ESG Metrics in Executive Compensation: a Multitasking Approach*

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ABSTRACT

We model the multitasking nature of managerial incentives when ESG metrics are introduced jointly with standard financial or accounting metrics in executive compensation. Building on insights from multitasking theory, we predict that pay-performance sensitivity or *dollar delta* of standard metrics should optimally decrease when value-adding but less measurable ESG goals are introduced in executive pay. Empirical tests support the existence of a significant *opportunity cost* for the effort of executives to improve ESG metrics that firms mitigate by decreasing incentives to achieve standard metrics. Consistently, the downward adjustment in the dollar delta of standard metrics is shown to be larger when ESG metrics are introduced in larger number, are less material to the firm, or are less measurable. This adjustment is not offset by a simultaneous increase in the time vesting delta or the executive's total compensation. The tests show a differential effect of E, S, and G metrics on the dollar delta of standard metrics. In sharp contrast, there is no variation in the dollar delta of standard metrics when a new standard metric (instead of an ESG metric) is introduced. Overall, the evidence is consistent with efficient contracting in the presence of multitasking when ESG metrics are introduced in executive compensation.

JEL classification: J33, M12, M14, G34, G32

Keywords: ESG pay, multitasking, pay-performance sensitivity, delta, incentives, executive compensation, metrics

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1 Introduction

The integration of Environmental, Social, and Governance (ESG) metrics into executive compensation has become a focal point in corporate governance research, driven by the increasing societal and investor emphasis on sustainability. This practice, referred to as "ESG Pay," has experienced rapid adoption around the world with the percentage of firms linking executive pay with ESG performance metrics growing globally from less than 10% in 2010 to close to 40% in 2021, with an exponential increase after 2018 (Gantchev, Giannetti, and Hober 2024).

A nascent but fast growing body of academic research on this topic has shown that the inclusion of these metrics is often accompanied by improvements in ESG outcomes such as reduced carbon emissions and better ESG ratings (Cohen et al. 2023), and firm value (Flammer, B. Hong, and Minor 2019). On the other hand, these metrics have little impact on executives' total compensation (Gantchev, Giannetti, and Hober 2024), because they typically carry a very modest weight in compensation schemes (Raghuram Rajan and Zingales 2023, Efing et al. 2024) and tend to be highly discretionary and poorly specified, which renders them suboptimal in the provision of managerial incentives (Edmans 2021, Edmans 2023a) and easy to manipulate by rent-extracting managers (Bebchuk and Tallarita 2022).

We provide a novel perspective to reconcile this apparent contradiction. Unlike in the case of standard financial metrics, it is not possible to estimate the expected sensitivity of the stock price to ESG goals because that would require long enough historical data that are not available to firms when structuring executive compensation. Moreover, ESG objectives are often difficult to quantify (with, arguably, differences among E, S or G objectives). In sharp contrast, there exists a battery of widely accepted and measurable accounting and market/financial metrics (like EBIT or total shareholder return, TSR) that firms have been using for a long time to motivate and compensate their executives for standard tasks. The interplay of incentives for tasks of different nature and measurability is the object of multitasking theory (Holmstrom and Milgrom 1991, G. Baker 1992, Feltham and Xie. 1994,

and Prendergast 1999). A key insight from this theory is that firms can provide incentives for a value-enhancing but difficult-to-measure task by optimally reducing its *opportunity cost*, that is, by decreasing the incentives for other tasks that are easier to measure or quantify and which compete for managers' limited time and costly effort.

In this paper, we explicitly model the multitasking nature of managerial incentives when ESG metrics are introduced jointly with standard compensation metrics. Building on the seminal model of Holmstrom and Milgrom 1991, we derive a set of empirically testable predictions. Specifically, we predict that the pay performance sensitivity or *delta* of a standard metric (accounting or market) will decrease after the introduction of an ESG metric. Moreover, the decrease in delta is expected to be larger (more negative) when the number of new ESG metrics is higher, the ESG metrics are less material to the firm's core business, or when ESG metrics are less measurable.

Empirically, we test these hypotheses on a set of more than 22,000 *metric-executive-firm-year* observations. Each observation includes an accounting or market metric used in performance-vested share or option awards granted to 5,671 unique executives from 735 unique US firms during the period 2008-2023. Of the 735 firms, 311 firms have no executives with an ESG metric in their contract and the remaining 424 firms have at least one executive with an ESG metric during our sample period.[1] Following the methodology in Bettis et al. 2018 and using the contract variables from the ISS Incentive Lab database together with market and firm accounting data, we estimate *dollar delta* for each metric, that is, the expected dollar increase in executive compensation conditioned on that metric when the stock price increases by 1%. This is a widely used measure of managerial incentives (e.g. Coles, Daniel, and Naveen 2006, Gormley, Matsa, and Milbourn 2013, Shue and Towsend 2017). We then test whether incentives, using dollar delta as the proxy, associated with standard metrics decrease when an ESG metric is introduced in the

[1] 38% of the observations belong to executives whose compensation contracts included at least one ESG metric. This percentage has increased from 23% in 2008 to 56% in 2023, with a sharp increase in the last 3 years of the sample period.

executive's compensation contract.

Supporting the model's main prediction, the average dollar delta of standard (accounting or market-based) metrics decreases by about $4,600 when the executive's compensation includes at least one ESG metric after including high-dimensional *metric-executive-firm-award type-vesting schedule* and *year* fixed effects. That is, we estimate the change in dollar delta of a particular standard metric (Sales, TSR, EPS, Operating Income, EBITDA, EBIT, Earnings, Stock Price or Net Income) for the same executive in the same firm for the same type of award (stock options or equity) and vesting schedule (cliff, ratable, or unknown) when the executive's compensation contract either includes at least one ESG metric or excludes ESG metrics altogether.

This result is both statistically (at the 1% level) and economically significant, representing a roughly 20% reduction in the average dollar delta of standard metrics ($23,560) after the addition of at least one ESG metric in our sample. This result is robust to the inclusion of year-industry fixed effects, and time-varying firm, contract, and executive characteristics, as well as to the use of alternative pay-performance sensitivity measure, namely pay-performance elasticity or delta. Our test allowing for an asymmetric effect of addition and removal of ESG metrics reveals that the dollar delta decreases (increases) with ESG addition (removal) and that the economic impact is similar in magnitude and statistical significance.

Using a staggered difference-in-differences methodology for the staggered introduction or removal of ESG metrics from compensation contracts confirms the symmetric effect of ESG metrics on the dollar delta. Moreover, underscoring the distinctive nature of ESG metrics, our falsification test results show that the addition or removal of standard metrics has an insignificant effect on the dollar delta, suggesting that our main findings are unlikely to be spurious and attributable to unobservable factors.

We then show that environmental (E), social (S), and governance (G) metrics have different impact on dollar delta. When only E metrics are introduced (1.7% of the observations), the decrease in dollar delta (in absolute value) is greater with an average drop of about $7,500

(significant at the 10% level). The decrease in dollar delta is smaller, about $4,000 (significant at the 5% level) when only S metrics are introduced in the contract (15% of the observations). However, there is a statistically insignificant drop in dollar delta after the introduction of only G metrics (2.2% of the observations). Analyses of a pairwise combination of E, S, or G metrics confirm the dominating effect of the E metric followed by the S metric in muting the incentives associated with standard metrics. G metric only matters in conjunction with the introduction of E and S metrics in executive compensation contracts.

We next test the model's prediction on the number of ESG metrics. The intuition is that the introduction of a larger number of ESG metrics in the contract requires even more attention from the executive and increases the opportunity cost of any marginal effort devoted to standard, more measurable tasks. Our empirical tests support this prediction and show a non-linear impact of the number of ESG metrics on the dollar delta of standard metrics. Thus, introducing a single ESG metric has a statistically and economically weaker impact on the dollar delta. However, if there are two or three ESG metrics, the average drop in the dollar delta is about $7,200 (significant at the 5% level) and becomes (negative) $8,400 when the number of ESG metrics is four or more (significant at the 1% level).

The model also predicts that the opportunity cost of the time and effort the executive devotes to standard tasks should be lower (i.e., more attenuated drop in dollar delta) when the ESG objectives are more complementary with the standard accounting or market goals delegated to the executive. We proxy complementarity through the SASB materiality index. Thus, for each ESG metric in the compensation of an executive in a given year, we determine if it is material for the company's industry. Our empirical tests show a different pattern for the E, S, and G metrics. When only material E metrics are introduced, the test rejects the model prediction: the dollar delta decreases additional $5,200 (significant at the 5% level). However, for material S and G metrics, the tests support the model: the expected unconditional drop in dollar delta is neutralized when the ESG goals consist only of material S metrics. If the ESG objectives are measured only with material G metrics, the effect on dollar delta is actually a

net increase of about $4,000.

Finally, we test whether more measurable ESG metrics are associated with a less pronounced drop in the dollar delta. Ultimately, if ESG metrics were as quantifiable as standard metrics, they could be directly incentivized with little opportunity cost (i.e., zero expected drop in dollar delta) for the time and effort the executive could invest in standard metrics. We define an ESG metric as measurable if at least one of the benchmarks that trigger vesting for the performance metric in the payout structure (i.e. minimum, threshold, or maximum performance), and the corresponding payout are reported in ISS Incentive Lab. Empirically, the test shows a pattern similar to that documented for materiality. When only measurable E metrics are introduced in the contract, the dollar delta drops by an additional $6,000, rejecting the model's prediction. When only measurable S metrics are introduced, the reduction in dollar delta is roughly (positive) $3,000 lower. There is no statistically significant net variation in the dollar delta when only measurable G metrics are introduced.

All these results are shown to be robust to including firm and executive characteristics as additional controls, entropy balance matching after considering the determinants of ESG pay at the firm level, alternative classifications of ESG metrics (corresponding to alternative ESG dictionaries), excluding grants with more than 12 (99th percentile) ESG metrics or observations prior to 2018 (the year ISS Incentive Lab introduced a major revision in the classification of ESG metrics), and using a staggered difference-in-differences method. The documented decrease in standard performance-based incentives associated with the inclusion of ESG metrics is not offset by any increase in incentives associated to time vesting equity or option rewards. There is also no evidence that the executive's total compensation changes when ESG metrics are introduced or removed. Taken together, we interpret these results as supportive of an efficient ESG pay design in the presence of multitasking.

1.1 Literature review and contribution

Efficient contracting theory (Holmström 1979) predicts that any observable metric correlated with the unobservable effort of an executive to improve firm performance should be included in the compensation contract. If ESG metrics align management incentives with the creation of long-term shareholder value, they would play a role similar to other nonfinancial performance measures such as customer satisfaction or product quality previously analyzed in the literature (e.g., Ittner, D. F. Larcker, and Rajan 1997, Dutta and Reichelstein 2003, De Angelis and Grinstein 2014, and Ma 2019). In that case, ESG metrics should be included in executives' compensation packages together with standard accounting, operating, or market-based metrics. Cohen et al. 2023 find evidence consistent with this view using global executive compensation data. They also show that ESG incentives are associated with improvements in ESG ratings and curbing carbon emissions, but do not predict higher levels of executive pay. Their evidence also supports the role of investors such as "the Big Three" asset managers (BlackRock, Vanguard, and State Street) in pushing companies to adopt ESG metrics in executive compensation contracts.

Challenging this view, Bebchuk and Tallarita 2022, argue that ESG pay is poorly designed, with ambiguous or straightforwardly unmeasurable goals and rewards, all of which facilitate rent extraction by managers, raising concerns about its implementation and efficacy. Also critical with the inclusion of ESG metrics in executive pay, Edmans 2023b advocates replacing all performance-based bonuses, based both on financial and nonfinancial metrics (like ESG), with restricted shares that executives are required to hold for many years.

