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

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December 28, 2022

Abstract

We conduct a large-scale global study of ESG-linked pay for major firms that make up 85% of the market capitalization across 59 countries. We find that the pay adoption is higher for firms in extractive and utility industries, in countries that value individualism and femininity, have stronger shareholder protections, and are of civil legal origin, and for large firms or firms with high return to assets. The adopters experience better future social and financial performances. Exploiting a regulatory shock that mandates corporate ESG disclosure, we show that the effect of ESG-linked pay on performances is likely causal and suggest employee satisfaction as a channel.

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

Keywords: ESG-linked pay, Executive Compensation, Corporate Governance, Managerial Incentives, Corporate Social Responsibility, ESG Disclosure, Employee Satisfaction

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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. 3,800 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 2021. 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 the 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, the use of non-financial measures such as CO_2 emission targets, product quality, customer satisfaction, and employee satisfaction in executive remuneration contracts.[1] 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.

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 executive's 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 et al., 1997, and 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, and/or harmful to financial performance (Bebchuk and Tallarita 2022). 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 percent in 2015.[2]

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

[1] Exhibit 1 provides an example of ESG-linked pay for Alcoa, as stated in the firm's 2017 proxy statement.
[2] Murray, S. "How to pay executives in the age of stakeholder capitalism." Financial Times December 14 2022.

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, 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 with 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 performances 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 that the adoption of ESG-linked pay by companies around the globe has risen significantly, from 3% in 2009 to 20% in 2020. 27% of firms in the developed markets and 6% firms in emerging markets use such pay contracts in 2020. Among the developed markets, UK and EU firms have the highest adoption rate in 2020, at 39%. The adoption rate for the US firms is 30%, whereas for Japanese firms, the rate is only 2%.

Exploring industry characteristics, we find significantly greater adoption of ESG-linked pay in extractive industries such as mining (30.12%) oil and petroleum (24.95%), utilities (22.21%) and chemical (14.46%) industries. The findings indicate a worldwide phenomenon that ESG-linked 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 in the corresponding Hofstede score increases the probability of pay adoption by 14.23 percent points (pp). On the other hand, a one standard deviation increase in the country's masculinity score reduces the

adoption probability by 5.60 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, firms from countries with stronger shareholder protections, a one standard deviation increase in *ADRI* is associated in an increase in the probability of ESG-linked pay by 4.72 pp. 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 12.69 and 12.26 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 and more profitable firms, as measured by return on assets (*ROA*), have a higher propensity to adopt ESG-linked pay. A one standard deviation increase in logarithm of firm size and *ROA* increases the adoption probability by 5.59 pp and 0.79 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, as well as ESG disclosure quality ratings. We find that the ESG-linked pay adopters experience significantly higher ESG performances than the non-adopters in the the years following the adoption, by 9.59% to 15.17% of the mean of the corresponding variables. In terms of financial performance, the ESG-linked pay adopters also enjoy a higher operating profit margin (*OPM*) and *ROA* than the non-adopters in the subsequent two years, by 2.96% to 12% 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.

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 the regulator 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 to 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 plausibly exogenous—the decision is more likely to be triggered by the Directive and thus relatively more exogenous compared to the adoption decision made in the absence of the Directive. The control sample consists of US firms from the same industry and sharing similar 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 7.5% 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.

One concern for our DiD methodology is that the US firms with EU subsidiaries may be fundamentally different from those without EU subsidiaries, hence there might 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, idiosyncratic volatility, and age. 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. These results suggest that the effect of ESG-linked pay on a firm's future social score and OPM 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 better *OPM* performance. In our final analysis, we investigate potential channels for the effect of ESG-linked pay on *OPM*. In this regard, we examine executive compensation at the individual grant level (in the form of cash bonus or restricted stock unites) and classify grants by their key performance objectives. We conduct textual searches of keywords such as "CSR", "esg", "employee", "staff", "labor", "social", "diversity", "climate", and "environment." Next, we classify ESG metrics into four categories: *Employee* (employee/staff/talent related), *Customer* (customer related, e.g. customer satisfaction), *Diversity*, and *Environment/Climate*. We then identify whether a grant

is tied to these four categories and perform DiD analysis regressing the likelihood that an executive compensation contract is tied to one of the categories on 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 13.8 percent, or 65% of the variable's standard deviation. Hence, the post-directive adoption of ESG-linked pay by treatment firms leads to a significant improvement in employee satisfaction relative to control firms. The result 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. (2022), who argued 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.

We should note that our causal evidence of a positive impact of ESG-linked pay on social and financial performance concerns US firms affected by a policy shock that calls for more transparency in ESG disclosure. We caution against the generalization of such 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.

Our result suggests that pay contracts that draw managerial attention to the 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.[3] For example, Flammer et al. (2019) and Ikram, Li and Minor (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. 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 across 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 is Cohen et al. (2022), who examine 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 with strong environmental protection rules, and the influence of institutional investors. Our paper differs from the Cohen et al. (2022) along a number of dimensions. First, our sample coverage is much broader, including all the 21 countries of the Cohen et al. (2022) and an additional 38 countries.[4] 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 decision 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 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 the affected US firms is associated with greater future profitability and identity 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.

[3] 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 (Hong, 2019). 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.

[4] The additional countries that are covered in our sample includes Hong Kong, Israel, Japan, Singapore and the following countries in the emerging markets: Brazil, Chile, China, Colombia, Czechia, Egypt, Hungary, India, Indonesia, South Korea, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Russia, Saudi Arabia, Taiwan, Thailand, Turkey, and UAE.

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. Fiechter, Hitz, Lehmann (2022) show that the 2014 EU Directive achieve real impacts—firms within the scope of the Directive respond by increasing their real CSR activities, even before the entry-into-force of the directive, in a way that is beyond "greenwashing." Our results complement these two papers by showing that ESG-disclosure mandates, by making a firm's ESG performance more standardized and transparent, make ESG-linked pay a more effective device in achieving the firm's social and financial performance goals. In addition, given the ongoing discussions regarding the SEC's 2022 proposal of climate-related disclosure rules, our findings take us a step closer to the understanding of the potential implications of such policy changes.

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 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. The ACWI sample corresponds to a market capitalization of USD 57.157 trillion, which is approximately 85% of the free float-adjusted market capitalization in each of the markets it covers.[5]

We obtain a firm's name, ISIN, date of incorporation and SIC code from Worldscope. The first two characters of a firm's ISIN identifies 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.

[5] 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/documents/10199/8d97d244-4685-4200-a24c-3e2942e3adeb https://www.msci.com/our-solutions/indexes/acwi

ESG disclosure quality score, and institutional ownership. The firm's ESG scores are from Asset4 (formerly owned by Thomson Reuters, now owned by Refinitiv). We use Worldscope and Datastream to obtain firm characteristics and stock returns. 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.

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 pertaining executive compensation.[6]

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 2,002 ACWI firms that were continuously covered by Bloomberg over the period 2009-2020.[7]

For this cohort sample, as of 2020, an average of 20% of firms for a given country 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.[8] In contrast, the numbers remain considerably smaller for firms in emerging markets, from 0% in 2009 to 6% in 2020 for emerging markets. Within the developed markets, US firms saw an increase in the adoption rate from 5% to 30%. For the EU and UK firms, the adoption rate increased from 7% to 39%. 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 emerging markets. The adoption rates in the developed markets are higher than the emerging markets across every industry. Figure 2, Panel B

[6] 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. The variable equals one if senior executives' pay is linked to CSR, Health and Safety or Sustainability targets, and zero otherwise.

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

[8] 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.

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 and the rest of the world suggests that the adoption of ESG-linked executive contracts is related to variables driven by institutional, cultural and economical differences across these regions. Figure 3, Panel B depicts a world-map showing the adoption rates and again drives 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 World Bank and have 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 following 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*.[9]

Power distance measures degree to which the less powerful of the society accept unequal distribution of power, with a higher value corresponding to an increase in acceptance. In our sample, the top three countries with the highest *Power distance* are Malaysia, Panama and Philippines, while the lowest countries 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* score are the US, Australia and the UK, while the lowest scored countries are Panama, Colombia and Indonesia.

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

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* 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 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 on 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 corresponds 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.[10]

Following Liang and Renneboog (2017), we include *Corruption control* and *Regulatory quality* from World Bank Governance indicators. *Corruption control* measures the extent to which politicians are constrained from pursuing their self-interest (through corruption), and *Regulatory quality* proxies for the government's effectiveness in addressing social responsibility and market externalities when implementing policies and regulations that promote private sector development. The variables range from -2.5 to 2.5, with larger numbers indicating high corruption control and good regulatory quality. The two variables are available for 56 countries in our sample, updated annually, and have a correlation coefficient of 0.94. As of 2020, the countries in our sample with the *Corruption control* and *Regulatory quality* 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, Lopez-de-Silanes, Shleifer, and Vishny (1998), Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) and Spamann (2010) as potential drivers for country-level economic

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

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, are a mixture of common law and civil law traditions. Examples for the French civil legal origin countries are France, Spain and Italy; the Scandinavian civil legal origin countries are Sweden, Denmark and Norway. As for the German civil legal origin, examples include German, Switzerland and Japan and finally, for common law are the UK, US and India. We define *French civil*, *German civil*, or *Scandinavian civil* as equal to one if the country of a firm's incorporation belongs to the corresponding legal origins, and zero otherwise.

