

# Executive Compensation Tied to ESG Performance: International Evidence

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Executive Compensation Tied to ESG  
Performance:  
International Evidence

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## Abstract

This paper examines the use of ESG performance metrics in executive compensation contracts. We first document that a growing fraction of publicly traded companies around the world now incorporate ESG metrics in the compensation schemes of their top executives. Our analysis links the reliance on these metrics to firm fundamentals, the geographic location of firms as well as the influence of institutional shareholders. Our findings also suggest that the adoption of ESG variables in managerial performance measures is accompanied by improvements in ESG performance and meaningful changes in the compensation of executives.

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Keywords: ESG metrics, Executive compensation, Institutional ownership

JEL Classifications: M12, M41, Q54

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# **Executive Compensation Tied to ESG Performance: International Evidence**

## **ABSTRACT**

This paper examines the use of ESG performance metrics in executive compensation contracts. We first document that a growing fraction of publicly traded companies around the world now incorporate ESG metrics in the compensation schemes of their top executives. Our analysis links the reliance on these metrics to firm fundamentals, the geographic location of firms as well as the influence of institutional shareholders. Our findings also suggest that the adoption of ESG variables in managerial performance measures is accompanied by improvements in ESG performance and meaningful changes in the compensation of executives.

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## 1. Introduction

With the rising interest in Corporate Social Responsibility (CSR) principles a broad set of Environmental, Social and Governance (ESG) variables have been proposed as metrics for gauging corporate CSR efforts. As might be expected, the proportion of global firms indicating that their executive compensation schemes are tied to ESG metrics has also grown. According to the global ISS Executive Compensation Analytics database, the share of firms indicating that some ESG metrics are Key Performance Indicators (KPI) for their executives has grown from 3% in 2010 to over 30% in 2021.<sup>1</sup>

The practice of including ESG metrics in executive compensation schemes (henceforth referred to simply as “ESG pay”) raises two broad sets of questions: who are the adopters of ESG pay and what economic outcomes are associated with the inclusion of ESG metrics in executive compensation schemes? More specifically, what characteristics, such as geographic location, size, industry and ownership structure, tend to make firms more prone to adopt the practice of ESG Pay? Furthermore, what economic outcomes, such as ESG performance and financial returns do we observe for the adopters of ESG pay? This paper examines whether the factors predicting ESG adoption and the subsequent economic outcomes result in a pattern that is consistent with the notion of ESG metrics playing a meaningful role in executive compensation arrangements.

From an agency and stewardship perspective, one would expect reliance on ESG metrics in executive compensation packages, provided a firm’s owners and the Board of Directors acting on their behalf intrinsically care about ESG outcomes (Bonham and Criggs-Cragun, 2022).<sup>2</sup> Some institutional equity investors, e.g., BlackRock, have urged firms to articulate their sustainability

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<sup>1</sup> See Figure1 for the actual growth rates between 2010 and 2020. The available data for 2021 indicates that the percentage of firms basing executive pay on some ESG metric has most recently grown to 38%.

<sup>2</sup> Recent studies in finance have suggested that some investor groups are willing to compromise financial results for improvements in certain ESG scores (Pastor et al., 2020; Riedl and Smeets, 2017; Barber et al., 2021).

agenda because of impending financial risks resulting from climate change. Accordingly, environmental metrics, such as carbon emissions, are viewed as indicators of future financial risk. The justification for ESG pay would then be in line with earlier agency-theoretic findings demonstrating that reliance on operational metrics, such as product quality or customer satisfaction, can make managerial incentive contracts more efficient.<sup>3</sup> This prediction emerges even if the firm's share price, a key indicator of future performance, is available for contracting purposes.<sup>4</sup>

A distinctive characteristic of many ESG metrics, in particular those in the “E” and “S” categories, is that some of the firm's stakeholder groups intrinsically care about these metrics. This reflects that some of the firm's activities entail external effects, the costs of which are not fully internalized by the firm. A firm's greenhouse gas emissions or other environmental pollution are prime examples in this context. By including ESG metrics for activities subject to external costs in executive compensation schemes, owners can credibly convey to the firm's stakeholders that management's attention will be drawn to these external effects. In addition to improving the general corporate image, a firm commitment to be “ESG conscious” may strengthen customer loyalty and make the firm's equity shares more attractive for certain investor groups.

The literature on CSR has long been concerned about the possibility of “window-dressing” or “green-washing” (Delmas and Burbano, 2011; Marquis et al. 2016; Grewal and Serafeim, 2021). In the context of ESG pay, window-dressing may be tempting for firms whose owners are skeptical regarding the financial benefits emerging from higher ESG scores, except for the general benefit that results from improving the firm's corporate image and its standing with certain stakeholder

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<sup>3</sup> See, for instance, Ittner, Larcker, and Rajan (1997), Dikolli (2001), Sliwka (2002), and Dutta and Reichelstein (2003).

<sup>4</sup> Conversely, the need for accounting variables in addition to stock price has been demonstrated, among others, by Bushman and Indjejikian (1993); Kim and Suh (1993), Paul (1992) and Dutta and Reichelstein (2005).

groups. Ideally, those firms would like to be perceived as being “ESG responsible” without having to “walk the talk”. Window-dressing is arguably difficult to detect in the context of ESG pay because the measurement of these variables is frequently subjective at the firm level. Furthermore, outside observers generally do not have access to the relative weights given to different performance indicators, the use of targets and thresholds, as well as the exact form of the payout function.

Our empirical tests are based on the ISS Executive Compensation Analytics database, covering a sample of 4,395 public firms from 21 countries between 2011 and 2020. We count a firm as practicing ESG pay if at least one ESG criterion was considered a key performance indicator in the firm’s executive compensation scheme. The criteria span a wide range of “E”, “S” and “G” variables.

Our analysis shows that several external factors appear to make firms more prone to adopt ESG pay. At a macro level, the inclusion of ESG metrics in compensation contracts is more common in countries that are generally perceived to be ESG sensitive, including the possibility that some form of ESG reporting is already mandatory in these countries. As one might expect, firms operating in environmentally burdensome industries also have a higher proclivity to adopt ESG pay. At the firm level, we find that, aside from size and volatility, the practice of ESG pay is associated with firms that have publicly issued environmental commitments.

We take a detailed look at the impact that institutional investors have on the practice of ESG pay. Institutional investors are often seen as leaders in the current effort to transition towards more sustainable business practices, yet there is also an ongoing debate on the growing influence of large asset management companies. Our analysis of the determinants of ESG pay breaks down institutional ownership in several ways. We use an instrumental variables approach to isolate



exogenous variation in institutional ownership. In addition, we collect data on engagements by the three largest institutional investors (i.e., Blackrock, State Street, and Vanguard) and find that their engagements tend to increase the likelihood of a particular firm implementing ESG pay. Finally, when analyzing investors' reaction to ESG pay, we find that funds tend to tilt their portfolios towards firms that do rely on ESG pay.

In terms of subsequent outcomes observed for ESG adopters, we find that these firms receive on average more favorable ESG scores from outside rating agencies. ESG pay adopters also tend to experience improvements for one key environmental ESG metric: the firm's carbon dioxide emissions. These patterns are more pronounced among ESG sensitive countries, specifically countries within the European Union. In terms of executive compensation consequences, our results indicate that after controlling for accounting and stock price performance, executives of firms exhibiting higher ESG ratings and lower CO<sub>2</sub> emissions receive higher variable compensation. This finding does not apply to firms that do not condition their compensation arrangements on ESG variables.

The effect of ESG pay on shareholder wealth is less clear-cut. We find no positive association with financial outcomes, such as return on assets, and even find a decrease in stock returns after the adoption of ESG pay. These findings are consistent with the notion that some investment groups are insistent on attention to ESG criteria and are willing to trade improvements in those dimensions for lower returns. Taken together, our findings on the determinants of and outcomes associated with ESG pay are consistent with the hypothesis that ESG pay provisions play a substantive role in executive compensation packages by supplementing traditional financial metrics.

To date, there appear to be relatively few studies examining the link between executive compensation and CSR activities. Somewhat complementary to our approach, some studies have asked whether basing compensation on CSR-contingent variables results in increased agency costs, possibly without increasing shareholder value. Higher agency costs may be the consequence of top-level managers having intrinsic CSR preferences and their power to lobby boards of directors to include CSR variables in executive compensation contracts. Some of these studies find that contracting based on CSR criteria is more common among firms with relatively less powerful CEOs (Hong et al., 2016; Ikram et al., 2019).<sup>5</sup> In contrast, Bebchuk and Tallarita (2022) conclude that a broader set of KPIs allow executives to extract larger rents at the expense of shareholders.<sup>6</sup>

Our result that institutional investors have a significant role in firms' decision to adopt ESG pay adds to the burgeoning literature on the effects of environmental activism on corporations (Dimson et al., 2015; Azar et al., 2021). Closely related to our study is Dimson et al. (2015), who study the activism of one large institutional investor with a major commitment to responsible investment. Consistent with our findings, Azar et al. (2021) demonstrate that the Big Three appear to push firms towards incremental reductions in carbon emissions.

The remainder of the paper is organized as follows. Section 2 develops our hypotheses on the determinants of and outcomes associated with ESG pay, while Section 3 describes our data and sample. Section 4 reports the empirical findings on the determinants of ESG pay. Section 5 extends the analysis on the influence of institutional investors. Section 6 focuses on the observed

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<sup>5</sup> Relatedly, Flammer et al. (2019) conclude that integrating CSR variables into executive compensation tends to improve firms' financial performance. Maas (2018) finds that quantitative, hard corporate social performance targets is an effective way to improve CSR results.

<sup>6</sup> These previous studies are restricted to the U.S. where we observe less frequent use of ESG pay. Moreover, their analyses are based on a relatively small cross-section of firms (S&P100 or S&P500) and data from years prior to 2014, a period in which ESG pay was relatively uncommon. (see Figure 1).

outcomes associated with the inclusion of ESG metrics in compensation contracts. We conclude in Section 7.

## **2. Conceptual framework and empirical predictions**

Our analysis is grounded in a conceptual framework that presumes heterogeneity in the preferences of shareholders across the firms represented in our sample. Specifically, we envision that there are (at least) three types of firms differing in their owners' preferences regarding the firm's ESG performance. We refer to Type I firms as those where the majority of shareholders subscribe to Friedman's postulate that the objective of businesses should be to maximize economic profits (Friedman, 1970). Furthermore, the owners of these firms believe that the ESG metrics popularized in recent years either have no first-order effect on the firm's financial performance, or that the signal-to-noise ratio of these metrics is sufficiently low to render them effectively useless for incentive contracting purposes. We expect these firms in our sample not to base executive compensation on ESG variables.

At the other end of the spectrum, Type III firms will engage in ESG pay for their executives either because the owners intrinsically care about ESG outcomes, or because they view ESG variables as leading indicators of future financial performance.<sup>7</sup> These leading indicators may capture risk exposures, such as the risk of stranded assets due to accelerating climate change. Agency models suggest that both are rational arguments for basing executive pay on ESG metrics (Sliwka, 2002; Dutta and Reichelstein, 2003; Bonham and Criggs-Cragun, 2022). When ESG variables are viewed as mere leading indicators of future financial performance, the case for ESG

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<sup>7</sup> Some studies on the use of ESG in compensation schemes have conjectured that ESG variables may present yet another convenient instrument for powerful executives to camouflage and justify excessive compensation in the guise of "pay-for-performance" (Bebchuk and Tallarita, 2022).

pay is similar to that for the inclusion of non-financial variables, e.g., customer satisfaction or product quality, in managerial incentive contracts (Ittner, Larcker and Rajan, 1997; Dikolli, 2001).

In the middle of our taxonomy, we envision Type II firms. Like Type I, the owners of Type II firms are “ESG skeptics”, except that they anticipate financial benefits if the firm is being perceived as “ESG active” by various stakeholder groups, including customers, employees, and certain investor groups. These stakeholders intrinsically care about the firm’s ESG outcomes because many of the “E” and “S” variables in ESG pertain to activities that entail external costs which are not fully reflected in the prices of goods and services transacted by the firm. Greenhouse gas emissions or labor practices in foreign countries are cases in point. Firms that are viewed as being concerned about these variables may therefore improve their standing with the corresponding stakeholder groups, resulting in, for instance, increased customer loyalty, stronger brand value, better labor relations, and a broader set of investment clients.

Owners of Type II firms will therefore seek to convince the concerned stakeholders that they indeed incentivize their management to pay attention to ESG. Given their intrinsic ESG skepticism however, these owners and their appointed boards of directors may want to implement ESG pay in only a nominal fashion, that is they engage in “window-dressing”. The concern that firms could use ESG pay opportunistically stems from the substantial degree of discretion that companies have when it comes to implementing ESG pay.<sup>8</sup> In particular, they can choose the compensation vehicle, the relative weights attached to different metrics, performance targets, and the specific ESG metric(s). These concerns are exacerbated by the difficulty in measuring many dimensions of ESG.

