ESG-linked Pay Around the World —Trends, Determinants, and Outcomes*

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Abstract

We conduct a large-scale global study of ESG-linked pay for major firms that constitute 85% of the market capitalization across 59 countries. We find that the ESG-linked pay adoption is strongly associated with a country's culture and legal and institutional environment and the firm's industry affiliation, and is higher for large firms or firms with high return on assets. The adopters also experience better future social and financial performance. Exploiting a regulatory shock that mandates corporate ESG disclosure, we establish that the adoption of ESG-linked pay is followed by enhancements in firms' social performance and profitability and that employee satisfaction is a plausible channel. Our findings suggest that pay contracts that direct managerial attention toward often overlooked, yet long-term valuable dimensions can lead to mutually beneficial outcomes for both shareholders and stakeholders. A regulatory framework advocating greater transparency in ESG disclosure holds the potential to enhance the effectiveness and advantages of ESG-linked pay. Such measures can have spillover effects beyond national borders.

JEL Classification: G15, G18, G34, G38, J33, J53, J83, J88, K32, K33

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1. Introduction

Environmental, social, and governance (ESG) issues have become front and center considerations for executives, investors, and regulators around the globe. 5,372 institutional investors (comprised of asset managers, pension funds, and sovereign wealth funds) managing $121 trillion had signed the Principles for Responsible Investment (UNPRI) at the end of 2023 [1]. Meanwhile, global regulations are increasingly requiring companies to disclose information regarding the nonfinancial aspects of their business to interested stakeholders. Examples of such regulations include EU's 2022 Corporate Sustainability Reporting Directive (CSRD) and the Securities and Exchange Commission's (SEC's) climate-related disclosure rules proposed in March 2022. More than ever, companies are under pressure to consider their approach to ESG to respond to the demands of investors and regulators, to avoid reputational damage, and to mitigate their litigation risk.

An important tool to incentivize company executives to focus on ESG is through ESG-linked pay, that is, the use of non-financial measures such as CO_2 emission targets, product quality, customer satisfaction, and employee satisfaction in executive remuneration contracts.[2] While firms have traditionally used financial metrics such as net earnings or return on investment to reward executives, the use of such non-financial measures has been on the rise. As of 2021, approximately 45% of the top 100 U.S. companies used ESG-linked pay for their CEOs and a similar rate also applies to the top UK companies listed on the FTSE 100.[3]

Despite recent attempts by firms to incorporate ESG-linked pay, our understanding of the determinants and impact of this practice remains limited. The shareholder, stakeholder and institutional views of governance suggest that ESG-linked pay helps direct executives' attention to focus on factors that are less salient but financially material to the firm in the long-run, thereby generating better corporate social and/or financial performance (see, e.g., Ittner, Larcker and Rajan, 1997; Flammer, Hong, and Minor, 2019). Critics, however, argue that such contracts may be ineffective, tied to outcomes that are difficult to measure, merely symbolic, susceptible to manipulation[4], and/or harmful to financial performance (Bebchuk and Tallarita

[1] https://www.unpri.org/download?ac=19120 (downloaded Oct 30th, 2023). $121 trillion is based on 3,826 signatories as of 31st March 2021.
[2] Exhibit 1 provide examples of ESG-linked pay for Alcoa Corp., Gilead Sciences, Inc., General Motors Company, Bank of New York Mellon Corporation, and Affiliated Managers, Inc, obtained from the companies' proxy statements.
[3] Source: Morningstar Sustainalytics (2022) for the US companies and PWC (2021) for the UK companies.
[4] https://www.greenpeace.de/publikationen/Report_DWS_Remuneration_System.pdf

2022).[5] Investor discontent with executive pay more broadly is also on the rise, with 9.3% of S&P 500 companies receiving less than 70% support for their pay policies in annual shareholder votes in 2022, a sharp increase from 3.6 % in 2015.[6]

This paper aims to provide insights into the issues surrounding ESG-linked pay by conducting a global study of the factors related to the adoption of such pay contracts and the outcomes that are associated with them. Our comprehensive and representative global sample consists of firms included in the MSCI's All Country World Index (ACWI) over 2005-2020. The ACWI sample is comprised of large and mid-sized firms from 59 countries, spanning both developed and emerging markets and amounting to a market capitalization of USD 57.157 trillion as of May 2022, or 85% of the free float-adjusted market capitalization in each of the markets. The ACWI is also the benchmark that is most followed by global asset managers (Cremers et al. 2016).

We first show that cross-industry differences, the cultural and institutional environment, and firm characteristics shape a firm's decision to adopt ESG-linked pay. We then investigate the association between such pay practices and firms' ESG conduct and financial performances. By exploring a change in disclosure policy, we provide plausibly causal evidence on the impact of ESG-linked pay on firm performance and provide new insights into the effect of ESG disclosure regulations.

We begin by documenting a substantial increase in the use of ESG-linked pay contracts over time, as well as its large cross-country and cross-industry variation. We find, for a cohort sample of MSCI ACWI firms with ESG-linked pay data continuously available from 2009, that the adoption of ESG-linked pay by companies around the globe has risen significantly, from about 3% in 2009 to about 19% in 2020. Additionally, 27% of firms in developed markets and 6% firms in emerging markets use such pay contracts in 2020. Among the developed markets, UK and EU firms have a high adoption rate in 2020, at 38%. The adoption rate for the US firms is 29%, whereas for Japanese firms, the rate is only 2%.

Exploring industry characteristics, we find significantly greater adoption rates of ESG-linked pay (as of 2020) in extractive industries such as Mining (65%) and Oil and Petroleum (47%), Utilities (46%) and Chemicals (28%), compared to industries like Durables (4%), Textiles (6%) and Steel (8%). The findings indicate a worldwide phenomenon that ESG-linked

[5] Asset managers, such as State Street Global Advisors, are now scrutinizing certain ESG metrics used in executive compensation, concerned that these metrics are subjective, fluffy, and easily manipulated. Source: Temple-West, P. and Xiao, E.: "Investors warn 'fluffy' ESG metrics are being gamed to boost bonuses." Financial Times, August 27, 2023.

[6] Murray, S. "How to pay executives in the age of stakeholder capitalism." Financial Times December 14, 2022.

pay contracts are indeed more prevalent in industries in which a firm's ESG impact and concerns are more material.

We then analyze the influence of country-specific cultural and institutional factors on the adoption of ESG-linked pay. In particular, we investigate the extent to which the implicit and explicit contracting environment (such as societal cultural preferences, country-level rules and regulations and institutional arrangements) impact a firm's choice to pursue ESG goals and to use a pecuniary, extrinsic compensation contract to incentivize top managers to meet these goals.

Regarding the cultural dimension, we find that individualism is positively associated with the prevalence of ESG-linked pay, with a one standard deviation increase around the mean is associated with an increase in the probability of ESG-linked pay adoption by 17.62 percent points (pp). On the other hand, a one standard deviation increase around the mean in the country's masculinity score corresponds to a reduction in the adoption probability by 7.88 pp. Individualistic countries stress independence and personal achievement and thus tend to adopt compensation contracts explicitly linked to ESG objectives to incentivize top executives to meet the firm's ESG goals. On the other hand, countries with a low masculine culture (high feminine culture) prefer cooperation, modesty, caring for the weak and quality of life, and thus care more about ESG goals and utilize ESG-linked pay contracts to meet them.

We find that a country's institutional framework – in particular, its shareholder protections and legal origin – is an important predictor of the adoption of ESG-linked pay. Specifically, the difference in the probability of ESG-linked pay adoption between the countries with the highest Anti-Director Rights Index (ADRI) (most protections) and lowest ADRI (least protections) is 8.47 pp with firms in countries with higher ADRI adopting ESG-linked pay more. Our results suggest that countries with stronger legal protections for shareholders provide a contracting environment where boards are less concerned about the danger that top executives may abuse ESG benchmarking to increase their compensation.

Countries with a French or German civil law legal origin have a higher probability of adopting ESG-linked pay, by 12.23 and 10.46 pp, respectively, compared to firms in common law countries. One explanation for this is that firms from French or German civil law countries consider ESG goals to be as important as financial goals and hence directly contract on them. This interpretation is consistent with Liang and Renneboog (2017), who argue that civil legal origin is associated with state intervention in economic life through rules and regulations and the stakeholder view of corporate purpose, and that therefore firms in these countries engage in corporate social responsibility (CSR) to a greater extent than firms in common-law countries.

We next investigate the extent to which firm characteristics contribute to the adoption of ESG-linked pay contracts. A plausible null hypothesis is that large firms with a diversified shareholder base and global institutional investors are primarily interested in financial returns and adopt compensation contracts linked to financial metrics. On the other hand, the increased awareness of ESG issues may significantly increase the probability of larger firms adopting ESG-linked pay. Another, somewhat less plausible but nevertheless important consideration is that globalization may reduce the importance of country and social norms in setting pay contracts, especially for large global firms, so that firm-level features are more salient in driving the nature of executive compensation contracts. We find that larger firms (measured by total assets *SIZE*), value firms (with high book-to-market value of equity ratio *BM*) and more profitable firms (measured by return on assets *ROA*) have a higher propensity to adopt ESG-linked pay. A one standard deviation increase around the mean in logarithm of firm size and *ROA* increases the adoption probability by 3.22 pp and 0.39 pp, respectively.

We next turn to an analysis of how ESG-linked pay adoption is associated with firms' performance outcomes. We begin by examining the relationship between ESG-linked pay adoption and a firm's ESG performance, as measured by environmental, social, and corporate governance scores. We find that the ESG-linked pay adopters experience significantly higher ESG performance than the non-adopters in the years following the adoption, by 10.11%, 9.07% and 13.99% of the mean of the environmental, social, governance variables respectively.[7] In terms of financial performance, the ESG-linked pay adopters also enjoy a higher operating profit margin and return on assets than the non-adopters in the subsequent two years, by 10.60% and 4.40% of the corresponding mean.

One needs to be careful in interpreting the positive relationship between ESG-linked pay adoption and subsequent financial and social performance. The adoption decision is endogenous and hence the observed association may be driven by omitted variables that influence both the adoption of ESG-linked pay and future performance, or by reverse causality. For example, better performing firms are more likely to adopt ESG-linked pay contracts. To address this, we exploit a quasi-natural experiment that introduces shocks to the likelihood of ESG-linked pay adoption using a difference-in-differences (DiD) methodology.

[7] One pertinent concern is that the relationship between ESG-linked pay and ESG ratings could be mechanical, i.e. ESG-linked pay may be a direct input into the rating decision. As explained in the Refinitiv data glossary, compensation policy affects the governance score but does not influence environmental or social performance (see Exhibit 2). Hence, we believe the mechanical relationship concern is less applicable when examining firms' environmental and social performances.

Specifically, we consider Directive 2014/95/EU of the European Parliament mandating increased disclosure of non-financial information (the Non-Financial Reporting Directive, NFRD) as a plausible exogenous shock to a firm's ESG-linked pay adoption decision. The law, first proposed in April 2013, was adopted in April 2014, and made effective from fiscal year 2017 onward. The directive mandates companies to report details of firm's policies regarding "non-financial key performance indicators relevant to the particular business" including information on policies, risks, and outcomes regarding environmental, social, and employee matters. The rule applies to firms listed on EU exchanges and firms with significant operations in the EU or designated as public-interest entities by EU member states.

Our DiD analysis focuses on US firms with subsidiaries in the EU that are therefore required to comply with the Directive. From this set of firms, we select the treatment sample as those that adopted ESG-linked pay post the enactment of Directive. There are two reasons why the Directive impacts the affected firms' propensity to adopt ESG-linked pay. First, the directive exposes the affected firms to increased pressure (potentially from both regulators and investors) to deliver/report good ESG performance and the companies' boards are thus more inclined to use ESG-linked pay in executive compensation. Second, the Directive makes ESG performance more transparent and easier to measure and verify, making such measures more suitable as performance metrics for managerial compensation contracts (Bebchuk and Tallarita 2022).

We therefore argue that the post-Directive ESG-linked pay adoption decision is more likely to be triggered by the Directive and thus relatively less driven by other characteristics of the firm compared to the adoption decision made in the absence of the Directive. We then compare the outcomes of the treatment firms with a variety of control firms.

We first focus on a control sample of US firms from the same industry and sharing similar observable firm characteristics but without EU subsidiaries and without ESG-linked pay. Using the DiD methodology, we find that treatment firms experience a larger increase in their social score after the post-Directive adoption of ESG-linked pay, by 7.4% of the variable's mean, compared to control firms. In addition, the treatment firms also experience a larger increase in *OPM* than the controls, by 19.8% of the mean. The result is robust after controlling for firm characteristics as well as industry, year, and event-year fixed effects. The effect of ESG-linked pay on the other financial performance measures, *ROA* and Tobin's Q, are positive although insignificant. Our results therefore suggest that the adoption of ESG-linked pay following the enactment of Directive 2014/95/EU enhances the future social performance and

the profitability of the affected firms. Additionally, we show that our results are robust with alternative measures of ESG ratings.

While it is intuitive that ESG-linked pay induces executives to focus on a firm's ESG performance, the link to improved financial (*OPM*) performance is not as straightforward. To probe the mechanisms by which ESG-linked compensation influences *OPM*, we further examine executive compensation at the individual grant level (in the form of cash bonus or restricted stock units) and classify grants by their key performance objectives. Specifically, we conduct textual analyses of performance metric keywords and classify ESG-linked grants into four categories: *Employee* (employee/staff/talent related), *Customer* (customer related, e.g. customer satisfaction), *Diversity*, and *Environment/Climate.* Our DiD analysis regressing the likelihood that an executive compensation contract is tied to one of the categories of explanatory variables.

We find that the post-Directive ESG-linked pay adopters are significantly more likely to use grants that are tied to employee-related performance objectives, by 14.1 percent, or 66% of the variable's standard deviation. In contrast, we do not find any significant changes in other dimensions of ESG-linked pay post-Directive. Together with our finding that social scores and financial performance improve, this suggests that employee satisfaction is a potential channel through which ESG-linked pay enhances both the social and financial performance of a firm.

This notion is consistent with Edmans (2011) and Edmans et al. (2023), who argue that human capital investment enhances a firm's future profitability and contributes to long-run shareholder returns and provide evidence in support of this hypothesis. The authors also show that the value of human capital investment is not sufficiently recognized by the market in the short run. In our context, a managerial compensation contract that provides explicit performance metrics for employee satisfaction helps focus managers' attention on this value-adding investment that otherwise might be neglected. As a result, the corresponding managerial effort not only improves the social score of the firm but also allows the firm to capture the benefit of more productive and innovative employees.

Exploring heterogeneities, we show that firms with better pre-Directive ESG disclosure quality are more likely to adopt ESG-linked pay post-Directive and that the treatment effect identified by our DiD analysis on ESG performance is concentrated in firms with low quality of pre-Directive ESG disclosure, whereas the effect on financial performance is stronger for firms with high quality of pre-Directive ESG disclosure.

One concern about the previous DiD analysis is that the US firms with EU subsidiaries may be fundamentally different from those without EU subsidiaries, and hence there might be

omitted variables that contribute to our findings. We address this concern in two ways. First, the treatment and control firms belong to the same industry and are shown to have similar size, book-to-market ratio, leverage, return on assets, earnings volatility, institutional ownership. Second, we estimate a dynamic DiD model and show that the treatment and control firms share similar trends in their social scores and *OPM* before the post-Directive adoption of ESG-linked pay.

We further complement the above analysis by examining possible changes to firm outcomes for different types of firms characterized by their ESG-linked pay adoption decision before and after the EU Directive.

We first compare the treatment firms (i.e., firms with EU subsidiaries that adopted ESG-linked pay after the Directive) from the DiD analysis with a matched sample of US firms that also have EU subsidiaries but did not adopt ESG-linked pay in our sample period. This alternative matching method helps alleviate the concern with our main DiD analysis that there might be differences in fundamentals between firms with EU subsidiaries and those without that our matching procedure fail to control for. We find that, compared to the non-adopters, the treatment firms experienced significantly greater improvements in their social score and *OPM*. Given that both types of firms are exposed to the EU Directive policy shock, this finding suggests that the differences in firm outcomes are unlikely to be entirely driven by the direct effects of the Directive.

Next, we proceed to compare the impact of ESG-linked pay adoption for early versus late adopters for the large sample of US Russell 3000 firms that have EU subsidiaries. We find that the ESG-linked pay adoption decision is associated with a larger increase in *OPM* if the adoption is post-2014 than adoptions made before 2014. A potential explanation for this finding is that the Directive increased the transparency of ESG performance objectives, therefore enhancing the effectiveness of incentives and alleviating the agency costs associated with fluffy ESG-linked pay contracts that we discussed earlier.

We also assess the direct effect of the Directive by comparing, among US firms that did not use ESG-linked pay, the performance of firms with EU subsidiaries with those without. We confirm that the direct effect of the Directive does not fully explain our findings for the improved social performance and *OPM* associated with the post-Directive ESG-linked pay adoption.

Together, our result suggests that pay contracts that draw managerial attention to long-term valuable but sometimes ignored dimensions (for example, employee satisfaction) can be "win-win" for both shareholders and stakeholders. Furthermore, our finding that, after the

enactment of Directive 2014/95/EU, ESG-linked pay leads to better social and financial outcomes suggests that a regulatory framework that calls for greater transparency in ESG disclosure can enhance the effectiveness and the potential benefit of ESG-linked pay.

This study is among the first set of papers analyzing the factors correlated with and outcomes of ESG-linked pay in an inclusive, cross-county setting. Our sample spans firms across 59 countries and corresponds to 85% of the market capitalization in each of the markets over the period 2005-2020. Our analysis is built on earlier papers that examine factors associated with ESG-linked pay for an earlier period and a narrower set of firms.[8] For example, Flammer et al. (2019) and Ikram et al. (2019) study S&P 500 firms for a period that ends in 2013. Al-Shaer and Zaman (2019) focus on UK FTSE350 firms for the period 2011-2015.[9] Given the rapid increase in the adoption of ESG-linked pay and the greater attention paid to ESG by investors and regulators in the more recent years around the globe, our findings provide new insights into the determinants and potential impacts of such pay contracts, as well as the role of disclosure regulation.

A closely related paper by Cohen et al. (2022) examines the adoption of ESG-linked pay by firms from 21 countries for the period 2011-2020. The paper finds that the adoption decisions are associated with the firm's industry affiliation, whether the firm is located in counties that mandate ESG disclosure and have strong environmental protection rules, and the influence of institutional investors.

Our paper differs from Cohen et al. (2022) along several dimensions. First, our sample coverage is much broader, including all the 21 countries in Cohen et al. (2022) and an additional 38 countries.[10] The richer cross-country variation enables us to investigate the role of culture, legal and institutional environment, and the level of economic development, which are fundamental determinants of a country's decisions on ESG mandates and environmental protection rules. These factors have been shown to play an important role for a firm's CSR performance by Liang and Renneboog (2017). Second, our broader coverage, especially for the

[8] A challenge to studies on the association between ESG-linked pay and certain characteristics or outcome variables is that the relation does not imply causation. Such identification issues are alleviated in Flammer and Bansal (2017) and Flammer *et al*. (2019), who compare shareholder proposals (advocating the use of long-term executive compensation) that narrowly pass or fail, and by using the enactment of constituency statutes as an instrument for CSR contracting, respectively.

[9] Hill and Barontini (2023) provide an overview of developments relating to the rise of ESG-linked pay and the prevalence of this practice.

[10] The additional countries that are covered in our sample include the developed markets of Hong Kong, Israel, Luxembourg, Japan, Singapore and the following countries: Argentina, Bermuda, Brazil, British Virgin Islands, Cayman Islands, Chile, China, Colombia, Curacao, Czechia, Egypt, Hungary, India, Indonesia, Isle of Man, Jersey, Liberia, Malaysia, Mexico, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Poland, Qatar, Russia, Saudi Arabia, South Korea, Taiwan, Thailand, Turkey, and UAE.

emerging markets, also makes our findings more relevant for these markets, for which the adoption rates remain low and for whom the trade-offs between economic development and environmental protection are more challenging. Third, using the Directive 2014/95/EU policy shock, we show that the ESG-linked pay adoption by affected US firms is associated with greater future profitability and identify employee satisfaction as a plausible channel. Hence our evidence suggests a way in which ESG-linked pay can be a "win-win" proposition. In comparison, Cohen et al. (2022) find that adopters experience improved ESG performance and greater amounts of executive bonuses, but do not find significant results for financial performance.

Our findings also join the emerging literature that investigates the impact of ESG disclosure regulation. Krueger et al. (2021) examine mandatory ESG disclosure around the world and find that the disclosure increases the availability and quality of ESG reporting, reduces the occurrence of negative ESG incidents and stock price crash risk, and improves a firm's financial information environment. In a closely related paper, Fiechter, Hitz & Lehmann (2022) show that EU firms responded to the 2014 EU Directive by increasing their real CSR activities, with effects concentrated in firms with previously low levels of CSR reporting and CSR activities.

Our DiD analysis builds upon Fiechter et al. (2022) but differs in several important ways. First, we examine US firms exposed to the Directive. This approach allows us to shed light on the spillover effects of disclosure policies beyond EU borders—an effect of particular significance for large, multinational US companies. Second, we investigate ESG-linked pay as a potential channel through which disclosure policies influence firm outcomes. Third, we find that the post-Directive adoption of ESG-linked pay has differential effects on financial versus nonfinancial performance outcomes, depending on a firm's prior disclosure quality—while this adoption results in greater improvements for companies with previously poor ESG disclosure quality, those with a history of strong ESG disclosure quality experience even greater improvements in financial outcomes. Our findings therefore offer a new perspective that complements both Krueger et al. (2021) and Fiechter et al. (2022). Our results suggest that ESG-disclosure mandates, by standardizing and increasing transparency in a firm's ESG performance, enhance the efficacy of ESG-linked pay as a tool for attaining both social and financial performance objectives. In light of the ongoing discussions surrounding the SEC's recent proposal for climate-related disclosure rules, our findings bring us closer to comprehending the potential implications of such policy changes.

We should also note that we caution against the generalization of our results in a one-size-fit-all fashion. As we have shown, the adoption of ESG-linked pay is heavily influenced by a country's culture and legal and institutional environment, a firm's industry affiliation and other tradeoffs that the firm faces. Therefore, the answer to the question of whether ESG-linked pay is optimal is therefore likely to be more nuanced and more future work is called for.

The paper is organized as follows. Section 2 describes the data and their sources and provides summary statistics. Section 3 analyzes the country, industry, and firm characteristics that are associated with ESG-linked pay adoption. Section 4 examines ESG-linked pay and firm performance and provides a DiD analysis to establish identification. Section 5 explores channels and provides further analysis. Section 6 concludes.

2. Sample and summary statistics

Our global sample starts from the 2,916 firms that constitute the MSCI All Country World Index (ACWI) as of December 2019. ACWI includes a comprehensive set of large- and mid-cap stocks from the major equity indices around the world, including both the MSCI World Index (developed countries) and the MSCI Emerging Markets Index.[11]

We obtain a firm's name, ISIN, date of incorporation and SIC code from Worldscope. The first two characters of a firm's ISIN identify the firm's country of incorporation. We then use Bloomberg to obtain information on a firm's adoption of ESG-linked pay and obtain *ESGPAY* for 2,865 firms. We use a firm's ISIN as the main identifier to merge across the databases and generate a final sample of 2,781 ACWI firms across 59 countries for the period of 2005-2020.

The firm's ESG scores are from Refinitiv (formerly Thomson Reuters Asset4), see also Servaes and Tamayo (2013), Lys, Naughton, and Wang (2015), Dai, Liang, and Ng (2021), and Fiechter et al. (2022). We also conduct robustness tests using data on ESG scores from Bloomberg. We use Worldscope and Datastream to obtain firm characteristics and stock returns and obtain institutional ownership from Factset. Other data is obtained from sources such as World Bank, MSCI, and WRDS unless otherwise mentioned.

Below we describe the construction of the variables and provide summary statistics and descriptions of the global trends in the adoption of ESG-linked pay.

[11] ACWI includes a comprehensive and representative set of large- and mid-cap stocks from the major equity indices around the world: Source: https://www.msci.com/our-solutions/indexes/acwi.

2.1 ESG-linked pay and global trends

Our main variable of interest is the ESG-linked pay indicator, *ESGPAY*, which equals one if executive compensation for a fiscal year is linked to ESG targets and zero otherwise. Bloomberg defines this variable based on information retrieved by parsing firms' disclosures concerning executive compensation.[12]

We find that there is significant variation in the adoption of ESG-linked pay by companies across time, countries, and industries. Figure 1 illustrates these trends for a cohort sample of 1,939 ACWI firms that were continuously covered by Bloomberg over the period 2009-2020.[13]

For this cohort sample, as of 2020, an average of 19% of firms adopted ESG-linked pay compared to 3% in 2009. The pattern is especially pronounced for developed markets, from 4% in 2009 to 27% in 2020.[14] In contrast, the numbers remain considerably smaller for firms in emerging markets, namely from 0% in 2009 to 6% in 2020. Within the developed markets, US firms saw an increase in the adoption rate from 6% to 29%. For the EU and UK firms, the adoption rate increased from 7% to 38%. In contrast, Japanese firms' adoption rate is only 0% to 2% over the same period.

Figure 2 Panel A displays the adoption of ESG-linked pay by Fama-French 17 industries as of year 2020. Emission-intensive industries such as mining, oil and petroleum, utilities and chemicals industries have a greater proportion of firms with ESG-linked pay compared to other industries, in both the developed and the emerging markets. The adoption rates in the developed markets are higher than the emerging markets across every industry. Figure 2, Panel B illustrates the time trend in ESG-linked pay adoption by industries and shows that the adoption rate has been increasing over time for almost all industries. The pattern is particularly strong for the following three industries: mining, increased from 15% in 2009 to 65% in 2020; oil and petroleum, increased from 11% to 47%; utilities, increased from 11% to 46%.

Figure 3, Panel A shows the country-level adoption of ESG-linked pay in FY 2020 categorized by their continent/geographic region. The stark contrast between Asian countries

[12] For example, for US firms, the information is available in the annual proxy statements (DEF 14A) filed with the SEC; these statements contain descriptions of the structure of managerial compensation contracts for the top executives of the firm, including the financial and, more recently, non-financial metrics used for performance-based compensation. We also gather an alternate measure of *ESGPAY* from Refinitiv's Asset4 for robustness checks. In Section 5.1, we provide an analysis that utilizes granular data on distinct categories of ESG performance metrics for compensation. This data is sourced from the ISS Incentive Lab. Refer to Exhibit 1 for examples of ESG-linked pay contracts.