2.3 Firm-level variables

We obtain firm's' ESG disclosure score, *ESG_DISC*, and institutional ownership, *IO*, 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. *IO* is defined as the percentage of shares outstanding held by institutional shareholders at the end of a year and is available since 2010. We also obtain the following ESG scores from Asset4: corporate governance score, *CGSCORE*, environment score, *ENSCORE*, and social score, *SOSCORE*. The scores range from 0 to 100.

We construct the following variables from Worldscope. *LN_SIZE* is the logarithm of total assets. *LN_BM* is the logarithm of common equity to market cap. *LEV* is defined as total debt to total assets. *ROA* (return on assets) is net income normalized by total assets. *OPM* is operating profit margin. *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, divide by the book value of assets. Appendix Table 1 lists the variables and their descriptions.

Table 1 provides summary statistics of the country- and firm-level variables, as well as the correlation coefficients. There is a considerable amount of cross-country variation in the culture variables, which help us to 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 also strongly correlated with *ESGPAY, Ln(Per Capita GDP), Corruption control*, *Regulatory quality* and the civil legal origin variables. As for the firm-level variables, *ESGPAY* is strongly correlated with *LN_SIZE*, the ESG scores, and *ESG_DISC*. 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. The 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 '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) correspond 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) and 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 30.12%, 24.95%, 22.21%, 14.46%, and 10.40%.

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.[11] 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 hold less 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 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 industries: oil and petroleum products of Fama-French 17 industries, and Mining (SIC division B). Hence, the *Extractive industries* 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 or Alcohol, or group 5, Smoke or Tobacco, 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:

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

Table 2 Panel B presents the results, with year and country fixed effects and two-way clustered standard errors by country and by year.[12] The table shows that the probability of ESG-linked pay is significantly higher for firms that belong to extractive industries. In terms of

[11] 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.

[12] The base industry group now includes the following FF17 industries: Food, Textiles, Consumer Durables, Chemicals, Drugs, Soaps, Perfumes, Tobacco, Construction, Steel, Fabricated Products, Machinery and Business Equipment, Automobiles, Transportation, Utilities, Retail, Financials and Other, i.e. all industries except Mining and Oil and Petroleum products, and Beer or Alcohol, or Smoke or Tobacco industries of the Fama-French 48 industries.

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economic significance, the coefficient reported in Column (1) indicates that the probability of ESG-linked pay is 23.52% 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 in the firm's decision to use ESG-linked pay for executives. Firms belong to industries for which ESG is of a material concern and those that are perceived as sensitive to negative ESG 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, L´opez-de-Silanes, and Shleifer 2008). We also follow the previous studies (e.g., Stulz and Williamson 2003, Guiso, Sapienza, and Zingales 2006, and Tabellini 2010) and consider whether national culture and values are associated with ESG-linked pay adoption choices.

We now turn to regression analysis to formally test the relation between ESG-linked pay and country-specific characteristics as follows:

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

where *Ln(lagged GDP per capita)* is the Ln 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 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.

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. We first regresses *ESGPAY* on the lagged per capita GDP of the country and the following Hofstede culture variables, *Individualism, Masculinity/Femininity, Power distance and Uncertainty avoidance*. All controls other than *Ln(Lagged GDP per capita)* and *ADRI* are rescaled by min-max normalization to lie in [0,1] window.[13]

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. Given that countries that value individualism stresses independence and personal achievement (e.g., United States, Australia and United Kingdom), our results guest that firms headquartered in these countries are likely to use managerial pay contracts to meet the firm's ESG goals. For *Masculinity*, a high score means that the dominant values in the society consist of competition, achievement, and material rewards for success. Its opposite, femininity, stands for societies with a preference for cooperation, modesty, caring for the weak and quality of life. This implies that people in feminine societies (e.g., Norway, Sweden and Netherlands) care more about ESG goals and firms utilize ESG-linked compensation contracts to meet them.

Next, we add to the 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 worried about these being misused. We find that 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.[14]

Regarding a country's legal origin, Liang and Renneboog (2017) find that firms from civil law countries tend to have lower CSR ratings than firms from common law countries. The explanation is that the 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;

[13] We do this by taking actual value - sample minimum value, and dividing it with the sample maximum – sample minimum.

[14] 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.

whereas the common law countries favor shareholder protection and places fewer restrictions on managerial behavior.

Column (3) includes the variables that captures 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 suggest that ESG-linked pay is a mechanism through which the company boards influence managerial decisions to focus on stakeholder value maximization. Interestingly, *Scandinavian civil* is negative and significant. with Scandinavian civil law firms having the highest CSR scores.[15] A possible reason for this finding is that firms from Scandinavian civil countries already have high CSR ratings (see, e.g., Liang and Renneboog 2017) and hence do not need to provide explicit incentives for their managers.

Column (4) uses the alternative Logit regression and find similar results as in Column (3). We use the coefficient estimates from Column (4) 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 1.441 for *Ln(Lagged GDP per capita)* suggests that a one standard deviation increase in the *Ln(Lagged GDP per capita)* increases the probability of ESG-linked pay adoption by 10.59 pp. Similarly, a coefficient of 5.381 for *Individualism* suggest that a one standard deviation increase in the *Individualism* score increases the probability of ESG-linked pay adoption by 14.23 pp. For *Masculinity*, a coefficient of -3.840 suggests that a one standard deviation increase in the *Masculinity* score reduces the ESG-linked pay adoption probability by 5.61 pp. For *ADRI*, the corresponding increases is associated in an increase in the probability of ESG-linked pay by 4.72 pp. Regarding legal origins, firms from French or German civil law countries are 12.69 pp and 12.27 pp, respectively more likely to adopt ESG-linked compensation contracts compared to firms in common law countries.

Our analysis shows that a country's economic development, culture, and the institutional and contracting environment, shaped by the country's legal origins, are strongly related to the likelihood of firms' adoption of ESG-linked pay for the firms' top executives.

3.3 Firm characteristics

[15] The correlation between *Scandinavian civil* and *French (German) civil* is -0.08 (-0.12), hence the negative coefficient on *Scandinavian civil* does not seem to be driven by multi-collinearity.

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 or Logit 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, with Columns (1)-(3) corresponding to Probit regressions, adding variables gradually, and Column (4) reports the results with Logit regression. In all the specifications, we find that large firms are more likely to adopt ESG-linked pay. In terms of economic significance, keeping all right-hand-side variables at their mean level, the probability of ESG-linked pay adoption increases by 5.59 pp for a one standard deviation 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 also 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, the probability of ESG-linked pay adoption increases by 0.79 pp for a one standard deviation increase in *ROA*. Institutional ownership does not seem to have a significant impact on ESG-linked pay for 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 in their portfolios than nonsignatories, whereas the US signatories have similar or worse ESG scores in their portfolios than nonsignatories.[16]

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, the institutional and

[16] 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 of 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.

legal environment, and the culture of the country that the firm resides in, and the firm's individual characteristics. Larger and more profitable firms, firms from industries for which ESG is of a material concern, firms in civil law countries, countries with higher per capita GDP and strong shareholder protection, those that value individualism and femininity are more likely to adopt ESG-linked pay contracts.

4. ESG-linked pay and firm performance

In this section we turn to outcomes and analyze the relationship between ESG-linked pay on firms' social and financial performance outcomes. For social performance, we examine the firms environmental, social, and governance scores, respectively, and the quality of the firm's ESG disclosure. For financial performance, we consider a firm's profitability and valuation. We present OLS panel regression analysis of performance outcomes on *ESGPAY*. While the analysis in this section finds that ESG-linked pay is strongly associated with the social and financial performances of firms, the evidence does not speak to causal relations. In the next section, we consider a regulation rule change that created plausibly exogenous variations in the adoption of ESG-linked pay and conduct a DiD analysis to provide identification.

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. The performance measures are the scores that a firm receives on environment (*ENSCORE*), social (*SOSCORE*), corporate governance (*CGSCORE*), and ESG disclosure quality (*ESG_DISC*).

We regress a firm's future E,S and G 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 or ESG_DISC*. We control for lagged firm characteristics ($X_{i,t}$) such as *LN_SIZE, LEV, LN_BM, ROA, IO* and *EARN_VOL*, year-, country- and industry-fixed effects to mitigate the possibility that our findings are driven by the firm characteristics or other omitted country- or industry-related variables. The standard errors are clustered by firm and the corresponding *t*-statistics are reported in parentheses.

In Table 5, Columns (1)–(4), the outcome variables are measured in the following year and in columns (5)–(8), 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 ratings, as well as better disclosure scores in the next two years compare to those without ESG-linked pay. In terms of economic magnitude, the coefficients of 5.605 and 5.008 of *ESGPAY* for *ENSCORE* indicate that the adoption of ESG-linked pay is associated with a higher environmental score of 5.605 and 5.008 points (on a scale of 0-100 points) for the next two years, respectively, which are 11.77% and 10.50% of the variable's sample mean.