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<sup>8</sup> Based on a sample of S&P100 firms, Bebchuk and Tallarita (2022) note that among those firms that disclosed the relative weights given to ESG variables in executive compensation schemes, the reported weights were rather small on average, i.e., in the range of 1-3%.

While these firm types are not directly observable, we can gain some understanding of their relative proportion in our sample by exploring which firms adopt ESG pay and whether the adoption of ESG pay is associated with improvements in ESG performance.

### *2.1. Determinants of ESG pay*

*Industry- and Country Level Determinants.* The tendency to base executive compensation on ESG metrics is plausibly higher for firms operating in environmentally burdensome segments, specifically in heavy manufacturing industries. Similarly, we expect a higher proclivity to adopt ESG pay for firms located in countries that are either considered to be sensitive to environmental protection and/or have regulations in place that mandate corporate ESG disclosures.

*Firm Fundamentals.* ESG pay could be associated with firm fundamentals in several ways. We expect firms exhibiting greater volatility to be more likely to implement ESG pay, since for these firms ESG metrics could be informative about future performance, i.e., ESG variables are leading indicators of future financial performance. We also expect larger firms to be more likely to implement ESG pay since the environmental and social management practices of larger firms are more visible to the public.

*ESG Pledges.* We predict that firms with pledges to improve ESG scores will seek to lend further credibility to these commitments by tying executive compensation to ESG metrics. A prominent example are carbon reduction pledges. Carbon dioxide (CO<sub>2</sub>) emissions is the metric mentioned most prominently in connection with environmental ESG variables. As part of their sustainability efforts, a sizable number of global firms have recently articulated net zero pledges. Accordingly, these firms have stated the goal to reduce their emissions (gross emissions less so-called offsets) to zero by 20xx, where frequently xx=50. Yet, critics have argued that these self-imposed targets often lack credibility, as the firms do not specify how they are to achieve these

ambitious targets 30 years into the future (Comello et al. 2022). To strengthen the credibility of their net zero pledges, a substantial number of firms have partnered with NGOs such as the Science-Based Target initiative (SBTi).<sup>9</sup> We therefore examine the association between firms signing up with the SBTi and adopting ESG pay.

*Shareholder pressure.* Survey evidence suggests that a nontrivial number of institutional investors believe that climate risks have financial implications for their portfolio firms (Krueger et al. 2020). That said, it is plausible that a substantial number of investment fund managers may themselves be agnostic in their beliefs regarding the relationship between ESG criteria and financial performance. Yet, they may push for the adoption of ESG metrics in the executive compensation schemes of the portfolio companies for fear of losing their investment clients with an intrinsic ESG preference.<sup>10</sup> Indeed, recent research in finance has argued that some investment groups are willing to trade financial returns for improvements in ESG performance (Pastor et al., 2020; Riedl and Smeets, 2017; Barber et al., 2021; Kruger et al., 2020).<sup>11</sup> Because these investment clients are frequently represented by institutional equity investors, it is plausible that, even if the managers of these institutions are skeptical about ESG, a larger share of institutional ownership is associated with a higher proclivity to adopt ESG metrics in executive compensation schemes.

In his annual letters to CEOs, BlackRock's CEO Larry Fink has been explicit that, in order for firms to be eligible portfolio companies for BlackRock, they need to be transparent about their

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<sup>9</sup> Launched in 2014, the *Science-Based Targets Initiative* (SBTi) seeks to define and promote net-zero carbon emission targets in line with climate science. The list of companies that have set emissions reduction targets through the SBTi is available on the Emission Pledge's web-site: <https://sciencebasedtargets.org/companies-taking-action#anchor-link-test>.

<sup>10</sup> For example, the equilibria emerging in the model of Friedman and Heinle (2016) has the feature that investors effectively exert pressure on management to improve the firms' sustainability practices.

<sup>11</sup> For further evidence on investors' preferences towards ESG see also Hartzmark and Sussman (2019) and Ceccarelli, Ramelli, and Wagner (2021).

sustainability practices.<sup>12</sup> Mr. Fink has also been explicit that this insistence does not reflect BlackRock being a climate activist. Instead, BlackRock’s position supposedly reflects the belief that climate change poses a long-term financial risk to many corporations, in part due to impending regulatory risk, and yet these risks may not be properly reflected in current share prices.<sup>13</sup>

*Directors’ preferences.* The push/resistance to adopt ESG pay could also relate to directors’ preferences. For example, it is plausible that independent directors are in favor of ESG pay because reputational concerns make these directors sensitive to external pressure to implement ESG strategies. Moreover, based on prior literature showing that female directors are more sensitive to ESG issues (Atif et al., 2021; Ginglinger and Raskopf, 2021; Liu, 2018), it is possible that ESG pay is more prevalent among firms with more female directors.<sup>14</sup>

In sum, the above determinants should lead firms in the Type II and III categories to include ESG variables among their KPIs. We therefore expect to see a positive association. In contrast, such an association should not emerge for the non-adopters of ESG pay (Type I firms).

## 2.2. ESG performance associated with ESG pay

*Pay for ESG performance.* If firms merely seek to claim the “green mantle” by nominally including ESG metrics in executive compensation schemes (type II firms), there should be no association between ESG performance and the cash bonuses received by the firm’s executives. In contrast, we would expect to see a positive association for type III firms.

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<sup>12</sup> The annual letter to CEOs in 2020 stated: “we will be increasingly disposed to vote against management and board of directors when companies are not making sufficient progress on sustainability-related disclosures and the business practices and plans underlying them” (Sprouse, 2020).

<sup>13</sup> Generation Investment Capital is another example of an equity fund emphasizing that long-term value maximization requires management practices that are environmentally and socially sustainable (Bebb and Reichelstein, 2016).

<sup>14</sup> See also Adams and Ferreira, 2009; Cronqvist and Yu (2017) for other research with consistent conclusions on the effect of women on corporate decision-making and, specifically, on CSR.

*Changes in ESG performance.* If ESG pay provisions are substantive (Type III firms), we expect that those firms that adopt ESG pay will improve their ESG performance.

*i) Carbon Emissions.* Since corporate CO<sub>2</sub> emissions are frequently a primary ESG metric, we expect that, in comparison to non-adopters of ESG pay, the adopters will achieve significant reductions in their levels of CO<sub>2</sub> emissions. We expect this relation to be particularly strong for firms that single-out carbon based metrics among their KPIs.

*ii) ESG Ratings.* The reasoning provided for carbon emissions as an outcome variable applies equally to ESG ratings that the firm in question receives from external rating agencies, such as Sustainalytics or Refinitiv.

In sum, if the adoption of ESG pay is associated with the determinants hypothesized above as well as with improvements in ESG performance, the findings would suggest that Type II firms are relatively rare in our sample.

### **3. Data, Sample, and Descriptive Statistics**

#### *3.1. Data and Sample*

Our initial sample includes international public firms covered by ISS Executive Compensation Analytics (ECA) from 2011 to 2020. ECA provides detailed, comparable data on incentive awards, including performance metrics, performance goals and payout structures on all incentive awards for over 9,000 companies across the U.S., Canada, U.K., Europe, Australia, New Zealand, and South Africa. Although the ECA database starts in 2008, comprehensive coverage of performance metrics used in compensation contracts is only available from 2011.<sup>15</sup> Our analysis ends in 2020, the last year with complete available data at the time of our study.

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<sup>15</sup> Unfortunately, the data on performance goals and payout structures is not available for many firms covered by the database.



Aside from the ECA data on compensation contracts, our analysis incorporates separate data sources on greenhouse gas emissions, ESG ratings and institutional ownership on individual firms. Trucost, a commercial provider of corporate carbon emission data, is a widely used source of firm carbon emissions data for the corporate sector (for example, MSCI and S&P use Trucost data in their indexes) and for international organizations such as UNEP FI (i.e., the United Nations Environment Program Finance Initiative). Trucost collects carbon emissions data from publicly available sources, including the Carbon Disclosure Project.<sup>16</sup> When a covered firm does not publicly disclose its carbon emissions, Trucost estimates a firm’s annual carbon emissions based on an environmental profiling model.

We obtain data on institutional ownership from the FactSet/LionShares database. FactSet/LionShares gathers institutional ownership for U.S. equities from mandatory filings with the SEC. For stocks traded outside the U. S., FactSet/LionShares gathers institutional ownership data from national regulatory agencies and stock exchange announcements, as well as direct disclosures of mutual funds, mutual fund industry directories, and company proxies and annual reports. We obtain accounting and market data from Datastream/WorldScope. This data set provides stock price, balance sheet, and income statement information for a large number of international firms. We collect data on commercial ESG Ratings sources from Refinitiv, Sustainalytics, and MSCI (ESG KLD Stats).

Table 1, Panel A, outlines the sample selection procedure. We start with 53,565 firm-year observations in the ECA dataset. To be included in our sample, we require that the firm is publicly traded and is covered by Datastream and FactSet/LionShares. The resulting sample consists of 35,076 firm-year observations corresponding to 6,262 firms. Some of the tests require non-missing

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<sup>16</sup> Other sources of carbon emissions data include companies’ websites, annual reports (10-K), CSR reports, and direct communications with companies.

Trucost data, which further restricts the sample size to 22,603 observations corresponding to 4,395 firms from 21 countries.

Table 1, Panel B, presents the sample composition by year. The table shows a remarkable increase in the number of firms adopting ESG pay over the sample period, with the increase being most pronounced in the latter part of the sample. This is consistent with a substantial body of evidence of a significant increase in the social sensitivity towards ESG in these recent years (e.g., Azar et al., 2021). As shown in the table, a non-trivial number of firms have implemented ESG pay by the end of our sample period (1,198 firms, corresponding to 31% of our sample firms in 2020).

Table 1, Panel C, presents the sample composition by country. We observe that the use of ESG pay is more common among European countries, Australia, and Canada. The table also shows that the frequency of ESG pay in the US is significantly lower than that in these countries. This is consistent with evidence suggesting that societies within the EU being more sensitive to ESG issues (Gibson et al., 2020).

Table 1, Panel D, presents the sample composition by industry. ESG metrics are most commonly used in the compensation contracts of producers of oil and petroleum products, utilities, and automakers. That is, ESG pay appears to be more prevalent in industries that are environmentally controversial.

### *3.2 Firm, industry, and country characteristics*

Table 2 presents descriptive statistics of the variables used in our tests.<sup>17</sup> Panel A presents the summary data for the pooled sample and Panel B distinguishes between observations with and

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<sup>17</sup> Continuous variables are winsorized at the top and bottom 1%.

without ESG pay. Table 2, Panel B, shows that firms with ESG pay are larger, exhibit higher CO<sub>2</sub> emissions, higher ESG ratings, and are more likely to make environmental pledges.

### *3.3 Contract characteristics*

Table 3 presents summary data on the characteristics of compensation contracts containing ESG metrics. Panel A presents a taxonomy of the ESG metrics we observe (see Table 3 for the number of sample firms using each type of metric and Appendix B for examples of each type). As shown in Panel A, most of our sample firms use metrics related to environmental dimensions. Indicators related to carbon emissions are popular but, as shown in the table, firms also use a wide range of other environmental metrics. On the social dimension, Table 3 also reveals that firms often use indicators related to safety and security, diversity and inclusion, and employee satisfaction/development. We also observe metrics related to governance, most frequently in relation to corporate culture.

Table 3, Panel A also shows that compensation contracts often include firm specific ESG scores (see also Appendix B for examples) and -to a lesser extent- scores provided by external parties (e.g., ESG ratings provided by agencies such as Refinitiv, MSCI or Sustainalytics). Clearly, the categories listed in Table 3, Panel A, are not mutually exclusive; a substantial number of executive compensation contracts include more than two metrics, presumably to capture the multidimensional nature of ESG performance.<sup>18</sup>

The disclosure of the use of ESG metrics in compensation contracts also varies significantly. Some companies provide a detailed description of the metrics, weights, targets, and

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<sup>18</sup> To have a sense of the number of ESG metrics typically used in compensation contracts, we manually count the number of metrics in the subsample of observations containing at least one environmental KPI. We focus on environmental metrics for practical purposes (conducting the hand-collection exercise for the whole sample would require a disproportionate amount of resources). We find that 276 firms use only one metric, 133 firms use two metrics, and 305 firms use more than two metrics. This suggests that the use of multiple ESG metrics is not uncommon.

structure of the contract (see Appendix C for an example). In contrast, other firms state that compensation is based on criteria such as “Decarbonisation and sustainability”, “Equal opportunities and non-discrimination”, “Strategic priorities - Simplify work and eliminate complexity”, “Conduct and Culture”, “ESG performance”, but provide little detail about the pay scheme and the corresponding assessment process.

