news after a history of poor CSR performance. Furthermore, Flammer (2013) finds that a strong CSR strategy has an insurance-like effect in unfavourable future events: stock prices increase when corporations behave responsibly and decrease when they act irresponsibly. The negative effect dominates the positive effect, and marginal returns are diminishing. 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). Although investors care about investing sustainably, Heeb et al. (2023) find in their experiment an unwillingness to pay more for more impact. Given these results, they see a prosocial investor as a "warm glow" optimizer. In other words, it is more important for investors to invest sustainably, as a yes or no question, than what the actual impact of the investments is. An investor's time horizon has, next to previous 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.

While these studies highlight that shareholders value some level of firm sustainability, there are different ways and levels of being sustainable. In the case of abnormal CSR (Lopatta et al., 2022), the marginal cost 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; Krueger et al., 2020; Krüger, 2015; 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 a 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 Krueger et al. (2020) show that there is mispricing in the market as climate risk is not priced completely. Also, Edmans (2011) finds that it can take up to four years for different forms of intangible assets to be correctly priced in 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.

People are motivated to do the right thing more often than not. But this highly depends on the cost they have to bear for this moral. In a recent study, 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 to do good is high among participants, it depends strongly on their personal costs (Hart et al., 2022).

Sustainability is now an undeniable concern for businesses, requiring a shift from profit-centric thinking to a broader focus on people and the planet. While investors appreciate sustainability strategies, the relationship is not straightforward, as some sustainability investments may not enhance a company's value. It is crucial to examine how investors impact sustainability strategies to achieve a strong triple bottom line, with market value and compensation playing key roles.

Compensation

Besides tying manager compensation to firm financial performance, supporters of stakeholder value suggest tying it to environmental, social and governance goals. The latter should encourage managers to enhance the well-being of stakeholders; however, recent literature has contradicted this notion. Bebchuk & Tallarita (2022) identify two structural problems with the inclusion of ESG metrics into compensation structures. First, ESG metrics often only 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 the 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 schemes 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 applied in CEO compensation structures prove to be ineffective (Fabrizi et al., 2014; Maas, 2018). In most cases, the inclusion of corporate social performance targets in executive compensation does not lead to better corporate social 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 interest with the interest of shareholders hurt CSR. Walker (2022) partly explains this, by challenging the economic significance of ESG-based pay, stating that the 4.2% found by Flammer, Hong and Minor (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 have an effect on the incentive structure for a CEO (Walker, 2022).

The original intent of tying a portion of an executive's compensation to the firm's performance is to address and reduce the agency problem. Baker et al. (1988) show that financial incentives are a substantial driver 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 schemes (Bebchuk and Fried, 2006; Cheng and Farber, 2008; Cheng, 2004; Frey and Jegen, 2001; Gopalan et al., 2014; Prendergast, 1999). Edmans et al. (2022) find in a survey that 34% of directors and 51% of investors identify 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 that arises when ESG metrics 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 around 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 scheme that encompasses sustainability is challenging. Furthermore, Bebchuk & 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). For all those

different stakeholder interests, ESG metrics 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.'s (2022) survey findings, directors hold the belief 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 intangibles are not valued by the equity market, this hurts the use of stock price-linked compensation. Indeed, equity compensation can create an opportunity cost for CEOs when they are focussing their efforts and investments on these intangibles or secondary tasks (Walker, 2022). This argument is in line with the notion that directors and investors see the world differently and therefore value strategies in different ways (Edmans, Gosling, et al., 2022). 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 argumentation may be counterintuitive, as equity compensation is commonly known to incentivize against myopic behaviour and to favour 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; M. Harjoto et al., 2017; Wang et al., 2008), the market would likely punish the company. CEOs require a different compensation scheme to address stakeholder needs effectively, enabling them to adopt a sufficiently long-term perspective while remaining unaffected by short-term investors’ biases.

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.

Equity compensation's emphasis on long-term perspectives primarily centres around profit, often overlooking the well-being of both people and the environment. To improve on all three dimensions, one needs a better understanding of the different aspects of incentives. Bénabou & Tirole (2010) distinguish between three interdependent motivations behind socially responsible behaviour. First, there is genuine, intrinsic altruistic motivation. Second, there can be material incentives through, for example, tax reductions. Third, there is social and self-esteem motivation which affects how we are perceived by others and how we perceive ourselves. The first motivation is very personal for an individual. Together with a CEO's reputation, intrinsic motivation is seen as most important (Edmans et al., 2022). The second motivation, the material incentive, can be influenced through a proper incentive program.

Financial incentives can also reinforce intrinsic and reputational incentives, which are the first and third motivations from Bénabou & Tirole (2010). Executives desire compensation which is based on fairness, recognition, and reputation (Edmans, Gosling, et al., 2022; Walker, 2022). When pay is perceived as unfair, this could erode intrinsic motivation (Edmans et al., 2022). An important aspect of fairness and reputation is being able to compare compensation between firms. Flow incentives, such as annual pay, bonuses, and current-year equity compensation grants, are easier to compare between peers than portfolio incentives. Also, changes in flow pay have a bigger effect on a CEO's reputation, as they require a decision by the board and a positive vote from shareholders.

Most CEO compensation packages consist mainly of a cash and an equity component. 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 stock and stock options are granted, the market eventually decides upon its 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 high proportion of cash relative to equity 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 high proportion of equity relative to cash compensation in the CEO compensation package positively relates to environmental intentions, social intentions and social outcomes.*

Behavioral agency theory argues that option pay is fundamentally different from stock ownership when it comes to managerial responses to downside risk. While Karim et al.'s (2018) study treats equity compensation as a unified factor, prior research has indicated that stock and stock options can influence the risk-taking behavior of recipients differently. The direct correlation between CEO wealth and firm value for stock holdings introduces potential downside risk that could deter risk-taking. On the other hand, 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 Armstrong & Vashishta (2012), Coles et al. (2006), and Guay (1999), we anticipate that this negative relationship between equity compensation and environmental outcomes primarily arises from the proportion of stock grants. In our first hypothesis, we propose that a higher proportion of equity compensation, due to the opportunity costs associated with information asymmetry, leads to a detrimental effect on environmental outcome performance. 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 performance 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 high proportion of stock option grants relative to stock grants in a CEO compensation package positively relates to environmental outcomes.*

Furthermore, we hypothesize that the compensation structure has the same relation to the Refinitiv ESG score. As investors often use ESG ratings to judge the firm's sustainability performance, we expect a high level of equity compensation to affect the Refinitiv ESG score positively. 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 high proportion of equity relative to cash compensation in a CEO compensation package positively relates to the Refinitiv ESG score.*

The rationale behind the hypotheses 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 therefore more significant, CEOs are more inclined to opt for a CSR strategy emphasizing environmental outcomes. In line with this rationale, we would 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 & Wang, 2020). One element of influence is the share of non-executive board members. An example is the

increase in voluntary disclosure (Chen & Jaggi, 2000; Donnelly & Mulcahy, 2008) in firms with a larger percentage of non-executives on the board. Although non-executive board members are not necessarily 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 corporate social responsibility became more relevant (Ibrahim & Angelidis, 1995).

Because of these reasons, we believe that the percentage of non-executive members on the board is a good indicator of the focus on financial 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 influence of the CEO is stronger than that of the board. To examine this rationale, we explore if the relationship we predict in hypothesis H1 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 level of non-executive board members.*

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

Karim et al. (2018) find that a firm's social performance is negatively associated with the proportion of cash-based compensation, while performance is positively associated with the equity-based proportion of compensation. We extend their work by adopting a more granular approach toward sustainability measurement. Billio et al. (2021) show that ESG ratings from rating agencies often correlate poorly. Moreover, there is evidence that ESG ratings do not adequately reflect a firm's sustainability achievements (Berg et al., 2022a). Therefore, we produce sub-scores that explicitly distinguish between environmental and social sustainability aspects and sustainability intentions and outcomes.

III. DATA & METHODOLOGY

This section introduces the data we use in our analysis. Furthermore, we elaborate on the sub-score construction of our CSR variables. Last, we provide insights into the characteristics of the firms in the sample by providing summary statistics and correlations.

Data description

We focus our analysis on U.S. firms. To examine the relationship between CEO compensation and CSR, we collect and merge data from several sources. We obtain environmental and social activity and performance information from Refinitiv ESG from 2006 to 2020. Refinitiv ESG data include 136 individual environmental and 197 individual social variables. Refinitiv ESG also provides standardized ESG scores and sub-scores. Individual variables for environmental performance include, e.g., 'policy for water efficiency', 'whether the company has an environmental management team', and 'CO2 emissions'. Social performance variables include e.g. '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 indicates whether the CEO's compensation package includes ESG targets.