Similarly, the adoption of ESG-linked pay is followed by higher social scores for the next two years, by 10.1% and 9.59% of the corresponding mean. The magnitudes are the largest for the governance score, with the increases correspond to 15.17% and 13.97% of the mean. For disclosure quality, the ESG-linked pay adoption is followed by increases in the next two-year's *ESG_DISC* by 13% and 12% of the variable's mean. Regarding the control variables, Table 5 shows that large firms, firms with higher *ROA* and *IO* tend to have better ESG performances in the future, whereas value firms tend to have lower future ESG scores.

Next, we run the following panel regressions to estimate the effect of ESG-linked pay adoption on 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 ($TobinQ_{t+1}$). $X_{i,t}$ represents the vector of lagged control variables.

In Table 6, we analyze how ESG-linked pay is associated with a firm's future financial performance by examining the firm's profitability (measured with *OPM* and *ROA*) and valuation (measured by Tobin's Q) for the next two years. The control variables and the regression specification is otherwise similar to Table 5. Columns (1)–(3) and (4)–(6) correspond to one- and two-year ahead performance measures.

The results in Table 5 show that firms with ESG-linked pay have significantly higher *OPM* and *ROA* in the next two years than firms that do not use ESG-linked pay. The coefficients of 1.477 and 1.698 for *ESGPAY* in Columns (1) and (4) imply that firms with ESG-linked pay experience a higher one-year ahead *OPM* that is equivalent to 9.64% and 12% of the variable's sample mean, respectively. Similarly, Columns (2) and (5) shows that the presence of ESG-

linked pay contracts are associated with a significantly higher *ROA* for the next two years, by 2.96% and 5.67% of the mean. We find no impact of ESG-linked pay adoption on 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 caution the interpretation of 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 of ESG-linked pay adoption. We then use a difference-in-differences (DiD) methodology and establish a causal effect of *ESGPAY* on firm outcomes.

4.2 Identification strategy: plausibly exogeneous variation in ESG-linked pay

In this subsection, we first introduce the policy change that we use to generate plausible exogenous variations in the adoption of ESG-linked pay contracts and then describe the DiD test design. Next, we present the results of the DiD analysis on the effect of ESG-linked pay adoption on firms' ESG and financial performances. We conduct additional parallel trend analysis to provide further evidence that the effect of ESG-linked pay on performances is likely causal. Finally, we investigate the channel through which ESG-linked pay affects firm performance by examining the more granular dimensions of the managerial compensation contracts.

4.2.1 Policy shock and DiD analysis design

The quasi-natural experiment that we consider is the Directive 2014/95/EU of the European Parliament. The law, first proposed in April 2013, was adopted by EU in April 2014 and the mandate 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 firms' propensity to adopt ESG-linked pay for two reasons: First, the directive exposes the affected firms to increased pressure (potentially from both the regulator and investors) to deliver/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 advocated by Bebchuk and Tallarita (2022), transparency (and standardization) of ESG performance disclosure is important to provide meaningful incentives for executives.

Due to the above reasons, it is plausible that 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, an argument can be made that increased pressure to disclose greater non-financial information may be plausibly linked to increased adoption of ESG-linked pay. Hence, we argue that firms that adopt ESG-linked pay after the enactment of the Directive are likely adopting it due to its enactment. Putting it another way, the decision to adopt ESG-linked pay by affected firms is more likely to be exogenous after the policy shock compared to the pre-directive period, as the decision to adopt ESG-linked pay after 2014 is more likely to be in response to the exogenous policy shock. This makes the regulation change a plausible event to analyze for establishing a causal effect of pay adoption on firm value.

We thus consider firms that were plausibly 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.[17] 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 the directive became

[17] We collect the subsidiary location data using the subsidiary data from WRDS, which is obtained from Exhibit 21 of a 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 difficult to select treatment and control firms.

effective. Of the 793 US firms that have EU subsidiary, 58 firms adopted ESG-linked pay since 2014 and therefore are classified as treatment firms.[18]

The control firms are US firms without EU subsidiaries that hence were not impacted by the Directive and never adopted ESG-linked pay. Specifically, we select, from the Russell 3000 sample, firms with the same industry affiliation and similar characteristics as the treatment firm, but with no EU subsidiaries and never adopted the ESG-linked pay for the 2011-2018 period. The firm characteristics that are used 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.[19] We impose the requirement that both treatment and control firms should have continuous ESG pay data coverage starting from three years before the adoption of the directive up to four years after the enactment of the Directive (i.e., 2011-2018).

Appendix Table A2 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.

To check the validity of conducting DiD analysis by exploiting the EU Directive, we must verify that the regulatory mandate on non-financial performance disclosure imposed by the directive has led to an increase in the disclosure quality of ESG information by U.S. companies operating in the EU and have exposure to the regulatory change. Appendix Table A3 shows that ESG disclosure quality is significantly better for U.S. firms with EU sub post the Directive. The improvement in ESG disclosure quality is expected for firms that the EU Directive applies to. Similar results on ESG disclosure transparency have been shown for EU firms post directive in Fiechter et al. (2022).

4.2.2 ESG-linked pay and ESG performance

In this section we analyze the impact of ESG-linked pay on the firm's ESG performance as measured by scores for Environment (*ENSCORE*), Social (*SOSCORE*) and Corporate Governance (*CGSCORE*). To address the endogeneity concern of our finding of the positive association between *ESGPAY* and firm performance, we perform DiD analyses. For each treatment firm and its matched control firm we include five annual observations centered

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

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

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 following ESG scores: *SOSCORE*, *ENSCORE*, and *CGSCORE*. $TREAT_i$ equals one if firm i is a treated firm 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 β_1 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 leads to a significant improvement in the social performance relative to control firms. The coefficient of 3.727 for β_1 in Column (1) corresponds to an increase of 7.5% in *SOSCORE* relative to the sample average. Regarding $CGSCORE$ and *ENSCORE*, β_1 coefficient estimates are insignificant. Our results remain robust after the inclusion of event-year (i.e., ESG pay adoption year) fixed effects.

The identifying assumption for the application of DiD model is that of parallel trends. That is, to interpret the DiD estimates as due to the ESG-linked pay adoption of the treatment firms, one must assume that in the absence of the ESG-linked pay adoption, the outcome variables for the treated and control firms would exhibit parallel trend. We estimate the following Diff-in-Diff model, replacing the $AFTER$ dummy in equation (1) with indicator variables for different event years around the adoption of ESG-linked pay as follows:

$$SOSCORE_{\mathrm{i,t+1}} = \alpha + \beta \mathrm{TREAT_i} + \beta_{-1} \mathrm{TREAT_i} \times D_{\mathrm{t=-1}} + \beta_0 \mathrm{TREAT_i} \times D_{\mathrm{t=0}} + \beta_1 \mathrm{TREAT_i} \times D_{\mathrm{t=1}} + \beta_2 \mathrm{TREAT_i} \times D_{\mathrm{t=2}} + \gamma_{-1} D_{\mathrm{t=-1}} + \gamma_0 D_{\mathrm{t=0}} + \gamma_1 D_{\mathrm{t=1}} + \gamma_2 D_{\mathrm{t=2}} + \eta X_{i,t} + e_{i,t} \quad (8)$$

where *Dt=i , i=-1, 0, 1, 2,* corresponds to indicator variables that equal one for years -1, 0, 1, and 2, around the year for 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 4 Panel A.

The plot shows that the β_{-1} and β_0 coefficients are insignificant, suggesting similar trends between the treatment and control firms the year prior to and at the year of the adoption. In contrast, the β_1 and β_2 coefficients are significantly positive, suggesting that the increased social score after the adoption of ESG-linked pay is likely a response to the EU directive and hence the effect of ESG-linked pay on *SOSCORE* is likely causal.

4.2.3 ESG-linked pay and financial performance

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

$$FinPerf_{i,t+1} = \beta_0 + \beta_1 Treat_i \times AFTER + \beta_2 Treat_i + \beta_3 AFTER + \gamma X_{i,t} + \varepsilon_{it} \quad (9)$$

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 ($TobinQ_{t+1}$). $X_{i,t}$ represents the same vector of control variables (lagged by one fiscal year).[20]

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 and is significant for OPM_{t+1} and ROA_{t+1} at the 5% and 10% level respectively. Treatment firms experience a significantly higher increase in operating profit margin post 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 a larger increase of OPM after the adoption of ESG-linked pay (following the 2014 enactment of the directive) compared to control firms by about 3.049 percent points, which represents approximately 19.8% 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. At the same time, treatment firms also experienced a larger increase in *ROA*, though this larger increase relative to control firms is less significant compared to the increase in *OPM*.

We then conduct parallel trend analysis to verify the interpretation that the DiD estimate on *OPM* as due to the ESG-linked pay adoption of the treatment firms. We estimate a dynamic DiD model similar to Equation (3), replacing *SOSCORE* with *OPM*. Figure 4 Panel (b) plots

[20] 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.

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 the effect of the post-directive ESG-linked pay adoption on *OPM* 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 better *OPM* performance. As discussed in the introduction, while such contracts have the potential to align the managerial incentives with the interest of shareholder in the long run, the contract may introduce a multitasking problem and can distort the managers away from important tasks and hurt financial performance (Holmström and Milgrom 1991, Bebchuk and Tallarita 2022). Therefore, we next explore the plausible channels through which ESG-linked pay can improve financial performance of the firm.

