Do Firms Walk the Talk in Adopting Greenpay? ☆

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Abstract

We classify compensation plans linked to environmental metrics (greenpay) into those with specific weights on or targets of environmental factors (hard greenpay) and those without (soft greenpay); we find that they lead to very different outcomes. Firms adopting hard greenpay reduce carbon emissions and increase environmental or climate risk disclosure, consistent with the notion that hard greenpay is used as a credible signal of management's commitment to environmental issues. Firms adopting soft greenpay also increase environmental or climate risk disclosure, but do not "walk the talk" in terms of improving environmental performance, consistent with "greenwashing" behavior. We further show that shareholders appear to be misled by greenwashing, as they cast more supporting votes for "Say-on-Pay" (SoP) proposals and director elections after the firm adopts both types of greenpay. However, shareholders reduce their submissions of environmental-related proposals after the adoption of hard, but not soft greenpay. This indicates limitations in the ability of greenwashing to influence shareholders' perceptions.

1. Introduction

The practice of linking executive pay to ESG (environmental, social, and governance) factors has become popular globally.[1] A survey by the Semler Brossy Consulting Group (Borneman, Teefey, Mazzoni, Yoo, and Veale, 2023) shows that approximately 72% of S&P 500 firms have included some ESG factors or metrics in their compensation plans (referred to as "ESG Pay") as of March 2023. Extant studies (e.g., Maas, 2018; Ikram, Li, and Minor, 2019; Flammer, Hong, and Minor, 2019; Cohen, Kadach, Ormazabal, and Reichelstein, 2023) have shown that ESG-linked compensation plans in general are related to improved ESG ratings and other positive outcomes. These results are generally interpreted as the usefulness of ESG Pay in aligning the interests of managers and shareholders who prefer ESG performance, or as a signal to show the firm's commitment to ESG.[2]

Our study shows further descriptive evidence that ESG pay policies are heterogeneous, and not all of them are associated with subsequent performance improvement. This study is motivated by reservations about ESG pay raised by practitioners and researchers. Compensation consultancy Willis Towers Watson's survey shows that among S&P 500 companies that have adopted ESG Pay, only 15% use hard, quantifiable metrics (Newbury, Delves, and Resch, 2020). Another compensation consultancy, Shearman & Sterling, also observes that ESG metrics are often broad, vague, and qualitative (Behrens and La Scala, 2022). Issues such as these lead commentators in the financial press (e.g., Hill, 2021 and Temple-West and Xiao, 2023 in the *Financial Times*) to question whether ESG Pay provides valuable incentives. The same skepticism is raised by Bebchuk and Tallarita (2022), who point out that the lack of clear and objective goals leaves room for manipulation and self-interested use by managers. Thus, doubt remains as to whether firms "walk the talk" with ESG Pay

[1] Following recent research (e.g., Gillan, Koch, and Starks, 2021), our study uses ESG and CSR interchangeably.
[2] Positive empirical evidence is used by the Principles of Responsible Investing (PRI), a UN-supported network of investors, to encourage more corporations to adopt ESG Pay voluntarily.

adoption by improving ESG performance.

Our study focuses on compensation plans linked to environmental factors (referred to as "greenpay") for two reasons. First, we can relate greenpay to measures of real environmental performance such as carbon emissions and records of compliance with environmental laws. According to Raghunandan and Rajgopal (2022), the ESG ratings used in most prior research are related to news coverage and firms' voluntary disclosure instead of actual environmental performance. Second, compared with ESG Pay, greenpay was relatively uncommon in the United States until very recently. Semler Brossy Consulting's survey (Trivedi, Miao, Veale, Teefey, Mazzoni, and Yoo, 2023) finds that only 70 (14%) of S&P 500 firms included green pay policies in the fiscal year of 2020 (relative to 285 firms, or 57% with ESG Pay).[3] Hence, there is scant academic research on greenpay. However, as pressure to achieve carbon neutrality by mid-century intensifies globally, the number of greenpay adopters has jumped to 175 (35%) in 2022 (relative to 360 firms, or 72% with ESG Pay). By examining the consequences of earlier greenpay adopters, our study is useful for practitioners and regulators of executive compensation in understanding the merits of this increasingly popular practice.

From the S&P 1500 Index, we identified 206 firms with greenpay from proxy statements filed for the fiscal years of 2002–2019. Among these adopters, 155 nonfinancial firms (with 538 firm-year observations) have available data.[4] We classify the greenpay plans into "hard" and "soft" categories. Hard greenpay refers to compensation plans that specify the weights or targets of environmental metrics, whereas soft greenpay refers to those plans without such metrics. We find that firms experience subsequent improvement in carbon emissions only when they adopt hard (but not soft) greenpay. We find consistent results from

[3] The prevalence of greenpay was even lower in earlier years. Maas (2018) shows that only 44 (11%) of the S&P 400 firms had green pay policies in 2012. Ikram et al. (2019) and Flammer et al. (2019), covering a similar period, had to group the environment together with safety and health or local communities. In Cohen et al.'s (2023) sample of firm-years with ESG pay in 21 countries, only 8% include a carbon-specific metric in their compensation plans.

different measures of carbon emissions, including Scope 1 Greenhouse gas (GHG) emissions and the GHG emissions over which the company has control.[5] The results imply that hard (but not soft) greenpay provides effective incentives for managers to reduce carbon emissions. However, given that greenpay or ESG pay typically accounts for only a small portion of the total compensation (Flammer et al., 2019), our results can be better interpreted as hard greenpay providing a credible signal of management's commitment to environmental matters. Soft greenpay, however, is not a credible signal.

To control for unobservable time-invariant firm factors and observable firm characteristics that may bias the estimated effect of greenpay adoption, we include firm fixed effects and utilize an entropy-balancing approach, as in Hainmueller (2012) and Chapman, Miller, Neilson, and White (2022). We recognize that this approach reduces selection bias but does not directly address the issue of endogeneity. Thus, our paper provides a descriptive analysis of the outcomes associated with greenpay adoption rather than a causal relationship.

Although the factors used in greenpay are related to the environment in general and are not specific to carbon emissions, many of the factors (such as renewable energy development and improving energy efficiency) can lead to reduced carbon emissions. To establish a more direct connection between compensation and carbon performance, we limit greenpay plans to those linked with carbon emissions. In this definition of "carbon pay," those plans with weights or targets are associated with carbon reduction, while those without are not. This reinforces the notion that merely mentioning carbon emissions in compensation plans is not a credible signal of the firm's commitment to carbon reduction. Rather, numerical weights and targets are necessary.

We also explore two variations in greenpay designs. The first is that hard greenpay

[5] According to Trucost, the GHG emissions over which the company has control include Scope 1 and first-tier indirect emissions (i.e., those from purchased electricity and employees' business air travel). Our results are qualitatively the same when both emission measures (in tons of carbon dioxide equivalent) are converted to the natural logarithm or scaled by revenue.

plans (i.e., those specifying the weight or target of the environmental factors) can include only the weight, only the target, or both the weight and target. The composition is 42% with the weight only, 8% with the target only, and 50% with both. We find that the reduction in carbon emissions is driven by hard greenpay that specifies both the weight and target. The second variation is that the weight tied to environmental metrics can be high or low. We find that the reduction in carbon emissions is driven by hard greenpay that specifies a relatively larger weight. These additional tests show that the tighter the connection is between the environmental factors and compensation, the more credible a signal is of management's commitment to improving environmental performance.

Christensen, Hail, and Leuz (2021) define greenwashing as "selectively disclosing positive CSR activities without intending to materially adjust the underlying real activities" (p. 1206). To examine the existence of this behavior, we show that the initiators of both hard and soft greenpay plans talk more about climate risk and use a more positive tone in earnings calls after adoption (Sautner, van Lent, Vilkov, and Zhang, 2023). We further find that both groups increase environmental disclosures, as measured by the E-pillar of Bloomberg's disclosure scores. The enhanced disclosures of environmental or climate matters by hard greenpay adopters are consistent with their intention to use greenpay to signal their commitment to environmental issues. For adopters of soft greenpay, increased disclosures are indicative of greenwashing. As further evidence of greenwashing by soft greenpay adopters, we show that they have more subsequent violations of environmental laws, while this is not observed for those adopting hard greenpay. In addition, this practice is related to poor governance, as soft greenpay adopters have lower percentages of independent directors.

The natural question that follows is why firms choose to "greenwash" with soft greenpay. That is, what gains do they obtain? We attempt to answer this question by examining shareholders' actions in shareholder meetings after greenpay adoption. We consider three

measurable activities: shareholders' votes to approve the firm's executive compensation ("Say-on-Pay" (SoP) votes) and votes in uncontested director elections, as well as their environmental-related proposals. Sirra and Vanbastelaer (2019) and Flammer, Toffle, and Viswanathan (2021) show that shareholders are increasing their use of SoP votes and environmental proposals to pressure management to address environmental issues, especially those related to climate change. Although uncontested director elections are not directly related to executive compensation, Fischer, Gramlich, Miller, and White (2009) show that they reflect shareholder perceptions of board performance.

We find that shareholders cast a higher percentage of votes to approve SoP proposals and elect directors after the adoption of both hard and soft greenpay. They submit significantly fewer environmental-related proposals in shareholder meetings after the initiation of hard (but not soft) greenpay. The finding that soft greenpay adoption comes with more supportive votes from shareholders could indicate their failure to distinguish hard and soft greenpay policies. Consistent with legitimacy theory used in CSR disclosure research, it could also indicate that soft greenpay is useful in improving shareholders' perceptions of management, even though it is not associated with improvement in environmental performance. The influence of soft greenpay, however, is limited, as shareholders who are environmental activists appear to be able to "see through" hard versus soft greenpay policies in their decisions to submit environmental-related proposals.

Although there is already a large body of research on ESG-linked compensation plans, our results shed additional light on the effectiveness of this practice. Most recent empirical research finds that ESG Pay is useful in driving ESG performance. For example, Cohen et al. (2023) find that ESG Pay leads to many positive outcomes such as improvements in ESG ratings, decreased emissions (when executive compensation packages include emission-specific metrics), increased institutional holdings, and more supportive voting in shareholders'

meetings. By comparison, our results also show that greenpay is associated with real environmental performance, but only when the compensation plans include quantitative weights or targets. Our study lends support to the skepticism raised by both academics and practitioners that ESG or greenpay plans are not useful in inducing real ESG or environmental improvement if they are based on soft criteria.

Our finding that shareholders cast more supporting votes for "Say-on-Pay" (SoP) proposals and director elections after the firm adopts both soft and hard greenpay plans implies that firms might use soft greenpay as a device to enhance shareholders' perceptions of management. [6] This finding also implies that shareholders appear to be misled by "greenwashing" behavior from their voting in shareholder meetings. This adds to the emerging "walk the talk" ESG research (e.g., Cornaggia and Cornaggia, 2023 and Baker, Larcker, McClure, Seraph, and Watts, 2024), which shows that some firms enhance their ESG image through the disclosure or management of ESG ratings without delivering better ESG performance. We contribute to this line of literature by shedding new light on the potential green image manipulation via soft greenpay provisions.

Our study also has practical implications. For members of boards who are responsible for designing executive compensation plans and the compensation consultants who assist them, it shows whether and what types of green compensation plans are associated with improvement in firm environmental performance. In addition, investors and environmental activists can use the findings of this study to lobby and pressure corporations to adopt the type of green compensation policy that is related to real results.

2. Background of greenpay practices and empirical predictions

[6] Maas (2018) considers the scores of strengths (the extent to which a firm can be deemed socially responsible) and weaknesses (violations such as pollution, corruption, or fraud) in the MSCI ESG STATS (the former KLD database), and finds that objective (quantitative) ESG compensation significantly reduces the weakness score but has no impact on the strength score. Instead of ESG ratings, we examine the greenpay adoption's impact on more objective measures of carbon emissions and compliance records of environmental laws.

2.1. The Practice of Linking Compensation to Environmental Factors

Recently, due to investors' demand and the public expectation of firms to address ESG issues, more and more listed companies have been including ESG factors as criteria in setting executive compensation in addition to traditional financial measures. Flammer et al. (2019) show that from 2004 to 2013, the ratio of S&P 500 companies adopting ESG compensation contracting increased from 12% to 37%. This figure further jumped to 57% in the fiscal year of 2020 and 72% in 2022 according to the Semler Brossy Consulting Group's recent survey (Borneman et al., 2023).[7]

Semler Brossy's survey classifies ESG measures into three categories: (1) Human Capital Management (HCM), including the company culture, diversity, & inclusion (D&I), employee satisfaction, talent development, turnover/retention, safety, etc.; (2) environmental, including carbon emissions, energy efficiency, renewable energy, waste reduction, etc.; and (3) other metrics such as product quality, customer satisfaction, and cybersecurity. HCM factors are used in almost all ESG-based compensation programs; environmental factors (referred to as "greenpay" in this study) were not as common until very recently. Borneman et al. (2023) show that the percentage of S&P 500 firms with greenpay increased from 14% in the fiscal year of 2020 to 35% in 2022.

The growing popularity of ESG pay or greenpay practice comes with reservations from both practitioners and researchers. The issue most frequently raised involves the subjectivity of the ESG criteria used in many firms' greenpay policies. Willis Towers Watson (Newbury, Delves, and Resch, 2020) finds that while a majority of S&P 500 companies are integrating ESG into their compensation programs, just over 15% of them use hard, quantifiable metrics.

[7] Semler Brossy's survey defines the proxy year as proxy statements filed from April to March. For example, the proxy year of 2023 includes proxy statements filed from April 2022 to March 2023. The correspondent fiscal year end is usually December 2022.

Similarly, Meridian Compensation Partners (2021) finds that few companies disclosed specific quantitative goals for ESG metrics in its survey of proxy statements. In our sample, we also find that many firms' greenpay policies are based on generic language such as "our compensation is linked to sustainability" rather than objective measures such as carbon emissions.[8] Ittner, Larcker, and Meyer (2003) show that subjective performance measures can weaken managers' motivation to reach a specific target, as they can change the evaluation criteria from period to period. This subjectivity of ESG Pay leads commentators in the financial press (e.g., Hill, 2021 and Temple-West and Xiao, 2023) to question whether ESG pay provides valuable incentives. Coupled with the lack of proper disclosure involving ESG metrics for outsiders to verify the CEO's achievement of the criteria, Bebchuk and Tallarita (2022) further suspect that ESG-based compensation can be exploited by self-interested CEOs to inflate their pay, with little or no accountability for actual performance.[9]

2.2. Environment-linked Compensation Plans and Real Performance

Although the practice of ESG pay is relatively new, there has been a large volume of research on its motivations and consequences. Extant studies (e.g., Maas, 2018; Flammer et al., 2019; Cohen et al., 2023) show that ESG pay in general leads to improved ESG ratings. The positive findings are consistent with Ittner, Larcker, and Rajan's (1997) earlier argument that nonfinancial performance measures (such as product quality, customer satisfaction, and employee productivity) are regarded as drivers of firms' long-term performance. They are useful supplements to short-term-oriented financial measures in compensation contracts.

[8] The 2020 proxy statement of Abbott Laboratories has a paragraph titled "Compensation Link to Sustainability." It states, "Our leadership covenant includes commitments to multiple environmental, social and governance efforts. Examples include: A sustainable infrastructure to drive quality, environmental, health and safety performance …" However, in tabulating the detailed compensation paid to executives, ESG factors are not mentioned at all.

[9] Bebchuk and Tallarita (2022) show that most ESG pay plans adopted by large US companies do not include quantifiable metrics. However, Cohen et al. (2023) find that ESG Pay is unrelated to abnormal CEO compensation and positively related to board independence, which does not support the opportunistic use of ESG Pay.

Cohen et al. (2023) take the positive outcomes of ESG pay as evidence of its value in aligning the objectives of a company's management with shareholders who intrinsically care about ESG outcomes. Together with the findings that firms adopting ESG pay tend to have environmental pledges and higher ESG ratings, Cohen et al. (2023) further interpret ESG Pay as a signal by firms to strengthen their pledge to improve ESG performance.

Upon closer examination of the structure of ESG pay, however, it is uncertain whether it can provide sufficient incentives to align the interests of management and shareholders in improving ESG performance. Flammer, Hong, and Minor (2019) find that the average ratio of CSR-based compensation to total compensation is only 4.2% in their sample. Among our sample firms with relevant information, the weights attached to environmental metrics range from 0.3% to 30%, with an average of 7.4%. As bonus accounts for about 19% of the total compensation for those firms, the greenpay is just around 1.4% of the total compensation, on average. Thus, ESG pay or greenpay is not likely to provide direct incentives. The positive outcomes of ESG pay or greenpay are more likely due to the signaling effect. This conjecture is consistent with the finding of a practitioner-based survey (Spierings, 2022) that one of the firms' main objectives in adopting ESG pay is to signal their ESG priority.

In academic research, signaling theory predicts that firms can use devices such as greenpay to demonstrate their commitment to environmental protection. A signal is credible only if it is costly for other firms without serious commitment to mimic (e.g., Spence, 1973). Between greenpay plans that include hard or quantitative environmental metrics and those that do not, soft greenpay is easier to mimic, as outsiders cannot verify whether the greenpay provision is enforced (Bebchuk and Tallarita, 2022). Thus, hard greenpay is more likely than soft greenpay to reflect how serious firms are about environmental issues.