We merge Refinitiv ESG data with ExecuComp. We determine the compensation package structure by 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 amount of cash and equity compensation, we calculate the proportions of cash- and equity-based compensation as in Karim et al. (2018). We also introduce a dummy variable (*Sust. Comp*) that indicates whether there are any forms of CSR-based compensation in the executive's compensation package.

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. We select relevant environmental and social variables based on the materiality criteria of the Sustainability Accounting Standards Board (SASB). In some cases, we take the negative value of the variables to ensure that a higher value implies a positive sustainability effect. Next, we group these variables into six categories: policy, reporting, target, activity, performance, and controversy following Bams et al. (2022). We define *environmental outcome* variables as SASB material environmental variables that belong to the categories *performance* or *controversy* and *environmental intention* variables as SASB material environmental variables that belong to the categories *activity*, *policy*, *reporting*, or *target*. The *social outcome* and *social intention* variables are defined analogously. We classify sustainability information 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 et al.'s (2003) multi-criteria rank-ordering algorithm. This algorithm applies at the firm-year level and ranks each firm's annual information in one of the four categories relative to all other firm-year information. 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 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 never strictly better. In all other cases, two firm-years are neither superior nor inferior compared to each other. The algorithm accounts for missing observations. In such a case, comparing two firm-years follows from all remaining available variables.[2]

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. (2003) show that the resulting rankings asymptotically converge to a normal distribution, when the number of firm-years gets large, allowing the ranking to be interpreted as a score. We standardize the rankings to a 0 to 10 scale, where 0 means the firm scores poorly on a particular aspect, and 10 means it scores excellent.

[2]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 requires any weights being attributed to variables.

Using this algorithm we compute an *Environmental Outcomes Score*, an *Environmental Intentions Score*, a *Social Outcomes Score*, and a *Social Intentions Score*. This type of distinction is relevant as each of them requires different levels of investment, has a different investment horizon, and has a different sustainability impact. *Environmental Intentions* are relatively cheap to achieve in a short time. Their resulting environmental impact is limited. *Environmental Outcomes* are costly and take a long investment horizon. The subsequent environmental impact is 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 rating agencies differ a lot, with correlations ranging from 0.38 to 0.71 (Berg et al., 2022b), they have been widely used to make investment decisions. These ratings may not align with the anticipated or actual corporate sustainability effort. However, they do reflect the market's perception and therefore we include them in our analyses as a reference point.

Descriptives

Following Maas (2018), Karim et al. (2018) and Fabrizi et al. (2014), our control variables include firm size (*lnMVE)* 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*). The company control variables are winsorised at the 1st and 99th percentile. With regard to CEO characteristics, we include age and gender following 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) and CEO power (CEO-chairman duality) also following Karim et al. (2018). Last, we control for total compensation.

Table 1 provides summary statistics for the CSR variables, the compensation variables, and the control variables. All CSR variables range from 0 to 10. Both the constructed CSR variables and the ESG score show significant dispersion, which suggests substantial 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% is paid out in equity (stock and options). This deviation between equity and cash compensation is stable over the different industries and time. Further, 22% of the sample includes some kind of 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 of the average size firm in the sample.

Table 2 shows correlations. Notable is the negative correlation between the aggregate Refinitiv ESG rating and the constructed *Environmental Outcome Score*. The correlation between the Refinitiv ESG Rating and *Environmental Intention Score*, the *Social Intention Score*, and the *Social Outcome* Score 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., 2022a). However, in our analyses, we exclude the governance variables which would 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 the environmental outcome score, while the proportion of equity is negatively correlated. This correlation reverses in the case of the environmental intention score, social intention score, social outcome score and the Refinitiv ESG score. Last, there is a high negative correlation between firm size and the environmental outcome score 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 into compensation schemes does not enhance every aspect of sustainability performance. Subsequently, we delve into our main findings, examining the relationship between cash/equity compensation and various aspects of sustainability performance. We further examine the relationship between cash/equity compensation and the different aspects of sustainability performance at the industry level to identify which industries drive the effect. Also, we subdivide equity further into stock and option compensation to provide a detailed explanation of our key findings. Lastly, we test the non-executive board members' channel as a validation for our hypothesis building and include robustness checks to support our main findings.

CEO compensation scheme based on CSR metrics

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

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

The dependent variable (CSR_{it}) in equation (1) is one of the following five: the Environmental Outcome score, the Environmental Intentions score, the Social Outcome score, the Social Intention score, or the Refinitiv ESG score. The relationship between CEO compensation and CSR strategy potentially suffers from endogeneity issues (Callan & Thomas, 2011). To control for this endogeneity, the regression equation uses one-year lagged explanatory variables as well as a two-year lag in the robustness analysis.[3] Therefore, $CONTROLS_{i,t-1}$ is the vector of lagged control variables, D_t denotes the year fixed effect for year *t* and F_i the industry fixed effect for firm *i*. The lagged sustainable compensation incentives dummy variable, $SustComp_{i,t-1}$, for firm *i* at time *t-1* equals 1 if the compensation package of the CEO includes some sort of CSR metrics.

Table 3 reports a negative and highly significant relationship between the 1-year lagged dummy variable for sustainable compensation and next year's environmental outcome score. The relationship with environmental intentions, social intentions and the Refinitiv ESG score is significantly positive. These findings suggest that sustainable compensation relates to intentions that are easy to achieve at low cost, and negatively relate to actual environmental outcomes.[4] The relationship with social outcomes is insignificant. Overall, we conclude that the inclusion of CSR metrics in compensation schemes does not affect all sustainability aspects positively. These results confirm the earlier findings by Maas (2018) and Bebchuk & Tallarita (2022) who show that corporate social responsibility targets in executive compensation do not automatically lead to better corporate social performance. Besides confirming earlier results using recent data, these findings also contribute to the validation of our sub-scores construction.

Cash and equity compensation

The previous section shows that the inclusion of CSR metrics in compensation packages does not have the desired effect. Environmental outcomes significantly worsen. The issue at hand is identifying what enhances environmental outcomes. Dissecting the compensation

[3] However, reverse causality is unlikely as the ESG performance would unlikely influence the compensation scheme. Instead, compensation schemes influence firm performance and in this case sustainability performance in particular.

[4] In the robustness analyses we test for the relationship between intentions and outcomes. Although one would expect outcomes to follow intentions, intentions are no predictor for outcomes.

package into a cash and equity component helps to clarify if, when and to what extent CEO compensation schemes could lead to improved environmental outcomes. We start by estimating the following model for the full sample.

$$CSR_{it} = \beta_0 + \beta_1 pCOMP_{i,t-1} + \gamma' CONTROLS_{i,t-1} + D_t + F_i + \varepsilon_{it}, \quad (2)$$

The dependent variables and control variables in equation (2) are the same as in equation (1). The variable *pCOMP* reflects either the proportion of total compensation in cash (*pcash*) or the proportion of total compensation in equity (*pequity).*[5] 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 *pcash* and the environmental outcome score. The first column only includes the proportion of cash as an explanatory variable. In column 2, total compensation, together with the CEO-level control variables are added to the model and the positive relationship continues to hold. Also, after adding board controls (column 3) and firm controls (column 4) the relationship remains. By including year fixed effects (column 5) and industry fixed effects (column 6), the coefficient becomes smaller yet 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 (*pcash*) perform better in terms of environmental outcomes.

The finding that a high proportion of cash compensation and thereby a low proportion of equity compensation indeed has a positive relation with environmental outcomes supports hypothesis H1. This finding is in line with the existing literature showing that the market does not fully price in climate risk. CEOs would lose part of their equity compensation if they would make large and high-risk investments to improve firm's environmental outcomes. That is why, through a higher proportion of cash compensation, CEOs are not limited by the opportunity costs of 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 cash

[5] We do not test for the relationship between total compensation and the CSR strategies because total compensation is too strongly correlated with firm size. However, total compensation is included as a control variable.

compensation is completely set within the firm which reduces information asymmetry and opaqueness.

In Panel B of Table 4, we pursue the same stepwise regressions for the proportion of equity (*pequity)*. 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 different 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. The results in Panel B are for the most part in line with hypothesis H2, showing that a high proportion of equity has a positive relationship with the ESG score, the environmental intentions score and the social intentions score. These findings are in line with the notion that equity compensation incentivizes the CEO to pursue strategies that are recognized and rewarded by the market. The Refinitiv ESG rating score is mostly driven by intentions, which likely explains the positive relationship. A high proportion of equity does not have a significant relationship with social outcomes, which is in contradiction with hypothesis H2. These analyses all include CEO, board and company control variables, and industry and year fixed effects.