4.2.4 Channels

Upon establishing the evidence that US firms with exposure to more stringent non-financial disclosure rule imposed by the EU Directive who first adopted ESG-linked pay after the regulation change experience significantly larger increases in *OPM* and *ROA*, in this subsection we dive deeper into the specific types of ESG performance metrics adopted in executive compensation contracts and analyze which type(s) of metric was first adopted by those firms, which may help explain treatment firms' superior financial performance compared to control firms post ESG-linked pay adoption.

We collect data on absolute performance goals from ISS Incentive Lab, who 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. We then match this dataset with the extracted grant level information identifying the type of the grant. A grant typically includes multiple performance objectives. We classify a grant as ESG-related if the grant includes at least one performance metric keyword is featured in the non-financial, non-operational performance goal as "CSR", "esg", "employee", "staff", "labor", "social", "diversity", "climate", and "environment" and then 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 bonus or restricted stock units (RSU). We then create a set of dummy variables indicating whether a

certain type of ESG performance metric is featured in the absolute performance goals tied to the grants a firm issues to its executives in a given fiscal year.

Similar to our main DiD analysis for SOSCORE, we run the following panel regressions that estimate the effect of ESG pay adoption on ESG scores based on the same panel dataset:

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

where $ESGPAY\_CAT_{i,t+1}$ represents four categories of keywords (as reported by ISS Incentive Lab): *Employee* (employee/staff/talent related), *Customer* (customer related, e.g. customer satisfaction), *Diversity*, and *Environment/Climate*. $X_{i,t}$ represents a vector of control variables similar to our previous specifications. All the regressions control for industry and year fixed effects.

Table 9 reports the results. The β_1 coefficient on the interaction term $Treat_i \times AFTER$ is positive for the first two categories of keywords, *Employee* and *Customer*, but is only statistically significant for *Employee*. Economically, a coefficient of 0.138 for *Employee* suggests that the treatment firms are more likely to adopt employee-related absolute performance metrics, by 13.8 pp, which corresponds to 65% of the variable's standard deviation. The result suggests that the post-directive adoption of ESG-linked pay by treatment firms leads to a significant improvement in employee satisfaction relative to control firms.

We next discuss how employee satisfaction can contribute to a firm's profitability. As Edmans (2011) and Edmans et al. (2022) point out, employee satisfaction is beneficial for firm value through the recruitment, retention, and motivation of talented, innovative, and capable employees, and the benefits are especially higher 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, the authors 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 have 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, our finding suggest that enhanced employee

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, *Customer, Diversity, and Environment/Climate*, the β_1 coefficient is insignificant. There are several possible reasons for this. It might be that firm considers trade-offs, and managerial efforts to improve *Environment/Climate* performance may be relatively costly to a US firm than its EU counterparts, making the multitasking concern more prevalent. Another reason could be that there is just lack of sufficient variation in our DiD sample for us to discover any significant results.

We should also note that the lack of results of ESG-linked pay adoption on these other performance dimensions (e.g., environmental performances) for our sample of US firms does not necessarily apply for firms in other markets. The reason is that the shareholder view of capitalist is still much more prevalent in the US compare to, for example, the case of EU firms. 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, the US firms may be more likely to choose to improve employee satisfaction that allows the firms to achieve "win-win" than choose the improve the firm's climate performance, compared to the EU firms.

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 the 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. Conclusions

We study ESG-linked executive compensation contracts using 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 belonging 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 with greater return on assets are more likely to adopt. The ESG-linked pay adopters exhibit

significantly higher ESG scores, better ESG disclosure, 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 a firm's ESG-linked pay adoption decision, we conduct DiD analysis to provide identification. For the treatment firms, which are 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 causal. Further exploring contracts at the individual grant level, we show that the treatment firms' increased reliance on incentives tied to employee satisfaction is a plausible channel to achieve a "win-win" outcome.

Taken together, these results indicate 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 providing 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: Example: Alcoa – 2017 Proxy

This exhibit provides an example of ESG-linked pay for Alcoa, as stated in the firm's 2017 proxy statement.

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.

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.

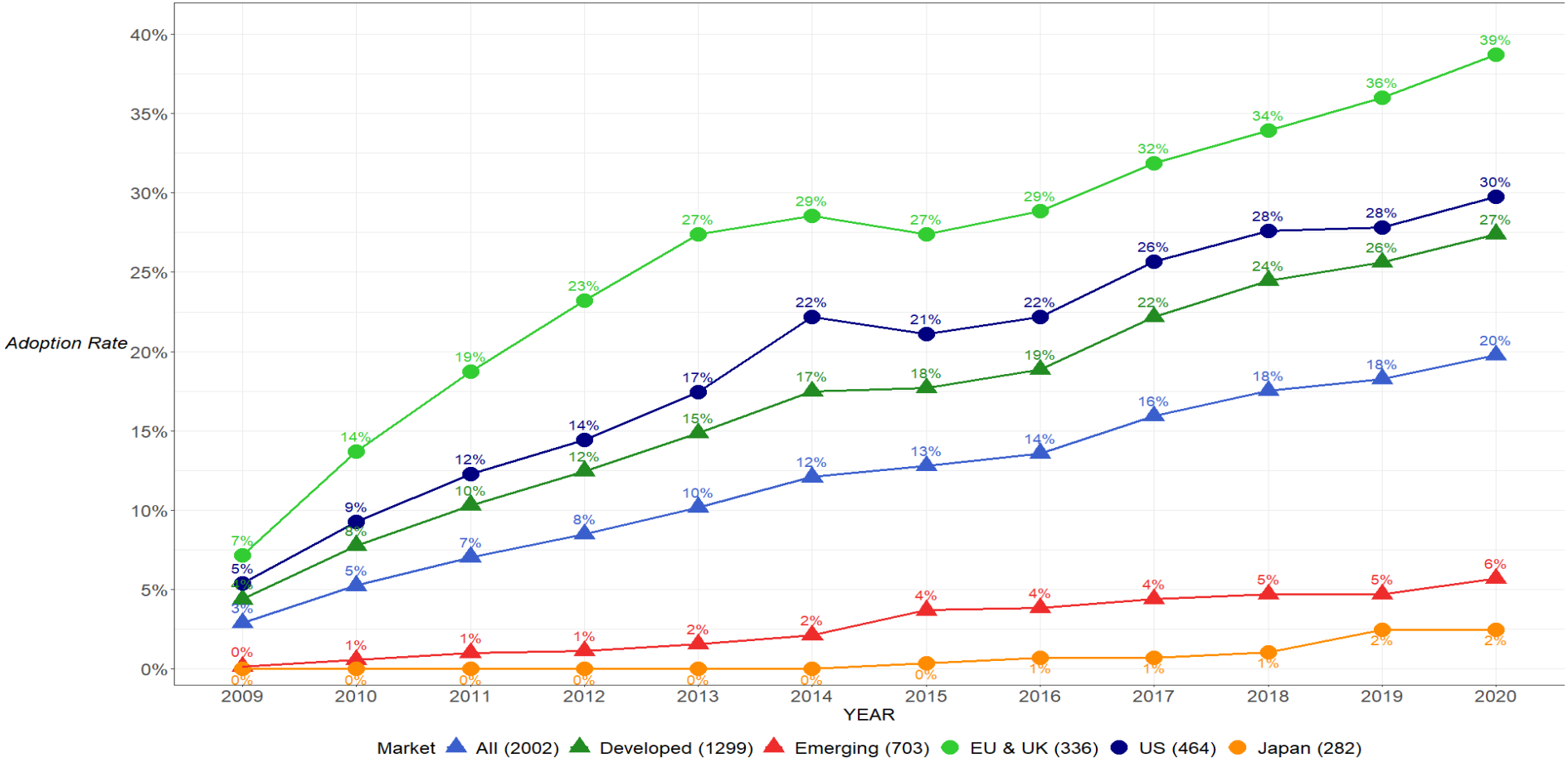
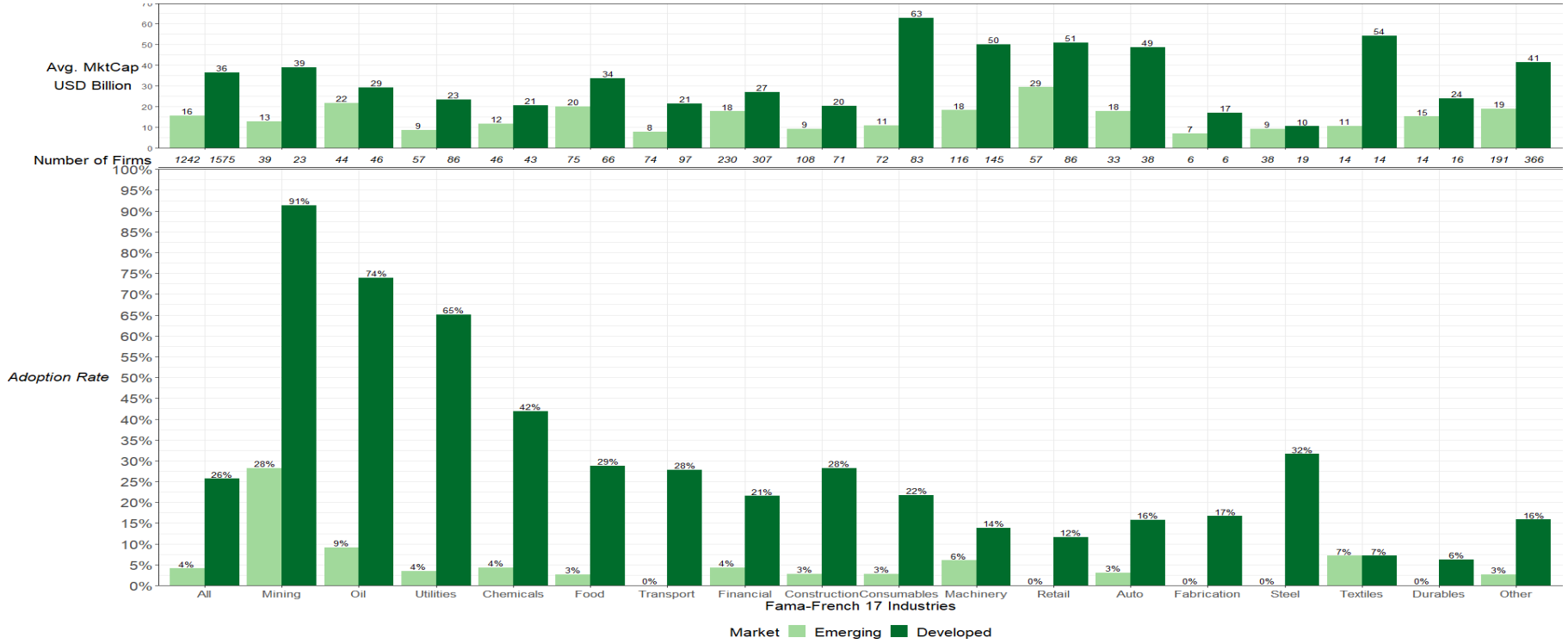