[13] We use the cohort sample so that the adoption rates are not affected by the variations in Bloomberg's coverage of firms.

[14] We use MSCI's market classifications, based on the primary listing of the firm, to categorize firms as developed or emerging markets. See https://www.msci.com/market-classification for further details.

and the rest of the world suggests that the adoption of ESG-linked executive contracts is driven by institutional, cultural and economic differences across these regions. Figure 3, Panel B depicts a world map showing the adoption rates, again driving home the idea that the variation across countries is associated with the geographic region. In the next section, we conduct a formal analysis to examine the determinants of ESG-linked pay, starting with industry fixed effects; then, country level variables; and lastly, firm characteristics.

2.2 Country-level variables

We begin by collecting GDP per capita (in 2015 US$) from the World Bank and obtain non-missing data for 55 countries in our sample. Next, we describe country level variables that measure the implicit and explicit contracting environment such as societal cultural preferences, rules and regulations and institutional arrangements.

Regarding the cultural variables, we follow La Porta, Lopez-de-Silanes, and Shleifer (2008), and use the widely used Hofstede cultural indices to capture social attitudes and norms (Hofstede and Hofstede 2005)—*Power distance*, *Individualism, Masculinity/Femininity,* and *Uncertainty avoidance*.[15]

Power distance measures the degree to which the less powerful members of society accept an unequal distribution of power, with a higher value corresponding to an increase in acceptance. In our sample, the three highest *Power distance* countries are Malaysia, Panama and Philippines, while the lowest three are Austria, Israel and Denmark. *Individualism* measures the degree to which a society prefers a framework where an individual's self-interest extends only to themselves and to their immediate families. Societies with lower scores are collectivistic while societies with higher scores are individualistic. The countries with the highest *Individualism* scores are the US, Australia and the UK, while the lowest-score countries are Panama, Colombia and Indonesia.

Masculinity measures the degree to which society prefers achievement, heroism and material rewards for success; societies with higher scores are competitive while societies with lower scores (higher on *Femininity*) are co-operative and consensus oriented. It is also sometimes referred to as the "tough versus tender" score. Countries with the highest *Masculinity* scores are Japan, Hungary and Australia, while the countries with the lowest scores are Sweden, Norway and the Netherlands. Finally, *Uncertainty avoidance* measure the degree of a society's discomfort with uncertainty and ambiguity; societies with higher scores are more

[15] The data is collected from http://geert-hofstede.com/.

orthodox while societies with lower scores are more relaxed. The countries with the highest scores are Greece, Portugal and Russia, and the countries with the lowest are Singapore, Denmark and Sweden. The cultural scores range from 0-100 and we have non-missing scores for the four measures for 47 countries.

The Anti-Director Rights Index (*ADRI*) measures the degree of shareholder protection and has been analyzed as a predictor for market outcomes such as market size, owner dispersion and resilience to crises. It ranges from 0-6, with a higher value corresponding to increased protection for shareholders. Examples of countries with high *ADRI* are the UK, India and Spain, while Italy, Greece and Argentina have low *ADRI*. We obtain data for legal origins and *ADRI* following Spamann (2010) for 41 countries.[16]

Following Liang and Renneboog (2017), we include *Corruption control* from the World Bank Governance indicators. *Corruption control* measures the extent to which politicians are constrained from pursuing their self-interest (through corruption). The variable ranges from -2.5 to 2.5, with larger numbers indicating high corruption control. The variable is available for 56 countries in our sample, updated annually. As of 2020, the countries in our sample with the best *Corruption control* are Singapore, Finland and New Zealand, while the countries with the lowest scores are Liberia, Pakistan and Russia.

Legal origin and shareholder protection have also been studied in a series of papers by La Porta et al. (1998), Djankov et al. (2008) and Spamann (2010) as potential drivers for country-level economic outcomes. Legal origin theory connects economic outcomes today to the origins of the legal framework used in the countries. The theory claims that legal frameworks in several countries, partly through colonization, have their origins in one of two main European traditions, civil law or common law. The civil law tradition codifies core principles, which can then be referred to in the practice of law. The common law tradition, instead, comes from uncodified case law (*i.e*. adjudication is based on precedents instead of legislation). The civil law tradition is further refined into three traditions, French civil, Scandinavian civil and German civil, based on varying influences and thus a mixture of common law and civil law traditions. Examples of French civil legal origin countries are France, Spain and Italy; Scandinavian civil legal origin countries are Sweden, Denmark and Norway. As for the German civil legal origin, examples include German, Switzerland and Japan. Finally, common law countries include the UK, US and India. We define *French civil*, *German civil,* or *Scandinavian*

[16]Data is available at https://scholar.harvard.edu/hspamann/publications/antidirector-rights-index-revisited. *ADRI* is measured as of 2008.

civil dummy variables as equal to one if the country of a firm's incorporation has the corresponding legal origin, and zero otherwise.

2.3 Firm-level variables

. We obtain institutional ownership, *IO*, from Factset. *IO* is defined as the percentage of shares outstanding held by institutional shareholders at the end of a year. We also obtain the following ESG scores from Refinitiv (formerly Asset4): corporate governance score, *CGSCORE*, environment score, *ENSCORE*, and social score, *SOSCORE.* The Refinitiv ESG scores range from 0 to 100. We obtain emissions data from Trucost and define Δ*SCOPE 1,* Δ*SCOPE 2* and Δ*SCOPE* 3 as the percentage change over the previous year in Scope 1, 2 and 3 emissions.

We construct the following variables from Worldscope. Firm size, *LN_SIZE*, is the logarithm of total assets. Book-to-market equity is captured by *LN_BM*, the logarithm of common equity to market cap. Leverage *LEV* is defined as total debt to total assets. Return on assets, *ROA*, is net income normalized by total assets. The operating profit margin is *OPM*. Earnings volatility *EARN_VOL* is the standard deviation of past five-year deflated earnings (i.e., the ratio of net income to average total assets). *TobinQ* equals market value of equity plus book value of debt, divided by the book value of assets. Appendix Table A1 lists the variables and their descriptions.

Table 1 provides summary statistics of the country- and firm-level variables, including their correlation. There is a considerable amount of cross-country variation in the culture variables, which helps us identify the importance of these variables in shaping the firm's decisions to adopt ESG-linked pay contracts for their executives. The culture variables such as *Power distance* and *Individualism* are strongly correlated with *ESGPAY*, *Ln(GDP per capita), Corruption control*, *Regulatory quality* and the civil legal origin variables. As for the firm-level variables, *ESGPAY* is strongly correlated with *LN_SIZE* and ESG scores. In the sections that follow, we formally investigate the relationship between *ESGPAY* and the various industry, country, and firm-level variables with regression analysis.

3. Adoption of ESG-linked pay

In this section, we analyze the extent to which a firm's use of ESG pay is associated with the industry to which the firm belongs, the cultural and institutional factors of the country where the firm's headquarters are located, and the individual characteristics of the firm.

3.1 Industry characteristics

We first test whether the adoption of ESG-linked pay is associated with certain industries. The previous section showed significant cross-industry and cross-country variation in the adoption of ESG-linked pay; hence a thorough analysis of ESG- pay adoption at the industry level must control for dynamics at the country level. We classify firms into the 17 Fama-French industries and run panel regressions of firm-level *ESGPAY* on the industry indicators. Specifically, we estimate the following panel regression equation:

$$ESGPAY_{i,t+1} = \beta_0 + \beta_1 IND1_i + \cdots + \beta_{16} IND16_{i,} + \varepsilon_{it} \quad (1)$$

Where *IND1-IND16* are the industry indicators that equal one if firm *i* belongs to the industry, and zero otherwise. The Fama-French 'Other' Industry is used as the baseline industry and is omitted from the regression. We include year and country fixed effects to account for systematic differences over time and across countries. We compute two-way clustered standard errors by year and by country to account for the possibility that ESG-linked pay may be correlated across firms for a given year and over time within a given country.

Table 2, Panel A presents the results, with columns (1) and (2) corresponding to a probit and a logit model, respectively. Both specifications show that, controlling for country characteristics and time trends, the industries with the highest rate of ESG pay adoption are Mining, Oil and Petroleum, Utilities, Chemical, and Steel. To illustrate the economic magnitudes, we use coefficient estimates in column (2) to compute the marginal increase in the probability of *ESGPAY* when an industry indicator changes from zero to one. The marginal increases in the probability of *ESGPAY* for the above five industries are 34.93%, 25.72%, 21.05%, 12.08% and 8.25%.

We next use an alternative classification of industries, focusing on whether a firm is in an extractive industry or qualifies as a 'sin' stock'. Firms in extractive industries tend to be most affected by negative ESG events.[17] In addition, Bolton and Kacperczyk (2021) find that institutional investors such as insurance companies, investment advisors and pension funds apply exclusionary screens and tend to have lower holdings of high scope 1 emission companies.

Given the focus on environmental concerns in extractive industries, firms in these industries are likely to adopt ESG-linked pay to incentivize managers to focus more on the

[17] For instance, BP incurred $18.7 billion in fines due to the Deepwater Horizon oil spill. Source: Wade T. and Hayes, K. "BP reaches $18.7 billion settlement over deadly 2010 spill." Reuters, July 2, 2015.

firms' environmental impacts. We follow Dyck *et al.* (2019) and define a firm as belonging to an extractive industry if the firm belongs to one of the following two industries: the Oil and Petroleum Products (industry number 3 in the Fama-French 17 classification), and Mining and Quarrying (SIC Section B). Thus, the *Extractive industries* dummy equals one if the firm belongs to the extractive industry, and zero otherwise.

We also consider the role of social norms in determining whether firms adopt ESG-linked pay. Hong and Kacperczyk (2009) find that norm-constrained funds like pension funds shun 'sin' stocks, *i.e.* stocks of firms that belong to the gambling, tobacco and alcohol sectors. Hong and Kostovetsky (2012) find that mutual fund managers who make campaign donations to Democrats are less likely to hold socially irresponsible industries in their portfolios compared to non-donors and Republican donors. Firms in industries which may be shunned due to social norms may adopt ESG pay to incentivize managers to improve their social image. We follow Hong and Kacperczyk (2009) and define an indicator variable, *Sin stocks*, that equals one if the firm is in group 4, Beer & Liquor, or group 5, Tobacco Products, of the Fama-French 48 industries, and zero otherwise.

We estimate the following panel regression of firm-level *ESGPAY* on the "extractive industries" and "sin" stock indicators:

$$ESGPAY_{i,t} = \beta_0 + \beta_1\, Extractive\ industries_i + \beta_2\ Sin\ stocks_i\ + \varepsilon_{it} \qquad (2)$$

Table 2 Panel B presents the results, with year and country fixed effects and two-way clustered standard errors by country and by year. The table shows that the probability of ESG-linked pay is significantly higher for firms that belong to extractive industries. In terms of economic significance, the coefficient reported in column (1) indicates that the probability of ESG-linked pay is 19.91% higher for an extractive industry firm. On the other hand, we do not find evidence of a relation between sin stocks and ESG-linked pay.

Our results suggest that a firm's industry affiliation has a strong influence on the firm's decision to use ESG-linked pay for executives. Firms that belong to industries for which ESG is a material concern and those that are perceived as sensitive to negative ESG-related events are more likely to adopt *ESGPAY* to mitigate such concerns and risks.

3.2 Country characteristics

In this subsection, we investigate the extent to which the implicit and explicit contracting environment (such as country-level rules and regulations, institutional arrangements, and

societal cultural preferences) impact a firm's choice to use a pecuniary, extrinsic compensation contract to incentivize top managers to meet ESG goals.

The analysis is motivated by Liang and Renneboog (2017), who propose that corporate social responsibility choices reflect the tradeoff between rules and discretion by institutions governing economic life and is likely shaped by legal rules and regulations and enforcement mechanisms. To this effect, we consider a country's legal origin, which has been shown to influence the institutional environment of a country and the contracting environment of firms (Doidge, Karolyi, and Stulz 2007, La Porta et al. 2008). We also follow previous studies (e.g., Stulz and Williamson 2003, Guiso, Sapienza, and Zingales 2006, and Tabellini 2010) in considering whether national culture and values are associated with ESG-linked pay adoption choices.

The following regression analysis formally tests the relation between ESG-linked pay and country-specific characteristics:

$$ESGPAY_{i,t} = \beta_0 + \beta_1\, Ln(GDP\ per\ capita)_{i,c,t} + \beta_2\, Culture\ variables_{i,c} + \beta_2\, ADRI_{i,c} + \beta_3\, Corruption\ control_{i,c} + \beta_4\, Legal\ origin_{i,c} + \varepsilon_{it} \quad (3)$$

where *Ln(GDP per capita)* is the logarithm of the lagged per capita GDP of the country that the firm resides in and *Culture variables* is a vector representing the following Hofstede culture indices for the firm's country of incorporation: *Individualism, Masculinity/Femininity, Power distance and Uncertainty avoidance*. *ADRI*, *Corruption Control*, and *Legal origin*.

Table 3 presents the results of firm-year probit (columns (1)-(3)) or logit panel (column (4)) regressions with year and industry fixed effects, and two-way clustered standard errors by year and by country. All culture variables are rescaled through division by 100 to lie in the [0,1] range.

We first regress *ESGPAY* on the lagged per capita GDP of the country and the following subset of the Hofstede culture variables, *Individualism, Masculinity/Femininity, Power distance and Uncertainty avoidance*. Column (1) shows that firms from countries with high GDP per capita are more likely to use ESG-linked pay, consistent with the evidence in Figure 1 that firms from developed countries are more likely to use ESG-linked pay for their executives. In addition, firms in individualistic countries are significantly more likely to adopt ESG-linked pay, whereas those located in countries that value masculinity are significantly less likely to adopt it. In countries that value individualism, stress independence, and personal achievement (e.g., the US, Australia, and the UK), firms are more likely to use managerial pay

contracts to incentivize their CEOs. To the extent that ESG goals are important for these firms, we would expect a greater usage of ESG-linked pay incentives for their top executives.

Regarding *Masculinity*, a high score means that the dominant values in the society consist of competition, achievement, and material rewards for success, while its opposite, femininity, stands for societies with a preference for cooperation, modesty, caring for the weak and quality of life. Our results suggest that in feminine societies (e.g., Norway, Sweden and Netherlands), where people care more about ESG goals, firms utilize ESG-linked compensation contracts to meet these goals. In other words, if these firms use pay incentives to motivate their CEOs, it is likely that the portion of ESG-linked pay incentives is higher compared to firms located in low feminine societies.[18]

Next, we add regression variables that capture the legal and institutional environment of a country. Column (2) considers *ADRI*, the Anti-Director Rights Index, and *Corruption Control*. Stronger legal protection of outside investors limits the scope for expropriating them, and hence shareholders are willing to give top executives ESG-linked compensation contracts as they are not as worried about these being abused. The coefficient on *ADRI* is significantly positive, suggesting that countries with stronger legal protections for shareholders are more likely to adopt ESG-linked pay. The coefficient on *Corruption Control* is insignificant.[19]

Regarding a country's legal origin, Liang and Renneboog (2017) find that firms from civil law countries tend to have higher CSR ratings than firms from common law countries. The explanation is that civil law origin is more in line with a "stakeholder view" because it tends to be more strongly associated with state intervention in economic life via rules and regulations; whereas the common law countries favor shareholder protection and place fewer restrictions on managerial behavior.

Column (3) includes the variables that capture whether the firm's country is of civil law origin (French, German, or Scandinavian), relative to the baseline case of common law origin. The results show that firms located in countries with French or German civil legal origins are more likely to use ESG-linked pay, relative to firms from common law countries. The finding is consistent with the Liang and Renneboog (2017) view and suggests that ESG-linked pay is a mechanism through which company boards influence managerial decisions to focus on

[18] Table 1, Panel B, shows that the correlation between Individualism and Masculinity is -0.01, suggesting that these two culture variables are distinctly different.

[19] We also examined *Regulatory quality*, which proxies for the government's effectiveness in addressing social responsibility and market externalities when implementing policies and regulations that promote private sector development. The variable is highly correlated with *Corruption control*, with a correlation coefficient of 0.94. The coefficient of *Regulatory quality* is insignificant and hence we omit the variable from the regression to avoid multi-collinearity.

stakeholder value maximization. Interestingly, *Scandinavian civil* is negative and significant, although firms in Scandinavian civil law countries have the highest CSR scores, as documented by Liang and Renneboog (2017). A possible reason for this finding is that firms from Scandinavian civil countries already have such high CSR ratings that they do not need to provide explicit incentives for their managers. Column (4) uses the alternative logit specification and finds similar results to those in column (3).

We use the coefficient estimates from column (3) to illustrate the economic magnitude of the country-level variables that are significantly associated with a firm's propensity to adopt ESG-linked pay. We consider the marginal effect of a variable when evaluating all right-hand side variables at their mean level. A coefficient of 0.667 for *Ln(GDP per capita)* suggests that a one standard deviation increase in the *Ln(GDP per capita)* increases the probability of ESG-linked pay adoption by 10.62 percent points (pp). Similarly, a coefficient of 3.367 for *Individualism* suggests that a one standard deviation around the mean increase in the *Individualism* score increases the probability of ESG-linked pay adoption by 17.62 pp. For *Masculinity*, a one standard deviation increase in the score around the mean reduces the ESG-linked pay adoption probability by 7.88 pp; for *ADRI*, a corresponding increase is associated in an increase in the probability of ESG-linked pay by 8.47 pp. Regarding legal origins, firms from French or German civil law countries are 12.23 pp and 10.46 pp, are respectively, more likely to adopt ESG-linked compensation contracts than firms in common law countries.

Our analysis shows that countries' economic development, culture, and institutional and contracting environment, shaped by their legal origins, are strongly related to the likelihood that firms will adopt ESG-linked pay for their top executives.

3.3 Firm characteristics

So far, we have shown that industry and country factors play important roles in the adoption of ESG-linked pay by firms. We next turn to firm characteristics and their association with *ESGPAY* while controlling for the country and industry characteristics.

We perform the following probit, logit and OLS panel regressions of *ESGPAY:*

$$ESGPAY_{i,t+1} = \beta_0 + \gamma X_{i,t} + \varepsilon_{it} \quad (4)$$

where $X_{i,t}$ represents a vector of control variables: *LN_SIZE$_t$, LN_BM$_t$, LEV$_t$, ROA$_t$, IO$_t$, and EARN_VOL$_t$* (see, e.g., Ikram et al., 2019; Flammer et al., 2019).

We control for year, country and industry fixed effects and report *t*-statistics with standard errors clustered by year and by country.

Table 4 presents the results. In all the specifications, we find that large firms are more likely to adopt ESG-linked pay. In terms of economic significance, in column (4), keeping all right-hand-side variables at their mean level, the probability of ESG-linked pay adoption increases by 3.22 pp for a one standard deviation around the mean increase in *LN_SIZE*. Our results are consistent with Ikram et al. (2019), who find that firm size is the most significant firm characteristic driving the adoption of ESG-linked pay.

Our results indicate that high ROA firms are also significantly more likely to adopt *ESGPAY*. In terms of economic significance, evaluating all right-hand-side variables at their mean level in column (4), the probability of ESG-linked pay adoption increases by 0.39 pp for a one standard deviation around the mean increase in *ROA*. Institutional ownership does not seem to have a significant impact on ESG-linked pay in our sample. Institutional investors' impact in driving ESG-linked pay can be influenced by multiple considerations such as following their investment mandate, the need to obtain the desired returns, or to attract fund flows, and therefore can be much nuanced. For example, Gibson et al. (2022) find that while the non-US based PRI signatories exhibit better ESG scores for their portfolios than non-signatories, in contrast the US signatories have similar or worse ESG scores for their portfolios than non-signatories.[20]

Taken together, our analysis in this section suggests that a firm's decision to use ESG-linked pay for its executives is strongly associated with the firm's industry affiliation, its country of incorporation's institutional and legal environment and culture, and the firm's individual characteristics. Larger and more profitable firms, firms in industries for which ESG is of material concern, firms in countries with French and German civil law, higher per capita GDP, strong shareholder protections, and more individualistic and less masculine values, are more likely to adopt ESG-linked pay contracts.

4. ESG-linked pay and performance

In this section we turn to outcomes and analyze the relationship between ESG-linked pay and firms' social and financial performance. For social performance, we examine the firm's environmental, social and governance scores, as well as the quality of the firm's ESG

[20] Cohen et al. (2022) study public firms from 21 countries and find that engagement by the big-three largest institutional investors (i.e., Blackrock, State Street, and Vanguard) increases the ESG-linked pay adoption. As described in Section 2, our sample of MSCI ACWI firms spans 59 countries from developed and emerging markets and correspond to large and mid-sized companies that are already targeted by institutional investors. Hence, although our sample has a broader worldwide coverage, the sample is likely to have smaller within-country variations in *IO* compared to Cohen et al. (2022) and results in insufficient statistical power.

disclosure. For financial performance, we consider a firm's profitability and valuation. We first present OLS panel regressions of performance outcomes on *ESGPAY.* While the analysis in this section finds that ESG-linked pay is strongly associated with the social and financial performance of firms, the evidence does not speak to causal relations. We then provide further insight by considering a regulatory rule change that impacted some but not all firms' ESG disclosure obligations, leading to variations in the adoption and effectiveness of ESG-linked pay and the associated firm performance outcomes.

4.1 OLS panel regression analysis

We begin by examining how ESG-linked pay is associated with a firm's ESG performance for our ACWI sample of firms for the period 2005-2020. ESG performance is measured by the scores that the firm receives for environmental (*ENSCORE*), social (*SOSCORE*) and corporate governance (*CGSCORE*) performance.

We regress the firm's future ESG performance scores on the firm's lagged *ESGPAY* and present the panel regression analysis results in Table 5. Specifically, we estimate the following panel regression:

$$SCORE_{i,t+1} = \beta_0 + \beta_1 ESGPAY_{i,t} + \gamma X_{i,t} + \varepsilon_{it} \quad (5)$$

where $SCORE_{i,t}$ represents *SOSCORE, ENSCORE*, *CGSCORE*. We control for lagged firm characteristics ($X_{i,t}$) such as *LN_SIZE, LEV, LN_BM, ROA, IO* and *EARN_VOL*, as well as year, country and industry fixed effects, to mitigate the possibility that our findings are driven by firm characteristics or other omitted country- or industry-related variables. The standard errors are clustered by firm to account for possible intertemporal dependence in a firm's performance score and the corresponding *t*-statistics are reported in parentheses.

In Table 5 Panel A, columns (1) – (3), the outcome variables are measured in the following year and in columns (4) – (6), the outcome variables are measured two years later. Across all the specifications, we find that firms that adopt ESG-linked pay exhibit significantly higher environmental, social, and governance scores in the next two years compare to those without ESG-linked pay.

In terms of economic magnitude, the coefficient of 4.903 on *ESGPAY* for *ENSCORE* indicates that the adoption of ESG-linked pay is associated with a higher environmental score of 4.903 points (on a scale of 0-100 points) for the year, representing 10.11% variable's sample mean. The effect persists since the coefficient for the two-year forward regression of

ENSCORE on *ESGPAY* is 4.279, almost equal to the one-year forward coefficient. This persistence is observed for all the ESG outcome variables.

Similarly, the adoption of ESG-linked pay is followed by higher social scores *SOSCORE* for the next year, by 9.07% of the corresponding mean. The magnitudes are the largest for the governance score *CGSCORE*, with an increase corresponding to 13.99% of the mean.

In Panel B of Table 5, columns (1) – (3), the outcome variables, % change in emissions levels over the previous year, are measured in year t+1 and in columns (4) – (6), the outcome variables are measured two years later. Across all the specifications, we find that firms that adopt ESG-linked pay exhibit significantly lower % change increases in Scope 1 and Scope 3 emissions compared to those without ESG-linked pay.

In terms of economic magnitude, the coefficient of -1.905 on *ESGPAY* for Δ*SCOPE 1* (column (1)) indicates that the adoption of ESG-linked pay is associated with a lower growth rate in Scope 1 emissions, by 26.79% of the sample mean of 7.11 percentage points. The association persists with reduced magnitude in the two-year forward model. Similar effects are seen for Δ*SCOPE 3*. The coefficient for Δ*SCOPE 2* regression is also negative, although insignificant. Scope 1 emissions are directly controlled by the firm, Scope 2 emissions are associated with the production of the energy that a firm buys and Scope 3 emissions are associated with the upstream and downstream value chain upon which the firm has indirect control. A plausible reason for the non-association for Δ*SCOPE* 2 and ESGPAY could be high marginal costs in uncovering lower emissions in the regulated utilities industry.

Next, we run a similar set of panel regressions to estimate the relationship between ESG-linked pay adoption and future financial performance:

$$FinPerf_{i,t+1} = \beta_0 + \beta_1 ESGPAY_{i,t} + \gamma X_{i,t} + \varepsilon_{it} \quad (6)$$

where the outcome variable $FinPerf_{i,t+1}$ represents three types of measures: operating profit margin (OPM_{t+1}), return on assets (ROA_{t+1}), or Tobin's Q ($TobinQ_{t+1}$), and $X_{i,t}$ represents the vector of lagged control variables. Table 6 shows how ESG-linked pay is associated with a firm's future financial performance over the next two years; the control variables and the regression specification are the same as in Table 5. Columns (1) – (3) and (4) – (6) depict one- and two-year ahead performance respectively.

The results in Table 6 show that firms with ESG-linked pay have significantly higher *OPM* and *ROA* in the two subsequent years than firms without it. The coefficients of 1.339 and 1.601 for *ESGPAY* in columns (1) and (4) imply that firms with ESG-linked pay experience a higher

one-year ahead and two-year ahead *OPM* that is equivalent to 8.87% and 10.60% of the variable's sample mean, respectively. Similarly, column (5) shows that the presence of ESG-linked pay contracts is associated with a significantly higher *ROA* in year *t*+2, by 4.40% of the mean. In contrast to the accounting measures of profitability, we find no impact of ESG-linked pay adoption on the firm's market valuation as measured by Tobin's Q.