If firms are not serious about environmental issues, why do they adopt soft greenpay? "Legitimacy theory," which has been used in CSR disclosure research, offers one possible

explanation. Specifically, legitimacy theory postulates that in order to survive and grow, organizations (including business corporations) must retain their "legitimacy" by aligning the entity's value system with that of the larger social framework (e.g., Mathews, 1995). As reviewed by Christensen, Hail, and Leuz (2021), this theory has been used in studies such as Cho and Patten (2007) and Clarkson, Li, Richardson, and Vasvari (2008) to explain the "greenwashing" behavior of poor CSR performers, who provide more positive CSR disclosures. In the context of ESG Pay, the firm will perceive a threat to its legitimacy when peer firms begin introducing ESG criteria into their compensation plans. Soft greenpay adoption is a convenient way to manage stakeholder perceptions without any real intention to improve environmental performance.

In summary, we predict that hard greenpay adoption is associated with improved real environmental performance. Soft greenpay, however, is more likely a means for firms to create an image of being environmentally conscious; hence, it is not associated with improved real environmental performance.

Empirically, we follow Raghunandan and Rajgopal (2022) and use carbon emissions and firms' compliance records with environmental laws to measure environmental performance.

2.3. Green Compensation Plans and Shareholders' Activities in Shareholder Meetings

Shareholders are becoming more engaged in companies' ESG issues through various activities. Three of such activities are quantifiable and commonly used in recent studies of shareholder engagement. The first involves voting in "Say-on-Pay" (SoP) proposals. The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) requires firms to allow shareholders to cast a non-binding vote to approve the company's executive compensation, starting from 2011. Historically, the average support rate for SoP votes has been quite high (around 90%), whereas the failure rate has been low (ranging from 1.4% to 2.8% in

the period 2011–2018). However, Sirra and Vanbastelaer (2019) observe a declining support rate and an increasing failure rate in recent years, as shareholders are using SoP voting as an indirect mechanism for shareholder activism. They vote more critically to pressure companies to adopt and disclose formal policies on issues such as pay-performance alignment and those related to ESG. Cullinan, Mahoney, and Roush (2017) show that firms with poor ESG performance receive fewer favorable SoP votes from their shareholders. Asset managers such as Alliance Bernstein have expressed their expectation of integrating ESG metrics into portfolio firms' executive compensation. If investors share such expectations, they should vote more favorably in SoP after the firm adopts greenpay.

Second, shareholders can also use votes in uncontested director elections to express their opposition to the firm's board and management. Because there are no proxy fights or vote-no campaigns in such elections, director nominees almost always prevail. However, Fischer, Gramlich, Miller, and White (2009) show that uncontested elections serve as meaningful polls that reflect investor perceptions of board performance. Chapman et al. (2022) also use the approval rates of shareholder votes for board members to proxy for shareholders' perceptions of management and the board. In analyzing the recent shareholder voting trends, Tonello (2022) notes an emerging link between the decline in SoP and director elections support levels and shareholders' dissatisfaction with companies' ESG performance.

The third shareholder activity involves submitting proposals in annual shareholder meetings. Grewal, Serafeim, and Yoon (2016) show that shareholder proposals on ESG topics have more than doubled in the last two decades. Growing concerns about climate change have also led to more environmental-related proposals (Flammer, 2015; Copland and O'Keefe, 2016). Grewal et al. (2016) show that filing shareholder proposals is effective in improving the company's performance in terms of the focal ESG issue, even though such proposals seldom

receive majority support. Flammer et al. (2019) further show that these environmental-related proposals pressure managers to voluntarily disclose their climate risk information.

Cohen et al. (2023) show that, consistent with the view that ESG Pay aligns managers' objectives with shareholders' intrinsic preferences for ESG, shareholders react positively to its adoption by casting more supporting votes in both SoP and director elections. We expect the same result for hard greenpay adoption. For soft greenpay, to the extent that its adoption can enhance the firm's legitimacy from the shareholders' perspective, we expect that adopting firms can receive more supporting votes from shareholders, even if they make no improvement in real performance. In addition, we predict that shareholders will submit fewer environmental-related proposals in shareholders' meetings after the adoption of both hard (from the interest alignment perspective) and soft (from legitimacy theory) greenpay plans.

We recognize that, when voting in SoP and director elections, soft greenpay can have the same effects as hard greenpay if shareholders do not pay attention to the details of the proxy statements and fail to distinguish between the two types of greenpay. Prior research (e.g., Ertimur, Ferri, and Oesch, 2013; Larcker, McCall, and Ormazabal, 2015; Ertimur, Ferri, and Oesch, 2018) shows that shareholders rely on proxy advisors' recommendations in SoP and director voting. To filter out the influence of proxy advisors, we include an indicator variable to denote their recommendations (for or against) in the test.

Similarly, in using environmental-related proposals to test our prediction, both hard and soft greenpay plans can have the same effect if the environmental activist shareholders fail to differentiate hard from soft greenpay when submitting their proposals. Activists include pension funds (e.g., New York City Pension Funds), SRI funds (e.g., Walden Asset Management and Trillium Asset Management), NGOs (e.g., As You Sow Foundation), and in some cases, individuals. In comparison to voting for SoP and directors, activist shareholders

who submit environmental-related proposals are expected to be more sophisticated in environmental issues and exercise more care in discerning hard from soft greenpay disclosures in the proxy statements. Since we expect that hard greenpay is more likely to have real effects, the two greenpay plans might have different impacts on environmental-related proposals.

[Insert Table 8 here]

3. Sample Construction and Descriptive Statistics

3.1. Sample Construction

We start the sampling process with 23,736 firm-year observations of S&P 1500 firms in Compustat from 2002–2019.[10] As detailed in Table 1, we identify firms with "greenpay" by conducting a textual analysis on these firms' annual proxy statements (Form DEF 14A) filed in the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system of the US Securities and Exchange Commission (SEC). Specifically, we first extract all contents under the sections whose titles include the keyword "compensation" from the retrieved proxy statements.[11] Based on these extracted contents, we identify sentences containing environmental-related keywords and manually examine each sentence for its relevance.[12] We consider a sentence relevant to the practice of greenpay if the sentence indicates a link between top executives' compensation and environmental metrics, which yields 1,070 firm-years adopting greenpay practices that cover 206 unique firms. Finally, we consider different types of greenpay separately. We define hard environmental pay as having specific targets (e.g.,

[10] There are two primary databases in our study: Trucost's GHG emissions and ISS' shareholder voting records, which are available from 2003–2020. Because the greenpay should be adopted one year beforehand, we choose 2002–2019 as the years to collect the greenpay information. In addition, we remove firms delisted from the S&P 1500 Index before 2018 so that our sample firms have enough years of data before and after the greenpay adoption.
[11] Most of the contents identified are from the section "Compensation Discussion and Analysis" of proxy statements.
[12]The matched keywords include: environmental sustainability, sustainable energy, pollution, pollutant, toxic release, environmentally responsible, environmental responsibility, environmental performance, environmental compliance, environmental goal, environmental metric, environmental target, environmental benchmark, environmental enforcement, environmental concern, CO2, greenhouse gas, carbon dioxide, carbon footprint, emission, renewable energy, clean energy, energy efficient, and other frequent climate change bigrams listed in Table IA. III and IX of Saunter et al. (2023).

reduced CO_2 emissions by 5% in the next year) and/or with specific weights (e.g., linking 10% of the annual incentive plan to energy efficiency and air stewardship), and soft environmental pay as having neither specific targets nor weights. Examples of each type of greenpay are provided in Appendix A.

To examine the effect of greenpay adoption on firms' subsequent environmental performance, we merge the above initial sample with one-year-ahead carbon emission data from the Trucost-Environmental dataset between 2003 and 2020. In our main tests, we restrict our sample to nonfinancial firms and require the availability of standard controls for corporate carbon emissions and the likelihood of adopting greenpay, yielding a final sample of 9,980 firm-years used in Table 4, including 155 unique firms with greenpay practices.[13] We next merge this sample with firms' environmental violation incidents from the Violation Tracker Dataset and the climate change-related disclosure in earnings conference calls constructed by Sautner et al. (2023) to examine firms' subsequent changes in environmental violations and climate change disclosures. To test the subsequent changes in shareholder activism after greenpay adoption, we further merge the shareholder proposals and voting data obtained from the Company Vote Results Dataset from Institutional Shareholder Services (ISS). Following Flammer et al. (2021), in our tests on shareholder activism, we restrict the sample to firms targeted by Socially Responsible Investing (SRI) proposals during our sample period. This restriction ensures that the firms included all face a credible risk of being a target of SRI-related shareholder activism.[14] This process yields 3,442, 38,079, and 4,709 observations used in

[13] Our sample includes around 13% of S&P 500 firms adopting environment-linked plans as of the fiscal year of 2019. This percentage is comparable to practitioners' surveys such as Semler Brossy (2021) and Willis Towers Watson (2021), which show that 14% and 12% of the S&P 500 have environment-linked pay based on proxy statements as of March 2021 and November 2020, respectively.

[14] Our results are not sensitive to this requirement, as we obtain similar results when we include firms not targeted by SRI proposals.

Panels A, B, and C of Table 6, as well as 6,230 and 6,805 observations in Panels A and B of Table 7.

[Insert Table 1]

3.2. Descriptive Statistics

3.2.1. Greenpay overtime

Figure 1 plots the evolution of soft vs. hard greenpay adoption from the fiscal years of 2002 to 2019 for S&P 1500 nonfinancial firms with available carbon emission data in our final sample. The figure shows a rapid growth of overall greenpay adoption: no firm adopted greenpay before 2002, while the number of adoptions surged from 21 in 2011 to 114 in 2019. This trend echoes the recently increasing pressure on firms to improve their corporate ESG performance. In addition, we find that soft and hard greenpay exhibit a similar growing pattern to overall greenpay adoption.

[Insert Figure 1]

3.2.2. Greenpay by industry

In Figure 2, we plot the distribution involving the number of greenpay firms across 11 nonfinancial industries defined by Fama-French in our final sample. Greenpay adoption is more prevalent in industries whose operations produce larger environmental externalities. Approximately 66% of greenpay firms are from the utilities, energy, and manufacturing industries. Figure 2 also shows that greenpay firms are not limited to emission-intensive industries, as they are dispersed in 10 out of 11 nonfinancial industries.[15]

[Insert Figure 2]

3.2.3. Greenpay by environmental factors

[15] Although the number of adopters in the finance industry is large, we exclude these firms because most of their greenpay provisions concern green finance and are not related to their real environmental performance. The only industry without greenpay in our sample is wholesale & retail services.

Companies often link compensation to environmental factors that are material to their operations. We classify those factors into carbon emissions, environmental sustainability, environmental violations & incidents, waste, spills & leaks, renewable energy & energy efficiency, and others. Figure 3 shows that the most common factor is carbon emissions, followed by environmental sustainability, and environmental violations & incidents in our final sample.

[Insert Figure 3]

3.2.4. Summary statistics

Panel A of Table 2 provides the summary statistics for the full sample. Greenpay practices are not widely adopted in our study period. Among 9,980 firm-year observations, 5.4% have greenpay. Consistent with Bebchuk and Tallarita (2022), who show that most S&P 100 companies using ESG metrics in their executive compensation did not disclose clear or objective goals, we find that soft pay (3%) is more frequently used than hard pay (2.4%). Since only the percentages are very low, the conventional winsorization thresholds are no longer appropriate. Therefore, we winsorize all *continuous* control variables at the 1st and 99th percentiles within the subsamples of firms with Greenpay = 1 and 0, respectively. We do not winsorize the log of emissions because extreme values are not an issue.

To reduce the covariate unbalances from non-random greenpay adoption, such as stakeholder pressure and technological capability in carbon reduction, we apply entropy balancing along all the control variables of our main tests in Table 4, year, and industry membership, and conduct weighted regressions as robustness checks.[16] The summary statistics for adopters and nonadopters after entropy balancing are reported in Panel B of Table 2. The

[16] Compared to propensity score matching (PSM), entropy balancing has several benefits. First, it leaves less discretion to researchers. Second, it produces a lower approximation error and reduces model dependency for subsequent treatment effect estimations. Third, it preserves the sample size, which allows us to make the most use of data variations.

slight differences between the two groups of firms suggest that this method effectively balances the covariate distributions.

[Insert Table 2]

4. Empirical Results

4.1. Cross-sectional variations of adopting (hard) greenpay

We first explore why companies incorporate environmental metrics in compensation plans, and more importantly, what factors explain their choices between hard vs. soft greenpay.

4.1.1. Determinant model

To that end, we estimate the following logit model:

$$Greenpay_{i,t+1}\ (Hard\ greenpay_{i,t+1}) = \alpha_0 + X_{i,t} + IndustryFE + YearFE + \varepsilon_{i,t+1}, \quad (1)$$

where i and t denote the firm and fiscal year, respectively. The dependent variable, *Greenpay,* is an indicator variable equal to one if firm i links its top executives' compensation to environmental performance in year $t+1$, and zero otherwise.[17] Since we are interested in the choices between soft vs. hard pay, we decompose *Greenpay* into *Soft greenpay* and *Hard greenpay*. *Soft* (*Hard*) *greenpay* is an indicator variable that equals one if firm i adopts a soft (hard) environmental pay in the year, and zero otherwise. The classifications of soft/hard environmental pay have been discussed in Section 3.1. $X_{i,t}$ is a vector of firm characteristics inspired by Cohen et al. (2023). We also incorporate SIC 2-digit industry fixed effects to account for the fact that ESG pay is more common in industries with a larger environmental footprint, and year fixed effects to control for macroeconomic shocks.

The first set of explanatory variables reflects the cost and benefits of adopting greenpay. Specifically, we include *Size* (defined as the natural logarithm of total assets) because larger

[17] Some firms stopped disclosing greenpay in their proxy statement for certain years and resumed later. If the gap is one or two years, we assume the continuation of greenpay, as the gap may be due to a firm's omission in its disclosure. If the gap is three years or longer, we treat the resumption of greenpay as a new adoption. We find robust results if we do not assume the continuation of greenpay for gaps of one or two years.

firms have more resources and greater pressure to improve their environmental performance. To account for financial slack, we add variables including *Dividend* (defined as the total amount of dividends divided by net income), *ROA* (measured as the income before extraordinary items divided by total assets), financial leverage (measured as the sum of current and long-term debt divided by total assets), *R&D* (measured as R&D expenditures divided by total assets), and *PPENT* (measured as the total Property, Plant, and Equipment divided by total assets). Considering that past studies show that market valuation and stock returns are related to ESG performance (Flammer, 2015; Lins, Servaes, and Tamayo, 2017; Hartzmark and Sussman, 2019), we control for *B/M*, the book-to-market ratio, and *Return*, the annual stock return. In addition, we include *LnTierCO2* (defined as the natural logarithm of the sum of a firm's direct and first-tier indirect GHG emissions in metric tons of CO_2 equivalent) and *RetVol* (defined as the standard deviation of stock returns over the fiscal year). For large emitters and volatile firms, environmental outcomes are likely to be informative about their future financial performance.

To examine whether (hard) greenpay adoption reflects managerial rent extraction (Bebchuk, Fried, and Walker, 2002; Bebchuk and Tallarita, 2022), we add board and governance characteristics such as *Independent Ratio* (defined as the ratio of independent board members as reported) and *Female Ratio* (defined as the ratio of female directors on the board).

We account for ownership structure using *InsiderOwn* (defined as the percentage of ownership held by the top five executives) and *IO* (defined as the percentage of shares owned by institutional investors) because institutional investors care about ESG performance (Azar et al., 2021; Cohen, Kadach, and Ormazabal, 2023). Since companies exhibiting higher transparency in ESG issues are subject to stricter monitoring and thus are more likely to adopt greenpay, we also add *CSRreport* (defined as an indicator variable that equals one for firms that issue CSR sustainability reports, and zero otherwise).

4.1.2. Results

We first test the choice of adopting greenpay or not. Column (1) of Table 3 reports the regression results using *Greenpay* as the dependent variable. Largely consistent with Cohen et al. (2023), we find that greenpay adoptions are more likely when companies are larger, less profitable, and have greater financial slack, as indicated by more tangible assets, less intensive R&D investments, and higher dividend payments. The adoption likelihood is positively associated with firms' returns, volatilities, and ex-ante carbon emissions. The likelihood also increases with the ratios of independent and female directors. In addition, we find that companies are more likely to adopt greenpay when they have more institutional ownership, less inside ownership, and issue CSR reports.

We then examine which factors explain the choice between hard vs. soft greenpay. Column (2) of Table 3 reports the regression results using a subsample, where *Greenpay* = 1 and *Hard greenpay* is the dependent variable. The results show that companies are more likely to choose hard greenpay if they have fewer R&D investments and issue CSR reports. Notably, we find that companies with higher ratios of independent directors are more likely to adopt hard greenpay, indicating that companies may use soft greenpay opportunistically. In addition, we find that hard greenpay is more likely to occur when more female directors serve on the board.