Figure 2: ESG-linked pay adoption by industry

This figure presents the percentage of firms that adopted ESG-linked pay for each of the Fama-French 17 industries. *Adoption Rate* is the percentage of firms in a country that adopted ESG-linked pay for a given year, based on a cohort sample of MSCI ACWI firms that were continuously covered by Bloomberg over the period 2009-2020. Panel A bottom columns compare the industry-level adoption rate between developed and emerging markets as of year 2020. The top columns represent the average market capitalization of the firms in the corresponding category, with the number of firms listed at the bottom of the column. Panel B illustrate the industry-level adoption rate for the years 2009, 2013,2016 and 2020.

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



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

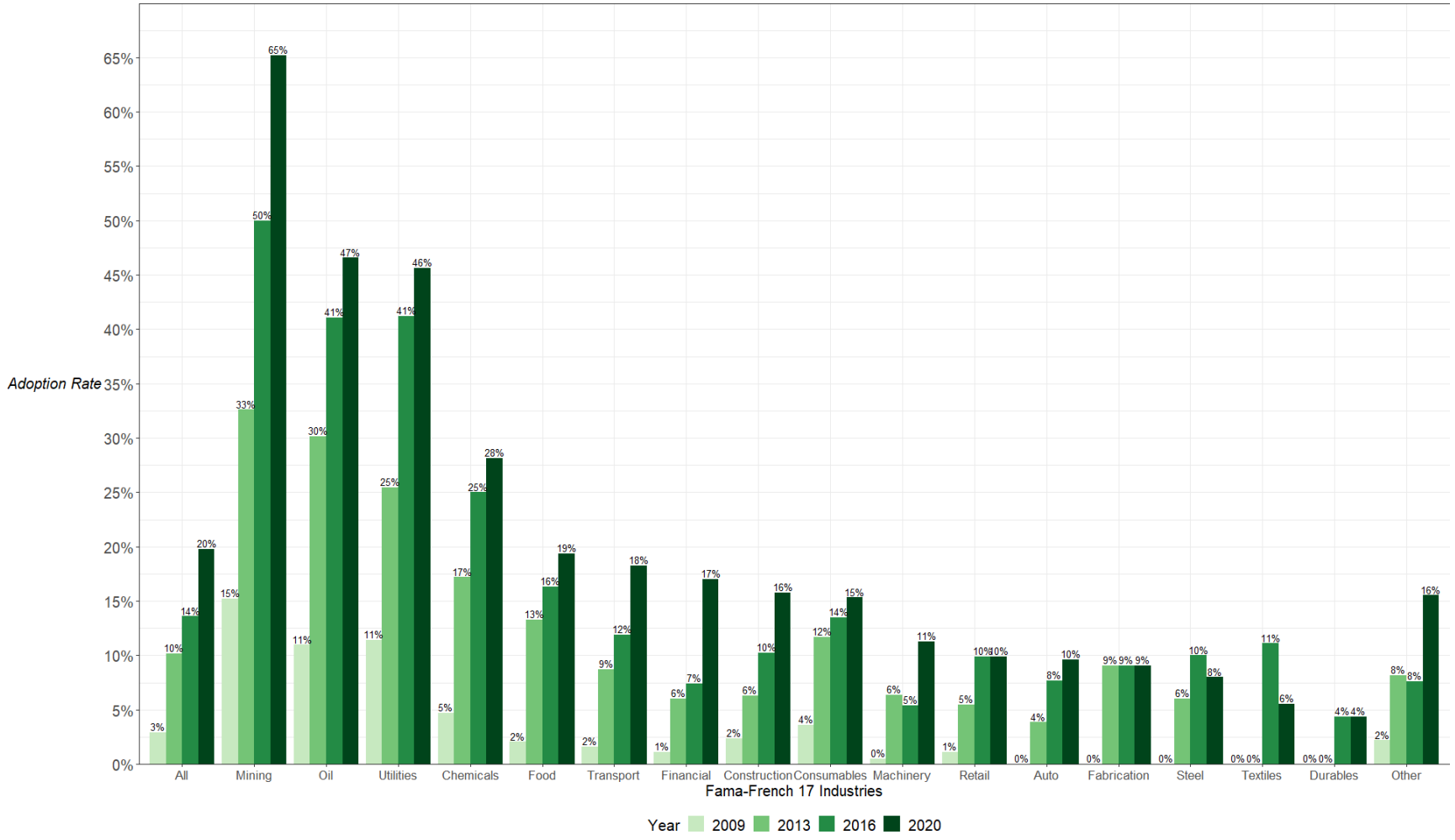
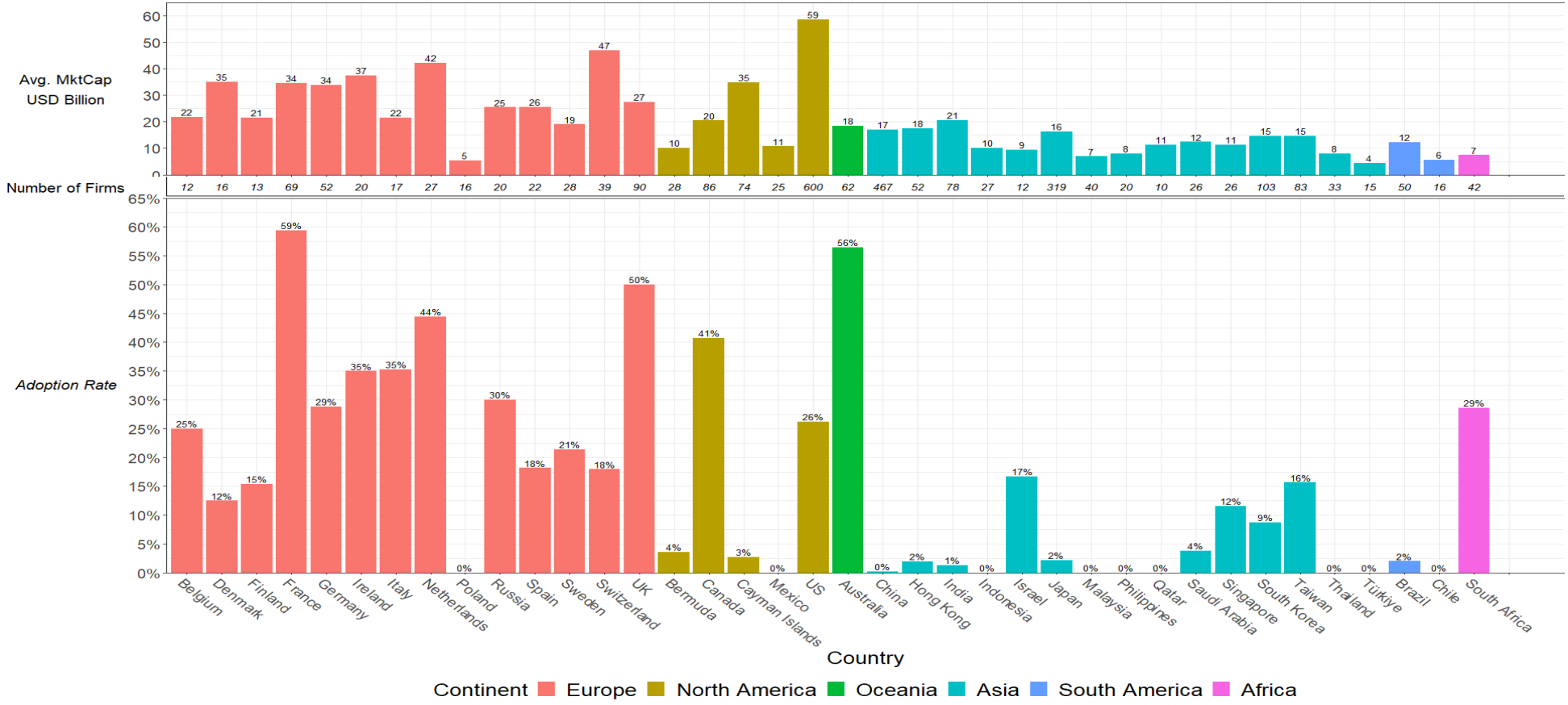