Hypothesis H2 can therefore be generally 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. This contributes to the literature showing the market's valuation of sustainable investments. Consistent with the existing literature, a moderate level of sustainability is appreciated. But when sustainability investments become 'abnormal' the market evaluates this as value diminishing. That is why CEOs with a higher proportion of equity compensation focus mostly on social and environmental intentions. These variables also have the highest correlation with the Refinitiv ESG score. In line with this correlation, hypothesis H4 can be confirmed as we indeed find that a higher proportion of equity compensation has a positive relation with the Refinitiv ESG score.

Industry Effects

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 *pcash*, 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 a subsequent analysis at the industry level, to more accurately determine the relation between cash compensation and environmental outcomes.

Table 6 shows the regression results at the industry level. When $pcash$ acts as the explanatory variable, the positive significant relationship is mostly driven by two industries, namely 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 *pcash* leads to a 5% standard deviation variation in the environmental outcome score for Manufacturing, and 15% standard deviation for Transportation & Public Utilities. Construction also shows a positive relationship yet is insignificant, possibly because of the smaller sample size of this industry.

Industries can be alternatively classified into service and manufacturing sectors. In this distinction, it becomes evident that the effect is primarily driven by manufacturing industries, with no discernible impact observed in service sectors such as Retail Trade and Finance. Intuitively these results make sense, as the industries that pollute the most by design, i.e. manufacturing, have the most to improve and therefore gain from a compensation structure that allows for large investments in enhancing environmental outcomes. Although the effect is driven by manufacturing industries, this does not mean it is only an industry effect, as we control for the differences per industry in the main analysis through fixed effects.

Stock awards versus option awards

Next, we differentiate between stock and option awards within the equity compensation package as literature suggests that these two compensation elements can have a different effect on risk-taking behaviour (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999). We repeat the analysis with equation (2), but use the proportion of stock awards (*pstock)* and the proportion of option awards (*poption)* instead of the proportion of equity. Table 7 documents that stock awards have a strong negative relation with environmental outcomes whereas option awards show a positive relationship. These results are in line with the notion that option awards are more likely to motivate risk-taking behaviour (Sanders & Hambrick, 2007). As option awards, unlike stock awards, are insensitive to downside risk, CEOs are known to take more risk when a large part of their compensation exists of option awards (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999). As option compensation is less sensitive to downside risk, it allows CEOs to take higher risks, i.e. large sustainable investments. On the opposite

side, stock awards are sensitive to downside risk and thereby to mispricing in the market due to information asymmetry and opaqueness. Therefore, these results are in line with the literature showing that stock awards motivate less risk-taking behaviour. The contrary results of stock and options awards are a potential explanation for the insignificant relationship between equity compensation and environmental outcomes that we reported in Table 4 and Table 5.

Consequently, hypothesis H3 is supported by these findings. This contributes to the literature which links stock and option awards to the strategic risk CEOs are willing to take. 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 are performing better on environmental outcomes. This is in line with previous findings that option awards promote risk-taking. Stock awards, on the other hand, are known to promote a more conservative strategy as they are more sensitive to downside risk. This is in line with the findings 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.

Non-Executive Board Members Channel

In the literature review and hypotheses development, we argue that equity compensation has a negative relation with environmental outcomes because the market punishes 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 is diminished, and thereby the impact of internal agents is more significant, CEOs are at liberty to follow a CSR strategy focussing on environmental outcomes. We test for this channel; we analyse if the relationship we find in our main analysis increases if the influence of the market is further reduced. We do this by including the level of non-executive board members (high versus low) and see if this affects the relationship between compensation structure and CSR strategy. For this analysis, we create a dummy variable (NonExec) to separate between firms with a high and low level of non-executive board members based on the median level. We hence estimate the following model:

$$CSR_{it} = \beta_0 + \beta_1 pCOMP_{i,t-1} + \beta_2 NonExec_{i,t-1} + \beta_1 pCOMP_{i,t-1} \times \beta_2 NonExec_{i,t-1} + \gamma' CONTROLS_{i,t-1} + D_t + F_i + \varepsilon_{it} \quad (3)$$

Table 8, 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. This finding aligns with the rationale 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 more inclined to opt for a CSR strategy emphasizing environmental outcomes. Moreover, a heightened presence of non-executive board members exhibits a favourable 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 8 demonstrates that in the presence of a high level of non-executive board members within a company, this significant negative effect disappears.

Table 8, Panel B shows that only in case of environmental outcomes the level of non-executive board members 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. The relationship with environmental outcomes is potentially driven by the high correlation between *pcash* and *pequity*. Therefore, we include an additional analysis separating the stock and option component of *pequity*. Table 9 shows that the significant interaction effect between *pequity* and environmental outcomes vanishes when we further divide the equity holdings into a stock component (*pstock)* and an option component (*poption)*. Otherwise, the interaction effects remain unchanged, showing that when a CEO gets a high proportion of his or her compensation in the form of stock and options, the level of non-executive board members does not influence the sustainability strategy of the firm. This may be because a CEO's power outweighs the influence of the board.

These findings confirm hypothesis H5a. By including the interaction effect of the level of non-executive board members, the relationship we find for hypothesis H1 becomes stronger. This shows that, when the impact of the market is further diminished by a high level of non-executive members on the board, together with a large proportion of cash compensation for the CEO, this 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 balance more overall sustainability aspects, including the social outcomes and social

and environmental intentions. Also, hypothesis H5b can be confirmed as we do not find an additional effect of the level of non-executive board members on sustainability performance. This is in line with the notion that the decision power of the CEO 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 exercising a propensity score matching to better specify the relationship between the inclusion of CSR metrics in a CEO's compensation scheme and CSR performance. Next, we test if the relationship between cash/equity compensation and sustainability performances still holds in case we include the dummy variable which shows if some form of CSR metrics is included in the compensation scheme. Furthermore, we test for the relationship between environmental and social intentions and outcomes. Also, we rerun our main analysis using a two-year lag instead of a one-year leg for all independent variables. Lastly, we investigate if the effect in our main regression is driven by the appointment of a new CEO.

First of all, to further analyse the effect of the sustainability compensation incentive on CSR activities, we follow a propensity score matching approach. We employ a two-step approach, where we first perform the "nearest neighbour 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 in the CEO compensation scheme, and the control group by their absence. The sample is matched using the variables: year, industry, gender, age, size (lnMVE), 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 0.957, in favour of not including CSR metrics 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 -0.28 in favour of including it. This is in the same order of magnitude as social intentions (-0.30). The difference in social outcomes is insignificant. The ESG score indicates a difference of -0.70, favouring the incorporation of CSR metrics into the CEO compensation scheme. Consistent with Table 3,

CSR inclusion in compensation schemes favours low-cost easy-to-implement CSR strategies and discourages high-cost substantial environmental outcome investment.

In Table 11, we expand the model 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 (9) and (10) show that within a firm, the inclusion of CSR metrics in compensation schemes positively relates to both the social intentions score 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 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 take away the relationship between the compensation components and CSR performance. We hence estimate the following model:

$$CSR_{it} = \beta_0 + \beta_1 pCOMP_{i,t-1} + \beta_2 SustComp_{i,t-1} + \gamma' CONTROLS_{i,t-1} + D_t + F_i + \varepsilon_{it} \quad (4)$$

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 has the same sign, but both significance and size somewhat deteriorate in comparison with the results in Table 5. Overall, the implications remain unchanged.

In our analysis, we differentiate between sustainability intentions and outcomes. One would expect that current intentions lead to an improvement in future outcomes. However, Table 13 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.

As the next robustness analysis, we rerun the regression in equation (2) but use a two-year lag for all independent variables. Table 14 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. The sample becomes somewhat smaller as another year of data cannot be used due to the additional year of lagging.

Lastly, as the composition of compensation packages mostly changes with the appointment of a new CEO, we check for this specific event. Using a dummy for the appointment of a new CEO, Table 15 shows that we find no effect on any of the sustainability scores, besides social outcomes and the Refinitiv ESG score. This relation is 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 the social outcome score. These findings indicate that in the first year of the newly appointed CEO, there is additional focus on the factors influencing the ESG ratings by rating agencies.

V. CONCLUSION

This study examines the relationship between 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, results from one of the robustness tests show that intentions have no predicting quality over outcomes. This is why it is important to distinguish between the different aspects of sustainability strategies. From theory and literature, we propose 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 to follow a more substantial sustainability strategy.

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 stock and options.

Whereas the proportion of option compensation is also beneficial for a CSR strategy that is more focussed on outcomes, the proportion of stock compensation motivates towards 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 CEOs taking more risk, whereas stock awards are sensitive to downside risk making CEOs less risk-taking (Armstrong & Vashishta, 2012; Coles et al., 2006; Guay, 1999). This is in line with the notion that the market, represented by the stock price, values a lower level of CSR strategy investments. These strategies often focus on intentions which are often also most strongly represented in an ESG score. Consequently, an incentive program which focuses on stock compensation will motivate the CEO to follow a CSR strategy emphasizing intentions. Furthermore, the proportion of stock compensation is even negatively related to environmental outcomes, showing that through stock compensation, CEOs are actively disincentivized to make larger investments benefiting the improvement of environmental outcomes.