[Insert Table 3]

4.2. Environmental Performance

In this section, we examine how the choice between hard vs. soft greenpay is associated with companies' subsequent environmental performance.

4.2.1. Carbon emission

We choose firm-level greenhouse gas (GHG) emissions as our main proxy for firms' environmental performance. This choice is motivated by the following considerations. First, unlike ESG ratings, which include subjective judgments of the rating agencies, GHG emissions are more objective and less prone to measurement error. Second, studies have shown that investors care about carbon emissions (e.g., Bolton and Kacperczyk, 2021); thus, we expect firms to have incentives to reduce their carbon emissions. Third, as Figure 3 suggests, carbon emissions are the criterion used in many greenpay policies. Other factors, such as environmental sustainability and renewable energy, could also eventually lead to reduced GHG emissions.

4.2.1.1. Empirical design

Our main measurement for firm-level GHG emissions is the sum of a firm's direct and first-tier indirect GHG emissions (*Tier1CO2*) from the Trucost dataset. This measure captures the GHG emissions that managers can directly control or adjust such as emissions from a firm's own production, energy consumption, and employees' air travel. Empirically, we construct *LnTier1CO2* by taking the natural logarithm of metric tons of CO_2 equivalent. In robustness checks, we also use the sum of direct and first-tier indirect GHG emissions scaled by total revenue (*Tier1CO2/Revenue*) and the natural logarithm of direct GHG emissions (*LnScope1CO2*).

We apply the following equation to examine the association between greenpay adoption and subsequent carbon emissions:

$$LnTier1CO2_{i,t+1} = \beta_0 + \beta_1 Greenpay_{i,t} (\beta_1 Hard\ greenpay_{i,t} + \beta_2 Soft\ greenpay_{i,t}) + Controls_{i,t} + FirmFE + YearFE + \varepsilon_{i,t+1}. \quad (2)$$

Controls is a vector of time-variant firm characteristics that are shown to explain greenpay adoption in Section 4.1 and are likely to be associated with firms' ESG performance according to prior studies. Specifically, we control for firm size (*Size*), profitability (*ROA*), and

proxies for financial slack (*Leverage*, *R&D*, *PPENT*, and *Dividend*), given that larger and less financially constrained firms have more resources to improve their environmental performance. We include the B/M ratio (*B/M*), returns (*Return*) and return volatility (*RetVol*) to account for the association between market valuation and stock returns, and ESG performance (Flammer, 2015; Lins et al., 2017; Hartzmark and Sussman, 2019). Since Dyck, Lins, Roth, and Wagner (2019) show that institutional investors play a significant role in driving ESG performance, we control for ownership structures using institutional ownership (*IO*) and insider ownership (*InsiderOwn*). To rule out the confounding effect from CSR reporting, we control for the availability of sustainability reports (*CSRreport*). Finally, we control for *Independent Ratio* and *Female Ratio*, given that companies with better corporate governance are shown to exhibit higher future environmental performance (Ferrell, Liang, and Renneboog, 2016; Dyck et al., 2023). All the variables retain their definitions in Section 4.1.

FirmFE and *YearFE* represent firm and year fixed effects, respectively. We incorporate firm fixed effects because various unobserved firm-level time-invariant factors can affect the level and intensity of emissions such as the technique paths for production. Moreover, prior studies frequently use firm fixed effects in testing the association between various factors (e.g., Big-3 engagement (Azar, Duro, Kadach, and Ormazabal, 2021) and CDP disclosure (Cohen, Kadach, and Ormazabal, 2023)) and carbon emissions. The use of firm fixed effects increases the comparability of our paper to those existing studies. We also rerun the regressions using industry fixed effects as robustness checks and report the results in the appendix.

We estimate the equations using the OLS model and cluster the standard deviation at the firm-level to account for the time-series correlations within firms. We report results using both unbalanced and entropy-balanced samples.

4.2.1.2. Results

Panel A of Table 4 reports the results of the tests. Column (1) shows a significantly negative coefficient of -0.131 (t-statistic: -2.44) on *Greenpay*, which translates to a 12.3% reduction in direct and indirect first-tier GHG emissions in the next year.[18, 19] This finding is consistent with Cohen et al. (2023). However, we note that the coefficient no longer becomes significant at the conventional level (t-statistics: -1.34) once entropy balancing is applied in Column (3). In Column (2), we decompose greenpay into soft and hard greenpay, and find significant coefficients on *Hard greenpay* (t-statistics: -3.26) but not on *Soft greenpay*. The difference in the two coefficients is significantly different from zero. Moreover, the magnitude of the coefficient on *Hard greenpay* is 3.25 times larger than that on *Soft greenpay*. Economically, companies' direct and indirect first-tier GHG emissions are 19.8% lower on average in the next year of adopting hard greenpay. Column (4) reports similar results using entropy balancing. These results suggest that our findings in Column (1) are driven by hard greenpay, and that soft greenpay is not associated with carbon reduction.[20]

We then verify that our findings are not sensitive to alternative proxies for carbon emissions. In Panel B of Table 4, we measure GHG emissions with the intensity of the sum of direct and first-tier indirect GHG emissions (*Tier1CO2/Revenue*) and the natural logarithm of one plus direct GHG emissions (*LnScope1CO2*).[21] The findings are qualitatively similar: the coefficients are significant only (and larger) for hard greenpay; the coefficients of hard and soft greenpay are significantly different.

4.2.2. Variations in greenpay designs and carbon emissions

[18] The 12.3% reduction is calculated from [exp(-0.131)-1]*100%.

[19] This magnitude is comparable to the findings of prior literature. For example, Cohen et al. (2023) show a 7% reduction in Scope 1 carbon emissions after firms' CDP disclosure; Jouvenot and Krueger (2019) find a 16% reduction in Scopes 1 and 2 carbon emissions after the UK-mandated GHG disclosure. Having said that, we acknowledge that this magnitude is large and can be due to companies adopting hard greenpay, expecting improvement in their environmental performance.

[20] Trucost provides its estimation of carbon emissions when it is not disclosed by the firm. Our results remain unchanged using only the measures disclosed by firms.

[21] Our results are robust if we use the cost of goods sold as the denominator to measure the carbon emission intensity.

The main results just presented are based on the dichotomous definitions of hard vs. soft greenpay. We further partition greenpay using different forms of the environmental factors employed in compensation plans. The first form focuses on the carbon-linked greenpay to tighten the link between the compensation factor and the actual outcomes. Specifically, we define *Carbonlinked greenpay* as an indicator variable equal to one if the carbon emissions are linked to compensation, and zero otherwise. We use *Carbonlinked soft (hard) greenpay* to denote soft (hard) carbon-linked pay. Then we re-estimate Eq. (1) by replacing *Greenpay* with *Carbonlinked greenpay* and report the results in Panel C of Table 4. We observe that the adoption of carbon-linked greenpay is significantly associated with a reduction in carbon emissions, and that the association is only significant for hard carbon-linked pay. This finding indicates that, even when the specific carbon metrics are used in the compensation plan, the weight or target must be specified in order to be effective. Perhaps due to the small number of carbon-linked pay plans, the differences in the coefficients on soft and hard carbon-linked pay are not significant (p-value: 0.188 and 0.177 for unbalanced and balanced samples).

The second feature of the greenpay designs we examine concerns whether the plan specifies the weight or target of the environmental factors. Theoretically, the implications of the weight and target can be different. The weight communicates companies' priorities and directs managers to allocate attention and effort to the specific dimensions (Ittner et al., 1997), while the target provides strong incentives, especially when the target is challenging (Bennett, Bettis, Gopalan, and Milbourn, 2017). To see whether it is the target or weight (or both) that drives our findings, we classify hard greenpay into cases with the weight only (42%), cases with the target only (8%), and cases with both the weight and target (50%), and use *Hard greenpay only weight*, *Hard greenpay only target*, and *Hard greenpay target & weight* to denote them. We then replace *Hard greenpay* with these three indicators to rerun the regressions in Panel A of Table 4, and report the results in Panel D. We find that the reduction

in carbon emissions is driven by hard greenpay that specifies both the weight and target, as the coefficient on *Hard greenpay target & weight* is negatively significant but not for others. When we turn to carbon-linked pay, we obtain similar results, as reported in Columns (2) and (4) of the panel.

The third feature of the greenpay designs we examine involves the relative weight tied to the environmental metrics or carbon emissions. In Panel E of Table 4, we partition hard greenpay into two subgroups based on the industry-year median of the weight tied to the environmental metrics, and rerun the regressions in Table 4, Panel A. Columns (1) and (3) of Panel E show that the associated reductions in carbon emission are significant and much greater when the weight is higher, consistent with the notion that higher weights effectively direct managers' attention and effort to environmental issues. Columns (2) and (4) show similar results when we focus on carbon-linked greenpay.

[Insert Table 4 here]

4.2.3. The effects of environmental commitment on the association between greenpay and carbon emissions

We test whether the association between greenpay and carbon emissions is affected by the environmental commitments previously made by the firm. Cohen et al. (2023) show that ESG Pay is more common among firms with stated environmental pledges. Therefore, greenpay adoption might be part of a firm's broader environmental strategies or initiatives (e.g., a firm's commitment to carbon neutrality). To test this explanation, we re-examine the analysis in Table 4, Panel A by using a sample of firms that have made public commitments to reduce their carbon emissions. Specifically, following Bolton and Kacperczyk (2023), we narrow our sample to firms who have an emission reduction target identified from the CDP, or those who have set a science-based emission reduction target identified from the science-based target

initiative (SBTi). This process yields 1,874 firm-year observations covering 212 unique firms (including 235 firm-years and 48 firms with greenpay).

As shown in Table IA1, among firms having carbon emission reduction pledges, we continue to find that greenpay adoption is significantly associated with carbon emission reduction, and such a result is driven by hard greenpay.[22] Similar results are found if we examine carbon-linked greenpay. The pledge to meet certain environmental (usually carbon-related) targets can be viewed as a signal of the firm's commitment to environmental issues. Our results suggest that, as in Cohen et al.'s (2023) finding from ESG Pay, hard greenpay is an additional signal to enhance the credibility of a firm's pledge to meet environmental targets. Soft greenpay, however, does not appear to be a credible additional signal.

4.2.4. Other environmental outcomes: Environmental-related violations

This part examines firms' environmental compliance records as another measure of environmental performance. One consideration is that Figure 3 shows a significant number of compensation plans linked to environmental violations, compliance, and environmental incidents. In addition, if hard (soft) greenpay adoptions capture companies' genuine (false) commitment to environmental issues, then we should observe a divergence in other environmental outcomes for the two types of adopters as well.

We extract violations assigned to the keyword "environment" from the Violation Tracker database, which covers violations of laws and regulations related to consumer protection, the environment, wages & hours, safety, discrimination, etc., that are resolved by a variety of federal and state regulatory agencies. We then test whether the adoption of hard and soft greenpay policies is associated with the frequency of companies' environmental-related violations *(# of EV_incidents*).

[22] We did not apply entropy balancing for this subsample because the sample size is too small to successfully use it.

Table IA2 of the Online Appendix reports the Poisson pseudo-maximum likelihood (PPML) regression results of Eq. (2) using *# of EV_incidents* as the dependent variable. Column (1) shows that on average, a company does not exhibit a significantly higher or lower frequency of environmental-related violations after greenpay adoption. However, adopters with soft greenpay experience 27.8% more cases of environmental incidents.[23] We find that the hard greenpay adoption is negatively associated with subsequent environmental violations, although the association is not significant at conventional levels (t-statistics: -1.61). The result that companies with soft greenpay adopters perform worse suggests that they either make no effort to improve their real environmental performance (not "walking the talk"), or they use greenpay to camouflage their poor future performance. The latter is consistent with using greenpay as a "window-dressing" or "greenwashing" device.

4.2.5. Discussion

This subsection (4.2) shows that the choice of soft vs. hard greenpay is associated with very different subsequent environmental performance outcomes. Hard greenpay policies (especially those with a larger weight or those that include both the target and weight) are associated with lower levels and intensities of carbon emissions; soft greenpay policies are not associated with carbon emissions but have more frequent environmental violations. These divergent outcomes of the two types of greenpay are consistent with our prediction that hard greenpay is a credible signal of firms' commitment to environmental issues. Soft greenpay does not have such an effect, and there is an indication that it is used opportunistically by some firms. We will further examine this issue in the next section.

4.3.Environmental Disclosure

[23] The 27.8% increase is calculated from [exp(0.245) -1]*100%. The coefficient estimated from PPML should be interpreted as if the dependent variable is in logarithmic form (Karolyi and Taboada, 2015).

We analyze adopting firms' disclosure of environmental information to see whether soft and hard greenpay adopters' environmental disclosures are consistent with their environmental performance.

4.3.1. Climate change-related disclosure in earnings conference calls

We focus on the climate change-related disclosure in managers' conference calls to announce quarterly earnings, given that the conference call is one major channel for companies to communicate with their shareholders, and the data are available for most of our sample firms. Following Sautner et al. (2023), we define the first measure regarding managers' disclosure of climate change, *CCDisclosure,* as the frequency of the bigrams related to climate change appearing in each transcript of the quarterly earnings call, scaled by the total number of bigrams in the transcript and multiplied by 100. *CCDisclosure* is calculated for each year as the average of the same measure for four quarters. Panel A of Table 5 reports the results of this test. We find that after adopting greenpay, managers provide significantly more climate change-related disclosures in their conference calls, whether the greenpay is the soft or hard type. The F-test shows that the coefficients on hard and soft greenpay adoptions are not significantly different. Based on the coefficients of 0.168 (for hard greenpay) and 0.125 (for soft greenpay) in Column (2), managers of firms with the two types of greenpay increase their climate change disclosures by 137% and 102%, respectively.[24] Columns (3) and (4) further show that these findings are robust to entropy balancing.

Our second measure involving managers' disclosure of climate change involves the tone in the disclosure. Prior literature shows that managers could engage in tone management for informative or strategic purposes (Huang, Teoh, and Zhang, 2014). Managers might change their tone in disclosing climate issues to either inform investors of the firm's climate risk or

[24] The 137% increase in climate disclosures for hard greenpay adopters is calculated from 0.168/0.122; the 102% increase in climate disclosures for soft greenpay adopters is calculated from 0.125/0.122. In both calculations, 0.122 is the level of climate disclosure for an average firm in the sample.

manage investors' perceptions of the firm's commitment to climate issues. Therefore, we also test the change in the sentiment in disclosing climate-related issues following the adoption of greenpay policies, using Sautner et al.'s (2023) measure of *CCSentiment*. Specifically, *CCSentiment* is computed as the relative frequency with which bigrams related to climate change are mentioned together with positive-tone words minus that with negative-tone words (as defined by Loughran and McDonald, 2011) in the transcripts of earnings conference calls in year *t+1*, multiplied by 100. Panel B of Table 5 shows that, with the adoption of both hard and soft greenpay policies, managers use a significantly more positive tone is disclosing climate issues in conference calls. Furthermore, the F-test indicates that the differences in the coefficients on hard and soft greenpay adoptions are not significant.

4.3.2. Bloomberg environmental disclosure scores

Since companies disseminate their environmental information via multiple channels, we use the Bloomberg environmental disclosure score as another proxy, following Christensen, Serafeim, and Sikochi (2022), to more comprehensively examine their disclosure behaviors. We take advantage of the fact that this score aggregates data from various sources such as sustainability reports, annual reports, and corporate websites, and is tailored for different industry sectors. Bloomberg standardizes the score to a range from 0 to 100, with a greater value representing more disclosure. In Panel C of Table 5, we report the regression results using *E_bloomberg*, the Bloomberg environmental disclosure score scaled by 100, as the dependent variable.[25] We find that the coefficient on *Soft Greenpay* is significantly positive before and after entropy balancing, and that the coefficient on *Hard Greenpay* is significant before entropy balancing. Moreover, the coefficients on *Soft Greenpay* and *Hard Greenpay* are not significantly different. These results again suggest that firms with greenpay (especially

[25] We note that the size of the testing sample shrinks from 9,980 to 6,680 because Bloomberg disclosure scores start from 2005, and we need one extra year to construct *E_bloomberg*.

those with soft greenpay) increase their disclosure of environmental-related information, even though their real performance does not improve.

4.3.3. Discussion

This subsection shows that managers of firms adopting both hard and soft greenpay policies increase their discussions of climate-related information in conference calls and use a more positive tone in these discussions. In addition, they disseminate more environmental information through other various channels, as indicated by Bloomberg disclosure scores. This convergence in hard and soft pay adopters' environmental disclosures is inconsistent with their divergence in environmental performance. Combined with an improvement in carbon reduction, the enhancement in environmental disclosures following hard greenpay adoption seems to be consistent with the notion that hard greenpay is used to signal the firm's commitment to improving environmental performance. The firm could adopt hard greenpay as part of a set of initiatives to improve its environmental performance and disclosures. As for soft greenpay, the lack of improvement in carbon reduction, more environmental compliance violations, and more climate disclosures all suggest that adopters do not "walk the talk." Rather, it is used as a means of perception management or even "greenwashing" when it is defined as "selectively disclosing positive CSR activities without intending to materially adjust the underlying real activities" (Christensen et al. 2021).