Figure 3: ESG-linked pay by country

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 columns plot the country-level adoption rates. The top columns 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 column. 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

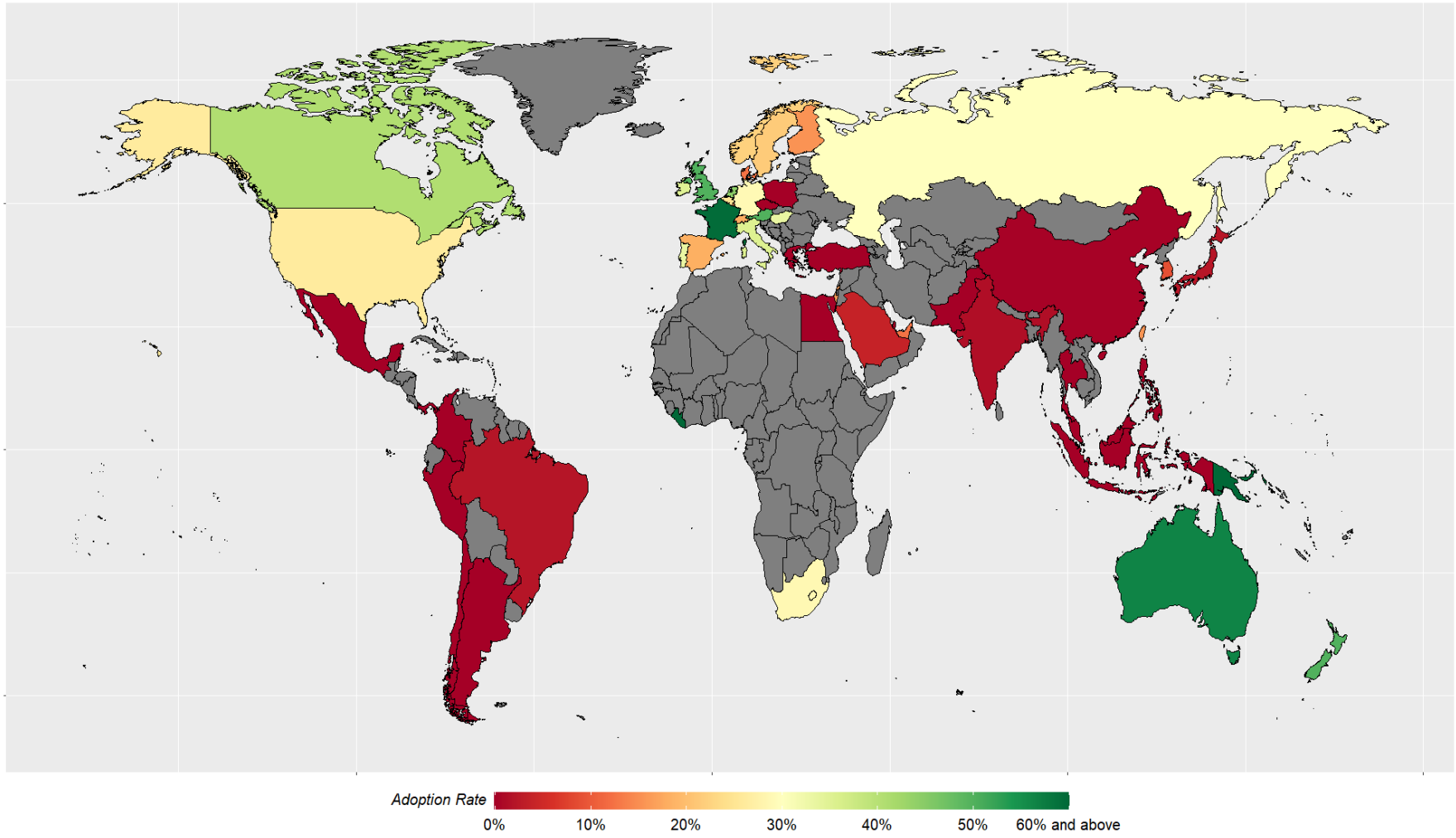
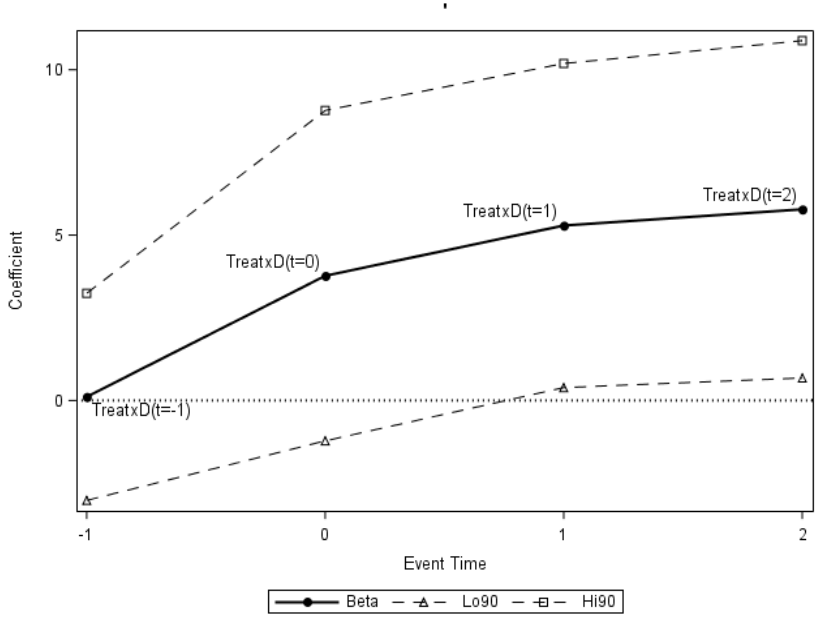
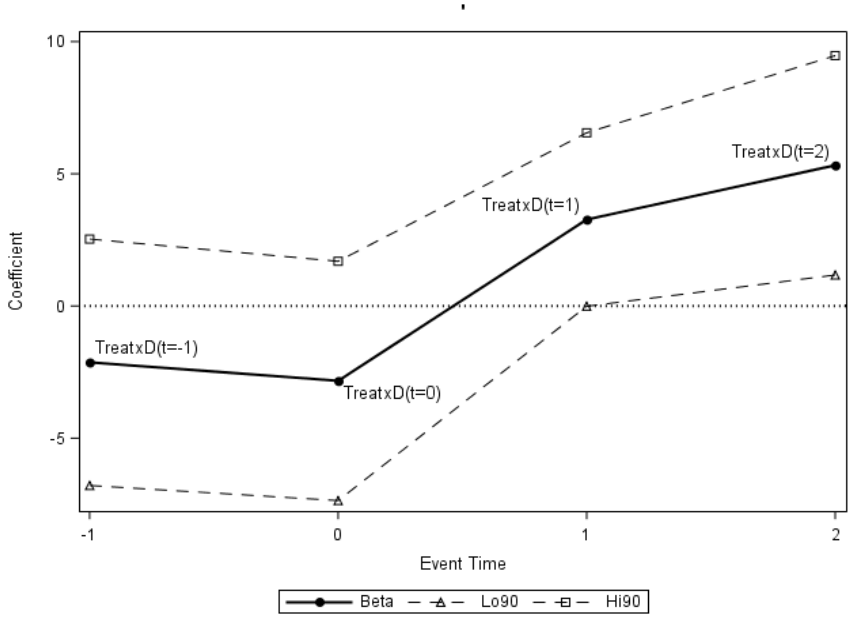


Figure 4: Parallel trend analysis –Dynamic Diff-in-Diff

The figure presents results of the parallel trend analysis, estimated using the following dynamic Diff-in-Diff model:
$SOSCORE_{\mathrm{i,t+1}}$ (or $OPM_{\mathrm{i,t+1}}$) $= \alpha + \beta \mathrm{TREAT_i} + \beta_{-1}\mathrm{TREAT_i} \times D_{\mathrm{t=-1}} + \beta_0 \mathrm{TREAT_i} \times D_{\mathrm{t=0}} + \beta_1 \mathrm{TREAT_i} \times D_{\mathrm{t=1}} + \beta_2 \mathrm{TREAT_i} \times D_{\mathrm{t=2}} + \gamma_{-1} D_{\mathrm{t=-1}} + \gamma_0 D_{\mathrm{t=0}} + \gamma_1 D_{\mathrm{t=1}} + \gamma_2 D_{\mathrm{t=2}} + \eta X_{i,t} + e_{i,t}$.
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