In contrast to equity compensation, the value of cash compensation is set within the firm by agents who have superior information regarding sustainable strategies. Therefore, we expect that when the influence of internal agents within the firm is even more significant and the influence of the market is further diminished, while CEOs receive a larger proportion of compensation in cash, they are more inclined to opt for a CSR strategy emphasizing 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 to 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 in stock and option awards, the level of non-executive board members does not have an effect. This is in line with the notion that the power of the CEO outweighs the influence of the board.

In conclusion, our study shows that indeed, compensation schemes focussing on equity compensation do not motivate for the triple bottom line. In contrast, when CEOs receive a higher cash and options component in their compensation packages, they are more inclined to opt for CSR strategies focussing on environmental outcomes. Especially in combination with a high level of non-executive board members this applies. Hence, if a board wants to improve the non-financial performance of a firm, it needs to put more focus on the proportion of cash

compensation. Through this channel, the influence of the market on sustainability strategies is reduced. As research shows, the market does not appreciate and thereby value all elements of corporate social responsibility.

This study contributes to several fields of research. First, it contributes to the sustainability and ESG literature examining the role of sustainability in the corporate governance of the firm (Bebchuk & Fried, 2003; Francoeur et al., 2017; Karim et al., 2018; Stanwick & Stanwick, 2001; Velte, 2019). Our results show that the way a CEO is compensated influences her sustainability strategy. Also, in line with Maas (2018), Fabrizi et al. (2014), and Bebchuk & Tallarita (2022), we show that including CSR metrics in a CEO's compensation scheme does not lead to substantial sustainability improvements.

Furthermore, this research contributes to the compensation and incentive literature analysing 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.

The biggest limitation of this study is the lack of available and reliable CSR data. The average firm in our sample is larger than the average size of all existing firms combined. Furthermore, as much of the available CSR information is self-reported, the reliability of this data is questionable. We attempt to reduce this limitation by separating the different elements of CSR between intentions and outcomes, but part of this limitation still stands. Lastly, the available CSR data has a lot of missing values. We counter this limitation by using the Wittkowski multi-criteria rank ordering algorithm to rate all firms within the sample.

For further research, we recommend using more and different CSR data to get a larger and more reliable view of a firm's sustainability performance. However, at this moment we are not aware of any data source that provides this. Furthermore, it would be interesting to get a better understanding of a CEO's underlying motivation to invest in environmental outcomes through interviews and or surveys.

References

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. *The 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, & 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, & 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

Cabezon, F. (2020). *Executive Compensation: The Trend Toward One Size Fits All* (SSRN Scholarly Paper 3727623). https://doi.org/10.2139/ssrn.3727623

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

Cassell, C. A., Huang, S. X., Manuel Sanchez, J., & Stuart, M. D. (2012). Seeking safety: The relation between CEO inside debt holdings and the riskiness of firm investment and financial policies. *Journal of Financial Economics*, *103*(3), 588–610. https://doi.org/10.1016/j.jfineco.2011.10.008

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

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

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

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

Durand, R., Hawn, O., & Ioannou, I. (2019). Willing *and* Able: A General Model of Organizational Responses to Normative Pressures. *Academy of Management Review*, *44*(2), 299–320. https://doi.org/10.5465/amr.2016.0107

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, June 26). 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-11624669882

Edmans, A., Gosling, T., & Jenter, D. (2022). *CEO Compensation: Evidence From the Field* (SSRN Scholarly Paper 3877391). https://doi.org/10.2139/ssrn.3877391

Edmans, A., Levit, D., & Schneemeier, J. (2022). *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* (SSRN Scholarly Paper 227391). https://papers.ssrn.com/abstract=227391

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* (SSRN Scholarly 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

Gopalan, R., Milbourn, T., Song, F., & Thakor, A. V. (2014). Duration of Executive Compensation. *The 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). https://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

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

Hart, O., Thesmar, D., & Zingales, L. (2022). *Private Sanctions* (SSRN Scholarly Paper 4238839). https://doi.org/10.2139/ssrn.4238839

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

Heeb, F., Kölbel, J. F., Paetzold, F., & Zeisberger, S. (2023). Do Investors Care about Impact? *The 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

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

Indjejikian, R. (1999). Performance Evaluation and Compensation Research: An Agency Perspective. *Accounting Horizons - ACCOUNT HORIZ*, *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

Kleindorfer, P. R., Singhal, K., & Van Wassenhove, L. N. (2005). Sustainable Operations Management. *Production and Operations Management*, *14*(4), 482–492. https://doi.org/10.1111/j.1937-5956.2005.tb00235.x

Krueger, P., Sautner, Z., & Starks, L. T. (2020). The Importance of Climate Risks for Institutional Investors. *The 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

Liang, H., & Renneboog, L. (2017). On the Foundations of Corporate Social Responsibility: On the Foundations of Corporate Social Responsibility. *The Journal of Finance*, *72*(2), 853–910. https://doi.org/10.1111/jofi.12487

Lins, K. V., Servaes, H., & Tamayo, A. (2017). *Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis—LINS - 2017—The Journal of Finance—Wiley Online Library*. 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

Lu, X., Sheng, Y., & Wang, J. (2020). The influence of executive compensation incentives on R&D investment: The moderating effect of executive overconfidence. *Technology Analysis & Strategic Management*, *32*(10), 1169–1181. https://doi.org/10.1080/09537325.2020.1748184

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

Murphy, K. J. (2013). Chapter 4 - Executive Compensation: Where We Are, and How We Got There. In G. M. Constantinides, M. Harris, & R. M. Stulz (Eds.), *Handbook of the Economics of Finance* (Vol. 2, pp. 211–356). Elsevier. https://doi.org/10.1016/B978-0-44-453594-8.00004-5

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, Ľ., 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

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

Wittkowski, K. M. (2003). Novel Methods for Multivariate Ordinal Data applied to Genetic Diplotypes, Genomic Pathways, Risk Profiles, and Pattern Similarity. *MPRA Paper*, Article 4570. https://ideas.repec.org//p/pra/mprapa/4570.html

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

Tables

Table 1
Descriptive statistics.

	N	Mean	Median	St Dev	Minimum	25th perc.	75th perc.	Maximum
CSR Variables								
E outcomes	152731	5.38	5.75	2.64	0.01	3.14	7.61	9.79
E intentions	152731	4.86	5.29	1.82	0.69	3.40	6.31	8.02
S outcomes	152731	5.15	5.00	1.83	1.00	3.96	6.38	9.99
S intentions	152731	5.08	5.14	1.19	0.42	4.68	5.87	8.80
ESG score	152612	4.32	4.05	1.90	0.05	2.83	5.70	9.52
Compensation Variables								
cash	152731	1182.79	970	1519.71	0.00	750	1200	77926
equity	151827	4684.06	3197.57	7082.17	0.00	1186.38	6177.36	277000
pcash	152731	0.24	0.17	0.21	0.00	0.11	0.28	1.00
pequity	152731	0.50	0.56	0.27	0.00	0.35	0.69	1.00
total comp	152731	7748.10	5843.41	8465.50	0.00	3219.17	9784.77	281000
sust comp incent	152731	0.22	0.00	0.42	0.00	0.00	0.00	1.00
Control Variables								
lnMVE	152731	8.56	8.45	1.51	0.00	7.54	9.54	12.31
book/market	147456	0.54	0.44	0.42	0.03	0.25	0.73	2.35
roa	152252	0.13	0.12	0.10	-0.15	0.07	0.18	0.45
roe	147331	0.13	0.12	0.23	-0.74	0.06	0.20	1.22
boardsize	152731	10.11	10.00	2.49	0.00	8.00	12.00	35.00
nonexec	152731	83.56	85.71	9.63	0.00	80.00	90.91	100.00
CEO duality	152731	0.66	1.00	0.48	0.00	0.00	1.00	1.00
age	152339	57.15	57.00	6.79	28.00	53.00	61.00	90.00
gender	152731	0.04	0.00	0.20	0.00	0.00	0.00	1.00