Although the OLS regression results indicate a strong positive association between ESG-linked pay and future profitability of the firm, one should be cautious in interpretating such associations. An obvious endogeneity concern about the association between ESG-linked pay and firm outcomes is that it could be driven by omitted variables that correlate with both the adoption of ESG-linked pay and unobservable firm characteristics. The relation could also be driven by reverse causality, for example, it might be that the more profitable firms are more likely to adopt ESG-linked pay. In the subsection that follows, we address this concern by exploiting a quasi-natural experiment that introduces positive shocks to the likelihood and effectiveness of ESG-linked pay adoption and use a difference-in-differences (DiD) methodology.

4.2 Disclosure policy and difference-in-difference analysis

In this subsection, we introduce the policy change that triggers variation in the rate of adoption of ESG-linked pay contracts and then describe the DiD analysis.

4.2.1 DiD analysis design

The quasi-natural experiment that we consider is Directive 2014/95/EU of the European Parliament. The law, first proposed in April 2013, was adopted by EU in April 2014, and became effective from fiscal year 2017 onward. The Directive mandates affected companies to report a non-financial statement that provides details on the firm's policies regarding "non-financial key performance indicators relevant to the particular business" including information on policies, risks, and outcomes regarding environmental, social, and employee matters. The rule applies to firms (i) listed on EU exchanges or with significant operations in the EU, (ii) defined as "large" (i.e., with 500 or more employees in the EU), or (iii) designated as public-interest entities by EU member states due to their activities, size, or number of employees.

We postulate that the Directive introduces a positive shock to the propensity to adopt ESG-linked pay for firms subject to the Directive for two reasons. First, the Directive exposes the affected firms to increased pressure (potentially from both the regulator and investors) to deliver and/or report good ESG performance, which leads to an increased need to incentivize

managers to focus more on ESG. Second, the directive makes the disclosure of ESG related information more transparent and hence makes it easier for shareholders to monitor the firms' ESG performance, making the ESG-linked targets more credible and suitable as performance metrics for managerial compensation contracts. As argued by Bebchuk and Tallarita (2022), transparent (and standardized) ESG performance disclosure is important in providing meaningful incentives for executives.[21]

Thus, it is plausible that these firms, that have hitherto not paid attention to non-financial metrics and do not have ESG-linked compensation contracts, will now consider adopting ESG-linked pay. Hence, the Directive likely introduced exogenous variation in firms' propensity to adopt ESG-linked pay.

We next provide evidence that the Directive indeed increased the likelihood of ESG-linked pay adoption for firms with EU subsidiaries. Using the full sample of Russell 3000 US firms, we show in Figure 4 that for firms with EU subsidiaries the proportion adopting ESG-linked pay increased from 5.66 % pre-Directive to 9.97% post-Directive, that is by 76%. In comparison, the corresponding increase for firms without EU subsidiaries is lower, namely by 56% (from 4.24% to 6.61%).

Appendix Table A2, Panel A further confirms this finding using multivariate regression analysis. The dependent variable of the regression is pre- or post-Directive *ESGPAY*. The pre-Directive *ESGPAY* equals one if the firm has ESG-linked pay for its executives in 2013, and zero otherwise. The post-Directive *ESGPAY* equals one if *ESGPAY* is one in at least one of the years during the period 2014-2017, and zero otherwise (to allow for staggered implementation of the Directive by different EU countries). In column (1) the coefficient on the interaction variable *EUsub*×*Post2014* (a dummy variable set to one if the firm has an EU subsidiary and the Directive is in place), is positive and highly significant, suggesting that US firms with an EU subsidiary experienced a significantly larger increase in the likelihood of ESG-linked pay adoption post Directive compared to firms with no EU subsidiaries. This effect remains robust after controlling for firm level characteristics and year and industry fixed effects in column (2).[22] This result is also in line with the cross-country evidence of Cohen et al. (2022), who show that the use of ESG pay is higher for countries with an ESG disclosure mandate.

[21] A counterargument might be that forced disclosure and ESG pay are substitutes: the fact that ESG performance is made public is enough to induce executives to protect their reputation by attending to ESG issues, so that ESG-linked financial incentives are no longer as necessary.

[22] In addition, Appendix Table A4 shows that the Directive is followed by an increase in the ESG disclosure quality by firms with ESG-linked pay. The result is consistent with Fiechter et al. (2022), who show a similar improvement for EU firms in the wake of the Directive.

We consider firms that were affected by the Directive and adopted ESG-linked pay after its enactment, as treatment firms. Since the Directive directly affects firms that have a significant presence in the EU as detailed above, we focus on US firms that have EU subsidiaries.[23] We first broaden our US sample coverage from the MSCI ACWI US sample to include all Russell 3000 firms that are covered by Bloomberg. From this expanded sample, we select treatment firms as those with EU subsidiaries that first adopted ESG-linked pay between 2014, the year the Directive was adopted, and 2018, the year after it became effective. Of the 793 US firms that have an EU subsidiary, 58 firms adopted ESG-linked pay since 2014 and therefore are classified as treatment firms.[24]

The control firms analyzed in this section are US firms without EU subsidiaries that hence were not impacted by the Directive and that never adopted ESG-linked pay.[25] Specifically, we select, from the Russell 3000 sample, firms with the same industry affiliation and similar characteristics as the treatment firms, but with no EU subsidiaries, and that never adopted ESG-linked pay in the period 2011-2018. The firm characteristics that are used in selecting the control sample are *LN_SIZE, LN_BM,* and *TobinQ* as of 2013. We use the nearest neighbor method to find control firms that has the smallest Mahalanobis distance from the treatment.[26] We impose the requirement that both treatment and control firms should have continuous ESG pay data coverage starting from three years before up to four years after the enactment of the Directive, (i.e., 2011-2018).

Appendix Table A3 presents the comparison of firm-level covariates for the treatment and control firms used in our main DiD analysis. These firms are similar in characteristics such as *LN_SIZE LN_BM, LEV, ROA, EARN_VOL, AGE* and *IO*, confirming that the treatment and control firms share similar characteristics pre-Directive.

[23] We collect the subsidiary location data using the subsidiary data from WRDS, which is obtained from Exhibit 21 of the firm's annual 10-K filing. We argue that the presence of an EU subsidiary in the 10-K indicates that the firm has a significant presence in the EU. We use the ISIN of our dataset to find the Central Index Key (CIK) from Bloomberg and then match the subsidiary data using the CIK. If a firm has (any) EU or UK subsidiary, we then define this firm as a firm with EU subsidiaries. We could not use any EU firms for the DiD analysis because all of them are subject to the EU Directive, which makes it impossible to select treatment and control firms.

[24] Of the 793 firms, 665 never adopted ESG-linked pay, 43 adopted pre-2014, and the remaining 27 firms had irregular adoption patterns.

[25] In Section 5.2, we provide further analysis comparing the treatment firms with alternative control firms, namely, firms with EU subsidiaries that adopted ESG-linked pay prior to the Directive, firms with EU subsidiaries that did not have ESG-linked pay in our sample, and other US firms that did not adopt ESG-linked pay.

[26] Mahalanobis distance ($d_M(x, y)$) between two vectors (of firm covariates), x and y, is computed as $\sqrt{(x-y)^T S^{-1}(x-y)}$, where S is the covariance matrix.

4.3 ESG-linked pay and ESG performance

In this section we analyze the relationship between ESG-linked pay and ESG performance as measured by Social (*SOSCORE*), Environmental (*ENSCORE*), and Corporate Governance (*CGSCORE*) scores using DiD analysis. For each treatment firm and its matched control firm we include five annual observations centered around the event year (i.e., the year of ESG pay adoption)—event window [-2, +2]. Specifically, we estimate the following panel regression equation:

$$SCORE_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it} \quad (7)$$

where $SCORE_{i,t}$ represents one of the ESG scores (*SOSCORE, ENSCORE*, and *CGSCORE*), $TREAT_i$ equals one if firm *i* is a treated firm (that is, it is subject to the EU Directive and adopts ESG pay) and zero if the firm is a matched control firm. $AFTER$ equals one if year *t*+1 is post-ESG-linked pay adoption for the corresponding treatment firm. $X_{i,t}$ represents a vector of control variables: LN_SIZE_t, ROA_t, LEV_t, LN_BM_t, IO_t, and $EARN\_VOL_t$. All the regressions control for year and industry fixed effects. Standard errors are clustered by firm and the corresponding *t* statistics are reported in parentheses.

Table 7 reports the results. The coefficient on the interaction term $TREAT_i \times AFTER$ is positive and marginally significant for $SOSCORE$ (column (1)). The result suggests that the post-Directive adoption of ESG-linked pay by treatment firms is followed by a significant improvement in the social performance relative to control firms. The coefficient of 3.698 in Column (1) corresponds to an increase of 7.4% in *SOSCORE* relative to the sample average. Regarding $CGSCORE$ and *ENSCORE*, the coefficient estimates are insignificant.

4.3.1 ESG-linked pay and financial performance

Next, similar to the analysis in the previous subsection, we run regressions that estimate the effect of ESG pay adoption on financial performance based on the same panel dataset:

$$FinPerf_{i,t+1} = \beta_0 + \beta_1 Treat_i \times AFTER + \beta_2 Treat_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it} \quad (8)$$

where the outcome variable $FinPerf_{i,t+1}$ represents three types of measures: operating profit margin (OPM_{t+1}), return on assets (ROA_{t+1}), or Tobin's Q ($TobinQ_{t+1}$), and $X_{i,t}$ represents the same vector of control variables (lagged by one fiscal year).[27]

Table 8 presents the results. As shown, the estimated coefficient on the interaction term, $Treat_i \times AFTER$, is positive for all three outcome variables but is significant at the 5% level for OPM_{t+1} only. Treatment firms experience a significantly higher increase in operating profit margin after the adoption of ESG-linked pay relative to control firms. The economic magnitude of this increase is sizable: column (1) shows that (after controlling for firm characteristics as well as year and industry fixed effects) treatment firms experience an increase of *OPM* after the adoption of ESG-linked pay (following the 2014 enactment of the Directive) that is about about 3.08 percent points greater than for control firms, representing approximately 20.0% of the sample average *OPM*. The positive and significant treatment effect is robust to the inclusion of the four additional firm-level controls and event-year fixed effects.

4.3.2 Parallel trends and direct effects

The difference-in-difference (DiD) model is based on the premise that in the absence of ESG-linked pay adoption, the outcome variables for the treated and control firms would exhibit parallel trends. To confirm this, focusing on the social score which was found to be significantly related to *ESGPAY*, we estimate the following DiDi model, replacing the $AFTER$ dummy in equation (7) with indicator variables for different event years around the adoption of ESG-linked pay as follows:

$$SOSCORE_{\mathrm{i,t+1}} = \alpha + \beta \mathrm{TREAT_i} + \beta_{-1}\mathrm{TREAT_i} \times D_{\mathrm{t=-1}} + \beta_0 \mathrm{TREAT_i} \times \mathrm{s}D_{\mathrm{t=0}} + \beta_1 \mathrm{TREAT_i} \times D_{\mathrm{t=1}} + \beta_2 \mathrm{TREAT_i} \times D_{\mathrm{t=2}} + \gamma_{-1} D_{\mathrm{t=-1}} + \gamma_0 D_{\mathrm{t=0}} + \gamma_1 D_{\mathrm{t=1}} + \gamma_2 D_{\mathrm{t=2}} + \eta X_{i,t} + e_{i,t} \quad (9)$$

where $D_t=i$, i=*-1, 0, 1, 2*, are indicator variables that are set to one for years -1, 0, 1, and 2, respectively, relative to the year in which the treatment firm adopted ESG-linked pay, and zero otherwise. The coefficients of interest are β_{-1}, β_0, β_1, and β_2 and we plot the coefficients and the corresponding 90% confidence intervals in Figure 5.

The plot shows that, consistent with the findings in Table 7, the β_1 and β_2 coefficients are significantly positive, indicating that treatment firms experienced significantly better social performance after the adoption of ESG-linked pay than control firms. More importantly, the

[27] The US Russell 3000 sample includes many small firms with a large left tail of extremely negative *OPM*. We select a comparable sample of the largest decile of the Russell 3000 firms by market cap and winsorize *OPM* at the 1st and 99th percentile of the distribution.

β_{-1} and β_0 coefficients are insignificant, suggesting similar trends between the treatment and control firms in the year prior to adoption and the year of the adoption. We therefore conclude that the omitted variables are unlikely to contribute to our findings.

Similarly, we conduct parallel trend analysis by estimating a dynamic DiD model similar to equation (8), replacing *SOSCORE* with *OPM*. Figure 5 panel (b) plots the coefficient estimates, are β_{-1}, β_0, β_1, and β_2, and the corresponding 90% confidence intervals. The results show that β_{-1}, β_0 are insignificant, whereas β_1, and β_2 are significantly positive. These results support the parallel trend assumption and suggest that the relationship is not driven by omitted common factors.

We next investigate the extent to which the Directive directly affect firms' ESG and financial performance by focusing on a subsample of 103 firms that already adopted ESG-linked pay prior to the Directive. Appendix Table A2 Panel B examines the Russell 3000 sample by regressing firms' ESG scores, financial performance measures, and disclosure quality scores on the indicator variable representing applicability of the Directive, *EUsub*×*Post2014*. Since the Directive does not change these firms' decisions on ESG-linked pay, the observed effect, if any, would reflect the direct effect of the Directive on performance. Therefore, the results from this test would help us assess whether firms' changes in ESG-linked pay decision have an effect over and above the direct effect of disclosure. We find that the coefficients on *EUsub*×*Post2014* are insignificant across all the performance measures, indicating that the Directive did not trigger different performance outcomes for early adopter firms with EU subsidiaries relative to those without.[28] Hence our DiD analysis finding that the post-Directive adoption of ESG-linked pay is followed by better ESG and financial performance for the treatment firms, is likely causal.

While it is intuitive that ESG-linked pay induces executives to focus on a firm's ESG performance, it is less clear why such pay contracts lead to higher profitability as measured by *OPM*. As discussed in the introduction, while such contracts have the potential to align managerial incentives with the interests of shareholder in the long run, the contract may introduce a multitasking problem and can draw managers' attention away from important other tasks and thus hurt financial performance (Holmström and Milgrom 1991, Bebchuk and

[28] In addition, Appendix Table A4 shows that the Directive is followed by an increase in the ESG disclosure quality by the treatment firms. The result is consistent with Fiechter et al. (2022), who show a similar improvement for EU firms in the wake of the Directive.

Tallarita 2022). Therefore, we next explore the plausible channels through which ESG-linked pay can improve the financial performance of the firm.

5. Channels for the impact on performance and further analysis

We have established that US firms with exposure to the more stringent non-financial disclosure rule imposed by the EU Directive who first adopted ESG-linked pay after the regulation came into force experienced significantly larger increases in operating profit margin. In this subsection we delve deeper into the specific types of ESG performance metrics adopted in executive compensation contracts by these treatment firms to shed light on the channels through which the ESG-linked incentives help drive their superior financial performance.

We also provide additional analysis on the relationship between a firm's choice of ESG-linked pay and their subsequent performances for different types of firms, by whether they have EU subsidiaries, and before and after the EU Directive. Additionally, we explore the heterogeneity of our main findings for firms that differ in their pre-Directive ESG disclosure quality. Finally, we present robustness checks using ESG scores obtained from an alternative data source.

5.1 ESG categories and compensation

We collect data on absolute performance goals from ISS Incentive Lab, which sources it from firms' proxy statements (Bennett et al. 2017). We have information on all the cash, stock, and option grants awarded to the top executives of the largest 750 U.S. firms based on market capitalization over the time period 1998–2021. This dataset provides information on the metric(s) the grant is tied to. The keywords of these metrics may include financial goals such as sales, EPS, operating income, EBITDA, etc., as well as non-financial goals such as customer satisfaction, staff health and safety, diversity, CSR, environmental protection, etc. We then match this dataset with the extracted grant level information identifying the type of the grant.

A grant typically includes multiple performance objectives. A grant is classified as ESG-related if it includes at least one performance metric keyword featuring a non-financial, non-operational performance goal, such as "CSR", "esg", "employee", "staff", "talent", "social", "diversity", "climate", and "environment". Next, we classify the types of specific ESG metrics into four categories: *Employee* (employee/staff/talent related), *Customer* (customer related, e.g. customer satisfaction), *Diversity*, and *Environment/Climate*. The grants are paid in the form of either cash bonuses or restricted stock units (RSU). We then create a set of dummy variables, *EMP*, *CUS*, *DIV*, and *ENV* respectively, indicating whether a certain category of ESG

performance metric is featured among the absolute performance goals tied to the grants that a firm issues to its executives in a given fiscal year.

We first examine the extent to which the various categories of ESG metrics were adopted by the treatment firms in our DiD sample. Figure 6 presents the comparison of average adoption rate (represented by the bars) by treatment firms during event years 0 to 2, for the four categories of ESG metrics separately, with the corresponding 95% conference intervals. The figure shows that the *EMP* metric has a highest adoption rate of about 3.0%, followed by *CUS* metric with a 1.9% adoption rate. The average adoption rates of *ENV* and *DIV* metrics are lower.

In addition, similar to our main DiD analysis for SOSCORE, we run the following panel regressions to estimate the specific type of ESG performance metric adopted by the firm after adopting ESG-linked pay:

$$ESGPAY\_CAT_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it} \qquad (10)$$

where $ESGPAY\_CAT_{i,t+1}$ is a dummy variable representing the presence of one of the four above-defined categories of ESG keywords in absolute performance goals for cash, stock, and option grants awarded to the CEO as reported by ISS Incentive Lab: *EMP* (employee/staff/talent related), *CUS* (customer related), *DIV* (diversity), and *ENV* (environment/climate related). $X_{i,t}$ represents a vector of control variables similar to our previous specifications. All the regressions control for industry and year fixed effects.

By design, the treatment sample is selected as firms that adopted ESG-linked pay post Directive, hence we expect that the likelihood of the adoption of such pay would be higher for treatment firms than the controls. The interesting question is whether the treatment firms are more likely to adopt such incentives across all ESG subcategories or do they have any preference towards any particular subcategories over the rest.

Panel A of Table 9 reports the results. The coefficient on the interaction term $Treat_i \times AFTER$ is positive for the first two categories of keywords, *EMP* and *CUS*, but is only statistically significant for *EMP*. Economically, a coefficient of 0.141 for *EMP* suggests that the treatment firms are more likely to adopt employee-related absolute performance metrics, by 14.1 pp, corresponding to 66% of the variable's standard deviation.

Next, we construct a continuous measure to quantify the proportion of ESG-linked cash incentive pay in total executive compensation. For each named executive officer (NEO) whose compensation is reported in the proxy statement, we compute the ratio of cash incentive pay

that mention a particular type of ESG metric (i.e. Employee, Customer, Diversity, and Environment/Climate) to total compensation and take the average of the ratios for all named NEOs of the same fiscal year.[29] Then we re-run the panel regressions as specified in equation (10) by replacing the dummy outcome variables with these continuous variables.

Panel B of Table 9 reports the results. Similar to our results based on dummy indicators of ESG metric adoption, the coefficient on the interaction term *TREAT×AFTER* is positive and significant only for the employee-related metric, suggesting that among the different metrics that treatment firms could potentially adopt, the employee metric linked cash incentive pay likely increased the most relative to total executive compensation. The 2.9% increase in this ratio corresponds to an increase of ESG-linked incentive pay of up to $272,947 for the median value of total compensation ($9,411,976) in our Diff-in-Diff analysis sample. Appendix Table A5 shows similar results for the CEO's compensation.

Together with our finding that social scores and financial performance improve, this suggests that employee satisfaction could be a potential channel through which ESG-linked pay enhances both the social and financial performance of a firm. As Edmans (2011) and Edmans et al. (2023) point out, employee satisfaction can enhance firm value through the recruitment, retention, and motivation of talented, innovative, and capable employees, and the benefits are especially high in a flexible labor market. Empirically, the authors find that high employee satisfaction is associated with higher long run stock returns and higher future profitability for the US firms and firms in countries with flexible labor supply. Furthermore, they show that the value of employee satisfaction is not fully incorporated into stock prices, hence the value of employee satisfaction is only manifested in future earnings surprises and long run stock returns.

Building on these findings, we postulate that managers may not be fully aware of the value of human capital investment. Hence a managerial compensation contract that has explicit performance metrics for employee satisfaction helps focus managers' attention on this value-adding investment. As a result, the corresponding managerial effort not only improves the social score of the firm but also allows the firm to capture the benefit of more productive and innovative employees. Consistent with this, our findings suggest that enhanced employee

[29]Note that a grant may be associated with performance metrics that concern more than one ESG subcategories as well as related to financial performance metrics. Hence our classification is non-exclusive and the quantitative magnitude we report in this subsection should be interpreted as the upper bound of the quantity of incentives for a particular category.

satisfaction is a channel through which the post-Directive ESG-linked pay adoption results in both higher social scores and greater OPM.

As for the other categories of performance goals in the executive compensation contracts, *CUS, DIV, and ENV*, the coefficient is insignificant. There are several possible reasons for this. It might be that the firm considers trade-offs, and managerial efforts to improve Environment/Climate performance may be costlier for a US firm than its EU counterparts, making the multitasking concern more salient. Another reason could be that there is just insufficient variation in the DiD sample to uncover any significant results.

We should also note that the lack of association of ESG-linked pay adoption with the other performance dimensions (e.g., environmental performance) for our sample of US firms need not extend to firms in other markets. The reason is that the shareholder view of capitalism is much more prevalent in the US than, for example, the EU. Hence it might be that the US firms are more likely to take the route with the least resistance when considering improving ESG performance. That is, relative to EU firms, US firms may be more likely to choose to provide incentives to improve employee satisfaction that allows the firms to achieve a "win-win" outcome, rather than choose to improve the firm's climate performance, which may entail financial costs.

In this regard, our findings of the effect of ESG-linked pay on US firm's social scores and profitability can be viewed as the lower bound of the potential beneficial social impact that ESG-linked pay may achieve. For firms in countries that are more receptive to ESG concerns, it is likely that the effect of ESG-linked pay on social performance is broader. For example, Cohen et al. (2022) find that the ESG-linked pay adopters, especially those in the EU, experience improvements in their environmental performance as measured by carbon dioxide emissions.

5.2 EU Directive and ESG-linked pay for different types of firms

Our earlier analyses exploit the EU Directive that introduces a shock to the probability of ESG-linked pay adoption, as illustrated in Figure 4 and Table A2. But we acknowledge that there is always an endogenous component in a firm's decision to adopt ESG-linked pay. Hence, it is informative to examine possible changes to firm outcomes for different types of firms characterized by their ESG-linked pay adoption decision before and after the EU Directive.

Specifically, to provide more insight into how various types of firms' performance changes after the EU Directive, we perform additional analysis by classifying all Russell 3000 US firms into three groups: (i) late adopters who adopted ESG-linked pay for the first time after 2014

(i.e. equivalent to our definition of treatment firms in the DiD analysis); (ii) early adopters who adopted ESG-linked pay before 2014; and (iii) never adopters who never adopted ESG-linked pay throughout the sample period 2005-2020. Within each category, we group the firms into two subcategories based on whether a firm has EU subsidiaries. Panel A of Table 10 presents the summary statistics of the characteristics of these firms as of 2013, one year before the EU Directive was adopted.

Among firms with EU subsidiaries, early adopters have the highest pre-Directive ESG disclosure quality, followed by late adopters, with never adopters the lowest. The same is true for firms with no EU subsidiaries. The early adopters also tend to have better ESG performance than the late adopters, and the never adopters tend to have worse ESG performance. Within the same adopter category, firms with EU subsidiaries tend to have better ESG disclosure quality and ESG performance than those without EU subsidiaries.

One potential limitation of our DiD analysis is that the matched control firms are selected from the pool of US firms with no EU subsidiaries. One might be concerned that our findings of ESG-linked pay may be driven by the direct effect of the EU directive in ways that our matched sample and parallel analysis fail to account for. To address this concern, we next compare treatment firms with firms with EU subsidiaries that differ in their choices of use ESG-linked pay and the timing of such choices. To the extent that the firms with EU subsidiaries have similar exposure to the EU Directive policy shock, the differences in firm outcomes are unlikely to be driven by the direct effects of the Directive.

EU-Sub Late-Adopters vs. EU-Sub Never-Adopters We first compare the treatment firms from the DiD analysis with other US firms that also have EU subsidiaries but never adopted ESG-linked pay throughout our sample period. Specifically, we match each treatment firm with a control firm with the same industry affiliation and similar firm characteristics from the pool of never adopters with EU subsidiary. This alternative matching method help alleviate the concern with our main DiD analysis that there might be significant differences in the fundamentals between firms EU subsidiaries and firms without.

Panel B of Table 10 presents the results. The positive and significant coefficient coefficients on the interaction term, *TREAT×POST*, suggests that firms who chose to adopt ESG-linked pay after the Directive experienced significantly greater improvement social score, compared to firms who never adopted ESG-linked pay. Similarly, *OPM* is also higher for treatment firms.

Taken together, these echo our earlier DiD results presented in Tables 7 and 8 that firms who adopted ESG pay after the Directive improve ESG performance without sacrificing

financial performance. To the extent that the firms with EU subsidiaries have similar exposure to the EU Directive policy shock, this finding suggests that the differences in firm outcomes are unlikely to be solely driven by the direct effects of the Directive.

EU-Sub Late-Adopters vs. EU-Sub Early-Adopters Next, we proceed to compare the impact of ESG-linked pay adoption for early versus late adopters within the subsample of Russell 3000 firms that have EU subsidiaries. We regress firm outcomes on the ESGPAY dummy, a late adopter dummy (*LATE_ADOPTER*), and the interaction of the two terms, controlling for the same firm-level controls and fixed effects. The coefficient of interest is the one on the interaction term as an indication for whether and how the link between ESG-linked pay adoption and firm outcomes is different for late adopters as compared to early adopters.

Table 10 Panel C presents the results. Compared to early adopters, post 2014 ESG-linked pay adoption is associated with a larger increase in the operating profit margin with 10% statistical significance. One possible explanation is that early adopter firms may have self-selected to adopt ESG performance metrics, especially metrics that are not easily verifiable or are easy to hit, in anticipation of poorer operating performance in order to allow for more room to justify granting a higher executive bonus. Hence, the Directive, by increasing the transparency of ESG performance objectives in pay, might have the effect of enhancing the effectiveness of incentives and alleviating the agency costs associated with fluffy ESG-linked pay contracts discussed in the introduction.