Table 3, Panel B, indicates that while a majority of the ESG metrics are used for annual (short-term) variable compensation, these metrics are also often found in long-term incentive plans. Finding ESG metrics in both parts of the compensation contract is also not uncommon. As shown in Table 3, Panel C, the typical weight assigned to these metrics is not negligible: the average weight is 13% in the short-term part of the contract and 16% in the long-term part of the contract.

#### **4. Determinants of ESG pay**

We start our empirical analysis by examining the determinants of the use of ESG metrics in compensation contracts. As discussed above, these determinants likely relate to industry, country, and firm characteristics. As such, we explore cross-sectional variation at these three levels.

##### *4.1 Industry- and country-level determinants*

We first explore variation in the use of ESG metrics across country and industries. Table 4, Panel A, presents the results of regressing *ESG Pay* (i.e., an indicator variable for whether the compensation contract of any of the top executives of the firm includes an ESG criterion) on year, industry, country, industry-year, and country-year fixed effects. *ESG Pay* equals one if the compensation contract of any of the top executives of the firm includes an ESG performance

criterion, and zero otherwise.<sup>19</sup> As shown in the table, time, industry, and country fixed effects alone explain 4%, 16%, and 6% of the variation in *ESG Pay*, respectively. Industry-year, and country-year fixed effects explain close to 30% of the variation in *ESG Pay*. This suggests that a substantial part of the variation in *ESG Pay* is firm specific.

To explore the time, industry, and country variation in *ESG Pay*, we construct the following industry- and country-level variables. *Environmentally Controversial Industry* is defined as an indicator for companies from transportation, utilities, steel works, and oil & petroleum products. *ESG Disclosure Mandate* is defined as an indicator for companies from countries with mandatory ESG disclosure policies (Krueger, Sautner, Tand, and Zhong 2021). *Country ESG sensitivity* is the value of the Environmental Performance Index (see Dyck et al., 2019 for an example of prior research using this metric).<sup>20</sup> Table 4, Panel A, shows that these variables are strongly associated with the use of ESG metrics in compensation contracts.

#### 4.2. Firm-level determinants

We next explore firm-level variation in the use of ESG metrics in compensation contracts.

To test the determinants of ESG, we estimate the following model (*i* denotes firm and *t* year):

$$ESG Pay_{it+1} = \alpha + \beta_1 * Fundamentals_{it} + \beta_2 * ESG\ pledges_{it} + \beta_3 * Shareholder\ pressure_{it} + \beta_4 * Directors\ preferences_{it} + \tau_i + \delta_k + \gamma_c + \varepsilon_{it} \quad (1)$$

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<sup>19</sup> To identify ESG metrics we use the data items *disclosed\_metric\_name*, *overall\_metric\_type*, and *metric\_type\_itemized*, which contain the description of the specific variables used by the firm as well as their classification. We focus on metrics related to “sustainability”, “environmental, social, and governance”, and “corporate social responsibility”. The definitions of all these terms are close (Christensen et al., 2021). We also check manually the conformity of the names of the metrics with their classification by the data provider.

<sup>20</sup> The Environmental Performance Index is developed by the Yale Center for Environmental Law (Yale University) and the Center for International Earth Science Information Network (Columbia University). The Environmental Performance Index (EPI) ranks 178 countries on 20 performance indicators in the following nine policy categories: health impacts, air quality, water and sanitation, water resources, agriculture, forests, fisheries, biodiversity and habitat, and climate and energy. These categories track performance and progress on two broad policy objectives: environmental health and ecosystem vitality. The EPI’s proximity-to-target methodology facilitates cross-country comparisons among economic and regional peer groups.

As before, the dependent variable *ESG Pay* equals one if the compensation contract of any of the top executives of the firm includes an ESG criterion, and zero otherwise. Based on the discussion in section 2, we include four vectors of variables: *Fundamentals*, *Pledges to ESG*, *Shareholder pressure*, and *Directors preferences*.  $\tau_t$ ,  $\delta_k$ ,  $\gamma_c$  refer to, respectively, time-, industry-, and country-fixed effects.

The vector *Fundamentals* contains the first group of variables, which relates to firm fundamentals potentially associated with ESG-based compensation.  $\text{Log}(CO_2)$  is the natural logarithm of firm's GHG emissions (scope 1) measured in equivalents of metric tons of CO<sub>2</sub>. *Volatility* is the standard deviation of stock returns measured over the year (in percentage). *Size* is the logarithm of total assets.  $\text{Log}(BM)$  is the logarithm of the book-to-market ratio (book value of equity divided by market value of equity). We also include two measures of past performance. *ROA* is defined as net income scaled by total assets. *Return* is computed as the stock return over the year. *Leverage* is computed as the sum of long-term debt and debt in current liabilities over the firm's total assets. *Tangibility* is the ratio of property, plant, and equipment over the firm's total assets. We include these two variables to measure credit constraints; more leveraged firms have to cope with regular cash outflows, which may preclude financing of environmental and other ESG investments. Conversely, pledgeable assets support more borrowings, which in turn allow for further investment. Finally, to control for disbursement to shareholders we include *Dividends*, measured as total amount of dividends scaled by net income.

The second group of variables, included in the vector *ESG pledges*, is intended to capture the extent to which the firm is more likely to benefit from increased ESG performance. For example, firms with higher emissions could benefit from reducing expenses associated with the cost of carbon. *Emission Pledge* equals one if the firm is a signatory of the Science-Based Target

Initiative, and zero otherwise. *ESG Rating* is the rating assigned to the company by Refinitiv. This rating is based on firm policies and outcomes related to ESG, and thus is a proxy for the extent to which a firm is making an effort to improve ESG performance.

The third group of variables, included in the vector *Shareholder pressure*, relates to firm-level characteristics potentially associated with the likelihood that the firm is under external pressure to implement ESG strategies. *Institutional ownership* is the fraction of shares owned by institutional shareholders. *Controlling shareholder* equals one if the firm is controlled by one shareholder (i.e., a given shareholder owns more than 50% of the shares). Firms with a controlling shareholder are less sensitive to pressure from shareholders. *Pct Peer ESG Pay* is the percentage of industry peers that have ESG pay in that year. We include this variable based on prior work showing substantial peer effects in corporate social responsibility (Cao et al., 2019).

The fourth group of variables, *Directors preferences* includes board characteristics that relate to directors' preferences for ESG. *Pct Independent* is the percentage of independent directors on the board. *Pct Female* is the percentage of female directors.

Finally, we include *Abnormal Compensation*, defined as the total compensation of the CEO minus the median CEO compensation among industry peers. We include this variable to explore the possibility that the inclusion of ESG metrics in compensation contracts could be yet another way to disguise managerial overcompensation.

Table 4, Panel B, presents the results of our analysis of the determinants of ESG-based pay. The results show that larger firms are more likely to link pay to ESG criteria. This is consistent with ESG strategies being more costly for smaller firms, but the association with size is also consistent with larger firms having more visibility and thus being more likely to be the target of ESG activism and/or regulatory pressure. The results for Model 1 also show that the use of ESG

metrics is more common among firms with lower accounting performance and among firms that are less likely to be financially constrained, i.e., firms with lower leverage and a smaller volume of collateralizable assets.

The coefficient on  $\text{Log}(CO_2)$  is positive and significant. This suggests that, controlling for industry, country, year, and firm fundamentals, higher carbon emitters tend to be more likely to base compensation on ESG performance. This result is particularly important in light of the concern emerging from earlier studies that high carbon emitters have been more reluctant to make carbon reduction commitments (Bolton and Kacperczyk, 2021). Also consistent with the notion that firms that benefit the most from ESG strategies are more likely to implement ESG pay, Table 4, Panel B, shows that firms with environmental pledges and higher ESG ratings are more likely to base compensation contracts on ESG criteria.<sup>21</sup>

Table 4, Panel B, also provides further evidence that firms adopting ESG pay are more likely to do so in response to external pressure. We find a strong association between ESG and the percentage of institutional ownership. To gauge the magnitude of the effect of institutional shareholders (a particularly relevant determinant that we explore in depth in section 5), we compute the marginal effects from re-estimating equation (1) using a logit model (see Table OA1 in the online appendix). The marginal effect of one standard deviation in *Institutional ownership* ranges from 4% to 8% (the within-firm standard deviation of *Institutional ownership* is 0.05).

The results also show that ESG metrics are less common among firms with a controlling shareholder. This is consistent with the notion that, at these firms, dispersed, ESG-sensitive shareholders hold a lower percentage of shares and thus are less influential. Also consistent with

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<sup>21</sup> Table 4 uses the ESG ratings from Refinitiv. We repeat the analysis for the ESG ratings from Sustainalytics and KLD (MSCI). While data on these other two ratings are missing for a substantial number of our sample observations, we obtain the same inferences. The coefficients on *ESG Rating (Sustainalytics)* and *ESG Rating (KLD)* are positive. The t-statistics are, respectively, 8.96 and 1.42.



the notion that firms implement ESG pay partly due to external pressure, we find an empirical association between the inclusion of ESG metrics and the percentage of industry peers that implement this practice.

Regarding board characteristics, we find that linking pay to ESG metrics is more common among firms with more independent directors and female directors. The former result could be due to independent directors' reputational concerns. The latter result is consistent with prior literature documenting that, in comparison to men, women are more inclined to address environmental and social issues (e.g., Atif et al., 2021; Liu, 2018).

Finally, Column 5 of Table 4 Panel B, presents the results of including all the previous right-hand side variables in the specification. Except for *Leverage*, all the previously discussed patterns remain statistically significant in the extended specification. This test also shows that ESG pay is not related to abnormal levels of CEO compensation, which is not consistent with the notion that ESG pay is yet another way to overcompensate the CEO.

## **5. The influence of institutional investors as a determinant of ESG pay**

Institutional investors are often seen as playing a crucial role in the current efforts to transition towards a sustainable economy. Yet, there are significant concerns that these institutions have had little impact in terms of delivering improved ESG performance. Understanding whether institutional investors are effective in inducing firms to include ESG criteria in compensation arrangements is also interesting in light on the ongoing debate on the role of large asset management companies in the economy (e.g., Bebchuk and Hirst, 2019; Azar et al., 2021).

### 5.1. Instrumental Variable Analysis

As a first step in our in-depth analysis of the role institutional investors on ESG pay, we sharpen identification by conducting an instrumental variables (IV) analysis based on two-stage least squares (2SLS) regressions. Following prior literature (e.g., Bena et al. 2017), we exploit the fact that foreign institutions are more likely to invest in Morgan Stanley Capital International (MSCI) indexes' stocks, because international portfolios are typically benchmarked against these indexes. Our instrument for foreign institutional ownership is the stock additions and deletions to the MSCI All Country World Index (MSCI ACWI). The variation in foreign institutional ownership induced by this rule is plausibly exogenous to the extent that index membership is determined by the mechanical rule that firms are included depending on their market capitalization ranking.

In the first stage we instrument institutional ownership using the following specification:

$$Foreign\ IO_{it-1} = \alpha + \beta * MSCI_{it-1} + \gamma * Controls_{it-1} + \tau_i + \delta_k + \gamma_c + \varepsilon_{it}, \quad (2)$$

*Foreign IO* is the percentage of shares owned by foreign institutions. *MSCI<sub>it</sub>* is the instrumental variable, defined as an indicator equal to one if stock *i* is assigned to the MSCI ACWI Index in year *t*, and zero otherwise. *Controls* includes *Size*, *Log(BM)*, *ROA*, *Leverage*, *Tangibility*, *Dividends*, and *Returns*, all as previously defined (see section 3 and Appendix A for variable definitions). In the second stage, we estimate the following model:

$$ESG\ Pay_{it} = \alpha + \beta * \widehat{Foreign\ IO}_{it-1} + \gamma * Controls_{it-1} + \tau_i + \delta_k + \gamma_c + \varepsilon_{it}, \quad (3)$$

*ESG Pay* is as previously defined.  $\widehat{Foreign\ IO}_{it-1}$  is the fitted value from the first stage (i.e., equation (2)). *Controls* is defined as above.

Table 5 presents the results from the IV analysis. The results of the first stage in Table 5, column 1, support the assumption that firm addition to the MSCI index is associated with an

increase in institutional ownership (i.e., the relevance assumption of the IV analysis). The coefficient on *MSCI* is positive and significant ( $p < 0.01$ ), suggesting that firm's membership in the MSCI index is associated with higher foreign institutional investor ownership. The results of estimating equation (3) are presented in column 2. The coefficient on  $\widehat{Foreign IO}_{it-1}$  is positively and highly significant ( $p < 0.05$ ). Overall, the results in Table 5 suggest that the influence of foreign institutional investors induces firms to include ESG metrics in compensation contracts.