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 are in thousand$. All company control variables are winsorised on the 1st and 99th percentile. 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) pcash	0.227***	-0.233***	-0.063***	-0.227***	-0.249***	0.152***	-0.354***	1		
(9) pequity	-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) lnMVE w	-0.499***	0.327***	0.127***	0.290***	0.556***	0.220***	0.362***	-0.301***	0.203***	0.447***
(12) bm w	-0.070***	0.020***	-0.212***	0.011***	-0.048***	0.032***	-0.087***	0.088***	-0.071***	-0.084***
(13) roa w	-0.148***	0.075***	0.131***	0.058***	0.041***	-0.024***	0.058***	-0.111***	0.061***	0.065***
(14) roe w	-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) nonexec	-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_comp_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_comp_	-0.723***	0.211**	0.013	0.291***	0.820***
incent_lag1	(0.085)	(0.070)	(0.061)	(0.040)	(0.079)
tdc1new_lag1	0.000	0.000*	-0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lnMVE_w_lag1	-0.800***	0.393***	0.119***	0.242***	0.684***
	(0.040)	(0.035)	(0.028)	(0.020)	(0.030)
bm_w_lag1	-1.272***	0.615***	-0.745***	0.267***	0.427***
	(0.130)	(0.136)	(0.087)	(0.061)	(0.085)
roe_w_lag1	-0.031	0.132	0.142	-0.096	0.112
	(0.164)	(0.160)	(0.100)	(0.092)	(0.126)
roa_w_lag1	-0.115	-0.000	0.670*	0.431	-0.778*
	(0.578)	(0.627)	(0.351)	(0.275)	(0.403)
board_size_lag1	-0.076***	0.029	-0.043***	0.024**	0.065***
	(0.024)	(0.018)	(0.012)	(0.010)	(0.019)
ceo_duality_lag1	-0.178**	0.091	-0.025	0.054	-0.215***
	(0.080)	(0.070)	(0.051)	(0.042)	(0.065)
nonexec_lag1	-0.011**	0.003	0.003	0.010***	0.022***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)
age_lag1	-0.004	-0.012**	-0.005	-0.010***	-0.010**
	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)
gender_lag1	-0.011	0.044	-0.130	0.114	0.290**
	(0.153)	(0.169)	(0.154)	(0.070)	(0.133)
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
R-squared	0.631	0.230	0.076	0.282	0.449

Note: This table documents the regression results from the relationship between the inclusion of CSR metrics in the CEO's compensation scheme and the firm's CSR performance. The variable sust_comp_incent is a dummy variable showing if a firm includes CSR metrics in its senior executive's compensation package. A dummy value of 1 means that a firm has CSR metrics included. 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*					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	E outcomes						E outcomes					
pcash_lag1	2.837***	1.939***	1.823***	1.023***	1.098***	0.513**						
	(0.034)	(0.036)	(0.035)	(0.031)	(0.241)	(0.186)						
pequity_lag1							-1.748***	-0.970***	-1.026***	-0.873***	-0.904***	-0.222
							(0.027)	(0.029)	(0.028)	(0.025)	(0.178)	(0.134)
total_comp_lag1		-0.000***	-0.000***	0.000***	0.000	0.000		-0.000***	-0.000***	0.000***	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1		-0.009***	-0.001	-0.000	-0.004	-0.006		-0.009***	-0.002	-0.002**	-0.006	-0.005
		(0.001)	(0.001)	(0.001)	(0.007)	(0.005)		(0.001)	(0.001)	(0.001)	(0.007)	(0.005)
gender_lag1		-0.241***	-0.324***	-0.285***	-0.356	-0.053		-0.256***	-0.338***	-0.286***	-0.357	-0.056
		(0.036)	(0.034)	(0.030)	(0.212)	(0.158)		(0.036)	(0.034)	(0.030)	(0.213)	(0.159)
ceo_duality_lag1			-0.601***	-0.357***	-0.307**	-0.198**			-0.614***	-0.367***	-0.318**	-0.197**
			(0.015)	(0.013)	(0.119)	(0.083)			(0.015)	(0.013)	(0.118)	(0.084)
nonexec_lag1			-0.030***	-0.022***	-0.021***	-0.012**			-0.032***	-0.022***	-0.021***	-0.013***
			(0.001)	(0.001)	(0.005)	(0.004)			(0.001)	(0.001)	(0.005)	(0.004)
board_size_lag1			-0.187***	-0.024***	-0.014	-0.084***			-0.188***	-0.023***	-0.013	-0.083***
			(0.003)	(0.003)	(0.032)	(0.025)			(0.003)	(0.003)	(0.032)	(0.025)
lnMVE_w_lag1				-0.870***	-0.850***	-0.825***				-0.887***	-0.869***	-0.835***
				(0.005)	(0.049)	(0.041)				(0.005)	(0.048)	(0.040)
bm_w_lag1				-1.649***	-1.598***	-1.336***				-1.659***	-1.609***	-1.341***
				(0.017)	(0.202)	(0.130)				(0.017)	(0.201)	(0.132)
roe_w_lag1				1.294***	1.183***	-0.047				1.242***	1.131***	-0.057
				(0.030)	(0.215)	(0.162)				(0.030)	(0.214)	(0.164)
roa_w_lag1				-6.489***	-5.997***	-0.001				-6.525***	-6.044***	-0.045
				(0.083)	(0.760)	(0.572)				(0.082)	(0.762)	(0.581)
Constant	4.590***	5.833***	10.065***	16.396***	16.135***	15.232***	6.128***	6.821***	11.237***	17.318***	17.106***	15.594***
	(0.011)	(0.060)	(0.083)	(0.081)	(0.662)	(0.499)	(0.015)	(0.064)	(0.084)	(0.080)	(0.671)	(0.493)
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	0.069	0.143	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. 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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	E outcomes	E intentions	S outcomes	S intentions	ESG score	E outcomes	E intentions	S outcomes	S intentions	ESG score
pcash_lag1	0.513**	-0.858***	-0.375**	-0.513***	-0.529***					
	(0.186)	(0.180)	(0.155)	(0.123)	(0.157)					
pequity_lag1						-0.222	0.389***	0.133	0.299***	0.441***
						(0.134)	(0.118)	(0.098)	(0.068)	(0.122)
total_comp_lag1	0.000	0.000	-0.000**	-0.000	0.000	0.000	0.000	-0.000**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1	-0.006	-0.011**	-0.004	-0.009***	-0.011**	-0.005	-0.012**	-0.005	-0.009**	-0.011**
	(0.005)	(0.005)	(0.004)	(0.003)	(0.005)	(0.005)	(0.005)	(0.004)	(0.003)	(0.005)
gender_lag1	-0.053	0.050	-0.132	0.128*	0.334**	-0.056	0.054	-0.130	0.130*	0.336**
	(0.158)	(0.165)	(0.154)	(0.069)	(0.132)	(0.159)	(0.167)	(0.154)	(0.070)	(0.133)
ceo_duality_lag1	-0.198**	0.111	-0.019	0.068	-0.189**	-0.197**	0.110	-0.021	0.070	-0.183**
	(0.083)	(0.070)	(0.050)	(0.042)	(0.068)	(0.084)	(0.070)	(0.050)	(0.042)	(0.068)
nonexec_lag1	-0.012**	0.002	0.003	0.010***	0.024***	-0.013***	0.002	0.003	0.010***	0.024***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)
board_size_lag1	-0.084***	0.035*	-0.042***	0.029***	0.077***	-0.083***	0.033*	-0.043***	0.028**	0.076***
	(0.025)	(0.018)	(0.012)	(0.010)	(0.021)	(0.025)	(0.018)	(0.012)	(0.010)	(0.021)
lnMVE_w_lag1	-0.825***	0.380***	0.110***	0.243***	0.707***	-0.835***	0.398***	0.118***	0.253***	0.717***
	(0.041)	(0.035)	(0.028)	(0.021)	(0.033)	(0.040)	(0.035)	(0.028)	(0.020)	(0.031)
bm_w_lag1	-1.336***	0.618***	-0.749***	0.285***	0.490***	-1.341***	0.626***	-0.745***	0.289***	0.492***
	(0.130)	(0.129)	(0.086)	(0.060)	(0.087)	(0.132)	(0.134)	(0.087)	(0.060)	(0.087)
roe_w_lag1	-0.047	0.138	0.147	-0.088	0.133	-0.057	0.155	0.153	-0.075	0.152
	(0.162)	(0.156)	(0.099)	(0.091)	(0.129)	(0.164)	(0.160)	(0.099)	(0.092)	(0.131)
roa_w_lag1	-0.001	-0.070	0.642*	0.362	-0.910**	-0.045	0.005	0.674*	0.408	-0.859*
	(0.572)	(0.603)	(0.353)	(0.266)	(0.411)	(0.581)	(0.625)	(0.349)	(0.273)	(0.417)
Constant	15.232***	1.660***	5.095***	2.411***	-3.656***	15.594***	1.048*	4.845***	2.015***	-4.125***
	(0.499)	(0.506)	(0.446)	(0.268)	(0.467)	(0.493)	(0.531)	(0.441)	(0.280)	(0.469)
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. 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
pcash_lag1	6.896***	-0.341	1.156	0.637**	1.837**	-0.010	0.212	-0.220	-0.066	-0.519*
	(0.000)	(0.545)	(1.197)	(0.222)	(0.808)	(0.621)	(0.370)	(0.241)	(0.398)	(0.166)
tdc1new_lag1		-0.000	0.000	0.000	0.000***	0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1		0.012	0.001	-0.007	0.011	-0.060***	0.007	0.019**	-0.035**	-0.028*
		(0.012)	(0.027)	(0.008)	(0.019)	(0.019)	(0.010)	(0.008)	(0.012)	(0.007)
gender_lag1		0.133	0.635**	-0.052	0.059	-0.105	-0.168	-0.005	-0.042	0.000
		(0.348)	(0.283)	(0.219)	(0.560)	(0.283)	(0.306)	(0.244)	(0.454)	(0.000)
ceo_duality_lag1		0.191	1.056*	-0.322**	0.004	0.966***	-0.254	-0.013	-0.248	0.000
		(0.178)	(0.496)	(0.130)	(0.271)	(0.272)	(0.209)	(0.112)	(0.158)	(0.000)
nonexec_lag1		-0.005	-0.035	-0.020***	-0.014	-0.037**	-0.008	-0.006	0.009	0.034
		(0.009)	(0.028)	(0.006)	(0.013)	(0.016)	(0.009)	(0.005)	(0.009)	(0.012)
board_size_lag1		-0.079*	0.036	-0.193***	-0.082	-0.090	-0.202***	0.063**	-0.271***	0.004
		(0.044)	(0.083)	(0.036)	(0.050)	(0.075)	(0.051)	(0.022)	(0.050)	(0.027)
lnMVE_w_lag1		-0.820***	-0.954**	-0.736***	-1.047***	-0.758***	-1.002***	-0.937***	-0.670***	-0.427**
		(0.125)	(0.369)	(0.057)	(0.145)	(0.212)	(0.068)	(0.088)	(0.100)	(0.096)
bm_w_lag1		-0.604***	-0.498	-2.526***	-0.993**	-3.525***	-0.387*	-0.046	-1.930***	1.688
		(0.199)	(0.971)	(0.219)	(0.352)	(0.717)	(0.213)	(0.134)	(0.415)	(0.598)
roe_w_lag1		-0.805	2.297***	-0.834***	0.659	-1.437	0.013	1.365***	0.109	1.968*
		(0.834)	(0.569)	(0.223)	(0.536)	(1.069)	(0.427)	(0.386)	(0.436)	(0.612)
roa_w_lag1		3.122*	-6.080**	0.612	-0.338	2.247	4.603***	-0.529	-1.461	-0.622
		(1.551)	(2.341)	(0.876)	(2.796)	(1.571)	(0.959)	(1.034)	(0.970)	(1.866)
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 number 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. 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 relationship Stocks and Options on CSR performances.