Non-Adopters: EU-Sub firms vs. Non-EU Sub firms Our final analysis in this subsection assesses the direct effect of the Directive by comparing, among US firms that did not use ESG-linked pay, the performance of firms with EU subsidiaries with those without.

Specifically, we compare, among US firms that did not use ESG-linked pay, the performances of firms with EU subsidiaries with those without. If our DiD results in Table 7 is purely due to the direct impact of the EU Directive and ESG-linked pay is irrelevant, we would expect that firms with EU subsidiaries to have a similarly higher social score and *OPM* than firms without EU subsidiaries post 2014.

Table 10 Panel D presents the results of panel regressions of firm performances on a firm's EU subsidiary status (*EUsub*), an indicator for the post 2014 time period (*Post2014*), and the interaction of the two for this subsample, controlling for the same set of firm characteristics and fixed effects. The interaction term, *EUsub*×*Post2014* is the variable of interest. The coefficient of *EUsub*×*Post2014* in columns (1) is positive and significant, indicating that, post Directive, firms with EU subsidiaries increase their social scores more than firms without EU

subsidiaries, by 2.96. Nevertheless, the magnitude of the increase is smaller compared to what we observe for Table 7, where treatment firms outperform controls by 3.70, respectively, post their ESG-linked pay adoption. This suggests that the direct effect of the Directive on firms with EU subsidiaries does not fully explain our findings for the improved social performance associated with the post-Directive ESG-linked pay adoption.

More importantly, columns (4) and (5) show that the coefficients of *EUsub×Post2014* are negative and significant for *OPM* and *ROA*. These estimates are in sharp contrast to the positive corresponding coefficients we observe in Table 8. This further suggests that our findings for *OPM* cannot simply be explained by the direct effect of the EU Directive on firms with EU subsidiaries. Instead, the contrast between Table 8 and Table 10 Panel D suggests that focusing managerial attention on the less salient and intangible dimensions of employee satisfaction can be value-enhancing, as highlighted by Edmans (2011) and Edmans et al. (2023).[30]

5.3 Heterogeneity by pre-Directive disclosure quality

As regulators consider whether and how to implement mandatory ESG disclosure policies (see Krueger et al., 2021 for a recent survey), an important consideration is how different firms may respond differently to such regulations. In this subsection, we focus on the dimension of a firm's existing ESG disclosure quality and ask the question of how the ESG-linked pay adoption propensity (in response to the Directive) depends on the existing disclosure quality.

One might expect that, among firms affected by the EU Directive, those with lower ESG disclosure quality may have a relatively higher exposure to the Directive, due to a stronger need to improve their disclosure quality to comply with the new regulation. Hence, such firms are more likely to adopt ESG-linked pay to focus managerial attention on ESG performance metrics. On the other hand, one may argue that firms with relatively high ESG disclosure quality before the regulation are likely to be the firms for which ESG reporting matters more. Therefore, we may observe an increased adoption of ESG-linked pay to further incentivize their management to deliver better ESG performance.

To shed light into this debate, we conduct cross-sectional analyses and examine potential variation in our treatment effects. Specifically, we investigate how a firm's pre-Directive ESG disclosure quality influences its ESG-linked pay adoption decision and firm outcomes.

[30] The observed lower ROA and OPM post Directive for the firms with EU subsidiaries compare to those without EU subsidiaries might be associated with the cost of compliance. Additionally, the higher post-Directive Tobin's Q for firms with EU subsidiaries could be due to the lowers ESG disclosure and litigation risk and investors' willingness to pay for this "greenium." We leave the further exploration of this for future work.

We first focus on the broader the sample of Russell 3000 firms with EU subsidiaries and sort them into four quartiles, $Rank_{ESG\_DISC}$ =1 through 4, based on their ESG disclosure quality score as of year 2012, where 1 corresponds to the lowest disclosure quality quartile and 4 corresponds to the highest.[31] We then conduct a panel regression analysis with the *Post2014* dummy and its interactions with three of the four quartile indicators, controlling for indicators of ESG disclosure quality and firm characteristics.

Table 11 presents the results. The coefficient on *Post2014* in columns (1) and (3) indicates the baseline effect of the Directive on firms that had the lowest ESG disclosure quality before the Directive. This coefficient reflects the change in the likelihood of these firms adopting ESG-linked pay from before to after 2014. In columns (2) and (4), year fixed effects are included, which means the *Post2014* effect is already accounted for in those models. The focus is on the interaction terms $Post2014 \times RANK_{ESG\_DISC}$, which measure the varying likelihood of adopting ESG-linked pay among firms with different levels of ESG disclosure quality. The interaction terms for the highest disclosure quality rank are positively significant in all columns, indicating that firms with the highest ESG disclosure quality before the Directive are the most likely to adopt ESG-linked pay after 2014.

We next build upon our DiD analysis from Section 4.2 by categorizing the treatment firms into two subgroups based on their ESG disclosure quality before the Directive. We define *TRT_DiscL* (*TRT_DiscH*) as one for firms with pre-Directive ESG disclosure quality below (above) the median, and zero otherwise. We then modify equations (7) and (8) by replacing the treatment dummy *TRT* with *TRT_DiscL* and *TRT_DiscH*, as outlined in equations (7) and (8).

Table 12 presents the results for firm performance, with ESG and financial performance presented in Panels A and B, respectively. The key coefficients are those associated with the interaction terms: $TRT\_DiscL \times AFTER$, and $TRT\_DiscH \times AFTER$. In Panel A, we see a positive and significant coefficient for $TRT\_DiscL \times AFTER$ in columns (1) and (3), indicating a stronger improvement for social and governance scores for firms with lower pre-Directive ESG disclosure.

Moving on to financial performance, Panel B reveals an intriguing pattern: the Directive's positive influence on firms' ROA and OPM is primarily seen in treatment firms with above-median pre-Directive ESG disclosure, as shown by the significant coefficient for the second

[31] We obtain firms' ESG disclosure scores, ESG_DISC, from Bloomberg. ESG_DISC is based on ESG data from published disclosures and news items. It is a measure of transparency and ranges from 0 to 100.

interaction term. This differential effect does not extend to the market-based performance indicator, Tobin's Q.

In a related study, Fiechter et al. (2022) found that EU firms with lower initial CSR reporting quality ramped up their CSR activities more substantially in response to the Directive but also suffered declines in financial performance (ROA and Tobin's Q). Our research corroborates the finding of a pronounced impact of the Directive on social performance for firms with poor pre-Directive disclosure, but it also contributes new insights on several fronts. Firstly, by analyzing US firms affected by the Directive, we highlight the cross-border spillover effects of EU disclosure policies, which is particularly relevant for large, multinational US corporations. Secondly, our study explores the adoption of ESG-linked compensation as a mechanism by which disclosure policies might shape corporate behavior and outcomes. Lastly, we find that the post-Directive adoption of ESG-linked pay has differential effects on financial versus nonfinancial performance outcomes, depending on a firm's prior disclosure quality—while this adoption results in greater improvements for companies with previously poor ESG disclosure quality, those with a history of strong ESG disclosure quality experience even greater improvements in financial outcomes. The result points to a multifaceted role for disclosure regulations and underscores their intricate role on firms. Such complexity calls for further investigation to pinpoint the exact drivers of these varied outcomes.

5.4 Robustness checks with alternative ESG score variables

In this subsection, we adopt alternative ESG performance measures obtained from Bloomberg and perform robustness checks of our main results.

Bloomberg provides individual environmental, social and governance pillar scores for over 6000 firms in their BBESGCO Index, and the data is available since 2015.[32] The scores range from 0-10 with higher scores indicating better performance. To make the Bloomberg ESG scores comparable to the corresponding Refinitiv scores that range from 0-100, we scale the Bloomberg E, S, G score by a factor of 10. The data was merged using ISIN and its corresponding Bloomberg identifier ticker. Of the 2,781 firms in our ACWI sample, we obtain data for 2,526 firms. The mean of the Bloomberg E, S and G scores for firms in the MSCI ACWI index (with non-missing ESGPAY data) from 2015-2020 after scaling are 19.74, 22.83

[32] We choose to use the Bloomberg scores rather than the MSCI KLD scores or the Sustainalytics scores used in previous literature because of the better availability of the Bloomberg data in recent years. The MSCI KLD scores are unavailable after 2019 and the Sustainalytics scores are unavailable after 2018. Since ESGPAY adoption has been on the rise and ESG issues have become salient in recent times, it seems appropriate to use a measure that is available through the end of our sample period.

and 55.59 respectively with standard deviations of 19.62, 17.30 and 14.52 respectively. The correlations of the Bloomberg E, S, G scores with their Refinitiv counterparts are 0.45, 0.41 and 0.39 respectively. The relatively low correlations are in line with Berg et al. (2022).

We first replicate Table 5, Panel A for the full global sample of firms in the MSCI AWCI index. Appendix Table A6 presents the OLS regressions for the robustness check. As in Table 5, we find that *ESGPAY* is associated with improved future ESG outcomes. The magnitudes of the coefficients for *ESGPAY* are also similar to those of Table 5, adding greater confidence to our results.

Appendix Table A7 presents the robustness check for our DiD analysis using the alternative ESG scores. In Panel A, we compare the treatment firms' average performance in the three years before the adoption of ESG-linked pay with the average three-year performance after adoption.[33] Panel A reports the results. The coefficient on the interaction term $TREAT_i \times AFTER$ is positive and marginally significant for $SOSCORE\_B$ (like the results of Table 7) and positive and significant for *ENSCORE_B* (Column (2)).

In an alternative test reported in Panel B, we include in our estimation five annual observations centered around the event year (i.e., the year in which ESG-linked pay is first adopted) for both treatment and control firms and estimate a panel regression specified similar to regression model (7). Since coverage of Bloomberg ESG ratings starts from year 2015, the ratings are missing for a significant fraction of DiD sample observations, especially observations associated with event year earlier than or equal to 2015. The coefficient on the interaction term $TREAT_i \times AFTER$ is positive and marginally significant for *ENSCORE_B.*[34]

6. Conclusion

We study the adoption of ESG-linked executive compensation contracts for an inclusive global sample of major firms across 59 countries over the period 2005-2020. We document a substantial increase in firms' adoption of ESG-linked pay over the last decade, especially for firms from developed markets and those that belong to the extractive and utility industries. The adoption decision is also strongly associated with the culture, shareholder rights and legal origin of the country where the firm resides. Among firm characteristics, large firms and firms

[33] Since the coverage of Bloomberg ESG scores is less comprehensive relative to Refinitiv, we choose this slightly longer event time window for estimation as compared to the 5-year time window [-2,+2] used for our main analysisE.

[34] In unreported tests, we obtain qualitatively similar results when we restrict the estimation window to the [-2, +2] event year window.

with greater return on assets are more likely to adopt. Firms that adopt ESG-linked pay exhibit significantly higher ESG scores, and higher operating profit margin and return on assets.

Exploiting a policy change that mandates corporate ESG disclosure to provide a plausible exogenous shock to the decision to adopt ESG-linked pay, we conduct DiD analysis to provide identification. For the treatment firms, that is, firms that are affected by the policy change and that adopt ESG-linked pay following the enactment of the policy, we show that the effect of ESG-linked pay on improving the firms' social score and profitability is likely to be causal. Further exploring contracts at the individual grant level, we show that the treatment firms' increased reliance on executive incentives tied to employee satisfaction is a plausible channel to achieve a "win-win" outcome.

We should note that our study is subject to limitations. Although our comprehensive global sample encompasses a significant portion of the worldwide equity market, the correlations between ESG-linked pay and firm outcomes, as well as the factors influencing ESG-linked pay, do not inherently imply causation. We employ DiD analysis to examine a scenario in which the adoption of ESG-linked pay is more likely triggered by the Directive and less likely influenced by other unobserved firm characteristics. This approach helps mitigate concerns related to endogeneity to a certain extent. By matching treatment and control firms based on a range of firm attributes, we confirm that these two groups exhibit comparable trends prior to the implementation of ESG-linked pay. Despite our conscientious efforts, it is important to acknowledge that challenges related to identification persist within such contexts.

Our results suggest that ESG-linked pay contracts have the potential to serve as a useful corporate governance tool to achieve the desired social and financial performance and that more transparent ESG disclosure can make such tools more effective. However, there is likely no one-size-fits-all formula for such contracts. Company boards need to take into consideration the relevant ESG concerns that are material to the company, the role of regulation, and the benefits and costs of ESG initiatives in relation to their financial performance. Increased salience of ESG and an understanding of the role of stakeholders in achieving corporate sustainability is likely to fuel more research into understanding key issues in ESG-linked pay contracts. More broadly, policy makers who aim to achieve international cooperation in tackling the climate crisis also need to be mindful of the tradeoffs firms face and the relevance of the cultural, legal and institutional environments that firms operate in.

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Exhibit 1: Examples of ESG-linked pay

This exhibit provides examples of ESG-linked pay obtained from the companies' proxy statements. Panels A through E correspond to Alcoa Corp., Gilead Sciences, Inc., General Motors Company, Bank of New York Mellon Corporation, and Affiliated Managers, Inc., respectively.

Panel A: Alcoa Corporation – 2017 proxy

Executive Compensation | Compensation Discussion and Analysis | Components of ParentCo's 2016 Executive Compensation Program (continued)

The below chart describes the specific metrics and results for ParentCo and Alcoa for the 2016 annual IC awards:

Performance Metric[1]	ParentCo Targets	ParentCo Performance	Alcoa Targets	Alcoa Performance	Metric Weight (%)
Adjusted Free Cash Flow[2]	$ (710) M	$ (533) M	$ (247) M	$ 6 M	40%
Adjusted EBITDA[2]	$2,386 M	$2,360 M	$ 893 M	$1,002 M	40%
Safety[3] DART (measured in days away from work)	0.48	0.36	0.385	0.276	5%
Environmental[4] CO2 Emissions Reduction (thousand tons)	195	101	171	38.5	5%
Diversity (as percentage of workforce)					10%
Executive Level Women, Global	22.8%	23.2%	20.9%	20.9%	
Executive Level Minorities, U.S.	16.0%	16.1%	23.4%	24.3%	
Professional Level Women, Global	28.0%	28.3%	20.9%	20.7%	
Professional Level Minorities, U.S.	19.0%	18.6%	16.8%	17.6%	
Total	—	—	—	—	**100%**

(1) The maximum payout for each financial and non-financial metric is 200%.
(2) The free cash flow and EBITDA financial measures have not been calculated in accordance with generally accepted accounting principles ("GAAP"). A description of the calculation of each non-GAAP financial measure to the most directly comparable GAAP financial measure is provided in *"Calculation of Financial Measures"* in Attachment B.
(3) The safety metric focuses on reducing the number of serious injuries, based upon the DART (Days Away, Restricted and Transfer) rate, which measures injuries and illnesses that involve one or more days away from work per 100 full-time workers and days in which work is restricted or employees are transferred to another job due to injury per 100 full-time workers.
(4) The environmental metric relates to a reduction of carbon dioxide emissions in 2016.

Panel B: Gilead Sciences, Inc. – 2019 proxy

Executive Compensation

Performance Target		2018 Results
10%	**Develop Organizational Capacity**	**Performance Factor: 135% of Target** — **Results: 13.5%**
EMPLOYEES AND CULTURE	■ Conduct employee survey in H1 2018 and ensure actions implemented to optimize employee engagement and retention.	■ Conducted Employee survey in Q2 2018 with 92% participation across the Gilead and Kite organizations. Results and action items shared with all employees within one month of the survey completion. Began focused efforts on efficiency and inclusion and will continue into 2019.
FACILITIES	■ Achieve all milestones for major capital projects, including new Research Building 324 and New Lab and Pilot Lab 357, while meeting all safety, sustainability and quality objectives.	■ Achieved all capital projects while meeting safety, sustainability and quality objectives. All major projects executed on, or ahead, of schedule, at or below budget. Leased a site in Amsterdam to engineer cell therapies in Europe, leased a new facility in Maryland for clinical manufacturing and purchased a new building in Santa Monica for cell therapy research.
BUSINESS CONTINUITY MANAGEMENT	■ Establish and enhance business continuity initiatives for key business areas.	■ Completed 2018 Business Continuity Plans for select mission critical processes.
INTELLECTUAL PROPERTY, LEGAL and COMPLIANCE	■ Uphold intellectual property covering our products.	■ Defeated 10 of 10 sofosbuvir-related intellectual property challenges. ■ Overturned $2.54 billion jury verdict against Gilead related to sofosbuvir intellectual property. ■ Successfully defended appeal of trial court decision setting aside $200 million jury verdict against Gilead related to sofosbuvir intellectual property.

Panel C: General Motors Company – 2018 proxy

Compensation Decisions for Mary T. Barra

Mary T. Barra, Chairman and Chief Executive Officer

Ms. Barra's performance for 2017 was directly aligned with the Company's 2017 strategic objectives:

Core

- Continued to drive improvement in EBIT-adjusted margins and delivered record EBIT-adjusted margins, including the third straight year of 10% or higher margins in North America
- Increased EPS-diluted-adjusted to record $6.62
- Achieved 13 top 3 models in the J.D. Power APEAL survey measuring performance, execution, and layout
- Received the IHS Automotive Loyalty Award for the third straight year
- Chevrolet sold a record number of electric vehicles, including more than 43,600 Bolt EVs and Volts
- Completed the sales of Opel/Vauxhall and GM Financial European businesses to PSA
- More than 150 facilities are operating landfill free
- Global Cadillac experienced record sales in 2017 with significant increases from GM China

Transformation

- Introduced the vision of zero crashes, zero emissions, and zero congestion for the future of GM
- Expanded both Maven and Book by Cadillac to increase carsharing capabilities
- Announced plans to deploy self-driving vehicles in a dense urban environment in 2019
- Launched Super Cruise, the world's first hands-free highway driving technology, on the Cadillac CT6
- 180 Cruise autonomous vehicles built with approximately 100 testing in Arizona, California, and Michigan
- Acquired Strobe, Inc. to help develop next-generation LiDAR solutions for self-driving vehicles and reduce LiDAR costs by 99% over time
- Announced plans for at least 20 new electric vehicles by 2023
- Became the first company to use mass-production methods to build autonomous electric test vehicles

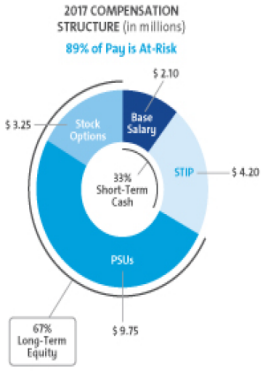
Effective January 1, 2017, the Compensation Committee increased Ms. Barra's base salary from $2,000,000 to $2,100,000 based on her performance, leadership, and the competitive market analysis provided by the Compensation Committee's independent compensation consultant. For 2017, the Compensation Committee awarded Ms. Barra an annual equity grant of $13 million consisting of 75% PSUs and 25% Stock Options. These changes placed Ms. Barra in line with the compensation peer group, as her targeted total direct compensation remained competitive at the market median.

The Compensation Committee awarded Ms. Barra 40 points based on her results, highlighted above, for the 2017 performance year. The total compensation for Ms. Barra in 2017, including salary, STIP and LTIP awards, is displayed below.

Pay Element	Majority of Pay Is At-Risk	Awarded Value
Base Salary	Only Fixed Pay Element	$ 2,100,000
STIP	Performance to Metrics	$ 4,956,000
PSUs(1)	Performance to Metrics and Stock Price	$10,737,570
Stock Options(2)	Performance to Stock Price	$ 3,250,003
TOTAL		**$21,043,573**

(1) PSUs are subject to performance vesting; value reflects grant date fair value at target performance for Relative ROIC-adjusted awards and probable performance results from the Monte Carlo analysis to value Relative TSR awards.

(2) Stock Options are subject to time-based vesting.



Awarded value reflects the amount included in the Summary Compensation Table, excluding change in pension value and all other compensation. Realized compensation includes base salary, earned STIP, and all options exercised and stock vested during the year. 2017 realized compensation increased relative to the prior year reflecting 1) the vesting of the PSU award granted to Ms. Barra in 2014, the year she was promoted to her current role; and 2) an increase in stock price at the time of vesting versus the prior year.

Panel D: Bank of New York Mellon Corporation – 2015 proxy

Gerald L. Hassell
Awarded 90% for his individual component following a number of considerations, including:

- **Financial:**
  - As adjusted for compensation purposes, EPS of $2.39, compared to a target of $2.43; return on common equity, as adjusted for compensation purposes, of 8.1% compared to budget of 8.8%; and return on tangible common equity, as adjusted for compensation purposes, of 17.6% compared to budget of 19.0%;
  - Delivered positive operating leverage, as adjusted for compensation purposes, in excess of target by 83 basis points;
  - Instituted a more disciplined and measured capital allocation/expenditure process for better oversight of our portfolios and major expenditures; and
  - Delivered one-year TSR of 18%, positioning the company at the 61st percentile of the S&P 500 Financials Index and three-year TSR of 117%, positioning the company at the 76th percentile.
- **Strategic:**
  - Executed strategic priorities and adjusted business model to develop alternatives for capital reinvestment by, among other things, taking action on a number of underperforming or non-strategic businesses, implementing new cost reduction initiatives and approving new organic growth initiatives with key clients;
  - Developed a three-year plan for the Company as presented at our 2014 Investor Day; and
  - Established specific, measurable programs to improve the risk culture of the company, including launching a new program to produce company-wide intraday credit exposure reports with increased visibility, developing daily early warning indicators of key intraday liquidity metrics, and delivering a risk and compliance curriculum at BKU, our learning and development platform for employees.
- **Leadership:**
  - Streamlined the Executive Committee structure while strengthening the senior management team with the addition of several key hires and internal promotions;
  - Continued progress in driving our performance culture through cross-business collaboration and company-wide innovation, while enhancing risk management by promoting a strong, sound and forward-looking risk culture;
  - Led development of improved talent, succession and development planning for key senior leadership positions across the company; and
  - Advanced diversity and inclusion by setting the "tone at the top," including sponsoring or representing BNY Mellon at key diversity and leadership events and overseeing the hiring and progression of diverse talent through the company.

Panel E: Affiliated Managers, Inc. – 2019 proxy

Exhibit 3

2018 Short-Term Incentive Compensation Performance Assessment

Business Initiatives
Weighting: 50%

- Individual Objectives and Contributions (*Weighting: 20%*)
- Operational Performance (*Weighting: 20%*)
- Strategic Initiatives (*Weighting: 20%*)
- Capital Management (*Weighting: 20%*)
- Risk Management & ESG Factors (*Weighting: 20%*)

Annual Financial Performance
Weighting: 50%

- Economic earnings per share (*Weighting: 50%*)
- EBITDA margin (*Weighting: 50%*)

(See Exhibit 4 for Targets and Achievement Levels)

Business Initiatives Score **60%**

Financial Performance Score **40%**

Overall Weighted Score **50%**

Exhibit 5

2018 Long-Term Incentive Compensation Performance Assessment

Key Financial and Operating Metrics
Weighting: 33.3%

Relative Growth Rates
(Weighting: 50%)

- Compound annual growth rates of key financial and operating metrics relative to AMG's Peer Group over the trailing 1-, 3- and 5-year periods, including AUM, Aggregate fees, GAAP net income, GAAP earnings per share (diluted), Economic net income, Economic earnings per share and Adjusted EBITDA

Absolute Growth Rates
(Weighting: 50%)

- Compound annual growth rates of key financial and operating metrics over the trailing 1-, 3- and 5-year periods, including AUM, Aggregate fees, GAAP net income, GAAP earnings per share (diluted), Economic net income, Economic earnings per share and Adjusted EBITDA

Stockholder Value Creation
Weighting: 33.3%

Relative Stock Performance
(Weighting: 50%)

- Annual and long-term (measured over the trailing 1-, 3- and 5-year periods) stock performance relative to AMG's Peer Group and the S&P 500®

Absolute Stock Performance
(Weighting: 50%)

- Annual and long-term (measured over the trailing 1-, 3- and 5-year periods) stock performance on an absolute basis

Strategic Performance Criteria
Weighting: 33.3%

Investment Performance and Organic Growth Generation *(Weighting: 30%)*

- Investment performance by Affiliates in areas of strategic focus, positioning AMG for future success in areas of strong client demand
- Annual and long-term organic growth from net client cash flows, both on an absolute basis and relative to AMG's Peer Group

New Investments Strategy, Pursuit of Strategic Initiatives and Global Distribution Enhancements *(Weighting: 30%)*

- Cultivation of relationships with prospective new Affiliates to position AMG for strong future growth; deployment of capital through investments in new Affiliates
- Working with Affiliates on strategic matters and pursuing new strategic partnerships
- Development of AMG's Global Distribution platform

Capital Management *(Weighting: 30%)*

- Effective balance sheet management to return capital to stockholders and to ensure adequate capacity and flexibility to execute on AMG's growth strategy

ESG Strategies and Initiatives *(Weighting: 10%)*

- Responsible management of environmental, social and governance practices; meaningful initiatives to continuously improve AMG's corporate stewardship

Key Financial and Operating Metrics Score **40%**

Stockholder Value Creation Score **0%**

Strategic Performance Criteria Score **60%**

Overall Weighted Score **33.3%**

Exhibit 2: Score calculation methodology provided by Asset4 in Datastream

The ASSET4 ESG framework allows to rate and compare companies against approximately 700 individual data points, which are combined into over 250 key performance indicators (KPIs). These KPI scores are aggregated into a framework of 18 categories grouped within 4 pillars that are integrated into a single overall score. (see diagram below)

Indicators, categories, pillars and overall score are calculated by equally weighting and z-scoring all underlying data points and comparing them against all companies in the ASSET4 universe. The resulting percentage is therefore a relative measure of performance, z-scored and normalized to better distinguish values and position the score between 0 and 100%.