Alternatively, a growing body of literature suggests that firms are increasingly trying to accommodate their stakeholders' preferences for ESG outcomes (e.g., Hart and Zingales 2017 and Pástor, R. Stambaugh, and L. Taylor 2023). If this pressure is large enough, institutional investors and shareholder groups with intrinsic ESG preferences would prioritize sustainability over short-term financial returns (Riedl and Smeets 2017, Hartzmark and Sussman 2019). In this case, ESG pay would be used to align the executive's

objectives with shareholder and stakeholder preferences for ESG outcomes. Consistent with this hypothesis, Gantchev, Giannetti, and Hober 2024 show that the adoption of ESG pay is associated with higher levels of institutional investor engagement, voting, and trading activities, as well as greater shareholder support for director elections and compensation proposals. Interestingly, these authors also find no significant effect of ESG pay on the level of executive pay. All this leads them to interpret the ESG pay as a signal about the firm's strategy and, in particular, its commitment to sustainability initiatives, particularly to counter accusations of "greenwashing" (Grewal and Serafeim 2020, Marquis, Toffel, and Zhou 2016)

In our paper, we are agnostic as to whether ESG pay is an efficient mechanism to create long-term managerial incentives or it is rather meant to align executives' effort with shareholders' social and environmental concerns.[2] We contribute to the literature on ESG pay by shifting the focus from the *level* to a so far neglected aspect of ESG pay design: the *interplay* between traditional shareholder value-maximizing accounting and market-based metrics and ESG metrics.[3]

We also contribute to the literature of multitasking in executive compensation initiated by Holmstrom and Milgrom 1991 and expanded by G. Baker 1992, Feltham and Xie. 1994, Dewatripont, Jewitt, and Tirole 2000, Prendergast 2002, and Bénabou and Jean Tirole 2016, among others.

Like in the models of Holmstrom and Milgrom 1991 and Bénabou and Jean Tirole 2016, we assume that executives must allocate limited time and effort to improve the performance of potentially competing standard (accounting or market) and ESG metrics, all of which contribute to increase firm value.[4]

[2]See Pástor, R. Stambaugh, and L. Taylor 2021 and Pástor, R. F. Stambaugh, and L. A. Taylor 2022 for, respectively, a theoretical and empirical investigation on the motives underlying investors' demand for ESG stocks.

[3]Edmans 2023b mentions the conflict of explicitly incentivizing some ESG objectives at the expense of other less explicit ESG objectives. Instead, we analyze the opportunity cost of incentives for ESG metrics in relation to standard metrics.

[4]See Chaigneau and Sahuguet 2025 for an alternative view where ESG metrics in executive compensation reflect the preferences of the board for social outcomes at the expense of stock price maximization

Finally, although the multitasking framework applied to executive compensation has been widely studied in the accounting literature (see, for instance, the balance scorecards models in Budde 2007, and Køvaly and Olsen 2023), the empirical evidence is much more scarce (e.g., Slade 1996, and F. Hong et al. 2018). We quantify empirically the decrease in the power of incentives (dollar delta) for standard metrics present in the compensation of US executives after the introduction of ESG metrics. Our findings are consistent with efficient contracting in the presence of multitasking.

The remainder of the paper is structured as follows. Section 2 presents a model to motivate our empirically testable predictions. Section 3 presents the data sources and the construction of the variables used in the empirical analysis. The results of the empirical tests are analyzed in Section 4. We explore additional predictions from the model in Section 5. Section 6 reports the robustness tests before concluding with Section 7.

2 Theoretical motivation

2.1 The model setup

Our model is based on the multitasking model of Holmstrom and Milgrom 1991. There is only one period. At the beginning of the period, the CEO (the agent) is hired by the firm (the principal). At that point, the CEO decides whether to accept the contract and, if so, how much effort to exert in two different tasks. The firm decides the CEO's compensation. At the end of the period, the uncertainty is resolved: the CEO receives her pay and the firm shareholders receive the residual net profit.

One of the tasks the CEO must undertake is a *standard* task: to increase EPS, for instance. The other task is new and is meant to decrease the firm's environmental impact (E), increase the firm's social contribution (S), or improve its governance (G). Both tasks contribute to the firm's profit. Let $t^T = (t_s, t_n)$ denote the effort vector, with $t_s \geq 0$ the CEO's effort choice for the standard task and $t_n \geq 0$ the effort choice for the new task. The effort is not observable

and has a personal cost for the CEO given by the convex cost function:[5]

$$C(t) = t_s^2/2 + t_n^2/2 + \gamma t_s t_n \tag{1}$$

The parameter $0 < \gamma < 1$ denotes the substitution intensity of both tasks. That is, how much the cost of one task increases when the manager devotes effort to the other task.

Each effort generates a signal captured by a performance metric. For example, the performance metric associated with t_s could be an accounting figure, such as Earnings Per Share (EPS) or Earnings Before Interest and Taxes (EBIT), or a market performance metric, such as the Total Shareholder Return (TSR). Likewise, the performance metric associated with t_n could be an ESG ranking or some metric of carbon emission. The signals are distributed as follows:

$$x(t) = t + \epsilon \tag{2}$$

where ϵ is the noise around the signals, normally distributed with mean zero and variance Σ. Let σ_s^2, σ_n^2 denote the variance of, respectively, the standard and the new signals, while σ_{sn} denotes the covariance. We assume, without loss of generality, that the covariance of both signals is zero, that is, $\sigma_{sn} = 0$. The company's gross profit is an increasing and concave function of both signals: $B(x(t))$.

2.2 The CEO's problem

The CEO is risk averse with the risk-aversion parameter $r > 0$ and has an exponential utility defined over her compensation. The compensation consists of a performance-based component linear in both metrics and a fixed salary:

$$w(x) = \beta + \alpha^T x \tag{3}$$

[5]This is, for instance, the cost function assumed in Bénabou and Jean Tirole 2016.

$\alpha^T = (\alpha_s, \alpha_n)$, where $\alpha_s \geq 0$ and $\alpha_n \geq 0$ measure the sensitivity of the compensation to the observable metrics x_s and x_n, respectively; β is the fixed salary.

Under these assumptions, the CEO solves for her optimal level of effort for each task that maximizes the expected utility of her compensation net of the cost of effort. Given the utility function and the normal distribution of the noise term, this is equivalent to choosing t to maximize the certainty equivalent payoff, CE. Replacing (2) into (3) this is equivalent to:

$$\max_t \quad \alpha^T t - \tfrac{1}{2} r \alpha^T \Sigma \alpha + \beta - C(t)$$

This yields the optimal effort condition $\alpha_i = \frac{\partial C(t)}{\partial t_i}$ for $i = \{s, n\}$. Differentiating this condition with respect to t and inverting it yields the CEO's implicit incentive compatibility constraint:

$$\frac{\partial t}{\partial \alpha} = [C_{ij}]^{-1} \tag{4}$$

where

$$[C_{ij}] = \begin{pmatrix} 1 & \gamma \\ \gamma & 1 \end{pmatrix}$$

is the matrix of the second partial derivatives of the cost function with respect to the effort employed in both tasks. In other words, the sensitivity of the CEO's optimal effort with respect to the performance incentive (α) in the contract decreases with the convexity of the cost function.

2.3 The firm's optimal contract problem

The firm is assumed to be risk neutral. It chooses the contract (β, α) that maximizes the firm's expected profit net of the CEO's expected compensation subject to the CEO's certainty equivalent being above her reservation level $\bar{CE}$, and the incentive compatibility constraint

that implicitly defines effort $t(\alpha)$ as a function of α in Equation (4):

$$\begin{aligned} \max_{\beta,\alpha} \quad & B(x(t(\alpha))) - \beta - \alpha^T t(\alpha) \\ \text{s.t.} \quad & \alpha^T t(\alpha) - \tfrac{1}{2} r \alpha^T \Sigma \alpha + \beta - C(t(\alpha)) \geq \bar{CE} \\ & \tfrac{\partial}{\partial \alpha} t(\alpha) = [C_{ij}]^{-1} \end{aligned}$$

Holmstrom and Milgrom 1991 show that the optimal contract (β^*, α^*) satisfies the first-order conditions:

$$\begin{aligned} \tfrac{\partial B}{\partial x} = & \quad (I + r[C_{ij}]\Sigma)\, \alpha^* \\ \beta^* = & \quad \bar{CE} - \alpha^{*T} t(\alpha^*) + \tfrac{1}{2} r \alpha^{*T} \Sigma \alpha^* + C(t(\alpha^*)) \end{aligned}$$

For the standard metric, the first condition can be written as follows:

$$\frac{\partial B}{\partial x_s} = \alpha_s^* + r(\alpha_s^* \sigma_s^2 + \gamma \alpha_n^* \sigma_n^2) \tag{5}$$

Let us define Δ_s as *Dollar Delta*, that is, the variation in the CEO's performance-based dollar pay linked to the standard metric when the company's gross profit (in general, the stock performance) changes:

$$\Delta_s = \frac{\partial \alpha_s^* x_s}{\partial B} = \alpha_s^* \frac{\partial x_s}{\partial B}$$

Replacing the inverse of (5) in the previous equation, we obtain:

$$\Delta_s = \left(1 + r\sigma_s^2 \left(1 + \gamma \frac{\alpha_n^* \sigma_n^2}{\alpha_s^* \sigma_s^2}\right)\right)^{-1} \tag{6}$$

The prediction from Equation (6) can be easily generalized to the introduction of $N > 1$ new non-standard metrics with the same pairwise level of substitution γ across tasks:

$$\Delta_s = \left(1 + r\sigma_s^2 \left(1 + \frac{\gamma}{\alpha_s^* \sigma_s^2} \sum_{m=1}^{N} \alpha_m^* \sigma_m^2\right)\right)^{-1} \tag{7}$$

In other words, the model predicts that when tasks are substitutes ($\gamma > 0$) the dollar delta of the standard metric should decrease relative to the case when the new task is independent from the standard task ($\gamma = 0$) or the case when there is no new task ($\alpha_n = 0$). Moreover, the decrease in delta should be higher (in absolute value) when the number N of the new tasks increases and when the new tasks are more noisy (higher σ_n^2). In summary, informed by this model, we predict that:

Prediction 1 *The dollar delta of a standard (accounting or market) metric will decrease after the introduction of an ESG metric. Moreover, the decrease in the dollar delta is expected to be smaller (less negative) when:*

Prediction 2 *The number of new ESG metrics is higher.*

Prediction 3 *The ESG metrics are more material (i.e., more complementary with the standard tasks) to the firm's core business.*

Prediction 4 *The ESG metrics are more measurable.*

These predictions are the basis for our empirical analysis.

3 Data

We collect data on performance goals from the ISS Incentive Lab database, which compiles detailed, comparable information on incentive awards from firms' proxy statements (DEF 14A). This includes grants, performance metrics, performance goals, and payout structures for all short-term and long-term awards granted to named executive officers (NEOs). We

focus only on performance-vesting (p-v) grants, which trigger the vesting of stock and option awarded to executives based on one or several performance metrics. The criteria for the number of units vested are commonly based on one or more accounting, stock price, or ESG metrics, such as EPS, total shareholder return, or emissions reduction.[6] Our sample includes all the accounting or market-based metric-executive-firm-year observations from ISS Incentive Lab in the period from 2008 to 2023 with non-missing payout structure information and for which we were able to collect the market and accounting historical data necessary to compute our dependent variable, dollar delta. This results in a dataset of 22,437 observations from 15,303 grants awarded to 5,671 unique executives from 735 unique US companies. We obtain accounting information from Compustat and stock price data from CRSP.[7]

3.1 Key variables

Dollar Delta: A continuous variable that measures the change in the expected performance metric value (in dollars) after an increase of 1% in stock price. Mathematically, we define it as:[8]

$$\text{Dollar Delta} = \text{Stock Price} \times \text{Number of Shares} \times \text{Percent Vest} \times \text{Delta} \tag{8}$$

Our analysis is at the metric level. The first product on the right-hand side of Equation (8) quantifies the dollar value of the executive's compensation if she meets all the target performance goals in the grant award. The variable, *Percent Vest*, indicates the portion of the award tied to a particular metric in a given evaluation period.[9] Delta captures the sensitivity

[6] Appendix A.1 includes as an example the performance-based structure of an actual executive with a detailed description of all the variables mentioned.

[7] To calculate our dependent variable, we require detailed grant information for delta simulation, including the performance metric triggering vesting (accounting or stock price), the back-end instrument (stock or option), the number of awarded units, the performance evaluation period, the option's exercise price and expiration date, the exact grant date, and the correlation between the accounting metric and stock price.