	(1) E outcomes	(2) E intentions	(3) S outcomes	(4) S intentions	(5) ESG score
pstock_lag1	-0.388**	0.511***	0.098	0.390***	0.564***
	(0.139)	(0.130)	(0.108)	(0.071)	(0.127)
poption_lag1	0.353*	0.104	0.261*	0.109	0.072
	(0.192)	(0.169)	(0.121)	(0.101)	(0.151)
tdc1new_lag1	0.000	0.000	-0.000**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1	-0.005	-0.011**	-0.004	-0.009**	-0.008*
	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)
gender_lag1	-0.028	0.044	-0.123	0.122*	0.324**
	(0.157)	(0.166)	(0.154)	(0.068)	(0.130)
ceo_duality_lag1	-0.200**	0.111	-0.026	0.068	-0.185**
	(0.083)	(0.071)	(0.050)	(0.041)	(0.068)
nonexec_lag1	-0.013***	0.003	0.003	0.010***	0.024***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)
board_size_lag1	-0.081***	0.030	-0.042***	0.027**	0.073***
	(0.025)	(0.018)	(0.012)	(0.010)	(0.021)
lnMVE_w_lag1	-0.836***	0.399***	0.118***	0.253***	0.720***
	(0.040)	(0.035)	(0.028)	(0.020)	(0.030)
bm_w_lag1	-1.304***	0.603***	-0.736***	0.274***	0.475***
	(0.131)	(0.130)	(0.088)	(0.059)	(0.087)
roe_w_lag1	-0.038	0.149	0.157	-0.078	0.146
	(0.163)	(0.158)	(0.102)	(0.093)	(0.128)
roa_w_lag1	-0.103	0.002	0.649*	0.412	-0.849*
	(0.572)	(0.631)	(0.353)	(0.275)	(0.414)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	131,681	131,681	131,681	131,681	131,610
R-squared	0.624	0.233	0.077	0.277	0.427

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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. 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 8

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

	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
pcash_lag1	0.133	-0.825***	-0.310*	-0.374***	-0.387**					
	(0.177)	(0.191)	(0.174)	(0.121)	(0.176)					
pequity_lag1						-0.042	0.448***	0.193	0.316***	0.369**
						(0.142)	(0.141)	(0.131)	(0.076)	(0.141)
dum_nonexec_lag1	-0.397***	0.066	0.038	0.155**	0.319***	0.036	0.122	0.064	0.092	0.141
	(0.105)	(0.091)	(0.074)	(0.058)	(0.094)	(0.122)	(0.109)	(0.118)	(0.071)	(0.093)
dum_nonexec_lag1 x pcash_lag1	1.027***	-0.118	-0.209	-0.402*	-0.480*					
	(0.268)	(0.278)	(0.206)	(0.200)	(0.225)					
dum_nonexec_lag1 x pequity_lag1						-0.404**	-0.155	-0.138	-0.050	0.136
						(0.146)	(0.172)	(0.158)	(0.104)	(0.159)
total_comp_lag1	0.000	0.000	-0.000**	-0.000	0.000	0.000	0.000	-0.000**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1	-0.006	-0.010**	-0.004	-0.009**	-0.009*	-0.005	-0.011**	-0.004	-0.008**	-0.008*
	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)
gender_lag1	-0.059	0.053	-0.132	0.131*	0.345**	-0.060	0.058	-0.130	0.133*	0.346**
	(0.158)	(0.165)	(0.154)	(0.070)	(0.132)	(0.159)	(0.167)	(0.154)	(0.070)	(0.133)
ceo_duality_lag1	-0.184**	0.107	-0.021	0.062	-0.200**	-0.190**	0.109	-0.019	0.069	-0.191**
	(0.082)	(0.069)	(0.050)	(0.041)	(0.068)	(0.084)	(0.070)	(0.051)	(0.042)	(0.068)
nonexec_lag1	-0.007	0.000	0.003	0.008***	0.016***	-0.007	0.001	0.003	0.008***	0.016***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.005)	(0.005)	(0.004)	(0.003)	(0.002)	(0.005)
board_size_lag1	-0.087***	0.035*	-0.042***	0.029***	0.078***	-0.085***	0.033*	-0.043***	0.028**	0.076***
	(0.025)	(0.018)	(0.012)	(0.009)	(0.021)	(0.025)	(0.018)	(0.012)	(0.009)	(0.021)
lnMVE_w_lag1	-0.822***	0.383***	0.110***	0.243***	0.710***	-0.834***	0.401***	0.119***	0.254***	0.721***
	(0.041)	(0.035)	(0.028)	(0.021)	(0.033)	(0.041)	(0.035)	(0.028)	(0.020)	(0.031)
bm_w_lag1	-1.333***	0.623***	-0.749***	0.287***	0.498***	-1.336***	0.631***	-0.744***	0.291***	0.500***
	(0.129)	(0.128)	(0.087)	(0.060)	(0.086)	(0.132)	(0.133)	(0.087)	(0.060)	(0.087)
roe_w_lag1	-0.024	0.132	0.141	-0.099	0.109	-0.051	0.147	0.146	-0.083	0.135
	(0.164)	(0.156)	(0.100)	(0.090)	(0.127)	(0.165)	(0.160)	(0.099)	(0.091)	(0.130)
roa_w_lag1	-0.054	-0.078	0.641*	0.382	-0.852*	-0.052	0.005	0.679*	0.424	-0.818*
	(0.575)	(0.602)	(0.355)	(0.264)	(0.406)	(0.589)	(0.625)	(0.353)	(0.270)	(0.415)
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	132,585	132,585	132,585	132,585	132,514	132,585	132,585	132,585	132,585	132,514
R-squared	0.624	0.237	0.078	0.281	0.428	0.622	0.231	0.077	0.276	0.427

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 level of non-executive board members on the board and the five different CSR variables. 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.