### 5.2. Engagements by institutional investors

To further confirm that institutional investors play a role in inducing firms to include ESG metrics in compensation contracts, we analyze investors' engagements with the firms in their portfolio. To keep the analysis tractable, we focus on the three largest asset managers in the world, namely BlackRock, Vanguard, and State Street. We focus on these investment firms, often referred to as the "Big Three", for the following reasons. The first is data availability; the Big Three recently started publicly disclosing, in investment stewardship reports (ISR), detailed data on private engagements with their portfolio firms.<sup>22</sup> Second, while the public disclosure of engagements may not be unique to the Big Three, collecting this data for all the investment funds present in our sample would be prohibitively costly. Third, studying the Big Three is in and of itself interesting in light of the recent debate on the role of these large investment managers in the economy (e.g., Bebchuk and Hirst, 2019; Azar et al., 2021).

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<sup>22</sup> According to the narrative in the investment stewardship reports (ISRs), most engagements go beyond sending a letter to the firm. For example, BlackRock's ISR states that the fund's investment stewardship department had "substantive dialogue with the companies listed as engaged firms." The ISR also states that the fund "engages companies for the following reasons: (1) to ensure that BlackRock can make well-informed voting decisions; (2) to explain its voting and governance guidelines; (3) to convey its thinking on long-term value creation and sound governance practices."

We hand collect engagement information from the recent ISRs published by the Big Three. We disregard engagements by letters and include only comprehensive engagements via calls and in-person meetings. The length of the period covered by the ISRs exhibits some variation across the three investors. BlackRock's ISRs include engagements data from 7/1/2017 to 6/30/2020. Vanguard's ISRs include engagements data from 7/1/2018 to 6/30/2020. State Street's ISRs include engagements data from 1/1/2014 to 12/31/2020. Vanguard and State Street classify engagements into broad categories and report reasons for the engagements. BlackRock simply publishes a list of firms contacted for comprehensive engagement.

In absolute terms, we observe that, during the period covered by the ISR reports, the Big Three engage with a relatively large number of firms; BlackRock engaged with 3,102 firms, State Street engaged with 2,376 firms, and Vanguard engaged with 1,301 firms. In relative terms, however, the Big Three appear to engage with a relatively small percentage of their portfolio firms: BlackRock, Vanguard, and State Street annually engage with 9%, 3%, and 5% of their portfolio firms, respectively.

We conduct a multivariate test on whether the probability that a firm includes ESG metrics in its executive compensation contracts is higher when the firm is engaged by the Big Three. That is, we regress *ESG Pay* (i.e., the previously defined indicator for whether the firm includes ESG criteria in executive compensation contracts) on *Engagement by at least one Big 3*, namely an indicator variable that equals one if the firm is included in the list of engagements disclosed in ISR of any of the Big Three institutions (Blackrock, State Street, or Vanguard). We also repeat the analysis replacing *Engagement by at least one Big 3* with similar variables specific to each of the three asset management companies. That is, each indicator equals one if the firm is included in the

list of engagements disclosed in ISR of that Big Three institution, and zero otherwise.<sup>23</sup> The corresponding three variables are labelled as *Engagement by Black Rock*, *Engagement by State Street*, and *Engagement by Vanguard*, respectively. The specification also includes a vector of controls for firm characteristics: *Size*, *Log(BM)*, *ROA*, *Leverage*, *Tangibility*, *Dividends* and *Return*, all of them as previously defined (see Appendix A for variable definitions).

Table 6 presents the results of estimating OLS regressions based on the variables described above. The coefficient on *Engagement by at least one Big 3* is positive and statistically significant. The coefficients on the fund-specific variables *Engagement by Black Rock*, *Engagement by State Street*, and *Engagement by Vanguard* are also positive and significant except for the case of Vanguard. As such, the results in Table 6 suggest that the inclusion of ESG metrics in compensation contracts is more frequent among firms that are engaged by the Big Three. This is consistent with our inferences from prior tests that institutional investors play a significant role in the gradual increase of this compensation practice.

### 5.3. Changes in institutional investors' holdings

Even if they are not the target of direct engagements, firms could also implement ESG pay to attract and/or retain institutional investment. This is consistent with prior literature documenting that institutional investors influence firms not only through direct engagements, but also through trading decisions (e.g., Admati and Pfleiderer, 2009). We next explore this possibility by testing whether ESG pay is associated with changes in institutional investors' ownership in the firm.

Focusing on investment funds, we estimate the following model at the firm-fund-year level:

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<sup>23</sup> The classification of engagements across the Big Three is not homogeneous. Vanguard includes engagements on environmental issues in the “oversight of strategy and risks” category. State Street includes engagements on environmental issues in the “Environmental/Social” category. While Blackrock does not classify engagements into categories, environmental issues are a commonly included in the agenda of Blackrock’s engagements with portfolio companies (e.g., BlackRock, 2019).

$$\Delta Fund\_Ownership_{ift} = \alpha + \beta * ESG\ Pay_{it} + \gamma * Controls_{it-1} + \tau_i + \delta_{ft} + \varepsilon_{ift} \quad (4)$$

The dependent variable,  $\Delta\_Fund\_Ownership_{ift}$ , is defined as the fractional change in the number of shares of firm  $i$  owned by fund  $f$  in year  $t$ .  $ESG\ Pay_{it}$  equals one if firm  $i$  uses ESG metrics in the compensation contracts of top executives in year  $t$ , and zero otherwise.  $Controls_{it}$  is as previously defined (equations (2) and (3)). The specification includes firm fixed effects to capture time variation in  $ESG\ Pay$ . The model also incorporates fund-year fixed effects to control for time-variant fund characteristics such as capital inflow. As shown in Table 7, the coefficient on  $ESG\ Pay_{it}$  is positive and statistically significant. This suggests that investment funds are more likely to increase their stake in firms that implement ESG pay.<sup>24</sup>

## 6. ESG pay and ESG performance

### 6.1 Pay for ESG performance

As a first step, we explore how ESG performance, as represented by commercial ESG ratings and the level of the firm's carbon emissions, is associated with variable executive pay. Our interest here is in seeing whether this association differs for the subsample of ESG pay adopters in comparison to those firms that do not include ESG metrics among their KPIs.

Our analysis is based on the following model:

$$\begin{aligned} \text{Log}(\text{Variable Cash})_{it} = & \alpha + \beta_1 * ESG\ Rating_{it-1} + \beta_2 * \text{Log}(CO2)_{it-1} + \\ & \gamma * Controls_{it-1} + \tau_i + \delta_i + \varepsilon_{it} \end{aligned} \quad (5)$$

$\text{Log}(\text{Variable Cash})$  is the logarithm of the amount of cash variable compensation, including annual cash bonus and non-equity incentive pay received by the CEO in that year.  $ESG\ Rating$  is

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<sup>24</sup> In Table OA2 (Online Appendix) we analyze whether ESG pay explains investor behavior beyond the ESG ratings and emissions, we repeat the analysis including two additional control variables:  $ESG\ Rating_{it}$  (i.e., the ESG rating of firm  $i$  in year  $t$ ) and  $\text{Log}(CO2)_{it}$  (i.e., the logarithm of firm  $i$ 's carbon emissions in year  $t$ ). The coefficient on  $ESG\ Pay_{it}$  remains positive and statistically significant.

the ESG rating provided by Refinitiv, KLD, and Sustainalytics.  $\text{Log}(CO_2)$  is the logarithm of CO2 emissions, and *Controls* is the vector of control variables from equation (5). We conduct the analysis separately for observations with  $ESG\ Pay = 1$  and for observations with  $ESG\ Pay = 0$ . This latter group serves as placebo test, as there is no reason to expect that the amount of variable compensation is related to ESG performance if the contract is not based on ESG criteria.

Table 8, Panel A, presents the results of this test. In the subsample with  $ESG\ Pay = 1$ , the coefficient on  $\text{Log}(CO_2)$  is negative and significant, suggesting that executives are rewarded for reducing carbon emissions. The coefficient on *ESG Rating* is positive (although not significant in some of the specifications), suggesting that the CEO indeed receives a higher level of compensation when ESG pay is incorporated in the contract. In contrast, these patterns do not exist in the subsample with  $ESG\ Pay = 0$ , which is consistent with these contracts not providing incentives to increase ESG performance. Thus, the results in Table 8, Panel A, are consistent with the notion that ESG pay provides meaningful incentives to increase ESG performance.

Table 8, Panel B, repeats the analysis splitting the sample by geographic area. This analysis focuses on observations with  $ESG\ Pay = 1$ . We find evidence of pay for ESG performance among European firms (pay is associated with carbon emission reductions and higher ESG ratings). We also find a significant association between some ESG ratings and variable compensation in the US and in the rest of the world.

## 6.2 Changes in ESG performance

As a second step in exploring whether ESG pay provisions result in meaningful incentives, we analyze whether improvements in ESG outcomes are associated with the decision to adopt ESG pay. While descriptive, such an association would be consistent with the notion that ESG Pay,

possibly in combination with other corporate and regulatory actions, is instrumental in improving ESG performance.

### 6.2.1. Carbon emissions

We start by testing whether the inclusion of ESG metrics among a firm’s KPIs is associated with reductions in the firm’s carbon emissions. To that end, we estimate the following model:

$$\Delta CO2_{it} = \alpha + \beta_1 * ESG Pay_{it} + \gamma * Controls_{it} + \tau_t + \delta_i + \varepsilon_{it} \quad (6)$$

where  $\Delta CO2$  is the change in the firm’s carbon dioxide emissions, measured in metric tons of CO<sub>2</sub> (scope 1) with respect to the previous year (i.e., from  $t-1$  to  $t$ ). We focus on scope 1 emissions because these are directly emitted by the firm.<sup>25</sup> We also decompose the variable *ESG Pay* in the following manner: *carbon-specific metric* equals one if the KPIs includes a metric related to carbon emissions, and zero otherwise. *Non Carbon-specific metric* equals one if the KPIs include an ESG metric unrelated to carbon emissions, and zero otherwise.

*Controls* includes *Size*, *Log(BM)*, *ROA*, *Leverage*, *Tangibility*, *Dividends*, and *Returns*, all as previously defined (see section 3 and Appendix A for variable definitions). Sub-indexes  $i$  and  $t$  refer to firm  $i$  and year  $t$ , respectively. All independent variables are measured at the start of the year.  $\tau_t$  and  $\delta_i$  denote year and firm-fixed effects, respectively.

Table 9, Panel A, presents the results of this test. As shown in the table, while the coefficient on *ESG Pay* is not statistically significant, when we distinguish between emission-specific KPIs and other metrics, the coefficient on *Carbon-specific metric* is negative and

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<sup>25</sup> The GHG Protocol proposes a breakdown of the total amount of GHG emissions into three “scopes” based on the source of emission. “Scope 1” emissions relate to direct GHG emissions from sources that are owned or controlled by the company. “Scope 2” emissions relate to indirect GHG emissions from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company’s direct operations. “Scope 3” emissions are the consequence of the firm’s activities but occur from sources not owned or controlled by the company, for example employee business travel, outsourced business activities, and other parts of the supply chain.



significant, which is consistent with the notion that introducing emission-specific KPIs in top executive compensation contracts induces a decrease in emissions. It is of course possible that part of the reduction effect materializes in the long-term and therefore is not captured by our empirical tests.<sup>26</sup>

### 6.2.2. ESG ratings

We next repeat the previous analysis replacing the dependent variable in equation (6),  $\Delta CO_2$ , with  $\Delta ESG Rating$ , defined as the change in ESG ratings with respect to the previous year. We use the ESG ratings provided by three major vendors: Refinitiv, Sustainalytics, and KLD. The coverage of these two latter ratings is substantially lower than Refinitiv, which causes sample attrition.<sup>27</sup> Table 9, Panel B, presents the results of these additional tests. When using  $\Delta ESG Rating$  as the dependent variable, the coefficient on *ESG Pay* is positive and significant for two of the ratings, suggesting that ESG pay is followed by an increase in ESG ratings. Finding that the result differs somewhat for the three ratings is perhaps not surprising given that prior literature documents a significant divergence across these metrics, including their coverage (e.g., Berg et al., 2020).

Table 10 repeats the analysis splitting the sample by geographic area. The results are substantially more pronounced in Europe. In contrast, we find weak results in the US and in the rest of countries. Together with Table 8, Panel B, these results are consistent with the common perception that European countries are more sensitive towards ESG issues. Consistent with this perception European countries exhibit higher values of *Country ESG sensitivity* and *ESG*

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<sup>26</sup> Recalling our finding above that ESG disclosure mandates tend to make the adoption of ESG pay more likely, the results obtained for equation (6) are aligned with earlier findings that firms located in countries with mandatory carbon reporting achieve incrementally lower carbon emissions (Grewal, 2021; Downar et al. 2021).