[Insert Table 5 here]

4.4. Greenpay and the Management of Investor Perceptions

4.4.1. Shareholder voting support for management-sponsored proposals

Cohen et al. (2023) find that, after a firm adopts ESG Pay, shareholders react positively by casting more supporting votes for both SoP proposals and director elections. The same result is expected for hard greenpay adoption since it has been shown to be a credible signal to

improve environmental performance. For soft greenpay, its impact on shareholder voting is not as clear. A positive impact indicates that firms are successful in using soft greenpay as perception management. It can also mean that shareholders are not as sophisticated in distinguishing hard from soft greenpay.

4.4.1.1. Say on Pay

Since greenpay is a part of the compensation design, we first infer shareholders' views on greenpay by examining the association between SoP support levels and greenpay adoption. To that end, as in Guest, Kothari, and Pozen (2022), we estimate the following equation:

$$InvPerception(SoP_{i,t+1}) = \gamma_0 + \gamma_1 Greenpay_{i,t} + Controls_{i,t} + IndustryFE + YearFE + \tau_{i,t+1}, \quad (3)$$

where *InvPerception*(*SoP*) is the percentage of votes in favor of the management-sponsored SoP proposals. We include two-digit SIC industry and fiscal year fixed effects.[26] Because Ertimur et al. (2013) and Larcker et al. (2015) show that the proxy advisor's recommendations play an important role in SoP voting outcomes, we additionally incorporate two indicator variables, *ISSRec_FOR* (equal to one if ISS recommends voting for, and zero otherwise) and *ISSRec_Against* (equal to one if ISS recommends voting against, and zero otherwise), into the list of control variables. All other variables are as defined beforehand, and standard errors are clustered at the firm-level.

Panel A of Table 6 presents the OLS estimation of Eq. (3). Consistent with Cohen et al. (2023), who find that companies receive higher vote support for their compensation-related proposals when they adopt ESG (especially environmental pay), we show positive and significant coefficients on *Greenpay.* When we separately examine the soft and hard greenpay

[26] We include industry fixed effects rather than firm fixed effects to avoid "throwing the baby out with the bath water." The SoP data were not available in the United States until 2013; thus, using firm fixed effects imposes stringent constraints on the data and may provide little variation in *Greenpay* because many firms have adopted greenpay before 2013. The R-squares in Panel A of Table 6 show that up to 95% of the variation in the SoP voting outcomes can be explained by *Greenpay,* together with our industry fixed effect structure. Thus, firm fixed effects do not seem to be necessary.

policies, we find that both types of greenpay adopters experience similarly higher levels of voting support. Specifically, we find that the coefficients on *Soft Greenpay* and *Hard greenpay* are significantly positive with entropy balancing, although the coefficient on *Soft Greenpay* is only close to the conventional significance level (t-statistics: 1.63) before entropy balancing. The difference in the coefficients is not significantly different according to the F-test.

4.4.1.2. Director proposals

Next, we evaluate the effects of greenpay on the *overall* shareholder perceptions of directors and managers. We use the percentage of votes in favor of the management-sponsored director proposals on the shareholder ballots (*InvPerception*(*Director*)) as a proxy for the overall shareholder perceptions of directors and managers. Fischer et al. (2009) first validate this measure by documenting its ability to predict CEO/board turnover. It is then used in later studies such as Chapman et al. (2021). There is also anecdotal evidence that shareholders cast dissenting votes in directors' elections to express their dissatisfaction with directors' oversight of ESG issues (Tonello, 2022).

Following Chapman et al. (2022), we estimate the following equation to examine the association between shareholders' voting and greenpay.

$$InvPerception(Director)_{i,j,t+1} = \gamma_0 + \gamma_1 Greenpay_{i,t} + Controls_{i,t} + Firm\text{-}DirectorFE + YearFE + \tau_{i,j,t+1}, \quad (4)$$

where *i*, *j*, and *t* represent firm *i*, director *j*, and fiscal year *t*, respectively. We include *ISSRec_FOR* and *ISSRec_Against* as additional control variables to account for the influence of proxy advisors on director elections (Cai, Garner, and Walkling, 2009). We use firm-director fixed effects to control for the time-invariant characteristics of firms and directors, and the matching between firms and directors. Year fixed effects are included to account for any systematic factor affecting shareholder voting for all companies. All other variables retain their definitions. The standard error is clustered at the firm-level.

Panel B of Table 6 presents the OLS estimations of Eq. (4). Columns (1) and (3) show significantly positive coefficients on *Greenpay*. Economically, the percentage of supportive votes for a director is 1 or 1.1 percent higher when a firm adopts greenpay, moving it from the median to above the 75th percentile of our sample distribution. Columns (2) and (4) show that the investors' overall perceptions of directors and managers are positively associated with greenpay adoption, regardless of whether it is soft or hard. The difference in the coefficients on the two types of greenpay is indistinguishable from zero. In Table IA3, we obtain very similar results when focusing on elections of compensation committee members, who are in charge of compensation designs.

Like Chapman et al. (2022), we ensure the robustness of our findings by examining the association between greenpay adoption and auditor approval rates. Auditor ratification serves as a good placebo test because it is unlikely to be related to greenpay. Indeed, we find insignificant coefficients on all greenpay variables in Panel C of Table 6, thereby mitigating the concern of omitted variables leading to higher shareholder votes on all agenda items.

4.4.2. Shareholder activism: Initiating environmental proposals

So far, we have examined the impact of greenpay on shareholders' voting for compensation proposals and director elections, which are used as indications of shareholders' perceptions regarding the overall compensation arrangements and management. We next examine whether greenpay adoption affects shareholders' activism in environmental issues. We measure shareholder activism with *#E-activism*, a count variable used to denote the number of environmental-related proposals to be voted on during the firm's shareholder meeting.[27]

[27] The number of proposals voted on is usually smaller than the number of those submitted because companies can exclude certain proposals based on SEC rules or can persuade shareholders to withdraw. In an untabulated analysis, we continue to find that the coefficient on *Hard greenpay* is significant but insignificant for *Soft greenpay*, after including those proposals that were submitted but not voted on. This finding lends further support to the notion that activists perceive hard greenpay as more effective than soft greenpay in addressing their environmental concerns.

Earlier, Panel A of Table 2 shows that, among firms that have been targeted by SRI proposals, the average number of such environmental proposals is 0.091.

We investigate whether greenpay adoption is associated with a higher frequency of environmental-related proposals appearing on the ballot, and how this association changes for soft vs. hard greenpay. To that end, we estimate the following equation using PPML regressions:

$$\#E\text{-}activism_{i,t+1} = \delta_0 + \delta_1 Greenpay_{i,t} + Controls_{i,t} + IndustryFE + YearFE + \mu_{i,t+1}. \quad (5)$$

Greenpay, *Soft/Hard greenpay*, and *Controls* retain their definitions in Eq. (2). We cluster the standard error at the firm-level and incorporate two-digit SIC industry fixed effects and fiscal year fixed effects.[28] A negative and significant δ_1 suggests that shareholders are less likely to pressure managers to address environmental issues if firms adopt greenpay.

Panel A of Table 7 shows the test results. Columns (1) and (3) report negative coefficients on *Greenpay*, with and without entropy balancing. On average, the number of voted-on environmental proposals is 37.3% – 40.5% lower after greenpay adoption.[29] When replacing *Greenpay* with *Soft greenpay* and *Hard greenpay*, Columns (2) and (4) show that this negative association is driven by hard green adoptions: the coefficients on *Hard greenpay* are significant, but the coefficients on *Soft greenpay* are not. Perhaps due to limited variation in *#E-activism*, we do not find the difference in the coefficients to be significant. These results lend some support to the idea that investors who initiate environmental-related shareholder proposals can distinguish the different commitment levels of hard and soft greenpay policies.[30]

[28] Only 7.2% of all firm-year observations have nonzero observations on *#E-activism*, and very few firms have environmental shareholder proposals voted on in multiple years. Thus, there is limited within-firm variation in *#E-activism*, and we use industry instead of firm fixed effects in Eq. (5) to avoid "throwing the baby out with the bath water."

[29] The 37.3% and 40.5% are calculated from [exp(-0.467) -1]*100% and [exp(-0.520) -1]*100%, respectively. We interpret the coefficient estimated from PPML as if the dependent variable is in logarithmic form (Karolyi and Taboada, 2015).

[30] In addition to *voice*, shareholders can simply *exit* if they are unsatisfied with the company's ESG policies. We therefore examine whether greenpay adoption is associated with greater ownership by SRI funds. Although we do not find that greenpay adoption is associated with higher average firm-level SRI ownership, when dividing greenpay into hard and soft, we observe a negative and significant coefficient on *Hard Greenpay*, which is significantly different from the coefficient on *Soft Greenpay*. These untabulated results suggest that SRI funds can "see-through" the deception of soft pay.

Panel B of Table 7 shows the results of a placebo test by replacing the dependent variable with the number of social proposals (#*S-activism*). Because greenpay only focuses on environmental issues, we should expect no correlation with shareholder activism in social issues. Consistent with our prediction, we do not find any evidence that greenpay adoption is significantly associated with the number of social-related proposals appearing on the ballot. These insignificant results alleviate the concern of confounding factors simultaneously affecting greenpay adoption and shareholder activism.

[Insert Table 7 here]

In Table 3, we show that firms lower their carbon emissions after adopting hard greenpay. Thus, one may question whether it is the reduced carbon emissions that make the adopting firms less likely to be targeted by activists. To evaluate whether this explanation is plausible, we control for the current and the next period's carbon emissions and report the results in Table IA4. We find that the coefficients on all greenpay variables are similar to those reported in Panel A of Table 7. Thus, our results in Table 7 are not confounded by lower carbon emissions.

4.4.3. Discussion

Table 6 shows that the firm receives more supporting votes from shareholders in voting for compensation proposals and directors. This is consistent with Cohen et al. (2023). We provide an additional insight that shareholders react positively to both hard and soft greenpay adoptions. We show earlier that after adopting soft greenpay, firms enhance their environmental disclosures without improving their real performance, consistent with greenwashing. The finding that shareholders react favorably to greenpay adoption, whether it is hard or soft, indicates that they seem to misled by the latter.

In addition, Table 7 shows that environmental activists submit fewer environmental-related proposals when companies adopt greenpay. This effect is driven by hard greenpay,

suggesting that environmental activists "see through" the two types of greenpay. This is different from the finding in Table 6 that shareholders vote more positively after the firm adopts either hard or soft greenpay. These results suggest that environmental activists pay more attention to the details of greenpay policies in the proxy statement than the overall shareholders who vote for SoP proposals and directors.[31]

5. Conclusions

This paper examines the use and outcomes of linking environmental performance to executive compensation in the United States using a sample of S&P 1500 nonfinancial firms. We find very different results for compensation plans linked to environmental criteria with targets or weights (hard greenpay) and those linked to environmental criteria but without specifying targets or weights (soft greenpay). We find that, consistent with prior research, hard greenpay is associated with reduced carbon emissions. In addition, it is associated with more shareholders' supporting votes in SoP and director elections and a lower number of environmental-related proposals. On the other hand, soft greenpay adopters do not "walk the talk" in reducing carbon emissions or environmental-related violations. Despite having no association with environmental performance, shareholders react positively to soft greenpay adoption through more supportive votes in SoP and director elections. However, it is not associated with a lower number of environmental-related proposals. Our results suggest that soft greenpay seems to be used by firms to manage shareholders' perceptions, and shareholders appear to be misled by it when voting in shareholder meetings. The extent of such misleading, however, is limited, as shareholders are likely able to differentiate the two types of greenpay in their submissions of environmental-related proposals.

[31] We also tested shareholder voting on environmental proposals around firms' adoption of greenpay but did not find any significant results (untabulated). This lack of statistical significance might be due to the limited number of environmental proposals with voting outcomes in our sample.

The interpretation of our results is subject to three caveats. First, it takes time to put in place the necessary facilities or procedures to improve environmental performance such as carbon emissions. It is likely that the firm adopts greenpay right before the improvement in environmental performance. In addition, greenpay adoption is likely to depend on factors unobservable to us. Thus, we can only characterize our results as descriptive rather than causal evidence. Second, we rely on companies' disclosure of compensation contracts in proxy statements to define the various types of greenpay. It is possible that companies may deliberately provide vague references to greenpay in their proxy statements while incorporating concrete environmental metrics with explicit targets and weights. It is also possible that firms might overstate hard greenpay by mentioning the target or weight in their disclosure, but do not enforce it. Both reporting errors bias against finding the expected results, i.e., the coefficient on hard greenpay is significant, while the coefficient on soft pay is not. Although these measurement errors work against documenting significant results, it is a limitation in our study. Finally, our study is limited to firms in the United States. The results might not be generalizable to Europe or the rest of the world, where environmental issues receive very different levels of attention.

References

Azar, J., M. Duro, I. Kadach, and G. Ormazabal. 2021. The Big Three and corporate carbon emissions around the world. *Journal of Financial Economics* 142 (2): 674–696.

Baker, A. C., D. F. Larcker, C. G. McClure, D. Saraph, and E. M. Watts. 2024. Diversity washing. *Journal of Accounting Research* forthcoming.

Bebchuk, L., J. Fried, and D. Walker. 2002. Managerial power and rent extraction in the design of executive compensation. *University of Chicago Law Review* 69 (3).

Bebchuk, L. A., and R. Tallarita. 2022. The perils and questionable promise of ESG-based compensation. *Journal of Corporation Law* 48: 37–75.

Behrens, M., and G. L. Scala. 2022. ESG and incentive compensation plans: Are investors satisfied? *The Harvard Law School Forum on Corporate Governance*.

Bennett, B., J. C. Bettis, R. Gopalan, and T. Milbourn. 2017. Compensation goals and firm performance. *Journal of Financial Economics* 124 (2): 307–330.

Bolton, P., and M. T. Kacperczyk. 2021. Carbon disclosure and the cost of capital. Working Paper.

Bolton, P., and M. T. Kacperczyk. 2023. Firm commitments. NBER Working Paper No. 31244 May 2023.

Borneman, J., J. Teefey, M. Mazzoni, M. Yoo, and J. Veale. 2023. ESG + incentives 2023 report. *The Harvard Law School Forum on Corporate Governance*.

Cai, J., J. L. Garner, and R. A. Walkling. 2009. Electing directors. *The Journal of Finance* 64 (5): 2389–2421.

Chapman, K. L., G. S. Miller, J. J. Neilson, and H. D. White. 2021. Investor relations, engagement, and shareholder activism. *The Accounting Review* 97 (2): 77–106.

Cho, C. H., and D. M. Patten. 2007. The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society* 32 (7): 639–647.

Christensen, D. M., G. Serafeim, and A. Sikochi. 2022. Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review* 97 (1): 147–175.

Christensen, H. B., L. Hail, and C. Leuz. 2021. Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies* 26 (3): 1176–1248.

Clarkson, P. M., Y. Li, G. D. Richardson, and F. P. Vasvari. 2008. Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society* 33 (4): 303–327.

Cohen, S., I. Kadach, and G. Ormazabal. 2023. Institutional investors, climate disclosure, and carbon emissions. *Journal of Accounting and Economics* 76 (2): 101640.

Cohen, S., I. Kadach, G. Ormazabal, and S. Reichelstein. 2023. Executive compensation tied to ESG performance: International evidence. *Journal of Accounting Research* 61 (3): 805–853.

Copland, J. R., and M. M. O'Keefe. 2017. Climate-change proposals break through. *Proxy Monitor*. https://www.proxymonitor.org.

Cornaggia, J., and K. Cornaggia. 2023. ESG ratings management. Working Paper.

Cullinan, C. P., L. Mahoney, and P. B. Roush. 2017. Are CSR activities associated with shareholder voting in director elections and say-on-pay votes? *Journal of Contemporary Accounting & Economics* 13 (3): 225–243.

Dyck, A., K. V. Lins, L. Roth, M. Towner, and H. F. Wagner. 2023. Renewable governance: good for the environment? *Journal of Accounting Research* 61 (1): 279–327.

Dyck, A., K. V. Lins, L. Roth, and H. F. Wagner. 2019. Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics* 131 (3): 693–714.

