Do Firms Walk the Talk in Adopting Greenpay?

Abstract

This study shows that not all firms adopting compensation plans linked to environmental metrics (greenpay) show improvement in environmental performance. On one hand, "hard greenpay" plans, which specify the weights or targets of the environmental factors, are consistent with efficient incentive contracting, as the adoption is followed by subsequent reductions in carbon emissions and waste incineration. On the other hand, adopters of plans without specific weights or targets ("soft greenpay") do not "walk the talk" in terms of improving environmental performance. Rather, they show more violations of environmental laws while talking more about climate risk with a more positive tone in earnings calls after adoption. This "greenwashing" behavior is related to soft greenpay adopters' weaker governance such as having a less independent board. We also find that soft greenpay is useful in improving shareholders' perceptions of management, as adopters receive higher levels of shareholder support in "say on pay" (SoP) votes and director elections. However, shareholders do not reduce their submissions of environmental-related proposals after the adoption. This finding indicates the limitation in firms' use of soft greenpay to manage perceptions, as stakeholders are sophisticated in interpreting firms' executive compensation disclosures in certain situations.

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 et al., 2022) 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 lead to improved ESG ratings and other positive outcomes. These results are generally interpreted as ESG Pay providing appropriate incentives for managers to redirect attention toward ESG factors.[2]

Despite the positive empirical findings of ESG Pay, practitioners and researchers alike express reservations. 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 adoption by improving ESG performance.

This study attempts to reconcile the two conflicting views by focusing on compensation

[1] Following recent research (e.g., Gillan et al., 2021), our study uses ESG and CSR interchangeably.
[2] In prior studies (e.g., Cohen et al., 2023), ESG activities are viewed as either conducive to the firm's long-term value creation or preferred by certain shareholder groups. The 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.

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 et al., 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). Understanding the effectiveness of the more focused greenpay has become useful for practitioners and regulators of executive compensation.

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, and soft greenpay refers to those plans without such metrics. Using a difference-in-differences approach, we find that firms experience subsequent improvement in carbon emissions only when they adopt hard (but not soft) greenpay. We find consistent results from different measures of carbon emissions, including Scope 1 Greenhouse gas (GHG) emissions and the GHG emissions over which the company

[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. Cohen et al. (2023) examined the ESG pay of firms in 21 countries worldwide. Among their sample of firm-years with ESG pay, only 8% include a carbon-specific metric in their compensation plans.

has control.[5] We also find a similar result when the carbon variable is replaced by the quantity of waste generated by the company and when focusing on firms whose greenpay is based on highly quantifiable environmental metrics.[6] 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 then use the track records for compliance with environmental laws obtained from the Violation Tracker database as another measure of real environmental performance. This database, compiled by the nonprofit organization Good Jobs First, covers corporate misconduct events, including consumer, labor, safety, environmental, and other cases resolved by a variety of federal and state regulatory agencies. We find that adopters of soft greenpay have more subsequent violations of environmental laws, while this is not observed for those adopting hard greenpay.

The disclosure of greenpay adoption in the proxy statement can be viewed as a signal of the firm's commitment to improve environmental performance. Our findings that soft greenpay adopters show no improvement in carbon reduction and have poorer compliance records in environmental laws are consistent with the behavior of "greenwashing" in ESG research.[7] As further evidence of this behavior, we examine the disclosure practice of 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 emissions measures (in tons of carbon dioxide equivalent) are converted to the natural logarithm or scaled by revenue.

[6] We use the natural logarithm of (1) the direct and indirect hazardous and nonhazardous incineration quantities and (2) the direct and indirect hazardous and nonhazardous landfill and waste quantities as measures of waste. The highly quantifiable environmental metrics include carbon emissions, waste & leaks, and renewable energy/energy efficiency.

[7] *Merriam-Webster Dictionary* defines greenwashing broadly as "the act or practice of making a product, policy, activity, etc. appear to be more environmentally friendly or less environmentally damaging than it really is." Similar definitions are found in the accounting research of ESG. For example, Christensen, Hail, and Leuz (2021) define greenwashing as "selectively disclosing positive CSR activities without intending to materially adjust the underlying real activities" in order to "hide negative actions through positive, but merely symbolic, activities and reporting" (p. 1206).

adopters using a measure related to the disclosure of climate change in earnings calls (Sautner, van Lent, Vilkov, and Zhang, 2023).[8] This measure is constructed from a textual analysis of transcripts involving the quarterly earnings conference calls of public firms. It captures the proportion of an earnings call devoted to climate-related topics. While Sautner et al. (2023) refer to this measure as "climate exposure," it reflects the extent to which a firm voluntarily discusses climate-related topics in conference calls.[9] We find that the initiators of both hard and soft greenpay plans talk more about climate risk and use a more positive tone after the adoption. More frequent and positive discussions about climate risk can represent management's genuine focus on climate risk or may merely be cheap talk, depending on whether the discussion is aligned with improvement in environmental performance. In conjunction with our findings from carbon emissions and compliance records, hard greenpay appears to motivate management to "walk and talk" on climate risk, while soft greenpay seems to be a greenwashing device.

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

[8] Many studies (e.g., Flammer et al. 2021) use CDP data to measure climate risk disclosure. However, CDP coverage started in 2012, not long enough relative to our sample period.
[9] Although just published recently, Sautner et al.'s (2023) measure has been used by Hail et al. (2021) to examine the determinants of managers' climate disclosure and by Even-Tov et al. (2022) to study the association between the firm's climate disclosure and its success in securing governmental procurement contracts.

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 leads to 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 incentivizes managers to improve 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. They interpret the results as ESG Pay reflecting efficient contracting and being favored by institutional investors. By comparison, our results also imply that greenpay reflects efficient contracting, but only when the compensation plans include quantitative weights or targets. For soft greenpay, it appears to be a device to enhance shareholders' perceptions of management, rather than incentivizing management to improve

environmental performance.[10] We find that this lack of efficient contracting practice is related to poor governance, as soft greenpay adopters have lower percentages of independent directors.[11] 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 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 can lead to improved 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 can yield real results.

2. Background and hypothesis development

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%. It further jumped to 57% in the fiscal year of 2020 and 72% in 2022 according to Semler Brossy Consulting Group's 2023 survey.[12]

[10] 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.

[11] We performed (but do not show) tests on the impact of greenpay on adopting firms' institutional shareholdings and ESG ratings because the associations are either weak or insignificant when using the data of socially responsible investment (SRI) funds and the environmental scores of Asset4 ESG ratings.

[12] 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.

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 are not as common. Semler Brossy Consulting's survey (Borneman et al., 2022) finds that only 14% of S&P 500 firms included greenpay policies in the fiscal year of 2020 (relative to 57% with ESG Pay). However, as pressure to achieve carbon neutrality by mid-century intensifies globally, the percentage of greenpay adopters has jumped to 35% in fiscal 2022 (relative to 72% with ESG Pay). In other words, among large U.S. firms with ESG pay policies, only about 25% included environmental criteria in 2020, but the percentage increased to 49% in 2022.

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 policies in general lead to improved ESG ratings. These results are generally interpreted as consistent with "efficient contract theory," which posits that ESG Pay provides appropriate incentives for managers to redirect their attention toward ESG factors that are either conducive to the firm's long-term value or preferred by certain shareholder groups (e.g., Cohen et al. 2023). These positive findings are also 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 such as earnings or cash flows in compensation contracts.

However, the practice of ESG Pay has met 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 et al., 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. 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.[13] 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.

Cohen et al. (2023) show that ESG Pay is unrelated to abnormal CEO compensation and positively related to board independence. These results are consistent with efficient contract theory and counter Bebchuk and Tallarita's (2022) prediction regarding the opportunistic use of ESG Pay. However, Cohen et al. (2023) and most other extant studies do not differentiate ESG Pay policies that link compensation to objective or hard ESG criteria

[13] 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.

("hard ESG pay") from those based on subjective criteria ("soft ESG Pay"). The results are consistent with efficient contracting and might be applicable to hard ESG Pay plans, as they specify the weight or target of the environmental factors for managers to achieve. Soft ESG Pay plans, however, are subjective and unverifiable. They are less likely to incentivize managers to achieve ESG goals. Their adoption can be better explained by "legitimacy theory," which has been used in research on CSR disclosure.

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 by 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. The adoption of soft greenpay is a convenient way to manage stakeholder perceptions without any real intention to improve environmental performance.

In summary, we postulate that firms adopt hard greenpay to incentivize managers to improve real environmental performance. Soft greenpay, however, is more likely a means for firms to create an image of being environmentally conscious rather than an incentive device to drive real performance. These predictions can be written as the following hypothesis (in alternative form):

H1: A firm's environmental performance will improve after initiating hard greenpay. There is no improvement from initiating soft greenpay.

Empirically, we follow Raghunandan and Rajgopal (2022) in terms of using carbon emissions (supplemented with waste incineration) 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 them 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 in SoP votes has been quite high (around 90%), whereas the failure rate has been low (ranging from 1.4% to 2.8% in 2011–2018). However, Sirra and Vanbastelaer (2019) observe a declining support rate and an increasing failure rate in recent years as shareholders use 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 trend, Tonello (2022) notes an emerging link between the decline in SoP support levels and director elections with 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 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 efficient contracting view of ESG Pay, shareholders react positively to its adoption by casting more supporting votes in both SoP and director elections. We expect the same result for the adoption of hard greenpay. 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 efficient contracting perspective) and soft (from legitimacy theory) greenpay plans. These predictions can be stated as the following hypothesis:

H2: The percentage of support in SoP votes and director elections will increase, and the number of environmental-related proposals submitted for voting in annual

shareholder meetings will decrease after initiating a hard or soft green compensation policy.

We recognize that, from testing H2 using voting for SoP and director elections, soft greenpay can have the same effects as hard greenpay if shareholders do not pay attention to the details of 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 a fixed effect of their recommendations (yes, no, or withhold) in testing H2. The test will reveal whether shareholders differentiate hard from soft greenpay in their voting.

Similarly, in testing H2 using environmental-related proposals, both hard and soft greenpay plans can have the same effect if the environmental activist shareholders submitting the proposals fail to differentiate hard from soft greenpay. 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, the activist shareholders who submit environmental-related proposals are expected to exercise more care in discerning hard from soft greenpay disclosures in the proxy statements. As H1 predicts that hard greenpay is more likely to have real effects, the results from testing H2 using environmental-related proposals may be different for hard and soft greenpay plans.

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.[14] As detailed in Table 1, we retrieve these firms' annual proxy statements (Form DEF 14A) filed in the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system from the U.S. Securities and Exchange Commission (SEC) to identify "greenpay" by conducting a textual analysis.[15] Specifically, we first extract all contents under the sections whose titles include the keyword "compensation" from the retrieved proxy statements.[16] Based on these extracted contents, we identify sentences containing environmental-related keywords and manually examine each sentence for its relevance.[17] 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 metrics as those with specific targets (e.g., 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 define those with neither specific targets nor weights as soft environmental metrics. 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

[14] We choose this period due to the maximum overlapping period for our one-year-ahead dependent variables: carbon emissions from the Trucost database and shareholder voting from the ISS Company Voting database are from 2003–2020. We remove firms delisted from the S&P 1500 Index before 2018 to avoid survival bias.

[15] Proxy statements are the only publicly available source that officially provides information on executive performance measures (Macindoe and Eaton, 2011).

[16] The mandatory section "Compensation Discussion and Analysis" is the primary area of proxy statements to collect data.

[17] 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).

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 3, including 155 unique firms with greenpay practices.[18] 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 change in environmental violation and climate change disclosure. To test the subsequent changes in shareholder activism after the adoption of greenpay, 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.[19] This process yields 6,948 firm-year observations used in Table 6 and 46,230 proposal-year-level observations used in 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 corporate ESG performance. In addition,

[18] To further differentiate the incentive effect of greenpay from firms' overall environmental commitment/strategy, we narrow down the above sample to firms that have committed to carbon emissions reduction/carbon neutrality, yielding a subsample of 1,874 firm-years used in Table IA2.

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

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 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.[20]

[Insert Figure 2]

3.2.3. Greenpay by environmental factors

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.[21] 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. All continuous variables are winsorized at the 1st and 99th percentiles of their empirical distributions to reduce the impact of outliers. Greenpay practices are not widely adopted in our study period. Among

[20] 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.
[21] Examples of others include sustainable forest practices and plastic bottle usage.

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%).

In Panel B, we separately tabulate the means and variances of the covariates for greenpay adopting and nonadopting firms. The panel shows that greenpay adoption is not a random choice, as all the means of the covariates are significantly different between the two groups before entropy matching. In the online appendix, we report the regressions of the covariates on an indicator that equals one if the firm is a greenpay adopter, and zero otherwise. Consistent with Cohen et al. (2023), Table IA1 shows that adopters are larger, less profitable, and have more tangible assets, fewer growth opportunities, fewer R&D investments, and higher returns and volatilities. They pay more dividends, have higher ratios of independent and female directors, and are more likely to issue CSR reports. In addition, they tend to have more institutional ownership, less inside ownership, and higher ex-ante carbon emissions. In Table IA1, we also provide a determinant analysis for hard greenpay adoption by restricting the sample to greenpay adopters. The dependent variable is an indicator equal to one if the firm uses hard greenpay. We find that adopters with fewer R&D investments, a CSR report, and higher ratios of independent and female directors are more likely to choose hard greenpay.

To address potential endogeneity from nonrandom greenpay adoption, we apply entropy balancing with industry fixed effects in our main tests.[22] Compared to propensity score matching (PSM), this method has several benefits. First, it leaves less discretion to researchers.[23] Second, it produces a lower approximation error and reduced model dependency

[22] Entropy balancing assigns continuous weights to the control observations such that the mean and variance of the resulting control group match those of the treatment group across the specified covariates.
[23] Unlike PSM, entropy balancing does not require users to specify the closeness of the match, the replacement method, or the number of matched control firms for each treatment (e.g., Shipman et al. 2017; McMullin and Schonberger 2020).

for subsequent treatment effect estimations.[24] Third, it preserves the sample size, which allows us to make the most use of data variations. The summary statistics for adopters and nonadopters after entropy matching are reported in Panel B of Table 2. The slight differences between the two groups of firms suggest that entropy matching effectively balances the covariate distributions. Thus, we use the entropy-matching approach in our main tests.[25]

[Insert Table 2]

4. Results

4.1. Environmental Emissions

4.1.1. Main results

We choose firm-level greenhouse gas (GHG) emissions as our first proxy for firms' environmental performance. This choice is motivated by the following considerations. First, unlike ESG ratings, which include subjective judgment of the rating agencies, GHG emissions are more objective and have less measurement error. Second, GHG emission data are available for many firms, allowing us to examine a large sample of firms. Third, 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. Fourth, as Figure 3 suggests, carbon emissions are the criterion used in many greenpay policies. The other factors, such as environmental sustainability and renewable energy, could also eventually lead to reduced GHG emissions.

Our main measurement for firm-level GHG emissions is the sum of a firm's direct GHG emissions and the 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

[24] Hainmueller (2012) randomly draws subsets of covariates from the set of all possible subsets of covariates. He shows that the estimates are the same across different specifications using processed data (regressions are weighted by the entropy-balancing weights), but the estimates vary more using unadjusted data (unweighted).
[25] In Table 8, to check the robustness, we also replicate our main results by using a one-by-one propensity score-matched sample that accounts for self-selection on the observed variables (e.g., Dehejia and Wahba, 2002).

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*), the natural logarithm of direct GHG emissions (*LnScope1CO2*), and two waste-related performance measures—the sums of the direct and indirect hazardous and non-hazardous incineration quantities (*LnWaste1*), and landfill and waste quantities (*LnWaste2*).

We implement a difference-in-differences design to examine the effects of greenpay on real emissions. Specifically, we estimate the following equation:

$$LnTier1CO2_{i,t+1} = \beta_0 + \beta_1 Greenpay_{i,t} + Controls_{i,t} + FirmFE + YearFE + \varepsilon_{i,t+1}, \quad (1)$$

where *i* and *t* indicate firm *i* and fiscal year *t*, respectively. The main variable of interest, *Greenpay*, is an indicator variable equal to one if firm *i* links its top executives' compensation to environmental performance in year *t*, and zero otherwise.[26] Since we incorporate firm fixed effects and fiscal year fixed effects, β_1 captures the changes in carbon emissions after the adoption of greenpay relative to firms not adopting greenpay.

To shed light on the effects of different compensation designs, we decompose *Greenpay* into *Soft greenpay* and *Hard greenpay*. *Soft* (*Hard*) *greenpay* is an indicator variable that equals one if firm *i* adopts a greenpay design with soft (hard) metrics in year *t*, and zero otherwise. The classifications of soft/hard metrics have been discussed in Section 3.1. We expect the coefficient on *Hard greenpay* to be significant and negative but not for *Soft greenpay*.

In Eq. (1), *Controls* is a vector of time-variant firm characteristics, including the firm size (*Size*), ROA (*ROA*), leverage (*Leverage*), B/M ratio (*B/M*), R&D expenses (*R&D*), tangibility (*PPENT*), dividend (*Dividend*), institutional ownership (*IO*), return volatility

[26] 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.

(*RetVol*), returns (*Return*), CSR report availability (*CSRreport*), independent (*Independent Ratio*) and female director ratios (*Female Ratio*), and insider ownership (*InsiderOwn*). We obtain firms' accounting variables from Compustat, stock returns from CRSP, institutional ownership from Thomson Reuters, insider ownership from ExecuComp, CSR reports from Asset4, and director information from BoardEx. Detailed definitions for all variables are provided in Appendix A. 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.

Panel A of Table 3 reports the results of the tests. Column (1) shows a significantly negative coefficient of -0.145 (t-statistic: -2.76) on *Greenpay* with the control variables and entropy matching. The results are also economically large: compared to non-adopters, greenpay adoption leads to a 13.5% reduction in direct and indirect first-tier GHG emissions.[27]

Columns (2) provides supportive evidence for our predictions in H1. We find significant coefficients on *Hard greenpay* (t-statistics: -3.51) but not for *Soft greenpay*. Moreover, the magnitude of the coefficient on *Hard greenpay* is 1.66 times larger than that on *Soft greenpay*. These results suggest that our findings in Column (1) are driven by hard greenpay.[28]

We verify that our findings are not sensitive to alternative proxies for environmental performance. In Panel B of Table 3, 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*). Panel C of Table 3 reports the results of replacing GHG emissions with waste—the natural logarithm of one plus the sum of direct and indirect hazardous and non-hazardous incineration quantities (*LnWaste1*), and landfill and

[27] The 13.5% reduction is calculated from [exp(-0.145)-1]*100%.
[28] 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.

waste quantities (*LnWaste2*). The findings are qualitatively similar: greenpay adoption is negatively associated with waste; the coefficients are significant (and larger) for hard greenpay.

There is a concern that, because soft greenpay is based on less quantifiable factors such as environmental sustainability, there will be insignificant coefficients on *Soft greenpay*. To alleviate this concern, we only consider compensation plans tied to highly quantifiable environmental metrics, including carbon emissions, waste & leaks, and renewable energy/energy efficiency. We rerun the regressions in Panels A and C of Table 3 using the new definition and report the results in Panel D of Table 3. The panel shows the same results quantitatively.

In addition, the existence of the greenpay incentive effect can be further supported by the sensitivity of carbon emission reduction to the weight tied to the environmental metrics. The intuition is that if our results are driven by other changes concurrent with the adoption of greenpay, then the observed carbon emission reduction will be less likely to vary across the magnitude of the weight tied to the environmental metrics.[29] In Panel E of Table 3, 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 3, Panel A. Panel E shows that hard greenpay has a much stronger effect on firms' carbon reduction when the weight is larger, consistent with the incentive effect of hard greenpay adoption.

[Insert Table 3 here]

4.1.2. The endogeneity issue of other environmental initiatives

In this subsection, we discuss a potential endogeneity problem in our setting and conduct an additional test to address it. Cohen et al. (2023) show that ESG Pay is more common among firms with stated environmental pledges. The adoption of greenpay might be part of a

[29] We did not further partition the soft greenpay policies because by definition, we do not know the exact compensation weight tied to the environmental factors for soft greenpay.

firm's broader environmental strategies or initiatives (e.g., a firm's commitment to carbon neutrality). Hence, it is possible that our documented carbon emission reduction is not driven by the incentive effect of greenpay adoption but rather by other concurrent new environmental initiatives. To mitigate this concern, we re-examine the analysis in Table 3, Panel A by using a sample of firms that have made public commitments to reduce carbon emissions. Specifically, following Bolton and Kacperczyk (2023), we narrow our sample to firms who have an emission reduction target identified from 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 Panel A of Table IA2, among firms having carbon emission reduction pledges, we continue to find that the adoption of greenpay has a significant effect on carbon emission reduction, and such an effect is driven by hard greenpay.[30] The robust results suggest an incremental incentive effect of greenpay adoption above a firm's overall environmental commitment.

4.2. Environmental-related Violations

This section examines firms' environmental compliance records as another measure of environmental performance. 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., resolved by a variety of federal and state regulatory agencies. We then test whether the adoption of hard and soft greenpay policies affects the frequency and likelihood of companies' environmental-related violations.

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

We construct two measures of environmental compliance records based on violation counts. Specifically, we define *Ln(1+EV_incidents)* as the natural logarithm of one plus the frequency of environmental-related violations, and *EV_incident_dummy* as an indicator variable representing whether a violation occurred. Table 4 reports the regression results of Eq. (1) using each of the two variables as the dependent variable. We find that, compared with non-adopters, the frequency and likelihood of environmental-related violations for an average greenpay adopter do not change significantly. However, adopters with soft greenpay significantly increase their violation frequency by 15.8% (calculated from the coefficient of 0.147) and the likelihood of incurring an incident by 9.6 percentage points (from the coefficient of 0.096), respectively.[31] We do not find evidence that adopting hard greenpay policies is associated with an increase in subsequent environmental violations. The result that companies with soft greenpay policies perform worse after adoption is inconsistent with efficient contracting. Rather, it suggests that soft greenpay adopters either make no effort to improve their real environmental performance (not "walking the talk"), or use greenpay to camouflage their poor future performance. The latter is consistent with using greenpay as a "window-dressing" or "greenwashing" device.

[Insert Table 4 here]

4.3. Climate Change-related Disclosure in Earnings Conference Calls

To further explore whether greenpay policies (especially soft ones) are used as a greenwashing tool, we examine firms' disclosure of environmental information after greenpay adoption. We focus on the climate change-related disclosure in managers' conference calls to announce quarterly earnings. 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,

[31] The 15.8% increase is calculated from [exp(0.147) -1]*100%.

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.[32] Columns (1) and (2) in Table 5 report the results of this test. We find that managers significantly increase their climate change-related disclosures in conference calls after the adoption of greenpay, whether it is the soft or hard type. Based on the coefficients of 0.111 (for hard greenpay) and 0.048 (for soft greenpay) in Column (2), managers of the two types of greenpay increase their climate change disclosures by 91% and 39%, respectively, relative to firms without greenpay policies.[33]

Our second measure of 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 et al., 2014). Managers might change their tone in disclosing climate issues in order to either inform investors of climate risk change or manage investors' perceptions of climate issues and the overall corporate image. Therefore, we also test the change of 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. Columns (3) and (4) in Table 5 show that, following the adoption of both hard and soft greenpay policies, managers use a significantly more positive tone is disclosing climate issues in conference calls.

[32] We obtained the data of *CCDisclosure* and *CCSentiment* from the public website (https://osf.io/fd6jq/) provided by the authors of Sautner et al. (2023).
[33] The 91% increase in climate disclosures for hard greenpay adopters is calculated from 0.111/0.122; the 39% increase in climate disclosures for soft greenpay adopters is calculated from 0.048/0.122. In both calculations, 0.122 is the level of climate disclosure for an average firm in the sample.

This subsection shows that managers of firms adopting both hard and soft greenpay policies disclose more climate-related information and use a more positive tone when discussing it. Combined with the improvement in carbon reduction, the enhancement in climate disclosures following the adoption of hard greenpay seems to be consistent with the efficient incentive contracting argument. That is, hard greenpay appears to be used to drive managers to improve environmental performance and communicate more environmental information to investors. As for soft greenpay, the lack of improvement in carbon reduction, more environmental compliance violations, and more climate disclosures tend to suggest that adopters do not "walk the talk." Rather, it is used as a means of perception management or even "greenwashing" when it is broadly defined as "the act or practice of making a product, policy, activity, etc. appear to be more environmentally friendly or less environmentally damaging than it really is."