<sup>27</sup> Beyond having a smaller coverage of our sample firms, KLD ratings are only readily available until 2018.

*Disclosure Mandate*, namely the measures used in prior sections to capture regulatory and social pressure to improve ESG performance.

### 6.3. Financial performance

For completeness, we finally explore whether ESG pay is associated with financial performance. We repeat the analysis replacing the dependent variable in equation (6),  $\Delta CO_2$ , with  $\Delta ROA$ , namely the change in ROA (i.e., return on assets) with respect to the previous year. ROA is computed as net income scaled by total assets.

Table 11 presents the results of this test. As shown in the table, the coefficient on *ESG Pay* is statistically insignificant, suggesting that adding ESG metrics to compensation contracts is not significantly associated with a change in accounting profitability, at least in the short term. When we distinguish between various categories of ESG metrics, we find some negative relation with the use of carbon-specific metrics. Table 11, Columns (3) and (4), repeats the previous test using *Return* as dependent variable, namely the annually compounded return over the next year. Interestingly, the coefficient on *ESG Pay* is negative and marginally significant. When we look at the categories of ESG metrics we find that the coefficient on *Carbon-specific metric* is negative and significant.

The interpretation of the results in Table 11 is not straightforward. The evidence is consistent with the idea that an emphasis on ESG may not be beneficial for shareholder wealth in the short term. As stated above, some investor groups may not mind such a tradeoff because of external costs reflected in some ESG metrics. At the same time, lower financial performance in the short term does not necessarily imply a destruction of shareholder value, as superior ESG performance could yield long-term benefits for shareholders that are not fully captured by accounting earnings or/and by stock prices.

## 7. Conclusion

A rapidly growing number of firms around the world has recently begun to include ESG metrics in executive compensation schemes. Relying on an international data set, this study has examined both the factors that favor the adoption of ESG pay and the economic outcomes that emerge for the firms implementing such compensation plans. Our study thereby adds to the ongoing discussion as to which firms tend to embrace ESG principles and which firms actually “walk the talk” in terms of incentivizing their top executives on the basis of ESG metrics.

Among the determinants of ESG pay, we identify at the macro level several factors that strongly predict a firm’s tendency to include ESG metrics among its KPIs. Aside from operating in an environmentally burdensome industry, these factors include the geographic location as it relates to countries that mandate ESG these disclosures and are generally known for stronger environmental protection rules. In terms of firm fundamentals, we find that ESG pay is more common among larger firms that exhibit higher volatility. Beyond firm fundamentals, our findings show that the proclivity to implement ESG pay increases with existing public commitments to reduce carbon emissions, the level of institutional ownership, and certain board characteristics.

Our analysis of different outcome variables associated with ESG pay show that this practice has been consequential in that ESG pay adopters tend to achieve lower carbon emissions and improved ESG ratings. Furthermore, in contrast to non-adopters, the adopters of ESG pay experience a stronger association between improved ESG performance and the magnitude of the annual executive bonuses. Taken together, these findings give every indication that the inclusion of ESG metrics in executive compensation schemes are for the most part not window-dressing activities intended to merely create the perception of an ESG-active firm.

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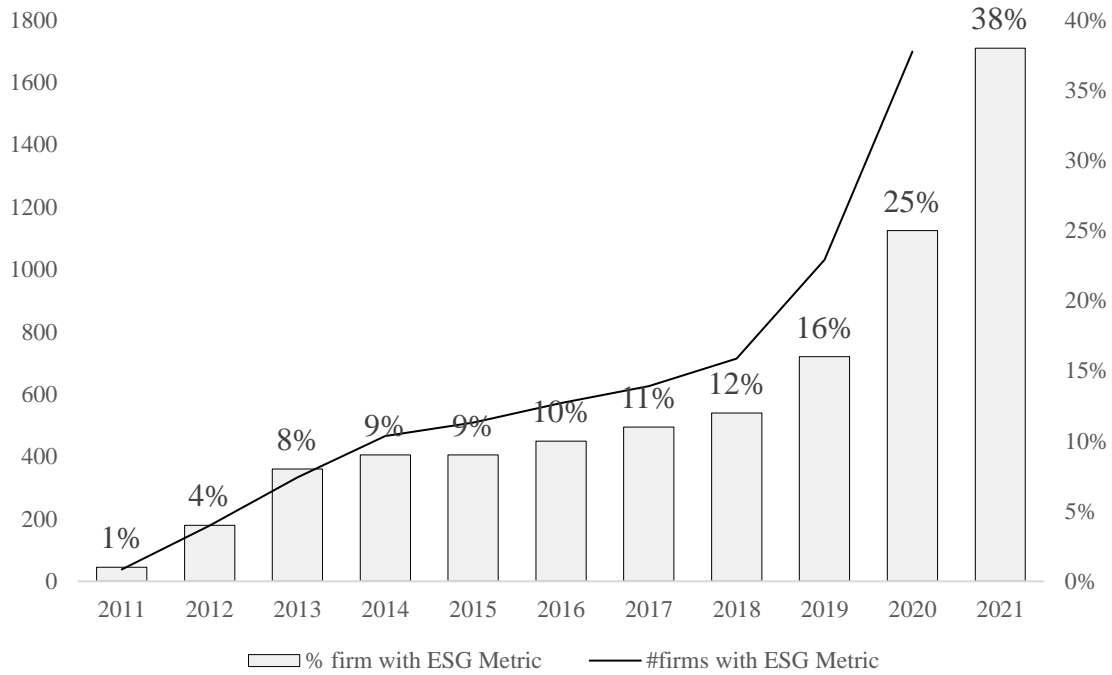
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## Figure 1. Use of ESG Metrics in Executive Compensation

This figure shows the evolution of ESG pay (i.e., the inclusion of ESG metrics in executive compensation contracts) over our sample period. The data includes all firms covered by ISS Executive Compensation Analytics (ECA) from 2011 to 2021 (10,061 firms). The bars represent the percentage of firms that include ESG performance metrics in their executive compensation contracts in a given sample year (right axis). The solid line represent the number of firms that include ESG performance metrics in their executive compensation contracts in a given sample year (left axis).



Note: The data corresponding to the year 2021 is not complete. At the time of writing this paper ISS ECA had gathered compensation information corresponding to the year 2021 for 3,065 firms.



## Appendix A. Variable definitions

<i>ESG Pay</i>	Indicator variable that equals one if the company incorporates any ESG criterion in executive compensation contracts in that year, and zero otherwise.
<i>Size</i>	Logarithm of the firm's total assets (expressed in millions of USD).
<i>BM</i>	Logarithm of the book value of common equity scaled by the market value of equity.
<i>ROA</i>	Net income scaled by total assets.
<i>Leverage</i>	Total debt scaled by total assets. Total debt is the sum of long-term debt and the debt in current liabilities.
<i>Tangibility</i>	Property, Plant and Equipment scaled by total assets.
<i>Dividends</i>	Total amount of dividends scaled by Net income
<i>Return</i>	Stock return of the firm compounded over the year (expressed as a fraction of the past market value)
<i>Volatility</i>	Standard deviation of the stock returns measured over the year, expressed in percentage.
<i>Log(CO2)</i>	Logarithm of the firm's direct GHG emissions measured in equivalents of metric tons of CO <sub>2</sub>
<i>Institutional ownership</i>	Fraction of the firm's equity owned by institutional investors
<i>Foreign IO</i>	Fraction of holdings of all institutions domiciled in a country different from the one in which the stock is listed.
<i>Controlling shareholder</i>	Indicator variable that equals one if company's insiders own more than 50% of the firm's outstanding equity, and zero otherwise.
<i>ESG Disclosure mandate</i>	Indicator variable that equals one if a company's headquarters is in the country with mandatory ESG disclosure polices, and zero otherwise.
<i>Country ESG sensitivity</i>	Country-specific Environmental Performance Index (EPI) developed by the Yale Center for Environmental Law (Yale University) and the Center for International Earth Science Information Network (Columbia University). The EPI is measured biennially for 180 countries using 32 performance indicators across 11 issue categories that measure environmental health and ecosystem vitality.
<i>Emission Pledge</i>	Indicator variable that equals one if a company has set emissions reduction targets through the "Science-based Targets Initiative", and zero otherwise.
<i>ESG Rating (Refinitiv)</i>	Refinitiv's ESG Score is an overall company score (from 0 to 1) based on the self-reported information in the environmental, social and corporate governance pillars.
<i>ESG Score (Sustainalytics)</i>	Sustainalytics' measure of ESG preparedness and performance that takes value from 0 to 100. A higher score indicates better ESG Performance.
<i>ESG Score (KLD)</i>	Score obtained from MSCI's KLD database, obtained by computing the number of "strengths" and subtracting from this the number of "weaknesses" identified by KLD as related to the firm's overall corporate social responsibility. A higher score indicates better ESG Performance.
<i>Carbon-Specific metric</i>	Indicator variable that equals one if the company incorporates specific GHG emission metrics in executive compensation contracts, and zero otherwise.

<i>Non Carbon-specific metric</i>	Indicator variable that equals one if the company incorporates an ESG metric in executive compensation contracts that is not specific to GHG emissions, and zero otherwise.
<i>Pct Independent</i>	Percentage of independent board members as reported by the company.
<i>Pct Female</i>	Percentage of female directors on the board.
<i>Pct Peer ESG Pay</i>	Percentage of the company's industry peers that include ESG metrics in their compensation contracts (industry affiliation is defined based on the Fama-French 48 industry classification).
<i>Abnormal Compensation</i>	Total compensation of the CEO as disclosed by the company minus the median ECO compensation of industry peers (expressed in USD)
<i>Log(Variable_Comp)</i>	Natural logarithm of the sum of executives' annual cash bonus and annual non-equity incentives (expressed in tens of USD millions).
<i>Engagement by Black Rock</i>	Indicator variable that equals one if BlackRock engages with the firm from July 1, 2017 until June 30, 2020, and zero otherwise. The data includes all engagements.
<i>Engagement by State Street</i>	Indicator variable that equals one if State Street Global Advisors engages with the firm from January 1, 2014 until December 31, 2020, and zero otherwise. The data includes engagements about Environmental/Social issues.
<i>Engagement by Vanguard</i>	Indicator variable that equals one if Vanguard engages with the firm from July 1, 2018 until June 30, 2020, and zero otherwise. The data includes engagements about "Oversight of strategy and risk" (which include environmental issues).

## Appendix B. Examples of ESG metrics

This table provides examples of various ESG metrics used in the compensation contracts of our sample firms, as described in the ISS ECA database. The examples follow the taxonomy defined in Table 3.






Type of ESG metric	Examples	Company
<i>a) Specific indicators:</i>		
Carbon emissions	Greenhouse gas emissions intensity at gold producing operations measured in kg CO <sub>2</sub> e/tonne	AngloGold Ashanti Ltd. (2020)
Other environmental variables	Wastewater compliance percentage	Essential Utilities Inc. (2019)
Safety and security	Days Away/Restricted or Transfer (DART) incident rate per 100 full-time employees	New Jersey Resources Corporation (2019)
Diversity and inclusion	Percentage of women among the SMP (Senior Management Position)	BNP Paribas SA (2020)
Employee satisfaction and development	Internal promotion rate in global leadership	Adecco Group AG (2020)
Governance and corporate culture	Colleague Culture & Engagement survey	Lloyds Banking Group Plc (2020)
<i>b) Scores:</i>		
Self evaluation (i.e., scores defined and measured by the firm)	Combination of 3 criteria: (1) Diversity and equal opportunities; (2) Strengthen our People and the Digital Transformation of the Company; (3) Ethics and Good Governance.	Enagas SA (2020)
External evaluation (i.e., scores defined and measured by external parties)	Inclusion over the three-year period 2020-2022 in the DJSI, FTSE4GOOD, and CDP Climate Change	Italgas SpA (2020)
	Bloomberg ESG disclosure score	Newmont Corporation (2020)
	MSCI ESG rating	Standard Bank Group Ltd. (2020)
	“Great Place to Work Trust” Index	Admiral Group Plc. (2021)
	Maintain citation in Bloomberg “Gender-Equality Index”	Scentre Group (2021)

## Appendix C. Example of firm disclosure about ESG Pay

This table provides examples of the disclosure of ESG metrics in compensation contracts. The disclosure is an excerpt of the description of the compensation package of the CEO of Schneider Electric, as disclosed in the firm's 2020 public filings.