Ertimur, Y., F. Ferri, and D. Oesch. 2013. Shareholder votes and proxy advisors: Evidence from Say on Pay. *Journal of Accounting Research* 51 (5): 951–996.
Ertimur, Y., F. Ferri, and D. Oesch. 2018. Understanding uncontested director elections. *Management Science* 64 (7): 3400–3420.
Ferrell, A., H. Liang, and L. Renneboog. 2016. Socially responsible firms. *Journal of Financial Economics* 122 (3): 585–606.
Fischer, P. E., J. D. Gramlich, B. P. Miller, and H. D. White. 2009. Investor perceptions of board performance: Evidence from uncontested director elections. *Journal of Accounting and Economics* 48 (2): 172–189.
Flammer, C. 2015. Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science* 61 (11): 2549–2568.
Flammer, C., B. Hong, and D. Minor. 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.
Flammer, C., M. W. Toffel, and K. Viswanathan. 2021. Shareholder activism and firms' voluntary disclosure of climate change risks. *Strategic Management Journal* 42 (10): 1850–1879.
Gillan, S. L., A. Koch, and L. T. Starks. 2021. Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance* 66: 101889.
Grewal, J., G. Serafeim, and A. Yoon. 2016. Shareholder activism on sustainability issues. Working Paper.
Guest, N. M., S. P. Kothari, and R. C. Pozen. 2022. Why do large positive non-GAAP earnings adjustments predict abnormally high CEO pay? *The Accounting Review* 97 (6): 297–326.
Hainmueller, J. 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis* 20 (1): 25–46.
Hartzmark, S. M., and A. B. Sussman. 2019. Do investors value sustainability? A natural experiment examining ranking and fund flows. *The Journal of Finance* 74 (6): 2789–2837.
Hill, A. 2021. Executive pay and climate: Can bonuses be used to reduce emissions? *Financial Times*, November 14.
Huang, X., S. H. Teoh, and Y. Zhang. 2014. Tone management. *The Accounting Review* 89 (3): 1083–1113.
Ikram, A., Z. (Frank) Li, and D. Minor. 2019. CSR-contingent executive compensation contracts. *Journal of Banking & Finance*: 105655.
Ittner, C. D., D. F. Larcker, and M. W. Meyer. 2003. Subjectivity and the weighting of performance measures: Evidence from a balanced scorecard. *The Accounting Review* 78 (3): 725–758.
Ittner, C. D., D. F. Larcker, and M. V. Rajan. 1997. The choice of performance measures in annual bonus contracts. *The Accounting Review* 72 (2): 231–255.
Jouvenot, V., and P. Krueger. 2019. Mandatory corporate carbon disclosure: Evidence from a natural experiment. Working Paper.
Karolyi, G. A., and A. G. Taboada. 2015. Regulatory arbitrage and cross-border bank acquisitions. *The Journal of Finance* 70 (6): 2395–2450.
Larcker, D. F., A. L. McCall, and G. Ormazabal. 2015. Outsourcing shareholder voting to proxy advisory firms. *The Journal of Law & Economics* 58 (1): 173–204.

Lins, K. V., H. Servaes, and A. Tamayo. 2017. Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance* 72 (4): 1785–1824.
Loughran, T., and B. McDonald. 2011. When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *The Journal of Finance* 66 (1): 35–65.
Maas, K. 2018. Do corporate social performance targets in executive compensation contribute to corporate social performance? *Journal of Business Ethics* 148 (3): 573–585.
Mathews, M. R. 1995. Social and environmental accounting: A practical demonstration of ethical concern? *Journal of Business Ethics* 14 (8): 663–671.
Meridian Compensation Partners, LLC. 2021. Study on environmental, social, and governance metrics in incentive plans.
Newbury, R., D. Delves, and R. Resch. 2020. ESG issues in the forefront. *The Harvard Law School Forum on Corporate Governance*.
Raghunandan, A., and S. Rajgopal. 2022. Do ESG funds make stakeholder-friendly investments? *Review of Accounting Studies* 27 (3): 822–863.
Sautner, Z., L. Van Lent, G. Vilkov, and R. Zhang. 2023. Firm-level climate change exposure. *The Journal of Finance* 78 (3): 1449–1498.
Semler Brossy. 2021. 2021 ESG & incentives report. *The Harvard Law School Forum on Corporate Governance*.
Sirras, T., and A. Vanbastelaer. 2019. 2019 Say on Pay & proxy results. *The Harvard Law School Forum on Corporate Governance*.
Spence, M. 1973. Job market signaling. *The Quarterly Journal of Economics* 87 (3): 355–374.
Spierings, M. 2022. Linking executive compensation to ESG performance. *The Harvard Law School Forum on Corporate Governance*.
Temple-West, P., and E. Xiao. 2023. Investors warn 'fluffy' ESG metrics are being gamed to boost bonuses. *Financial Times*, August 27.
Tonello, M. 2022. Shareholder voting trends (2018–2022). *The Harvard Law School Forum on Corporate Governance*.
Trivedi, A., C. Miao, J. Veale, J. Teefey, M. Mazzoni, and M. Yoo. 2023. ESG incentives 2023 report. *The Harvard Law School Forum on Corporate Governance*.
Willis Tower Watson. 2021. ESG and executive compensation: Hearing from board members globally.

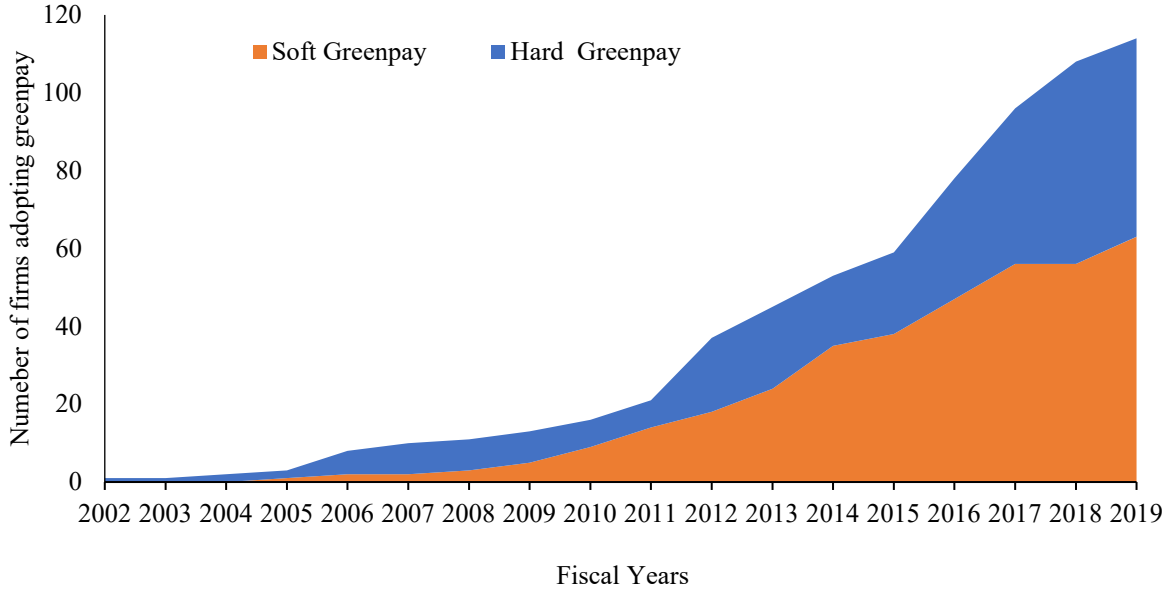

Figure 1: Time series of the number of firms adopting soft vs. hard greenpay in our final sample. The sum of the number of firms adopting hard greenpay, whose environmental metrics specify either targets or weights, and that of firms adopting soft greenpay, whose environmental metrics specify neither targets nor weights, equals the total number of firms adopting greenpay.

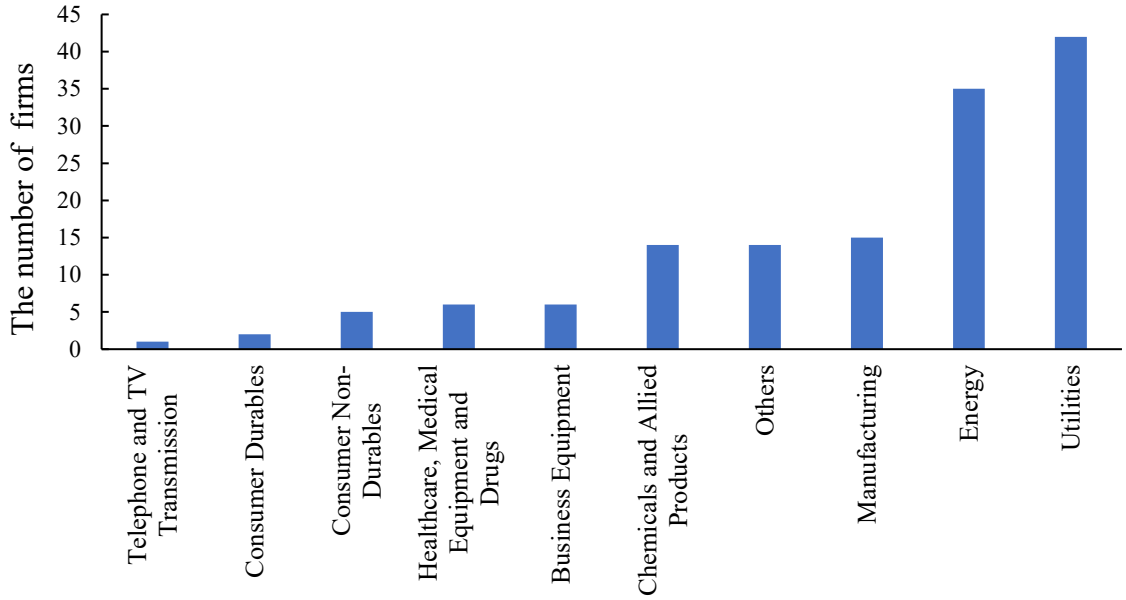

Figure 2: Number of firms adopting greenpay across industries in our final sample. Industries are defined based on Fama-French 12 industries.

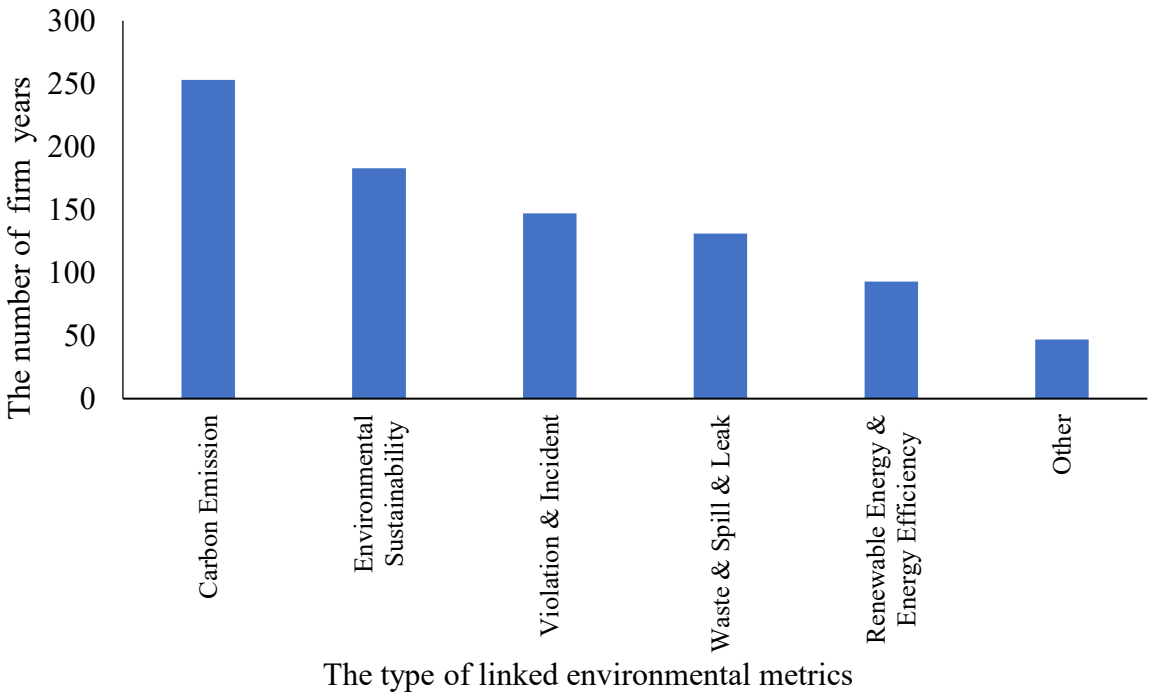

Figure 3: Distribution of environmental factors linked to greenpay in our final sample. Carbon Emissions include elements related to carbon emissions, GHG emissions, CO2, and methane emissions. Environmental Sustainability includes general or holistic environmental terms without specific aspects. Violation & Incident includes environmental violations, compliance, and environmental incidents. All other categories are self-explanatory.

Table 1: Sample Construction

This table shows the sample selection details.

	Remaining Observations	Used In
Greenpay Sample: S&P 1500		
Start with a list of S&P 1500 firms, and retrieve their historical proxy statements from the EDGAR Company Filings website to identify greenpay, and retrieve their historical financial data from Compustat from 2002 to 2019.	23,736	
Carbon Emission Sample		
Merge with valid carbon emission data and environmental violation incident data in t+1 from the Trucost-Environmental dataset and Violation Tracker dataset between 2003–2020, respectively.	13,186	
Drop firm-year observations with no sufficient data in Compustat, BoardEx, Thomas Reuters, or CRSP for computation of the control variables and drop the financial firms (6000<=SIC<=6999).	9,980	Tables 2 - 5
Shareholder Activism Sample		
Merge with the proposal-level voting data in t+1 from the ISS Company Vote Results database between 2003–2020.	3,442 SoP proposals (Panel A) 38,079 director-proposals (Panel B) 4,709 auditor-proposal (Panel C)	Table 6
Merge with firm-years with SRI proposals initiated in t+1 from the ISS Company Vote Results database between 2003–2020. Drop firms without any SRI proposals initiated between 2003–2020.	6,230 (Panel A) 6,805 (Panel B)	Table 7

Table 2. Descriptive Statistics

Panel A: Summary statistics

Variable	n	mean	std	p5	p25	p50	p75	p95
Geenpay Firm	9,980	0.190	0.392	0.000	0.000	0.000	0.000	1.000
Greenpay	9,980	0.054	0.225	0.000	0.000	0.000	0.000	1.000
Soft greenpay	9,980	0.030	0.169	0.000	0.000	0.000	0.000	0.000
Hard greenpay	9,980	0.024	0.153	0.000	0.000	0.000	0.000	0.000
Carbonlinked greenpay	9,980	0.024	0.142	0.000	0.000	0.000	0.000	0.000
Carbonlinked soft greenpay	9,980	0.012	0.105	0.000	0.000	0.000	0.000	0.000
Carbonlinked hard greenpay	9,980	0.012	0.103	0.000	0.000	0.000	0.000	0.000
LnTier1CO₂	9,980	13.215	2.059	9.975	11.774	13.070	14.585	16.946
LnScope1CO₂	9,980	11.736	2.499	8.081	10.035	11.416	13.138	16.594
CCDisclosure	9,520	0.122	0.265	0.000	0.016	0.037	0.098	0.602
CCSentiment	9,520	0.074	0.157	0.000	0.007	0.023	0.065	0.335
Ebloomberg	6,680	0.169	0.198	0.000	0.000	0.113	0.301	0.577
#E-activism	6,949	0.091	0.398	0.000	0.000	0.000	0.000	1.000
InvPerception(Director)	38,079	0.950	0.110	0.772	0.957	0.981	0.991	0.999
InvPerception(SoP)	3,442	0.722	0.363	0.000	0.616	0.930	0.964	0.985
Size	9,980	8.640	1.423	6.409	7.668	8.499	9.546	11.285
ROA	9,980	0.057	0.071	-0.050	0.026	0.055	0.093	0.166
Leverage	9,980	0.248	0.162	0.000	0.125	0.246	0.357	0.531
B/M	9,980	0.440	0.309	0.091	0.226	0.366	0.573	1.034
R&D	9,980	0.024	0.044	0.000	0.000	0.000	0.030	0.118
PPENT	9,980	0.291	0.241	0.032	0.098	0.206	0.434	0.788
Dividend	9,980	0.251	0.484	0.000	0.000	0.157	0.409	0.915
IO	9,980	0.738	0.282	0.000	0.673	0.815	0.912	1.034
RetVol	9,980	0.021	0.009	0.010	0.014	0.019	0.025	0.040
Return	9,980	0.016	0.321	-0.466	-0.178	-0.005	0.171	0.582
CSRreport	9,980	0.323	0.467	0.000	0.000	0.000	1.000	1.000
Independence ratio	9,980	0.820	0.098	0.615	0.778	0.857	0.900	0.917
Female Ratio	9,980	0.175	0.105	0.000	0.100	0.167	0.250	0.364
InsiderOwn%	9,980	2.154	4.908	0.037	0.187	0.501	1.402	12.493

Panel B: Pre- and post-entropy balancing distributional properties

Variable	Mean			Variance		
	Greenpay Firm=1	Greenpay Firm=0	Difference	Greenpay Firm=1	Greenpay Firm=0	Difference
Pre-Entropy Balancing						
Size	9.285	8.491	-0.794***	1.858	1.857	0.088
ROA	0.043	0.060	0.017***	0.004	0.005	0.001
Leverage	0.294	0.237	-0.057***	0.015	0.027	0.013*
B/M	0.518	0.422	-0.097***	0.120	0.084	-0.031
R&D	0.011	0.027	0.017***	0.001	0.002	0.002***
PPENT	0.494	0.244	-0.250**	0.070	0.043	-0.026
Dividend	0.356	0.227	-0.129***	0.377	0.196	-0.179
IO	0.668	0.754	0.086***	0.083	0.081	-0.006
RetVol	0.019	0.021	0.002*	0.000	0.000	0.000
Return	0.002	0.019	0.017***	0.089	0.100	0.017
CSRreport	0.530	0.275	-0.255***	0.249	0.192	-0.050
Independence ratio	0.857	0.811	-0.046***	0.005	0.010	0.005
Female Ratio	0.188	0.171	-0.017***	0.011	0.011	0.000
InsiderOwn%	0.616	2.508	1.892***	2.809	26.680	25.501***
Post-Entropy Balancing						
Size	9.285	9.284	-0.001	1.858	1.858	0.000
ROA	0.043	0.043	0.000	0.004	0.004	0.000
Leverage	0.294	0.294	0.000	0.015	0.015	0.000
B/M	0.518	0.518	0.000	0.120	0.120	0.000
R&D	0.011	0.011	0.000	0.001	0.001	0.000
PPENT	0.494	0.494	0.000	0.070	0.070	0.000
Dividend	0.356	0.356	0.000	0.377	0.377	0.000
IO	0.668	0.668	0.000	0.083	0.083	0.000
RetVol	0.019	0.019	0.000	0.000	0.000	0.000
Return	0.002	0.002	0.000	0.089	0.089	0.000
CSRreport	0.530	0.530	0.000	0.249	0.249	0.000
Independence ratio	0.857	0.857	0.000	0.005	0.005	0.000
Female Ratio	0.188	0.188	0.000	0.011	0.011	0.000
InsiderOwn%	0.616	0.616	0.000	2.809	2.810	0.001

This table reports descriptive statistics for the key variables. Panel A reports the number of observations (N), mean, standard deviation (std), 5% quantile (p5), 25% quantile (p25), median (p50), 75% quantile (p75), and 95% quantile (p95) for the variables used in the empirical analysis. Panel B tabulates the mean and standard deviation of the covariates for firms that have adopted greenpay and those that never have. The upper panel reports the covariate distributions before entropy balancing and the lower panel after entropy balancing. *, **, and *** denote statistical significance at the 1%, 5%, and 10% levels.