[8] If the award is in stock options, we replace stock price and number of shares with the Black-Scholes value of the option and number of options, ensuring consistency in valuation.

[9] Even if there is a single performance metric, it can be evaluated over several consecutive periods, with different weights applied to each period.

of the executive's compensation tied to a specific metric to changes in the company's stock price. We calculate *Delta* using the simulation method from Bettis et al. 2018, where the expected value of the metric is simulated under an initial stock price of \$1, and then increased by 1% to observe the change in the discounted expected value of the metric.

Measurability: We define an ESG metric as measurable if at least one of the benchmarks that trigger vesting for that performance metric in the payout structure (i.e., minimum, threshold, or maximum performance) and the corresponding payout are reported in ISS Incentive Lab. Measurability indicates that ESG metrics within executive compensation are more quantifiable and structured around clear performance criteria.

Table A.5 in the Appendix illustrates different examples of ESG metrics in grants for NEOs, where the third column indicates whether a metric is measurable. For instance, while "Cumulative Carbon Emissions Reduction" is measurable because the benchmarks at which vesting is initiated for the executive are explicitly defined, "Progress toward our long-term sustainability goal" is a broader and rather ambiguous metric without any specific benchmark in the compensation structure.

Materiality: We define an ESG metric as material if it is included in the SASB materiality map of the industry to which the firm belongs. The SASB framework assesses the relevance of ESG metrics across industries, identifying those most critical to a company's performance and risk exposure. For each ESG metric in a grant, we determine whether it is material for the company's industry. The last column in Table A.5 indicates whether each ESG metric is considered material to the firm. Since materiality depends on the industry in which a company operates, the fourth column provides an example of an industry where such a metric is included in executive compensation.

Table 1 shows the annual trend in performance metrics in our sample during the period from 2008 to 2023. The column *#Metrics* represents the number of accounting or market-based performance metrics in our sample. The column *%ESG Metrics* represents the percentage of observations in the column *#Metrics* that includes at least an ESG metric in

the executive's compensation contract that year. The column *%Measurable ESG* and *%Measurable ESG* denote, respectively, the percentage of measurable and material ESG metrics in our sample. In particular, there is a sharp increase in the percentage of observations that include at least one ESG metric in executive compensation contracts over time, from about 23% in 2008 to more than 56% at the end of our sample period in 2023. Interestingly, there is significant time-series variation in both the measurability and materiality of ESG metrics, but neither shows a monotonically increasing or decreasing trend.

[Insert Table 1 about here]

3.2 Identification of ESG compensation contracts

To identify ESG-related compensation contracts, we initially considered using the categorization provided in the ISS Incentive Lab dataset, which classifies metrics as 'Accounting', 'Stock Price', 'Other', or 'ESG'. However, we found that prior to 2018, ESG metrics were left blank or categorized as 'Other'.[10] This limitation prompted us to instead rely on the available details for each disclosed metric.[11] The available details for each disclosed performance metric provide brief descriptions of the criteria tied to compensation contracts, such as 'Total Recordable Incident Rate', 'Development Contribution - Adjusted EBITDA', and 'Environmental Health and Safety Performance'. These descriptions are available for both ESG and non-ESG contracts.

To classify these metrics as related to ESG, we use the keyword list provided by Gantchev, Giannetti, and Hober 2024, which consists of 1,034 terms associated with Environmental, Social, and Governance (ESG) factors. For each keyword on their list, we evaluated its effectiveness in identifying ESG metrics by analyzing its performance in the post-2018 period, when ISS Incentive Lab began explicitly categorizing ESG metrics.

[10] There are also examples of financial goals that are categorized as 'Other'.

[11] The column 'metricother' in the ISS Incentive Lab dataset provides additional details on disclosed metrics. For some examples of ESG metrics, see Table A.4.

Specifically, we calculate the false positive ratio for each keyword, defined as the proportion of instances where the keyword incorrectly classifies a metric as ESG related (i.e., the metric was not marked ESG by ISS) relative to the total number of matches. Keywords with a false positive ratio greater than 50% are deemed unreliable and excluded from our classification process. This filtering results in the removal of 81 keywords, leaving a refined set of 953 terms used to identify ESG-related metrics. Section A.3 in the Appendix provides the complete list of the 953 keywords, along with examples of removed terms and their corresponding false positive matches. These examples illustrate cases where the removed keywords incorrectly classified non-ESG metrics as ESG-related.

Finally, a compensation contract is considered an ESG contract if the executive has at least one ESG metric in their contract.[12] Figure 1 shows the percentage of executives with ESG contracts in our sample based on the ISS Incentive Lab classification and our keyword-based classification. The percentage of ESG contracts was nearly zero from 2008 to 2017 using the ISS Incentive Lab classification, indicating that ESG metrics were not explicitly identified during this period. The percentage of contracts with an ESG component has increased since 2018. Our keyword-based classification identifies more ESG contracts than the ISS classification post-2018, since the ISS does not categorize certain descriptions as ESG, such as 'Environmental and Safety,' 'Green Growth Decarbonization,' and 'Implementation and Announcement of Climate Action Plan,' despite their likely relevance to ESG.

[Insert Figure 1 about here]

3.3 Descriptive Statistics

As discussed in Section 3, our final sample includes 22,437 observations. Each observation is a unique performance metric at the executive-year level. Table 2 presents the descriptive statistics for the key variables in our analysis. The *ESG Metric* variable, a dummy indicator, has a mean value of 0.38, indicating that 38% of the observations in our sample have at least

[12] An example of an ESG contract with two metrics is provided in Section A.1 of the Appendix.

one ESG metric in the compensation contract. These are *treatment* observations. There is significant variability in the inclusion of ESG metrics in compensation contracts (standard deviation of 0.486). The *Dollar Delta*, is the pay-performance sensitivity and captures the managerial incentives for the standard metrics. It has a mean value of $23,559.5, with a median value of $5,934.1, suggesting a positively skewed distribution. This variable also shows considerable variation, as indicated by a standard deviation of $68,253.3.

[Insert Table 2 about here]

4 Baseline results

In this section, we test the first of the four predictions of the model. We estimate the following regression to test the first prediction: there should be a decrease in the dollar delta of a standard metric (accounting or market) when an ESG metric is included in the compensation contract. Specifically, we estimate:

$$Dollar\ Delta_{e,f,m,a,v,y} = \beta \cdot ESGMetric_{e,f,y} + \alpha_{e,f,m,a,v} + \alpha_y + \epsilon_{e,f,m,a,v,y} \tag{9}$$

Dollar Delta, or pay-performance sensitivity, is estimated for an executive e employed at firm f, where the compensation contract for fiscal year y is associated with metric type m, award group a, and vesting schedule v. To ensure outliers do not unduly influence our findings, we winsorize *Dollar Delta* at the one percent level. The variable *ESGMetric* is an indicator equal to one if the executive's compensation contract includes an ESG metric, otherwise zero. We cluster standard errors at the executive level to account for heteroskedasticity and possible executive-level correlations among observations.

To mitigate potential omitted variable bias, we include high-dimensional fixed effects to control for confounding factors that may influence both pay sensitivity and the inclusion of an ESG metric in an executive's compensation contract. Specifically, we include executive-firm-metric-award group-vesting schedule fixed effects to estimate the change in pay-performance

sensitivity of a particular standard metric for the same executive in the same firm for the same type of award and vesting schedule when an ESG metric is either introduced or removed from the contract. We incorporate fixed effects for fiscal years to account for temporal variations in executive pay.

The coefficient of primary interest, β, measures the average difference in *Dollar Delta*, or pay-performance sensitivity, when an ESG-related metric is included in the compensation contract, after controlling for fiscal year, executive and other contract-level factors that can affect pay-performance sensitivity.

Table 3 reports the results. Model (1) includes fixed effects by year, executive-firm, and metric to control for time-invariant characteristics across these dimensions. Model (2) imposes stricter executive-firm-metric fixed effects in addition to year fixed effects. This specification allows us to estimate the effect of ESG metrics on the dollar delta for the same executive at the same firm and for the same metric. Finally, Model (3) includes even higher-dimensional fixed effects to absorb any variation across the award type (stock option or equity) and vesting schedule (cliff, ratable, or unknown). Regardless of the specification, we observe roughly similar estimates ranging from \$4,010.6 to \$4,642.1, all significant at the 1% level, indicating that the incorporation of ESG metrics into executive compensation contracts significantly reduces the managerial incentives for executives to achieve standard financial goals. These estimates are also economically large considering that the average dollar delta in our sample is \$23,559.5. The findings of this baseline analysis support the first main prediction of the model motivated by multitasking theory.[13]

Moreover, these results are not sensitive to our choice of pay-performance sensitivity measure. When we use the pay-performance elasticity or just the delta, our results continue to hold (see the Appendix Table A.6). For example, in the most comprehensive specification

[13]As an alternative way to address the skewness in the distribution of our dependent variable, we repeat the regression in Equation (9) replacing the winsorized *Dollar Delta* with *Log(1+Dollar Delta)* without winsorization. The coefficient β becomes -0.164 significant at the 1% level, which indicates around 16.4% decrease in the *Dollar Delta* for the addition of an ESG metric. This magnitude is similar to the finding in Table 3 without logs (about 20% decline).

in column (3) with high-dimensional fixed effects, the delta decreases by 0.2% (8% of the the sample average delta of 2.5%) after incorporation of ESG metrics into executive compensation contracts. Finally, we find a similar effect on the dollar delta when we restrict our sample either to financial metrics only or to accounting metrics only, as shown in the Appendix Table A.7.[14]

[Insert Table 3 about here]

Our baseline analysis in Equation (9) does not allow for an asymmetric effect of the addition versus removal of ESG metrics in an executive's compensation contract. To consider the possibility of asymmetry, we split the treatment effect into addition and removal of ESG subsamples, and then repeat our analyses by considering the appropriate control groups for the two subsamples. For additions, the control group consists of executives that never had ESG metrics in their contracts while for removal subsample, the control group consists of executives who had at least one ESG metric in their contract throughout the sample period. Our results reported in Table 4 support a symmetric effect of additions and removal of ESG metrics on managerial incentives. Thus, *Dollar Delta* increases on average by \$5,889 when an ESG metric is removed from the executive's compensation while it decreases by \$4,148.8 when it is added. The difference between the coefficients is not statistically significant, with a p-value of 61%.

[Insert Table 4 about here]

4.1 Placebo test with respect to standard metric

Are ESG metrics actually intrinsically different from standard metrics because of the challenges in predicting their sensitivity to stock prices and measurability? Would inclusion of any standard metric yield the same results as in our baseline analysis? We perform a

[14]Since ESG metric adoption may vary across industries over time, we also test the robustness of our findings in Table 3 by including 2-digit SIC industry × year fixed effects and find qualitatively similar (albeit slightly weaker in economic magnitude) results.

falsification test to answer these questions. To this end, we estimate a regression similar to Equation 9 but after replacing the primary independent variable from *ESGMetric* to *StandardMetric*, which is a binary variable set to one for *executive-firm-year* observations where executives' compensation contracts include at least one more standard (accounting or market) metric for that year compared to last year, otherwise zero. In alternative specifications, we also control for *TotalMetric*, which accounts for the total count of both ESG and standard metrics included in the compensation contract of an executive in a firm in a given year.

Our results reported in column (1) of Table 5 show that in sharp contrast to our baseline results in Table 3, there is an insignificant effect of the inclusion of additional standard metrics in the compensation contracts of executives. This finding remains unchanged in column (2) when we control for the total number of metrics. In contrast, the introduction of ESG metrics decreases the pay-performance sensitivity by \$4,473 as shown in column (3) even after controlling for the total number of metrics in the compensation contract. Collectively, this falsification test mitigates the potential concerns that our baseline results are spurious and driven by unobservable factors.