A Z Score, or "standard score" is a relative measure comparing one company with a given benchmark. It expresses the value in units of standard deviation of that value from the mean value of all companies. Among other things, this allows to create more distinction between values that otherwise might be very close together. To read more: htttp://en.wikipedia.org/wiki/Standard_score

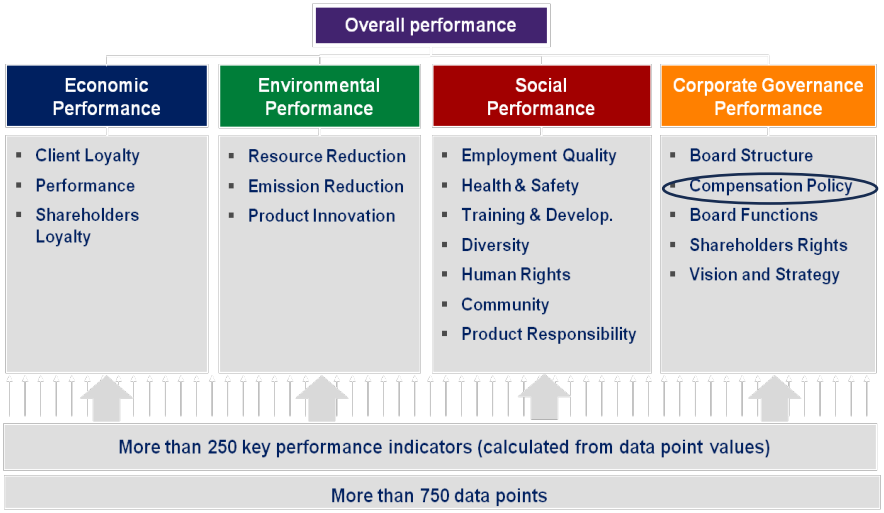


Figure 1: Time trends in ESG-linked pay adoption

This figure shows the average adoption rate of ESG-linked pay by firms across different markets over time. The rates are calculated based on a cohort sample of MSCI ACWI firms that were continuously covered by Bloomberg over the period 2009-2020. *Adoption rate* is the percentage of firms in a country that adopted ESG-linked pay for a given year, averaged for a given market. The averages are computed for the following markets, with the corresponding number of firms in parenthesis: All, Developed, Emerging, EU & UK, US, and Japan.

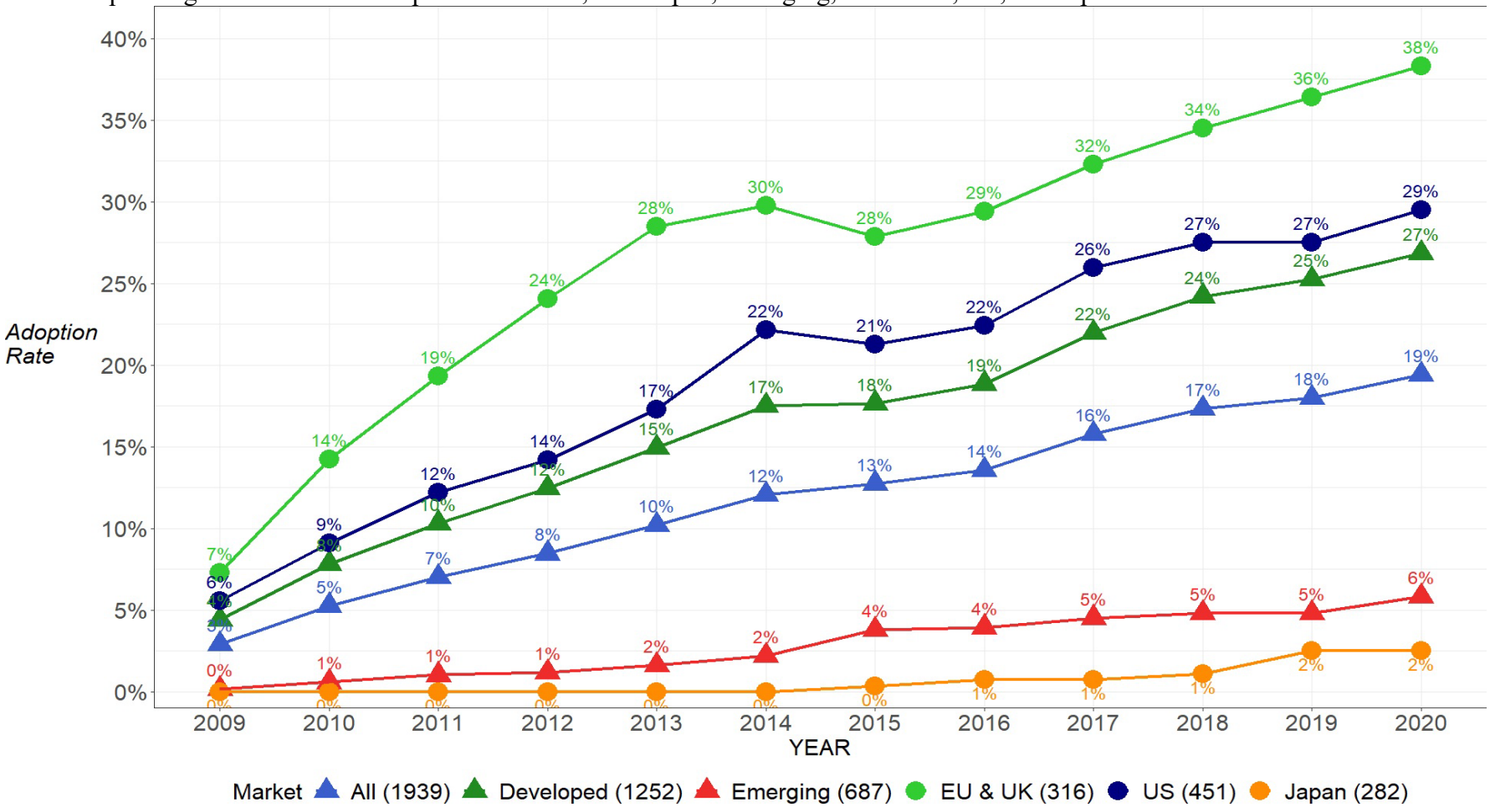
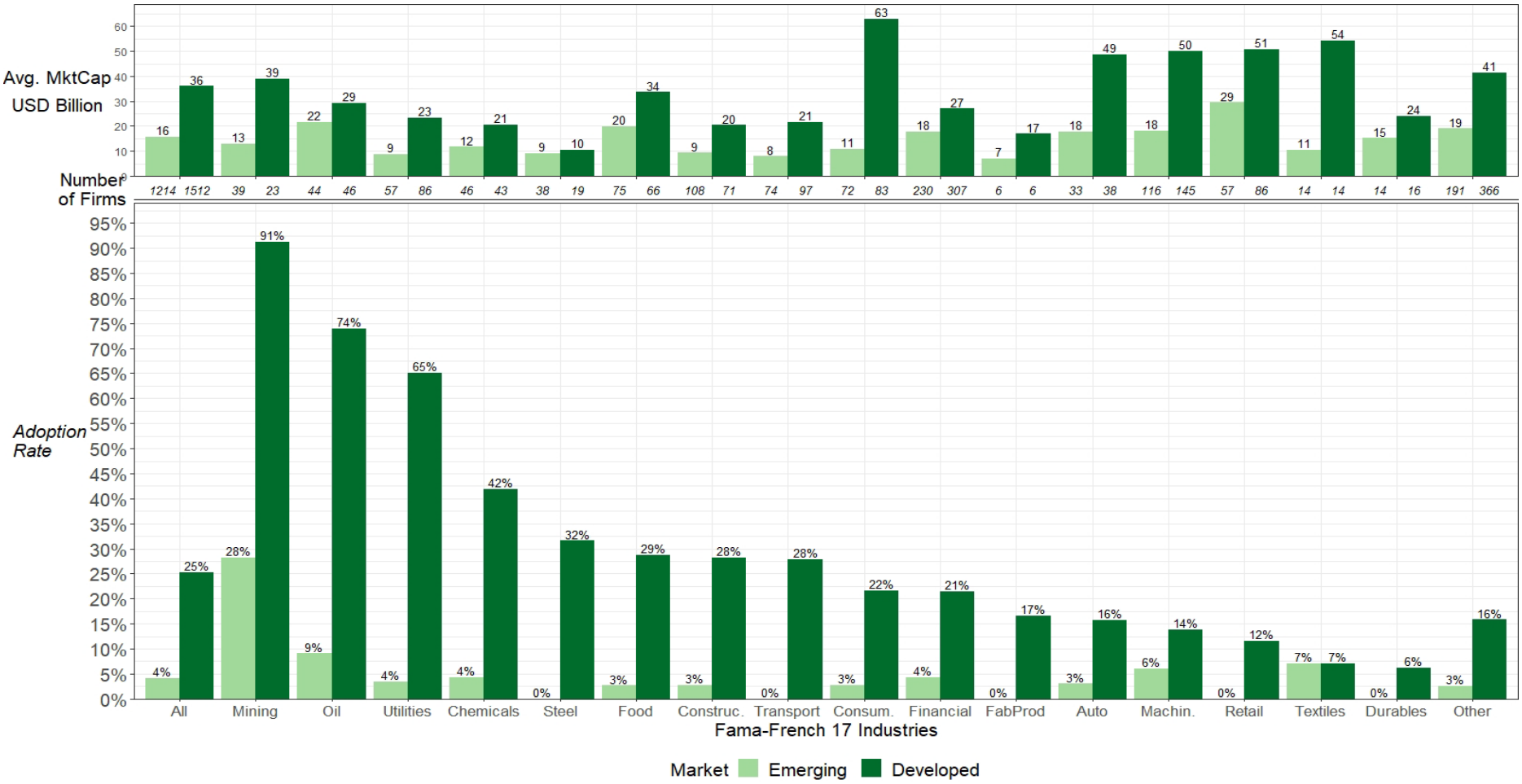


Figure 2: ESG-linked pay adoption by industry

This figure presents the percentage of firms that adopted ESG-linked pay in the MSCI ACWI sample for each of the Fama-French 17 industries. Panel A provides a snapshot of the adoption rates across these industries for the year 2020. *Adoption rate*, in this panel, is the percentage of firms in a given industry-market pair that adopted ESG-linked pay. The bottom bars compare the industry-level adoption rate between developed and emerging markets. The top bars display the average market capitalization of the firms in the corresponding industry-market pair, with the number of firms in the pair listed at the bottom of the bar. The first bars on the left represent the entire sample and then the Fama-French 17 industries (except for "Other") are ordered in descending order of the adoption rates in the developed markets. Fama-French category 17 "Other" is placed first from the right.

Panel B illustrates the industry-level adoption rate for the years 2009, 2013,2016 and 2020. *Adoption rate*, in this panel, is the percentage of firms in a given industry that adopted ESG-linked pay in a given year, based on a cohort sample of MSCI ACWI firms that were continuously covered by Bloomberg over the period 2009-2020. Similar to Panel A, the bars for the entire sample and for the Fama-French category 17 "Other" are placed at the left and right extremes respectively. The remaining industry bars are placed in descending order for the industry's adoption rate in 2020.

Panel A: ESG-linked pay adoption by market and industry (as of 2020)



Panel B: ESG-linked pay adoption by industry over time

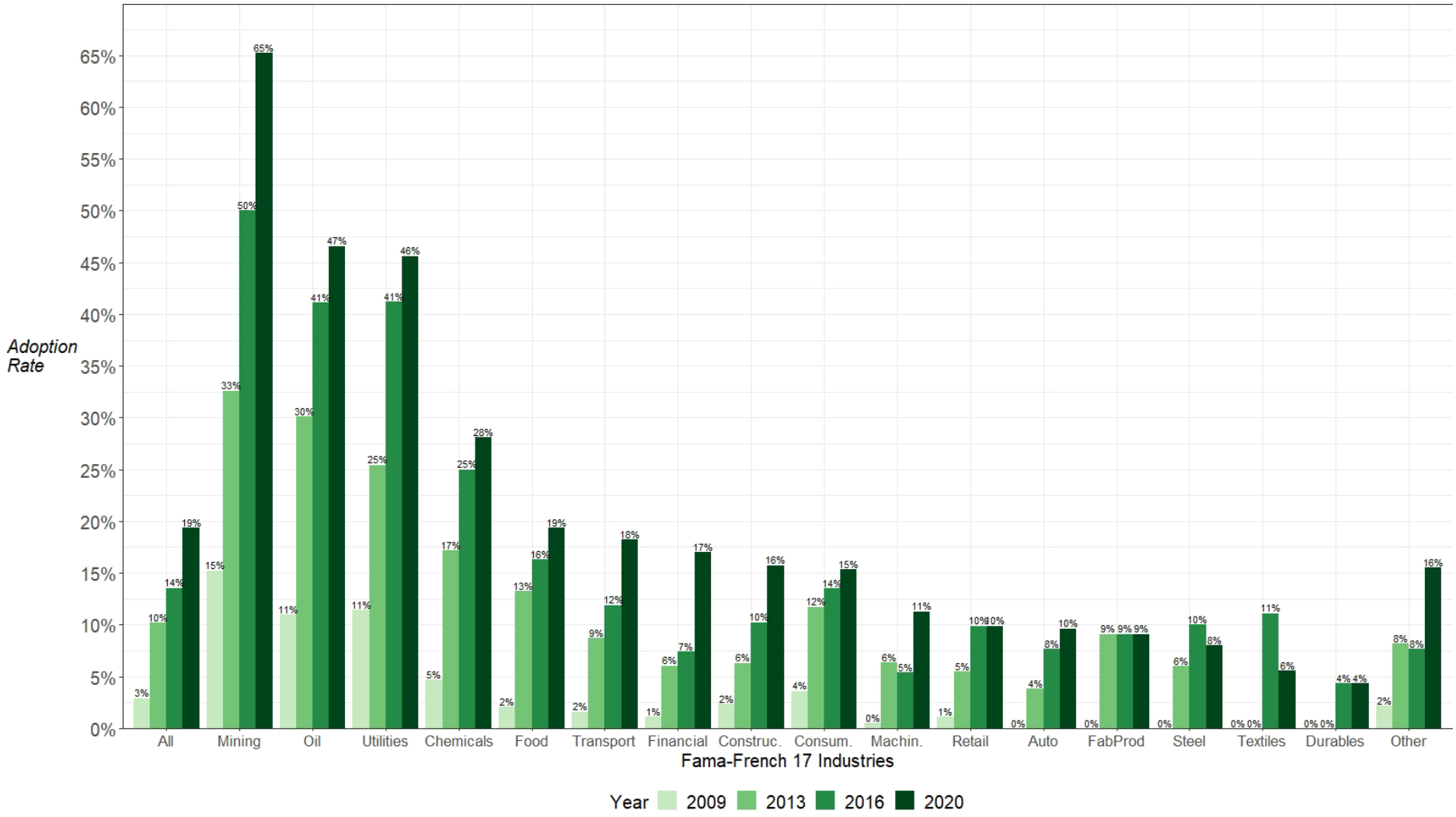
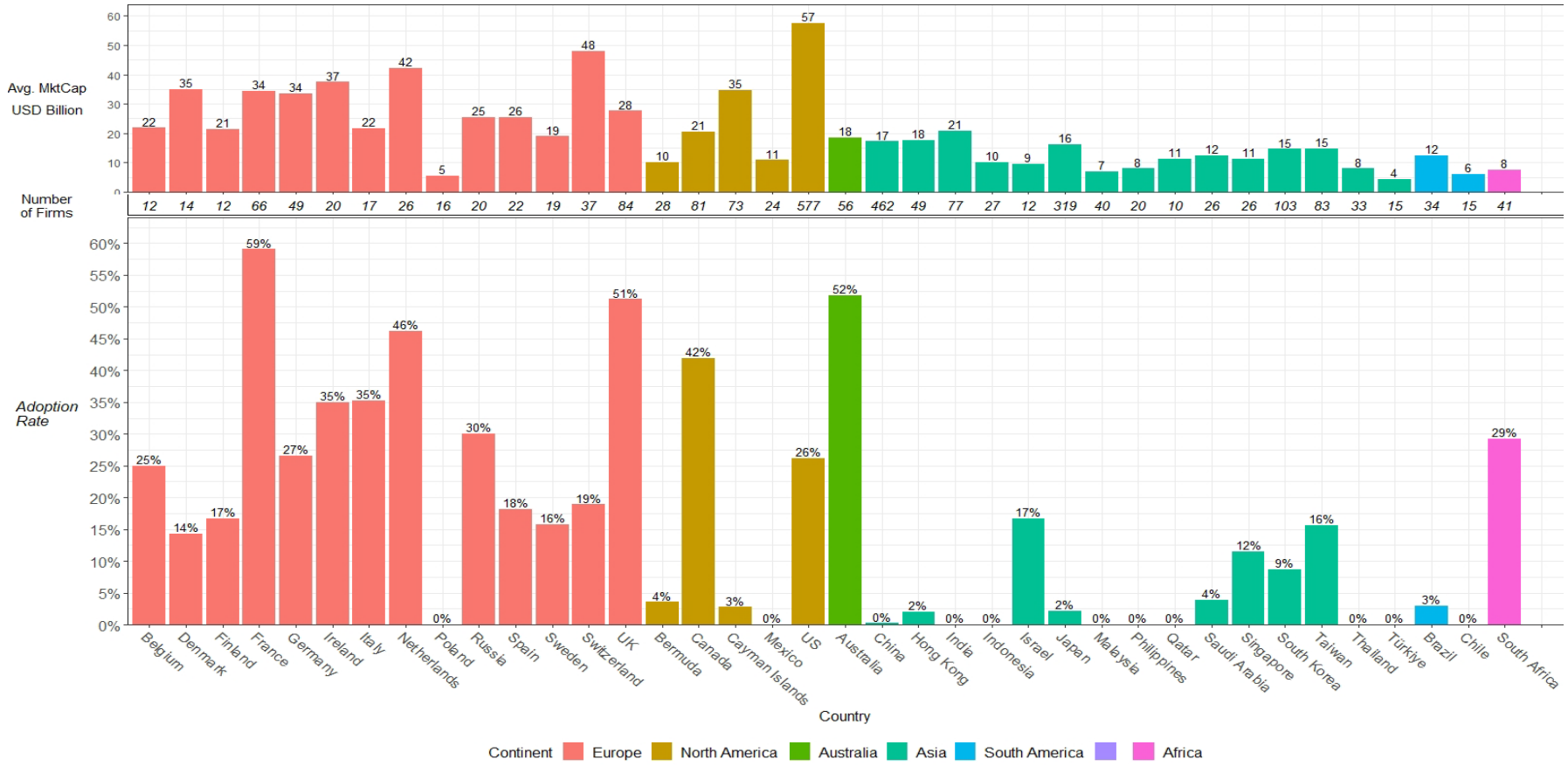


Figure 3: ESG-linked pay by country

This figure presents the percentage of firms for a given country that adopted ESG-linked pay as of 2020. *Adoption rate* is the percentage of firms in a country that adopted ESG-linked pay for a given year, excluding countries with less than 10 firms. Panel A bottom bars plot the country-level adoption rates. The top bars represent the average market capitalization (in USD billion) of the sample firms for the corresponding country, with the number of firms listed at the bottom of the bar. Panel B illustrates the adoption rate by country on a world map.

Panel A: ESG-linked pay as of 2020



Panel B: ESG-linked pay around the world in 2020

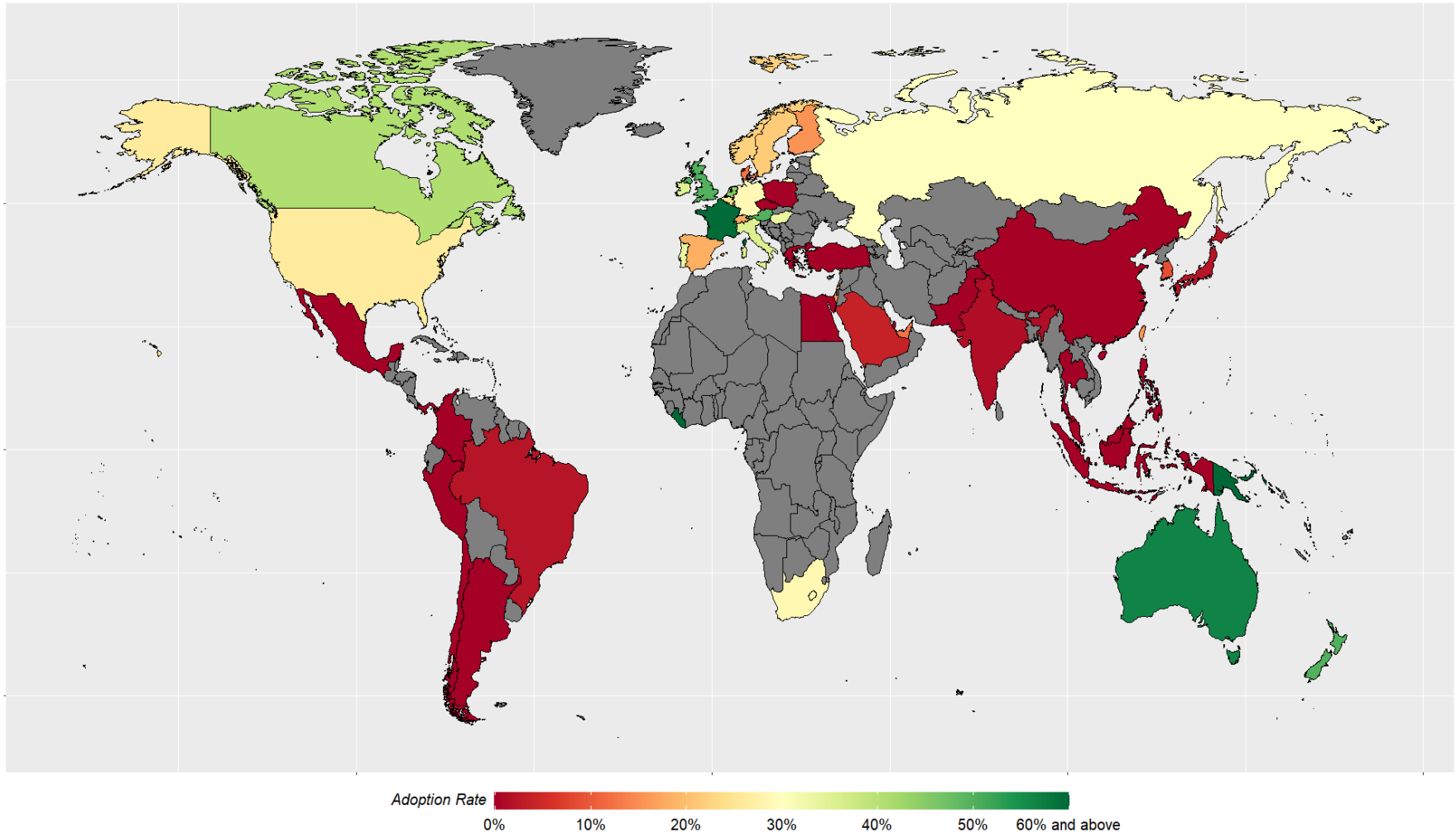


Figure 4: ESG-linked pay adoption rate for U.S. Russell 3000 sample

This figure plots the average ESG-linked pay adoption rate for the pre-Directive period (2010-2013) and the post-Directive period (2014-2017) for U.S. Russell 3000 firms with and without EU subsidiaries separately.

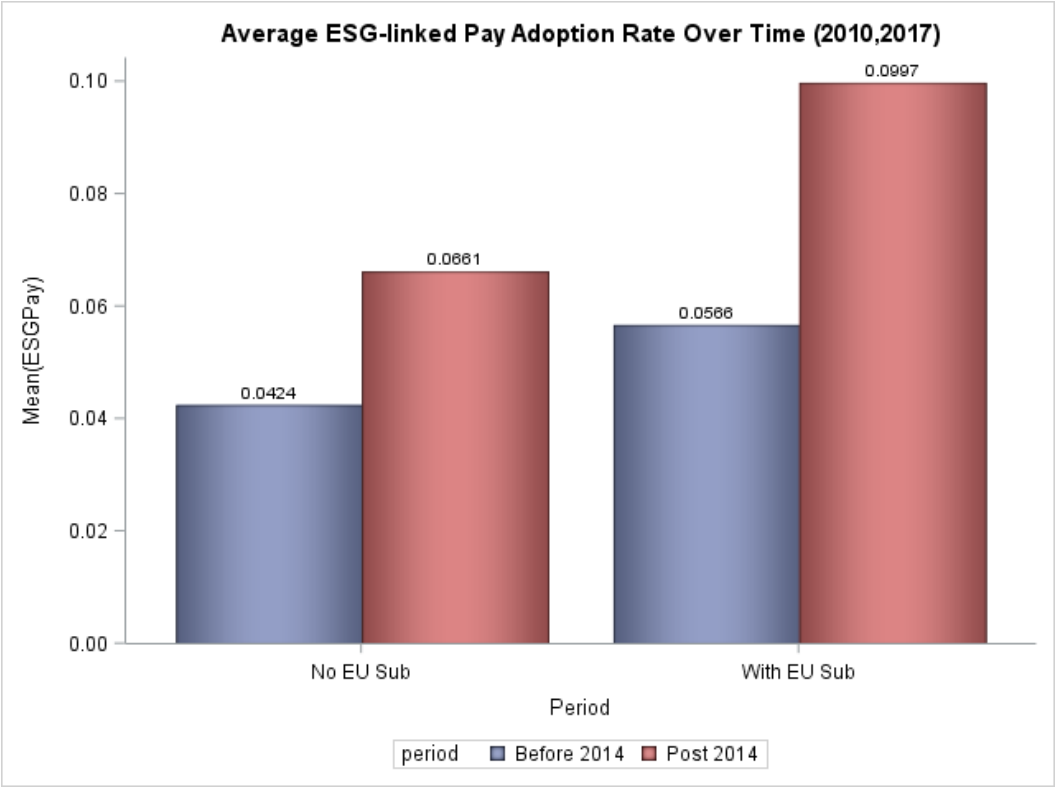
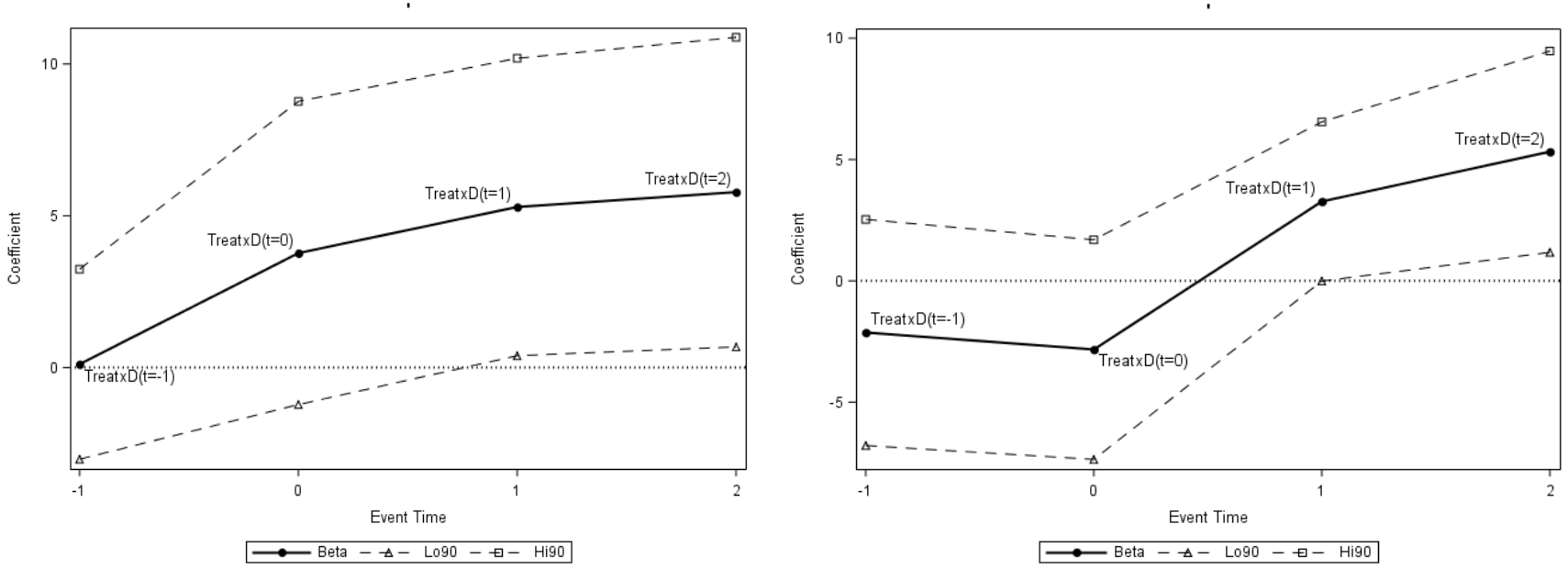


Figure 5: Parallel trend analysis –dynamic difference-in-diff erences

The figure presents results of the parallel trend analysis, estimated using the following dynamic Diff-in-Diff model:
$SOSCORE_{\mathrm{i,t+1}}$ (or $OPM_{\mathrm{i,t+1}}$) $= \alpha + \beta TREAT_{\mathrm{i}} + \beta_{-1} TREAT_{\mathrm{i}} \times D_{\mathrm{t=-1}} + \beta_0 TREAT_{\mathrm{i}} \times D_{\mathrm{t=0}} + \beta_1 TREAT_{\mathrm{i}} \times D_{\mathrm{t=1}} + \beta_2 TREAT_{\mathrm{i}} \times D_{\mathrm{t=2}} + \gamma_{-1} D_{\mathrm{t=-1}} + \gamma_0 D_{\mathrm{t=0}} + \gamma_1 D_{\mathrm{t=1}} + \gamma_2 D_{\mathrm{t=2}} + \eta X_{i,t} + e_{i,t}$.
The dependent variable is either *SOSCORE*, a firm's social score, or *OPM*. *TREAT* equals one for a treatment firm, defined as the sample of US firms with EU subsidiaries that first adopts ESG pay after the enactment of the 2014 EU Directive in 2014, and zero if the firm is a matched control firm. *AFTER* equals one if year t+1 is after the year for which the treatment firm adopted ESG-linked pay, and zero otherwise. *X* represents a vector of lagged control variables: *LN_SIZE, ROA, LEV, LN_BM, IO, and EARN_VOL*. D_t=i , i=-1, 0, 1, 2, corresponds to indicator variables that equal one for a given event year around the adoption of ESG pay by the treatment firm. See Appendix Table A1 for detailed variable descriptions. The coefficients of interest are β_{-1}, β_0, β_1, and β_2, which we plot in panels A (*SOSCORE*) and B (*OPM*).