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(Per Capita GDP)* 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, and *Regulatory quality* proxies for the government's effectiveness in addressing social responsibility and market externalities. 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 targets 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. *ROA* is return on assets and *OPM* is operating profit margin. *EARN_VOL* is the standard deviation of past five-year deflated earnings. *TobinQ* equals market value of equity plus book value of debt, divide by the book value of assets. All variables are defined in the 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	0.06	2.10	8.99
Ln(Per Capita GDP)	56	9.87	1.19	10.21	-0.78	2.98
Individualism	47	48.60	24.82	48	0.05	1.66
Masculinity/Femininity	47	50.85	18.78	52	-0.36	3.42
Power distance	47	55.51	22.11	58	-0.04	2.35
Uncertainty avoidance	47	65.04	23.30	70	-0.46	2.21
ADRI	41	3.74	0.94	4	-0.18	2.03
Corruption control	56	0.74	1.03	0.85	-0.05	1.64
French civil	41	0.66	0.50	0	0.35	1.12
German civil	41	0.42	0.36	0	2.00	5.01
Scandinavian civil	41	0.15	0.30	0	2.71	8.36
Regulatory quality	56	0.84	0.83	0.98	-0.48	2.18

Firm-level variables						
	N	Mean	Standard deviation	Median	Skewness	Kurtosis
ESGPAY	35,169	0.09	0.29	0.00	2.80	8.86
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
EARN_VOL (%)	33,852	2.92	3.57	1.75	2.85	13.00
IO (%)	27,408	57.07	30.81	58.42	-0.05	1.99
ENSCORE	28,949	47.65	28.69	50.95	-0.18	1.83
SOSCORE	28,944	51.08	24.69	52.17	-0.14	2.03
CGSCORE	28,949	54.64	22.44	56.63	-0.25	2.15
ESG_DISC	35,065	38.28	13.70	36.56	0.29	2.51
TobinQ	33,789	2.00	1.62	1.41	2.84	12.38
OPM(%)	33,878	15.14	14.75	13.08	-0.33	7.60

Panel B: Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Adoption Rate	1.00											
(2) Power distance	-0.56	1.00										
(3) Individualism	0.73	-0.66	1.00									
(4) Masculinity/Femininity	-0.13	0.06	0.08	1.00								
(5) Uncertainty avoidance	-0.16	0.17	-0.19	0.13	1.00							
(6) ADRI	-0.13	0.20	-0.15	0.01	-0.45	1.00						
(7) Ln(Per Capita GDP)	0.15	-0.63	0.65	-0.09	-0.16	-0.15	1.00					
(8) French civil	-0.19	0.47	-0.26	-0.05	0.58	-0.41	-0.34	1.00				
(9) German civil	-0.01	-0.21	-0.07	0.36	0.19	-0.11	0.27	-0.35	1.00			
(10) Scandinavian civil	0.14	-0.39	0.27	-0.64	-0.33	-0.04	0.32	-0.28	-0.14	1.00		
(11) Corruption control	0.39	-0.69	0.64	-0.18	-0.39	0.05	0.86	-0.49	0.20	0.42	1.00	
(12) Regulatory quality	0.30	-0.63	0.59	-0.11	-0.33	0.09	0.86	-0.47	0.20	0.31	0.94	1.00

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(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) EARN_VOL	0.02	-0.29	-0.21	-0.03	0.11	1.00							
(7) IO	0.12	0.13	-0.13	0.05	0.01	0.05	1.00						
(8) CGSCORE	0.20	0.25	0.04	0.02	-0.05	-0.04	0.07	1.00					
(9) ENSCORE	0.22	0.43	0.15	0.05	-0.10	-0.10	0.00	0.41	1.00				
(10) SOSCORE	0.25	0.34	-0.02	0.05	-0.02	-0.04	0.14	0.44	0.73	1.00			
(11) TobinQ	-0.06	-0.50	-0.77	-0.21	0.53	0.26	0.05	-0.08	-0.17	-0.03	1.00		
(12) ESG_DISC	0.36	0.39	0.08	0.10	-0.06	-0.05	0.19	0.40	0.63	0.66	-0.11	1.00	
(13) OPM	0.02	0.04	-0.12	-0.04	0.45	-0.08	0.06	-0.01	-0.07	-0.02	0.13	-0.01	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:

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

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)	0.698***	1.294***
	(6.04)	(6.23)
IND2 (Mining)	1.825***	3.345***
	(12.71)	(14.84)
IND3 (Oil & Petroleum)	1.579***	2.903***
	(8.33)	(9.75)
IND4 (Textiles, Apparel & Footwear)	-0.172	-0.337
	(-0.61)	(-0.57)
IND5 (Consumer Durables)	-0.491*	-1.139**
	(-1.69)	(-2.06)
IND6 (Chemicals)	1.067***	1.966***
	(4.06)	(4.11)
IND7 (Perfumes, Soap, Perfumes, Tobacco)	0.531***	0.995***
	(2.69)	(2.90)
IND8 (Construction)	0.548***	1.066***
	(3.21)	(3.41)
IND9 (Steel)	0.859***	1.555***
	(3.34)	(3.28)
IND10 (Fabricated Products)	0.164	0.437
	(0.38)	(0.57)
IND11 (Machinery and Business Equipment)	0.112	0.148
	(0.90)	(0.58)
IND12 (Automobiles)	0.193	0.416
	(0.85)	(0.96)
IND13 (Transportation)	0.341***	0.671***
	(3.82)	(4.13)
IND14 (Utilities)	1.452***	2.667***
	(7.70)	(8.76)
IND15 (Retail)	-0.123	-0.209
	(-1.02)	(-0.83)
IND16 (Financials)	0.091	0.197
	(0.80)	(0.94)
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***	2.342***
	(11.70)	(15.10)
Sin stocks	0.410	0.723
	(0.89)	(0.81)
Observations	32,536	32,536
Pseudo R2	0.30	0.30
Year FE	Yes	Yes
Country FE	Yes	Yes

Table 3: ESG-linked pay and country characteristics

This table shows OLS, 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:

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

where *Ln(lagged 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 controls other than *Ln(Lagged GDP per capita)* and *ADRI* are rescaled by min-max normalization 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 the Appendix Table A1.

	(1)	(2)	(3)	(4)
ESGPAY	Probit	Probit	Probit	Logit
Ln(Lagged GDP per capita)	0.434**	0.524***	0.667***	1.441***
	(2.25)	(2.60)	(3.99)	(3.66)
Individualism	1.776***	2.396***	2.694***	5.381***
	(4.41)	(4.79)	(5.23)	(4.54)
Masculinity/Femininity	-1.381***	-1.715***	-2.088***	-3.840***
	(-3.10)	(-3.70)	(-5.22)	(-4.28)
Power distance	0.167	0.524	0.107	0.560
	(0.21)	(0.70)	(0.15)	(0.34)
Uncertainty avoidance	0.477	0.842*	-0.634	-1.153
	(1.02)	(1.87)	(-1.07)	(-0.93)
ADRI		0.306**	0.391***	0.777***
		(2.00)	(3.80)	(3.89)
Corruption control		-0.122	-0.693	-1.446
		(-0.16)	(-1.06)	(-1.11)
French civil			0.884***	1.739***
			(3.13)	(3.31)
German civil			0.878**	1.681**
			(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 and logit regressions for firm-level ESG-linked pay. *ESGPAY* and is equal to one if executive compensation is linked to ESG goals and 0 otherwise. We estimate the following panel regression equation:

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

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). LEV_t, ROA_t, IO_t, $EARN\_VOL_t$, are in decimals. All the control variables are lagged by one fiscal year. We include year, country, and industry fixed effects 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 the Appendix Table A1.

	(1)	(2)	(3)	(4)
$ESGPAY_{t+1}$	Probit	Probit	Probit	Logit
LN_SIZE_t	0.245***	0.249***	0.256***	0.470***
	(4.24)	(4.47)	(4.77)	(4.53)
LN_BM_t	0.042	0.074*	0.054	0.103
	(0.99)	(1.88)	(1.31)	(1.26)
LEV_t		0.085	-0.000	0.102
		(0.40)	(-0.00)	(0.25)
ROA_t		0.868**	0.900**	1.660**
		(2.04)	(2.14)	(2.18)
IO_t			-0.156	-0.214
			(-1.54)	(-1.13)
$EARN\_VOL_t$			0.434	0.683
			(0.86)	(0.68)
Observations	31,115	30,843	22,312	22,312
Pseudo R^2	0.395	0.397	0.383	0.387
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Table 5: *ESGPAY*, ESG Ratings and ESG disclosure - OLS outcomes regressions