[Insert Table 5 here]

4.4. Shareholder Voting: Supporting Levels 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 the adoption of hard greenpay since it has been shown to be consistent with efficient incentive contracting. For soft greenpay, its impact on shareholder voting is not as clear. As discussed in H2, 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. 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 et al. (2022), we estimate the following equation:

$$InvPerception(SoP_{i,t+1}) = \gamma_0 + \gamma_1 Greenpay_{i,t} + Controls_{i,t} + IndustryFE + YearFE + ISSRecommendationFE + \tau_{i,t+1}, \quad (2)$$

where *InvPerception*(*SoP*) is the percentage of votes in favour of the management-sponsored SoP proposals. We include two-digit SIC industry and fiscal year fixed effects.[34] 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 incorporate the fixed effect of ISS recommendation (for, against, or withhold) to control for its influence. All other variables are as defined before, and the standard errors are clustered at the firm-level.

Panel A of Table 6 presents the OLS estimation of Eq. (2). The coefficient on *Greenpay* is positive and significant (coefficient = 0.015; t-statistic = 3.61) in Column (1). This result suggests that greenpay adopters receive more shareholder support in terms of the firm's compensation arrangements than non-adopters. When we separately examine the soft and hard greenpay policies in Column (4), we continue to obtain positive significant coefficients, regardless of greenpay type.

4.4.2. 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 favour of the management-sponsored director proposals on the shareholder ballots (*InvPerception*(*Director*)) as a proxy for the overall shareholder perceptions of directors and managers. Consistent with prior studies, the descriptive statistics in Table 2 show that the support rates in director elections are generally high and have small variations: *InvPerception*(*Director*) varies from the 25th percentile of 95.7% to the 75th percentile of 99.1%.

[34] 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. Also, note that Panel A of Table 6 shows that 94.6 percent of the variation in SoP support levels can be explained by *Greenpay*, together with our current fixed effect structure.

Following Chapman et al. (2022), we estimate the following equation to examine the relation.

$$InvPerception(Director)_{i,j,t+1} = \gamma_0 + \gamma_1 Greenpay_{i,t} + Controls_{i,t} + Firm\text{-}DirectorFE + YearFE + ISSRecommendationFE + \tau_{i,j,t+1}, \quad (3)$$

where *i*, *j*, and *t* represent firm *i*, director *j*, and fiscal year *t*, respectively. We incorporate fixed effects for the classes of ISS recommendations to control for the influence of proxy advisors on director elections (Cai et al., 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. (3). Column (1) shows significantly positive coefficients on *Greenpay* (coefficients: 0.011; t-statistics: 2.99). Economically, compared to firms without greenpay, the percentage of supportive votes for a director increased by 1.1 percent after a firm adopts greenpay, moving it from the median to above the 75th percentile of our sample distribution. The next column shows that the increase in investors' perceptions is associated with greenpay adoption, regardless of whether it is soft or hard.

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 affected by 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.

4.5. Shareholder Activism: Initiating Environmental Proposals

So far, we examine the impact of greenpay on shareholders' voting outcomes on compensation proposals and director elections, which are used as indications of shareholders' perceptions of 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*, an indicator variable equal to one if shareholders submit an environmental-related proposal to the shareholder meeting, and zero otherwise. Earlier, Panel A of Table 2 shows that among firms that have been targeted by SRI proposals, the average likelihood of receiving an environmental proposal is 7.2%.

We first estimate the overall effect of greenpay on the likelihood of shareholders initiating environmental-related proposals and then estimate the effects separately for soft vs. hard greenpay. To that end, we estimate the following equation:

$$Pr(E\text{-}activism_{i,t+1}) = f(\delta_0+\delta_1 Greenpay_{i,t} + Controls_{i,t} + IndustryFE + YearFE + \mu_{i,t+1}). \quad (4)$$

Since the dependent variable is binary, we use the logit model. *Greenpay*, *Soft/Hard greenpay*, and *Controls* retain their definitions in Eq. (1). We cluster the standard error at the firm-level and incorporate two-digit SIC industry fixed effects and fiscal year fixed effects.[35] A negative and significant δ_1 suggests that shareholders are less likely to pressure managers to address environmental issues after firms adopt greenpay, compared to those firms without greenpay.

Panel A of Table 7 shows the test results. Column (1) reports negative coefficients on *Greenpay* (coefficients: -0.681; t-statistics: -2.15). This negative association is economically significant. Holding all other variables constant, the chance of receiving environmental proposals for an average greenpay firm is 50.6% (the odds ratio calculated as exp(-0.681)) of the chance for an average non-adopter. Column (2) replaces *Greenpay* in Column (1) with *Soft greenpay* and *Hard greenpay*. We find evidence that the result in Column (1) is driven by hard

[35] Because the logit model gives biased estimations when including multiple fixed effects, we include industry (but not firm) fixed effects (Greene, 2004).

greenpay: the coefficient on *Hard greenpay* (t-statistics = -2.36) is significant, but the coefficient on *Soft greenpay* is not. This result implies that investors who initiate environmental-related shareholder proposals can distinguish the different commitment levels of hard and soft greenpay policies.

Panel B of Table 7 shows the results of a placebo test by replacing the dependent variable with the existence of social proposals (*S-activism*). Because greenpay only focuses on environmental issues, we should expect no effect on shareholder activism in social issues. Consistent with our prediction, we do not find any evidence that greenpay adoption is significantly associated with the likelihood of shareholders submitting a social-related proposal. 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 next period's carbon emissions and report the results in Table IA3. 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.

Taken together, the results in Table 7 provide evidence 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 in SoP proposals and director elections.[36]

4.6. Robustness Tests Using the Propensity Score-matching Sample

To show that our results are not sensitive to matching methods, we rerun Eqs. (1) to (4) using the propensity score-matching (PSM) sample obtained from a three-step process. First, we test the statistical significance of the difference in the key variables between firms that adopted greenpay (treatment firms) and those that never did so (control firms). Second, using the variables that are significantly different between the two groups as independent variables, we estimate a logit regression to model the probability of being treated (including industry and year fixed effects). The third step is to match each treatment firm to a control firm using the "nearest neighbour matching technique" (with no replacement, and a calliper set at 0.02).

We report the results from rerunning Eqs. (1) to (4) using the PSM sample in Table 8. The table confirms that our results are robust to PSM: we continue to find that *Greenpay* is negatively associated with the next-period *LnTier1CO2* (Panel A), and *E-activism* (Panel F), and is positively associated with *CCDisclosure* (Panel C), *CCSentiment* (Panel C), *InvPerception*(*SoP*) (Panel D), and *InvPerception*(*Director*) (Panel E). When we include the two types of greenpay separately as independent variables, we also obtain a similar pattern: the decrease in *LnTier1CO2* is driven by *Hard greenpay*; *Ln(1+ EV_incidents)* and *EV_incident_dummy* are positively associated with *Soft greenpay* only; *E-activism* is negatively associated with *Hard greenpay* but not *Soft greenpay*; increases in *CCDisclosure*, *CCSentiment*, *InvPerception*(*SoP*), and *InvPerception*(*Director*) apply to both types of greenpay; In addition, compared to entropy matching, we find that all the coefficients in the PSM regressions have similar magnitudes.

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

[Insert Table 8 here]

5. Conclusions

This paper examines the effects of linking environmental performance to executive compensation in the United States using a sample of S&P 1500 nonfinancial firms. We find very different outcomes 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 appears to reflect efficient incentive contracting, as it is associated with reduced carbon emissions and increased climate change-related disclosures. In addition, hard greenpay increases shareholders' supporting votes in SoP and director elections and decreases the 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 no improvement in environmental performance, soft greenpay adopters talk more about climate change in earnings calls and use a more positive tone. Shareholders also react positively to the adoption of soft greenpay through more supporting 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. Its success in doing so, however, is limited, as shareholders are able to differentiate the two types of greenpay in their submissions of environmental-related proposals.

We acknowledge that our study is subject to some constraints and limitations. First, our sample of firms adopting greenpay is relatively small (5.4% of the total available firm-year observations, Table A of Table 2); hence, the tests might not be sufficiently powerful. This relatively small sample size reflects the fact that while the majority of large U.S. firms already link their executive compensation to ESG criteria, greenpay has been less prevalent until very recently. The number of adopters is increasing rapidly as corporations face increasing urgency

to manage climate change. A larger sample of greenpay adopters would allow for more powerful tests and more ways to partition the types of greenpay criteria. In addition, our study is limited to firms in the United States. The results might not be generalizable to Europe and the rest of the world, where environmental issues receive very different levels of attention.

Finally, as in many empirical studies, there are also endogeneity issues that we cannot fully control for. Although we matched the treatment firms with control firms having similar characteristics such as size, growth, R&D intensity, governance structure, and carbon exposure, there are always unknown factors that may affect our results.

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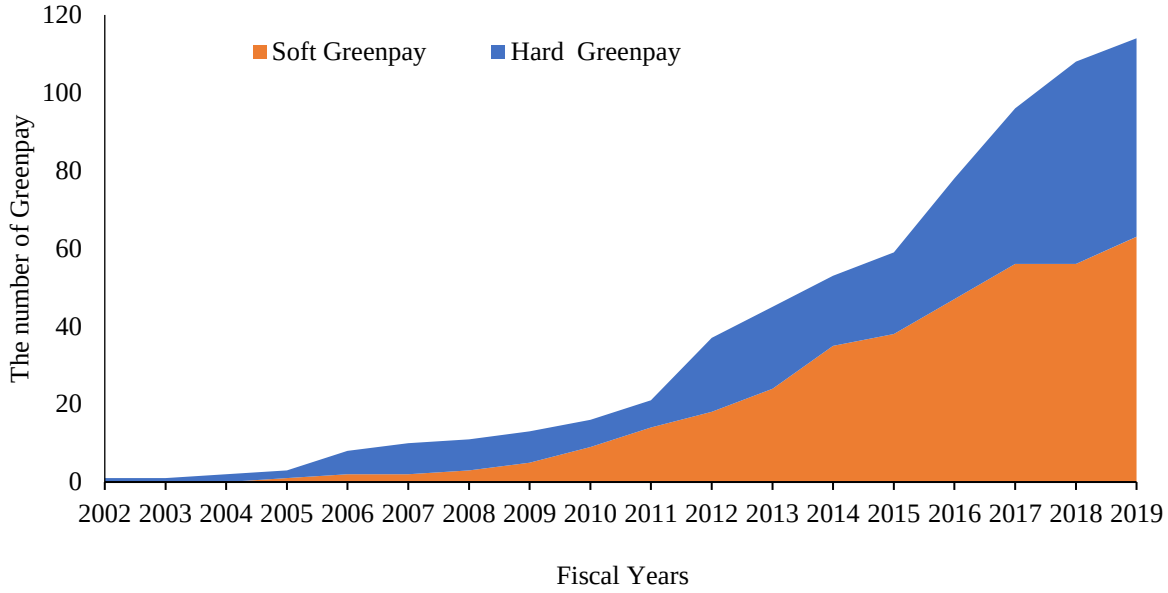

Figure 1: Time series of the number firms adopting soft vs. hard greenpay in our final sample. The sum of hard greenpay, whose environmental metrics specify either targets or weights, and soft greenpay, whose environmental metrics specify neither targets nor weights, equals the total number of firms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

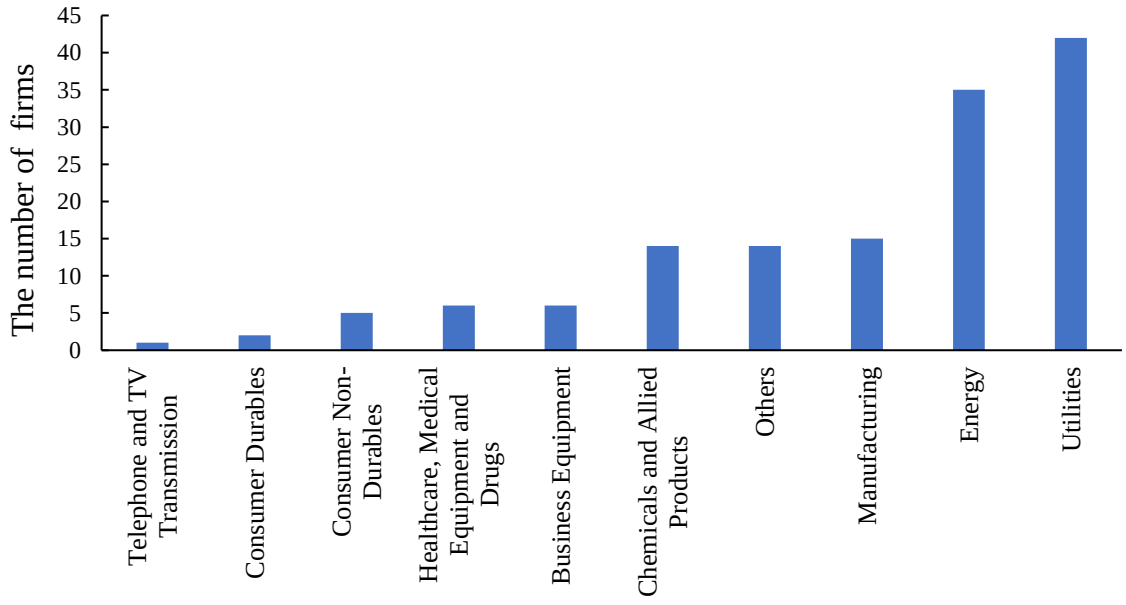

Figure 2: Number of firms adopting greenpay across industries in our final sample. Industries are defined based on Fama-French 12 industries.

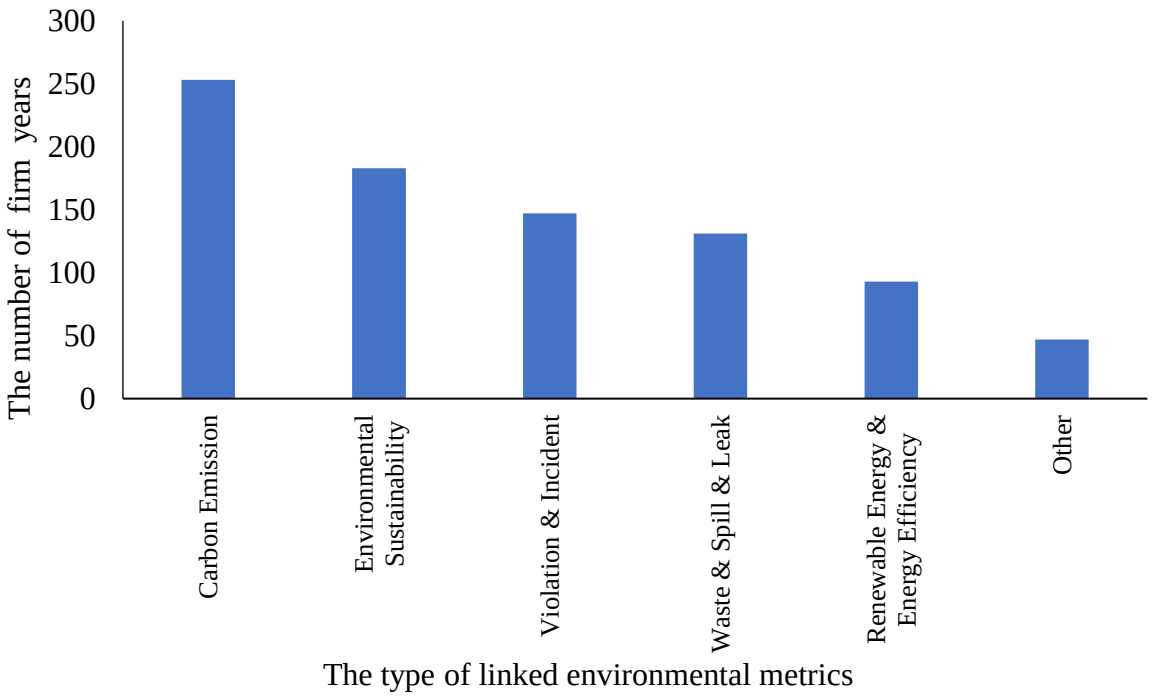

Figure 3: Distribution of environmental factors linked to greenpay in our final sample. Carbon Emissions include elements related to carbon emissions, GHG emissions, CO2, and methane emissions. Environmental Sustainability includes general or holistic environmental terms without specific aspects. Violation & 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, and 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) 4,779 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.	6,805	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
LnTier1CO₂	9,980	13.291	2.034	10.096	11.862	13.139	14.650	16.968
LnScope1CO₂	9,980	11.804	2.446	8.161	10.101	11.475	13.187	16.621
LnWaste1	9,899	7.919	1.620	5.322	6.898	7.902	8.929	10.664
LnWaste2	9,899	10.501	1.565	7.973	9.460	10.484	11.546	13.188
Ln(1+EV_incidents)	9,980	0.229	0.500	0.000	0.000	0.000	0.000	1.386
EV_incident_dummy	9,980	0.214	0.410	0.000	0.000	0.000	0.000	1.000
CCDisclosure	9,520	0.122	0.256	0.000	0.016	0.037	0.098	0.606
CCSentiment	9,520	0.073	0.152	0.000	0.007	0.023	0.065	0.335
E-activism	6,949	0.072	0.258	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	8.668	1.386	6.494	7.718	8.529	9.548	11.241
ROA	9,980	0.058	0.070	-0.045	0.027	0.057	0.095	0.166
Leverage	9,980	0.243	0.160	0.000	0.123	0.240	0.351	0.524
B/M	9,980	0.434	0.295	0.092	0.226	0.364	0.569	1.009
R&D	9,980	0.024	0.043	0.000	0.000	0.000	0.030	0.117
PPENT	9,980	0.290	0.240	0.031	0.098	0.208	0.434	0.784
Dividend	9,980	0.255	0.466	0.000	0.000	0.160	0.407	0.915
IO	9,980	0.727	0.287	0.000	0.662	0.807	0.906	1.028
RetVol	9,980	0.021	0.009	0.010	0.014	0.019	0.025	0.039
Return	9,980	0.025	0.311	-0.435	-0.165	0.003	0.176	0.576
CSRreport	9,980	0.306	0.461	0.000	0.000	0.000	1.000	1.000
Independence ratio	9,980	0.818	0.099	0.600	0.769	0.857	0.900	0.917
Female Ratio	9,980	0.167	0.102	0.000	0.100	0.167	0.222	0.333
InsiderOwn%	9,980	2.104	4.757	0.037	0.184	0.493	1.380	12.256

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	9.286	8.523	-0.763***	1.730	1.857	0.127
ROA	0.044	0.062	0.018***	0.004	0.005	0.001
Leverage	0.290	0.232	-0.059***	0.015	0.027	0.012*
B/M	0.509	0.417	-0.092***	0.093	0.084	-0.009
R&D	0.011	0.027	0.016***	0.001	0.002	0.001***
PPENT	0.496	0.242	-0.253**	0.069	0.043	-0.026
Dividend	0.369	0.228	-0.141***	0.290	0.196	-0.094
IO	0.658	0.743	0.085***	0.085	0.081	-0.005
RetVol	0.019	0.021	0.002*	0.000	0.000	0.000
Return	0.018	0.027	0.009***	0.084	0.100	0.016
CSRreport	0.504	0.259	-0.245***	0.250	0.192	-0.058
Independence ratio	0.856	0.810	-0.047***	0.005	0.010	0.005
Female Ratio	0.182	0.164	-0.018***	0.010	0.011	-0.001
InsiderOwn%	0.617	2.452	1.835***	2.609	26.680	24.071***
Post-Entropy Balancing						
Size	9.286	9.285	-0.001	1.730	1.731	0.001
ROA	0.044	0.044	0.000	0.004	0.004	0.000
Leverage	0.290	0.290	0.000	0.015	0.015	0.000
B/M	0.509	0.509	0.000	0.093	0.093	0.000
R&D	0.011	0.011	0.000	0.001	0.001	0.000
PPENT	0.496	0.496	0.000	0.069	0.069	0.000
Dividend	0.369	0.369	0.000	0.290	0.290	0.000
IO	0.658	0.658	0.000	0.085	0.085	0.000
RetVol	0.019	0.019	0.000	0.000	0.000	0.000
Return	0.018	0.018	0.000	0.084	0.084	0.000
CSRreport	0.504	0.504	0.000	0.250	0.250	0.000
Independence ratio	0.856	0.856	0.000	0.005	0.005	0.000
Female Ratio	0.182	0.182	0.000	0.010	0.010	0.000
InsiderOwn%	0.617	0.617	0.000	2.609	2.610	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: Greenpay and Carbon Emissions

Panel A: Main results

	Dep Var. =LnTier1CO₂	
	(1)	(2)
Greenpay	-0.145***	
	(-2.76)	
Soft greenpay		-0.085
		(-1.26)
Hard greenpay		-0.226***
		(-3.51)
Size	0.434***	0.431***
	(7.71)	(7.70)
ROA	-0.016	-0.028
	(-0.08)	(-0.14)
Leverage	0.842***	0.823***
	(3.45)	(3.33)
B/M	0.524***	0.522***
	(5.89)	(5.94)
R&D	2.864**	2.868**
	(2.23)	(2.23)
PPENT	-1.329***	-1.300***
	(-3.66)	(-3.61)
Dividend	0.005	0.004
	(0.23)	(0.20)
IO	-0.151	-0.152
	(-1.33)	(-1.35)
RetVol	-2.437	-2.304
	(-1.09)	(-1.03)
Return	-0.011	-0.012
	(-0.29)	(-0.31)
CSRreport	0.125***	0.123***
	(2.93)	(2.89)
Independence Ratio	0.046	0.060
	(0.19)	(0.25)
Female Ratio	0.273	0.282
	(0.99)	(1.02)
InsiderOwn	0.005	0.005
	(0.68)	(0.67)
Entropy Balance	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Adj. R-squared	0.952	0.952
N. of Obs.	9,980	9,980

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

	Dep Var.=Tier1CO_2/Revenue		*Dep Var.=LnScope1CO_2*	
	(1)	(2)	(3)	(4)
Greenpay	-2.277***		-0.114*	
	(-2.83)		(-1.73)	
Soft greenpay		-1.219		-0.050
		(-1.28)		(-0.60)
Hard greenpay		-3.700***		-0.201***
		(-3.36)		(-2.69)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2	0.910	0.911	0.948	0.948
N. of Obs.	9,980	9,980	9,980	9,980

Panel C: Robustness tests by using other environmental emissions

	Dep Var. =LnWaste1		*Dep Var. =LnWaste2*	
	(1)	(2)	(3)	(4)
Greenpay	-0.117*		-0.129*	
	(-1.92)		(-1.91)	
Soft greenpay		-0.020		-0.011
		(-0.34)		(-0.14)
Hard greenpay		-0.174**		-0.201**
		(-2.04)		(-2.25)
Controls	Yes	Yes	Yes	Yes
Entropy Balance	Yes	Yes	Yes	Yes
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.	9,899	9,899	9,899	9,899

Panel D: Robustness tests by using an alternative definition of greenpay

	Dep Var. =LnTier1CO₂		*Dep Var. =LnWaste1*		*Dep Var. =LnWaste2*	
	(1)	(2)	(3)	(4)	(5)	(6)
Greenpay	-0.186***		-0.164*		-0.158	
	(-2.61)		(-1.75)		(-1.54)	
Soft greenpay		-0.135		-0.020		-0.093
		(-1.55)		(-0.25)		(-0.63)
Hard greenpay		-0.223***		-0.237*		-0.191
		(-2.69)		(-1.88)		(-1.50)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Entropy Balance	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.951	0.951	0.892	0.892	0.898	0.898
N. of Obs.	9980	9980	9899	9899	9899	9899

Panel E: Partition the sample by weights tied to environmental metrics

	Dep Var. = LnTier1CO2
Soft greenpay	-0.076
	(-1.14)
Hard greenpay_high weight	-0.356***
	(-3.98)
Hard greenpay_low weight	-0.112
	(-1.40)
Controls	Yes
Entropy Balance	Yes
Firm FE	Yes
Year FE	Yes
Adj. R-squared	0.952
N. of Obs.	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 uses waste to measure environmental emissions: *LnWaste1* (*LnWaste2*), the natural logarithm of the sum of direct and indirect hazardous and nonhazardous incineration (landfill and waste) quantities in year *t+1*. Panel D defines greenpay only based on the cases in which top executives' compensation are tied to carbon emissions, waste & leaks, and renewable energy/energy efficiency. Panel E partitions the sample 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 4: Environmental-related Violations after the Adoption of Greenpay

	Dep Var. = Ln(1+ EV_incidents)		*Dep Var. = EV_incident_dummy*	
	(1)	(2)	(3)	(4)
Greenpay	0.041		0.041	
	(0.87)		(1.30)	
Soft Greenpay		0.147**		0.096**
		(2.49)		(2.23)
Hard Greenpay		-0.038		0.008
		(-0.65)		(0.22)
Size	0.182***	0.177***	0.112***	0.109***
	(5.02)	(5.01)	(4.37)	(4.30)
ROA	0.044	0.025	0.107	0.099
	(0.23)	(0.13)	(0.68)	(0.63)
Leverage	0.347**	0.329**	0.250**	0.240**
	(2.48)	(2.30)	(2.15)	(2.04)
B/M	0.299***	0.298***	0.184***	0.184***
	(3.95)	(3.91)	(3.85)	(3.81)
R&D	2.022***	2.063***	1.929**	1.945**
	(3.00)	(3.06)	(2.36)	(2.38)
PPENT	-0.120	-0.087	-0.015	-0.001
	(-0.54)	(-0.39)	(-0.10)	(-0.01)
Dividend	0.045**	0.043**	0.013	0.012
	(2.27)	(2.17)	(0.82)	(0.76)
IO	0.159*	0.157*	0.101	0.100
	(1.78)	(1.86)	(1.62)	(1.64)
RetVol	-1.335	-1.102	-1.821	-1.704
	(-0.62)	(-0.51)	(-0.96)	(-0.90)
Return	-0.013	-0.018	0.021	0.019
	(-0.38)	(-0.51)	(0.70)	(0.63)
CSRreport	0.008	0.008	0.003	0.003
	(0.31)	(0.31)	(0.09)	(0.09)
Independence Ratio	0.134	0.163	0.048	0.062
	(0.70)	(0.86)	(0.34)	(0.43)
Female Ratio	-0.059	-0.047	-0.015	-0.011
	(-0.36)	(-0.29)	(-0.10)	(-0.07)
InsiderOwn	-0.010	-0.010	-0.006	-0.007
	(-0.63)	(-0.66)	(-0.70)	(-0.72)
Entropy Balance	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.575	0.577	0.384	0.385
N. of Obs.	9980	9980	9980	9980

This table tests whether greenpay adopters change their environmental violation in terms of frequency and likelihood. *Ln(1+ EV_incidents)* is the natural logarithm of one plus the count of environmental incidents in year t+1, based on a violation tracker. *EV_incident_dummy* is an indicator variable equal to one if the company has at least one environmental incident in year t+1, and zero otherwise. 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 5: Climate Change Disclosure after the Adoption of Greenpay

	Dep Var. = CCDisclosure		*Dep Var. = CCSentiment*	
	(1)	(2)	(3)	(4)
Greenpay	0.074***		0.056***	
	(2.79)		(2.79)	
Soft Greenpay		0.048**		0.039**
		(1.96)		(1.99)
Hard Greenpay		0.111***		0.080***
		(2.68)		(2.70)
Size	-0.000	0.001	-0.004	-0.003
	(-0.03)	(0.07)	(-0.45)	(-0.36)
ROA	0.009	0.013	0.016	0.019
	(0.19)	(0.28)	(0.50)	(0.58)
Leverage	-0.189**	-0.180**	-0.132**	-0.126**
	(-2.27)	(-2.22)	(-2.35)	(-2.30)
B/M	-0.058**	-0.057**	-0.024	-0.024
	(-2.15)	(-2.14)	(-1.38)	(-1.38)
R&D	-0.486	-0.487	-0.214	-0.215
	(-1.62)	(-1.64)	(-1.19)	(-1.20)
PPENT	0.565***	0.551***	0.346***	0.336***
	(4.91)	(4.72)	(4.18)	(4.02)
Dividend	-0.009	-0.008	-0.007*	-0.007*
	(-1.44)	(-1.37)	(-1.88)	(-1.79)
IO	0.017	0.018	0.001	0.002
	(0.57)	(0.60)	(0.05)	(0.07)
RetVol	-2.352**	-2.411**	-1.308**	-1.346***
	(-2.32)	(-2.38)	(-2.52)	(-2.61)
Return	0.026**	0.026**	0.013*	0.013**
	(2.46)	(2.51)	(1.90)	(1.97)
CSRreport	0.016	0.017	0.009	0.009
	(1.34)	(1.41)	(1.03)	(1.09)
Independence Ratio	0.026	0.020	-0.024	-0.027
	(0.26)	(0.21)	(-0.36)	(-0.42)
Female Ratio	-0.042	-0.045	0.011	0.009
	(-0.36)	(-0.38)	(0.13)	(0.10)
InsiderOwn	0.004	0.004	0.003**	0.003**
	(1.47)	(1.46)	(2.11)	(2.10)
Entropy Balance	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.825	0.826	0.825	0.826
N. of Obs.	9520	9520	9520	9520

This table tests whether greenpay adopters change their climate change disclosures 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 that are summarized by Loughran and McDonald (2011) in one sentence in the transcripts of earnings conference calls in year t+1, multiplied 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: Say on Pay

	Dep Var. =InvPerception(SoP)	
	(1)	(2)
Greenpay	0.015***	
	(3.61)	
Soft greenpay		0.021**
		(2.12)
Hard greenpay		0.012***
		(3.37)
Size	-0.018***	-0.019***
	(-7.40)	(-7.04)
ROA	0.002	-0.003
	(0.07)	(-0.10)
Leverage	-0.065*	-0.067*
	(-1.72)	(-1.86)
B/M	-0.038***	-0.038***
	(-4.50)	(-4.37)
R&D	-0.136**	-0.149**
	(-2.28)	(-2.26)
PPENT	0.076***	0.073***
	(6.49)	(6.36)
Dividend	0.003	0.003
	(1.20)	(1.23)
IO	0.016***	0.018***
	(3.21)	(3.44)
RetVol	-0.910***	-0.861***
	(-2.78)	(-2.80)
Return	0.012	0.011
	(1.11)	(1.01)
CSRreport	0.005	0.004
	(0.94)	(0.72)
Independence Ratio	-0.114*	-0.089
	(-1.74)	(-1.23)
Female Ratio	0.019	0.018
	(0.45)	(0.43)
InsiderOwn	0.002	0.001
	(1.23)	(0.66)
Entropy Balance	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
ISS Recommendation	Yes	Yes
Adj. R-squared	0.946	0.946
N. of Obs.	3,442	3,442

Panel B: Director proposals

	Dep Var. =InvPerception(Director)	
	(1)	(2)
Greenpay	0.011***	
	(2.99)	
Soft greenpay		0.010**
		(2.19)
Hard greenpay		0.013***
		(2.72)
Size	-0.001	-0.001
	(-0.21)	(-0.21)
ROA	-0.034*	-0.034*
	(-1.88)	(-1.86)
Leverage	-0.035*	-0.035*
	(-1.86)	(-1.83)
B/M	-0.021***	-0.021***
	(-2.66)	(-2.67)
R&D	-0.220	-0.222
	(-1.13)	(-1.14)
PPENT	0.079***	0.078***
	(3.56)	(3.60)
Dividend	0.004*	0.004*
	(1.71)	(1.74)
IO	0.023**	0.022**
	(2.20)	(2.18)
RetVol	-0.300	-0.300
	(-1.24)	(-1.23)
Return	0.004	0.004
	(0.85)	(0.85)
CSRreport	0.004	0.004
	(1.25)	(1.27)
Independence Ratio	-0.006	-0.006
	(-0.30)	(-0.32)
Female Ratio	0.042	0.041
	(1.47)	(1.44)
InsiderOwn	0.001**	0.001**
	(2.20)	(2.19)
Entropy Balance	Yes	Yes
Firm-Director FE	Yes	Yes
Year FE	Yes	Yes
ISS Recommendation	Yes	Yes
Adj. R-squared	0.591	0.592
N. of Obs.	38,079	38,079

Panel C: Auditor approval vote placebo analysis

	Dep Var. =InvPerception(Auditor)	
	(1)	(2)
Greenpay	0.003	
	(0.72)	
Soft greenpay		0.000
		(0.06)
Hard greenpay		0.005
		(1.15)
Controls	Yes	Yes
Entropy Balance	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
ISS Recommendation	Yes	Yes
Adj. R-squared	0.945	0.954
N. of Obs.	4,709	4,709