[Insert Table 5 about here]

5 Heterogeneity analysis

5.1 Heterogeneity by the type of ESG metric

A natural question after the analysis in the previous section is whether the effect on managerial incentives or the dollar delta varies by the type of ESG metric included in the compensation contract. To this end, we construct a set of binary variables corresponding to a single metric exclusively included in the contract (E, S, or G) or a pairwise combination of any two of these three metrics. The results reported in Table 6 show that when only environmental metrics are included in the contract, it has the largest effect on weakening the managerial incentives

with a statistically significant reduction of $7,446.8 in dollar delta (see Model 1). The effect of only including social metrics is roughly 55% of including only environmental goals in the compensation contract. Model (2) shows a decrease $4,087.3, significant at the 5% level.

In contrast, requiring executives to achieve governance objectives does not significantly influence the pay-performance sensitivity associated with financial metrics. The estimated coefficient in Model (3) is negative but insignificant at conventional levels. Models (4) through (6) explore the effect of pairing of two of the three ESG metrics. All combinations are associated with a decrease in the dollar delta. Estimates for the E or S metric in Model (4) and for the E or G metric in Model (6) are smaller than those for the E metric alone, confirming that the S and G metrics are less influential in affecting the managerial incentives associated with financial goals. Comparing the estimate for the G or S metric in Model (5) with that for only the S metric in Model (2) also underscores the dominance of social metrics over governance metrics in driving the pay-performance sensitivity.

[Insert Table 6 about here]

5.2 Heterogeneity by the number of ESG metrics

We continue our empirical investigation by testing the next three predictions of our model that follow from our first main prediction. Recall that our second prediction relates to how the number of ESG metrics affects the dollar delta. If the executive is required to pursue numerous ESG goals, it would require her to pay more attention and increase the opportunity cost of the marginal effort needed to meet standard financial goals. We would therefore expect a larger decline in the dollar delta as the number of ESG metrics increases.

Table 7 reports the results of three different specifications. Model (1) uses a continuous variable that counts the number of ESG metrics. The coefficient estimate on this variable indicates a reduction of $877.5 in the dollar delta for an increase of one ESG metric in the contract. Models (2) and (3) allow for nonlinear relation between the number of ESG metrics and dollar delta. Model (2) uses an indicator variable of whether the executive's compensation

contract includes at least one ESG metric along with the continuous variable from Model (1). Only the indicator variable turns out to be significantly negative, suggesting that having at least one ESG metric has the dominant effect. Model (3) extends this analysis to a piecewise-linear kind of specification where we include indicator variables for one, two to three, and four or more ESG metrics. Including more ESG metrics has a larger and nonlinear effect on the dollar delta (about \$8,400 for four or more ESG metrics compared to \$7,200 for two to three ESG metrics).

[Insert Table 7 about here]

5.3 Heterogeneity by materiality and measurability of the ESG metric

The last two predictions of the model are related to the materiality and measurability of the ESG metrics. The intuition is as follows. The more material are the ESG metrics, the greater the complementarity in the ESG and standard/financial objectives assigned to the executive. This implies that the opportunity cost of the time and effort that the executive needs to devote to standard objectives should be lower. Put differently, the decrease in the dollar delta should be smaller or less negative when the ESG metrics are more material. A similar argument applies to the measurability of ESG metrics. If ESG metrics can be quantified and measured, it would also reduce the opportunity cost of time and effort to achieve standard goals. That is, decrease in the dollar delta should be smaller or less negative when the ESG metrics are more measurable.

Table 8 and Table 9 report the results to test these two last predictions. Using the SASB materiality map, we observe that the introduction of only material S or G supports the third prediction, as the coefficient estimates are positive and significant (\$5,439.5 for only S in Model 2 and \$8,365.4 for only G in Model 3). Adding these figures to the significantly negative coefficient on *ESGMetric* shows that the decrease in dollar delta is muted for the

material S or G metrics. Surprisingly, this prediction is not supported when only E metrics are included in the contract, as the coefficient estimate on only E material is negative and significant. When we consider combinations of material E, S, and G metrics in Models (4) through (7), only a combination of materiality of G and S metrics supports the prediction of a smaller decrease in the dollar delta with greater materiality.

[Insert Table 8 about here]

Moving on to the last prediction related to the measurability of ESG metrics, the measurability of S alone supports the prediction, as the coefficient estimate on *Only S Measurable* is positive ($3,223.0) and significant at the 5% level in Model (2). Combining the measurability of S with that of the G metrics in Model (5) also leads to a similar conclusion with a coefficient estimate of $2,996.8 that is also significant at the 5% level. However, the measurability of the E metric is associated with a larger decrease in the dollar delta, while the measurability of G metric does not significantly influence the dollar delta.

[Insert Table 9 about here]

6 Robustness tests

This section presents a series of robustness tests to confirm the validity of our main findings.

6.1 Robustness to including firm and executive controls

While our fixed effects account for variations in pay associated with different compensation contracts for an executive, they do not control for time-varying firm and executive characteristics that may influence both the pay-performance sensitivity and the likelihood of including an ESG metric in an executive's contract. Table 10 includes additional time-varying firm and executive characteristics that have been identified as key determinants of the dollar delta (Gormley, Matsa, and Milbourn 2013). The inclusion of these controls

does not alter our results. We continue to observe significantly negative coefficient estimates for *ESGMetric* with magnitudes comparable to those reported in Table 3.

[Insert Table 10 about here]

6.2 Robustness to entropy-balanced matching

One potential concern with our empirical analysis is that there may be selection bias associated with the inclusion and removal of ESG metrics in compensation contracts. To address this concern, we use a host of observable firm and executive characteristics that have been shown to influence the choice of ESG pay in firms as documented in Cohen et al. 2023, and construct an entropy-balanced matched sample of treatment and control firms. Specifically, the covariates included in the matching are tangibility, capital expenditure, return on assets, leverage, dividends, size, stock price volatility, stock price growth, institutional ownership, and executive tenure. Our results presented in Table 11 show that uniformly in all three specifications, the coefficient on *ESGMetric* remains negative and statistically significant at the 1% level, ranging from −5,106.5 to −6,890.5 dollars. These findings suggest that the reduction in pay-performance sensitivity (dollar delta) persists even after considering the determinants of ESG pay at the firm level.

[Insert Table 11 about here]

6.3 Robustness to different ESG metric classification

To further assess the robustness of our classification methodology, we employ four alternative approaches to distinguish ESG-related metrics from non-ESG metrics. Specifically, we classify 'metric other' text as an ESG metric using the following methods: (1) ChatGPT 4o-mini, where we ask if the text pertains to an ESG-related compensation contract; (2) the comprehensive keyword set introduced in Gantchev, Giannetti, and Hober 2024, which includes all 1,034 words; (3) ISS Incentive Lab data, which classifies

compensation contracts as ESG or non-ESG (available since 2018); and (4) an extended version of ISS Incentive Lab, where pre-2018 metrics are labeled as ESG if they appear as ESG in the post-2018 ISS classification. The results of these alternative classifications are presented in Table 12, all of which align with our baseline findings.

[Insert Table 12 about here]

6.4 Alternative incentives: Time vesting incentives and total compensation

Executives may receive alternative incentives to those provided by the performance vested equity or options analyzed so far. One possibility is time-vesting equity or options, not conditioned on any performance metric. In addition to equity- or option-based incentives, executives can also receive cash bonuses and fixed salaries. In this section, we test whether the documented decrease in performance-based incentives after the introduction of ESG metrics is offset to some extent by an increase in time-vesting or other type of incentives.

To test this hypothesis, we calculate the time-vesting delta as the change in the dollar value of the CEO's overall compensation including both stock holdings and option positions for a 1% change in the firm's stock price. We adopt the methodology of Coles, Daniel, and Naveen 2006 and Core and Guay 2002, which distinguishes among different time-vesting option components such as new option grants, nonexercisable options, and exercisable options. Note that the time-vesting delta is different from the performance delta defined in Section 3.1, which is computed for an individual performance metric. Total compensation is defined as the logarithm of the sum of salary, bonus, stock and option compensation received by the executive in a year.

The results are reported in Table 13. We do not find a significant relation between the introduction of ESG metrics and variation in either the delta of time-vested incentives or the total compensation.

[Insert Table 13 about here]

6.5 Robustness to restricted sampling

Finally, we perform two additional robustness tests, presented in Table 14. In the first test, we exclude executives with more than 12 ESG metrics in their compensation contracts, as this represents the 99th percentile of the treatment sample, ensuring that our results are not driven by outliers. In the second test, we restrict the sample to post-2017 data, as the ISS Incentive Lab data offer more comprehensive coverage of executive compensation contracts from 2018 onward. Our results remain consistent across both specifications.

[Insert Table 14 about here]

6.6 Using a staggered difference-in-differences approach

Since the addition and removal of ESG metrics can occur at different times for different executives across different firms, our setting is that of a staggered difference-in-differences. Following the suggestion in A. Baker, D. Larcker, and Wang 2022, we use a staggered regression approach to avoid the "bad comparison" problem associated with comparing already-treated units with later-treated units. In addition, we zoom around the events of additions and removals of ESG metrics by constructing an event window of six years - three years before and three years after each event. We include year-event fixed effects along with the high-dimensional executive-firm-metric-awardgroup-vestingschedule fixed effects in our baseline analysis earlier. Our results reported in Table 15 corroborate our previous findings from Table 4. There is a significant decrease in the dollar delta of $4,066.2 associated with the inclusion of at least one ESG metric in the executive compensation contract. Symmetrically, there is a significant increase in the dollar delta of $4,315.1 when ESG metrics are completely eliminated from an executive's compensation contract. These results are again consistent with the theory of multitasking.

[Insert Table 15 about here]

7 Conclusion

Despite the progress made in understanding ESG incentives in executive compensation, significant questions remain unaddressed. Scholars continue to debate whether ESG pay is primarily a tool for genuine sustainability efforts or a mechanism for managing reputation. In addition, the long-term financial and social benefits of ESG pay remain largely unexplored.

This paper contributes to the growing body of literature on ESG pay by analyzing the interactions between incentives for standard versus ESG metrics in executive compensation. Informed by the predictions derived from a multitasking model where executives must allocate limited time and effort to competing standard and ESG tasks, we show that US firms in our sample find it optimal to decrease the incentives (dollar delta) for standard metrics to reduce the opportunity cost of managers' time and effort spent in less measurable ESG metrics. The findings are consistent with efficient contracting in the presence of multitasking.

Our study revealed several novel patterns in ESG pay. The number of ESG metrics introduced reduces the optimal provision of incentives for standard tasks non-linearly, showing a convex relation between the decline in dollar delta and the number of ESG metrics. When more material (i.e., more complementary with traditional tasks) and more measurable E metrics are introduced in isolation into the executive's compensation, we observe that dollar delta decreases even further, contrary to the model's prediction. For S and (partially) G metrics, materiality and measurability reduce the intensity of the down-adjustment for the standard dollar delta. More theoretical and empirical analysis is necessary to understand the different impact of the E, S, and G metrics on the power of standard metrics.