This table analyzes a 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 (*SOSCORE, ENSCORE,* or *CGSCORE,* respectively) or its disclosure quality score (*ESG_DISC*). *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).. We include year, country, and industry fixed effects and cluster 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 performances and columns (5)-(8) examines two-year ahead performances. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in the Appendix Table A1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$ENSCORE_{t+1}$	$SOSCORE_{t+1}$	$CGSCORE_{t+1}$	ESG_DISC_{t+1}	$ENSCORE_{t+2}$	$SOSCORE_{t+2}$	$CGSCORE_{t+2}$	ESG_DISC_{t+2}
$ESGPAY_t$	5.605***	5.178***	8.290***	4.962***	5.008***	4.910***	7.634***	4.585***
	(5.13)	(5.89)	(8.37)	(9.61)	(4.59)	(5.59)	(7.60)	(8.84)
LN_SIZE_t	9.465***	7.053***	4.142***	3.226***	9.183***	6.846***	3.977***	3.210***
	(29.39)	(25.87)	(13.88)	(26.71)	(29.34)	(25.71)	(13.62)	(26.45)
LN_BM_t	-1.306**	-2.425***	-0.920*	-0.557**	-1.319**	-2.623***	-0.951*	-0.452*
	(-2.26)	(-5.09)	(-1.84)	(-2.42)	(-2.28)	(-5.47)	(-1.89)	(-1.96)
LEV_t	0.015	-0.011	-0.010	-0.002	0.022	-0.014	-0.010	0.000
	(0.62)	(-0.55)	(-0.45)	(-0.27)	(0.89)	(-0.69)	(-0.46)	(0.02)
ROA_t	0.277***	0.198***	0.131**	0.079***	0.281***	0.178***	0.132**	0.081***
	(4.75)	(4.01)	(2.48)	(3.86)	(4.89)	(3.59)	(2.54)	(3.91)
IO_t	0.017	0.044***	0.039***	0.014**	0.015	0.042***	0.029**	0.013**
	(1.11)	(3.39)	(2.81)	(2.33)	(1.03)	(3.32)	(2.11)	(2.18)
$EARN\_VOL_t$	-0.080	0.064	-0.063	0.015	-0.105	0.103	-0.053	0.033
	(-0.78)	(0.70)	(-0.67)	(0.44)	(-1.04)	(1.12)	(-0.57)	(0.90)
Observations	20,804	20,798	20,804	23,599	19,916	19,910	19,916	22,526
Adj. R^2	0.404	0.437	0.140	0.561	0.405	0.447	0.142	0.548
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: *ESPAY* and firm performance - OLS outcome regressions

This table analyzes 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 $FinPerf_{i,t+1}$ 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). We include year, country, and industry fixed effects and cluster 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 the Appendix Table A1.

	(1) OPM_{t+1}	(2) ROA_{t+1}	(3) $TobinQ_{t+1}$	(4) OPM_{t+2}	(5) ROA_{t+2}	(6) $TobinQ_{t+2}$
$ESGPAY_t$	1.477***	0.193*	-0.003	1.698***	0.371**	0.009
	(2.83)	(1.95)	(-0.08)	(3.12)	(2.54)	(0.19)
LN_SIZE_t	0.398**	-0.216***	-0.157***	0.094	-0.371***	-0.180***
	(2.33)	(-7.31)	(-11.59)	(0.54)	(-8.95)	(-11.95)
LN_BM_t	-0.479	-1.221***	-1.050***	-0.240	-1.070***	-1.006***
	(-1.57)	(-16.07)	(-28.47)	(-0.76)	(-11.34)	(-26.94)
LEV_t	0.064***	-0.011***	-0.015***	0.068***	-0.008***	-0.015***
	(4.98)	(-5.79)	(-15.89)	(5.06)	(-3.16)	(-14.78)
ROA_t	1.066***	0.669***	0.036***	0.925***	0.553***	0.030***
	(23.36)	(48.89)	(7.39)	(19.44)	(33.17)	(5.95)
IO_t	0.022***	0.002	-0.000	0.022***	0.002	-0.000
	(2.97)	(1.20)	(-0.47)	(2.88)	(1.35)	(-0.08)
$EARN\_VOL_t$	-0.196***	-0.074***	0.040***	-0.152**	-0.056**	0.036***
	(-3.04)	(-4.73)	(6.83)	(-2.12)	(-2.56)	(5.83)
Observations	23,546	23,521	23,578	23,479	23,400	23,460
Adj. R^2	0.325	0.634	0.640	0.279	0.498	0.593
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 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 firm, 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 $SCORE_{i,t}$ 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. $X_{i,t}$ represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. All the regressions control for industry and year fixed effects. 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.

	(1) $SOSCORE_{t+1}$	(2) $ENSCORE_{t+1}$	(3) $CGSCORE_{t+1}$
$TREAT_i$ X AFTER	3.727*	-0.681	3.697
	(1.87)	(-0.31)	(1.29)
$TREAT_i$	11.482***	15.205***	9.036**
	(3.65)	(3.56)	(2.03)
AFTER	1.131	3.990	0.494
	(0.50)	(1.37)	(0.20)
LN_SIZE_t	5.759***	6.612***	2.767*
	(4.82)	(4.04)	(1.90)
LEV_t	-0.008	-0.023	-0.157
	(-0.07)	(-0.18)	(-1.30)
LN_BM_t	-3.993*	-3.661	-0.503
	(-1.80)	(-1.22)	(-0.22)
ROA_t	0.173	-0.070	0.167
	(1.02)	(-0.39)	(1.10)
IO_t	0.261***	0.200**	0.117
	(3.74)	(2.28)	(1.49)
$EARN\_VOL_t$	0.691*	0.705*	0.463
	(1.98)	(1.95)	(1.06)
Observations	537	537	537
Adj. R^2	0.561	0.550	0.228
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 a firm's financial performances. For each treatment firm, 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 $FinPerf_{i,t+1}$ represents three types of 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. $X_{i,t}$ represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. All the regressions control for industry and year fixed effects. 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.

	(1)	(2)	(3)
	OPM_{t+1}	ROA_{t+1}	$TobinQ_{t+1}$
$TREAT_i$ *X AFTER*	3.049**	1.365*	0.106
	(2.43)	(1.66)	(1.27)
$TREAT_i$	-4.178**	-0.196	-0.105
	(-2.17)	(-0.35)	(-1.10)
AFTER	-1.014	-0.994	0.004
	(-0.67)	(-1.22)	(0.05)
LN_SIZE_t	2.399***	0.051	0.005
	(3.32)	(0.31)	(0.11)
LEV_t	0.024	0.008	-0.008**
	(0.27)	(0.41)	(-2.48)
LN_BM_t	-2.749	-2.806***	-0.902***
	(-1.60)	(-5.00)	(-9.29)
ROA_t	0.682***	0.323***	0.013
	(5.04)	(4.14)	(1.46)
IO_t	0.047	-0.015	-0.006**
	(1.09)	(-0.85)	(-2.38)
$EARN\_VOL_t$	0.259	0.185*	0.010
	(1.06)	(1.98)	(1.40)
Observations	558	556	558
Adj. R^2	0.403	0.435	0.698
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. 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 $ESGPAY\_CAT_{i,t+1}$ corresponds to one of the four categories of performance goals: *Employee* (employee/staff/talent related), *Customer*, *Diversity*, and *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. $X_{i,t}$ represents a vector of control variables including *LN, SIZE*, *ROA*, *LEV*, *LN_BM*, *IO*, and *EARN_VOL*. All the regressions control for industry and year fixed effects. 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.

	(1)	(2)	(3)	(4)
	Employee$_{t+1}$	*Customer*$_{t+1}$	*Diversity*$_{t+1}$	*Environment/Climate*$_{t+1}$
TREAT$_i$ *X AFTER*	0.138***	0.044	-0.029	-0.043
	(3.12)	(0.97)	(-1.19)	(-0.84)
TREAT$_i$	0.027	0.059	0.006	-0.031
	(1.19)	(1.36)	(0.36)	(-0.87)
AFTER	-0.048**	-0.051*	-0.001	-0.021
	(-2.02)	(-1.87)	(-0.05)	(-0.66)
LN_SIZE$_t$	-0.002	-0.014	0.001	0.012
	(-0.15)	(-0.89)	(0.11)	(0.82)
LEV$_t$	0.000	0.001	0.000	0.000
	(0.55)	(0.63)	(0.55)	(0.44)
LN_BM$_t$	0.017	0.048	0.004	0.067**
	(0.87)	(1.63)	(0.39)	(2.28)
ROA$_t$	0.002	0.003	-0.000	-0.001
	(0.83)	(1.03)	(-0.26)	(-0.31)
IO$_t$	0.001*	-0.002	0.001	0.002
	(1.81)	(-0.97)	(1.19)	(1.47)
EARN_VOL$_t$	0.010*	-0.002	-0.002	-0.001
	(1.86)	(-0.36)	(-0.71)	(-0.32)
Observations	468	468	468	468
Adj. R^2	0.130	0.076	0.056	0.487
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	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)	Bloomberg	Institutional ownership from Bloomberg EQY_INST_PCT_SH_OUT. Data available from 2010. 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).*
ENSCORE	Asset4	Environmental Score from Asset4.
SOSCORE	Asset4	Social 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.

Appendix Table A2: Diff-in-Diff 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 a EU or UK subsidiary that first adopted ESG-linked pay post 2014, the enactment of the directive. Each Treatment firms is matched to one control firm, which is a US with no EU 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	91.67	11.32	92.92	0.835	0.701
	CONTROL	92.21	15.77	95.40		
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		

Appendix Table A3: 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 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, $EARN\_VOL_t$ and IO_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 industry and year fixed effects. Standard errors are double clustered by firm and Year and the corresponding *t*-statistics are reported in parentheses. Variables are defined in the 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)
$EARN\_VOL_{t-1}$	0.107***	0.113***	0.114***
	(4.83)	(4.94)	(4.69)
IO_{t-1}	-0.019**	-0.015*	-0.013
	(-2.59)	(-1.89)	(-1.52)
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