This table reports the coefficients of OLS 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 the Likelihood of Shareholder Activism (Logit)

Panel A: Environmental activism

	Dep Var. = E-activism	
	(1)	(2)
Greenpay	-0.681**	
	(-2.15)	
Soft greenpay		-0.465
		(-1.00)
Hard greenpay		-0.818**
		(-2.36)
Size	0.889***	0.887***
	(6.80)	(6.76)
ROA	-1.520	-1.528
	(-0.82)	(-0.83)
Leverage	1.260	1.280
	(1.26)	(1.27)
B/M	1.196***	1.210***
	(3.07)	(3.10)
R&D	-18.619***	-18.564***
	(-2.87)	(-2.86)
PPENT	0.976	0.972
	(1.16)	(1.15)
Dividend	0.062	0.060
	(0.46)	(0.44)
IO	0.167	0.172
	(0.51)	(0.53)
RetVol	-19.973	-20.343
	(-1.14)	(-1.17)
Return	-0.194	-0.194
	(-0.60)	(-0.60)
CSRreport	-0.043	-0.037
	(-0.21)	(-0.18)
Independence Ratio	0.696	0.727
	(0.45)	(0.47)
Female Ratio	-1.089	-1.050
	(-0.88)	(-0.84)
InsiderOwn	-0.011	-0.010
	(-0.24)	(-0.23)
Entropy Balance	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Pseudo R^2	0.278	0.278
N. of Obs.	6230	6230

Panel B: Social activism placebo analysis (Logit)

	Dep Var. = S-activism	
	(1)	(2)
Greenpay	-0.375	
	(-1.41)	
Soft greenpay		-0.273
		(-0.89)
Hard greenpay		-0.264
		(-0.79)
Controls	Yes	Yes
Entropy Balance	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Adj. R-squared	0.291	0.291
N. of Obs.	6805	6805

This table reports the coefficients of logit regressions examining the effect of greenpay on shareholder activism (Equation (2)). Panel A uses *E-activism*, an indicator equal to one if a firm has 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*, an indicator equal to one if a firm has 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.

Table 8: Robustness Tests Using the PSM Sample

Panel A: Carbon emissions

	Dep Var. =LnTier1CO₂	
	(1)	(2)
Greenpay	-0.082*	
	(-1.72)	
Soft greenpay		-0.035
		(-0.42)
Hard greenpay		-0.165***
		(-2.89)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Adj. R-squared	0.954	0.954
N. of Obs.	2,542	2,542

Panel B: Environmental violations

	Dep Var. = Ln(1+ EV_incidents)		*Dep Var. = EV_incident_dummy*	
	(1)	(2)	(3)	(4)
Greenpay	0.026		0.043	
	(0.63)		(1.09)	
Soft greenpay		0.103**		0.094**
		(2.05)		(1.97)
Hard greenpay		-0.048		0.001
		(-0.82)		(0.02)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.489	0.490	0.370	0.371
N. of Obs.	2,542	2,542	2,542	2,542

Table 8: Robustness Tests Using the PSM sample, Continued

Panel C: Climate change disclosure

	Dep Var. = CCDisclosure		*Dep Var. = CCSentiment*	
	(1)	(2)	(3)	(4)
Greenpay	0.080***		0.056***	
	(3.22)		(2.71)	
Soft greenpay		0.056**		0.039**
		(2.13)		(2.08)
Hard greenpay		0.126***		0.088**
		(2.87)		(2.09)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.676	0.678	0.412	0.414
N. of Obs.	2,542	2,542	2,542	2,542

Panel D: Say on Pay

	Dep Var. = InvPerception(SoP)	
	(1)	(2)
Greenpay	0.016***	
	(2.66)	
Soft greenpay		0.015*
		(1.93)
Hard greenpay		0.017**
		(2.07)
Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
ISS Recommendation	Yes	Yes
Adj. R-squared	0.937	0.937
N. of Obs.	1,258	1,258

Panel E: Investor voting in favor of director proposals

	Dep Var. = InvPerception(Director)	
	(1)	(2)
Greenpay	0.021***	
	(5.34)	
Soft greenpay		0.015***
		(3.34)
Hard greenpay		0.028***
		(5.04)
Controls	Yes	Yes
Firm-Director FE	Yes	Yes
Year FE	Yes	Yes
ISS Recommendation	Yes	Yes
Adj. R-squared	0.593	0.593
N. of Obs.	14,115	14,115

Table 8: Robustness Tests Using the PSM Sample, Continued

Panel F: Environmental activism (Logit)

	Dep Var. = E-activism	
	(1)	(2)
Greenpay	-0.733**	
	(-2.49)	
Soft greenpay		-0.602
		(-1.44)
Hard greenpay		-0.815***
		(-2.76)
Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Pseudo R^2	0.211	0.211
N. of Obs.	2,462	2,462

This table reports the coefficients of OLS regressions using the PSM sample. Panels A, B, C, D, E, and F report the results using *LnTier1CO₂*, *Ln(1+ EV_incidents)*, *EV_incident_dummy*, *CCDisclosure*, *CCSentiment*, *E-activism*, *InvPerception*(*SoP*), 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*. *Ln(1+ EV_incidents)* is the natural logarithm of one plus the count of the environmental incidents in year *t+1* based on a violation tracker. *EV_incident_dummy* is an indicator variable equal to one if the company has at least one environmental incident in year *t+1*, and zero otherwise. *E-activism* is an indicator variable equal to one if a firm has environmental-related proposals to be voted on in year *t+1*, and zero otherwise. *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). *InvPerception*(*Director*) and *InvPerception*(*SoP*) are 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.

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.
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.
LnWaste1	Natural logarithm of the sum of direct and indirect hazardous and non-hazardous incineration quantities in year t+1, measured in tons. Data source: Trucost.
LnWaste2	Natural logarithm of the sum of direct and indirect hazardous and non-hazardous landfill and waste quantities in year t+1, measured in tons. Data source: Trucost.
Ln(1+ EV_incidents)	Natural logarithm of one plus the count of environmental incidents in year t+1. Data source: Violation Tracker.
EV_incident_dummy	An indicator variable equal to one if the company has at least one environmental incident in year t+1, and zero otherwise. Data source: Violation Tracker.
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).
CCSentiment	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 that are summarized by Loughran and McDonald (2011) in one sentence in the transcripts of earnings conference calls in year t+1, multiplied by 100.
E-activism	An indicator variable that equals one if a firm has environmental-related proposals to be voted on in year t+1. Data source: ISS Company Vote Results database.
S-activism	An indicator variable that equals one if a firm has 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.
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: Determinant Model (Logit)

	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 *Hardgreenpay*, 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 IA2: Testing the Existence of Incentive Effects Conditional on a Sample of Firms Making a Commitment

	Dep Var. = LnTier1CO2	
	(1)	(2)
Greenpay	-0.111***	
	(-2.68)	
Soft greenpay		-0.085
		(-1.55)
Hard greenpay		-0.149***
		(-2.64)
Controls	Yes	Yes
Entropy Balance	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Adj. R-squared	0.983	0.983
N. of Obs.	1874	1874

This table tests the existence of incentive effects. It reports the coefficients of OLS regressions examining the effect of greenpay on real environmental performance, conditional on a sample where firms made a commitment via CDP or SBTi. Panel B reports the coefficients of OLS regressions examining the effect of greenpay on real environmental performance after partitioning hard greenpay into two subgroups based on the industry-year median of the compensation weight tied to the environmental metrics. 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 IA3: Alternative Explanation: Environmental Activism Decrease Due to Reduced Carbon Emissions

	Dep Var.=E-activism	
	(1)	(2)
Greenpay	-0.948***	
	(-2.81)	
Soft greenpay		-0.708
		(-1.55)
Hard greenpay		-1.092***
		(-2.92)
LnTier1CO₂t	0.423**	0.383*
	(2.57)	(1.83)
LnTier1CO₂ t+1	-0.139	0.077
	(-0.87)	(0.40)
Controls	Yes	Yes
Entropy Balance	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Adj. R-squared	0.293	0.293
N. of Obs.	6,230	6,230

This table reports 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.