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Figure 1: Share of executives that have ESG metric in their compensation contracts

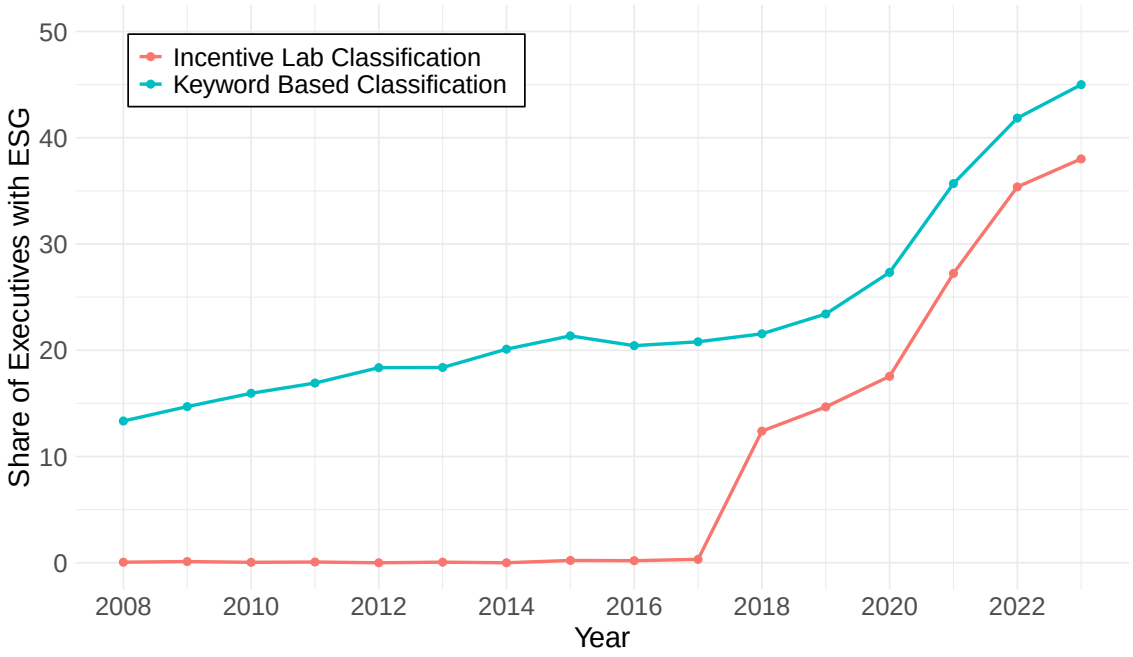


Table 1: Annual distribution of performance-based metrics for NEOs

This table reports the annual distribution of performance-based metrics for named executive officers (NEOs) in our sample. *# Metrics* counts the number of observations. *% ESG Metrics* shows what percentage of the observations belong to a compensation package that includes at least one ESG metric that year. *% Measurable* is a continuous variable at the grant level representing the percentage of ESG performance metrics with explicit performance benchmarks. *% Material* is a continuous variable at the grant level representing the percentage of ESG performance metrics in a grant that are classified as material based on the SASB Materiality Map.

Fiscal Year	**# Metrics**	**% ESG Metrics**	**% Measurable ESG**	**% Material ESG**
2008	532	22.9	25.3	18.9
2009	383	29.0	28.6	32.9
2010	467	36.6	51.9	39.1
2011	555	20.2	48.5	48.2
2012	518	26.8	42.7	26.3
2013	468	27.1	64.4	15.6
2014	541	29.9	67.4	9.47
2015	456	20.4	79.5	19.5
2016	514	23.7	66.3	18.8
2017	604	23.8	63.2	18.6
2018	2,294	24.9	58.5	38.0
2019	2,687	29.6	56.9	34.2
2020	2,892	32.1	51.0	30.6
2021	3,013	45.4	53.8	28.7
2022	3,485	54.6	54.6	30.8
2023	3,028	56.3	52.0	31.0
Aveg. 2008-2023	**22,437**	**38.2**	**54.0**	**30.7**

Table 2: Summary statistics

This table reports the summary statistics of the variable used in our empirical analyses. We estimate *Dollar Delta* following the Equation 8. The *ESG Metric* is a binary variable set to one for executives whose compensation contracts include an ESG-related metric that year. *Only E Metric* is a dummy variable that takes value of one if all ESG metrics in the contract are of the E type, otherwise zero. We define analogous variables for S and G categories. *One ESGMetric* identifies observations in contracts with a single ESG metric. We construct analogous variables for *Two-Three ESGMetrics* and *Four or More ESGMetrics*. We follow Gormley, Matsa, and Milbourn 2013 in constructing firm- and executive- level controls. The contract variables are from ISS Incentive Lab.

	Observation	Mean	SD	p25	Median	p75
Dollar Delta	22,437	23,559.5	68,253.3	1,230.3	5,934.1	17,861.5
ESG Metric	22,437	0.382	0.486	0	0	1
Only E Metric	22,437	0.017	0.129	0	0	0
Only S Metric	22,437	0.147	0.354	0	0	0
Only G Metric	22,437	0.022	0.148	0	0	0
One ESGMetric	22,437	0.175	0.38	0	0	0
Two-Three ESGMetric	22,437	0.123	0.329	0	0	0
Four or More ESGMetric	22,437	0.084	0.277	0	0	0
Cashflows/assets	18,266	0.136	0.086	0.084	0.124	0.18
EBITDA/assets	18,633	0.137	0.083	0.084	0.124	0.175
Ln(assets)	22,339	9.497	1.33	8.555	9.429	10.393
Ln(sales)	17,892	8.903	1.272	8	8.841	9.711
Market-to-book ratio	18,687	2.708	75.348	1.616	2.947	5.337
PP&E/assets	21,721	0.277	0.265	0.068	0.177	0.426
R&D/sales	17,892	0.039	0.104	0	0.004	0.038
Sales growth	17,441	0.06	0.208	-0.009	0.053	0.126
Surplus cash/assets	18,433	0.086	0.09	0.033	0.07	0.127
Ln(total pay)	20,372	14.973	0.872	14.338	14.891	15.566
Salary + bonus	22,344	838,444	749,077	500,000	650,000	951,157
Options/total pay	20,374	0.098	0.146	0	0	0.188
Tenure	22,437	4.9	4.9	1	3	7

Table 3: Change in the dollar delta on addition or removal of ESG from compensation contracts

This table reports coefficient β from a our baseline results in Equation 9:

$$Dollar\ Delta_{e,f,m,a,v,y} = \beta \cdot ESGMetric_{e,f,y} + \alpha_{e,f,m,a,v} + \alpha_y + \epsilon_{e,f,m,a,v,y}$$

For each observation *executive (e)-firm (f)-metric (m)-award type (a)-vesting schedule (v)-year (y)*, we calculate $Dollar\ Delta_{e,f,m,a,v,y}$ in accordance with Equation 8. $ESGMetric_{e,f,y}$ is a binary variable set to one for *executive-firm-year* observations where executives' compensation contracts include at least one ESG-related metric for that year, otherwise zero. $\alpha_{e,f,m,a,v}$ and α_y represent alternative multidimensional and year fixed effects, respectively. The t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Dollar Delta	
ESGMetric	-4,454.1***	-4,010.6***	-4642.1***
	(-2.92)	(-2.96)	(-3.37)
Year FE	Y	Y	Y
Executive-Firm FE	Y		
Metric FE	Y		
Executive-Firm-Metric FE		Y	
Executive-Firm-Metric -Award-Vesting FE			Y
Observations	20,929	20,315	20,061
R-squared	0.680	0.725	0.757

Table 4: Change in the dollar delta associated with the addition or removal of ESG metrics

This table reports coefficient β from the following baseline regression in Equation 9:

$$\textit{Dollar Delta}_{e,f,m,a,v,y} = \beta \cdot \textit{Treatment}_{e,f,y} + \alpha_{e,f,m,a,v} + \alpha_y + \epsilon_{e,f,m,a,v,y}$$

For each observation *executive (e)-firm (f)-metric (m)-award type (a)-vesting schedule (v)-year (y)*, we calculate $\textit{Dollar Delta}_{e,f,m,a,v,y}$ in accordance with Equation 8. In Column 1, $\textit{Treatment}_{e,f,y}$ is a binary variable equal to one for executive-firm-year observations where the executive's compensation contract includes at least one ESG-related metric in that year, and zero otherwise. In Column 2, $\textit{Treatment}_{e,f,y}$ is equal to one for executive-firm-year observations where the contract does not include any ESG-related metric, and zero otherwise. In Column 1, the control group consists of executive-firm pairs who never had any ESG metrics included in their contracts from 2008 to 2023. In Column 2, the control group consists of executive-firm pairs who had at least one ESG metric during the same period. The treatment group includes executive-firm pairs that experienced a one-time change in *Treatment* status during the same period. $\alpha_{e,f,m,a,v}$ and α_y represent *executive-firm-metric-award type-vesting schedule* and *year* fixed effects, respectively. The t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Dollar Delta	
Treatment	-4,148.8**	5,889.4**
	(-2.35)	(2.01)
Treatment Definition	ESG Presence	ESG Absence
Year FE	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y
Observations	12,800	5,703
R-squared	0.805	0.573

Table 5: Change in the dollar delta associated with the addition of standard metrics

This table reports coefficient β from our baseline results in Equation 9, but for standard or non-ESG contracts:

$$Dollar\ Delta_{e,f,m,a,v,y} = \beta \cdot StandardMetric_{e,f,y} + \alpha_{e,f,m,a,v} + \alpha_y + \epsilon_{e,f,m,a,v,y}$$

For each observation *executive (e)-firm (f)-metric (m)-award type (a)-vesting schedule (v)-year (y)*, we calculate $Dollar\ Delta_{e,f,m,a,v,y}$ in accordance with Equation 8.. $StandardMetric_{e,f,y}$ is a binary variable set to one for *executive-firm-year* observations where executives' compensation contracts include at least one additional standard metric for that year. In Column (2), we control for *TotalMetric*, which captures the total count of both ESG and standard metrics assigned to an executive by a firm in a given fiscal year. In Column (3), we show our results from Table 3 for *ESGMetric*, a dummy variable set to one if an executive's compensation contract includes at least one ESG-related metric for that year, after controlling for *TotalMetric*. $\alpha_{e,f,m,a,v}$ and α_y represent alternative high-dimensional and year fixed effects, respectively. The t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Dollar Delta	
StandardMetric	-546.5	-159.2	
	(-0.58)	(-0.16)	
ESGMetric			-4,472.6***
			(-2.99)
TotalMetric		-230.7	-58.63
		(-1.59)	(-0.39)
Year FE	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y
Observations	20,003	20,003	20,061
R-squared	0.757	0.757	0.757

Table 6: Effect of E, S, or G metric separately

We calculate *Dollar Delta* following the Equation 8. In specification (1), *Dollar Delta* is regressed on *Only E Metric*, a binary variable equal to one for executives whose compensation contracts include only environment-related metrics for that year, but exclude social or governance-related metrics. Similarly, *Only S Metric*, in specification (2) and *Only G Metric*, in specification (3), are binary variables based on the inclusion of exclusively social-related and governance-related metrics, respectively, in the compensation contract. The other variables in specifications (4) through (6) are defined analogously. We remove the sample of observations where an executive has more than one type of ESG metric included in their contracts. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dollar Delta					
Only E Metric	-7,446.8*					
	(-1.89)					
Only S Metric		-4,087.3**				
		(-2.43)				
Only G Metric			-727.2			
			(-0.54)			
E or S Metric				-3,910.8**		
				(-2.45)		
G or S Metric					-3,567.4***	
					(-2.99)	
E or G Metric						-5,058.6**
						(-1.98)
Year FE	Y	Y	Y	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y	Y	Y	Y
Observations	12,373	15,028	12,443	17,039	15926	12917
R-squared	0.807	0.804	0.807	0.813	0.789	0.764

Table 7: Number of ESG metrics in the compensation contract

In specification (1) we regress *Dollar Delta* on *Number of ESGMetric*, a variable that counts the number of ESG metrics included in the executive's compensation in a given year. We calculate *Dollar Delta* in accordance with Equation 8. In specification (2) we add the variable *ESG Metric*, a binary variable set to one for executives whose compensation contracts include at least one ESG-related metric that year. In specification (3) we allow for the number of metrics to change in a non-linear fashion. *One ESGMetric* identifies observations in contracts with a single ESG metric. Analogous definitions apply to *Two-Three ESGMetrics* and *Four or More ESGMetrics*. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Dollar Delta	
Number of ESGMetric	-877.5***	-480.0	
	(-2.78)	(-1.52)	
ESGMetric		-3,803.9**	
		(-2.53)	
One ESGMetric			-2,934.5
			(-1.58)
Two-Three ESGMetric			-7,240.6**
			(-2.46)
Four or more ESGMetric			-8,389.2***
			(-3.77)
Year FE	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y
Observations	20,061	20,061	20,061
R-squared	0.757	0.757	0.757