(a) SOSCORE (b) OPM

Figure 6: Adoption of ESG Metrics by treatment firms in the DiD sample

This figure presents a bar chart showing the average adoption rate by treatment firms in the [0, +2] event window (i.e., event years 0, 1, and 2) for the four types of ESG metrics with their corresponding 95% confidence intervals. We classify ESG-related grants into four categories: *Employee* (employee/staff/talent related), *Customer* (customer related, e.g. customer satisfaction), *Diversity*, and *Environment/Climate* and create a set of dummy variables, *EMP*, *CUS*, *DIV*, and *ENV* respectively, indicating whether a certain category of ESG performance metric is featured among the absolute performance goals tied to the grants that a firm issues to its executives in a given fiscal year.

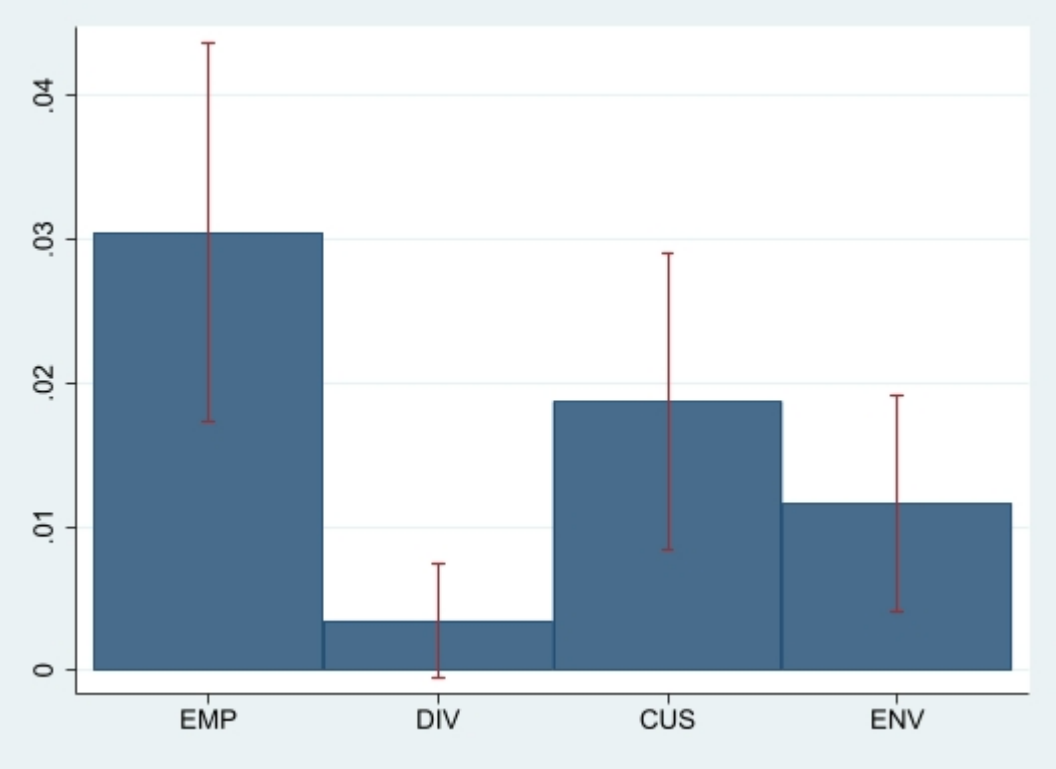


Table 1: Summary statistics and correlations

The table reports the summary statistics (Panel A) and correlation matrix (Panel B) for the main variables used in the paper. The following variables are measured at the country level. *Adoption rate* is the percentage of firms in a country that adopted ESG-linked pay for a given year. *Power distance, Individualism, Masculinity/Femininity,* and *Uncertainty avoidance* are the Hofstede cultural indices to capture social attitudes and norms. *Ln(GDP per capita)* is the GDP per capita (in 2015 US$). *ADRI* is the Anti-Director Rights Index and measures the degree of shareholder protection. We define *French civil, German civil,* and *Scandinavian civil* as equal to one if the country of a firm's incorporation belongs to the corresponding legal origins, and zero otherwise. *Corruption control* measures the extent to which politicians are constrained from pursuing their self-interest. The following variables are measured at the firm level. *ESGPAY* equals one if executive compensation for a fiscal year and a given firm is linked to ESG goals and zero otherwise. *LN_SIZE* is the logarithm of total assets. *LN_BM* is the logarithm of common equity to market cap. *LEV* is total debt to total assets, *EARN_VOL* is the standard deviation of past five-year deflated earnings, and *IO* is institutional ownership. *ROA* is return on assets and *OPM* is operating profit margin. *TobinQ* equals market value of equity plus book value of debt, divide by the book value of assets. All variables are defined in Appendix Table A1.

Panel A: Summary statistics

For the ACWI 2019 sample from 2005-2020 with non-missing *ESGPAY* data. *ESGPAY* is equal to one if executive compensation is linked to ESG goals and 0 otherwise.

Country-level variables						
	N	Mean	Standard deviation	Median	Skewness	Kurtosis
Adoption Rate	59	0.10	0.13	0.05	2.07	8.78
Ln(Per Capita GDP)	56	9.87	1.19	10.21	-0.78	2.98
Individualism	47	48.60	24.82	48.00	0.05	1.66
Masculinity/Femininity	47	50.85	18.78	52.00	-0.36	3.42
Power distance	47	55.51	22.11	58.00	-0.04	2.35
Uncertainty avoidance	47	65.04	23.30	70.00	-0.46	2.21
ADRI	41	3.74	0.94	4.00	-0.18	2.03
Corruption control	56	0.74	1.03	0.85	-0.05	1.64
French civil	41	0.41	0.50	0	0.35	1.12
German civil	41	0.15	0.36	0	2.00	5.00
Scandinavian civil	41	0.10	0.30	0	2.71	8.36

Firm-level variables						
	N	Mean	Standard deviation	Median	Skewness	Kurtosis
ESGPAY	34,068	0.09	0.29	0	2.82	8.94
LN_SIZE	33,977	23.13	1.70	23.01	0.29	3.48
LN_BM	33,421	-0.84	0.86	-0.75	-0.74	4.79
LEV (%)	33,819	24.82	17.46	23.36	0.54	2.80
ROA (%)	33,701	6.50	6.80	5.30	0.74	6.05
IO (%)	34,068	38.09	30.27	27.74	0.71	2.20
EARN_VOL (%)	33,852	2.92	3.57	1.75	2.85	13.00
ENSCORE	28,453	47.54	28.69	50.82	-0.17	1.83
SOSCORE	28,448	50.94	24.66	52.01	-0.13	2.04
CGSCORE	28,453	54.66	22.42	56.63	-0.25	2.15
ΔSCOPE 1 (%)	29,033	7.11	38.60	2.14	1.49	7.99
ΔSCOPE 2 (%)	29,052	13.05	49.76	2.93	2.57	11.75
ΔSCOPE 3 (%)	29,074	6.01	22.35	3.77	.52	5.39
OPM(%)	33,878	15.14	14.75	13.08	-0.33	7.60
TobinQ	33,789	2.00	1.62	1.41	2.84	12.38

Panel B: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Adoption rate	1.00										
(2) Ln(GDP per capita)	0.18	1.00									
(3) Individualism	0.26	0.71	1.00								
(3) Masculinity/Femininity	-0.11	0.06	-0.01	1.00							
(4) Power distance	-0.22	-0.81	-0.80	0.01	1.00						
(5) Uncertainty avoidance	-0.04	0.18	-0.07	0.26	-0.09	1.00					
(6) ADRI	-0.10	-0.43	-0.48	0.21	0.41	0.10	1.00				
(7) Corruption control	0.18	0.86	0.65	0.06	-0.80	0.19	-0.11	1.00			
(8) French civil	0.02	-0.30	-0.18	-0.30	0.40	0.31	-0.15	-0.35	1.00		
(9) German civil	-0.15	0.09	-0.51	0.50	0.07	0.68	0.20	0.12	-0.26	1.00	
(10) Scandinavian civil	0.01	0.10	0.05	-0.43	-0.24	-0.18	-0.04	0.24	-0.07	-0.11	1.00

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) ESGPAY	1.00														
(2) LN_SIZE	0.19	1.00													
(3) LN_BM	0.02	0.46	1.00												
(4) LEV	0.07	0.13	0.05	1.00											
(5) ROA	-0.04	-0.35	-0.48	-0.19	1.00										
(6) IO	0.18	0.05	-0.23	0.02	0.06	1.00									
(7) EARN_VOL	0.02	-0.29	-0.21	-0.03	0.11	0.11	1.00								
(8) ENSCORE	0.25	0.34	-0.02	0.05	-0.02	0.16	-0.04	1.00							
(9) SOSCORE	0.22	0.43	0.15	0.05	-0.10	-0.03	-0.10	0.73	1.00						
(10) CGSCORE	0.20	0.25	0.04	0.02	-0.05	0.10	-0.04	0.44	0.41	1.00					
(11) *ΔSCOPE 1*	-0.04	-0.06	-0.05	0.00	0.04	-0.03	0.03	-0.07	-0.09	-0.06	1.00				
(12) *ΔSCOPE 2*	-0.05	-0.03	-0.03	0.00	0.03	-0.06	0.02	-0.07	-0.07	-0.05	0.35	1.00			
(13) *ΔSCOPE 3*	-0.08	-0.10	-0.15	-0.04	0.14	-0.02	0.04	-0.12	-0.15	-0.09	0.40	0.34	1.00		
(14) OPM	0.02	0.04	-0.12	-0.04	0.45	0.04	-0.08	-0.02	-0.07	-0.01	0.04	0.05	0.11	1.00	
(15) TobinQ	-0.06	-0.50	-0.77	-0.21	0.53	0.12	0.26	-0.03	-0.17	-0.08	0.06	0.03	0.16	0.13	1.00

Table 2: ESG-linked pay and industry characteristics

This table shows probit and logit regressions of ESG-linked pay on industry indicators for the MSCI ACWI sample from 2005-2020. The dependent variable is firm-level *ESGPAY* and is equal to one if executive compensation is linked to ESG goals and 0 otherwise. In Panel A, we estimate the following panel regression:

$$ESGPAY_{i,t} = \beta_0 + \beta_1 IND_{i,t} + \cdots + \beta_{16} IND16_{i,t} + \varepsilon_{it}$$

The industry indicators equal one if firm *i* belongs to the corresponding industry, and zero otherwise. The 'Other' industry is used as the baseline industry and is omitted from the regression. In Panel B, we estimate the following panel regression:

$$ESGPAY_{i,t} = \beta_0 + \beta_1 \, Extractive\ industries_{i,t} + \beta_2 \ Sin\ stocks_{i,t} \ + \varepsilon_{it}$$

where *Extractive industries* and *Sin stocks* equal one if the firm belongs to the extractive industry (Dyck et al. 2019) or Sin stocks (Hong and Kacperczyk 2009), and zero otherwise. We include year and country fixed effects, and the standard errors are clustered by year and country. *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: Industry factors

	(1)	(2)
ESGPAY	Probit	Logit
IND1 (Food)	0.696***	1.291***
	(6.06)	(6.25)
IND2 (Mining)	1.824***	3.343***
	(12.74)	(14.89)
IND3 (Oil & Petroleum)	1.577***	2.900***
	(8.36)	(9.80)
IND4 (Textiles, Apparel & Footwear)	-0.174	-0.340
	(-0.62)	(-0.58)
IND5 (Consumer Durables)	-0.492*	-1.142**
	(-1.70)	(-2.07)
IND6 (Chemicals)	1.066***	1.963***
	(4.07)	(4.12)
IND7 (Perfumes, Soap, Perfumes, Tobacco)	0.530***	0.992***
	(2.69)	(2.91)
IND8 (Construction)	0.547***	1.064***
	(3.20)	(3.39)
IND9 (Steel)	0.858***	1.553***
	(3.33)	(3.27)
IND10 (Fabricated Products)	0.163	0.434
	(0.38)	(0.57)
IND11 (Machinery and Business Equipment)	0.111	0.145
	(0.89)	(0.57)
IND12 (Automobiles)	0.192	0.413
	(0.84)	(0.95)
IND13 (Transportation)	0.340***	0.668***
	(3.80)	(4.11)
IND14 (Utilities)	1.451***	2.664***
	(7.73)	(8.80)
IND15 (Retail)	-0.125	-0.212
	(-1.03)	(-0.84)
IND16 (Financials)	0.089	0.194
	(0.79)	(0.93)
Observations	32,536	32,536
Pseudo R^2	0.36	0.37
Year FE	Yes	Yes
Country FE	Yes	Yes

Panel B: Extractive industries and sin stocks

	(1)	(2)
ESGPAY	Probit	Logit
Extractive industries	1.285***	2.341***
	(11.71)	(15.11)
Sin stocks	0.409	0.722
	(0.89)	(0.81)
Observations	32,536	32,536
Pseudo R^2	0.30	0.30
Year FE	Yes	Yes
Country FE	Yes	Yes

Table 3: ESG-linked pay and country characteristics

This table shows probit and logit regressions for ESG-linked pay for the MSCI ACWI sample for the period 2005-2020. The dependent variable is firm-level *ESGPAY* and is equal to one if executive compensation is linked to ESG goals and 0 otherwise. We estimate the following panel regression equation:

$$ESGPAY_{i,t} = \beta_0 + \beta_1\, Ln(GDP\ per\ capita)_{i,c,t-1} + \beta_2\, Culture\ variables_{i,c} + \beta_2\, ADRI_{i,c} + \beta_3\, Corruption\ control_{i,c} + \beta_4\, legal\ origin_{i,c} + \varepsilon_{it}$$

where *Ln(GDP per capita)* is the lagged per capita GDP of the country that the firm resides and *Culture variables* is a vector representing the following Hofstede culture indices of the country: *Individualism, Masculinity/Femininity, Power distance* and *Uncertainty avoidance*. *ADRI*, the Anti-Director Rights Index, *Corruption Control*, and *Legal origin* are all country level measures. The legal origin variables are: *French civil*, *German civil* and *Scandinavian civil*. All culture variables are rescaled through division by 100 to lie in [0,1] window. Constant is included in the controls and standard errors are clustered by year and country. *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix Table A1.

	(1)	(2)	(3)	(4)
ESGPAY	Probit	Probit	Probit	Logit
Ln(GDP per capita)	0.434**	0.524***	0.667***	1.441***
	(2.25)	(2.60)	(3.99)	(3.66)
Individualism	2.221***	2.995***	3.367***	6.725***
	(4.41)	(4.79)	(5.23)	(4.55)
Masculinity/Femininity	-1.534***	-1.904***	-2.320***	-4.265***
	(-3.10)	(-3.70)	(-5.22)	(-4.28)
Power distance	0.188	0.589	0.120	0.629
	(0.21)	(0.70)	(0.15)	(0.34)
Uncertainty avoidance	0.518	0.915*	-0.689	-1.253
	(1.02)	(1.87)	(-1.07)	(-0.93)
ADRI		0.306**	0.390***	0.776***
		(2.00)	(3.80)	(3.89)
Corruption control		-0.033	-0.187	-0.391
		(-0.16)	(-1.06)	(-1.11)
French civil			0.884***	1.738***
			(3.13)	(3.30)
German civil			0.877**	1.680**
			(2.53)	(2.18)
Scandinavian civil			-0.762**	-1.288**
			(-2.51)	(-2.29)
Observations	31,018	25,150	25,150	25,150
Pseudo R^2	0.32	0.30	0.32	0.32
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Table 4: ESG-linked pay and firm-level regressions

This table presents probit, logit and OLS regressions for firm-level ESG-linked pay for the MSCI ACWI sample for the period 2005-2020. *ESGPAY* is equal to one if executive compensation is linked to ESG goals and 0 otherwise. We estimate the following panel regression equation:

$$ESGPAY_{i,t+1} = \beta_0 + \gamma X_{i,t} + \varepsilon_{it}$$

where *X* corresponds to a vector of firm characteristics as follows: *LN_SIZE* (the logarithm of total assets), *LN_BM* (the logarithm of common equity to market cap), *LEV* (total debt to total assets), *ROA* (return on assets), *IO* (institutional ownership) and *EARN_VOL* (earnings volatility). All the control variables are lagged by one fiscal year. *LEV*, *ROA*, *IO* and *EARN_VOL* are rescaled through division by 100. Constant is included in the controls and standard errors are clustered by year and country. *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix Table A1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$ESGPAY_{t+1}$	Probit	Probit	Logit	Probit	Logit	OLS	OLS
LN_SIZE_t	0.338***	0.334***	0.648***	0.255***	0.469***	0.037***	0.023*
	(10.05)	(8.25)	(8.23)	(4.87)	(4.60)	(3.37)	(2.08)
LN_BM_t	-0.184***	-0.009	-0.043	0.075*	0.141*	-0.009	-0.002
	(-2.71)	(-0.19)	(-0.45)	(1.90)	(1.76)	(-1.42)	(-0.41)
LEV_t		-0.109	-0.316	0.091	0.225	-0.029	-0.033
		(-0.54)	(-0.79)	(0.44)	(0.60)	(-1.32)	(-1.46)
ROA_t		0.552	0.939	0.897**	1.682**	-0.010	-0.003
		(1.38)	(1.28)	(2.23)	(2.19)	(-0.15)	(-0.03)
IO_t		1.359***	2.588***	0.178	0.315	0.180***	0.012
		(4.10)	(4.23)	(0.52)	(0.50)	(3.68)	(0.25)
$EARN\_VOL_t$		1.907***	3.318**	0.328	0.592	0.301***	0.102
		(2.80)	(2.32)	(0.70)	(0.65)	(3.34)	(1.48)
Observations	32,996	32,571	32,571	30,711	30,711	32,571	32,571
Adjusted R^2						0.155	0.226
Pseudo R^2	0.201	0.263	0.266	0.396	0.399		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	No	Yes

Table 5: ESG-linked pay and ESG scores and emissions

This table presents OLS regressions of firm's E, S and G performance and the firm's adoption of ESG-linked pay by estimating the following equation:

$$SCORE_{i,t+1} = \beta_0 + \beta_1 ESGPAY_{i,t} + \gamma X_{i,t} + \varepsilon_{it}$$

where $SCORE_{i,t}$ represents a firm's social, environmental, or governance scores (*ENSCORE, SOSCORE* and *CGSCORE,* respectively) in Panel A and % change over the previous year in Scope 1, 2 and 3 emissions (Δ*SCOPE 1*, Δ*SCOPE 2* and Δ*SCOPE 3,* respectively) in Panel B. *ESGPAY* equals one if executive compensation is linked to ESG goals and 0 otherwise. *X* corresponds to the following vector of firm characteristics: *LN_SIZE* (the logarithm of total assets), *LN_BM* (the logarithm of common equity to market cap), *LEV* (total debt to total assets), *ROA* (return on assets), *IO* (institutional ownership), and *EARN_VOL* (earnings volatility). Constant is included in the controls and standard errors are clustered by year and by country in all regressions. *t*-statistics are reported in parentheses. In Panel A, Columns (1)-(3) examines one-year ahead E, S, and G performances and columns (4)-(6) examine two-year ahead performance. In Panel B, columns (1)-(3) examines one-year ahead % change in SCOPE 1, 2 and 3 performances and columns (4)-(6) examine two-year ahead performance. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix Table A1.

Panel A: ESG Scores

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$	(4) $SOSCORE_{t+2}$	(5) $ENSCORE_{t+2}$	(6) $CGSCORE_{t+2}$
$ESGPAY_t$	4.689***	4.903***	7.702***	4.270***	4.279***	7.104***
	(7.90)	(4.49)	(6.15)	(6.68)	(4.05)	(5.91)
LN_SIZE_t	7.372***	9.933***	4.737***	7.206***	9.678***	4.626***
	(19.13)	(13.23)	(7.92)	(18.31)	(12.80)	(7.81)
LN_BM_t	-2.579***	-1.575***	-1.195	-2.772***	-1.612***	-1.262
	(-5.30)	(-3.39)	(-1.49)	(-5.65)	(-3.42)	(-1.46)
LEV_t	-0.013	0.003	-0.020	-0.017	0.010	-0.025
	(-0.77)	(0.10)	(-0.71)	(-0.98)	(0.33)	(-0.87)
ROA_t	0.193**	0.249*	0.104	0.165**	0.239*	0.104
	(2.58)	(2.01)	(0.99)	(2.21)	(2.00)	(1.02)
IO_t	0.076***	0.010	0.175***	0.076***	0.015	0.176***
	(3.68)	(0.37)	(7.51)	(4.15)	(0.59)	(7.63)
$EARN\_VOL_t$	0.038	-0.037	-0.045	0.058	-0.067	-0.031
	(0.58)	(-0.38)	(-0.29)	(0.92)	(-0.71)	(-0.21)
Observations	26,174	26,180	26,180	25,453	25,459	25,459
Adj. R^2	0.432	0.406	0.153	0.443	0.409	0.156
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Annual percentage change in emissions (basis pts)

	(1) Δ *SCOPE 1*$_{t+1}$	(2) Δ *SCOPE 2*$_{t+1}$	(3) Δ *SCOPE 3*$_{t+1}$	(4) Δ *SCOPE 1*$_{t+2}$	(5) Δ *SCOPE 2*$_{t+2}$	(6) Δ *SCOPE 3*$_{t+2}$
ESGPAY$_t$	-1.905***	-1.467	-1.952***	-1.609*	-1.014	-1.376**
	(-3.05)	(-1.17)	(-3.57)	(-2.10)	(-0.72)	(-2.18)
LN_SIZE$_t$	-1.596***	-0.801	-1.199***	-2.059***	-1.627**	-1.951***
	(-5.13)	(-1.12)	(-4.75)	(-5.13)	(-2.21)	(-7.32)
LN_BM$_t$	-2.875***	-3.592***	-4.237***	-1.589**	-1.963***	-2.388***
	(-4.53)	(-6.14)	(-8.24)	(-2.46)	(-3.01)	(-3.49)
LEV$_t$	0.013	-0.018	-0.022	0.005	-0.048**	-0.024
	(0.91)	(-0.63)	(-1.11)	(0.37)	(-2.23)	(-1.20)
ROA$_t$	-0.295**	-0.346***	-0.242**	-0.279**	-0.295**	-0.262***
	(-2.64)	(-3.05)	(-2.85)	(-2.58)	(-2.35)	(-3.58)
IO$_t$	-0.023	-0.041**	-0.001	-0.032	-0.072***	-0.011
	(-1.27)	(-2.17)	(-0.03)	(-1.71)	(-3.81)	(-0.83)
EARN_VOL$_t$	0.208	0.443***	0.168	0.315***	0.516***	0.219**
	(1.50)	(4.83)	(1.39)	(3.61)	(5.55)	(2.65)
Observations	26,638	26,660	26,679	24,924	24,949	24,963
Adj. R^2	0.028	0.039	0.152	0.032	0.043	0.163
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: ESG- linked pay and financial performance

This table presents OLS regressions of a firm's financial performance and the firm's adoption of ESG-linked pay by estimating the following equation:

$$FinPerf_{i,t+1} = \beta_0 + \beta_1 ESGPAY_{i,t} + \gamma X_{i,t} + \varepsilon_{it},$$

where *FinPerf* represents one of the following financial performance measures: *OPM* (operating performance margin), *ROA* (return on assets), and *TobinQ* (Tobin's Q). *ESGPAY* equals one if executive compensation is linked to ESG goals and 0 otherwise. *X* corresponds to a vector of firm characteristics as follows: *LN_SIZE* (the logarithm of total assets), *LN_BM* (the logarithm of common equity to market cap), *LEV* (total debt to total assets), *ROA* (return on assets), *IO* (institutional ownership) and *EARN_VOL* (earnings volatility). Constant is included in the controls and standard errors are clustered by year and country. *t*-statistics are reported in parentheses. Columns (1)-(3) examines one-year ahead ESG performances and columns (4)-(6) examines two-year ahead performances. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Appendix Table A1.