Table 3: Determinant Models of Greenpay Adoption and the Adoption of Hard vs. Soft Greenpay (Logit regressions)

	Dep Var. = Greenpay	*Dep Var. = Hardgreenpay*
	(1)	(2)
Size	0.210***	-0.081
	(7.37)	(-1.16)
ROA	-1.375***	-0.334
	(-3.68)	(-0.35)
Leverage	0.075	-0.329
	(0.48)	(-0.56)
B/M	-0.008	0.039
	(-0.08)	(0.20)
R&D	-3.558***	-36.441***
	(-4.39)	(-2.93)
PPENT	0.951***	-0.603
	(6.26)	(-1.37)
Dividend	0.077*	-0.040
	(1.73)	(-0.46)
IO	0.172**	0.120
	(2.33)	(0.74)
RetVol	11.166***	13.763
	(3.28)	(1.51)
Return	0.131*	0.190
	(1.73)	(1.01)
CSRreport	0.169***	0.252**
	(3.06)	(1.96)
Independence Ratio	1.055***	2.025**
	(4.07)	(2.10)
Female Ratio	0.978***	0.609*
	(3.88)	(1.81)
InsiderOwn	-0.049***	-0.025
	(-4.53)	(-0.75)
LnTier1CO₂	0.123***	0.034
	(5.87)	(0.72)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Pesudo R-squared	0.338	0.278
N. of Obs.	8,833	1,580

This table reports the results from estimating logit regressions. Column (1) examines the firm characteristics related to greenpay adoption. The dependent variable is *Greenpay*, an indicator variable that equals one for firm-years that link their top executives' compensation to environmental performance. Column (2) restricts the sample to firm-years where *Greenpay* = 1. The dependent variable is *Hard greenpay*, an indicator variable that equals one for firm-years with *Hard Greenpay.* The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table 4: Greenpay and Carbon Emissions

Panel A: Main results

	Dep Var. =LnTier1CO₂			
	(1)	(2)	(3)	(4)
Greenpay	-0.131**		-0.073	
	(-2.44)		(-1.34)	
Soft greenpay		-0.068		-0.023
		(-1.02)		(-0.34)
Hard greenpay		-0.221***		-0.148**
		(-3.26)		(-2.41)
Size	0.525***	0.524***	0.427***	0.425***
	(19.05)	(19.03)	(8.03)	(8.02)
ROA	0.258*	0.250	0.120	0.103
	(1.65)	(1.61)	(0.56)	(0.49)
Leverage	0.776***	0.770***	0.902***	0.886***
	(7.79)	(7.71)	(3.51)	(3.43)
B/M	0.744***	0.744***	0.608***	0.608***
	(11.97)	(12.08)	(6.65)	(6.72)
R&D	1.526*	1.525*	3.346***	3.387***
	(1.96)	(1.95)	(2.66)	(2.68)
PPENT	-0.048	-0.030	-1.096***	-1.068***
	(-0.22)	(-0.14)	(-3.20)	(-3.16)
Dividend	-0.001	-0.001	0.019	0.018
	(-0.08)	(-0.11)	(1.01)	(1.01)
IO	-0.079	-0.079	-0.154	-0.154
	(-1.40)	(-1.40)	(-1.31)	(-1.31)
RetVol	-4.572***	-4.491***	-2.464	-2.342
	(-2.98)	(-2.93)	(-0.94)	(-0.90)
Return	-0.010	-0.011	-0.059	-0.061*
	(-0.59)	(-0.63)	(-1.64)	(-1.69)
CSRreport	0.025	0.025	0.131***	0.131***
	(1.26)	(1.27)	(4.02)	(4.02)
Independence Ratio	0.181	0.184	0.100	0.110
	(1.35)	(1.37)	(0.40)	(0.44)
Female Ratio	0.313**	0.314**	0.320	0.321
	(2.36)	(2.38)	(1.13)	(1.14)
InsiderOwn	0.002	0.002	-0.003	-0.004
	(0.45)	(0.45)	(-0.38)	(-0.41)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.073	-	0.097
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.969	0.969	0.951	0.951
N. of Obs.	9980	9980	9980	9980

Panel B: Robustness tests by using alternative measures on carbon emissions

	Dep Var.=Tier1CO₂/Revenue				*Dep Var.=LnScope1CO₂*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greenpay	-1.796***		-1.457**		-0.030		-0.075	
	(-3.27)		(-2.46)		(-0.43)		(-1.13)	
Soft greenpay		-0.911		-0.641		0.050		0.005
		(-1.42)		(-0.92)		(0.60)		(0.07)
Hard greenpay		-3.078***		-2.702***		-0.146*		-0.197***
		(-3.72)		(-3.39)		(-1.74)		(-2.64)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.030	-	0.029	-	0.039	-	0.017
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.938	0.939	0.936	0.937	0.942	0.942	0.945	0.946
N. of Obs.	9980	9980	9980	9980	9980	9980	9980	9980

Panel C: Carbon-linked greenpay

	Dep Var. =LnTier1CO₂			
	(1)	(2)	(3)	(4)
Carbonlinked greenpay	-0.181***		-0.119**	
	(-3.10)		(-2.13)	
Carbonlinked soft greenpay		-0.124		-0.035
		(-1.62)		(-0.42)
Carbonlinked hard greenpay		-0.229***		-0.144**
		(-3.93)		(-2.53)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Carbonlinked Soft greenpay = Carbonlinked Hard greenpay*	-	0.188	-	0.177
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.895	0.895	0.901	0.901
N. of Obs.	9,980	9,980	9,980	9,980

Panel D: Partition hard greenpay by target vs. weight

	Dep Var. =LnTier1CO₂			
	(1)	(2)	(3)	(4)
Soft greenpay	-0.066		-0.020	
	(-0.98)		(-0.30)	
Hard greenpay only target	-0.115		-0.080	
	(-1.20)		(-0.90)	
Hard greenpay only weight	-0.131*		-0.029	
	(-1.91)		(-0.33)	
Hard greenpay target & weight	-0.330***		-0.229**	
	(-3.30)		(-2.51)	
Carbonlinked soft greenpay		-0.124		-0.033
		(-1.61)		(-0.40)
Carbonlinked hard greenpay only target		-0.388		-0.334
		(-1.25)		(-1.13)
Carbonlinked hard greenpay only weight		-0.035		0.055
		(-0.34)		(0.48)
Carbonlinked hard greenpay target & weight		-0.303***		-0.207***
		(-4.16)		(-3.32)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.969	0.966	0.951	0.950
N. of Obs.	9980	9980	9980	9980

Panel E: Partitioning of hard greenpay by the weights tied to environmental metrics

	Dep Var. = LnTier1CO2			
Soft greenpay	-0.063		-0.017	
	(-0.94)		(-0.26)	
Hard greenpay high weight	-0.368***		-0.275***	
	(-5.01)		(-3.92)	
Hard greenpay low weight	-0.086		-0.029	
	(-0.96)		(-0.37)	
Carbonlinked soft greenpay		-0.122		-0.036
		(-1.61)		(-0.45)
Carbonlinked hard greenpay high weight		-0.310***		-0.164**
		(-3.43)		(-2.13)
Carbonlinked hard greenpay low weight		-0.124		-0.080
		(-1.30)		(-0.81)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.969	0.966	0.951	0.950
N. of Obs.	9980	9980	9980	9980

This table reports the coefficients of OLS regressions examining the effect of greenpay on real environmental performance (Equation (1)). Panel A reports the results using *LnTier1CO₂*, the natural logarithm of GHG direct & first-tier Indirect emissions in year *t+1*, as dependent variables. Panel B uses alternative measures of carbon emissions as dependent variables: *Tier1CO₂/Revenue*, GHG direct & first-tier indirect emissions scaled by revenue in year *t+1*, and *LnScope1CO₂*, the natural logarithm of direct GHG emissions in year *t+1*. Panel C focuses on carbon-linked greenpay. *Carbonlinked greenpay* is an indicator variable equal to one if the firm's executive compensation plans are linked to metrics about carbon emissions, and zero otherwise. *Carbonlinked soft greenpay* is an indicator variable equal to one if the executive compensation plans are linked to carbon emission, but neither the weight nor target is specified, and zero otherwise. *Carbonlinked hard greenpay* is an indicator variable equal to one if the executive compensation plans are linked to carbon emission, and either the weight or target is specified, and zero otherwise. Panels D and E explore the variations in hard greenpay and carbon-linked greenpay, and their association with carbon emission levels. Panel D classifies hard pay into three subtypes, depending on whether the weight or target is specified in the compensation plans. Panel E partitions hard pay into high and low weights tied to environmental metrics. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table 5: Environmental Disclosure After the Adoption of Greenpay

Panel A: Quantity of climate change disclosure in conference calls

	Dep Var. = CCDisclosure			
	(1)	(2)	(3)	(4)
Greenpay	0.147***		0.123***	
	(3.85)		(3.30)	
Soft Greenpay		0.125***		0.104**
		(2.82)		(2.39)
Hard Greenpay		0.168***		0.142***
		(3.13)		(2.66)
Size	0.006	0.006	-0.004	-0.003
	(1.37)	(1.42)	(-0.30)	(-0.22)
ROA	-0.003	-0.001	0.029	0.033
	(-0.13)	(-0.04)	(0.58)	(0.67)
Leverage	-0.069**	-0.068**	-0.201**	-0.198**
	(-2.50)	(-2.51)	(-2.23)	(-2.22)
B/M	-0.031**	-0.032**	-0.065**	-0.065**
	(-2.27)	(-2.27)	(-2.25)	(-2.25)
R&D	-0.229**	-0.229**	-0.504*	-0.510*
	(-2.18)	(-2.19)	(-1.80)	(-1.83)
PPENT	0.290***	0.284***	0.566***	0.557***
	(3.91)	(3.83)	(4.40)	(4.29)
Dividend	-0.003	-0.002	-0.011*	-0.010
	(-0.82)	(-0.68)	(-1.75)	(-1.62)
IO	0.005	0.006	0.017	0.017
	(0.48)	(0.50)	(0.48)	(0.49)
RetVol	-0.298	-0.321	-1.949**	-1.997**
	(-0.83)	(-0.89)	(-2.17)	(-2.22)
Return	0.013***	0.013***	0.027**	0.028**
	(2.80)	(2.82)	(2.52)	(2.55)
CSRreport	0.010*	0.010*	0.003	0.003
	(1.66)	(1.66)	(0.20)	(0.20)
Independence Ratio	-0.028	-0.030	0.020	0.015
	(-0.82)	(-0.88)	(0.21)	(0.15)
Female Ratio	-0.046	-0.047	-0.057	-0.059
	(-1.16)	(-1.17)	(-0.43)	(-0.44)
InsiderOwn	0.001*	0.001*	0.005	0.005
	(1.87)	(1.88)	(1.48)	(1.50)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.492	-	0.546
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.810	0.810	0.818	0.819
N. of Obs.	9520	9520	9250	9520

Panel B: Sentiment of climate change disclosure in conference calls

	Dep Var. = CCSentiment			
	(5)	(6)	(7)	(8)
Greenpay	0.103***		0.087***	
	(4.01)		(3.43)	
Soft Greenpay		0.092***		0.079**
		(2.86)		(2.53)
Hard Greenpay		0.113***		0.094***
		(3.33)		(2.78)
Size	0.002	0.002	-0.006	-0.006
	(0.54)	(0.58)	(-0.76)	(-0.71)
ROA	-0.007	-0.006	0.021	0.023
	(-0.46)	(-0.40)	(0.65)	(0.70)
Leverage	-0.055***	-0.055***	-0.151**	-0.149**
	(-2.79)	(-2.79)	(-2.31)	(-2.31)
B/M	-0.016*	-0.016*	-0.034*	-0.034*
	(-1.78)	(-1.78)	(-1.90)	(-1.90)
R&D	-0.135**	-0.135**	-0.269	-0.271
	(-2.10)	(-2.10)	(-1.54)	(-1.56)
PPENT	0.163***	0.161***	0.329***	0.325***
	(3.39)	(3.31)	(3.79)	(3.71)
Dividend	-0.003	-0.003	-0.009**	-0.008**
	(-1.44)	(-1.31)	(-2.19)	(-2.07)
IO	0.001	0.001	-0.001	-0.001
	(0.17)	(0.18)	(-0.03)	(-0.02)
RetVol	-0.113	-0.123	-1.048**	-1.068**
	(-0.47)	(-0.52)	(-2.01)	(-2.07)
Return	0.006*	0.006*	0.015**	0.016**
	(1.90)	(1.94)	(2.21)	(2.25)
CSRreport	0.007*	0.007*	0.007	0.007
	(1.83)	(1.83)	(0.81)	(0.81)
Independence Ratio	-0.020	-0.021	-0.012	-0.014
	(-0.89)	(-0.93)	(-0.20)	(-0.24)
Female Ratio	-0.019	-0.019	-0.017	-0.018
	(-0.77)	(-0.78)	(-0.19)	(-0.20)
InsiderOwn	0.000	0.000	0.004**	0.004**
	(1.37)	(1.37)	(2.02)	(2.02)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.609	-	0.705
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.810	0.810	0.818	0.819
N. of Obs.	9520	9520	9520	9520

Panel C: Bloomberg environmental disclosure scores

	Dep Var. = Ebloomberg			
	(1)	(2)	(3)	(4)
Greenpay	0.057***		0.027*	
	(5.08)		(1.93)	
Soft Greenpay		0.066***		0.040**
		(4.11)		(2.11)
Hard Greenpay		0.050***		0.016
		(3.93)		(1.12)
Size	0.007	0.006	-0.014	-0.015
	(0.93)	(0.91)	(-0.95)	(-1.02)
ROA	-0.003	-0.003	0.021	0.021
	(-0.09)	(-0.09)	(0.39)	(0.38)
Leverage	0.054*	0.054*	0.014	0.013
	(1.94)	(1.93)	(0.24)	(0.22)
B/M	0.018	0.018	-0.004	-0.004
	(1.39)	(1.40)	(-0.17)	(-0.15)
R&D	-0.337*	-0.335*	0.481	0.519
	(-1.82)	(-1.81)	(0.90)	(0.96)
PPENT	0.064	0.066	0.093	0.100
	(1.13)	(1.17)	(0.88)	(0.95)
Dividend	0.000	0.000	-0.007	-0.007*
	(0.08)	(0.02)	(-1.58)	(-1.70)
IO	-0.033***	-0.033***	0.007	0.007
	(-3.04)	(-3.03)	(0.29)	(0.32)
RetVol	-0.495	-0.491	-1.040	-1.022
	(-1.32)	(-1.31)	(-1.56)	(-1.53)
Return	0.002	0.002	0.004	0.003
	(0.53)	(0.50)	(0.43)	(0.37)
CSRreport	0.054***	0.054***	0.035***	0.035***
	(7.70)	(7.70)	(3.20)	(3.20)
Independence Ratio	-0.087**	-0.086**	-0.105*	-0.103*
	(-2.47)	(-2.46)	(-1.69)	(-1.67)
Female Ratio	0.014	0.014	-0.044	-0.043
	(0.39)	(0.39)	(-0.63)	(-0.61)
InsiderOwn	0.001	0.001	-0.004	-0.004
	(1.22)	(1.22)	(-0.92)	(-0.92)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.392	-	0.190
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.839	0.839	0.842	0.842
N. of Obs.	6680	6680	6680	6680

This table tests whether greenpay adopters change their environmental disclosures in conference calls. Panels A and B examine climate change disclosure in conference calls. *CCDisclosure* is the relative frequency with which bigrams related to climate change occur in the transcripts of earnings conference calls in year *t+1*, multiplied by 100, constructed by Sautner et al. (2023). *CCSentiment* is the difference between $CCSentiment^{Pos}$ and $CCSentiment^{Neg}$, constructed by Sautner et al. (2023). $CCSentiment^{Pos}$ *(*$CCSentiment^{Neg}$*)* is computed as the relative frequency with which bigrams related to climate change are mentioned, together with positive- (negative-) tone words summarized by Loughran and McDonald (2011) in one sentence in the transcripts of earnings conference calls in year *t+1*, multiplied by 100. Panel C uses the Bloomberg E-pillar disclosure score to capture the company's overall supply of environmental disclosures. Bloomberg derives this score from sources including sustainability reports and corporate websites, and standardizes the score to a range from 0 to 100. *Ebloomberg* is Bloomberg E-pillar scores in year *t+1*, divided by 100. All variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table 6: Greenpay Adoption and Investor Perceptions of Management and the Board

Panel A: Voting outcomes of Say-on-Pay proposals

	Dep Var. =InvPerception(SoP)			
	(1)	(2)	(3)	(4)
Greenpay	0.016*		0.021***	
	(1.90)		(4.11)	
Soft greenpay		0.022		0.025***
		(1.63)		(3.82)
Hard greenpay		0.012*		0.018***
		(1.81)		(3.49)
Size	-0.013***	-0.013***	-0.017***	-0.017***
	(-4.47)	(-4.49)	(-4.50)	(-4.42)
ROA	0.130**	0.130**	0.006	0.005
	(2.44)	(2.44)	(0.16)	(0.15)
Leverage	-0.026	-0.026	-0.066	-0.065
	(-0.72)	(-0.72)	(-1.53)	(-1.50)
B/M	-0.039***	-0.039***	-0.048***	-0.048***
	(-3.81)	(-3.76)	(-4.65)	(-4.69)
R&D	-0.098	-0.097	-0.180	-0.178
	(-0.59)	(-0.58)	(-1.60)	(-1.55)
PPENT	0.057**	0.058**	0.067***	0.067***
	(2.45)	(2.47)	(2.77)	(2.78)
Dividend	0.004	0.004	0.004	0.004
	(0.83)	(0.83)	(1.06)	(1.07)
IO	0.010	0.010	0.035***	0.035***
	(0.76)	(0.76)	(3.63)	(3.64)
RetVol	-0.913	-0.901	-1.664**	-1.645**
	(-1.66)	(-1.63)	(-2.64)	(-2.58)
Return	0.025**	0.025**	0.014	0.014
	(2.38)	(2.39)	(0.61)	(0.62)
CSRreport	-0.010	-0.010	-0.003	-0.003
	(-1.21)	(-1.21)	(-0.29)	(-0.29)
Independence Ratio	-0.077	-0.077	-0.062	-0.061
	(-1.37)	(-1.37)	(-0.98)	(-0.98)
Female Ratio	0.001	0.000	0.008	0.009
	(0.01)	(0.01)	(0.21)	(0.22)
InsiderOwn	0.003*	0.003*	0.001	0.001
	(1.71)	(1.71)	(0.56)	(0.56)
ISSRec_FOR	0.543***	0.543***	0.465***	0.465***
	(23.27)	(23.33)	(11.85)	(11.88)
ISSRec_Against	0.351***	0.351***	0.312***	0.312***
	(15.63)	(15.67)	(6.68)	(6.71)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.451	-	0.446
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.928	0.926	0.950	0.949
N. of Obs.	3442	3442	3442	3442

Panel B: Voting outcomes of director elections

	Dep Var. =InvPerception(Director)			
	(1)	(2)	(3)	(4)
Greenpay	0.010***		0.011***	
	(3.62)		(3.73)	
Soft greenpay		0.008**		0.010***
		(2.36)		(2.81)
Hard greenpay		0.013***		0.013***
		(3.84)		(3.76)
Size	-0.004**	-0.004**	-0.002	-0.002
	(-2.39)	(-2.38)	(-0.89)	(-0.88)
ROA	0.028***	0.028***	-0.034***	-0.034***
	(3.21)	(3.23)	(-3.05)	(-3.04)
Leverage	-0.020**	-0.020**	-0.038***	-0.037***
	(-2.09)	(-2.07)	(-3.61)	(-3.59)
B/M	-0.020***	-0.020***	-0.021***	-0.021***
	(-5.38)	(-5.39)	(-4.45)	(-4.47)
R&D	-0.185***	-0.185***	-0.215**	-0.218**
	(-2.60)	(-2.61)	(-2.50)	(-2.54)
PPENT	0.024**	0.023**	0.084***	0.083***
	(2.14)	(2.05)	(6.14)	(6.10)
Dividend	0.001*	0.001*	0.004***	0.004***
	(1.74)	(1.78)	(4.31)	(4.32)
IO	0.011***	0.011***	0.022***	0.022***
	(2.96)	(2.93)	(3.89)	(3.83)
RetVol	-0.399***	-0.401***	-0.279**	-0.280**
	(-5.03)	(-5.06)	(-2.46)	(-2.47)
Return	0.008***	0.008***	0.003	0.003
	(4.74)	(4.73)	(0.98)	(0.98)
CSRreport	0.001	0.001	0.004**	0.003**
	(0.59)	(0.58)	(2.33)	(2.31)
Independence Ratio	-0.014	-0.014	-0.011	-0.011
	(-1.57)	(-1.59)	(-0.93)	(-0.99)
Female Ratio	0.038***	0.038***	0.035***	0.034***
	(4.09)	(4.06)	(3.07)	(3.01)
InsiderOwn	0.001**	0.001**	0.001***	0.001***
	(2.37)	(2.35)	(4.20)	(4.18)
ISSRec_FOR	0.177***	0.177***	0.185***	0.185***
	(36.32)	(36.34)	(20.49)	(20.49)
ISSRec_Against	-0.027***	-0.027***	-0.027***	-0.027***
	(-3.96)	(-3.96)	(-2.65)	(-2.65)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.331	-	0.361
Firm-Director FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.520	0.520	0.582	0.582
N. of Obs.	38079	38079	38079	38079

Panel C: Placebo test using voting outcomes of auditor approval

	Dep Var. =InvPerception(Auditor)			
	(1)	(2)	(3)	(4)
Greenpay	0.004		0.008	
	(0.52)		(1.13)	
Soft greenpay		0.000		0.004
		(0.01)		(0.47)
Hard greenpay		0.006		0.010
		(0.85)		(1.30)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.589	-	0.546
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.515	0.515	0.582	0.582
N. of Obs.	4709	4709	4709	4709

This table reports the coefficients of regressions examining the effect of greenpay on SoP (Equation (3)) and director election voting (Equation (4)). The dependent variable in Panel A (Panel B), *InvPerception*, is the percentage of votes in favor of the management-sponsored SoP (director) proposals on the shareholder ballot. Panel C reports the results of the placebo analysis using the percentage of votes in favor of the management-sponsored auditor ratification as dependent variables. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table 7: Greenpay Adoption and Shareholder Activism

Panel A: Environmental activism (voting outcomes of environmental-related proposals)

	Dep Var. = #E-activism			
	(1)	(2)	(3)	(4)
Greenpay	-0.467**		-0.520**	
	(-1.99)		(-2.18)	
Soft greenpay		-0.351		-0.386
		(-1.22)		(-1.33)
Hard greenpay		-0.593**		-0.662**
		(-2.53)		(-2.57)
Size	0.911***	0.905***	0.855***	0.843***
	(10.51)	(10.32)	(7.56)	(7.17)
ROA	-0.810	-0.854	0.276	0.222
	(-0.79)	(-0.85)	(0.18)	(0.15)
Leverage	1.244*	1.258*	2.552**	2.564**
	(1.69)	(1.71)	(2.09)	(2.09)
B/M	1.103***	1.132***	1.220***	1.253***
	(3.80)	(3.79)	(3.84)	(3.88)
R&D	-3.989	-3.972	-18.933***	-19.000***
	(-1.16)	(-1.16)	(-3.15)	(-3.16)
PPENT	0.735	0.725	0.481	0.449
	(1.28)	(1.25)	(0.70)	(0.64)
Dividend	0.058	0.058	0.139	0.143
	(0.59)	(0.58)	(0.92)	(0.93)
IO	0.369	0.378	0.083	0.094
	(1.45)	(1.48)	(0.31)	(0.35)
RetVol	4.716	4.795	-20.226*	-20.199*
	(0.40)	(0.41)	(-1.81)	(-1.81)
Return	0.094	0.099	0.378	0.388
	(0.46)	(0.49)	(1.05)	(1.08)
CSRreport	-0.151	-0.144	-0.035	-0.026
	(-1.00)	(-0.96)	(-0.25)	(-0.19)
Independence Ratio	0.381	0.382	-0.543	-0.501
	(0.42)	(0.42)	(-0.39)	(-0.36)
Female Ratio	-0.561	-0.499	-1.108	-1.018
	(-0.74)	(-0.64)	(-1.05)	(-0.92)
InsiderOwn	0.034**	0.034**	-0.028	-0.029
	(2.18)	(2.19)	(-0.81)	(-0.84)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.204	-	0.197
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.293	0.293	0.294	0.295
N. of Obs.	6230	6230	6230	6230

Panel B: Social activism placebo test (voting outcomes of social proposals)

	Dep Var. = #S-activism			
	(1)	(2)	(3)	(4)
Greenpay	-0.175		-0.131	
	(-1.23)		(-0.87)	
Soft greenpay		-0.225		-0.167
		(-1.32)		(-0.99)
Hard greenpay		-0.112		-0.087
		(-0.57)		(-0.40)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.627	-	0.742
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.283	0.283	0.254	0.254
N. of Obs.	6805	6805	6805	6805

This table reports the coefficients of the Poisson regressions examining the effect of greenpay on shareholder activism (Equation (2)). Panel A uses *#E-activism*, a count variable that denotes the number of environmental-related proposals to be voted on, as dependent variables in year *t+1*. Panel B reports the results of the placebo analysis using *#S-activism*, a count variable that denotes the number of social-related proposals to be voted on, as dependent variables in year *t+1*. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Appendix A: Variable Definitions

Variable	Definition
Independent Variable	
Greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to environmental performance. The sum of *Soft greenpay* and *Hard greenpay* equals *Greenpay.*
Soft greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to environmental performance but do not specify the weight or targets of the environmental metrics.
Hard greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to environmental performance and specify the weight or targets of the environmental metrics.
Carbonlinked greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to carbon emission-related metrics, and zero otherwise.
Carbonlinked soft greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to carbon emission-related metrics, but neither the weight nor target is specified, and zero otherwise.
Carbonlinked hard greenpay	Indicator variable that equals one for firm-years that link top executives' compensation to carbon emission-related metrics, and either the weight or target is specified, and zero otherwise
Dependent Variable	
LnTier1CO2	Natural logarithm of the GHG direct & first-tier indirect emissions (from Trucost) of each firm in year t+1, measured in equivalents of metric tons of CO2, where first- tier indirect GHG emissions mean GHG emissions from direct suppliers. The most significant sources of first-tier indirect GHG emissions are typically purchased electricity (Scope 2 of the GHG Protocol) and employees' business air travel. Data source: Trucost.
Tier1CO2/Revenue	The GHG direct & first-tier indirect emissions (from Trucost) of each firm divided by the firm's revenue in year t+1. Data source: Trucost.
LnScope1CO1	Natural logarithm of the direct GHG emissions (Scope 1 from Trucost) of each firm in year t+1, measured in equivalents of metric tons of CO2. Data source: Trucost.
CCDisclosure	The relative frequency with which bigrams related to climate change occur in the transcripts of earnings conference calls in year t+1, multiplied by 100, constructed by Sautner et al. (2023). The data are available at https://osf.io/fd6jq/
CCSentiment	The difference between $CCSentiment^{Pos}$ and $CCSentiment^{Neg}$, constructed by Sautner et al. (2023). The data are available at https://osf.io/fd6jq/ $CCSentiment^{Pos}$ $(CCSentiment^{Neg})$ is computed as the relative frequency with which bigrams related to climate change are mentioned, together with positive- (negative-) tone words summarized by Loughran and McDonald (2011) in one sentence in the transcripts of earnings conference calls in year t+1, multiplied by 100.
Ebloomberg	The Bloomberg E-pillar scores in year *t+1*, divided by 100.
#E-activism	A count variable that denotes the number of environmental-related proposals to be voted on in year t+1. Data source: ISS Company Vote Results database.
#S-activism	A count variable that denotes the number of social-related proposals to be voted on, in year t+1. Data source: ISS Company Vote Results database.
InvPerception(Director)	The percentage of votes in favor of the management-sponsored director proposals on the shareholder ballot. Data source: ISS Company Vote Results database.

InvPerception(SoP)	The percentage of votes in favor of the management-sponsored Say-on-Pay proposals. Data source: ISS Company Vote Results database.
InvPerception(Auditor)	The percentage of votes in favor of management-sponsored auditor ratification. Data source: ISS Company Vote Results database.
InvPerception(CompDirector)	The percentage of votes in favor of the management-sponsored compensation committee member proposals on the shareholder ballot. Data source: ISS Company Vote Results database.
# of EV_incidents	A count variable that denotes the number of environmental incidents in year t+1, Data source: Violation Tracker.
# of NonEV_incidents	A count variable that denotes the number of non-environmental incidents in year t+1, Data source: Violation Tracker.
Control Variables	
Size	Natural logarithm of market capitalization at the end of fiscal year t.
ROA	Income before extraordinary items (IB) divided by total assets, both at the end of fiscal year t.
Leverage	The sum of current and long-term debt divided by total assets, both at the end of fiscal year t.
B/M	Ratio of the book value of common equity to the market value of equity, both at the end of fiscal year t.
R&D	R&D expenditures (XRD) divided by total assets, both at the end of fiscal year t. If missing, XRD is set to zero.
PPENT	Total Property, Plant, and Equipment (PPENT) divided by total assets, both at the end of fiscal year t.
Dividend	Total amount of dividends divided by net income, both at the end of fiscal year t.
IO	Institutional ownership in the firm at the end of the fiscal year. It is defined as the sum of shares held by institutions from 13F filings at the end of the fiscal year, divided by total shares outstanding. Data Source: Thomson Reuters.
RetVol	The standard deviation of stock returns measured over fiscal year t. Data source: CRSP.
Return	The buy-and-hold market-adjusted return over fiscal year t. Data source: CRSP.
CSRreport	Indicator variable that equals one for firms that issue CSR sustainability reporting in fiscal year t. Data source: ASSET4.
Independence ratio	The ratio of independent board members as reported by the company at the end of fiscal year t. Data source: BoardEx.
Female Ratio	The ratio of female directors on the board at the end of fiscal year t. Data source: BoardEx.
InsiderOwn%	The percentage of ownership held by the top five executives. Data source: ExecuComp (in %).

Appendix B: Examples of hard and soft greenpay provisions

The following are examples of hard and soft greenpay provisions excerpted from the CD&A section of proxy statements (DEF 14A) obtained from the EDGAR database.

Hard greenpay:

A. The proxy statement discloses both the weight and target of environment-related performance measures:

SOUTHERN COMPANY— Proxy statement for fiscal year 2019

GHG Reduction Goal for the CEO's 2019 Long-Term Incentive Award

Weight: To demonstrate our commitment to GHG reduction goals, the Compensation Committee added a new metric to the CEO's 2019 long-term equity incentive award. A meaningful portion of the CEO's 2019 PSP award (10% or up to $2 million) is aligned with our GHG reduction goals.

Targets of the GHG reduction goals:

2019-2021 Net MW Change[(1)]	Payout % of Target	Estimated % Complete by 2021 of GHG Emission Reduction Goal for 2030
< 2,204 MW	0%	42% of 50% GHG emission reduction goal, equivalent to 84% achievement of the 2030 goal
2,641 MW	50%	43% of 50% GHG emission reduction goal, equivalent to 86% achievement of the 2030 goal
3,080 MW	100%	44% of 50% GHG emission reduction goal, equivalent to 88% achievement of the 2030 goal
3,518 MW	150%	45% of 50% GHG emission reduction goal, equivalent to 90% achievement of the 2030 goal

(1) The goal is expressed in net MW change. Not all megawatts have the same GHG emission impacts.

B. The proxy statement discloses the weight of the environmental-related performance measure but not the target:

FIRSTENERGY CORPORATIO — Proxy statement for fiscal year 2015

2015 short-term incentive compensation

Weight: 10% of the top NEOs' short-term incentive program (STIP) linked with operating linkage. The Operational Linkage is based on the seven key operating metrics, including environmental excursions referred to in note (3) in the table below, and each component is weighted equally. The environmental excursion KPI measures fossil and nuclear environmental issues related to air emissions, water discharges, and unauthorized releases.