Table 8: Material ESG metrics

This table presents the coefficients on our baseline regression (9) augmented with other variables of interest. The variables in the baseline regression are described in Table 3. We define an ESG metric as material if it is included in the SASB Materiality Map of the industry to which the firm belongs. In specification (1), for each observation, the variable *Only E Material* takes value of one if there exists at least one material E metric in the compensation package of the executive-firm-year and no other material S or G metric is included, zero otherwise. We define the other variables in the remaining specifications analogously. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Dollar Delta			
ESG Metric	-4,453.4***	-5,387.6***	-4,663.6***	-4,988.6***	-5,475.3***	-4,451.8***	-5,183.1***
	(-3.24)	(-3.78)	(-3.39)	(-3.50)	(-3.83)	(-3.24)	(-3.58)
Only E Material	-5,263.5**						
	(-2.29)						
Only S Material		5,439.5***					
		(2.67)					
Only G Material			8,365.4**				
			(2.32)				
E or S Material				1,761.4			
				(0.85)			
G or S Material					5,733.0***		
					(2.81)		
E or G Material						-4,968.5**	
						(-2.27)	
E S or G Material							2,627.1
							(1.14)
Year FE	Y	Y	Y	Y	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y	Y	Y	Y	Y
Observations	20,061	20,061	20,061	20,061	20,061	20,061	20,061
R-squared	0.757	0.757	0.757	0.757	0.757	0.757	0.757

Table 9: Measurable ESG metrics

This table presents the coefficients on our baseline regression (9) augmented with other variables of interest. The variables in the baseline regression are described in Table 3. We define an ESG metric as measurable if at least one of the benchmarks that trigger vesting for that performance metric in the payout structure (i.e., minimum, threshold, or maximum performance) and the corresponding payout are reported in ISS Incentive Lab. In specification (1), for each observation, the variable *Only E Measurable* takes value of one if there exists at least one measurable E metric in the compensation package of the executive-firm-year and no other measurable S or G metric is included, zero otherwise. We define the other variables in the remaining specifications analogously. We include multidimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Dollar Delta			
ESG Metric	-4,502.7***	-4,994.5***	-4,697.2***	-4,014.1***	-5,047.7***	-4,665.7***	-4,229.9***
	(-3.27)	(-3.60)	(-3.37)	(-2.76)	(-3.58)	(-3.40)	(-2.99)
Only E Measurable	-6,035.3**						
	(-2.05)						
Only S Measurable		3,223.0**					
		(2.06)					
Only G Measurable			2,475.6				
			(1.22)				
E or S Measurable				-3,893.0*			
				(-1.65)			
G or S Measurable					2,996.8**		
					(2.15)		
E or G Measurable						457.2	
						(0.09)	
E S or G Measurable							-2,133.4
							(-1.28)
Year FE	Y	Y	Y	Y	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y	Y	Y	Y	Y
Observations	20,061	20,061	20,061	20,061	20,061	20,061	20,061
R-squared	0.757	0.757	0.757	0.757	0.757	0.757	0.757

Table 10: Robustness to adding firm- and executive-level controls

Model (1) of this table reports the results from the baseline specification in Equation 9. We estimate *Dollar Delta* following the Equation 8. *ESGMetric* is a binary variable set to one for executives whose compensation contracts include an ESG-related metric in a given year. In Model (2), we include the firm- and executive- level control variables described in Gormley, Matsa, and Milbourn 2013. In Model (3), we add the contract variables reported in ISS Incentive Lab. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all models. In all models, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Dollar Delta	
ESGMetric	-4,642.1***	-4,284.5**	-4,110.5**
	(-3.37)	(-2.34)	(-2.24)
Cashflows/assets		-15,157.9	-12,505.7
		(-1.07)	(-0.80)
EBITDA/assets		20,044.6	15,412.3
		(1.37)	(0.98)
Ln(assets)		-7,924.5	-9,046.8
		(-1.22)	(-1.34)
Ln(sales)		4,827.9	5,859.3
		(0.86)	(1.12)
Market-to-book ratio		-1.976	-1.269
		(-0.46)	(-0.29)
PP&E/assets		37,527.5**	51,529.8**
		(1.99)	(2.54)
R&D/sales		49,923.3	29,747.1
		(1.33)	(0.84)
Sales growth		-2,391.9	-2,886.0
		(-0.60)	(-0.75)
Surplus cash/assets		-13,060.8	-11,709.6
		(-1.22)	(-1.06)
Ln(total pay)			22,239.8***
			(7.17)
Salary + bonus			-0.00221
			(-1.07)
Options/total pay			-20,231.6*
			(-1.81)
Tenure			471.1
			(0.17)
Year FE	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y
R-squared	0.757	0.735	0.749
Observations	20,061	14,964	14,009

Table 11: Robustness to entropy balanced matching

This table reports the results using entropy-balanced matched sample of firms that either add or remove ESG metric from executive compensation contracts during our sample period (treatment firms) and firms that either never had ESG metrics in contracts or always had ESG metrics during the sample period (control firms). Observable executive and firm characteristics are used for matching covariates that include tangibility, capital expenditure, return on assets, leverage, dividends, size, stock price volatility, stock price growth, percentage institutional ownership, and executive tenure. The fixed effects included in Models (1)–(3) correspond to those in Table 3. t statistics, shown in parentheses, are computed from heteroskedasticity robust standard errors clustered at the executive level. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Dollar Delta	
ESGMetric	-5,106.5***	-6,401.8***	-6,890.5***
	(-4.178)	(-5.282)	(-5.708)
Year FE	Y	Y	Y
Executive–Firm FE	Y		
Metric FE	Y		
Executive–Firm–Metric FE		Y	
Executive–Firm–Metric–Award–Vesting FE			Y
R-squared	0.653	0.703	0.753
Observations	19,506	19,506	19,506

Table 12: Robustness to other definitions of ESG metric

This table reports the results from our baseline specification in Equation (9) after considering alternative definitions of ESG metric. We estimate *Dollar Delta* following the Equation 8. *ESGMetric* is a binary variable set to one for executives whose compensation contracts include an ESG-related metric for that year. In Model (1), we use ChatGPT 4o-mini to classify the *metricother* variable from IncentiveLab as either ESG or non-ESG. In Model (2), we rely on the full set of 1,034 words provided in Gantchev, Giannetti, and Hober 2024 to identify ESG contracts. In Model (3), we use the ISS classification to determine ESG contracts; however, because this data is only available since 2018, the sample size is smaller. In Model (4), we extend the ISS classification to earlier years by labeling a contract as ESG if it exactly matches a *metricother* value classified as ESG by ISS after 2018. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)
			Dollar Delta	
ESGMetric	-3,379.7**	-3,512.5**	-3,099.4**	-2,822.7**
	(-2.40)	(-2.54)	(-2.06)	(-2.05)
ESGMetric Definition	LLM	All Keywords	ISS Classification	Extend ISS Class.
Year FE	Y	Y	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y	Y	Y
Observations	20,061	20,061	15,588	20,061
R-squared	0.757	0.757	0.780	0.757

Table 13: Alternative incentives: Time vested delta and total compensation

This table reports the results from our baseline specification in Equation (9) after replacing the dependent variable, Dollar Delta, by time-vested delta in Model (1) and logarithm of total compensation in Model (2). *Time Vested Delta* is calculated in accordance with Coles, Daniel, and Naveen 2006 and Core and Guay 2002. *Total Compensation* is the sum of all compensation elements (salary, bonus, and stock and options) provided to an executive. *ESGMetric* is a binary variable set to one for *executive-firm-year* observations where executives' compensation contracts include at least one ESG-related metric in a given year, and zero otherwise. We include executive-firm and year fixed effects. The t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	TV Delta	ln(Total Compensation)
ESGMetric	5.202	-0.0108
	(0.34)	(-0.81)
Year FE	Y	Y
Executive-Firm FE	Y	Y
Observations	6,580	13,092
R-squared	0.927	0.897

Table 14: Robustness to extreme number of ESG metrics and restricting sample to recent years

This table reports the results from our baseline specification in Equation (9) after excluding outliers in the number of ESG metrics in compensation contracts and restricting our sample to recent years. *Dollar Delta* is estimated following the Equation 8. *ESGMetric* is a binary variable set to one for executives whose compensation contracts include an ESG-related metric for that year. In Model (1), we exclude observations where executives have more than 12 ESG metrics in their compensation contracts, as 12 represents the 99th percentile in our treatment sample. In Model (2), we restrict the sample to years after 2018, as ISS Incentive Lab provides more comprehensive data coverage and improved ESG classification for compensation contracts during this period. High-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects are included in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Dollar Delta	
ESGMetric	-4,637.8***	-3,907.8***
	(-3.37)	(-3.02)
Sample restricted to	$\leq 13 ESGMetric$	after 2017
Year FE	Y	Y
Executive-Firm-Metric-Award-Vesting FE	Y	Y
Observations	19,976	15,588
R-squared	0.757	0.780

Table 15: Staggered difference-in-differences estimates for the addition and removal of the ESG metrics in executive compensation contracts

This table presents the estimated coefficients from our baseline specification in Equation (9) using a stacked difference-in-differences framework. The dependent variable is *Dollar Delta*, calculated as described in Equation (8). *Treatment* is a binary indicator equal to one for executive-firm observations in which an ESG metric was added to or removed from the compensation contract. *Post* is a binary indicator equal to one for all years following (and including) the year in which the ESG metric change occurred. We construct an event window spanning six years—three years before and three years after the addition or removal of an ESG metric in an executive's compensation contract. In Column (1), we focus on events where an ESG metric was added to an executive's compensation contract exactly once within the six-year window. The control group comprises executives who never had any ESG metrics included in their compensation contracts during the same period. In Column (2), we examine events where an ESG metric was removed from an executive's compensation contract exactly once during the six-year window. The control group consists of executives who retained ESG metrics in their compensation contracts for the entire six-year period. High-dimensional *executive-firm-metric-award type-vesting schedule-event* and *year-event* fixed effects are included in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Dollar Delta	
Treatment x Post	-4,066.2**	4,315.1*
	(-2.00)	(1.80)
Treatment Group	ESG Added	ESG Removed
Year-Event FE	Y	Y
Executive-Firm-Metric -Award-Vesting-Event FE	Y	Y
Observations	3,312,106	524,425
R-squared	0.872	0.565

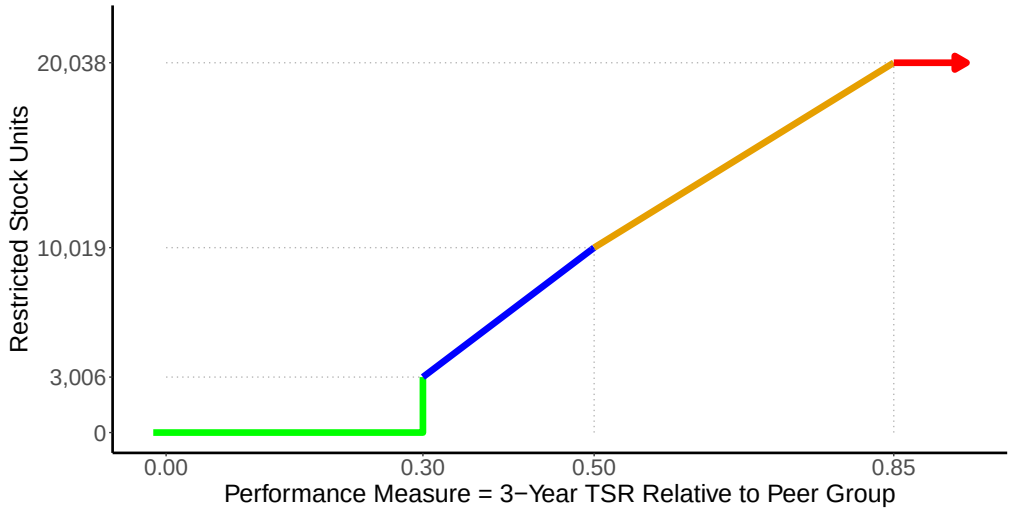
Appendix

A.1 Example of performance metrics and award structure in Xcel Energy Inc.