Table 9

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

	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
pstock_lag1	-0.364**	0.574***	0.051	0.433***	0.532***					
	(0.141)	(0.154)	(0.111)	(0.084)	(0.137)					
poption_lag1						0.639***	-0.226	0.281*	-0.188*	-0.292
						(0.172)	(0.164)	(0.137)	(0.099)	(0.178)
dum_nonexec_lag1	-0.052	0.124	0.028	0.139*	0.225**	-0.160	0.040	0.011	0.058	0.229**
	(0.105)	(0.105)	(0.085)	(0.066)	(0.096)	(0.104)	(0.072)	(0.088)	(0.045)	(0.076)
dum_nonexec_lag1 x pstock_lag1	-0.300	-0.228	-0.097	-0.185	0.000					
	(0.181)	(0.211)	(0.165)	(0.121)	(0.165)					
dum_nonexec_lag1 x poption_lag1						-0.114	0.064	-0.156	0.132	0.048
						(0.264)	(0.247)	(0.249)	(0.126)	(0.284)
total_comp_lag1	0.000	0.000	-0.000*	0.000	0.000	0.000	0.000**	-0.000**	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1	-0.005	-0.012**	-0.005	-0.009***	-0.012**	-0.003	-0.014***	-0.004	-0.011***	-0.014**
	(0.005)	(0.005)	(0.004)	(0.003)	(0.005)	(0.005)	(0.005)	(0.004)	(0.003)	(0.005)
gender_lag1	-0.042	0.041	-0.129	0.121*	0.325**	-0.040	0.053	-0.121	0.130*	0.336**
	(0.159)	(0.166)	(0.154)	(0.068)	(0.131)	(0.157)	(0.168)	(0.153)	(0.071)	(0.132)
ceo_duality_lag1	-0.202**	0.113	-0.029	0.068	-0.182**	-0.188**	0.097	-0.028	0.056	-0.198**
	(0.083)	(0.071)	(0.050)	(0.041)	(0.068)	(0.083)	(0.071)	(0.050)	(0.042)	(0.068)
nonexec_lag1	-0.007	0.001	0.004	0.008***	0.016***	-0.008	0.002	0.004	0.008***	0.017***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.005)	(0.005)	(0.004)	(0.003)	(0.002)	(0.005)
board_size_lag1	-0.083***	0.031	-0.043***	0.028**	0.078***	-0.082***	0.031	-0.043***	0.028**	0.078***
	(0.025)	(0.018)	(0.012)	(0.010)	(0.021)	(0.025)	(0.018)	(0.012)	(0.010)	(0.021)
lnMVE_w_lag1	-0.831***	0.396***	0.118***	0.251***	0.710***	-0.836***	0.400***	0.118***	0.254***	0.715***
	(0.040)	(0.035)	(0.029)	(0.020)	(0.030)	(0.040)	(0.035)	(0.028)	(0.020)	(0.030)
bm_w_lag1	-1.303***	0.597***	-0.741***	0.268***	0.453***	-1.312***	0.615***	-0.733***	0.283***	0.475***
	(0.130)	(0.131)	(0.088)	(0.059)	(0.086)	(0.131)	(0.133)	(0.088)	(0.061)	(0.088)
roe_w_lag1	-0.037	0.141	0.152	-0.089	0.123	-0.009	0.130	0.158	-0.095	0.107
	(0.164)	(0.159)	(0.100)	(0.092)	(0.129)	(0.164)	(0.158)	(0.100)	(0.093)	(0.130)
roa_w_lag1	-0.135	0.047	0.659*	0.447	-0.785*	-0.145	0.014	0.650*	0.421	-0.806*
	(0.576)	(0.629)	(0.356)	(0.273)	(0.413)	(0.582)	(0.632)	(0.354)	(0.278)	(0.416)
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	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 stock compensation (Panel A) and option compensation (Panel B), the level of non-executive board members on the board and the five different CSR variables. 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.

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	0.957	55304	0.022	44.190	55302	1	0	0	27652	4.749	27652	3.792
E intentions	-0.281	55304	0.012	-22.580	55302	0	0	1	27652	5.310	27652	5.592
S outcomes	-0.008	55304	0.016	-0.516	55302	0.303	0.606	0.697	27652	5.167	27652	5.175
S intentions	-0.302	55304	0.008	-35.692	55302	0	0	1	27652	5.333	27652	5.635
ESG score	-0.720	54660	0.016	-44.178	54658	0	0	1	27330	4.733	27330	5.453

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.

	(6) E outcomes	(7) E intentions	(8) S outcomes	(9) S intentions	(10) ESG Score
sust_comp_ incent_lag1	-0.016	0.037	-0.080	0.068**	0.226***
	(0.016)	(0.037)	(0.050)	(0.025)	(0.031)
tdc1new_lag1	0.000*	0.000	-0.000	0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lnMVE_w_lag1	-0.268***	0.150***	0.155***	0.084***	0.214***
	(0.039)	(0.031)	(0.047)	(0.016)	(0.041)
bm_w_lag1	-0.307***	0.161***	-0.721***	0.038	0.021
	(0.047)	(0.040)	(0.079)	(0.032)	(0.036)
roe_w_lag1	0.171***	0.068	0.264**	-0.071	0.095
	(0.037)	(0.062)	(0.110)	(0.045)	(0.068)
roa_w_lag1	-0.280**	-0.108	1.472***	-0.036	-0.629**
	(0.119)	(0.262)	(0.473)	(0.090)	(0.244)
board_size_lag1	-0.025***	0.017	-0.065***	0.007	0.023***
	(0.004)	(0.010)	(0.013)	(0.005)	(0.006)
ceo_duality_lag1	0.026	0.053	-0.080	0.027**	-0.170***
	(0.034)	(0.033)	(0.056)	(0.011)	(0.031)
nonexec_lag1	0.003***	-0.003	0.008***	0.001	0.006***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
age_lag1	-0.001	-0.001	-0.004	0.000	-0.007**
	(0.002)	(0.001)	(0.005)	(0.001)	(0.002)
gender_lag1	0.184***	0.002	-0.036	0.032	0.063*
	(0.048)	(0.053)	(0.151)	(0.029)	(0.034)
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 in the CEO's compensation scheme and the firm's CSR performance. The variable sust_comp_incent is a dummy variable showing if a firm includes CSR metrics in its senior executive's compensation scheme. The dummy value of 1 means that firms have CSR metrics included. The independent variables, together with the control variables are lagged by one year. 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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	E outcomes	E intentions	S outcomes	S intentions	ESG score	E outcomes	E intentions	S outcomes	S intentions	ESG score
pcash_lag1	0.456**	-0.854***	-0.385**	-0.500***	-0.506***					
	(0.180)	(0.179)	(0.156)	(0.122)	(0.143)					
pequity_lag1						-0.167	0.370***	0.134	0.278***	0.377***
						(0.126)	(0.118)	(0.098)	(0.068)	(0.113)
sust_comp_incent_lag1	-0.714***	0.194**	0.006	0.282***	0.811***	-0.718***	0.200**	0.009	0.283***	0.810***
	(0.085)	(0.070)	(0.061)	(0.040)	(0.079)	(0.085)	(0.070)	(0.061)	(0.040)	(0.078)
total_comp_lag1	0.000	0.000	-0.000**	-0.000	0.000	0.000	0.000	-0.000**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag1	-0.006	-0.010**	-0.004	-0.008**	-0.009*	-0.005	-0.011**	-0.004	-0.009**	-0.008*
	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)
gender_lag1	-0.009	0.040	-0.132	0.111	0.287**	-0.011	0.043	-0.130	0.113	0.289**
	(0.153)	(0.166)	(0.153)	(0.068)	(0.132)	(0.153)	(0.168)	(0.154)	(0.069)	(0.133)
ceo_duality_lag1	-0.186**	0.106	-0.019	0.063	-0.206***	-0.183**	0.104	-0.021	0.064	-0.202***
	(0.080)	(0.069)	(0.050)	(0.041)	(0.065)	(0.080)	(0.070)	(0.050)	(0.041)	(0.065)
nonexec_lag1	-0.010**	0.001	0.003	0.009***	0.021***	-0.011**	0.002	0.003	0.009***	0.021***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)
board_size_lag1	-0.077***	0.032*	-0.042***	0.026**	0.067***	-0.076***	0.030	-0.043***	0.025**	0.066***
	(0.024)	(0.018)	(0.012)	(0.009)	(0.019)	(0.024)	(0.018)	(0.012)	(0.009)	(0.019)
lnMVE_w_lag1	-0.789***	0.374***	0.110***	0.230***	0.672***	-0.799***	0.391***	0.118***	0.240***	0.681***
	(0.040)	(0.035)	(0.028)	(0.021)	(0.031)	(0.040)	(0.035)	(0.028)	(0.020)	(0.030)
bm_w_lag1	-1.266***	0.604***	-0.749***	0.260***	0.421***	-1.270***	0.611***	-0.746***	0.264***	0.424***
	(0.128)	(0.130)	(0.086)	(0.059)	(0.083)	(0.130)	(0.135)	(0.087)	(0.059)	(0.084)
roe_w_lag1	-0.031	0.132	0.142	-0.096	0.112	-0.039	0.148	0.148	-0.084	0.129
	(0.163)	(0.156)	(0.099)	(0.089)	(0.124)	(0.164)	(0.160)	(0.100)	(0.090)	(0.126)
roa_w_lag1	-0.080	-0.067	0.640*	0.392	-0.818*	-0.119	0.008	0.673*	0.437	-0.770*
	(0.568)	(0.605)	(0.354)	(0.264)	(0.397)	(0.577)	(0.627)	(0.351)	(0.271)	(0.403)
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	132,585	132,585	132,585	132,585	132,514	132,585	132,585	132,585	132,585	132,514
R-squared	0.632	0.238	0.078	0.289	0.452	0.632	0.233	0.077	0.285	0.452

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. 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 between Intentions and Outcomes.