In 2015, the KPI weightings of STIP for the NEOs were:

	Jones	Pearson	Alexander
Financial Target – Operating EPS[(1)]	80%	70%	80%
Safety/Operational Targets	20%	30%	20%

Safety[2]	10%	10%	10%
Operational Linkage[3]	10%	20%	10%

[3] Seven key operating metrics: CES Commodity Margin, a non-GAAP financial measure (see note (4) below); FEU/FET Operating Earnings, a non-GAAP financial measure (see note (6) below); System Average Interruption Duration Index (later referred to as SAIDI); Transmission Outage Frequency (later referred to as TOF); Peak Period Base and Intermediate Load Equivalent Availability, where peak periods are assumed to be January–February and May–September (later referred to as EA); the Institute of Nuclear Power Operations (later referred to as INPO) Index; and Environmental Excursions. Metrics are measured by points awarded for attaining a specified level of performance for each component based on annual performance. All components are weighted equally.

C. The proxy statement discloses the target of the environmental-related performance measure but without a separate weight:

VERIZON COMMUNICATIONS INC—Proxy statement for fiscal year 2016

2016 short-term incentive compensation

Diversity and sustainability (5%)

Targets: At least 59.4% of the U.S.-based workforce comprising minority and female employees; direct at least $4.6 billion of our overall supplier spending to minority- and female-owned firms; reduce our carbon intensity by at least 3.5%, compared to the prior year.

We are committed to promoting a diverse and inclusive culture among our employees, and to recognizing and encouraging the contribution of diverse business partners to our success. We are also committed to reducing the environmental impact of our operations. Our connected solutions empower industries and institutions to transform the way they work by making them more efficient. We have incorporated many of these solutions into our own business to support our goal of cutting Verizon's carbon intensity — carbon emissions produced per terabyte of data flowing through our networks — in half by 2020.

Soft greenpay:

The proxy statement discloses environmental-related performance measures but no specific weight or target:

1. APACHE CORPORATION—Proxy statement for fiscal year 2019 (only the first two operating goals are shown)

Operational Goals

With this in mind, the business rationale and weighting (shown in parentheses) for each 2019 operational goal are as follows:

- CROIC (weighted 25%): E&P companies have historically focused on production and revenue growth. However, the investment community has requested that the entire E&P industry give greater focus to competitive returns on capital. Our CROIC metric emphasizes Apache's focus on generating shareholder returns through disciplined capital management. This goal evaluates Apache's cash flow from operations relative to average debt and equity.

- Health, Safety, Security, and Environmental (weighted 10%): As a core value, Apache is committed to providing a safe, secure, healthy, and environmentally responsible workplace. Programs such as our "Aim for Zero" initiative (a reference to zero incidents) and our reductions in methane emission intensity and freshwater usage empower our employees to maintain a sustainable culture where we expect everyone to conduct business with minimal impact to the environment and return home safely at the end of each day.

2. ARCHER-DANIELS-MIDLAND Co (ADM)—Proxy statement for fiscal year 2020

Individual Compensation Decisions

MR. LUCIANO, Chairman, CEO, and President

• Advance our corporate responsibility and sustainability efforts, including new Scope 3 emission reduction goals; a zero-deforestation goal; a carbon-neutral milling footprint; and new initiatives to decarbonize operations through carbon capture and sequestration.

3. EASTMAN CHEMICAL COMPANY—Proxy statement for fiscal year 2018

Additionally, each of the executive officers had individual performance commitments specific to each executive's area of responsibility, with no specific weighting among the commitments. Performance of the CEO (as assessed by the Compensation Committee) and of the other named executive officers (as assessed by the CEO and the Compensation Committee) by key result areas was as follows: Productivity (including productivity improvements and cost control, targeted growth and innovation spending, and reduced energy usage and greenhouse gas emissions).

Table IA1: Association of Greenpay and Carbon Emissions Conditional on Firms Making a Commitment

	Dep Var. = LnTier1CO2			
	(1)	(2)	(3)	(4)
Greenpay	-0.111***			
	(-2.68)			
Soft greenpay		-0.085		
		(-1.55)		
Hard greenpay		-0.149***		
		(-2.64)		
Carbonlinked greenpay			-0.165***	
			(-3.22)	
Carbonlinked soft greenpay				-0.089
				(-0.82)
Carbonlinked hard greenpay				-0.183***
				(-3.08)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.983	0.983	0.983	0.983
N. of Obs.	1874	1874	1874	1874

This table tests the existence of incentive effects. It reports the coefficients of regressions examining the effect of greenpay on real environmental performance, conditional on a sample where firms made a commitment via CDP or SBTi. The dependent variable is $LnTier1CO_2$, the natural logarithm of one plus GHG direct & first-tier indirect emissions in year $t+1$, as dependent variables. All variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table IA2: Violation Records After the Adoption of Greenpay

Panel A: Environmental-related violations

Dep Var. =	*# of EV_incidents*			
	(1)	(2)	(3)	(4)
Greenpay	0.025		0.031	
	(0.18)		(0.26)	
Soft Greenpay		0.245**		0.230**
		(2.18)		(2.20)
Hard Greenpay		-0.217		-0.192
		(-1.61)		(-1.47)
Size	0.558***	0.549***	0.560***	0.551***
	(5.58)	(5.92)	(4.98)	(5.36)
ROA	-1.207**	-1.359**	0.079	-0.047
	(-2.10)	(-2.43)	(0.13)	(-0.08)
Leverage	0.693**	0.643*	1.172**	1.136**
	(1.97)	(1.83)	(2.39)	(2.30)
B/M	0.640***	0.638***	0.778***	0.787***
	(4.01)	(4.16)	(5.06)	(5.38)
R&D	3.814	3.894	10.468***	10.831***
	(1.23)	(1.23)	(3.63)	(3.52)
PPENT	-0.167	0.027	-0.731	-0.538
	(-0.29)	(0.05)	(-1.25)	(-0.92)
Dividend	0.077*	0.079*	0.091*	0.094**
	(1.76)	(1.84)	(1.94)	(2.04)
IO	0.590**	0.570***	0.590**	0.574**
	(2.56)	(2.73)	(2.11)	(2.27)
RetVol	-4.814	-4.167	-5.494	-4.831
	(-1.05)	(-0.93)	(-1.10)	(-0.99)
Return	0.043	0.036	-0.127	-0.130
	(0.52)	(0.46)	(-1.14)	(-1.21)
CSRreport	0.018	0.021	0.021	0.025
	(0.30)	(0.36)	(0.35)	(0.42)
Independence Ratio	-0.099	-0.056	0.362	0.455
	(-0.22)	(-0.13)	(0.70)	(0.91)
Female Ratio	-0.001	0.241	-0.079	0.170
	(-0.00)	(0.68)	(-0.20)	(0.45)
InsiderOwn	0.001	0.002	-0.020	-0.020
	(0.13)	(0.24)	(-0.88)	(-0.87)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.001	-	0.003
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.465	0.467	0.465	0.466
N. of Obs.	5517	5517	5517	5517

Panel B: Non-environmental related violations

Dep Var. =	*# of NonEV incidents*			
	(1)	(2)	(3)	(4)
Greenpay	-0.027		0.198	
	(-0.17)		(1.11)	
Soft Greenpay		0.076		0.276
		(0.49)		(1.52)
Hard Greenpay		-0.118		0.125
		(-0.60)		(0.59)
Size	0.232**	0.234**	-0.100	-0.097
	(2.30)	(2.32)	(-0.70)	(-0.67)
ROA	-1.651**	-1.702**	-0.809	-0.865
	(-2.03)	(-2.11)	(-1.02)	(-1.12)
Leverage	0.711*	0.715*	-0.266	-0.263
	(1.90)	(1.92)	(-0.37)	(-0.37)
B/M	0.527***	0.525***	0.162	0.167
	(3.24)	(3.27)	(0.68)	(0.70)
R&D	4.442	4.473	-2.700	-2.573
	(1.40)	(1.42)	(-0.66)	(-0.63)
PPENT	-0.630*	-0.612*	-0.219	-0.207
	(-1.74)	(-1.70)	(-0.51)	(-0.49)
Dividend	-0.032	-0.035	-0.050	-0.054
	(-1.04)	(-1.17)	(-1.38)	(-1.53)
IO	0.722***	0.715***	0.708*	0.698*
	(3.34)	(3.34)	(1.77)	(1.76)
RetVol	0.376	0.368	2.779	2.763
	(0.06)	(0.06)	(0.39)	(0.39)
Return	-0.122	-0.131	-0.168	-0.177
	(-1.44)	(-1.53)	(-1.22)	(-1.29)
CSRreport	-0.099	-0.105	-0.083	-0.090
	(-1.38)	(-1.44)	(-0.74)	(-0.79)
Independence Ratio	1.312***	1.338***	0.598	0.635
	(3.00)	(3.04)	(0.91)	(0.96)
Female Ratio	0.181	0.229	0.528	0.581
	(0.39)	(0.49)	(1.03)	(1.14)
InsiderOwn	-0.061***	-0.061***	-0.074***	-0.074***
	(-5.58)	(-5.58)	(-10.19)	(-10.25)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.690	-	0.686
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.743	0.743	0.8502	0.8502
N. of Obs.	8110	8110	8110	8110

This table use Poisson models to test whether greenpay adoption is associated with the frequency of environmental and non-environmental violation in Panels A and B, respectively. *# of EV_incidents* and # of *NonEV_incidents* are counts of environmental and non-environmental incidents in year t+1, based on a violation tracker. All variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table IA3: Voting Support for Compensation Committee Members

	Dep Var. =InvPerception(CompDirector)			
	(1)	(2)	(3)	(4)
Greenpay	0.013**		0.014**	
	(2.34)		(2.48)	
Soft greenpay		0.017**		0.021***
		(2.39)		(2.68)
Hard greenpay		0.011*		0.014**
		(1.95)		(2.19)
Size	-0.008*	-0.008*	-0.004	-0.004
	(-1.89)	(-1.89)	(-0.65)	(-0.69)
ROA	0.047**	0.047**	-0.044	-0.044
	(2.57)	(2.56)	(-1.55)	(-1.54)
Leverage	-0.012	-0.012	-0.030	-0.031
	(-0.81)	(-0.82)	(-1.48)	(-1.52)
B/M	-0.029***	-0.028***	-0.038***	-0.038***
	(-3.53)	(-3.51)	(-4.04)	(-4.03)
R&D	-0.218*	-0.215	-0.309**	-0.303**
	(-1.66)	(-1.64)	(-2.05)	(-2.01)
PPENT	0.009	0.010	0.086***	0.089***
	(0.37)	(0.41)	(3.10)	(3.23)
Dividend	0.001	0.001	0.003	0.003
	(0.49)	(0.47)	(1.40)	(1.39)
IO	0.010	0.010	0.006	0.007
	(1.51)	(1.53)	(0.50)	(0.51)
RetVol	-0.183	-0.178	-0.433	-0.425
	(-0.89)	(-0.87)	(-1.61)	(-1.60)
Return	0.015***	0.015***	0.007	0.007
	(4.10)	(4.09)	(1.25)	(1.23)
CSRreport	0.007**	0.007**	0.007**	0.007**
	(2.52)	(2.54)	(2.30)	(2.35)
Independence Ratio	0.001	0.001	0.015	0.016
	(0.03)	(0.06)	(0.59)	(0.62)
Female Ratio	0.020	0.019	0.023	0.021
	(0.98)	(0.95)	(0.99)	(0.92)
InsiderOwn	0.002**	0.002**	0.002***	0.002***
	(2.28)	(2.28)	(3.21)	(3.18)
ISSRec_FOR	0.200***	0.200***	0.201***	0.201***
	(24.09)	(24.07)	(12.21)	(12.21)
ISSRec_Against	-0.034***	-0.034***	-0.041**	-0.040**
	(-3.04)	(-3.03)	(-2.30)	(-2.28)
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.462	-	0.415
Firm-Director FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.563	0.564	0.611	0.611
N. of Obs.	11316	11316	11316	11316

This table reports the coefficients of regressions examining the effect of greenpay on voting for compensation committee members. The dependent variable, *InvPerception(CompDirector)*, is the percentage of votes in favor of the management-sponsored compensation committee member proposals on the shareholder ballot. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table IA4: Alternative Explanation: Environmental Activism Decrease Due to Reduced Carbon Emissions

	Dep Var.=#E-activism			
	(1)	(2)	(3)	(4)
Greenpay	-0.436*		-0.506**	
	(-1.91)		(-2.22)	
Soft greenpay		-0.326		-0.382
		(-1.17)		(-1.38)
Hard greenpay		-0.554**		-0.635**
		(-2.30)		(-2.42)
LnTier1CO₂t	0.292**	0.283**	0.423**	0.364**
	(2.48)	(2.33)	(2.57)	(2.49)
LnTier1CO₂ t+1	-0.063	-0.054	-0.139	-0.083
	(-0.49)	(-0.41)	(-0.87)	(-0.52)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.449	-	0.447
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.294	0.294	0.298	0.298
N. of Obs.	6,230	6,230	6,230	6,230

This table reports the Poisson regression results from estimating Equation (2) after additionally controlling for *LnTier1CO₂* in years *t* and *t+1*. *LnTier1CO₂* is calculated as the natural logarithm of one plus GHG direct & first-tier indirect emissions. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.

Table IA5: Robust Tests Using Industry Fixed Effects

Panel A: Carbon emissions

	Dep Var. =LnTier1CO₂			
	(1)	(2)	(3)	(4)
Greenpay	-0.031**		-0.054***	
	(-2.06)		(-2.79)	
Soft greenpay		-0.011		-0.032
		(-0.60)		(-1.56)
Hard greenpay		-0.061***		-0.084***
		(-2.61)		(-3.19)
LagLnTierCO₂	0.951***	0.951***	0.951***	0.951***
	(192.21)	(192.47)	(122.72)	(123.10)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.061	-	0.049
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.984	0.984	0.975	0.975
N. of Obs.	9938	9938	9938	9938

Panel B: Quantity of climate change disclosures in conference calls

	Dep Var. = CCDisclosure			
	(1)	(2)	(3)	(4)
Greenpay	0.172***		0.143**	
	(3.34)		(2.54)	
Soft Greenpay		0.174**		0.146*
		(2.20)		(1.79)
Hard Greenpay		0.170***		0.140**
		(2.69)		(2.07)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.969	-	0.949
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.505	0.810	0.554	0.819
N. of Obs.	9520	9520	9250	9520

Panel C: Sentiment of climate change disclosures in conference calls

	Dep Var. = CCSentiment			
	(5)	(6)	(7)	(8)
Greenpay	0.113***		0.097***	
	(3.49)		(2.73)	
Soft Greenpay		0.106**		0.092**
		(2.41)		(1.98)
Hard Greenpay		0.119***		0.103**
		(2.82)		(2.27)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.826	-	0.847
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.415	0.415	0.475	0.475
N. of Obs.	9520	9520	9520	9520

Panel D: Bloomberg environmental disclosure scores

	Dep Var. = Ebloomberg			
	(1)	(2)	(3)	(4)
Greenpay	0.060***		0.031*	
	(4.03)		(1.79)	
Soft Greenpay		0.073***		0.036*
		(3.59)		(1.68)
Hard Greenpay		0.048**		0.026
		(2.57)		(1.27)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.325	-	0.700
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.612	0.612	0.575	0.575
N. of Obs.	6680	6680	6680	6680

Panel E: Director proposals

	Dep Var. =InvPerception(Director)			
	(1)	(2)	(3)	(4)
Greenpay	0.007***		0.008***	
	(3.30)		(3.10)	
Soft greenpay		0.005**		0.006**
		(2.00)		(2.29)
Hard greenpay		0.010***		0.010***
		(3.39)		(2.90)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	No	No	Yes	Yes
P-value of F-test on *Soft greenpay = Hard greenpay*	-	0.237	-	0.309
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.439	0.439	0.501	0.501
N. of Obs.	40373	40373	40373	40373

This table reports the coefficients of regressions using the SIC 2-digit industry fixed effects. Panels A, B, C, D, and E report the results using *LnTier1CO₂*, *CCDisclosure, CCSentiment, Ebloomberg*, and *InvPerception*(*Director*) as dependent variables, respectively. *LnTier1CO₂* is calculated as the natural logarithm of one plus GHG direct & first-tier indirect emissions in year *t+1*. *CCDisclosure* is the relative frequency with which bigrams related to climate change occur in the transcripts of earnings conference calls in year *t+1*, multiplied by 100, constructed by Sautner et al. (2023). *CCSentiment* is the difference between $CCSentiment^{Pos}$ and $CCSentiment^{Neg}$, constructed by Sautner et al. (2023). *Ebloomberg* is Bloomberg E-pillar scores in year *t+1*, divided by 100. *InvPerception*(*Director*) is calculated as the percentage of votes in favor of the management-sponsored director proposals and SoP proposals, respectively, in year *t+1*. The variables are specified in the appendix. T-statistics (in parentheses) are based on standard errors clustered by firm. ***, **, and * indicate significance levels for two-tailed tests at the 1%, 5%, and 10% levels.