### Panel A. Annual incentives

- 40% Group organic sales growth markets
- 30% Adjusted EBITA margin (organic) improvement
- 10% Group cash conversion rate
- 20% **Schneider Sustainability Impact**, defined as follows:

Schneider Sustainability Impact 2018-2020				
Megatrends and SDGs	2018-2020 programs	2018 results	2019 results	2020 results
<b>Climate</b> 	1. 80% renewable electricity	30%	50%	<b>80% ▲</b>
	2. 10% CO <sub>2</sub> efficiency in transportation	-1.8%	4.1%	<b>8.4% ▲</b>
	3. 120 million metric tons CO <sub>2</sub> saved on our customers' end thanks to EcoStruxure™ offers	51	89	<b>134 ▲</b>
	4. 25% increase in turnover for our EcoStruxure™ Energy and Sustainability Services	13.8%	23.8%	<b>17.6% ▲</b>
<b>Circular economy</b> 	5. 75% sales under our new Green Premium™ program	45.7%	55.2%	<b>76.7% ▲</b>
	6. 200 sites labeled Towards Zero Waste to Landfill	178	193	<b>206 ▲</b>
	7. 100% cardboard and pallets for transport packing from recycled or certified sources	62%	96%	<b>99% ▲</b>
	8. 120,000 metric tons of avoided primary resource consumption through ECOFIT™, recycling, and take-back programs	43,572	97,439	<b>157,588 ▲</b>
<b>Health &amp; equity</b> 	9. 70% scored in our Employee Engagement Index	67%	64%	<b>69% ▲</b>
	10. 0.88 medical incidents per million hours worked	0.94	0.79	<b>0.58 ▲</b>
	11. 90% employees have access to a comprehensive well-being at work program	20%	47%	<b>90% ▲</b>
	12. 100% employees are working in countries that have fully deployed our Family Leave Policy	75%	99%	<b>100% ▲</b>
	13. 100% workers received at least 15 hours of learning (11.25 in 2020), and 30% of workers' learning hours are done digitally	57%	62%	<b>90% ▲</b>
	14. 90% white-collar workers have individual development plans	78%	79%	<b>92% ▲</b>
<b>Ethics</b> 	15. 95% employees are working in a country with commitment and process in place to achieve gender pay equity	92%	99%	<b>99.6% ▲</b>
	16. +5.5pts increase in average score of ISO 26000 assessment for our strategic suppliers	+1.8	+3.7	<b>+6.3pts ▲</b>
	17. 350 suppliers under human rights and environment vigilance received specific on-site assessment	155	279	<b>374 ▲</b>
<b>Development</b> 	18. 100% sales, procurement, and finance employees trained every year on anti-corruption	69%	94%	<b>94% ▲</b>
	19. x4 turnover of our Access to Energy program	x1.31	x1.56	<b>x1.64 ▲</b>
	20. 400,000 underprivileged people trained in energy management	196,162	246,268	<b>281,737 ▲</b>
	21. 15,000 volunteering days thanks to our VolunteerIn global platform	5,691	11,421	<b>18,469 ▲</b>

Source: Schneider Electric's 2020 Integrated Report.

## Appendix C. Example of firm disclosures about ESG Pay (cont'ed)

### Panel B. Long-term incentives

Metric	Weight	Description
Improvement of Adjusted Earnings Per Share (EPS)	40%	Average of the annual rates of achievement of Adjusted EPS improvement targets for the 2020 to 2022 fiscal years. Adjusted EPS performance is published in the external financial communications and its annual variance will be calculated using adjusted EBITA at constant FX from year N-1 to year N.
Relative TSR (benchmark: CAC 40)	17.5%	0% below median; 50% at median (rank 20); 100% at rank 10; 120% at ranks 1 to 4
Relative TSR (benchmark: 11 peer firms)	17.5%	0% at rank 8 and below; 100% at rank 4; 150% at ranks 1 to 3
<b>DJSIW</b>	<b>6.25%</b>	<b>0%: not in World; 50%: included in World; 100%: sector leader</b>
<b>Euronext Vigeo</b>	<b>6.25%</b>	<b>0%: out; 50%: included in World 120 or Europe 120; 100%: included in World 120 &amp; Europe 120</b>
<b>FTSE4GOOD</b>	<b>6.25%</b>	<b>0%: out; 50%: included in Developed or Environmental Leaders Europe 40 indexes; 100%: included in Developed &amp; Environmental Leaders Europe 40 indexes</b>
<b>CDP Climate Change</b>	<b>6.25%</b>	<b>0%: C score; 50%: B score (25% at B-); 100%: A score (75% at A-)</b>

Source: Schneider Electric's 2020 compensation report.

**Table 1. Sample composition by year, country, and industry**

This table reports descriptive statistics for the sample used in our tests. The sample spans from 2011 to 2020 and includes 22,603 firm-year observations. Panel A describes the procedure to construct our sample. Panel B presents summary statistics by year. Panel C presents summary statistics by country. Panel D presents summary statistics by industry affiliation.

**Panel A. Sample construction**

Sample observations	# Firm-Years	# Distinct Firms
Observations in ISS ECA database from 2011 to 2020	53,565	9,635
Observations with non-missing accounting and market data	38,876	7,014
Observations with non-missing institutional ownership information	35,076	6,262
Observations with non-missing Trucost data	22,603	4,395

**Panel B. Sample distribution by year**

Country	# obs.	# firms using ESG metric	% firms using ESG metric
2011	887	21	2.37%
2012	1,281	72	5.62%
2013	1,411	140	9.92%
2014	1,625	189	11.63%
2015	1,805	233	12.91%
2016	1,859	276	14.85%
2017	3,107	407	13.10%
2018	3,244	489	15.07%
2019	3,549	715	20.15%
2020	3,835	1,198	31.24%

**Panel C. Sample distribution by country**

Country	# obs.	# firms	# firms using ESG metric	% firms using ESG metric
Australia	1,675	337	184	54.60%
Austria	150	33	19	57.58%
Belgium	152	25	16	64.00%
Canada	1,716	319	168	52.66%
Denmark	159	37	8	21.62%
Finland	216	45	10	22.22%
France	1,195	192	114	59.38%
Germany	907	167	100	59.88%
Great Britain	2,65	390	172	44.10%
Greece	35	16	8	50.00%
Ireland	72	15	3	20.00%
Italy	423	84	51	60.71%
Netherlands	381	57	35	61.40%
New Zealand	68	19	6	31.58%
Norway	192	49	14	28.57%
Portugal	76	15	10	66.67%
South Africa	77	69	39	56.52%
Spain	288	48	24	50.00%
Sweden	598	132	22	16.67%

<i>Switzerland</i>	398	103	32	31.07%
<i>U.S.</i>	11,175	2,243	370	16.50%

**Panel D. Sample distribution by industry**

<i>Industry</i>	<i># obs.</i>	<i># firms</i>	<i># firms using ESG metrics</i>	<i>% firms using ESG metrics</i>
<i>Agriculture</i>	103	26	3	11.54%
<i>Food Products</i>	425	80	19	23.75%
<i>Candy &amp; Soda</i>	107	19	6	31.58%
<i>Beer &amp; Liquor</i>	138	22	5	22.73%
<i>Tobacco Products</i>	34	4	1	25.00%
<i>Recreation</i>	92	24	1	4.17%
<i>Entertainment</i>	220	45	10	22.22%
<i>Printing and Publishing</i>	205	33	7	21.21%
<i>Consumer Goods</i>	348	56	12	21.43%
<i>Apparel</i>	169	32	8	25.00%
<i>Healthcare</i>	257	57	18	31.58%
<i>Medical Equipment</i>	566	122	10	8.20%
<i>Pharmaceutical Products</i>	944	232	48	20.69%
<i>Chemicals</i>	564	91	46	50.55%
<i>Rubber and Plastic Products</i>	126	28	9	32.14%
<i>Textiles</i>	39	7	3	42.86%
<i>Construction Materials</i>	536	104	30	28.85%
<i>Construction</i>	685	124	60	48.39%
<i>Steel Works Etc</i>	328	55	24	43.64%
<i>Fabricated Products</i>	23	8	2	25.00%
<i>Machinery</i>	798	139	42	30.22%
<i>Electrical Equipment</i>	185	36	11	30.56%
<i>Automobiles and Trucks</i>	497	86	23	26.74%
<i>Aircraft</i>	198	30	12	40.00%
<i>Shipbuilding, Railroad Equipment</i>	46	8	3	37.50%
<i>Defense</i>	32	7	1	14.29%
<i>Precious Metals</i>	403	84	76	90.48%
<i>Non-Metallic and Industrial Metal Mining</i>	382	76	55	72.37%
<i>Coal</i>	70	17	11	64.71%
<i>Petroleum and Natural Gas</i>	949	164	119	72.56%
<i>Utilities</i>	985	148	113	76.35%
<i>Communication</i>	595	106	42	39.62%
<i>Personal Services</i>	252	51	12	23.53%
<i>Business Services</i>	2,347	530	107	20.19%
<i>Computers</i>	407	83	17	20.48%
<i>Electronic Equipment</i>	941	189	29	15.34%
<i>Measuring and Control Equipment</i>	314	59	3	5.08%
<i>Business Supplies</i>	230	44	18	40.91%
<i>Shipping Containers</i>	103	18	7	38.89%
<i>Transportation</i>	794	148	60	40.54%
<i>Wholesale</i>	676	130	33	25.38%
<i>Retail</i>	1,261	225	57	25.33%
<i>Restaurants, Hotels, Motels</i>	397	78	18	23.08%
<i>Banking</i>	1,773	380	82	21.58%
<i>Insurance</i>	820	143	48	33.57%
<i>Real Estate</i>	384	88	30	34.09%
<i>Trading</i>	749	143	46	32.17%
<i>Other</i>	106	16	8	50.00%

**Table 2. Firm, Industry, and Country Characteristics**

This table reports descriptive statistics for the variables and observations used in our tests. The sample spans from 2011 to 2020 and includes 22,603 firm-year observations for 4,395 distinct firms. Panel A presents descriptive statistics for the main variables used in our tests. Panel B presents descriptive statistics separately for the subset of firms that use ESG metrics in executive compensation and those that do not use these metrics. See Appendix A for variable definitions.

**Panel A. Pooled observations**

Variable	#Obs.	Std Dev	P25	Median	Mean	P75
<i>Volatility</i>	22,603	9.79	19.83	25.01	26.98	32.22
<i>Size</i>	22,603	1.90	6.84	8.08	8.15	9.40
<i>Log(BM)</i>	22,603	0.82	-1.32	-0.78	-0.85	-0.30
<i>ROA</i>	22,603	0.13	0.01	0.04	0.03	0.08
<i>Leverage</i>	22,603	0.17	0.08	0.21	0.23	0.34
<i>Tangibility</i>	22,603	0.26	0.05	0.16	0.26	0.39
<i>Dividends</i>	22,603	0.60	0	0.27	0.36	0.54
<i>Returns</i>	22,603	0.50	-0.12	0.07	0.13	0.28
<i>Institutional ownership</i>	22,603	0.31	0.26	0.52	0.54	0.84
<i>Larger IO</i>	22,603	0.17	0.14	0.27	0.28	0.41
<i>Longer Term IO</i>	22,603	0.17	0.09	0.21	0.24	0.39
<i>Foreign IO</i>	22,603	0.12	0.05	0.10	0.13	0.17
<i>ESG Disclosure mand.</i>	22,603	0.45	0	0	0.28	1
<i>Country ESG sensitivity</i>	22,603	7.94	69.30	71.19	74.14	80
<i>Controlling shareholder</i>	22,603	0.31	0	0	0.11	0
<i>Log(CO2)</i>	22,603	2.97	8.32	10.19	10.23	12.04
<i>Emission Pledge</i>	22,603	0.10	0	0	0.01	0
<i>ESG Rating(Refinitiv)</i>	19,829	0.29	0.33	0.69	0.61	0.90
<i>ESG Rating (Sustainalytics)</i>	17,809	10.17	49	55.88	57.51	64.63
<i>ESG Rating (KLD)</i>	2,156	3.48	0	1	1.89	4
<i>ESG Metric</i>	22,603	0.37	0	0	0.17	0
<i>Carbon-Specific metric</i>	22,603	0.11	0	0	0.01	0
<i>Non Carbon-specific metric</i>	22,603	0.36	0	0	0.15	0
<i>Pct Independent</i>	19,882	20.32	61.54	77.78	71.82	87.50
<i>Pct Female</i>	19,885	12.35	11.11	20	20.14	28.57
<i>Pct Peer ESG Pay</i>	22,603	7.64	1.22	3.55	6.67	9.77
<i>Abnormal Compensation</i>	20,258	5.42	-0.87	0.93	2.85	4.63
<i>Log(Variable_Comp)</i>	18,441	1.16	12.83	13.58	13.49	14.28



**Table 2. Firm, Industry, and Country Characteristics (cont'ed)**

**Panel B. Partitioning by ESG Pay**

Variable	<i>ESG Metric = 1</i>		<i>ESG Metric = 0</i>		Difference in means (p-value)
	Mean	Median	Mean	Median	
<i>Volatility</i>	26.46	24.21	27.09	25.13	-0.63***
<i>Size</i>	8.73	8.74	8.03	7.97	0.70***
<i>Log(BM)</i>	-0.59	-0.55	-0.91	-0.83	0.31***
<i>ROA</i>	0.02	0.03	0.03	0.04	-0.01***
<i>Leverage</i>	0.26	0.26	0.22	0.20	0.04***
<i>Tangibility</i>	0.43	0.42	0.22	0.14	0.21***
<i>Dividends</i>	0.43	0.36	0.35	0.26	0.08***
<i>Returns</i>	0.09	0.03	0.14	0.07	-0.05***
<i>Institutional ownership</i>	0.48	0.42	0.55	0.54	-0.07***
<i>Larger IO</i>	0.26	0.25	0.28	0.28	-0.02***
<i>Longer Term IO</i>	0.21	0.17	0.25	0.22	-0.04***
<i>Foreign IO</i>	0.18	0.14	0.13	0.09	0.05***
<i>ESG Disclosure mand.</i>	0.41	0	0.26	0	0.15***
<i>Country ESG sensitivity</i>	75.13	74.90	73.94	71.19	1.20***
<i>Controlling shareholder</i>	0.10	0	0.11	0	0.003
<i>Log(CO2)</i>	11.95	11.80	9.89	9.92	2.05***
<i>Emission Pledge</i>	0.03	0	0.01	0	0.02***
<i>ESG Rating(Refinitiv)</i>	0.73	0.84	0.59	0.64	0.14***
<i>ESG Rating(Sustainalytics)</i>	64.14	63.55	58.79	57.65	5.34***
<i>ESG Rating(KLD)</i>	2.46	2	1.83	1	0.63***
<i>ESG Metric</i>	1	1	0	0	-
<i>Carbon-Specific metric</i>	0.08	0	0	0	-
<i>Non Carbon-specific metric</i>	0.92	1	0	0	-
<i>Pct Independent</i>	72.71	77.78	71.63	77.78	1.08***
<i>Pct Female</i>	23.77	23.08	19.37	18.18	4.40***
<i>Pct Peer ESG Pay</i>	14.30	13.23	5.16	2.65	9.15***
<i>Abnormal Compensation</i>	2.94	1.11	2.83	0.88	0.11
<i>Log(Variable_Comp)</i>	13.48	13.53	13.49	13.59	-0.02

### Table 3. Contract Characteristics

This table describes variation in the characteristics of the compensation contracts that include ESG metrics. Panel A focuses on the types of ESG metrics used in the contracts. Panel B focuses on the types of compensation vehicles in which ESG metrics are included. Panel C presents the median values of the weights assigned to ESG metrics in short-term and long-term compensation vehicles.

<b>Panel A. Types of ESG metrics:</b>	<b><u># firms</u></b>
a) Specific indicators <sup>(1)</sup> :	
Carbon emissions	172
Other environmental variables	651
Safety and security	824
Diversity and inclusion	285
Employee satisfaction and development	1,167
Governance and corporate culture	1,323
b) Scores <sup>(2)</sup> :	
Self evaluation (i.e., combination of metrics defined and measured by the firm)	884
External evaluation (i.e., scores defined and measured by external parties)	97
<b>Panel B. Compensation vehicles with ESG metrics:</b>	<b><u># firms</u></b>
Short-term compensation (annual variable compensation)	1,321
Long-term compensation (long term incentive plans)	327
Both short-term and long-term compensation	233
<b>Panel C. Weights</b>	<b><u>% of comp.</u></b>
Short-term compensation	13.2%
Long-term compensation	15.9%

Notes:

- (1) Refers to the number of firms that include the corresponding type of metric in the compensation contract. Firms often include several types of metrics in the contract.
- (2) Restricted to the companies that use distinctive environmental metrics in the compensation contract.

**Table 4. Determinants of Linking Pay to ESG**

This table reports estimates from the analysis of determinants of use of ESG metrics in executives' compensation contracts. The dependent variable, *ESG Pay*, is an indicator variable that equals one if the company incorporates any ESG metrics in executive compensation contracts in that year, and zero otherwise. The rest of the variables are defined in Appendix A. Independent variables are measured at the end of the prior year. The sample spans from 2011 to 2020 and includes 22,603 firm-year observations. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

**Panel A. Industry- and country-level variation**

	Dependent Variable: <i>ESG Pay</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Environmentally controversial Industry</i>						0.265*** (13.548)	
<i>ESG Disclosure Mandate</i>						0.098*** (6.725)	0.065*** (6.516)
<i>Country ESG sensitivity</i>						0.008*** (6.520)	0.002*** (2.896)
<i>Year FE</i>	YES			YES		YES	YES
<i>Industry FE</i>		YES		YES			YES
<i>Country FE</i>			YES	YES		YES	
<i>Industry-year FE</i>					YES		
<i>Country-year FE</i>					YES		
R <sup>2</sup>	0.04	0.16	0.06	0.25	0.31	0.17	0.23
# Obs.	22,603	22,603	22,603	22,603	22,593	22,603	22,603

**Panel B. Firm-level variation**

	Dependent Variable: <i>ESG Pay</i>				
	Firm fundamentals	ESG Benefits	External Pressure	Internal Pressure	All
	(1)	(2)	(3)	(4)	(5)
<i>Log(CO2)</i>	0.013*** (4.64)				0.013*** (4.08)
<i>Volatility</i>	0.001** (2.46)				0.001*** (2.63)
<i>Size</i>	0.029*** (8.65)				0.015*** (3.14)
<i>Log(BM)</i>	0.004 (0.87)				0.007 (1.32)
<i>ROA</i>	-0.064*** (-2.93)				-0.081*** (-2.99)
<i>Leverage</i>	-0.057*** (-2.76)				-0.038 (-1.57)
<i>Tangibility</i>	0.122*** (4.66)				0.140*** (4.58)
<i>Dividends</i>	0.017*** (3.73)				0.020*** (3.68)
<i>Returns</i>	0.004 (0.74)				0.008 (1.43)
<i>Emission Pledge</i>		0.143*** (3.82)			0.116*** (3.13)
<i>ESG Rating (Refinitiv)</i>		0.184*** (12.67)			0.057*** (2.79)
<i>Institutional ownership</i>			0.129*** (6.59)		0.051** (2.02)

<i>Controlling shareholder</i>			-0.049***		-0.033**
			(-3.85)		(-1.97)
<i>Pct Peer ESG Pay</i>			0.015***		0.012***
			(14.08)		(8.49)
<i>Pct Independent</i>				0.002***	0.001***
				(6.74)	(3.35)
<i>Pct Female</i>				0.003***	0.001***
				(7.70)	(3.64)
<i>Abnormal Compensation</i>					0.0001
					(0.07)
<i>Year FE</i>	YES	YES	YES	YES	YES
<i>Industry FE</i>	YES	YES	YES	YES	YES
<i>Country FE</i>	YES	YES	YES	YES	YES
R <sup>2</sup>	0.28	0.27	0.26	0.28	0.30
# Obs.	22,603	19,829	22,603	19,882	17,921

**Table 5. 2SLS Estimation**

This table reports estimates from an instrumental variable (IV) 2SLS analysis exploiting the composition of the MSCI ACWI index to instrument foreign institutional ownership. *MSCI*, the instrument, equals one if the firm is a constituent of the MSCI ACWI Index in that year, and zero otherwise. *IO\_Foreign*, is the fraction of the firm's equity owned by institutional foreign investors. *ESG Pay* is an indicator variable that equals one if the company incorporates any ESG metrics in executive compensation contracts in that year, and zero otherwise.  $\widehat{IO\_Foreign}$  is the fitted value of *IO\_Foreign* from the first stage estimation. The control variables are as in Table 4. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

Dependent variable:	First stage <i>IO_Foreign</i> (1)	Second Stage <i>ESG Pay</i> (2)
<i>MSCI</i>	0.03*** (5.60)	
$\widehat{IO\_Foreign}$		0.85** (2.01)
<i>Controls</i>	YES	YES
<i>Country FE</i>	YES	YES
<i>Industry FE</i>	YES	YES
<i>Year FE</i>	YES	YES
R <sup>2</sup>	0.41	0.25
# Obs.	22,603	22,603

**Table 6. Engagements by the Big Three**

This table shows results of the analysis of the association of ESG pay with engagements by the Big Three with their portfolio firms. *ESG Pay* is an indicator variable that equals one if the company incorporates any ESG criteria in executive compensation contracts in that year, and zero otherwise. *Engagement by at least one Big 3* is an indicator variable that equals one if BlackRock, State Street, or Vanguard engage with the firm, and zero otherwise. *Engagement by BlackRock* is an indicator variable that equals one if BlackRock engages with the firm, and zero otherwise. *Engagement by StateStreet* is an indicator variable that equals one if State Street engages with the firm about Environmental/Social issues, and zero otherwise. *Engagement by Vanguard* is an indicator variable that equals one if Vanguard engages with the firm about “Oversight of strategy and risk” (which includes environmental issues), and zero otherwise. The rest of the variables are defined in Appendix A. Independent variables are measured at the start of the year. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

Dependent variable:	<i>ESG pay</i>			
	(1)	(2)	(3)	(4)
<i>Engagement by at least one Big 3</i>	0.05*** (4.99)			
<i>Engagement by BlackRock</i>		0.04*** (3.53)		
<i>Engagement by StateStreet</i>			0.03* (1.67)	
<i>Engagement by Vanguard</i>				0.02 (1.26)
<i>Size</i>	0.04*** (13.73)	0.04*** (14.52)	0.03*** (9.92)	0.05*** (15.12)
<i>Log(BM)</i>	0.01 (1.38)	0.01 (1.63)	0.01** (2.01)	0.01 (1.06)
<i>ROA</i>	-0.08*** (-4.02)	-0.13*** (-5.37)	-0.08*** (-2.79)	-0.15*** (-5.45)
<i>Leverage</i>	-0.05** (-2.25)	-0.04* (-1.71)	-0.07*** (-2.67)	-0.04 (-1.28)
<i>Tangibility</i>	0.15*** (5.24)	0.14*** (4.72)	0.15*** (4.51)	0.14*** (3.96)
<i>Dividends</i>	0.02*** (3.38)	0.03*** (3.50)	0.01** (2.05)	0.02*** (2.63)
<i>Return</i>	0.01 (1.39)	0.00 (0.36)	0.01* (1.80)	0.01 (0.84)
<i>Year FE</i>	YES	YES	YES	YES
<i>Industry FE</i>	YES	YES	YES	YES
<i>Country FE</i>	YES	YES	YES	YES
R <sup>2</sup>	0.29	0.32	0.29	0.34
# Obs.	19,024	10,628	12,374	7,384

**Table 7. Changes in institutional investment**

This table presents estimations of the association between ESG pay and investors' changes in ownership in the company. The dependent variable  $\Delta Fund\ Ownership$  is the fractional change in the number of a firm's shares owned by a particular institutional investor. *ESG Pay* is an indicator variable that equals one if the company incorporates any ESG metrics in executive compensation contracts in that year, and zero otherwise. *Carbon-specific metric* is an indicator variable that equals one if the company incorporates specific GHG emission metrics in executive compensation contracts, and zero otherwise. *Non Carbon-specific metric* is an indicator variable that equals one if the company incorporates an ESG metric in executive compensation contracts that is not specific to GHG emissions, and zero otherwise. The test is conducted at the fund-firm-year level. The rest of the variables are defined in Appendix A. Independent variables are measured at the start of the year. Standard errors are clustered at the fund-year level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

Dependent Variable:	$\Delta Fund\_Ownership$	
	(1)	(2)
<i>ESG Pay</i>	0.016*** (10.38)	
<i>Carbon-specific metric</i>		0.018*** (5.17)
<i>Non Carbon-specific metric</i>		0.016*** (10.37)
<i>Size</i>	-0.000 (-0.01)	-0.000 (-0.00)
<i>Log(BM)</i>	0.021*** (12.68)	0.021*** (12.68)
<i>ROA</i>	-0.006 (-0.59)	-0.006 (-0.60)
<i>Leverage</i>	0.018** (2.32)	0.018** (2.32)
<i>Tangibility</i>	-0.084*** (-8.17)	-0.084*** (-8.17)
<i>Dividends</i>	-0.003*** (-4.82)	-0.003*** (-4.79)
<i>Return</i>	-0.070*** (-35.48)	-0.070*** (-35.49)
<i>Firm FE</i>	YES	YES
<i>Fund-Year FE</i>	YES	YES
R <sup>2</sup>	0.36	0.36
# Obs.	11,008,616	11,008,616

**Table 8. Pay for ESG performance**

This table presents an analysis of “pay for ESG performance” (i.e., whether executives’ variable cash compensation varies with ESG performance). The dependent variable is *Variable\_Cash*, defined as the natural logarithm of the sum of executives’ annual cash bonus and annual non-equity incentives. *CO2 emissions* is the firms’ direct (scope 1) GHG emissions measured in tons of CO2 equivalent. *ESG Rating* is the ESG rating provided Refinitiv, Sustainalytics, and KLD (MSCI). In Panel A, Columns (1)-(4) include firm-year observations with ESG criteria in compensation contracts (*ESG Pay* =1), while Columns (5)-(8) include firm-year observations without ESG criteria in compensation contracts (*ESG Pay* =0). In Panel B, the results are based on partitions of the subsample of observations with *ESG Pay* =1 based geographic regions (as in Table 6). Panel B excludes tests using *ESG rating (KLD)* due to the small number of observations with non-missing values. The rest of the variables are defined in Appendix A. Independent variables are measured at the start of the year. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

**Panel A. By use of ESG pay**

Dependent Variable:	Log( <i>Variable_Cash</i> )							
	ESG Pay ( <i>ESG Pay</i> = 1)				No ESG Pay ( <i>ESG Pay</i> = 0)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Log(CO2)</i>	-0.05*				0.01			
	(-1.79)				(0.72)			
<i>ESG Rating (Refinitiv)</i>		0.14				0.01		
		(1.18)				(0.17)		
<i>ESG Rating (Sustainalytics)</i>			0.01***				0.00	
			(2.98)				(0.01)	
<i>ESG Rating (KLD)</i>				0.04				-0.00
				(1.49)				(-0.09)
<i>Size</i>	0.10	0.07	0.10	-0.33	0.08***	0.11***	0.08**	-0.48*
	(1.35)	(0.84)	(1.13)	(-0.48)	(2.82)	(3.51)	(2.35)	(-1.77)
<i>Log(BM)</i>	-0.01	-0.01	-0.01	-0.60	-0.06***	-0.05**	-0.06**	0.10
	(-0.28)	(-0.15)	(-0.10)	(-1.17)	(-2.69)	(-2.38)	(-2.33)	(1.08)
<i>ROA</i>	0.12	0.15	0.18	-2.14	-0.09	-0.10	-0.25***	-0.84
	(0.36)	(0.43)	(0.52)	(-1.04)	(-1.09)	(-0.98)	(-2.70)	(-1.53)
<i>Leverage</i>	-0.20	-0.10	-0.01	1.86	-0.01	-0.05	-0.05	0.71
	(-0.65)	(-0.34)	(-0.03)	(0.60)	(-0.12)	(-0.49)	(-0.46)	(1.19)
<i>Tangibility</i>	0.11	0.10	0.12	1.13	0.21	0.19	0.13	-1.37
	(0.32)	(0.29)	(0.31)	(0.35)	(1.20)	(1.08)	(0.68)	(-1.19)
<i>Dividends</i>	-0.01	-0.01	-0.01	-0.21**	0.02	0.02	0.02*	0.03
	(-0.50)	(-0.33)	(-0.60)	(-2.20)	(1.22)	(1.47)	(1.82)	(0.64)
<i>Returns</i>	0.03	0.03	0.05	0.24	0.06***	0.08***	0.10***	0.07
	(0.72)	(0.69)	(0.71)	(0.43)	(3.79)	(4.43)	(5.25)	(0.82)
<i>Year FE</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES	YES	YES	YES	YES
R <sup>2</sup>	0.84	0.84	0.84	0.89	0.81	0.80	0.79	0.79
# Obs.	2,005	1,890	1,742	60	13,968	12,288	11,291	1,165



**Table 8. Pay for ESG performance (cont'ed)**

**Panel B. By geographic area**

Dependent Variable:	Log( <i>Variable_Cash</i> ) ( <i>ESG Pay</i> = 1)								
	Europe			USA			ROW		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Log(CO2)</i>	-0.12*			-0.07			-0.03		
	(-1.78)			(-1.05)			(-0.73)		
<i>ESG Rating (Refinitiv)</i>		0.15			-0.07			0.53***	
		(0.52)			(-0.40)			(2.73)	
<i>ESG Rating (Sustainalytics)</i>			0.01*			0.02***			0.00
			(1.91)			(3.01)			(0.60)
<i>Controls</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES
R <sup>2</sup>	0.87	0.86	0.87	0.79	0.78	0.63	0.80	0.79	0.79
# Obs.	583	559	528	813	772	700	609	559	514

**Table 9. ESG Performance**

This table presents an analysis of the association between ESG pay and ESG performance. In Panel A, the dependent variable  $\Delta \text{CO}_2$  is defined as the year-to-year change in the firms' direct GHG emissions (measured in tons of CO<sub>2</sub> equivalent). In Panel B, the dependent variable  $\Delta \text{ESG Rating}$  is the year-to-year changes in ESG ratings/scores provided by Refinitiv, Sustainalytics, and KLD (MSCI). *ESG Pay* is an indicator variable that equals one if the company incorporates any ESG metrics in executive compensation contracts in that year, and zero otherwise. *Carbon-specific metric* is an indicator variable that equals one if the company incorporates specific GHG emission metrics in executive compensation contracts, and zero otherwise. *Non Carbon-specific metric* is an indicator variable that equals one if the company incorporates an ESG metric in executive compensation contracts that is not specific to GHG emissions, and zero otherwise. The rest of the variables are defined in Appendix A. Independent variables are measured at the start of the year. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

**Panel A. GHG emissions**

Dependent Variable:	$\Delta \text{CO}_2$	
	(1)	(2)
<i>ESG Pay</i>	-0.09 (-1.09)	
<i>Carbon-specific metric</i>		-0.58** (-2.08)
<i>Non Carbon-specific metric</i>		-0.06 (-0.72)
<i>Size</i>	-0.09* (-1.73)	-0.09* (-1.76)
<i>Log(BM)</i>	-0.02 (-0.63)	-0.02 (-0.65)
<i>ROA</i>	0.24** (2.11)	0.24** (2.14)
<i>Leverage</i>	0.17 (1.30)	0.17 (1.32)
<i>Tangibility</i>	0.64* (1.81)	0.65* (1.83)
<i>Dividends</i>	0.01 (0.29)	0.01 (0.26)
<i>Returns</i>	0.01 (0.39)	0.01 (0.40)
<i>Year FE</i>	YES	YES
<i>Firm FE</i>	YES	YES
R <sup>2</sup>	0.15	0.15
# Obs.	19,984	19,984

**Table 9. ESG Performance (cont'ed)**

**Panel B. ESG Ratings**

Dependent variable:	$\Delta$ ESG Rating (Refinitiv)		$\Delta$ ESG Rating (Sustainalytics)		$\Delta$ ESG Rating (KLD)	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ESG Pay</i>	-0.00 (-0.17)		0.25** (2.01)		1.00** (2.42)	
<i>Carbon-specific metric</i>		0.00 (0.44)		-0.36 (-1.25)		6.76*** (31.17)
<i>Non Carbon-specific metric</i>		-0.00 (-0.25)		0.31** (2.38)		0.88** (2.17)
<i>Size</i>	0.00 (1.15)	0.00 (1.17)	0.43*** (3.27)	0.41*** (3.16)	0.92 (1.35)	0.93 (1.37)
<i>Log(BM)</i>	-0.01*** (-4.03)	-0.01*** (-4.03)	0.03 (0.36)	0.04 (0.39)	-0.13 (-0.37)	-0.14 (-0.39)
<i>ROA</i>	-0.11*** (-7.58)	-0.11*** (-7.59)	0.33 (0.78)	0.35 (0.82)	-2.80 (-1.13)	-2.84 (-1.14)
<i>Leverage</i>	0.01 (0.71)	0.01 (0.71)	-0.23 (-0.52)	-0.21 (-0.47)	-1.92 (-1.03)	-1.96 (-1.05)
<i>Tangibility</i>	-0.03* (-1.69)	-0.03* (-1.69)	-0.44 (-0.66)	-0.43 (-0.65)	4.65 (1.37)	4.85 (1.43)
<i>Dividends</i>	-0.01*** (-5.73)	-0.01*** (-5.73)	0.05 (0.93)	0.05 (0.92)	0.09 (0.54)	0.10 (0.61)
<i>Returns</i>	-0.00 (-0.18)	-0.00 (-0.19)	-0.20** (-2.51)	-0.19** (-2.50)	0.08 (0.31)	0.10 (0.36)
<i>Year FE</i>	YES	YES	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES	YES	YES
R <sup>2</sup>	0.25	0.25	0.20	0.20	0.22	0.22
# Obs.	19,252	19,252	17,148	17,148	1,351	1,351

**Table 10. ESG Performance by Geographic Area**

This tables presents results of repeating the analyses in Table 9 across different geographic regions. Europe refers to 16 countries of Western Europe (see Table 1). ROW (Rest of the World) refers to Australia, Canada, New Zealand, and South Africa. The empirical specifications are as in Table 5. Independent variables are measured at the start of the year. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

**Panel A. GHG Emissions**

Dependent Variable:	$\Delta$ CO2					
	Europe		USA		ROW	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ESG Pay</i>	-0.20** (-2.10)		0.05 (0.20)		-0.07 (-0.77)	
<i>Carbon-specific metric</i>		-0.61** (-2.13)		-0.77 (-0.84)		-0.10 (-0.43)
<i>Non Carbon-specific metric</i>		-0.17 (-1.61)		0.07 (0.27)		-0.07 (-0.75)
<i>Controls</i>	YES	YES	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES	YES	YES
R <sup>2</sup>	0.18	0.18	0.12	0.12	0.19	0.19
# Obs.	7,012	7,012	9,801	9,801	3,171	3,171

**Panel B. ESG ratings**

Dependent Variable:	$\Delta$ ESG Rating ( <i>Refinitiv</i> )					
	Europe		USA		ROW	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ESG metric</i>	0.01* (1.84)		0.00 (0.49)		-0.01 (-1.21)	
<i>Carbon-specific metric</i>		0.02** (2.12)		-0.02 (-1.03)		-0.01 (-0.45)
<i>Non Carbon-specific metric</i>		0.01 (1.56)		0.00 (0.57)		-0.01 (-1.21)
<i>Controls</i>	YES	YES	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES	YES	YES
R <sup>2</sup>	0.30	0.30	0.24	0.24	0.28	0.28
# Obs.	6,125	6,125	10,053	10,053	3,074	3,074

**Table 11. Financial Performance**

This table presents an analysis of the association between ESG pay and financial performance. In columns (1) and (2), the dependent variable  $\Delta ROA$  is defined as the year-to-year change in the firms' return on assets (measured as income scaled by total sales). In columns (3) and (4), the dependent variable *Return* is the stock return compounded over the year. *ESG Pay* is an indicator variable that equals one if the company incorporates any ESG metrics in executive compensation contracts in that year, and zero otherwise. *Carbon-specific metric* is an indicator variable that equals one if the company incorporates specific GHG emission metrics in executive compensation contracts, and zero otherwise. *Non Carbon-specific metric* is an indicator variable that equals one if the company incorporates an ESG metric in executive compensation contracts that is not specific to GHG emissions, and zero otherwise. The rest of the variables are defined in Appendix A. Independent variables are measured at the start of the year. Standard errors are clustered at the firm level. *t*-statistics are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels (two-tail) respectively. Intercepts are omitted.

Dependent Variable:	$\Delta ROA$		<i>Return</i>	
	(1)	(2)	(3)	(4)
<i>ESG Pay</i>	-0.003 (-0.94)		-0.032* (-1.82)	
<i>Carbon-specific metric</i>		-0.015** (-1.96)		-0.104*** (-3.36)
<i>Non Carbon-specific metric</i>		-0.002 (-0.60)		-0.026 (-1.47)
<i>Size</i>	-0.022*** (-3.46)	-0.022*** (-3.48)	-0.417*** (-11.42)	-0.418*** (-11.44)
<i>Log(BM)</i>	-0.052*** (-13.50)	-0.052*** (-13.50)	0.303*** (9.93)	0.304*** (9.93)
<i>ROA</i>	-1.011*** (-33.98)	-1.011*** (-33.98)	-0.152 (-1.09)	-0.151 (-1.08)
<i>Leverage</i>	-0.022 (-1.27)	-0.022 (-1.26)	0.998*** (5.95)	0.999*** (5.95)
<i>Tangibility</i>	-0.046 (-1.18)	-0.045 (-1.17)	0.228 (1.51)	0.229 (1.51)
<i>Dividends</i>	-0.001 (-0.59)	-0.001 (-0.60)	-0.009 (-1.39)	-0.009 (-1.40)
<i>Returns</i>	0.004 (0.76)	0.004 (0.77)	-0.126*** (-6.28)	-0.126*** (-6.27)
<i>Year FE</i>	YES	YES	YES	YES
<i>Firm FE</i>	YES	YES	YES	YES
R <sup>2</sup>	0.50	0.50	0.34	0.34
# Obs.	22,011	22,011	22,012	22,012

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