	(1) E outcomes	(2) S outcomes	(3) E outcomes	(4) S outcomes
e_intentions_lag1	-0.010			
	(0.014)			
s_intentions_lag1		-0.000		
		(0.029)		
e_intentions_lag2			-0.016	
			(0.013)	
s_intentions_lag2				-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. 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 14

Regression using 2 year lagged variables.

	Panel A					*Panel B*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	E outcomes	E intentions	S outcomes	S intentions	ESG score	E outcomes	E intentions	S outcomes	S intentions	ESG score
pcash_lag2	0.470**	-0.783***	-0.456***	-0.549***	-0.656***					
	(0.187)	(0.185)	(0.132)	(0.113)	(0.156)					
pequity_lag2						-0.193	0.297**	0.219**	0.351***	0.442***
						(0.134)	(0.120)	(0.102)	(0.070)	(0.112)
tdc1new_lag2	0.000	0.000	-0.000*	-0.000	0.000	0.000	0.000*	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
age_lag2	-0.007	-0.010**	-0.005	-0.008***	-0.010**	-0.006	-0.011**	-0.005	-0.008**	-0.010*
	(0.006)	(0.005)	(0.004)	(0.003)	(0.005)	(0.006)	(0.005)	(0.004)	(0.003)	(0.005)
gender_lag2	-0.055	0.011	-0.126	0.137*	0.334**	-0.057	0.015	-0.125	0.138*	0.335**
	(0.167)	(0.173)	(0.139)	(0.078)	(0.146)	(0.168)	(0.174)	(0.140)	(0.079)	(0.146)
ceo_duality_lag2	-0.225***	0.098	-0.037	0.049	-0.161**	-0.224**	0.095	-0.037	0.052	-0.157**
	(0.087)	(0.076)	(0.062)	(0.043)	(0.074)	(0.087)	(0.076)	(0.062)	(0.043)	(0.074)
nonexec_lag2	-0.012***	0.001	0.005**	0.010***	0.021***	-0.013***	0.002	0.005**	0.010***	0.021***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)
board_size_lag2	-0.080***	0.028	-0.033***	0.025***	0.076***	-0.079***	0.026	-0.034***	0.024***	0.075***
	(0.026)	(0.018)	(0.012)	(0.009)	(0.021)	(0.025)	(0.018)	(0.012)	(0.009)	(0.021)
lnMVE_w_lag2	-0.811***	0.345***	0.078***	0.229***	0.696***	-0.821***	0.361***	0.087***	0.239***	0.708***
	(0.040)	(0.034)	(0.026)	(0.019)	(0.035)	(0.040)	(0.033)	(0.026)	(0.019)	(0.035)
bm_w_lag2	-1.301***	0.542***	-0.639***	0.258***	0.465***	-1.304***	0.547***	-0.637***	0.259***	0.466***
	(0.143)	(0.117)	(0.091)	(0.061)	(0.104)	(0.144)	(0.118)	(0.091)	(0.062)	(0.104)
roe_w_lag2	-0.057	0.160	0.169	-0.055	0.243*	-0.069	0.179	0.182	-0.034	0.268*
	(0.184)	(0.163)	(0.123)	(0.100)	(0.136)	(0.184)	(0.164)	(0.122)	(0.100)	(0.137)
roa_w_lag2	0.126	-0.203	0.319	0.299	-1.017**	0.099	-0.159	0.346	0.334	-0.974**
	(0.562)	(0.524)	(0.406)	(0.280)	(0.435)	(0.567)	(0.527)	(0.404)	(0.280)	(0.435)
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	115,097	115,097	115,097	115,097	115,050	115,097	115,097	115,097	115,097	115,050
R-squared	0.622	0.206	0.062	0.252	0.414	0.621	0.200	0.061	0.249	0.413

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. 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 15

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	0.008	0.026	-0.244***	-0.031	-0.117***
	(0.027)	(0.028)	(0.073)	(0.026)	(0.032)
newceo2	0.025	0.017	-0.226***	0.028	-0.057
	(0.028)	(0.045)	(0.057)	(0.029)	(0.036)
newceo3	-0.018	0.034	-0.185***	0.053**	0.047
	(0.025)	(0.038)	(0.044)	(0.024)	(0.042)
age_lag1	-0.001	-0.001	-0.005	0.002	-0.005
	(0.003)	(0.004)	(0.005)	(0.002)	(0.004)
gender_lag1	0.182**	-0.000	-0.036	0.032	0.069
	(0.081)	(0.113)	(0.179)	(0.064)	(0.102)
ceo_duality_lag1	0.023	0.052	-0.067	0.030	-0.159**
	(0.050)	(0.059)	(0.075)	(0.030)	(0.056)
nonexec_lag1	0.003**	-0.003	0.005**	0.001	0.006***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
board_size_lag1	-0.025***	0.017	-0.060***	0.008	0.026**
	(0.007)	(0.013)	(0.016)	(0.008)	(0.011)
lnMVE_w_lag1	-0.266***	0.154***	0.147**	0.086***	0.212***
	(0.047)	(0.041)	(0.054)	(0.023)	(0.049)
bm_w_lag1	-0.307***	0.161**	-0.715***	0.038	0.025
	(0.063)	(0.061)	(0.093)	(0.045)	(0.065)
roe_w_lag1	0.171**	0.069	0.261*	-0.068	0.100
	(0.058)	(0.092)	(0.130)	(0.063)	(0.098)
roa_w_lag1	-0.270	-0.098	1.426**	-0.046	-0.686*
	(0.232)	(0.388)	(0.546)	(0.192)	(0.346)
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 superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels (two-tailed test). The independent variables, together with the control variables are lagged by one year.

Table 1A
Variable definitions and data sources.

Variable	Source	Definition
Panel A: Compensation		
Pcash	Calculated based on data from Execucomp	Proportion of cash, calculated by adding salary and bonus, dividing it by total compensation.
Pequity	Calculated based on data from Execucomp	Proportion of equity, calculated by adding stock awards and option awards, dividing it by total compensation.
Pstock	Calculated based on data from Execucomp	Proportion of stock, calculated stock compensation divided by total compensation.
Poption	Calculated based on data from Execucomp	Proportion of options, calculated option compensation divided by total compensation.
Sustainable Compensation Incentives	Refinitiv	Dummy variable showing if CSR metrics are included in CEO compensation package.
Panel B: Sustainability Performances		
Environmental Outcomes	Calculated based on data 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.
Environmental Intentions	Calculated based on data from Refinitiv	
Social Outcomes	Calculated based on data from Refinitiv	
Social Intentions	Calculated based on data from Refinitiv	
ESG Score	Refinitiv	Score created by Refinitiv, rating all companies based on their environmental, social, and governance performance.
Panel C: Firm Characteristics		
Firm size	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.
ROE	CRSP/Compustat	Return on equity (in %): (Operating income / Shareholders' equity) and winsorized at 1st and 99th percentile.
ROA	CRSP/Compustat	Return on assets (in %): (Operating income / Book value of total assets) and winsorized at 1st and 99th percentile.
Panel D: Board Characteristics		
Boardsize	Refinitiv	Board size of the firm
Non_Exec	Refinitiv	The percentage of non-executive board members in the board.
Dum Non_Exec	Refinitiv	Dummy defined as high or low percentage of non executive members in the board. Separated on the median percentage.
CEO Duality	Refinitiv	Dummy variable of CEO / chairman duality
Panel E: CEO Characteristics		
Age	Execucomp	Age of director
Gender	Execucomp	Gender of director (0=male, 1=female)
New CEO	Execucomp	Dummy variables for the first, second and third year after the appointment of a new CEO.

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	Employees 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			