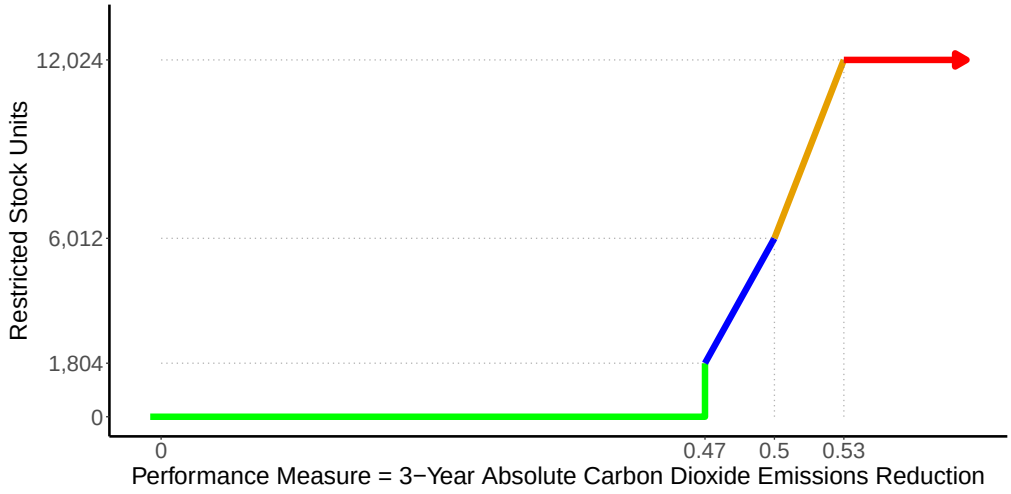
Here, we provide a detailed example of how we calculate different variables in our dataset. We consider a two-metric performance grant awarded to Mr. Kent T. Larson, former Executive Vice President and Group President of Operations at Xcel Energy Inc., for fiscal year 2020. The grant includes two performance metrics: one based on the firm's total shareholder return (TSR) relative to its peer group (accounting based) and the other on absolute reduction in carbon dioxide emissions (ESG based), both of which determine the vesting of restricted stock. The award payout structure specifies, for each metric, the performance metric that triggers vesting, the type of back-end instrument granted upon vesting, the number of units awarded, and the performance period used to evaluate the payout.

Figure A.1 (a) is provided to facilitate the interpretation of the award payout structure for this specific example. The minimum relative TSR required to trigger vesting is 30%, which means that the firm must outperform its peer group by at least 30%. At this point, the *minimum award* consists of 3,006 restricted shares. Once this threshold is met, the award amount increases linearly for a relative TSR between 30% and 50% to reach 10,019 shares, the *target award*. After that, the award increases linearly when the relative TSR is between 50% to 85% to reach the *maximum award* 20,038 restricted shares. After that, for any increase in TSR above 85%, the award remains at the maximum payoff.

Figure A.1 (b) shows the payoff structure when the performance metric is the reduction in carbon emissions. The minimum target and maximum trigger points in this case are 47%, 50% and 53%, respectively. The corresponding minimum, target, and maximum awards are, respectively, 1,084, 6,012, and 12,024 restricted shares.



(a) Accounting-based award payout structure



(b) ESG-based award payout structure

Figure A.1: Award payout structures
Payoffs from the 2 performance metrics in a grant awarded to Mr. Kent T. Larson, former Executive Vice President and Group President of Operations at Xcel Energy Inc., for the fiscal year 2020.

To calculate *Dollar Delta* for the TSR metric, we first compute delta that measures the change in the expected value of the metric when the stock price increases by 1%, assuming an initial stock price of $1. We apply the approach of Bettis et al. 2018 [15]. The simulation approach focuses on performance-vesting awards, where vesting in this case depends on 3-year TSR relative to peers. A Monte Carlo simulation models the evolution of this metric over the

[15]We thank the authors for generously sharing their simulation code with us.

performance period, assuming that TSR follows an arithmetic Brownian motion and stock prices follow a geometric Brownian motion. We estimate volatility and correlation between these factors using historical firm-level data. For each simulated path, the number of shares that vest is determined by the payout schedule, and the present value of the award is computed within a risk-neutral framework.[16]

In this case, delta is calculated to be 0.02. The *Percent Vest* is equal to one, which means that 100% perfect of the target award is granted based on this metric. Given that the closing stock price at the grant date (January 2, 2020) was \$62.38 and the target number of shares was 10,019 Therefore, according to Equation 8, the textitDollar Delta is calculated as follows:

$$DollarDelta = \$62.38 \times 10{,}019 \times 1 \times 0.02 \approx \$12{,}500$$

In other words, if the stock price increases by one percent, the executive is expected to earn 12,500 dollars based on this metric performance.

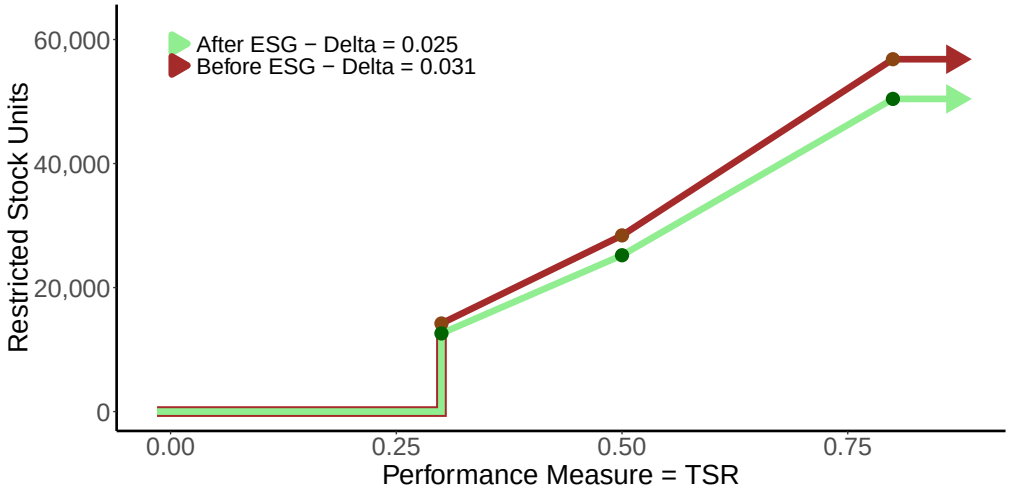
We cannot estimate the dollar delta for the ESG-based payout structure since there are no historical series of carbon dioxide emissions to estimate the moments necessary for the Monte Carlo simulation. However, we can use the structure in Panel (b) to estimate the *Measurability* of the ESG metric. As there is only one ESG metric in this grant and all trigger points and awards are specified, the measurability is equal to 1, indicating that all ESG metrics in this grant are available. Moreover, according to the SASB Materiality Map, 'GHG emissions' are material for companies in the "Electric Utilities & Power Generators sector". As a result, materiality is also equal to 1, indicating that all ESG metrics in this grant are material.

[16]For a more detailed explanation, refer to Appendix 1 of Bettis et al. 2018.

A.2 Example of introducing an ESG metric to a non-ESG grant and its effect on delta

In 2019, Mr. Paul S. Herendeen, Executive Vice President and Chief Financial Officer of Bausch Health Companies Inc., had only non-ESG metrics, such as Total Shareholder Return (TSR), EBIT, and Gross Revenues, included in his compensation grant. In 2020, a social metric from the Employee Engagement, Diversity & Inclusion category was introduced to his grant. In Figure A.2, the change in the pay structure related to the TSR metric is illustrated. It can be seen that while the benchmarks that trigger vesting remain unchanged, the amount paid at the same performance level is modified; as a result, the delta decreased from 0.031 to 0.025.

Figure A.2: Comparison of the delta in a performance metric before and after the introduction of an ESG metric in the 2019 compensation package of Mr. Paul S. Herendeen, Executive Vice President and Chief Financial Officer of Bausch.



A.3 ESG Words

The following is the list of 953 words from Gantchev, Giannetti, and Hober 2024 we used to classify compensation contracts as related to ESG:

AAIR, abatement, abating, Aboriginal, ACCC, accessible, accident, accidents, adopt, adverse, affordability, affordable, AFR, African, aid, AIFR, air, AIRR, alarms, all-electric, all-employee, all-injury, AML, animal, anti-money, antibias, antibribery, anticorruption, antidumping, antimicrobial, antiracist, antislavery, antitrust, arsenic, ASAOC, assault, assistance, assisting, atmosphere, attitude, attitudes, audit, auditing, auditors, authority's, avoidable, avoidance, awareness, AWRCR, B-BBEE, BaCE, BAIR, BAME, BEE, behaving, behavior, behavior-based, behavioral, beneficial, BIFR, bio, biodiversity, biofuel, biomass, biosecurity, BIPOC, black, breach, breaches, BREEAM, bribery, BSEE, bullying, bushfire, CAHPS, carbon, carcinogens, caseload, catastrophic, catchment, CCUS, CCV, CDC, CDIs, CDP, CE marking, Celsius, censure, certificates, certification, certifications, certified, CFC, CG, CGA, chargeable, charitable, charities, charity, CHESM, child, CIFR, CIGS, circular, circularity, citizenship, clean, cleaner, cleantech, climate, climate-positive, climate-related, climates, climatic, CMVI, CNMC, CO, CO2, CO2 emission, CO2 reduction, CO2-equivalent, CO2-reduced, CO2e, CO2eq, coal-based, coal-exit, collaborate, collaborative, collaboratively, collaborators, colleague, colleagues, collision, collisions, color, colored, commit, committed, committing, communities, community, community-backed, commuting, complex-recycling, compliance, compliances, compliantly, complying, compostable, concerns, conflict, conflicts, conservancy, conservation, consumed, consumption, contaminated, contamination, cooperation, COP21, CORESafety, corporate social responsibility, corrupt, corruption, coworker, CPMM, CRD, Cree, CRI, criticality, CSA, CSAP, CSR, CTF, cultivate, culture, CVIR, CWI, DI, damage, damages, danger, dangerous, DART, Days Away Restricted Time, deadly, deaths, decarbonization, decarbonized, DEI, demographic, demographics, derailments, dielectric, diesel, DIFR, dioxide, DIR, disability, disaster, discrimination, disposals, disturbance, diverse, diversity, DJSI, DJSIW, DOJ, donations, DOT, drops, e-buses, e-trucks, e-waste, EACC, eco, eco-design, eco-efficient, eco-labeled, ecological, ecologically, ECOLOGO, EcoVadis, educate, educating, education, educational, EEAFR, EHS, EHS-related, EHSS, EI, EIA, EIR,

elearning, electricity, electrification, ELMUS, ELWG, EMAS, emergencies, emergency, emission, emissions, emitted, empathetic, employability, employee, employee-based, employee-evaluation, employee-initiated, employee-led, employees, employer, employers, employment, energies, energy, engage, engaged, engagement, engages, engaging, engender, enjoyable, ENSR, environment, environment-linked, environmental, environmental-related, environmentally, environmentally-friendly, environments, EOS, EPC, equality, equitable, ergonomic, ERIF, ESCG, ESCMP, ESE, ESG, ESG reporting, ESG targets, ESG-criteria, ESG-dedicated, ESG-integrated, ESG-oriented, ESG-related, ESPC, Ethibel, ethic, ethically, ethics, EthiFinance, ethnic, ethnically, ethnicity, EV charging, EXI, fair, fairly, fatal, fatalities, fatality, fatigue, fatigue-violation, FCA, FCPA, female, female-owned, females, feminization, feminizing, fiduciary, FIR, fire, fire-related, fires, Fitwel, flooding, FOFA, food, footprint, footprinting, forest, forestry, FOS, foster, fostering, fosters, freedom, frequency, freshwater, FSI, FTSE4Good, FVR, GAIA, Gallup, Gallup's, gaps, gas outages, GCA, gCO2, gCO2e, GDPR, GED, gender, Gender-Equality Index, GHG, GHG-related, GHGE, GMDSS, GMP, GMP-compliant, GMP-ready, GMR, governance, GPG, green, greener, greenhouse, greening, GRESB, GRI, GSCOP, GWh, GxP, HACT, happier, happiness, harassment, harm, harmful, harms, hazard, hazardous, hazards, HCAHPS, HDSA, HDSAs, health, Health-e Workforce Solutions, healthcare-associated, healthier, healthy, heat, help, helped, helping, HES, HESS, high-hazard, high-severity, HIPAA, HIRR, HIV, HMDA, hospice, hospitality, hospitalization, house, housing, HPI, HPIFR, HPIs, HPN, HQE, HRA, HRI, HSE, HSEC, HSEIP, HSEMS, HSEQ, HSER, HSES, HSMSO, HSS, HSSD, HSSE, HSSEC, HSSEQ, HTA, human, human-resource, human-resources, humanitarian, humanity, hygiene, ICAM, IDEAL, IIR, illegal, illness, illnesses, impact, impacting, impacts, incidence, incidences, incident, incident-based, incidents, inclusion, inclusion-related, inclusiveness, inclusivity, Indigenous, infractions, inhalable, injuries, injury, Innu, inpatient, inspires, integrity, intensity, interpersonal, Inuit, involvement, IOSA, ISNetworld, ISO-compliance, ISP, ISS ESG, ISS ESG rating, ISS-oekom, JCI, job-safety,