	(1) OPM_{t+1}	(2) ROA_{t+1}	(3) $TobinQ_{t+1}$	(4) OPM_{t+2}	(5) ROA_{t+2}	(6) $TobinQ_{t+2}$
$ESGPAY_t$	1.339**	0.142	0.001	1.601***	0.290**	0.016
	(2.82)	(0.83)	(0.02)	(3.29)	(2.32)	(0.46)
LN_SIZE_t	0.412	-0.215***	-0.162***	0.134	-0.371***	-0.190***
	(1.21)	(-4.12)	(-6.33)	(0.35)	(-4.66)	(-7.71)
LN_BM_t	-0.785**	-1.374***	-1.002***	-0.626	-1.211***	-0.954***
	(-2.17)	(-10.26)	(-16.53)	(-1.61)	(-7.88)	(-14.51)
LEV_t	0.047	-0.013***	-0.014***	0.049	-0.011***	-0.014***
	(1.73)	(-5.68)	(-4.41)	(1.75)	(-4.97)	(-4.47)
ROA_t	0.986***	0.633***	0.036***	0.842***	0.514***	0.030***
	(16.47)	(25.63)	(4.64)	(15.40)	(21.46)	(4.19)
IO_t	0.033*	-0.002	-0.002**	0.026	-0.003	-0.003**
	(1.83)	(-0.73)	(-2.17)	(1.49)	(-1.17)	(-2.80)
$EARN\_VOL_t$	-0.119	-0.042	0.035***	-0.090	-0.027	0.030***
	(-1.28)	(-1.04)	(3.88)	(-1.02)	(-0.62)	(3.48)
Observations	30,227	30,217	30,287	30,151	30,085	30,161
Adj. R^2	0.312	0.617	0.629	0.265	0.490	0.586
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: ESG pay and ESG performance - DiD analysis

This table reports results from difference-in-differences regressions that estimate the effect of ESG-linked pay adoption on a firm's ESG performances. For each treatment-control pair of firms, we define the event year as the year that the firm adopted ESG_linked pay. We include five annual observations centered around the event year for both treatment and control firms and estimate the following panel regression:

$$SCORE_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it},$$

where *SCORE* is one of the following ESG scores: *SOSCORE* (social), *ENSCORE* (environmental), and *CGSCORE* (corporate governance). $TREAT_i$ equals one if firm *i* is a treated firm that first adopts ESG pay after the 2014 EU Directive and zero if the firm is a matched control firm. *AFTER* equals one if year *t+1* is after event year and zero otherwise. *X* represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. ***, ** and* indicate significance at the 1%, 5%, and 10% levels. All variables are defined in Appendix Table A1.

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$
$TREAT_i \times AFTER$	3.698*	-0.876	3.621
	(1.83)	(-0.41)	(1.24)
$TREAT_i$	11.883***	15.247***	9.224**
	(3.81)	(3.60)	(2.11)
AFTER	1.156	4.199	-0.101
	(0.53)	(1.48)	(-0.04)
LN_SIZE_t	5.762***	6.683***	2.965**
	(4.80)	(4.10)	(2.03)
LEV_t	-0.013	-0.034	-0.166
	(-0.12)	(-0.27)	(-1.49)
LN_BM_t	-4.013*	-3.918	-0.526
	(-1.90)	(-1.35)	(-0.24)
ROA_t	0.153	-0.049	0.182
	(0.92)	(-0.28)	(1.08)
IO_t	0.238***	0.175	0.125
	(2.85)	(1.57)	(1.43)
$EARN\_VOL_t$	0.603*	0.703**	0.307
	(1.93)	(2.09)	(0.77)
Observations	543	543	543
Adj. R^2	0.557	0.553	0.238
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 8: ESG-linked pay and financial performance - DiD Analysis

This table reports results from difference-in-differences regressions that estimate the effect of ESG-linked pay adoption on firms' financial performance. For each treatment - control pair of firms, we define the event year as the year that the firm adopted ESG-linked pay. We include five annual observations centered around the event year for both treatment and control firms and estimate the following panel regression:

$$FinPerf_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it}$$

where *FinPerf* represents one of the following financial measures: *OPM, ROA* or *TobinQ*. $TREAT_i$ equals one if firm *i* is a treated firm that first adopts ESG pay after the 2014 EU Directive and zero if the firm is a matched control firm. $AFTER$ equals one if year *t+1* is after event year and zero otherwise. *X* represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. ***, ** and* indicate significance at the 1%, 5%, and 10% levels. All variables are defined in Appendix Table A1.

	(1)	(2)	(3)
	OPM_{t+1}	ROA_{t+1}	$TobinQ_{t+1}$
$TREAT_i \times AFTER$	3.080**	0.981	0.126
	(2.39)	(1.24)	(1.52)
$TREAT_i$	-4.051**	0.036	-0.094
	(-2.11)	(0.06)	(-1.00)
AFTER	-0.717	-0.587	-0.038
	(-0.44)	(-0.86)	(-0.44)
LN_SIZE_t	2.283***	0.034	-0.000
	(3.18)	(0.22)	(-0.00)
LEV_t	0.040	-0.001	-0.006*
	(0.47)	(-0.05)	(-1.90)
LN_BM_t	-2.495	-2.736***	-0.876***
	(-1.56)	(-5.17)	(-9.27)
ROA_t	0.711***	0.355***	0.008
	(6.73)	(6.04)	(0.94)
IO_t	0.038	0.011	-0.010***
	(0.78)	(0.32)	(-2.94)
$EARN\_VOL_t$	0.277	0.191**	0.003
	(1.26)	(2.38)	(0.44)
Observations	567	565	567
Adj. R^2	0.413	0.477	0.690
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Table 9: ESG-linked pay and ESG metrics adoption in absolute performance goals - DiD analysis

This table reports results from difference-in-differences regressions that estimate the adoption of ESG-linked pay tied to specific ESG performance goals in compensation contracts of all named executive officers (NEOs) as reported in the proxy statement. We define an event year as the year that the treatment firm adopted ESG-linked pay and include five annual observations around the event year for the treatment and control firms in the following panel regression analysis:

$$ESGPAY\_CAT_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it},$$

where *EGPAY_CAT* is a dummy variable representing the presence of one of the four categories of performance goals: *EMP* (employee/staff/talent related), *CUS* (customer related), *DIV* (diversity), and *ENV* (environment/climate). $TREAT_i$ equals one if firm *i* is a treated firm that first adopts ESG-linked pay after the 2014 EU Directive and zero if firm *i* is a matched control firm. $AFTER$ equals one if year t+1 is after the event year and zero otherwise. *X* represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*.. Panel A presents the results.

In the second set of panel regressions reported in Panel B, we replace the dummy outcome variables with continuous variables measuring the fraction of cash incentive pay linked to ESG metrics with respect to total executive compensation.

$$ESGPAY\_CAT\_Prop_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it},$$

where *ESGPAY_CAT_Prop* corresponds to one of the four categories of performance goals: *EMP, CUS* , *DIV*, and *ENV*. The *ESGPAY_CAT_Prop* variable is defined as the ratio of cash incentive pay linked to the corresponding ESG metric to total compensation, averaged over all NEOs in the same fiscal year. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% levels. All variables are defined in Appendix Table A1.

Panel A: Intensive margin: outcome is a dummy indicator

	Outcome = Dummy Indicator			
	(1)	(2)	(3)	(4)
	EMP_{t+1}	CUS_{t+1}	DIV_{t+1}	ENV_{t+1}
$TREAT_i \times AFTER$	0.141***	0.047	-0.023	-0.040
	(3.22)	(1.05)	(-0.94)	(-0.79)
$TREAT_i$	0.031	0.053	0.000	-0.038
	(1.37)	(1.22)	(0.03)	(-1.03)
$AFTER$	-0.047*	-0.052*	-0.000	-0.022
	(-1.98)	(-1.87)	(-0.02)	(-0.69)
LN_SIZE_t	-0.003	-0.014	0.002	0.018
	(-0.26)	(-0.85)	(0.43)	(1.11)
LEV_t	0.000	0.001	0.000	-0.000
	(0.44)	(0.52)	(0.81)	(-0.69)
LN_BM_t	0.011	0.045	0.004	0.053*
	(0.65)	(1.57)	(0.47)	(1.95)
ROA_t	-0.000	0.003	-0.000	-0.000
	(-0.00)	(1.20)	(-0.30)	(-0.08)
IO_t	0.002*	-0.002	0.000	0.003**
	(1.79)	(-0.77)	(0.95)	(2.06)
$EARN\_VOL_t$	0.009*	-0.002	-0.001	-0.000
	(1.83)	(-0.26)	(-0.66)	(-0.09)
Observations	471	471	471	471
Adj. R^2	0.138	0.072	0.064	0.488
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel B: Extensive margin: outcome is a quantitative measure

	Outcome = Quantitative Measure			
	(1)	(2)	(3)	(4)
	EMP_Prop $_{t+1}$	*CUS_Prop* $_{t+1}$	*DIV_Prop* $_{t+1}$	*ENV_Prop* $_{t+1}$
$TREAT_i \times AFTER$	0.029***	0.011	-0.006	-0.006
	(2.92)	(1.44)	(-1.12)	(-0.78)
$TREAT_i$	0.014**	0.013**	0.000	-0.004
	(2.39)	(2.00)	(0.18)	(-0.54)
AFTER	-0.009	-0.010*	0.001	-0.007
	(-1.57)	(-1.89)	(0.22)	(-1.38)
LN_SIZE_t	-0.005	-0.001	0.001	0.000
	(-1.41)	(-0.22)	(0.70)	(0.07)
LEV_t	0.000	0.000	0.000	-0.000
	(1.18)	(0.41)	(0.96)	(-1.34)
LN_BM_t	0.001	0.000	0.001	0.008**
	(0.16)	(0.05)	(0.61)	(2.04)
ROA_t	-0.001	0.000	-0.000	0.000
	(-0.92)	(0.07)	(-0.51)	(1.03)
IO_t	0.000	0.000	0.000	0.001**
	(1.29)	(0.16)	(1.02)	(2.06)
$EARN\_VOL_t$	0.002	0.000	-0.000	-0.000
	(1.54)	(0.31)	(-0.94)	(-0.68)
Observations	471	471	471	471
Adj. R^2	0.163	0.090	0.052	0.357
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Table 10: ESG-linked Pay and firm outcomes for different types of US firms, by EU subsidiary status and ESG-linked pay choice

Panel A presents summary statistics for the six subcategories of US Russell 3000 firms as of fiscal year 2013 (mean and median): firms with EU subsidiary (early adopters, late adopters, and never adopters) and firms with no EU subsidiary (early adopters, late adopters, and never adopters). Early adopters are firms who adopted ESG-linked pay before 2014, late adopters are firms who adopted ESG-linked pay for the first time after 2014, and never adopters are firms who never adopted ESG-linked pay throughout the sample period 2005 -2020. Panel B presents DiD regression results based on a matched sample where treatment firms are matched to control firms from the pool of never adopters with EU subsidiaries. Panel C presents similar panel regression results focusing on a subsample of US firms with EU subsidiaries that are either early adopters or late adopters of ESG-linked pay. Panel D reports panel regression results of firm performances on firms' EU subsidiary status using a subsample of US firms that never adopted ESG-linked pay.

Panel A: Summary statistics for the 3x2 types of firms as of fiscal year 2013 (mean and median)

	Early Adopter				Late Adopter				Never Adopter			
	With EU sub		No EU sub		With EU sub		No EU sub		With EU sub		No EU sub	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
ESG_DISC	47.53	45.41	42.25	42.96	39.80	38.76	32.90	30.65	32.12	29.81	28.96	27.74
SOSCORE	61.06	63.72	53.85	58.55	52.72	53.25	37.46	34.97	45.44	42.94	40.91	37.63
ENSCORE	62.23	65.91	48.52	51.87	46.88	52.53	29.30	27.16	33.12	27.54	26.89	19.05
CGSCORE	66.26	70.02	59.55	66.66	57.80	60.52	54.60	55.52	47.53	47.48	44.15	44.66
ROA	7.27	6.73	5.79	5.09	6.96	6.03	2.01	4.12	5.32	5.66	2.06	3.22
OPM	16.53	15.17	20.14	20.05	14.46	13.24	14.62	15.82	11.69	10.32	14.52	12.35
TobinQ	2.07	1.76	1.64	1.35	1.87	1.70	1.92	1.46	2.29	1.82	2.16	1.41
LN_SIZE	23.98	24.21	23.56	23.79	23.17	22.71	21.79	22.24	21.53	21.48	20.96	20.98
LEV(%)	28.75	26.75	27.36	27.03	26.80	26.76	28.94	30.55	21.35	18.35	22.22	13.49
LN_BM	-1.04	-0.98	-0.85	-0.79	-1.02	-0.98	-0.94	-0.76	-1.08	-1.00	-0.88	-0.71
IO(%)	76.08	79.95	71.35	73.16	86.15	87.41	74.54	80.38	82.62	87.84	65.01	70.12
EARN_VOL(%)	2.71	2.04	3.10	1.93	3.20	2.39	5.17	2.12	4.93	2.93	5.01	1.97
Observations in Sample	43		48		58		60		653		955	

Panel B. DID regression of firm performance for US firms with EU sub: late adopters and never adopters

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$	(4) OPM_{t+1}	(5) ROA_{t+1}	(6) $TobinQ_{t+1}$
$TREAT_i$ X $AFTER$	4.326*	-0.014	2.935	2.293*	-0.004	0.114
	(1.81)	(-0.01)	(1.02)	(1.89)	(-0.01)	(1.59)
$TREAT_i$	4.560	5.352	8.772**	2.674*	-0.319	0.004
	(1.20)	(1.22)	(2.40)	(1.84)	(-0.56)	(0.04)
$AFTER$	-0.081	4.048	1.476	0.409	0.487	0.072
	(-0.03)	(1.29)	(0.59)	(0.36)	(1.01)	(0.91)
LN_SIZE_t	5.479***	9.046***	1.189	1.631***	-0.224	-0.030
	(3.80)	(4.93)	(0.69)	(2.63)	(-1.32)	(-0.76)
LEV_t	-0.006	0.135	0.138	0.106**	-0.014	-0.004
	(-0.05)	(0.96)	(1.19)	(2.54)	(-0.85)	(-1.59)
LN_BM_t	-2.854	-2.578	-0.808	-1.835	-2.258***	-0.651***
	(-1.53)	(-1.02)	(-0.36)	(-1.50)	(-4.61)	(-10.92)
ROA_t	0.171	0.259	0.435*	0.669***	0.387***	0.049***
	(0.80)	(0.93)	(1.76)	(5.53)	(5.24)	(3.20)
IO_t	0.127	0.009	0.202	0.029	0.014	-0.011**
	(0.92)	(0.05)	(1.51)	(0.70)	(0.65)	(-2.61)
$EARN\_VOL_t$	1.679***	0.967	0.107	0.223	0.138**	0.016
	(3.34)	(1.57)	(0.21)	(1.31)	(2.20)	(1.18)
Observations	542	542	542	571	569	571
Adj. R^2	0.414	0.448	0.181	0.461	0.498	0.702
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Panel regression for firm performance for US firms with EU sub: early & late adopters

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$	(4) OPM_{t+1}	(5) ROA_{t+1}	(6) $TobinQ_{t+1}$
$ESGPAY_t$	6.37	1.65	0.76	-2.87	0.12	0.03
	(1.49)	(0.30)	(0.13)	(-1.01)	(0.17)	(0.18)
LATE_ADOPTER	1.50	-3.06	-1.13	-1.56	-0.07	-0.31
	(0.30)	(-0.42)	(-0.17)	(-0.52)	(-0.09)	(-1.56)
$ESGPAY_t \times LATE\_ADOPTER$	-3.99	-0.43	5.11	5.31*	0.26	0.08
	(-0.86)	(-0.08)	(0.79)	(1.87)	(0.34)	(0.38)
LN_SIZE_t	7.08***	10.24***	3.99***	2.35***	-0.07	-0.13**
	(6.63)	(6.43)	(3.54)	(5.41)	(-0.36)	(-2.52)
LEV_t	-1.99	-0.93	0.02	-3.62***	-2.72***	-0.82***
	(-1.34)	(-0.42)	(0.02)	(-3.81)	(-6.12)	(-6.95)
LN_BM_t	0.04	0.04	0.10	0.01	-0.04**	-0.01**
	(0.45)	(0.26)	(1.01)	(0.29)	(-2.33)	(-2.24)
ROA_t	-0.01	-0.17	0.35**	0.60***	0.45***	0.05***
	(-0.10)	(-0.69)	(2.43)	(5.41)	(6.86)	(3.40)
IO_t	0.06	-0.03	0.24***	0.08**	-0.01	-0.00
	(0.71)	(-0.28)	(3.06)	(2.20)	(-0.56)	(-0.79)
$EARN\_VOL_t$	0.42	0.48	-0.02	0.12	0.04	-0.00
	(1.38)	(1.11)	(-0.04)	(0.91)	(0.62)	(-0.32)
Observations	887	887	887	939	937	939
Adj. R^2	0.422	0.410	0.112	0.439	0.531	0.644
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel D. Panel regression for firm performance for US firms that are never adopters: firms with & without EU subsidiaries

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$	(4) OPM_{t+1}	(5) ROA_{t+1}	(6) $TobinQ_{t+1}$
EUsub×Post2014	2.962**	1.069	-0.575	-3.091***	-0.886***	0.124***
	(2.36)	(0.69)	(-0.38)	(-7.82)	(-5.00)	(2.87)
EUsub	2.666*	4.989***	1.852	-0.132	0.930***	-0.106**
	(1.77)	(2.59)	(1.13)	(-0.23)	(4.96)	(-2.45)
LN_SIZE_t	6.288***	9.567***	2.863***	1.418***	0.103**	-0.101***
	(20.92)	(24.00)	(8.52)	(8.05)	(2.12)	(-7.70)
LEV_t	-0.015	-0.008	-0.021	-0.037***	-0.004	-0.014***
	(-0.83)	(-0.33)	(-1.01)	(-2.66)	(-1.48)	(-12.99)
LN_BM_t	-4.170***	-3.908***	-0.926*	-2.569***	-1.742***	-1.167***
	(-8.70)	(-6.68)	(-1.88)	(-9.73)	(-12.33)	(-28.54)
ROA_t	0.042	0.149***	0.066*	0.488***	0.643***	0.005**
	(1.29)	(4.10)	(1.85)	(25.96)	(38.54)	(1.98)
IO_t	0.085***	-0.008	0.163***	-0.020**	0.010***	0.001
	(4.65)	(-0.34)	(7.69)	(-2.27)	(3.04)	(0.70)
$EARN\_VOL_t$	0.212***	0.231***	-0.212***	-0.208***	-0.208***	0.024***
	(3.04)	(2.97)	(-2.88)	(-6.31)	(-9.37)	(6.48)
Observations	11260	11264	11264	17717	17776	17841
Adj. R^2	0.332	0.382	0.126	0.393	0.574	0.530
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: ESG pay adoption by Russell 3000 firms with EU subsidiaries, conditional on pre-Directive ESG disclosure quality

This table presents the results of a cross-sectional analysis of the effect of the EU Directive on ESG-linked pay adoption conditional on US firms' pre-Directive ESG disclosure quality score. We rank all the Russell 3000 firms with EU subsidiaries in our sample based on their ESG disclosure quality score as of year 2012 and partition them into four subsamples*: ESG_DISC_RANK*$_{2012}$=1 (lowest disclosure quality), $RANK_{ESG\_DISC}$ =2, $RANK_{ESG\_DISC}$ =3, and $RANK_{ESG\_DISC}$ =4 (highest disclosure quality). We run a panel regression analysis with the Post2014 dummy and its interactions with the three indicators for ESG disclosure quality subgroups ($RANK_{ESG\_DISC}$ =2,3,4), controlling for indicators of ESG disclosure quality and firm characteristics.

	(1) $ESGPay_{t+1}$	(2) $ESGPay_{t+1}$	(3) $ESGPay_{t+1}$	(4) $ESGPay_{t+1}$
Post2014	0.02**		0.03***	
	(2.29)		(2.59)	
Post2014×RANK$_{ESG\_DISC}$*=2*	-0.01	-0.02	-0.01	-0.01
	(-0.98)	(-1.06)	(-0.75)	(-0.74)
Post2014× RANK$_{ESG\_DISC}$*=3*	0.04*	0.03*	0.03*	0.03
	(1.86)	(1.76)	(1.76)	(1.53)
Post2014× RANK$_{ESG\_DISC}$ *=4*	0.05**	0.05**	0.06**	0.05**
	(2.14)	(2.09)	(2.56)	(2.33)
$RANK_{ESG\_DISC}$ *=2*	-0.00	0.00		
	(-0.08)	(0.05)		
$RANK_{ESG\_DISC}$ *=3*	-0.01	-0.01		
	(-0.86)	(-0.68)		
$RANK_{ESG\_DISC}$ *=4*	0.04*	0.05*		
	(1.75)	(1.94)		
LN_SIZE_t	0.04***	0.04***	0.01	-0.02**
	(5.59)	(5.41)	(0.70)	(-1.97)
LEV_t	-0.00	0.00	0.01	0.02**
	(-0.09)	(0.11)	(1.06)	(2.27)
LN_BM_t	-0.00	-0.00	0.00	0.00
	(-0.46)	(-0.47)	(0.49)	(0.57)
ROA_t	0.00	0.00	0.00	0.00
	(0.53)	(0.65)	(0.15)	(0.51)
IO_t	-0.00*	-0.00**	-0.00	-0.00
	(-1.95)	(-2.20)	(-0.13)	(-1.34)
$EARN\_VOL_t$	0.00**	0.00**	0.00	0.00
	(2.03)	(2.01)	(0.37)	(0.10)
Observations	7,605	7,605	7,604	7,604
Adj. R^2	0.269	0.272	0.675	0.681
Year FE	No	Yes	No	Yes
Industry FE	Yes	Yes	-	-
Firm FE	No	No	Yes	Yes

Table 12: Difference-in-differences analysis with *TREAT* decomposition based on pre-Directive ESG disclosure quality

We partition the treatment group into two subgroups based on firms' pre-directive ESG disclosure quality. *TRT_DisL* (*TRT_DisH*) is set equal to one if the pre-directive ESG disclosure quality is below (above) median as of year 2012. We then perform a difference-in-differences analysis with the two partitioned treatment dummies. Panel A reports results on ESG performance and Panel B presents results on financial performance.

Panel A: ESG performance

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$	(4) ESG_DISC_{t+1}
TRT_DiscL×AFTER	7.198**	1.097	9.986**	1.738
	(2.43)	(0.31)	(2.47)	(0.96)
TRT_DiscH×AFTER	3.313	-0.642	2.341	1.029
	(1.53)	(-0.29)	(0.75)	(0.98)
TRT_DiscL	-1.883	-0.909	7.115	-3.532
	(-0.35)	(-0.15)	(1.02)	(-1.61)
TRT_DiscH	14.667***	19.100***	9.360*	8.025***
	(4.24)	(3.87)	(1.83)	(4.13)
AFTER	0.485	3.184	0.466	0.516
	(0.21)	(1.09)	(0.18)	(0.39)
LN_SIZE_t	4.732***	5.276***	2.856*	2.913***
	(3.74)	(2.93)	(1.75)	(4.16)
LEV_t	0.002	-0.010	-0.158	0.038
	(0.02)	(-0.08)	(-1.30)	(0.82)
LN_BM_t	-3.514	-3.011	-0.608	0.444
	(-1.65)	(-1.03)	(-0.26)	(0.39)
ROA_t	0.197	-0.039	0.166	0.064
	(1.24)	(-0.23)	(1.09)	(0.82)
IO_t	0.256***	0.192**	0.118	0.079*
	(3.84)	(2.26)	(1.52)	(1.90)
$EARN\_VOL_t$	0.510	0.470	0.478	0.176*
	(1.53)	(1.34)	(1.13)	(1.67)
Observations	537	537	537	558
Adj. R^2	0.581	0.570	0.228	0.508
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel B: Financial performance

	(1) OPM_{t+1}	(2) ROA_{t+1}	(3) $TobinQ_{t+1}$
TRT_ESGdiscLOW×AFTER	1.057	10.568	0.164
	(0.72)	(1.59)	(1.18)
TRT_ESGdiscHIGH×AFTER	1.475*	4.312**	0.098
	(1.74)	(2.44)	(1.11)
TRT_ESGdiscLOW	0.959	-13.009*	0.051
	(0.85)	(-1.83)	(0.42)
TRT_ESGdiscHIGH	-0.567	-3.699	-0.158
	(-0.86)	(-1.51)	(-1.39)
AFTER	-0.980	-1.933	0.006
	(-1.21)	(-1.06)	(0.07)
LN_SIZE_t	0.160	2.112**	0.023
	(0.77)	(2.41)	(0.50)
LEV_t	0.007	0.009	-0.008**
	(0.33)	(0.10)	(-2.51)
LN_BM_t	-2.863***	-0.715	-0.913***
	(-4.87)	(-0.26)	(-9.34)
ROA_t	0.321***	0.940***	0.013
	(4.00)	(3.85)	(1.40)
IO_t	-0.015	0.043	-0.006**
	(-0.87)	(0.84)	(-2.46)
$EARN\_VOL_t$	0.186*	0.266	0.011
	(1.94)	(1.14)	(1.42)
Observations	556	558	558
Adj. R^2	0.435	0.318	0.700
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Appendix Table A1: Variable descriptions

Variable	Source	Definition
Dependent variables		
ESGPAY	Bloomberg	An indicator that equals one if executive compensation is linked to ESG goals, zero otherwise *(ESG_LINKED_BONUS)*
Tobin's Q (TobinQ)	Worldscope	[Market Cap (*WC07210*) + Total Assets (*WC07230*) – Common Equity (*WC07220*)]/Total Assets (*WC07230*). Winsorized at 0 and 99th percentiles.
Operating profit margin (OPM)	Worldscope	Operating profit margin (*WC08316*). Winsorized at 1st and 99th percentiles.
Country Characteristics		
GDP per capita	World Bank	GDP per capita at Constant 2015 $.
Power distance	Geert Hofstede's website/book	Power distance expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. A higher score indicates a large power distance between individuals.
Individualism	Ibid.	The high side of this dimension, called Individualism, indicates a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, Collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."
Masculinity/Femininity	Ibid.	The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite, Femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented. In the business context Masculinity versus Femininity is sometimes also related to as "tough versus tender" cultures.
Uncertainty avoidance	Ibid.	The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior, and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.
Corruption control	World Bank Governance Indicators	The extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as the "capture" of the state by elites and private interests. Coded from –2.5 to 2.5, with higher values corresponding to better governance outcomes.
Regulatory quality	World Bank Governance Indicators	The ability of the government to implement sound policies and regulations that promote private sector development. Coded from –2.5 to 2.5, with higher values corresponding to higher levels of regulatory quality.