jobs, JSEA, justice, kCO2, kgCO2, kgCO2e, kids, kWh, KYC, L6, landfill, landscape, Latinx, laundering, lawfully, LDAR, leader, leaders, leadership, leakage, leaks, LEED, legislation, LFTR, LGBTQ, life-changing, life-enhancing, LifeSkills, literacy, litigations, livelihood, lives, LMICs, LOCIs, LOPC, lost, Lost-Time, low-carbon, low-emission, LTAFR, LTAR, LTAs, LTDIF, LTFIR, LTIF, LTIFR, LTIIR, LTIR, LTIs, LTIS, LTISR, LWCR, LWDIR, LWDR, MAIFI, malaria, males, managers, materiality, maternal, Mecheshoo, Medicaid, medically, men, mental, mentality, mentor, mentoring, mentorship, methane, microplastics, middle-income, migrant, minorities, minority, mitigating, mitigation, MMTCO2e, monitor, morale, morbidity, mortality, MOSWEC, motivated, motivating, MSHA, MTIFR, multicultural, multiracial, MVI, NABERS, nationality, native, near-miss, NECEC, neighborhoods, net-zero, neutralize, newborn, NFDL, noise, noise-related, non-compliance, non-compliances, non-compliant, non-discrimination, non-emitting, non-fatal, non-fresh, non-hazardous, non-injury, non-renewable, non-reportable, non-white, norms, NQS, nurture, nurturing, occupational, ODMs, odor, Ofcom, offset, offsets, offsetting, Ofwat, OHC, OHES, OHI, OHSAS, OHSE, OII, oil-to-gas, ombudsman, ORIR, OSHA, OSHA-recordable, outpatient, OWL, P1, palm, parental, passion, patient, patient-centric, patient-focused, peatland, people, people-based, peoples, personnel development, PHC, PHEV, philanthropic, philanthropy, photovoltaic, physician, planet, plant-based, planting, plastic, plastics, PLMUS, PLWG, PM10, PMVA, PMVAR, policies, policy, policymaker, pollution, pollutions, population, populations, positivity, potable, poverty, POW, prejudice, preventable, preventative, prevention, preventive, prosecution, prosper, protected, protecting, PSER, PSEs, PSIR, PSIs, PSPS, psychologically, PUE, PV, PVAR, PVIR, QHSE, QHSES, QualityScore, race, racial, racialized, RCFR, RCR, recordable, recordables, recruit, recruiting, recyclability, recyclable, recycle, recycled, recycling, reduce, reduction, reductions, refuel, regeneratively, regime, regulation, regulations, regulator, regulatory, rehab, rehabilitate, rehabilitated, rehabilitation, rehospitalization, reliance, remotely, removals, renewable, replacements, represented,

resilience, resilience-based, resilient, reskilling, resource, resources, resources-related, respecting, respects, responsibilities, responsibility, responsible, responsibly, retention, retirees, retraining, reusable, reusables, reuse, reused, RGMP, Ribbon, RICI, RIDDOR, RIDDORs, RIF, RIFR, rights, RightShip, RIR, Robeco, RobecoSAM, rPET, RSE, RVIR, SACIFR, SAF, safe, safeguarding, safer, safety, safety-first, safety-related, SAIDI, salary, saltwater, SAM, sanitation, Sapin, Sarbanes-Oxley, SASB, satisfactory, satisfied, SBTi, SBTi-approval, SCFR, science-based, scope, scopes, secrecy, SEEC, SEIFR, self-care, self-development, serious, severity, sexual, SF6, shared-value, SHECR, SHECS, SHS, sick, sickness, SICR, SIF, SIFR, sinks, SIP, slates, slavery, SLO, smallholder, SMCR, SO2, social, social health, social-economical, socially, societal, societies, society, society's, socioeconomic, soil, solidarity, SOX, SOX deficiencies, SOX-compliant, species, spill, spilled, spills, SPMVI, SSOFR, StakeholderWatch, STARR, statutorily, stewardship, stress, succession, suicide, supervisors, supplied, support, supported, supportive, supports, surveillance, SustainAbilities, sustainability, sustainability-based, sustainability-labelled, sustainability-linked, sustainability-related, sustainable, sustainable-development, sustainably, Sustainagility, Sustainalytics, SWD, tailings, tails, talent, talents, TAR, taxonomy, TCEQ, TCF, TCFD, TCIR, tCO2, tCO2e, team, teambuilding, teammate, teams, teamwork, teamworking, TFAF, TFIR, thriving, TICR, TIFR, TIR, traceability, traceable, TRAFR, training, trainings, transparency, TRCF, TRCFR, TRCR, treatable, treating, trees, TRER, TRFIR, TRI, TRIF, TRIFR, TRIR, TRR, trustworthiness, trustworthy, TSM, TTIFR, UN, underrepresented, underserved, unionized, unions, unsafe, upcycling, upskilling, urgency, value-based, values, values-based, vegetation, veteran, veterans, Vigeo Eiris, violation, violations, VIR, VOCs, VoE, voluntary turnover, volunteered, volunteering, volunteerism, vulnerable, WACI, warming, waste, wastes, wastewater, water, water-intensive, waters, watershed, ways-of-working, welfare, wellbeing, wellness, whistleblowing, WHS, wildfire, wildflower, wildlife, WLO, WLTP, woman, women, women-owned, women's sponsorship, womenÄôs, woodland, work, work-related, workday,

workdays, worked, worker, workforce, worklife, workload, workplace, workplaces, worksite, worst, young, youth, zero-carbon, zero-fatalities.

A.4 Examples of excluded words

Below we show examples of few words we exclude from Gantchev, Giannetti, and Hober 2024 word list. We exclude these words, since the fraction of correctly identifying ISS classified ESG metricother was less than 0.5.

Table A.1: Examples of excluded words: Complaint

metricother	ESG Comp. Metric
Customer Complaint	0
On-time complaint quality reporting	0
Complaint Tracking Module Volume per 1,000 members per month	0
Complaint Management	0
Complaint Timeliness Execution	0

Table A.2: Examples of excluded words: Cyber

metricother	ESG Comp. Metric
Cyber Mindset results for Finance and Corporate Development departments	0
Cyber Mindset results	0
Cyber Mindset results for US Markets	0
Technology and Cyber Risk Management	0

Table A.3: Examples of excluded words: Trust

metricother	ESG Comp. Metric
Execution of The Trust's Capital Plan	0
Trust and Brokerage as Measured Against Their Combined Goals	0
Composition of Trust's Portfolio	0
Merck Trust & Value Customer Survey	0
MS Leader in Customer Trust and Value Survey	0
Wells Fargo Institutional Retirement Trust Integration Scorecard ...	0
MS Leader in Customer Trust and Value Survey	0
Enhance customer trust by achieving targeted product safety ...	0
Performance of Commerce Trust	0

A.5 Examples of ESG metrics in executive compensation

Table A.4: Examples of ESG metrics in executive compensation

This table presents selected environmental, social, and governance (ESG) metrics commonly used in executive compensation.

Environmental	**Social**	**Governance**
Food Waste	Employee Retention	Ethics Compliance
Wildfire Plan	Diversity	Cybersecurity
Zero Waste	Safety Training	Succession Plan
Water Recycling	Women in Leadership	Capital Use
Plastic Reduction	Incident Rate	Regulatory Goals
Renewable Energy	Client Retention	Internal Controls
Carbon Market	Fair Hiring	Public Policy
Water Savings	Community Work	Board Diversity
Emission Cuts	Workplace Safety	Anti-Corruption
Green Buildings	Employee Satisfaction	ESG Reporting
Methane Reduction	Equal Pay	Risk Management
Carbon Intensity Cut	Health & Safety	Corporate Transparency
Net Zero Goals	Labor Rights	Shareholder Rights

A.6 Examples of measurability and materiality of ESG metrics

Table A.5: Examples of measurability and materiality of ESG metrics

This table presents examples of ESG metrics in our dataset. The Measurable column indicates whether a given metric has explicit performance benchmarks (1) or not (0). Since the materiality of an ESG metric depends on the industry, we include in the Industry column one SASB industry category where this metric appeared in at least one executive's grant. The Material column specifies whether the ESG metric is considered material in that industry (1) or not (0).

Metric	ESG Category	Measurable	Industry	Material
Cumulative Carbon Emissions Reduction	Environmental	1	Electric Utilities & Power Generators	1
Sustainability - Air Travel	Environmental	1	Software & IT Services	0
Climate Change	Environmental	0	Road Transportation	1
Progress toward our long-term sustainability goals	Environmental	0	Restaurants	0
Low-carbon Investments as a Percent	Environmental	1	Oil & Gas – Refining & Marketing	1
Carbon Footprint Goal	Environmental	1	Medical Equipment & Supplies	1
Fatalities	Social	1	Meat, Poultry & Dairy	1
Safety Performance (Measured in ORIR)	Social	1	Water Utilities & Services	1
Safety	Social	0	Metals & Mining	1
On-Site Team Engagement, Retention	Social	0	Real Estate	0
Diversity Index Scores	Social	1	Asset Management & Custody Activities	1
Succession Planning	Governance	0	Real Estate	0
Achieve the Reliability System Average	Governance	1	Electric Utilities & Power Generators	1
Ethics	Governance	0	Biotechnology & Pharmaceuticals	1
Supporting Our Corporate Ethics Program	Governance	0	Software & IT Services	0
Legal Client Support	Governance	0	Electric Utilities & Power Generators	0

Table A.6: Change in the pay-performance elasticity or delta on inclusion of ESG metrics

This table reports coefficient β from a our baseline results in Equation 9:

$$Delta_{e,f,m,a,v,y} = \beta \cdot ESGMetric_{e,f,y} + \alpha_{e,f,m,a,v} + \alpha_y + \epsilon_{e,f,m,a,v,y}$$

For each observation *executive (e)-firm (f)-metric (m)-award type (a)-vesting schedule (v)-year (y)*, we calculate $Delta_{e,f,m,a,v,y}$ in accordance with Bettis et al. 2018. $ESGMetric_{e,f,y}$ is a binary variable set to one for *executive-firm-year* observations where an executive's compensation contract includes at least one ESG-related metric in a given year. $\alpha_{e,f,m,a,v}$ and α_y represent alternative high-dimensional and year fixed effects, respectively. The t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)
		Delta	
ESGMetric	-0.00114	-0.00186**	-0.00202**
	(-1.24)	(-2.05)	(-2.17)
Year FE	Y	Y	Y
Executive-Firm FE	Y		
Metric FE	Y		
Executive-Firm-Metric FE		Y	
Executive-Firm-Metric -Award-Vesting FE			Y
Observations	20,831	20,234	20,061
R-squared	0.432	0.464	0.472

Table A.7: Effect on accounting and financial metric separately

We calculate *Dollar Delta* following the Equation 8. In specification (1), we restrict our sample to only accounting metrics including: EBIT, EBITDA, EPS, Earnings, Net Income, Operating Income, and Sales. In specification (2), we restrict our sample to only financial metrics including Stock price and Total shareholder returns. We include high-dimensional *executive-firm-metric-award type-vesting schedule* and *year* fixed effects in all regressions. In all specifications, the t-statistics, in parentheses, are based on standard errors clustered at the executive level. ***, **, * denote statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)
	Dollar Delta	
ESGMetric	-5,704.2*	-4,019.2***
	(-1.96)	(-2.91)
Metric Type	Accounting	Financial
Year FE	Y	Y
Executive-Firm-Metric -Award-Vesting FE	Y	Y
Observations	6,828	13,233
R-squared	0.627	0.795