ADRI	La Porta *et al*. (1998), Djankov *et al*. (2008), Spamann (2010)	The Anti-Director Rights Index (ADRI) is a measure of investor protection against corporate management. ADRI consists of the same six key components: (1) proxy by mail allowed, (2) shares not blocked before shareholder meeting, (3) cumulative voting and proportional representation, (4) oppressed minority protection, (5) preemptive rights to new share issues, (6) percentage of share capital to call an extraordinary shareholder meeting. Each component is an indicator variable, and the ADRI is formed by aggregating the value of all six components. The index ranges from 0 to 6, whereby a higher value of the index indicates stronger shareholder protection.
French civil, German civil, Scandinavian civil	La Porta *et al*. (1998), Djankov *et al*. (2008), La Porta *et al*. (2008), and Spamann (2010)	The legal origin of the company law or commercial code of the country. We distinguish four major legal origins: English common law, French commercial code (civil law), German commercial code (civil law), Scandinavian civil law. The indicator is equal to one for each and zero otherwise.
Firm-level variables		
Firm size (LN_SIZE)	Worldscope	Log of total assets in $ *(ln of WC07230).*
Book-to- market (LN_BM)	Worldscope	Log of book-to-market ratio (ln[Common Equity (WC07220)]/(Market Cap (WC07210)]).
Leverage (LEV)	Worldscope	Debt/Assets *(WC08236)* Winsorized at 0 and 99th percentiles.
Return on assets (ROA)	Worldscope	Net income normalized by total assets *(WC08326)* Winsorized at 1st and 99th percentiles. For the causal analysis using the US Russell 3000 sample, due to the increased presence of extreme values, we winsorize at the 5th and 99th percentiles.
Institutional ownership (IO)	Factset	Institutional ownership from Factset. Winsorized at 0 and 99th percentiles.
Earnings volatility (EARN_VOL)	Worldscope	Standard deviation of past five-years of deflated earnings (Net Income/Avg Assets Winsorized at 0 and 99th percentiles. For the causal analysis using the US Russell 3000 sample, due to the increased presence of extreme values, we winsorize at 0 and 95th percentiles.
Return on equity (ROE)	Worldscope	Net income normalized by total equity *(WC08301).*
SOSCORE	Asset4	Social Score from Asset4.
ENSCORE	Asset4	Environmental Score from Asset4.
CGSCORE	Asset4	Corporate Governance Score from Asset4.
ESG_DISC	Bloomberg	ESG disclosure score, based on ESG data from published disclosures and news items.
Developed market	MSCI	1 for developed markets, 0 otherwise.
EU Subsidiary	WRDS Subsidiary Data	Binary variable that is 1 if the firm has (any) subsidiary in the EU27 or UK in the 2013 fiscal year, 0 otherwise.
ENSCORE_B	Bloomberg	Environmental Pillar Score from Bloomberg. Scaled up by a factor of 10.
SOSCORE_B	Bloomberg	Social Pillar Score from Bloomberg. Scaled up by a factor of 10.
CGSCORE_B	Bloomberg	Governance Pillar Score from Bloomberg. Scaled up by a factor of 10.
ΔSCOPE 1, ΔSCOPE 2, ΔSCOPE 3	Trucost	% changes in SCOPE 1 (Trucost variable di_319413), SCOPE 2 (Trucost variable di_319414) and SCOPE 3 (Trucost variable di_319415). Reported as percentages

Appendix Table A2: Exposure to the EU Directive, ESG-linked pay adoption, and firm performance

Panel A presents results from a regression of pre- or post-Directive *ESGPAY* on explanatory variables for firms in the Russell 3000 index. The pre-Directive *ESGPAY* equals one if the firm adopts ESG-linked pay for its executives during 2013, and zero otherwise. The post-Directive *ESGPAY* equals one if *ESGPAY* is one in at least one of the years during the period 2014-2017, and zero otherwise (to allow for staggered implementation of the Directive by different EU countries). *EUsub* equals one if the firm has an EU subsidiary and zero otherwise. Post2014 equals one for year observations post 2014, and zero otherwise. examines the adoption of ESG-linked pay for firms in the Russell 300 index pre- and post-EU Directive. The pre-Directive *ESGPAY* is defined as the value of *ESGPAY* as of 2013. The post-Directive *ESGPAY* equals one if *ESGPAY* is one for at least one of the years during the period 2014-2017.
Panel B reports results from Panel Regression for All US Russell 3000 Early Adopters (treating *EUsub*=missing as *EUsub*=0).

Panel A: All Russell 3000 firms

	(1)	(2)
	$ESGPAY_{t+1}$	$ESGPAY_{t+1}$
EUsub×*Post2014*	2.80***	2.47**
	(2.69)	(2.11)
EUsub	2.34**	-1.23
	(2.17)	(-0.96)
Post2014	3.52***	
	(6.21)	
LN_SIZE_t		4.68***
		(10.06)
LEV_t		-0.04**
		(-2.38)
$LNBM_t$		-1.47***
		(-2.59)
ROA_t		0.01
		(0.17)
IO_t		-0.05**
		(-2.43)
$EARN\_VOL_t$		0.17**
		(2.49)
Constant	4.90***	-89.37***
	(8.07)	(-9.86)
Observations	4719	4098
Adjusted R-squared	0.010	0.245
Year FE	No	Yes
Industry FE	No	Yes

Panel B: Russell 3000 early ESG-linked pay adopter firms

	(1) ESG_DISC_{t+1}	(2) $SOSCORE_{t+1}$	(3) $ENSCORE_{t+1}$	(4) $CGSCORE_{t+1}$	(5) OPM_{t+1}	(6) ROA_{t+1}	(7) $TobinQ_{t+1}$
EUsub×Post2014	-0.349	0.697	-1.922	1.118	-1.149	-0.332	0.159
	(-0.28)	(0.28)	(-0.70)	(0.35)	(-0.91)	(-0.59)	(1.53)
EUsub	2.484	2.116	6.733*	4.494	-4.504***	0.071	0.097
	(1.64)	(0.73)	(1.86)	(1.35)	(-2.94)	(0.16)	(0.94)
LN_SIZE_t	4.295***	10.316***	11.352***	5.654***	1.558***	0.169	-0.084***
	(12.24)	(14.68)	(11.76)	(6.85)	(4.03)	(1.52)	(-2.84)
LEV_t	-0.079*	-0.154**	-0.099	-0.082	-0.049	-0.084***	-0.017***
	(-1.88)	(-2.20)	(-0.93)	(-1.05)	(-1.13)	(-6.10)	(-4.28)
$LNBM_t$	-1.965***	-4.435***	-3.253*	-3.660**	-5.122***	-4.360***	-0.846***
	(-2.62)	(-3.62)	(-1.95)	(-2.43)	(-4.93)	(-11.53)	(-9.79)
ROA_t	-0.057	0.124	-0.008	0.057	0.368***	0.346***	0.025***
	(-1.11)	(1.35)	(-0.08)	(0.43)	(4.96)	(8.16)	(3.26)
IO_t	0.054*	0.083	0.047	0.252***	0.002	-0.012	-0.001
	(1.78)	(1.41)	(0.61)	(3.48)	(0.05)	(-1.21)	(-0.73)
$EARN\_VOL_t$	0.119	0.301	0.023	0.175	0.139	-0.071	0.005
	(1.05)	(1.25)	(0.09)	(0.61)	(1.50)	(-1.48)	(0.61)
Constant	-60.889***	-197.397***	-224.611***	-94.710***	-24.255**	-0.845	3.323***
	(-7.31)	(-10.95)	(-9.12)	(-4.45)	(-2.48)	(-0.32)	(4.84)
Observations	1857	1662	1662	1662	1854	1854	1854
Adjusted R-squared	0.568	0.527	0.470	0.263	0.389	0.506	0.616
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix Table A3: Difference-in-differences sample summary statistics

This table presents a comparison between the treatment and control firms as of 2013. Treatment firms are US firms with at least an EU or UK subsidiary that first adopted ESG-linked pay post 2014, the enactment of the directive. Each treatment firm is matched to one control firm, which is a US with no EU or UK subsidiary and never adopted ESG pay in the 2011-2018 period. We select a control firm that operates in the same industry and with the smallest Mahalanobis Distance based on *LN_SIZE*, *LN_BM*, and *Tobin's Q*. The *t*-test compares means across the treatment and control firms while the Kolmogorov-Smirnov (KS) test compares distributions. A p-value of greater than 5% implies that we cannot reject the null-hypothesis that the means or distributions are the same.

Variable	Group	Mean	SD	Median	T-test p-val	KS-test p-val
LN_SIZE	TREAT	23.17	1.91	22.71	0.115	0.167
	CONTROL	22.64	1.68	22.46		
LN_BM	TREAT	-1.02	0.81	-0.98	0.404	0.487
	CONTROL	-0.90	0.63	-0.82		
LEV %	TREAT	26.80	14.98	26.76	0.600	0.792
	CONTROL	28.36	16.79	25.74		
ROA %	TREAT	6.96	5.13	6.03	0.672	0.221
	CONTROL	6.56	5.14	6.08		
IO %	TREAT	86.15	11.09	90.13	0.730	0.109
	CONTROL	85.06	21.36	87.41		
EARN_VOL %	TREAT	3.20	4.05	2.39	0.885	0.639
	CONTROL	3.10	3.54	2.72		
TobinQ	TREAT	1.87	0.96	1.70	0.700	0.982
	CONTROL	1.81	0.83	1.52		
OPM %	TREAT	14.46	10.60	13.24	0.06	0.248
	CONTROL	18.84	14.01	13.10		

Appendix Table A4: ESG disclosure quality scores

This table reports results from difference-in-differences regressions that estimate the effect of the passage of the 2014 EU Directive (NFRD) on the ESG disclosure scores of the US Russel 3000 firms for the sample period 2005-2020. We estimate the following panel regression equation: $ESG\_DISC_{i,t} = \beta_0 + \beta_1 EU\_SUB_i \times AFTER + \beta_2 EU\_SUB_i + \beta_3 AFTER + X_{i,t-1}\gamma + \sigma_t + \varepsilon_{it}$, where $ESG\_DISC_{i,t}$ is the ESG disclosure score for firm *i* in year *t*, EU_SUB is 1 for a firm with a EU subsidiary, 0 otherwise. *AFTER* is 1 for all years 2014 and after, 0 otherwise. $X_{i,t-1}$ represents a vector of control variables (lagged by one fiscal year) including LN_SIZE_t, LN_BM_t, LEV_t, ROA_t, IO_t, and $EARN\_VOL_t$. The other specifications use ESG_DISC at *t*+1 and *t*+2 as dependent variables. The intercept is included but not reported. All the regressions control for year and industry fixed effects. Standard errors are double clustered by firm and year and the corresponding *t*-statistics are reported in parentheses. Variables are defined in Appendix Table A1. ***, ** and* indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)
	ESG_DISC_t	ESG_DISC_{t+1}	ESG_DISC_{t+2}
$EU\_SUB_i X\ AFTER$	1.624***	1.521***	1.204***
	(4.81)	(5.16)	(3.41)
EU_SUB_i	0.185	0.301	0.558
	(0.50)	(0.79)	(1.30)
LN_SIZE_{t-1}	3.364***	3.441***	3.537***
	(17.90)	(19.09)	(20.85)
LN_BM_{t-1}	-1.377***	-1.431***	-1.561***
	(-8.02)	(-8.39)	(-8.55)
LEV_{t-1}	-0.003	-0.001	-0.002
	(-0.32)	(-0.06)	(-0.21)
ROA_{t-1}	0.024**	0.023**	0.023*
	(2.47)	(2.32)	(1.93)
IO_{t-1}	-0.019**	-0.015*	-0.013
	(-2.59)	(-1.89)	(-1.52)
$EARN\_VOL_{t-1}$	0.107***	0.113***	0.114***
	(4.83)	(4.94)	(4.69)
Observations	15,491	14,773	13,167
Adj. R^2	0.543	0.536	0.534
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Appendix Table A5: ESG-linked pay and ESG metrics adoption in absolute performance goals - DiD analysis (CEO only)

This table reports results from difference-in-differences regressions that estimate the adoption of ESG-linked pay tied to specific ESG performance goals in CEO compensation contracts. We define an event year as the year that the treatment firm adopted ESG-linked pay and include five annual observations around the event year for the treatment and control firms in the following panel regression analysis:

$$ESGPAY\_CAT_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it},$$

where $ESGPAY\_CAT$ is a dummy variable for the presence of one of the four categories of performance goals: *EMP* (employee/staff/talent related), *CUS* (customer related), *DIV* (diversity), and *ENV* (environment/climate). $TREAT_i$ equals one if firm i is a treated firm that first adopts ESG pay after the 2014 EU Directive and zero if firm i is a matched control firm. $AFTER$ equals one if year *t+1* is after the event year and zero otherwise. *X* represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. Panel A presents the results.

In Panel B we replace the dummy outcome variables with continuous variables measuring the fraction of cash incentive pay linked to ESG metrics with respect to total executive compensation.

$$ESGPAY\_CAT\_Prop_{i,t+1} = \beta_0 + \beta_1 TREAT_i \times AFTER + \beta_2 TREAT_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it},$$

Where $ESGPAY\_CAT\_Prop$ corresponds to one of the four categories of performance goals: *EMP*, *CUS*, *DIV*, and *ENV*. For each firm year, we compute the ratio of cash incentive pay linked to the corresponding ESG metric to the total compensation of the CEO. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. All variables are defined in the Appendix Table A1. ***, ** and* indicate significance at the 1%, 5%, and 10% levels.

Panel A: Extensive margin: outcome is a dummy indicator

	Outcome = Dummy Indicator			
	(1)	(2)	(3)	(4)
	EMP_{t+1}	CUS_{t+1}	DIV_{t+1}	ENV_{t+1}
$TREAT_i \times AFTER$	0.141***	0.047	-0.023	-0.040
	(3.22)	(1.05)	(-0.94)	(-0.79)
$TREAT_i$	0.031	0.053	0.000	-0.038
	(1.37)	(1.22)	(0.03)	(-1.03)
$AFTER$	-0.047*	-0.052*	-0.000	-0.022
	(-1.98)	(-1.87)	(-0.02)	(-0.69)
LN_SIZE_t	-0.003	-0.014	0.002	0.018
	(-0.26)	(-0.85)	(0.43)	(1.11)
LEV_t	0.000	0.001	0.000	-0.000
	(0.44)	(0.52)	(0.81)	(-0.69)
LN_BM_t	0.011	0.045	0.004	0.053*
	(0.65)	(1.57)	(0.47)	(1.95)
ROA_t	-0.000	0.003	-0.000	-0.000
	(-0.00)	(1.20)	(-0.30)	(-0.08)
IO_t	0.002*	-0.002	0.000	0.003**
	(1.79)	(-0.77)	(0.95)	(2.06)
$EARN\_VOL_t$	0.009*	-0.002	-0.001	-0.000
	(1.83)	(-0.26)	(-0.66)	(-0.09)
Observations	471	471	471	471
Adj. R^2	0.138	0.072	0.064	0.488
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Panel B: Intensive margin: outcome is a quantitative measure

	Outcome = Quantitative Measure			
	(1)	(2)	(3)	(4)
	EMP_Prop $_{t+1}$	*CUS_Prop* $_{t+1}$	*DIV_Prop* $_{t+1}$	*ENV_Prop* $_{t+1}$
$TREAT_i \times AFTER$	0.029***	0.011	-0.006	-0.006
	(2.92)	(1.44)	(-1.12)	(-0.78)
$TREAT_i$	0.014**	0.013**	0.000	-0.004
	(2.39)	(2.00)	(0.18)	(-0.54)
AFTER	-0.009	-0.010*	0.001	-0.007
	(-1.57)	(-1.89)	(0.22)	(-1.38)
LN_SIZE_t	-0.005	-0.001	0.001	0.000
	(-1.41)	(-0.22)	(0.70)	(0.07)
LEV_t	0.000	0.000	0.000	-0.000
	(1.18)	(0.41)	(0.96)	(-1.34)
LN_BM_t	0.001	0.000	0.001	0.008**
	(0.16)	(0.05)	(0.61)	(2.04)
ROA_t	-0.001	0.000	-0.000	0.000
	(-0.92)	(0.07)	(-0.51)	(1.03)
IO_t	0.000	0.000	0.000	0.001**
	(1.29)	(0.16)	(1.02)	(2.06)
$EARN\_VOL_t$	0.002	0.000	-0.000	-0.000
	(1.54)	(0.31)	(-0.94)	(-0.68)
Observations	471	471	471	471
Adj. R^2	0.163	0.090	0.052	0.357
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Appendix Table A6: Robustness check for ESG outcomes

This table presents OLS regressions of firm's E, S and G performance and the firm's adoption of ESG-linked pay by estimating the following equation:

$$SCORE_{i,t+1} = \beta_0 + \beta_1 ESGPAY_{i,t} + \gamma X_{i,t} + \varepsilon_{it}$$

Where *SCORE* represents a firm's environmental, social or governance scores (*ENSCORE_B, SOSCORE_B*, or *CGSCORE_B*, respectively) from Bloomberg. *ESGPAY* equals one if executive compensation is linked to ESG goals and 0 otherwise. *X* corresponds to a vector of firm characteristics as follows: *LN_SIZE* (the logarithm of total assets), *LN_BM* (the logarithm of common equity to market cap), *LEV* (total debt to total assets), *ROA* (return on assets), *IO* (institutional ownership), and *EARN_VOL* (earnings volatility). Standard errors are clustered by year and by country. *t*-statistics are reported in parentheses. Columns (1)-(4) examines one-year ahead E, S, and G performance and columns (5)-(8) examines two-year ahead performance. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Constant included. All variables are defined in the Appendix Table A1.

	(1)	(2)	(3)	(4)	(5)	(6)
	$ENSCORE\_B_{t+1}$	$SOSCORE\_B_{t+1}$	$CGSCORE_{t+1}$	$ENSCORE\_B_{t+2}$	$SOSCORE\_B_{t+2}$	$CGSCORE\_B_{t+2}$
$ESGPAY_t$	6.247***	4.882***	3.724***	6.213***	4.443***	3.526***
	(5.81)	(5.15)	(7.42)	(5.98)	(5.21)	(6.53)
LN_SIZE_t	2.823***	1.234***	1.776**	2.855***	1.199***	1.679**
	(5.61)	(5.19)	(3.66)	(5.53)	(4.83)	(3.53)
LN_BM_t	-0.261	0.611	-1.063***	-0.377	0.771	-0.996**
	(-0.99)	(1.31)	(-4.27)	(-1.19)	(1.55)	(-3.69)
LEV_t	0.095***	0.077**	-0.017	0.094***	0.086**	-0.017
	(5.89)	(2.85)	(-0.91)	(6.39)	(2.97)	(-0.92)
ROA_t	0.240**	0.214***	0.066	0.226**	0.230***	0.046
	(2.94)	(6.36)	(1.41)	(2.76)	(6.76)	(0.99)
IO_t	-0.012	0.019	0.126**	-0.007	0.025	0.121***
	(-0.75)	(1.03)	(3.61)	(-0.42)	(1.32)	(3.78)
$EARN\_VOL_t$	0.058	-0.043	-0.049	0.083	0.015	-0.037
	(0.87)	(-0.76)	(-0.67)	(1.28)	(0.31)	(-0.47)
Observation	14,171	14,175	14,960	16,340	16,350	17,247
Adj. R^2	0.363	0.272	0.647	0.374	0.274	0.644
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Appendix Table A7: ESG-linked pay and alternative ESG performance measures - DiD analysis

This table reports results from difference-in-differences regressions that estimate the effect of ESG-linked pay adoption on a firm's ESG performance as reported by Bloomberg. For each treatment firm, we define the event year as the year that the firm adopted ESG-linked pay. We conduct two sets of tests. Results presented in Panel A are based on a sample that includes two collapsed observations for both the treatment and control firms for each event - at year *t*-1 and year *t*+3. The outcome variable at *t*+3 (*t-1*) is measured as the average value of the respective Bloomberg ESG performance scores (on a scale of 0-100) over the time period of t+1 *t+2* and *t*+3 (*t-3*, *t-2* and *t-1*). In Panel B, we include five annual observations centred around the event year for both treatment and control firms and estimate a panel regression similar to our main regression specification. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. ***, ** and* indicate significance at the 1%, 5%, and 10% levels.

Panel A: Average over three years before and after ESG-linked pay adoption

	(1)	(2)	(3)
	$SOSCORE\_B_{t+1}$	$ENSCORE\_B_{t+1}$	$CGSCORE\_B_{t+1}$
$TREAT_i \times AFTER$	8.825*	7.271**	0.401
	(1.72)	(2.16)	(0.21)
$TREAT_i$	1.229	-2.459	6.769***
	(0.26)	(-0.70)	(4.32)
AFTER	4.027	0.211	0.588
	(0.85)	(0.04)	(0.31)
LN_SIZE_t	2.818*	4.319***	1.689***
	(1.74)	(3.48)	(3.18)
LEV_t	0.100	0.034	-0.049
	(0.77)	(0.28)	(-1.38)
LN_BM_t	-1.923	-3.615*	-0.370
	(-1.08)	(-1.81)	(-0.31)
ROA_t	-0.057	0.131	-0.088
	(-0.22)	(0.43)	(-0.65)
IO_t	0.058	0.131	0.105***
	(0.81)	(1.48)	(3.07)
$EARN\_VOL_t$	0.259	0.722*	0.469**
	(0.75)	(1.74)	(2.49)
Observations	134	134	144
Adj. R^2	0.377	0.335	0.405
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Panel B: Sample has five annual observations centered around the event year

	(1) $SOSCORE\_B_{t+1}$	(2) $ENSCORE\_B_{t+1}$	(3) $CGSCORE\_B_{t+1}$
$TREAT_i \times AFTER$	5.631	4.535*	0.015
	(1.50)	(1.79)	(0.01)
$TREAT_i$	2.874	-1.178	6.619***
	(0.69)	(-0.38)	(4.64)
$AFTER$	1.415	-0.999	-1.101
	(0.48)	(-0.37)	(-0.84)
LN_SIZE_t	3.034*	4.369***	1.636***
	(1.86)	(3.52)	(3.41)
LEV_t	0.121	0.067	-0.040
	(1.02)	(0.68)	(-1.14)
LN_BM_t	-1.051	-3.278*	0.528
	(-0.58)	(-1.82)	(0.51)
ROA_t	0.153	0.305*	0.022
	(1.28)	(1.97)	(0.25)
IO_t	0.124*	0.222***	0.092**
	(1.72)	(2.82)	(2.52)
$EARN\_VOL_t$	0.113	0.706**	0.350**
	(0.51)	(2.08)	(2.26)
Observations	467	467	501
Adj. R^2	0.409	0.398	0.417
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Appendix Table A8: ESG-linked pay and GHG Emissions

This table reports results from difference-in-differences regressions that estimate the effect of ESG-linked pay adoption on a firm's GHG emissions. For each treatment firm, we define the event year as the year that the firm adopted ESG-linked pay. We conduct two sets of tests. Results presented in Panel A are based on a sample that includes two collapsed observations for each firm and each event: event year -1 and event year +3. The outcome variable is measured as a % change in the SCOPE 1, 2 and 3 variables from Trucost over the time range of *t-2*, *t-1*, and *t*, where *t* is either event year -1 or event year +3. In Panel B, we include five annual observations centered around the event year for both treatment and control firms and estimate a panel regression similar to our main regression specification. Standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses. ***, ** and* indicate significance at the 1%, 5%, and 10% levels. All variables are defined in Appendix A1.

	(1)	(2)	(3)
	Δ *SCOPE 1*$_{t+1}$	Δ *SCOPE 2* $_{t+1}$	Δ *SCOPE 3* $_{t+1}$
Treat X AFTER	0.029	0.089	0.043
	(0.57)	(1.35)	(1.30)
$TREAT_i$	-0.102**	-0.123***	-0.081***
	(-2.31)	(-3.04)	(-3.62)
AFTER	-0.027	-0.036	-0.055*
	(-0.71)	(-0.69)	(-1.87)
LN_SIZE_t	-0.010	-0.012	0.005
	(-0.78)	(-1.00)	(0.80)
LEV_t	0.001	0.002**	-0.000
	(0.52)	(2.36)	(-0.08)
LN_BM_t	0.009	0.006	-0.025
	(0.35)	(0.29)	(-1.60)
ROA_t	0.003	0.003	0.001
	(1.13)	(1.33)	(0.42)
IO_t	0.001	-0.000	0.001*
	(0.95)	(-0.59)	(1.73)
$EARN\_VOL_t$	0.003	0.001	0.001
	(0.76)	(0.20)	(0.52)
Observations	450	450	450
Adjusted R^2	0.103	0.089	0.253
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes