

Why Do Firms Adopt ESG-linked Pay?

The Role of Bank Financing*

Donglin Gao[†]

Hongpan Zhang[‡]

July 30, 2025

Abstract

This paper studies how debtholders influence firms' adoption of ESG-related metrics in executive compensation (i.e., ESG-linked pay). Leveraging exogenous variations in ESG regulations imposed on non-U.S. banks, we find that U.S. firms that have pre-existing lending relationships with these banks are more likely to adopt ESG-linked pay. This effect is stronger when borrowing firms have higher switching costs to new lenders, lower shareholder-manager coordination costs, and poorer ESG performances. We further show that borrowing firms adopt ESG-linked pay in response to firm value declines caused by heightened shareholder–debtholder conflicts following ESG regulations on banks, and such compensation scheme helps restore firm value and improve ESG performance. Taken together, our research demonstrates that ESG regulations in the banking sector can translate into compensation contracting outcomes because debtholders pass on regulatory costs to borrowing firms and reshape shareholders' perceptions of firm value.

Keywords: ESG, Executive Compensation, Corporate Governance, Debt Contracts

JEL Codes: G21, G38, J33

*We are deeply indebted to the continuous support and guidance from Carola Frydman. We appreciate constructive comments and suggestions from Yongzhao (Vincent) Lin, Xiumin Martin, Lior Shabtai, Yuxuan Wang, and participants in PhD student brownbag at Washington University in St. Louis. All errors our own.

[†]donglin.gao@bc.edu; PhD student at Carroll School of Management, Boston College.

[‡]hongpan@wustl.edu; PhD student at Olin Business School, Washington University in St. Louis.

1 Introduction

A significant wave of firms has incorporated metrics about Environmental, Social, and Governance (ESG) into management contracts (hereafter, ESG-linked pay) (Cohen et al., 2023). However, there is ongoing debate among academics and practitioners about the reasons why firms adopt ESG-linked pay (Carter et al., 2023; Homroy et al., 2023; Chaigneau and Sahuguet, 2025). We contribute to this debate by uncovering a new economic force: debtholders transmit ESG regulatory pressures to borrowing firms and influence their decision to adopt ESG-linked pay. When banks encounter unexpected ESG regulations, borrowing firms in their loan portfolios suffer declines in shareholder value, which is caused by intensified conflicts of interest between shareholders and debtholders. Affected firms respond by adopting ESG-linked pay as a commitment device to mitigate these conflicts and restore shareholder value. Our findings highlight the crucial role of the banking sector in translating ESG regulations into compensation contracting outcomes through shareholders' *value* incentives to reduce conflicts with debtholders (Starks, 2023).¹

Firms act as a nexus for various contractual relationships, and the optimal management contract balances shareholder-manager and shareholder-debtholder conflicts (Jensen and Meckling, 1976; John and John, 1993). When shareholders design management contracts to align managers' interests with their own by altering managerial risk preferences, they also need to minimize the agency costs of debt because debtholders *ex post* rationally price shareholder-debtholder conflicts inferred from managerial incentives embedded in compensation contracts (e.g., Brockman et al., 2010). Under ESG regulations that emphasize banks' ESG consciousness in their funded projects, banks risk losing social and reputation capital if firms in their lending portfolios fail to deliver satisfactory ESG performances (Lins et al., 2017; Houston and Shan, 2022; Chen et al., 2023b). Therefore, banks' payoff is influenced not only by downside risks but also by borrowers' ESG performance, which intensifies conflicts between shareholders and debtholders.² Exacerbated shareholder–debtholder

¹Starks (2023) discusses two major motivations for ESG issues in sustainable finance. First, *value* motivation, which focuses on financial performance and economic benefits, aims to achieve higher returns through ESG engagements. Second, *values* motivation, which is driven by personal or organizational ethics, social responsibility, or values, seeks to promote positive social or environmental change even at the potential expense of some financial gains.

²Before the regulation, banks primarily focused on minimizing the risk of loan defaults when assessing borrowers.

conflicts arising from ESG regulations in the banking sector reduce borrowing firms' shareholder value. To mitigate such a negative impact, shareholders can incorporate ESG performance metrics into executive compensation. Thus, ESG-linked pay functions as a commitment device that aligns the interests of shareholders and debtholders on ESG issues.

However, ESG-linked pay may not constitute the optimal strategy for firms that aim to minimize the agency costs of debt and the potential loss of firm value caused by debtholders' ESG concerns. The inclusion of ESG-related metrics in executive compensation schemes creates coordination costs between shareholders and managers.³ Meanwhile, firms also have alternative responses to lending banks' ESG regulatory pressures. These include adopting cost-efficient methods to enhance ESG performance, pursuing new lenders that fall outside ESG regulatory requirements, or choosing to maintain current practices without adjustment (Houston and Shan, 2022; Duchin et al., 2024). Hence, firms' optimal choice should depend on the level of shareholder-debtholder conflicts after the introduction of ESG regulations, and on the relative costs and benefits of ESG-linked pay in comparison to other available options under a given level of ESG pressure from banks.

Testing our theoretical predictions faces two main empirical challenges. First, ESG regulations typically apply uniformly to both banks and non-financial firms within the same regulatory framework. Thus, this uniformity limits the ability to isolate the specific effects of banks' ESG regulatory pressures on firms' executive compensation from the broader influence of general ESG compliance requirements. Second, firm-bank lending relationships are endogenously determined equilibrium outcomes. Borrowing firms have rational expectations about the agency costs of debt under banks'

However, with the introduction of ESG regulations, banks need to consider borrowers' ESG performance in addition to financial downside risks (Houston and Shan, 2022). If borrowers fail to deliver satisfactory ESG performances, banks face social and reputation costs. However, borrowers' exceptional ESG performances do not provide banks with additional benefits. Hence, a borrowing firm's ESG performance is effectively a source of downside risk for banks. We provide anecdotal evidence in Appendix D that when lenders are subject to ESG regulations, they have incentives to renegotiate with borrowers to include ESG-related covenants in the loan contract. Prior studies suggest that when lenders face ESG pressures, they usually incorporate ESG-related covenants into loan contracts (Choy et al., 2024) or increase their monitoring of borrowing firms (Wang, 2023). Our empirical findings confirm that shareholders respond negatively to the implementation of ESG regulations that affect their existing lending banks. A detailed discussion of stock market reaction to banks' ESG regulatory pressures is provided in Section 4.3.

³The coordination cost arises from the bargaining process between managers and shareholders. If managers lack expertise in ESG issues or hold excessive managerial power and refuse to commit to ESG initiatives (Frydman and Jenter, 2010), shareholders face difficulty in enforcing ESG-linked pay.

ESG regulatory pressures and select capital providers accordingly. Therefore, observed firm-bank matches reflect firms' strategic decisions after evaluating the costs and benefits associated with different capital providers. Hence, these observed matched pairs in the lending market do not permit direct inference about the causal impact of banks' ESG regulatory pressures on firm behavior.

In this paper, we address these empirical challenges in two ways. First, we focus on U.S. firms borrowing from non-U.S. banks subject to mandatory ESG disclosure regulations (e.g., [Wang, 2023](#); [Krueger et al., 2024](#)). Such regulations impose tangible costs on borrowing firms because banks under regulations tend to enforce stricter monitoring and incorporate ESG-related covenants into loan agreements. Second, following [Frydman and Hilt \(2017\)](#), we rely on pre-existing firm-bank lending relationships and use the introduction of ESG regulations on banks as an exogenous shocks for our identification strategy because borrowing firms are unlikely to have anticipated future ESG regulations at the time their loans were initiated.

We use stacked difference-in-differences (DiD) identification to investigate the effect of ESG pressure from banks on corporate decisions to adopt ESG-linked pay ([Baker et al., 2022](#)). First, we identify the initial year of mandatory ESG disclosure regulations for each non-U.S. lead arranger in DealScan based on the countries where they operate. We further label loans as “*ESG-shock Loans*” if they are issued before at least one of their lead arrangers becomes subject to ESG regulations and remain outstanding after the regulations take effect. Second, we calculate firm-level exposure to ESG regulation shocks from the banking sector by determining the proportion of ESG-shock loans relative to the total amount of outstanding loans from foreign banks. The underlying assumption is that firms that previously relied more heavily on lending banks later subject to ESG regulations face greater impact from these regulatory changes ([Frydman and Hilt, 2017](#)). We classify firms as treated when their exposure fraction exceeds 50% for the first time within the sample period. Third, a cohort in our stacked DiD framework consists of firms treated for the first time in the same year and control firms that never meet the treatment threshold ([Callaway and Sant’Anna, 2021](#)). Finally, for each cohort, we construct a [-3, +3] year window around the cohort year to form a cohort-firm-year panel with 9,912 observations. This panel includes 220 treated firms and 330

control firms, all of which are non-financial companies in the S&P 1500 index. We focus on S&P 1500 firms because ISS and ExecuComp provide comprehensive data coverage for this sample.

Our empirical evidence suggests that banks' ESG regulation pressures motivate their borrowing firms to adopt ESG-linked pay. Specifically, U.S. firms with a higher proportion of existing loans borrowed from foreign banks that later became subject to mandatory ESG disclosure requirements are more likely to incorporate ESG metrics in the executive compensation contracts. This pattern aligns with the theoretical prediction that shareholders take debtholders' preferences into account when designing executive compensation contracts ([John and John, 1993](#)). Moreover, our identification satisfies the parallel trends assumption because we find that treated and control U.S. firms show similar trends in adopting ESG-linked pay before the mandatory ESG disclosure regulations.

Next, we investigate the economic tradeoffs firms face when deciding whether to adopt ESG-linked pay, based on the relative costs and benefits compared to alternative options for addressing lending banks' ESG regulatory pressures. First, firms can switch to new lenders not bound by ESG regulations, as banks prefer borrowers with ESG profiles aligned to their own ([Houston and Shan, 2022](#)). Our evidence indicates that firms are more likely to adopt ESG-linked pay when the cost of switching banks is higher. Second, consistent with the notion that coordination costs between managers and shareholders make the adoption of ESG-linked pay challenging, our findings are stronger when CEOs have shorter tenures or when a higher proportion of the top five executives also serve on the board. Finally, if a firm has better ESG performance *ex ante*, it faces less severe shareholder-debtholder conflicts when lending banks are subject to ESG regulatory pressures. Our analyses suggest that firms with weaker ESG performance prior to the onset of such pressures are more likely to adopt ESG-linked pay.

We reinforce our economic analysis by providing evidence that mandatory ESG regulations in the banking sector alter shareholders' perceptions about firm value. We study stock market reactions to the EU Non-Financial Reporting Directive (NFRD) and find negative three-day abnormal returns for firms whose lending banks were affected by this regulation around the policy announcement

date, October 22, 2014.⁴ Moreover, following the changed shareholder perception about firm value, shareholders have become more aware of ESG issues. Our findings demonstrate that shareholders are more likely to submit ESG-related proposals when the firms' lending banks are subject to ESG regulatory pressures.

Moreover, another issue related to ESG-linked pay is whether such compensation schemes serve as greenwashing tools or as effective incentive mechanisms under intensified shareholder-debtholder conflicts. The widespread use of ESG-linked pay faces scrutiny because these schemes often lack strength or objectivity to influence behavior in a meaningful way, which suggests that they serve as symbolic gestures rather than genuine incentives (Walker, 2022; Efing et al., 2024). Hence, we examine the economic consequences of ESG adoption to assess whether these compensation schemes constitute window dressing. In our sample, the adoption of ESG-linked pay is associated with future shareholder value recovery and ESG performance improvement. Our findings validate that ESG-linked pay serves as a credible commitment device to mitigate heightened shareholder-debtholder conflicts and support the view that debtholders pass on regulatory costs to borrowing firms and prompt operational changes. However, it should be noted that our findings do not address other potential motivations behind the adoption of ESG-linked pay; rather, we provide one specific explanation related to its efficiency in the context of shareholder-debtholder conflicts.

Do banks' voluntary ESG initiatives shape their borrowing firms' decisions to adopt ESG-linked pay? Unlike government-mandated regulations, which penalize banks when their loan portfolios fail to deliver expected ESG performances, voluntary ESG initiatives without public enforcement mechanisms hardly compel banks to actively oversee the ESG practices and performance of their borrowing firms (Raghunandan and Rajgopal, 2022). We test this conjecture in the context where banks voluntarily become signatories of the Equator Principles, a risk management framework for assessing and managing environmental and social risks in project financing. However, we do not find evidence that borrowing firms are significantly more likely to adopt ESG-linked pay after their

⁴The EU Non-Financial Reporting Directive (NFRD) was issued on October 22, 2014, and impacted the regulatory landscape for corporate reporting across many European Union member states (i.e., a majority of countries in our sample). The directive mandates that large companies publicly disclose information on non-financial issues, such as environmental performance, social and employee-related matters, human rights, anti-corruption, and bribery issues.

lending banks become voluntary signatories.

This paper makes two major contributions to the literature. First, we contribute to the growing body of research on executive compensation contracts tied to ESG metrics. In recent years, many firms have adopted ESG-linked pay (Cohen et al., 2023; Hazarika et al., 2023), yet the economic mechanisms that explain this shift in executive compensation remain poorly understood. Moreover, both practitioners and academics have expressed doubts about the effectiveness of ESG-linked pay (Walker, 2022; Efing et al., 2024). While recent studies suggest that *values* motivate the adoption of ESG-linked pay (e.g., Carter et al., 2023; Homroy et al., 2023; Chaigneau and Sahuguet, 2025), we provide contrasting evidence that shareholder *value* also influences the adoption of ESG-linked pay, as debtholders' ESG pressures undermine the goal of shareholder value maximization (Starks, 2023). We further demonstrate that ESG-linked pay plays a substantive role in enhancing both shareholder value and ESG performance, rather than serving as a greenwashing tool for symbolic compliance. Our findings also complement Houston and Shan (2022), who find that banks do not directly enforce ESG improvements through executive compensation at borrowing firms.

Second, our findings shed new light on the role of debtholders in corporate governance (Shleifer and Vishny, 1997), particularly in the design of executive compensation. While prior studies find that debtholders suppress equity-based compensation (i.e., Vega and Delta) to mitigate risk-shifting problems (Rhodes, 2016; Balsam et al., 2018; Hong et al., 2021), we demonstrate that debtholders can influence the use of non-equity performance metrics in determining cash compensation. Moreover, existing research on equity-based compensation shows that debtholders influence managerial risk-taking incentives to prevent wealth transfers from themselves to shareholders. In contrast, we extend this literature by showing that debtholders may actively shift their own regulatory burdens onto borrowing firms. Specifically, we demonstrate that when debtholders face regulatory burdens from ESG regulations in the banking sector, they pass these costs onto borrowing firms. In response, shareholders of these firms adopt ESG-linked pay to subsidize debtholders by aligning corporate activities with ESG objectives. The banking sector not only supplies debt financing to firms but also serves as a conduit for the transmission of economic shocks to the corporate sector (Rajan and

Zingales, 1998; Bernanke et al., 1999; Costello, 2020; Chodorow-Reich and Falato, 2022). Within this framework, we contribute to the broader literature on the economic consequences of banking shocks by highlighting the role of banks in transmitting ESG regulations to the corporate sector.

2 Institutional Setting and Hypothesis Development

2.1 Executive Compensation Tied to ESG Performance

In recent decades, many firms have incorporate ESG metrics into management compensation contracts for their C-suite executives (Cohen et al., 2023; Hazarika et al., 2023). The proportion of firms adopting ESG-linked pay significantly increases from 3% in 2011 to 38% in 2021 worldwide. In 2021, of the \$6.96 billion paid to S&P 500 CEOs, nearly \$600 million is linked to Environmental and Social performance metrics (Shostal and Shah, 2022). Geographically, more than 60% of firms in the European Union include ESG metrics in the executive compensation, compared to just 16.5% in the United States. Industry-wise, firms in sectors with significant environmental impact, such as petroleum, natural gas, utilities, and metal mining, are more likely to adopt ESG-linked pay due to heightened public and regulatory scrutiny.

However, two important questions remain unsolved despite the prevalence of ESG-linked pay. First, the economic rationale underlying why firms adopt ESG-linked pay remains a topic of ongoing debate among academics and industry practitioners. Starks (2023) discusses two motivations for ESG activities in sustainable finance: *value* motivation, which focuses on the achievement of higher financial returns through ESG engagement, and *values* motivation, which reflects ethics or social responsibility and prioritizes positive social or environmental impact, even at the potential expense of financial gain. While prior studies show that shareholder *values* contribute to the prevalence of ESG-linked pay (Carter et al., 2023; Homroy et al., 2023; Chaigneau and Sahuguet, 2025), there exists scarce evidence on whether *value* incentive drives the widespread adoption of ESG-linked pay. Cohen et al. (2023) suggest that ESG-linked pay might be motivated by the desire to safeguard a firm's long-term performance by addressing future risks (e.g., regulatory risks). However, Houston

and Shan (2022) find no supporting evidence in the context of bank financing: although banks have financial incentives to influence the ESG activities of borrowers, they do not discipline borrowing firms through executive compensation scheme.

Second, whether ESG-linked pay serves as a greenwashing tool or an effective incentive mechanism remains debated. On one hand, more cost-effective and equally effective alternative methods exist for firms to signal their ESG commitment, which makes the adoption of ESG-linked pay potentially suboptimal. For instance, firms can fulfill their ESG goals by enhancing ESG-related disclosures, which serve as strong signals without a direct link between compensation and ESG performance metrics (Spierings, 2022). Supporting this view, prior literature shows that ESG-linked pay remains economically insignificant compared to equity-based incentives tied to shareholder value and serves more as symbolic gestures than genuine incentive mechanisms (Walker, 2022; Efung et al., 2024). On the other hand, existing studies demonstrate that ESG-linked pay leads to various favorable firm-level outcomes, such as improved ESG performance, reduced emissions, and growth in green innovation (e.g., Flammer et al., 2019; Carter et al., 2023; Cohen et al., 2023). However, we have mixed evidence on whether ESG-linked pay enhances shareholder value. Flammer et al. (2019) find that ESG-linked pay increases firm value, while Homroy et al. (2023) suggest that ESG-linked pay has no effect on firm profitability. Taken together, these findings reflect mixed views and evidence on the efficacy of ESG-linked pay.

2.2 Mandatory ESG Disclosure Regulations in the Banking Sector

Mandatory ESG disclosure regulations require firms to report on the environmental and social impacts of their corporate activities to enhance transparency and promote improved performance (Global Reporting Initiative, 2015). In recent decades, these regulations have increasingly applied to both financial and non-financial firms (KPMG, 2013). For example, the EU Directive 2014/95/EU mandates certain large companies, including banks, to disclose non-financial and diversity-related information. This paper focuses on mandatory ESG disclosure regulations affecting banks. Banks are subject to these regulations in two ways. First, certain ESG disclosure requirements specifically

target banks and require them to report on their own ESG practices. Second, broader ESG disclosure requirements apply to firms that meet specific criteria such as listing status, asset size, or number of employees, and banks can fall within this scope. Prior studies show that ESG regulations in the banking sector have a tangible impact on banks' ESG engagement. For example, banks under mandatory ESG disclosure regulations improve environmental and social performance by financing green projects (Wang, 2023).

Mandatory ESG disclosure regulations also matter significantly to borrowing firms that have lending relationships with affected banks. When banks subject to ESG disclosure regulation, their pressure on ESG will transmit to the borrowing firms. According to the Sustainability Accounting Standards Board (SASB), responsible financing is one of the most material aspects of a bank's ESG profile. Banks incorporate ESG considerations into their lending practices by increasing monitor and assess their borrowers' fulfillment of agree-upon environmental and social objectives, such as those specified in loan covenants, or by linking interest rates to ESG performance metrics. For instance, Dutch bank ABN AMRO stated that *"if the sustainability assessment indicates that a client does not meet the bank's sustainability standards, we explore possibilities for improvement."* Similarly, Singaporean bank DBS promotes responsible financing by linking interest rates to ESG performance metrics of their borrowers. These examples highlight how banks actively engage with borrowers to enhance ESG outcomes under ESG disclosure regulations.

The main empirical challenge in studying how ESG pressure from banks affects borrowing firms' adoption of ESG-linked pay is that ESG disclosure regulations often apply uniformly to both financial and non-financial firms, making it difficult to isolate the effect of pressure from debt capital providers. Following the approach of Frydman and Hilt (2017), we examine a setting of U.S. firms with lending relationships to non-U.S. lead banks, where ESG regulations apply only to the non-U.S. banks and not to the U.S. borrowing firms. Importantly, the United States currently does not mandate ESG disclosures for firms, including banks (Christensen et al., 2021). This setting allows us to isolate the effect of ESG pressure from debtholders on borrowing firms' adoption of ESG-linked pay. We collect mandatory ESG disclosure regulations are collected from Carrots

& Sticks Report, the Sustainable Stock Exchange Initiative (SSE), the Initiative for Responsible Investment at Harvard University, and the Global Reporting Initiative (Wang, 2023; Krueger et al., 2024). Those regulations vary across countries in terms of adoption dates and firms covered but share the common goal of enhancing transparency and encouraging improvements in ESG performance.

2.3 The Role of Banks in Corporate Governance

Debtholders, especially banks, play a crucial role in corporate governance by mitigating conflicts of interest between shareholders and debtholders (Shleifer and Vishny, 1997). Agency theory suggests that such conflicts often arise in leveraged firms, where shareholders may act opportunistically in ways that benefit themselves at the expense of debtholders (Jensen and Meckling, 1976). To limit such behavior, debtholders typically employ contractual arrangements (e.g., covenants) to restrict shareholder discretion and better align incentives. When firm performance deteriorates and covenant violation occurs, debtholders can intervene and take corrective actions. Moreover, Aghion and Bolton (1992) analyze shareholder–debtholder conflicts within an incomplete contracting framework, where not all future contingencies can be specified and shareholders may extract private benefits at debtholders’ expense. To address such problems, contracting parties can introduce a verifiable signal that triggers a reallocation of control rights from shareholders to debtholders when the latter are better positioned to make value-maximizing decisions. This contingent shift in control mitigates *ex post* inefficiencies and enhances corporate governance.

Therefore, previous research on how debtholders influence corporate governance has mainly concentrated on two default scenarios: when firms fail to fulfill their payment obligations to creditors (payment default) and when they breach specific covenants in their credit agreements (technical default). First, prior studies emphasize the prevalence of creditor control in restructurings following payment defaults or bankruptcy (e.g., Ivashina et al., 2008, 2016). For example, Ivashina et al. (2016) find that debtholders typically enter the corporate governance only when borrowing firms are severely distressed and face bankruptcy. Second, debtholders can influence corporate decisions

outside of payment default states and come to play an active role in corporate governance when performance deteriorates (e.g., [Nini et al., 2009, 2012](#)). In particular, when debtholders intervene in firm decisions, they can influence corporate management by replacing executives ([Nini et al., 2009](#)) or altering compensation levels ([Ferreira et al., 2018](#)).

Furthermore, recent studies show that even without covenant violations or payment defaults, debtholders exert significant control over borrowing firms' operating and financial policies through covenant renegotiation. [Roberts and Sufi \(2009\)](#) report that 90% of long-term debt contracts are renegotiated before maturity, driven by factors such as new information and macroeconomic changes rather than financial distress or default. They emphasize the importance of initial contract terms and bargaining power in determining renegotiation outcomes. Similarly, [Denis and Wang \(2014\)](#) find that renegotiation typically relaxes existing restrictions and significantly modify current limits, with borrowers' investment and financial policies closely aligning with the updated covenants.

One particular area of corporate governance is that debtholders influence the executive compensation structures of borrowing firms. Theoretically, [John and John \(1993\)](#) builds on [Jensen and Meckling \(1976\)](#) and argue that optimal managerial compensation depends not only on the agency relationship between shareholders and management but also on the conflicts of interest between shareholder and debtholders. Debtholders *ex post* rationally price shareholder-debtholder conflicts (e.g., risk shifting incentives) they infer from compensation contracts. Consequently, shareholders *ex ante* design the compensation contract as a precommitment device with considerations of debtholder preferences.

Empirical studies provide supporting evidence for theoretical analyses on how debtholders influence executive compensation. For instance, [Brockman et al. \(2010\)](#) find that short-maturity debt reduces managerial risk-taking incentives embedded in executive compensation, thereby lowering agency costs of debt and bond yields. After debt covenant violations, debtholders can obtain control rights that allow them to influence corporate management and structure executive compensation (e.g., [Nini et al., 2012](#); [Balsam et al., 2018](#); [Ferreira et al., 2018](#)). For example, [Balsam et al. \(2018\)](#) find that CEO pay drops 8.5% after covenant violations, and debtholders use more covenants to

limit risk-taking incentives. Importantly, debtholders could also influence executive compensation even outside of default events. Rhodes (2016) demonstrate that earnings-based debt covenants alter CEO pay structures by reducing their sensitivity to earnings performance. Additionally, Akins et al. (2020) find that change-of-management restrictions (CMRs) in loan contracts provide lenders with explicit *ex ante* control rights over managerial retention and selection.

2.4 Hypothesis Development

Shareholders effectively hold a call option on the firm's assets and benefit from any increase in asset value, whereas debtholders are primarily concerned with downside risks, as their losses are limited to the value of the debt. These asymmetric payoff structures give rise to conflicts of interest between shareholders and debtholders (Jensen and Meckling, 1976). Moreover, executive compensation can signal shareholder incentives because such contracts are designed to align managerial interests with those of shareholders. Rational debtholders can interpret the structure of these contracts to infer potential conflicts of interest. If the perceived conflicts are substantial, debtholders may respond by demanding higher interest rates or imposing more restrictive covenants, thereby increasing the cost of debt. Hence, shareholders anticipate the *ex post* reactions of debtholders to executive compensation and design those contracts as an *ex ante* precommitment mechanism to mitigate conflicts of interest between shareholders and debtholders (John and John, 1993).

Building on the theoretical literature, we delineate the dynamics between executive compensation and debtholders under a regime without ESG regulations in the banking sector. When lending banks are not bound by ESG regulations, they aim to minimize downside risk and increase the cost of debt when they expect value loss resulting from shareholders' opportunistic behaviors (e.g., asset substitution and risk-shifting). Anticipating debtholders' reactions, shareholders structure executive compensation to balance the upside potential of incentivizing managerial risk-taking with the potential agency costs of debt imposed by debtholders.

Furthermore, ESG regulations in the banking sector can change the incentives for debtholders. When banks are mandated to disclose ESG information, banks face potential losses of social and

reputation capital if firms in their lending portfolios do not meet ESG performance standards (Houston and Shan, 2022; Lins et al., 2017; Chen et al., 2023b). Our anecdotal evidence shows that banks incorporate ESG-related covenants into loan contracts after encountering ESG regulatory pressures. Moreover, prior studies find that debtholders include ESG covenants in loan agreements (Choy et al., 2024) and increase monitoring of borrowing firms (Wang, 2023) when they are subject to ESG regulations. Overall, these regulations change lending banks' payoff structures and cause them to demand stronger ESG performance from borrowers, which increase conflicts of interest between shareholders and debtholders.

We hypothesize that ESG regulations in the banking sector increase the marginal benefit of ESG-linked pay. Hence, the equilibrium level of ESG pay adoption rises compared to a non-regulatory regime. Building on John and John (1993), ESG-linked pay can function as a commitment device that mitigates shareholder–debtholder conflicts arising from ESG regulatory pressures of lending banks. Shareholders can incorporate ESG-related metrics into executive compensation schemes to establish a credible ESG commitment, thereby contributing to the harmonization of shareholder and debtholder interests regarding ESG issues (e.g., Hart and Zingales, 2022; Cohen et al., 2023). The executive compensation restructure thus reflects a strategic response by firms to external pressures from their debtholders: in the presence of ESG-focused regulation, borrowing firms are incentivized to adopt ESG-linked pay to align with the ESG preferences of regulated debtholders. Given that the marginal cost of implementing ESG-linked pay remains relatively stable across both regimes, the regulatory-induced increased marginal benefit provides an incentive for broader adoption among borrowing firms.

However, ESG-linked pay may not be the optimal strategy for firms to mitigate shareholder–debtholder conflicts arising from ESG regulations in the banking sector. On one hand, incorporating ESG-related metrics into executive compensation programs generates coordination costs between shareholders and managers, and the increased marginal benefit of ESG-linked pay might not sufficiently offset these costs. On the other hand, borrowing firms could respond to ESG regulatory pressures imposed on lending banks with alternative solutions. For example, these alternatives in-

clude implementing cost-efficient measures to enhance ESG performance, borrowing from lenders who are not subject to ESG regulations, or choosing to maintain existing practices without adjustment (Houston and Shan, 2022; Duchin et al., 2024). Consequently, the optimal strategy for firms should depend on the extent of shareholder-debtholder conflict following ESG regulations in the banking sector, as well as on the relative costs and benefits of ESG-linked pay compared to other available options under the given level of ESG pressure from banks.

Ultimately, it is an empirical question whether ESG regulations imposed on banks have a positive effect on firm decision to implement ESG-linked pay. The main hypothesis for this empirical question is that:

Hypothesis: *When banks experience ESG regulatory pressures, firms that already have established lending relationships with these banks are more likely to adopt ESG-linked pay.*

3 Research Design and Sample Construction

3.1 ESG Disclosure Regulation and Firms' Adoption of ESG-linked Pay

To address potential endogeneity concerns arising from firms' selection into borrowing from non-U.S. banks, we exploit pre-existing firm-bank lending relationships to identify exogenous shocks induced by ESG disclosure regulations (Frydman and Hilt, 2017). Specifically, for firms that already have outstanding loans with foreign banks, the introduction of ESG disclosure regulations in the foreign country directly affects these banks. This regulatory change serves as an exogenous shock to the borrowing firms, as it is unlikely that firms could anticipate or influence the timing of such foreign regulations. Moreover, to ensure comparability, we focus only on firms that have borrowed from non-U.S. banks to avoid unobservable factors that may affect their choice between domestic and foreign financing sources.

Following prior studies (e.g., Frydman and Hilt, 2017; Costello, 2020), we differentiate between treated and control firms based on their levels of exposure to ESG regulatory shocks in the banking

sector. Specifically, the exposure level is calculated as the ratio of loans exogenously impacted by ESG regulations, where a pre-existing lending relationship exists, to the total outstanding loans provided by foreign banks. Specifically, we begin with identifying the initial year of ESG disclosure regulation for each non-U.S. lead arranger in DealScan based on their countries of operations. We define loans as “*ESG-shock Loans*” if one of their lead arrangers’ regulation shock year falls within the loans’ active period. Next, we calculate the levels of exposure to ESG regulatory shocks and classify firms as the treatment group when their exposure ratio exceeds 50% for the first time. In the robustness tests, we use thresholds of 40% and 60% for comparison.

To estimate the causal impact of ESG regulation shocks from the banking sector on borrowing firms’ adoption of ESG-linked pay, we employ a stacked difference-in-differences (DiD) estimation strategy (Baker et al., 2022). In this framework, a cohort consists of firms treated for the first time in the same year and control firms that are never treated (Callaway and Sant’Anna, 2021). For instance, the 2013 cohort includes firms that are first exposed to ESG regulation shocks in 2013 as the treatment group and firms that are never exposed as the control group. Then, we select a [-3, 3] year window around each cohort year to construct a cohort-firm-year panel. This method allows us to control for time-varying unobserved heterogeneity and to examine the dynamics of firms’ responses in terms of ESG compensation scheme to the ESG regulation shocks from their banks.

The baseline regression equation is as follows:

$$ESG-linked Pay_{c,i,t} = \alpha + \beta Treat_{c,i} \times Post_{c,t} + X_{c,i,t-1} + \lambda_{c,i} + \tau_{c,t} + \epsilon_{c,i,t} \quad (1)$$

where c , i , and t represent cohort, firm, and year, respectively. $Treat_{c,i}$ equals to 1 if firm i in cohort c is in the treatment group. $Post_{c,t}$ equals to 1 for year t that after the shock year of a treated firm. $ESG-linked Pay_{c,i,t}$ is an indicator variable, which equals to 1 if firm i in cohort c has ESG-linked pay in year t . $X_{c,i,t-1}$ is a set of control variables that are related to borrowing firms’ ESG initiatives and compensation scheme. Specifically, we control for institutional ownership (*IOR*), as institutional investors increasingly consider ESG factors in their investment decisions, pressuring

firms to adopt sustainable practices, and include number of analysts following the firm ($\ln(\text{Analysts})$) to control for the monitoring of firms' ESG by financial intermediaries. We also control for the natural logarithm of total compensation amount of top 5 executives ($\ln(\text{Compensation})$) as the amount of compensation is related to the structure of the compensation scheme. Additionally, we control a set of firm fundamental variables, including natural logarithm of a firm's assets (Size) to control for firms' economic scale, leverage ratio (Leverage), return on assets (ROA), and current asset ratio (Current Asset) to capture firms' reliance on debts, fundamental performance, and financial flexibility. Lastly, we incorporate the number of outstanding loans ($\ln(\text{Number of Loans})$) to control for the size of firms' loan obligations.

In addition to these control variables, we include $\text{Cohort} \times \text{Firm}$ fixed effect $\lambda_{c,i}$ and $\text{Cohort} \times \text{Year}$ fixed effect $\tau_{c,t}$ to capture the time-invariant heterogeneity across firms and time-variant macroeconomic factors (Baker et al., 2022). Within the Stacked DiD framework, we cluster standard errors at the firm level (Petersen, 2009; Wing et al., 2024).

3.2 Empirical Measures

3.2.1 Mandatory ESG Disclosure Regulations in the Banking Sector

We manually compile mandatory ESG disclosure regulations from different sources: the *Carrots & Sticks Report*, the Sustainable Stock Exchange (SSE) initiative, the Initiative for Responsible Investment (IRI) at Harvard University, and the Global Reporting Initiative. Appendix C provides a summary of the mandatory ESG disclosure regulations for each economy in our sample with policy year, issuer, and firm coverage. Some of these regulations impose ESG disclosure mandates directly on banks, while others require disclosure from a subset of firms that meet certain criteria (e.g., listed status, firm size based on number of employees, net turnover, or total asset, etc.).⁵ Next, we identify banks affected by the ESG disclosure regulation based on their countries of operation.

⁵For example, Australia government introduced mandatory disclosure regulation for all firms from their fiscal year 2005. The regulation introduced by Finland government in 2016 sets criteria on a subset of firms: 1) large firms with over 500 employees, net turnover over EUR 40 million, or Balance sheet total over EUR 20 million, 2) public interest entities: listed companies, credit institutions, insurance providers, etc.

For countries where the regulation applies only to a subset of banks, we further determine whether each bank is subject to the regulation by evaluating the relevant regulatory criteria. To collect bank information (e.g., listed status and fundamentals), we match the lenders in our sample with the BankFocus database from Bureau van Dijk. The primary challenge in this process is the lack of a unique identifier to directly link the two databases. We begin by performing a fuzzy match of bank names using LinkTransformer.⁶ For each unique lender in DealScan, we retain up to five potential matches with the highest match scores. Subsequently, we manually verify the matches by comparing the bank names and their countries of operation from DealScan and BankFocus.

3.2.2 Borrowing Firms' ESG-linked Pay

We obtain ESG-linked pay data from ISS Incentive Lab and ISS Executive Compensation Analytics Database. We create an indicator variable, *ESG-linked Pay*, which takes the value of 1 if any executives have any grants linked to at least one ESG-related metric and zero otherwise. Figure 1 presents the time series trend of firms that use ESG-linked pay for our combined dataset of S&P 1500 firms. The percentage of firms using ESG-linked compensation increased from 3.0% in 2009 to 33.2% in 2022. In our baseline sample, an average of 13.4% of firm-year observations include ESG-linked metrics in executive compensation.

3.2.3 Firm-Bank Lending Relationship

Furthermore, we extract firm-bank lending relationships from the DealScan database with a focus on the lead arrangers in each tranche. Lead arrangers are pivotal in forming and maintaining borrower relationships and are responsible for monitoring their performance (Sufi, 2007). Firm-bank relationships are identified based on active and maturity dates of each tranche. To determine whether the banks are subject to regulation, we gather data such as their listed status and total assets from the BankFocus Database by Bureau van Dijk.

⁶LinkTransformer is a Python library for merging and deduplicating data frames using language model embeddings. In our matching process, we set the matching score threshold as 0.6 when retaining the potential matches, and then manually screen the correct matches to ensure the matching accuracy.

3.3 Sample Construction and Descriptive Statistics

We start with the S&P 1500 U.S. publicly traded firms that have borrowed from non-U.S. banks at least once. This selection results in a total of 831 unique U.S. firms. Approximately 55% of firms within the S&P 1500 have borrowed from foreign banks, highlighting the common practice of U.S. companies obtaining loans from non-U.S. banks. We choose these firms to address concerns about differences between U.S. firms that borrow from non-U.S. banks and those that do not. By focusing on S&P 1500 firms, we ensure comprehensive data coverage from both ISS and Execucomp Databases. We exclude financial firms from the sample since they serve as capital providers and are not comparable to non-financial borrowers. To avoid the effects of the financial crisis, our main sample period spans from 2009 to 2019 and covers significant variations in ESG disclosure regulations, most of which occurred before 2016. We include only firm-year observations with complete information on all firm-level control variables used in the main analyses. After applying these criteria, the final sample includes 550 U.S. firms.

We construct cohort-firm-year panel for our stacked DiD estimation ([Baker et al., 2022](#)). First, we identify the initial year of mandatory ESG disclosure regulations for each non-U.S. lead arranger in DealScan based on their operating country. We label loans as “ESG-shock loans” if they are issued by these banks before the regulations come into force and remain outstanding after the regulations take effect. Second, we calculate firm-level exposure to ESG regulation shocks from banks by determining the proportion of ESG-shock loans relative to total outstanding loans from foreign banks. Firms are classified as the treatment group when their exposure fraction exceeds 50% for the first time ([Costello, 2020](#)). In the robustness test, we take the threshold as 40% and 60%. Third, in our stacked DiD framework, a cohort consists of firms treated for the first time in the same year and control firms that are never treated. The main regression sample comprises four cohorts, representing firms initially treated in 2012, 2013, 2014, and 2016. The number of treated firms in each cohort is as follows: 50 in 2012, 151 in 2013, 12 in 2014, and 7 in 2016. The same group of control firms is used across all cohorts. Finally, we select a [-3,3] year window around the cohort year to construct a cohort-firm-year panel. Our final main sample includes 9,912

cohort-firm-year observations, including 220 treated firms and 330 controls firms from S&P 1500 index.

Appendix B shows the distribution of operating countries for non-U.S. banks in the sample. The top three countries with the largest share of banks are the United Kingdom (11.3%), Japan (10.3%), and Canada (8.2%). Panel A in Table 1 presents the industry distribution of the sample of U.S. borrowing firms. The top three industries with the largest number of companies are Manufacturing (47.6%), Services (17.1%), and Transportation, Communications, and Utility (16.7%). Panel B in Table 1 presents summary statistics of all variables (defined in Appendix A) used in the main test. We winsorize all continuous variables at top and bottom 1% of the distribution to minimize the effect of outliers. The average value of *ESG-linked Pay* is 0.107 in our cohort-firm-year panel. However, this figure underestimates the sample mean at the firm-year level because control firms are repeatedly included across different cohorts in the cohort-firm-year regression panel. The firm-year level sample mean of *ESG-linked Pay* is 13.4% for the period 2009 to 2019, and 16.1% for the period 2009 to 2021.

4 Empirical Results

4.1 Baseline Results

To examine how banks' regulatory ESG pressures influence the decision to adopt ESG-link pay among borrowing firms, we estimate Equation (1) and report regression results in Table 2. In the regression results with $Cohort \times Firm$ and $Cohort \times Year$ fixed effects and without control variables shown in column (1), the estimated coefficient on $Treated \times Post$ is 0.0554 and significantly positive at 5% level, suggesting that firms borrowing from banks subject to ESG disclosure regulations are more likely to adopt ESG compensation scheme. Column (2) reports similar results after we further control for time-varying borrowing firm characteristics.

We further investigate the dynamic effects of how banks' ESG regulatory pressures influence the adoption of ESG-linked pay among borrowing firms. Our identification strategy assumes that in the

absence of mandatory ESG disclosure regulations, U.S. borrowers with different levels of reliance on foreign banks would exhibit similar trends in adopting ESG-linked pay. We use the dynamic DiD model to estimate the treatment effect for each period relative to the treatment year, defined as the first year when a firm is exposed to non-U.S. banks' ESG regulations. Figure 2 with the year of the regulatory shock as the benchmark confirms the parallel trend assumption. Specifically, the coefficients in the pre-treatment period are statistically indistinguishable from zero. In contrast, the findings reveal a significant increase in the likelihood of treated firms adopting ESG-linked pay in the three years following the disclosure mandate.

Consistent with our hypothesis, we find that firms with pre-existing lending relationships with banks that later become subject to ESG disclosure regulations are more likely to adopt ESG-linked pay. Our findings underscore the pivotal role of the banking sector in transmitting ESG regulations into the broader corporate economy.

4.2 Cross-Sectional Analyses

Our theoretical analysis suggests that a firm's optimal decision depends on two key factors: the agency costs of debt and the relative costs and benefits of ESG-linked pay compared to other alternatives, given the level of regulatory pressures from lending banks. In this section, we study the cross-sectional variations of the main effects to further validate our economic analyses. We expect that our findings will be more pronounced when firms have higher costs of switching to new banks, lower coordination costs between shareholders and managers, and higher agency costs of debt induced by lending banks' ESG regulatory pressures. Empirically, we divide the treated group into two subgroups based on whether their partition variable is above or below the median in the year of treatment.⁷ Then, we re-estimate Equation (1) for two subgroups and compare the estimated coefficients on $Treated \times Post$.

⁷Specifically, for *Business Segment*, we partition the treated group into two subgroups: borrowing firms with a single segment and those with multiple segments.

4.2.1 Cost of Switching to New Banks

We expect that the impact of banks' ESG regulatory pressure on firms' adoption of ESG-linked pay is more pronounced when the cost of switching banks is higher. The cost of switching banks refers to the financial, operational, and strategic expenses associated with terminating existing lending relationships and seeking new lenders in an effort to escape the ESG pressure from the affected banks. Firms that are heavily reliant on their current lenders have stronger incentives to maintain these relationships, making them more likely to comply with ESG requirements imposed by banks under regulatory pressure (Houston and Shan, 2022). Hence, firms facing higher switching costs are less able to avoid ESG demands, which intensifies the influence of ESG pressure on their decision-making process. We measure the cost of switching to new banks for borrowing firms by the reliance on existing lenders (*Loan Reliance*) and business complexities (*Business Segments*).

Panel A of Table 3 presents the first set of cross-sectional analyses. First, *Loan Reliance* is measured as the ratio of loans from banks subject to ESG regulations to a firm's total private and public debt at the time the regulations were introduced (Lin et al., 2013). We find that the effect is stronger for firms with higher dependence on their existing banks. Second, business segment diversification reflects organizational complexity (Bushman et al., 2004), and firms with multiple segments, compared to those with a single segment, face higher switching costs due to more complex financing needs and lender relationships. Our findings confirm that the influence of banks' ESG regulatory pressure on firms' decisions to adopt ESG-linked pay is more pronounced for firms with more business segments.

4.2.2 Cost of Shareholder-Manager Coordination

Incorporating ESG metrics in executive compensation package imposes burden on managers, which in turn making the adoption of ESG-linked pay more challenging because the equilibrium in executive compensation scheme is a bilateral negotiated outcome. To gauge how coordination costs between shareholders and managers influence the effect of banks' ESG regulatory pressures on borrowing firms' ESG-linked pay, we use two empirical proxies to conduct cross-sectional

analyses.

Panel B of Table 3 presents the second set of cross-sectional analyses. First, we examine the *Board-Executive Ratio*, defined as the proportion of top five executives who also serve as board members. Dual roles reduce conflicts of interest between shareholders and managers, easing the implementation of new compensation schemes. The results show that the main effect is significantly positive only when more C-suite executives are also board members, suggesting that lower coordination costs between shareholders and managers enhance the likelihood of adopting ESG-linked pay. Second, *CEO Tenure* measures the length of a CEO's service. Shorter-tenured CEOs are more likely to focus on ESG initiatives to build their reputations, while longer-tenured CEOs may resist changes due to established compensation structures (Chen et al., 2023a). Thus, shorter tenure suggests lower coordination costs for implementing ESG-linked pay. Panel B of Table 3 confirms that the main effect is stronger for firms with shorter-tenured CEOs.

4.2.3 Conflicts of Interest from Banks' ESG Regulatory Pressures

Next, we examine how agency costs of debt induced by banks' ESG regulatory pressures influence firms' decisions to adopt ESG-linked pay. To measure the agency costs of debt, we use firms' ESG performance in the year of treatment. The conceptual framework of this cross-sectional analysis posits that a firm's current ESG performance influences the agency costs of debt induced by banks' ESG regulatory pressures. First, firms with weak ESG practices are likely to face higher pressure from banks, as they are perceived to fall short of lenders' sustainability expectations, which increases the agency costs of debt. Second, these firms may also experience a lower opportunity cost in adopting ESG-linked pay because they lack established ESG strategies and may need to make adjustments to meet regulatory demands. We measure ESG performance using the E&S score and the ESG combined score and expect that firms with weaker ESG performance to be more likely to implement ESG-linked pay, due to higher agency costs of debt. The results in Panel C of Table 3 support this our theoretical predictions: the main effects are more pronounced for firms with lower E&S or ESG scores.

4.3 Shareholder Value Loss due to ESG Regulations on Banks

In this section, we provide supporting evidence for the value incentive of ESG-linked pay by examining the stock market reactions of firms to ESG regulations targeting their lending banks. We focus on the European Union Non-Financial Reporting (EU NFR) Directive as the event of interest. The EU NFR Directive requires all member states to incorporate its disclosure requirements into national laws and implement them within their jurisdictions. These countries make up the majority of those issuing ESG regulations in our sample. Empirically, we compare the three-day cumulative abnormal returns (CAR) of firms with lending relationships to European banks versus those without, around the regulation announcement date. Our event study model is shown in Equation (2).

$$CAR_{[-1,+1]} = \alpha + \beta \times Regulation\ Exposure_i + X_i + \lambda_s + \epsilon_i \quad (2)$$

Subscript i represents the firm. The dependent variable CAR_i is the 3-day cumulative abnormal return earned by the shareholders. The time window runs from one day before to one day after the regulation announcement date. We estimate the three-day CAR using CAPM, FF 3-factor model, and Cahart model. The independent variable $Regulation\ Exposure_i$ is an indicator, which equals to 1 if firm i has a lending relationship with banks subject to EU NFR Directive when this regulation was announced. We control for a set of firm fundamental variables X_i that are related to stock market return, including firm size (*Size*), Market to Book ratio (*MTB*), current asset ratio (*Current Asset*), Leverage (*Leverage*), return on assets (*ROA*), R&D intensity (*R&D*), and institutional ownership (*IOR*). λ_s is two-digit SIC-code industry fixed effect.

Table 4 presents the results of different abnormal return estimation models, including CAPM (column (1) and column (2)), FF 3-factor model (column (3) and column (4)), and Cahart model (column (5) and column (6)). We add a standard set of firm-level control variables for each model. The estimated coefficients in columns (2), (4), and (6) indicate that firms that are affected by the ESG disclosure regulation through the lending relationship with their lenders experience a significant ($p < 0.05$) negative abnormal return compared to the unaffected firms. This result reveals that ESG regulation pressures from debtholders undermine the maximization of shareholder value.

The underlying mechanism behind the loss in shareholder value is that banks have additional demands for borrowers' ESG performance, which shifts the equilibrium in firms' optimal decisions regarding ESG-linked pay. Borrowing firms must weigh the trade-off between the agency costs of debt that arise after ESG regulations and the relative costs and benefits of adopting ESG-linked pay compared to other alternatives, given the level of ESG regulatory pressure from lending banks. This evidence suggests that shareholder value plays a role in influencing the transition toward ESG-linked pay (Starks, 2023).

Moreover, we investigate whether shareholders become more aware of ESG issues when their firms are subject to mandatory ESG disclosure regulations. As rational expectations about firm value evolve, shareholders are expected to increasingly recognize the importance of ESG considerations. Empirically, we use the same stacked DiD framework as the main test shown in Equation (1) to examine the casual relationship between ESG regulation and shareholder awareness of ESG issues. We measure shareholders' awareness on ESG as *ESG Proxy Dummy*, an indicator variable equal to 1 if shareholders initiate a proposal related to ESG issues in a given year. Following Abraham et al. (2024), we use the dictionary sourced from the United Nations Principles of Responsible Investing (UN PRI) Reporting Framework glossary to identify ESG-related shareholder proposals. This approach allows us to separately capture keywords associated with ESG issues.⁸

Table 5 shows that shareholders are more likely to submit ESG-related proposals when the firms' lending banks are affected by the ESG disclosure regulation. The coefficients of the main regressor of interest are positive and statistically significant at the 5% level, both with and without control variables.

⁸To identify ESG-related shareholder proposals, we first collect key terms from four categories in the glossary ("ESG issues," "ESG incorporation strategy," "Climate change," and "Sustainability outcomes"). We then search key terms in the titles of shareholder proposals. For more details, see the UN PRI Reporting Framework glossary: <https://www.unpri.org/reporting-and-assessment/reporting-framework-glossary/6937.article>

4.4 Economic Consequences of ESG-linked Pay

Another issue related to ESG-linked pay is whether such an executive compensation scheme serves as a greenwashing tool under intensified shareholder-debtholder conflicts. Hence, we further empirically examine the economic consequences of ESG-linked pay adoption using a difference-in-difference-in-differences (DDD) approach, where the third difference captures whether firms adopt ESG-linked pay following ESG regulatory pressure. Specifically, we define *Adopt ESG-linked Pay* as an indicator variable that equals to one if a firm has no ESG-linked pay prior to treatment but adopts it afterward, and zero otherwise.

First, we provide supporting evidence that ESG-linked pay contributes to shareholder value recovery. Shareholders react negatively to ESG regulations imposed on their lending banks because they rationally anticipate increased shareholder–debtholder conflicts following such regulation. We argue that the marginal benefit of ESG-linked pay increases in this context, as it can align shareholder–debtholder interests by serving as a precommitment device through executive compensation, thereby mitigating these conflicts. We further support this argument with evidence on shareholder value recovery. As shown in Panel A of Table 6, the triple-interaction term $Treat \times Post \times Adopt\ ESG-linked\ Pay$ is significantly positive in year $t + 2$, $t + 3$, and in the average of years $t + 1$ to $t + 3$, which captures the incremental increase in firm value attributable to adopting ESG-linked pay in response to ESG regulation for treated firms, relative to control firms and pre-regulation period.

Second, we find that ESG-linked pay also contributes to the improvement of firm ESG performance. We conjecture that, as lending banks are mandated to disclose borrowing firms' ESG performance, they would require concrete ESG improvement, making ESG-linked pay an incentive mechanism that enhances firm ESG outcomes. Panel B of Table 6 lends evidence to our hypothesis. We find that ESG scores increase for treated firms when they adopt ESG-linked pay following ESG regulatory pressure.

Overall, we find that ESG-linked pay is associated with shareholder value recovery after increased shareholder–debtholder conflicts and contributes to substantial improvement in ESG performance. Our evidence challenges the view that ESG-linked pay includes easy-to-attain ESG

targets and serves merely as a greenwashing tool (e.g., [Walker, 2022](#); [Efing et al., 2024](#)). We also delineate the mechanism documented in prior literature whereby the banking sector can shape the corporate sector’s ESG outcomes (e.g., [Wang, 2023](#)).

4.5 Additional Analyses

4.5.1 Do Banks’ Voluntary ESG Initiatives Affect Borrowing Firms’ ESG-linked Pay?

To further validate that government-initiated ESG regulations in the banking sector effectively travel through the corporate economy, we study whether banks’ voluntary ESG initiatives affect their borrowing firms’ decisions to adopt ESG-linked Pay. Unlike government-mandated regulations, which impose costs on banks when their loan portfolios fail to deliver expected ESG performance, banks’ voluntary ESG initiatives are the equilibrium outcome based on their cost-benefit analyses. Hence, without public enforcement mechanisms, these voluntary proclamations are unlikely to motivate banks to actively monitor existing borrowing firms’ ESG practices and performance. Consequently, we predict that banks’ voluntary ESG initiatives do not significantly influence their borrowing firms’ adoption of ESG-linked pay policies.

Empirically, we use the Equator Principles (EPs) to examine how banks’ voluntary ESG initiatives affect borrowing firms’ compensation scheme. Introduced in 2003 by leading international banks, EPs are a voluntary risk management framework designed to ensure that the projects they finance are not detrimental to society or the environment. This voluntary initiative by the financial institutions aims to promote environmental responsibility globally by uniting efforts to manage social and environmental risks in project financing. The EPs align with international standards (e.g., World Bank Environmental, Health, and Safety Guidelines) and provide a structured approach for assessing and managing these risks. Banks that adopt the EPs commit to granting loans only to projects that comply with ten defined social and environmental principles.

In this analysis, we employ the same approach as in the mandatory ESG disclosure regulation setting to identify treated and control firms and to construct the cohort-firm-year panel for the stacked DiD estimation. However, unlike the previous setting, we do not require firms to have ever

borrowed from non-U.S. banks, because the participants in the EPs include both U.S. and non-U.S. banks. We begin by identifying banks that voluntarily signed the EPs for each lead arranger in DealScan, based on their operating country. Loans are labeled as “ESG-shock loans” if the firm has a lending relationship when the banks are involved in EPs. Next, we calculate firm-level exposure to EPs by determining the proportion of ESG-shock loans relative to total outstanding loans. The key difference in the denominator in this context is that we use the amount of all outstanding loans instead of foreign loans, as the firms in this testing sample are not required to have borrowed from non-U.S. banks.⁹ Firms are classified as part of the treatment group when their exposure fraction exceeds 40%, 50%, or 60% for the first time (Costello, 2020).

Table 7 presents the regression results analyzing whether banks’ voluntary ESG initiatives influence borrowing firms’ adoption of ESG-linked pay. Columns (1) and (2) display the results using an exposure threshold of 40%, while columns (3) and (4) for 50%, columns (5) and (6) for 60%.¹⁰ Across all models, both with and without control variables, the coefficients of the main variable of interest are consistently insignificant. These results support the hypothesis that banks’ voluntary ESG initiatives do not have a significant impact on the likelihood of borrowing firms adopting ESG-linked pay.

4.5.2 Robustness Tests

First, we use 40% and 60% as exposure thresholds to examine whether the results remain robust under different thresholds. In Table 8 Panel A, columns (1) and (2) present the results for the 40% threshold, while columns (3) and (4) correspond to the 60% threshold. The coefficients on Treated $\times$ Post are statistically significant at least at the 5% level when using threshold values of 40% and 60%, both with and without the inclusion of control variables.

Second, we extend the sample period to test the robustness of the main results. In the baseline analysis, the sample period spans from 2009 to 2019. The starting year of 2009 is chosen to avoid

⁹The banks signing the EPs cover regions worldwide, including those headquartered in North America, the Middle East & Africa, Latin America, Asia-Oceania, and Europe.

¹⁰In the robustness tests, we use thresholds of 10%, 20%, and 30%, all of which result in estimated coefficients that are close to zero and not statistically significant.

the effects of the financial crisis, while the endpoint of 2019 ensures the inclusion of significant variations in ESG disclosure regulations, most of which occurred before 2016. For the robustness test, we first extend the sample period forward to 2021 to capture the effects in the most recent years. Then, we further extend the sample period backward to cover 2000–2021, providing a more comprehensive view of long-term trends. In Table 8, Panel B, columns (1) and (2) present the results for the extended period from 2009 to 2021, while columns (3) and (4) show the results for the full period from 2000 to 2021. The coefficients for the main variable of interest remain significant at the 5% level in both cases.

5 Conclusion

Although ESG-linked pay has been widely adopted in the corporate sector in the recent decade, the motivations behind its adoption and whether such compensation schemes serve as greenwashing tools remain debated among academics and practitioners. In this paper, we provide new empirical evidence on the role of debtholders in a firm’s corporate governance decisions regarding executive compensation (Nini et al., 2012; Rhodes, 2016; Ferreira et al., 2018; Akins et al., 2020). Specifically, we examine whether ESG regulatory pressures on banks influence the adoption of ESG-linked pay among borrowing firms. We emphasize the important role of *value* incentives shaped by lending banks (Starks, 2023), although prior literature suggests that shareholder *values* drive the prevalence of ESG-linked pay (e.g., Carter et al., 2023; Homroy et al., 2023). Moreover, we provide evidence that such compensation schemes contribute to the recovery of firm value loss and improvements in ESG performance. Our findings suggest ESG-linked pay can serve as a credible commitment device to mitigate shareholder-debtholder conflicts and is not merely symbolic window-dressing tool (Walker, 2022; Efung et al., 2024).

An important point to note is that we recognize value-driven and values-driven incentives are not mutually exclusive (Starks, 2023); they can coexist in motivating firms to adopt ESG-linked pay. Moreover, our analysis does not consider alternative motivations for the adoption of ESG-linked

pay; instead, it offers a focused explanation concerning its efficiency to attenuate shareholder-debtholder conflicts caused by ESG regulations in the banking sector. With that in mind, we shed new light on how firms conduct cost–benefit analyses when integrating ESG-related metrics into compensation contracts, as well as on the economic consequences of ESG-linked pay. Moreover, our findings carry important policy implications for standard-setters and regulators, as we highlight the crucial role of the banking sector in transmitting ESG regulations into the corporate world (e.g., [Bernanke et al., 1999](#); [Chodorow-Reich and Falato, 2022](#); [Costello, 2020](#)). In our falsification tests, we observe that banks’ voluntary ESG initiatives do not influence borrowing firms’ decision to adopt ESG-linked pay. This raises questions about the effectiveness of financial institutions’ voluntary ESG efforts and calls for further research into whether such initiatives genuinely reflect their stated commitments (e.g., [Raghunandan and Rajgopal, 2022](#)).

References

- Abraham, J., Olbert, M., and Vasvari, F. (2024). Esg disclosures in the private equity industry. *Journal of Accounting Research*, 62(5):1611–1660.
- Aghion, P. and Bolton, P. (1992). An incomplete contracts approach to financial contracting. *The Review of Economic Studies*, 59(3):473–494.
- Akins, B., De Angelis, D., and Gaulin, M. (2020). Debt contracting on management. *The Journal of Finance*, 75(4):2095–2137.
- Baker, A. C., Larcker, D. F., and Wang, C. C. (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics*, 144(2):370–395.
- Balsam, S., Gu, Y., and Mao, C. X. (2018). Creditor influence and ceo compensation: Evidence from debt covenant violations. *The Accounting Review*, 93(5):23–50.
- Bernanke, B. S., Gertler, M., and Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. In Taylor, J. B. and Woodford, M., editors, *Handbook of Macroeconomics*, volume 1, pages 1341–1393. Elsevier.
- Brockman, P., Martin, X., and Unlu, E. (2010). Executive compensation and the maturity structure of corporate debt. *The Journal of Finance*, 65(3):1123–1161.
- Bushman, R., Chen, Q., Engel, E., and Smith, A. (2004). Financial accounting information, organizational complexity and corporate governance systems. *Journal of Accounting and Economics*, 37(2):167–201.
- Callaway, B. and Sant’Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.
- Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, 52(1):57–82.
- Carter, M. E., Pawliczek, A., and Zhong, R. I. (2023). Say on esg: The adoption of say-on-pay laws, esg contracting, and firm esg performance. *European Corporate Governance Institute–Finance Working Paper*, (886).
- Chaigneau, P. and Sahuguet, N. (2025). Executive compensation with environmental and social performance. *Available at SSRN 4345102*.
- Chen, L., Liao, C.-H., Tsang, A., and Yu, L. (2023a). Ceo career concerns in early tenure and corporate social responsibility reporting. *Contemporary accounting research*, 40(3):1545–1575.
- Chen, Y.-C., Hung, M., and Wang, L. L. (2023b). Do depositors respond to banks’ social performance? *The Accounting Review*, 98(4):89–114.
- Chodorow-Reich, G. and Falato, A. (2022). The loan covenant channel: How bank health transmits to the real economy. *The Journal of Finance*, 77(1):85–128.

- Choy, S., Jiang, S., Liao, S., and Wang, E. (2024). Public environmental enforcement and private lender monitoring: Evidence from environmental covenants. *Journal of Accounting and Economics*, 77(2-3):101621.
- Christensen, H. B., Hail, L., and Leuz, C. (2021). Mandatory csr and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies*, 26(3):1176–1248.
- Cohen, S., Kadach, I., Ormazabal, G., and Reichelstein, S. (2023). Executive compensation tied to esg performance: International evidence. *Journal of Accounting Research*, 61(3):805–853.
- Costello, A. M. (2020). Credit market disruptions and liquidity spillover effects in the supply chain. *Journal of Political Economy*, 128(9):3434–3468.
- Denis, D. J. and Wang, J. (2014). Debt covenant renegotiations and creditor control rights. *Journal of Financial Economics*, 113(3):348–367.
- Duchin, R., Gao, J., and Xu, Q. (2024). Sustainability or greenwashing: Evidence from the asset market for industrial pollution. *Journal of Finance*. Forthcoming.
- Efing, M., Ehmann, S., Kampkötter, P., and Moritz, R. (2024). All hat and no cattle? esg incentives in executive compensation. Technical report, CESifo Working Paper.
- Ferreira, D., Ferreira, M. A., and Mariano, B. (2018). Creditor control rights and board independence. *The Journal of Finance*, 73(5):2385–2423.
- Flammer, C., Hong, B., and Minor, D. (2019). Corporate governance and the rise of integrating corporate social responsibility criteria in executive compensation: Effectiveness and implications for firm outcomes. *Strategic Management Journal*, 40(7):1097–1122.
- Frydman, C. and Hilt, E. (2017). Investment banks as corporate monitors in the early twentieth century united states. *American Economic Review*, 107(7):1938–1970.
- Frydman, C. and Jenter, D. (2010). Ceo compensation. *Annual Review of Financial Economics*, 2(1):75–102.
- Global Reporting Initiative (2015). GRI’s Combined Report 2014-2015. Technical report, Global Reporting Initiative.
- Hart, O. and Zingales, L. (2022). The new corporate governance. *The University of Chicago Business Law Review*, 1(195):196–216.
- Hazarika, S., Kashikar, A., Peng, L., Röell, A. A., and Shen, Y. (2023). Esg-linked pay around the world: Trends, determinants, and outcomes. *SSRN Electronic Journal*.
- Homroy, S., Mavruk, T., and Nguyen, V. D. (2023). Esg-linked compensation, ceo skills, and shareholder welfare. *The Review of Corporate Finance Studies*, 12(4):939–985.
- Hong, H. A., Ryou, J. W., and Srivastava, A. (2021). Lender monitoring and the efficacy of managerial risk-taking incentives. *The Accounting Review*, 96(4):315–339.

- Houston, J. F. and Shan, H. (2022). Corporate esg profiles and banking relationships. *The Review of Financial Studies*, 35(7):3373–3417.
- Ivashina, V., Iverson, B., and Smith, D. C. (2016). The ownership and trading of debt claims in chapter 11 restructurings. *Journal of Financial Economics*, 119(2):316–335.
- Ivashina, V., Nair, V. B., Saunders, A., Massoud, N., and Stover, R. (2008). Bank debt and corporate governance. *The Review of Financial Studies*, 22(1):41–77.
- Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4):305–360.
- John, T. A. and John, K. (1993). Top-management compensation and capital structure. *The Journal of Finance*, 48(3):949–974.
- KPMG (2013). The kpmg survey of corporate responsibility reporting 2013. Technical report, KPMG International Cooperative.
- Krueger, P., Sautner, Z., Tang, D. Y., and Zhong, R. (2024). The effects of mandatory esg disclosure around the world. *Journal of Accounting Research*.
- Lin, C., Ma, Y., Malatesta, P., and Xuan, Y. (2013). Corporate ownership structure and the choice between bank debt and public debt. *Journal of Financial Economics*, 109(2):517–534.
- Lins, K. V., Servaes, H., and Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance*, 72(4):1785–1824.
- Nini, G., Smith, D. C., and Sufi, A. (2009). Creditor control rights and firm investment policy. *Journal of Financial Economics*, 92(3):400–420.
- Nini, G., Smith, D. C., and Sufi, A. (2012). Creditor control rights, corporate governance, and firm value. *The Review of Financial Studies*, 25(6):1713–1761.
- Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies*, 22(1):435–480.
- Raghunandan, A. and Rajgopal, S. (2022). Do esg funds make stakeholder-friendly investments? *Review of Accounting Studies*, 27(3):822–863.
- Rajan, R. G. and Zingales, L. (1998). Financial dependence and growth. *The American Economic Review*, 88(3):559–586.
- Rhodes, A. (2016). The relation between earnings-based measures in firm debt contracts and ceo pay sensitivity to earnings. *Journal of Accounting and Economics*, 61(1):1–22.
- Roberts, M. R. and Sufi, A. (2009). Renegotiation of financial contracts: Evidence from private credit agreements. *Journal of Financial Economics*, 93(2):159–184.

- Shleifer, A. and Vishny, R. W. (1997). A survey of corporate governance. *The Journal of Finance*, 52(2):737–783.
- Shostal, E. and Shah, K. (2022). ES metrics and executive compensation. *The Harvard Law School Forum on Corporate Governance*.
- Spierings, M. (2022). Linking executive compensation to esg performance. *The Harvard Law School Forum on Corporate Governance*.
- Starks, L. T. (2023). Presidential address: Sustainable finance and esg issues—value versus values. *The Journal of Finance*, 78(4):1837–1872.
- Sufi, A. (2007). Information asymmetry and financing arrangements: Evidence from syndicated loans. *The Journal of Finance*, 62(2):629–668.
- Walker, D. I. (2022). The economic (in) significance of executive pay esg incentives. *Stan. JL Bus. & Fin.*, 27:318.
- Wang, L. L. (2023). Transmission effects of esg disclosure regulations through bank lending networks. *Journal of Accounting Research*, 61(3):935–978.
- Wing, C., Freedman, S. M., and Hollingsworth, A. (2024). Stacked difference-in-differences. Technical report, National Bureau of Economic Research.

Appendix

Appendix A: Variable Definitions

Variable	Definition Explained	Source
Dependent Variable		
<i>ESG-linked Pay</i>	Indicator variable, equals 1 if the firm adopts ESG-linked pay scheme in that year.	ISS ECA & ISS Incentive Lab
Independent Variable		
<i>Treated</i>	Indicator variable for firms in the treatment group based on the exposure threshold.	
<i>Post</i>	Indicator variable for years that are after the initial treatment year.	
Control Variables		
<i>Size</i>	Natural logarithm of total assets.	Compustat
<i>Leverage</i>	Total debt scaled by total assets.	Compustat
<i>ROA</i>	Return on assets.	Compustat
<i>Current Asset</i>	Current assets scaled by total assets.	Compustat
<i>R&D</i>	Research and development expense scaled by total sales. Missing values are set to 0.	Compustat
<i>MTB</i>	Market to Book ratio.	CRSP/Compustat
<i>IOR</i>	Fraction of outstanding shares owned by institutional investors.	Thomson Reuters
<i>ln(Analyst)</i>	Natural logarithm of one plus the number of analysts following.	I/B/E/S
<i>ln(Compensation)</i>	Natural logarithm of one plus the total compensation of top five executives.	Execucomp
<i>ln(Number of Loans)</i>	Natural logarithm of one plus the number of loans outstanding in the year.	DealScan
Market Reaction Variables		
$CAR_{[-1,1]}^{CAPM}$	Cumulative abnormal return based on CAPM model within [-1,1] window in percentage. The estimation window consists of 250 trading days with a gap of 20 trading days before the ruling announcement.	CRSP
$CAR_{[-1,1]}^{FF3}$	Cumulative abnormal return based on Fama-French 3 factor model within [-1,1] window in percentage. The estimation window consists of 250 trading days with a gap of 20 trading days before the ruling announcement.	CRSP
$CAR_{[-1,1]}^{Carhart}$	Cumulative abnormal return based on Carhart (1997) within [-1,1] window in percentage. The estimation window consists of 250 trading days with a gap of 20 trading days before the ruling announcement.	CRSP
<i>Regulation Exposure</i>	Indicator variable, equals 1 if the firm has a lending relationship with banks subject to EU NFR Directive when this regulation was announced.	DealScan & EU NFR Directive
Variables used in Table 3		
<i>Loan Reliance</i>	The ratio of loans obtained from banks subject to ESG regulations to the firm's total debt in the year when the regulations were introduced following Lin et al. (2013) .	DealScan

Variable	Definition Explained	Source
<i>Business Segments</i>	A dummy variable that is equal to one if the firm has multiple business segments and zero if the firm has a single segment.	Compustat
<i>Board-Executive Ratio</i>	The proportion of top 5 executives who also serve as board members.	Execucomp
<i>CEO Tenure</i>	The length of service of the firm's CEO	Execucomp
<i>E&S Score</i>	Environmental & Social Score, which is based on the reported information in the environmental and social pillars.	Refinitiv ESG
<i>ESG Score</i>	ESG Combined Score, which is an overall company score based on the reported information in the environmental, social and corporate governance pillars (ESG Score) with an ESG Controversies overlay.	Refinitiv ESG
<i>Variables used in Table 5</i>		
<i>ESG Proxy Dummy</i>	A dummy variable that takes the value of one if the firm has shareholder proposals about ESG-related issues, and 0 otherwise.	ISS Voting Analytics

Appendix B: Distribution of Banks' Operating Countries (or Regions)

Economy	Year	Bank		Firm w/ Lending Relationship	
		N	Percent	N	Percent
United Kingdom	2006	87	11.3%	345	59.5%
Japan	2005	79	10.3%	305	52.6%
Canada	2012	63	8.2%	306	52.8%
Germany	2005	56	7.3%	185	31.9%
Hong Kong	2016	48	6.2%	179	30.9%
France	2003	41	5.3%	223	38.4%
Australia	2005	37	4.8%	38	6.6%
Netherlands	1999	34	4.4%	100	17.2%
China	2008	29	3.8%	31	5.3%
Taiwan	2008	23	3.0%	10	1.7%
Singapore	2017	21	2.7%	14	2.4%
Norway	2013	18	2.3%	21	3.6%
Italy	2007	17	2.2%	23	4.0%
Switzerland	n.a.	15	2.0%	235	40.5%
South Korea	n.a.	14	1.8%	5	0.9%
Luxembourg	n.a.	14	1.8%	6	1.0%
Spain	2012	12	1.6%	31	5.3%
Belgium	n.a.	11	1.4%	12	2.1%
Ireland	n.a.	10	1.3%	6	1.0%
Philippines	n.a.	10	1.3%	2	0.3%
Sweden	2009	9	1.2%	5	0.9%
South Africa	2010	9	1.2%	1	0.2%
Brazil	2012	9	1.2%	3	0.5%
Thailand	n.a.	7	0.9%	2	0.3%
India	2012	7	0.9%	5	0.9%
Austria	2016	6	0.8%	4	0.7%
Denmark	2009	6	0.8%	4	0.7%
Mexico	n.a.	6	0.8%	1	0.2%
Other		71	9.2%	26	4.5%
Total		769	100.0%	580	100.0%

Notes: This table presents the distribution of operating countries (or regions) of the banks covered in the main sample and the number and fraction of firms that have lending relationships with the banks in that country or region.

Appendix C: Mandatory ESG Disclosure Regulation Worldwide

Economy	Policy Year	Issuer	Coverage
Australia	2005	Government	All firms
Australia	2010	Stock Exchange	All listed firms
Australia	2010	Government	Financial institutions
Austria	2016	Ministry of Justice	Large firms, listed firms, and financial institutions
Bahrain	2010	Government, Central Bank	Listed firms
Belgium	2009	Corporate Governance Committee	Listed firms
Belgium	2017	Government	Large firms, listed firms, and financial institutions
Brazil	2012	Central Bank	Financial institutions
Canada	2012	Government	Financial institutions with equity of over one billion
Chile	2015	Securities and Insurance Superintendence	Listed firms
China	2008	Stock Exchange	All listed firms on the Shanghai Stock Exchange
China	2008	Stock Exchange	All listed firms on the Shenzhen Stock Exchange
Denmark	2009	Government	Large firms based on accounting class.
Denmark	2016	Government	Large private firms and public firms
Finland	2011	Government	State-owned firms
Finland	2016	Government	Large firms, listed firms, and financial institutions
France	2003	Government	All listed firms
France	2012	Government	All listed firms from 2012 and all firms from 2014
France	2014	Government	All firms
France	2016	Government	Large firms, listed firms, and financial institutions
Germany	2005	Government	All listed firms
Germany	2016	Government	Large firms, listed firms, and financial institutions
Hong Kong	2016	Stock Exchange	All listed firms
Hong Kong	2020	Stock Exchange	All listed firms
Hungary	2016	Government	Large firms, listed firms, and financial institutions
Iceland	2016	Government	Large firms, listed firms, and financial institutions
India	2012	Stock Exchange	All listed firms
India	2016	Stock Exchange	All listed firms
Indonesia	2012	Capital Market and Financial Institutions Supervisory Agency	All listed firms
Ireland	2008	Government	Financial institutions
Ireland	2016	Government	Large firms, listed firms, and financial institutions
Israel	2011	Bank Regulator	Financial institutions
Italy	2007	Government	All listed firms
Italy	2016	Government	Large firms, listed firms, and financial institutions
Japan	2005	Government	Partial listed firms
Luxembourg	2016	Government	Large firms, listed firms, and financial institutions
Luxembourg	2017	Stock Exchange	All listed firms

Economy	Policy Year	Issuer	Coverage
Netherlands	1999	Government	All listed firms
Netherlands	2006	Government	All listed firms
Netherlands	2016	Government	Large firms, listed firms, and financial institutions
Norway	2013	Government	Large firms and financial institutions
Norway	2016	Government	Large firms, listed firms, and financial institutions
Portugal	2006	Government	All listed firms
Portugal	2010	Government	All firms
Portugal	2016	Government	Large firms, listed firms, and financial institutions
Romania	2016	Government	Large firms, listed firms, national/state owned firms, and financial institutions
Russia	2012	Government	State-owned firms
Singapore	2017	Stock Exchange	All listed firms
South Africa	2010	Stock Exchange	All listed firms
Spain	2012	Government	Government-sponsored commercial companies and state-owned firms
Spain	2014	Government	All firms
Spain	2016	Government	Large firms, listed firms, and financial institutions
Sri Lanka	2019	Stock Exchange	all listed firms
Sweden	2009	Government	State-owned firms
Sweden	2016	Government	Large firms
Taiwan	2008	Stock Exchange	All listed firms
Taiwan	2015	Stock Exchange	All listed firms
Taiwan	2019	Stock Exchange	listed firms
Thailand	2006	Stock Exchange	listed firms
United Kingdom	2006	Government	All listed firms
United Kingdom	2013	Government	All firms
United Kingdom	2016	Government	Large firms, listed firms, and financial institutions

Appendix D: Banks's ESG Regulatory Pressures and Agency Costs of Debt

I use an example from Ford Motor Company's (Ford) to demonstrate that banks will enhance monitoring over borrowers and include ESG-related covenants in loan contracts when they are subject to ESG regulatory pressures.¹¹

On December 15, 2006, Ford entered into a credit agreement that included a seven-year, \$7 billion term loan facility and a five-year revolving credit facility of \$11.485 billion. This revolving facility also included a \$2 billion letter of credit and bank guarantee sub-facility. Although Ford did not publicly disclose the details of the initial agreement, the second agreement shows the lead arrangers involved. Among the 11 lead arrangers in this loan contract, four foreign banks were affected by ESG disclosure regulations in their respective operating countries for the first time in 2005, 2013, and 2014. These include Deutsche Bank AG (2005, Germany), Royal Bank of Scotland PLC (2013, United Kingdom), Barclays Capital (2013, United Kingdom), and BNP Paribas (2014, France).

AMENDED AND RESTATED CREDIT AGREEMENT

Among

FORD MOTOR COMPANY,

The Subsidiary Borrowers from Time to Time Parties Hereto,

The Several Lenders from Time to Time Parties Hereto,

and

JPMORGAN CHASE BANK, N.A.

as Administrative Agent

Dated as of December 15, 2006

and Amended and Restated as of November 24, 2009

J.P. MORGAN SECURITIES INC.	BANC OF AMERICA SECURITIES LLC	BARCLAYS CAPITAL
CITIGROUP GLOBAL MARKETS INC.	DEUTSCHE BANK SECURITIES INC.	GOLDMAN SACHS CREDIT PARTNERS L.P.
MORGAN STANLEY SENIOR FUNDING, INC.		ROYAL BANK OF SCOTLAND PLC
BNP PARIBAS	HSBC BANK USA, NATIONAL ASSOCIATION	SUMITOMO MITSUI BANKING CORPORATION
	as Bookrunners and Lead Arrangers	

This loan agreement underwent eighteen amendments, with the eighteenth amendment on

¹¹The initial 8-K announcement of this credit agreement can be found at <https://www.sec.gov/Archives/edgar/data/37996/000095012406007582/k10791e8vk.htm>. The second amendment can be found at https://www.sec.gov/Archives/edgar/data/37996/000114036109027491/ex99_2.htm. The eighteenth amendment can be found at <https://www.sec.gov/Archives/edgar/data/37996/000003799621000079/exhibit101toseptember29202.htm>.

September 29, 2021 that marked the first inclusion of ESG terms in the credit agreement. Prior to this amendment, the agreement did not include any ESG-related covenants. The following figure shows the lead arrangers involved in the eighteenth arrangement.

EIGHTEENTH AMENDMENT TO THE CREDIT AGREEMENT among FORD MOTOR COMPANY, The Subsidiary Borrowers from Time to Time Parties Thereto, The Several Lenders from Time to Time Parties Thereto, JPMORGAN CHASE BANK, N.A., as Administrative Agent, JPMORGAN CHASE BANK, N.A., acting through its Hong Kong Branch, as RMB Administrative Agent, and BANCO BRADESCO S.A., as Brazilian Administrative Agent, Dated as of December 15, 2006, as Amended and Restated as of November 24, 2009, Amended and Restated as of April 30, 2014, and Amended and Restated as of April 30, 2015, and as amended by the Twelfth Amendment dated as of April 29, 2016, as further amended by the Thirteenth Amendment dated as of April 28, 2017, as further amended by the Fourteenth Amendment dated as of April 26, 2018, as further amended by the Fifteenth Amendment dated as of April 23, 2019, as further amended by the Sixteenth Amendment dated as of July 27, 2020 and as further amended by the Seventeenth Amendment dated as of March 16, 2021	
JPMorgan Chase Bank, N.A., as Bookrunner and Lead Arranger Banco Bradesco S.A., Barclays Bank PLC, BNP Paribas Securities Corp., BOFA Securities, Inc., Citibank, N.A., Commerzbank AG, New York Branch, Credit Agricole Corporate and Investment Bank, Deutsche Bank Securities Inc., Goldman Sachs Bank USA, Lloyds Bank Corporate Markets plc, Mizuho Bank, Ltd., Morgan Stanley MUFG Loan Partners LLC, RBC Capital Markets, Societe Generale, Sumitomo Mitsui Banking Corporation, as Bookrunners and Lead Arrangers	

The ESG-related covenants are excerpted from Ford’s eighteenth amendment to its credit agreement. Specifically, the amendment introduces an ESG performance-based interest rate adjustment covenant. The amended provisions focused on ESG are outlined as follows:

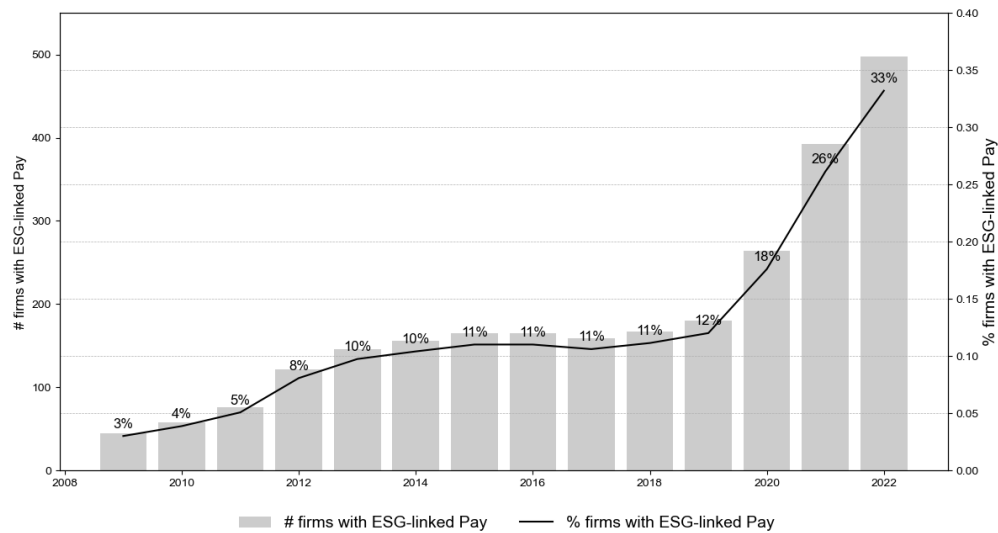
“KPI Metrics Report”: (a) with respect to the KPI Metrics regarding GHG Emissions and Renewable Electricity, an annual report audited by the KPI Metrics Auditor that sets forth the calculations for each KPI Metric for the applicable calendar year (except, for the avoidance of doubt, the calendar year ended December 31, 2020) which may take the form of the Company’s publicly available Integrated Sustainability and Financial Report (and any successor report thereof) on environmental, social and governance matters (“ESG Report”); provided, that if the KPI Metrics Report is not the ESG Report, all relevant and material data and information set forth in

such KPI Metrics Report shall also be set forth in the ESG Report, beginning with the ESG Report covering calendar year ending December 31, 2021 and (b) with respect to the KPI Metric regarding Ford Europe CO2 Tailpipe Emissions, the manufacturer error notification from the Company or its relevant Subsidiary to the European Environmental Agency pursuant to Article 7(5) of EU Regulation 2019/631 for the applicable calendar year.

“Sustainability Pricing Certificate”: *a certificate signed by a duly elected Responsible Officer of the Company that is delivered by the Company to the Lead Sustainability Structuring Agent and the Administrative Agent pursuant to Section 6.2 substantially in the form of Exhibit X (or such other form as is acceptable to the Company, the Lead Sustainability Structuring Agent and the Administrative Agent) attaching (a) true and correct copies of the KPI Metrics Report for the immediately preceding calendar year and setting forth each of the Sustainability Facility Fee Adjustment and the Sustainability Margin Adjustment and (b) a review report of the KPI Metrics Auditor confirming that the KPI Metrics Auditor is not aware of any material modifications that should be made to such computations in order for them to be presented in all material respects in conformity with the applicable reporting criteria.*

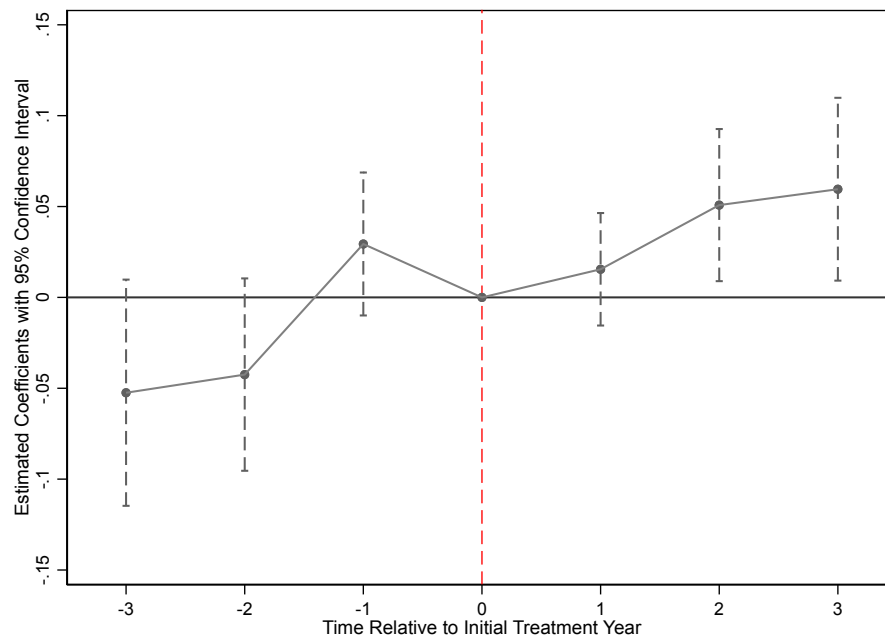
Figures

Figure 1: Percentage of S&P 1500 Firms with ESG-linked Pay



Notes: This figure presents the time trend of the adoption of ESG-linked pay among S&P 1500 firms from 2009 to 2022. The bar displays the number of firms that implement ESG-linked pay in each year, while the line indicates the proportion of S&P 1500 firms that use such compensation schemes. For the data sources, we combine data from ISS Executive Compensation Analytics and ISS Incentive Lab to identify ESG-linked pay adoption.

Figure 2: Dynamic Treatment Effects



Notes: This figure illustrates the difference in the adoption of ESG-linked pay between the treated and control groups before and after exposure to ESG regulatory shocks in the banking sector. We include $Cohort \times Firm$ and $Cohort \times Year$ fixed effects, as well as the full set of control variables in Equation (1). The 95 percent confidence intervals are based on standard errors clustered at the firm level (e.g., [Wing et al., 2024](#)).

Tables

Table 1: Sample Distribution and Summary Statistics

Panel A: Industry Distribution

Description	All Firms		Treated Firms		Control Firms	
	N	Percent	N	Percent	N	Percent
Mining, Construction	43	7.8%	22	10.0%	21	6.4%
Manufacturing	262	47.6%	92	41.8%	170	51.5%
Transportation, Communications, and Utility	92	16.7%	50	22.7%	42	12.7%
Wholesale Trade & Retail Trade	56	10.2%	26	11.8%	30	9.1%
Services	94	17.1%	28	12.7%	66	20.0%
Public Administration	3	0.5%	2	0.9%	1	0.3%
Total	550	100.0%	220	100.0%	330	100.0%

Panel B: Summary Statistics

Variable	N	Mean	SD	P10	P25	P50	P75	P90
Dependent Variable								
<i>ESG-linked Pay</i>	9,912	0.107	0.310	0	0	0	0	1
Independent Variable								
<i>Treat</i>	9,912	0.155	0.362	0	0	0	0	1
<i>Post</i>	9,912	0.571	0.495	0	0	1	1	1
Control Variable								
<i>Size</i>	9,912	8.633	1.275	7.098	7.786	8.542	9.478	10.41
<i>Leverage</i>	9,912	0.285	0.193	0.051	0.157	0.261	0.372	0.542
<i>ROA</i>	9,912	0.054	0.076	-0.016	0.026	0.056	0.091	0.134
<i>Current Asset</i>	9,912	0.378	0.204	0.104	0.209	0.383	0.519	0.657
<i>R&D</i>	9,912	0.039	0.072	0	0	0.004	0.0420	0.135
<i>MTB</i>	9,912	3.526	6.370	1.014	1.600	2.567	4.146	7.376
<i>IOR</i>	9,912	0.783	0.233	0.524	0.709	0.845	0.929	0.989
<i>ln(Analyst)</i>	9,912	2.740	0.665	1.946	2.398	2.833	3.219	3.466
<i>ln(Compensation)</i>	9,912	9.844	0.793	8.850	9.337	9.836	10.33	10.90
<i>ln(Number of Loans)</i>	9,912	1.382	0.666	0.693	1.099	1.386	1.792	2.197

Notes: Panel A reports the industry distribution for both the treated and control groups within our main sample. Panel B provides summary statistics for all variables used in Equation (1). To mitigate the influence of extreme values, we winsorize all continuous variables at the 1st and 99th percentiles of their respective distributions.

Table 2: Banks' ESG Regulatory Pressures and Borrowing Firms' ESG Pay: Baseline Results

Dependent Variable	(1)	(2)
	<i>ESG-linked Pay</i>	
<i>Treated</i> × <i>Post</i>	0.0554** (2.51)	0.0532** (2.44)
<i>Size</i>		-0.0014 (-0.08)
<i>Leverage</i>		-0.0342 (-0.56)
<i>ROA</i>		-0.0899* (-1.79)
<i>Current Asset</i>		0.0359 (0.48)
<i>R&D</i>		-0.5616*** (-2.62)
<i>MTB</i>		-0.0011** (-2.45)
<i>IOR</i>		0.0497 (1.61)
<i>ln(Analyst)</i>		0.0280 (1.30)
<i>ln(Compensation)</i>		-0.0128 (-1.46)
<i>ln(Number of Loans)</i>		0.0105 (0.94)
Observations	9,912	9,912
Adjusted R-squared	0.5991	0.6012
Cohort × Firm FE	Yes	Yes
Cohort × Year FE	Yes	Yes
SE Cluster	Firm	Firm

Notes: This table reports the estimated effect of ESG disclosure regulations targeting banks on the adoption of ESG-linked compensation by their borrowing firms. The dependent variable, *ESG-linked Pay*, is an indicator equal to one if a firm adopts an ESG-linked compensation scheme in a given year. *Treated* is an indicator for firms in the treatment group, defined based on their exposure to ESG regulations in the banking sector. *Post* is an indicator for years following the initial treatment year. The specification includes *Cohort* × *Firm* and *Cohort* × *Year* fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed definitions of all variables.

Table 3: Banks' ESG Regulatory Pressures and Borrowing Firms' ESG-linked Pay: Cross-sectional Analyses

Panel A: Cost of Switching Banks				
Partition Variable Group	(1)	(2)	(3)	(4)
	<i>Loan Reliance</i>		<i>Business Segments</i>	
	High	Low	Multiple	Single
<i>Treated</i> × <i>Post</i>	0.0672** (2.23)	0.0418 (1.55)	0.0628** (2.35)	0.0127 (0.30)
Observations	9,149	9,135	9,198	8,715
Adjusted R-squared	0.6040	0.6023	0.6096	0.6022
Control Variables	Yes	Yes	Yes	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm
Panel B: Cost of ESG-linked Pay				
Partition Variable Group	(1)	(2)	(3)	(4)
	<i>Board-Executive Ratio</i>		<i>CEO Tenure</i>	
	High	Low	High	Low
<i>Treated</i> × <i>Post</i>	0.0781** (2.28)	0.0400 (1.54)	0.0293 (1.15)	0.0863** (2.55)
Observations	8,925	9,317	9,191	9,051
Adjusted R-squared	0.6066	0.6009	0.6019	0.6056
Control Variables	Yes	Yes	Yes	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm
Panel C: ESG Performance				
Partition Variable Group	(1)	(2)	(3)	(4)
	<i>E&S Score</i>		<i>ESG Score</i>	
	High	Low	High	Low
<i>Treated</i> × <i>Post</i>	0.0337 (1.04)	0.0772** (2.35)	0.0506 (1.49)	0.0595* (1.90)
Observations	8,967	8,946	8,967	8,946
Adjusted R-squared	0.6040	0.6042	0.6092	0.5983
Control Variables	Yes	Yes	Yes	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm

Notes: This table presents cross-sectional analyses. The dependent variable, *ESG-linked Pay*, is an indicator variable that equals one if the firm adopts an ESG-linked compensation scheme in a given year. In Panel A, our sample is grouped by *Loan Reliance* and *Business Segments*, which serve as proxies for the cost of switching banks when firms face ESG pressure from lenders. In Panel B, the main sample are partitioned by *Board-Executive Ratio* and *CEO Tenure*, both of which serve as proxies for shareholder-manager coordination costs when implementing ESG-linked Pay in executive compensation structures. In Panel C, our sample is grouped by *E&S Score* and *ESG Score*, both of which serve as proxies for ESG performance when the regulation shock occurred. We include *Cohort × Firm* and *Cohort × Year* fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed variable definitions.

Table 4: Stock Market Reaction on Regulation Announcement Date

Panel A: Summary Statistics

Variable	N	Mean	SD	P10	P25	P50	P75	P90
Dependent Variable								
$CAR_{[-1,1]}^{CAPM}$	1,161	-0.363	3.194	-3.522	-1.741	-0.172	1.144	2.813
$CAR_{[-1,1]}^{FF3}$	1,161	0.166	3.105	-2.752	-1.168	0.178	1.584	3.296
$CAR_{[-1,1]}^{Carhart}$	1,161	0.170	3.101	-2.764	-1.186	0.182	1.584	3.324
Independent Variable								
<i>Regulation Exposure</i>	1,161	0.042	0.201	0	0	0	0	0
Control Variable								
<i>Size</i>	1,161	7.935	1.590	5.871	6.855	7.938	8.946	10.11
<i>Leverage</i>	1,161	0.307	0.214	0.027	0.155	0.288	0.416	0.577
<i>ROA</i>	1,161	0.035	0.074	-0.042	0.011	0.040	0.070	0.114
<i>Current Asset</i>	1,161	0.369	0.214	0.097	0.195	0.359	0.515	0.668
<i>R&D</i>	1,161	0.028	0.060	0	0	0	0.023	0.104
<i>MTB</i>	1,161	3.489	5.432	0.985	1.533	2.442	4.071	7.769
<i>IOR</i>	1,161	0.728	0.296	0.163	0.630	0.830	0.929	0.990

Panel B: Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	$CAR_{[-1,1]}^{CAPM}$		$CAR_{[-1,1]}^{FF3}$		$CAR_{[-1,1]}^{Carhart}$	
<i>Regulation Exposure</i>	-0.7822* (-1.71)	-0.8684** (-2.22)	-0.7599* (-1.81)	-0.8051** (-2.03)	-0.7660* (-1.80)	-0.8164** (-2.03)
<i>Size</i>		0.3472*** (5.71)		0.1104* (1.75)		0.1072* (1.69)
<i>Leverage</i>		0.7930* (1.79)		0.7548 (1.59)		0.7018 (1.44)
<i>ROA</i>		3.9194*** (2.89)		2.1849 (1.65)		2.1424 (1.64)
<i>Current Asset</i>		0.1537 (0.27)		0.1028 (0.19)		0.0460 (0.08)
<i>R&D</i>		2.7117 (1.06)		2.5276 (1.04)		2.2174 (0.93)
<i>MTB</i>		-0.0340* (-1.93)		-0.0355* (-1.98)		-0.0382** (-2.14)
<i>IOR</i>		0.8196** (2.48)		0.9849*** (3.07)		0.9597*** (3.01)
Observations	1,161	1,161	1,161	1,161	1,161	1,161
Adjusted R-squared	0.0671	0.1172	0.0728	0.0895	0.0709	0.0870
SIC2 FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Cluster	SIC2	SIC2	SIC2	SIC2	SIC2	SIC2

Notes: This table reports the summary statistics (Panel A) and the regression results (Panel B) of stock market reaction on the regulation announcement date. The dependent variable is the three-day *CAR* surrounding the announcement date. The independent variable is *Regulation Exposure*, an indicator variable for firms with lending relationships to banks subject to the EU NFR Directive at the time of the announcement. We winsorize all continuous variables at the top and bottom 1% of the distribution to minimize the effect of outliers. We include two-digit SIC-code industry fixed effects. Standard errors are clustered at the SIC 2-digit level, with *t*-statistics reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Shareholder Awareness of ESG Issues

Dependent Variable	(1)	(2)
	<i>ESG Proxy Dummy</i>	
<i>Treated</i> $\times$ <i>Post</i>	0.0084** (2.01)	0.0088** (2.12)
<i>Size</i>		0.0046 (1.44)
<i>Leverage</i>		0.0011 (0.31)
<i>ROA</i>		-0.0002 (-0.03)
<i>Current Asset</i>		0.0035 (0.27)
<i>R&D</i>		-0.0033 (-0.21)
<i>MTB</i>		0.0007 (1.10)
<i>IOR</i>		0.0024 (1.08)
<i>ln(Analyst)</i>		-0.0016 (-0.87)
<i>ln(Compensation)</i>		-0.0019 (-1.08)
<i>ln(Number of Loans)</i>		-0.0039 (-1.55)
Observations	9,912	9,912
Adjusted R-squared	0.0662	0.0754
Cohort $\times$ Firm FE	Yes	Yes
Cohort $\times$ Year FE	Yes	Yes
SE Cluster	Firm	Firm

Notes: This table reports the regression results of how ESG pressure from banks affect shareholder awareness of ESG issues. The dependent variable *ESG Proxy Dummy* is an indicator variable, which equals to 1 if shareholders initiate a proposal related to ESG issue in a given year. *Treat* is the indicator variable for firms in the treatment group based on exposure threshold. *Post* is the indicator variable for years that after initial treatment year. We include *Cohort* $\times$ *Firm* and *Cohort* $\times$ *Year* fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed variable definitions.

Table 6: Economic Consequences of ESG-link Pay Adoption

Panel A: Shareholder Value Recovery

Dependent Variable	(1) <i>Tobin's Q_{t+1}</i>	(2) <i>Tobin's Q_{t+2}</i>	(3) <i>Tobin's Q_{t+3}</i>	(4) <i>Avg. Tobin's Q_{t+1 to t+3}</i>
<i>Treat × Post × Adopt ESG-linked Pay</i>	0.1684 (1.49)	0.3122** (2.43)	0.3606** (2.34)	0.2476** (2.07)
Observations	7,042	7,042	7,042	7,042
Adjusted R-squared	0.8080	0.8021	0.8039	0.8602
Controls	Yes	Yes	Yes	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm

Panel B: ESG Performance Improvement

Dependent Variable	(1) <i>ESG Score_{t+1}</i>	(2) <i>ESG Score_{t+2}</i>	(3) <i>ESG Score_{t+3}</i>	(4) <i>Avg. ESG Score_{t+1 to t+3}</i>
<i>Treat × Post × Adopt ESG-linked Pay</i>	0.0765** (2.19)	0.0646* (1.70)	0.0432 (1.29)	0.0614* (1.82)
Observations	4,725	4,725	4,725	4,725
Adjusted R-squared	0.9046	0.9009	0.8915	0.9353
Controls	Yes	Yes	Yes	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm

Notes: This table reports the economic consequences of ESG-linked pay adoption after the ESG regulations on lending banks. The triple-interaction term *Treated × Post × Adopt ESG-linked Pay* captures the differential change in outcome variables for treated firms that newly adopted ESG-linked pay after the regulation shock, relative to control firms and the pre-regulation period. The indicator *Adopt ESG-linked Pay* equals one if a firm has no ESG-linked pay before treatment but adopts it afterward, and zero otherwise. In Panel A, we present evidence on the adoption of ESG-linked pay that could help contribute to the firm value recovery caused by intensified shareholder-debtholder conflicts. Firm value is measured by Tobin's Q over the three years after the regulation year. Columns (1) to (3) report the effects on Tobin's Q in years $t + 1$, $t + 2$, and $t + 3$, respectively. Column (4) presents the effect on average Tobin's Q over the three-year period. In Panel B, we report evidence on whether firms experience improvements in ESG performance. The dependent variable is ESG score over the three years after the regulation year. Columns (1) to (3) report the effects on ESG Score in years $t + 1$, $t + 2$, and $t + 3$, respectively. Column (4) presents the effect on average ESG score over the three-year period. We include *Cohort × Firm* and *Cohort × Year* fixed effects. Standard errors are clustered at the firm level, and t -statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed variable definitions.

Table 7: Banks' Voluntary ESG Initiatives and Borrowing Firms' ESG-linked Pay

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ESG-linked Pay</i>					
	Threshold = 40%		Threshold = 50%		Threshold = 60%	
<i>Treated</i> × <i>Post</i>	-0.0141 (-0.38)	-0.0169 (-0.46)	-0.0147 (-0.38)	-0.0164 (-0.43)	-0.0288 (-0.72)	-0.0306 (-0.77)
<i>Size</i>		-0.0288*** (-3.19)		-0.0269*** (-2.98)		-0.0275*** (-3.10)
<i>Leverage</i>		-0.0190 (-0.56)		-0.0183 (-0.55)		-0.0216 (-0.65)
<i>ROA</i>		-0.0805** (-2.31)		-0.0751** (-2.16)		-0.0784** (-2.30)
<i>Current Asset</i>		-0.0508 (-1.34)		-0.0434 (-1.17)		-0.0362 (-0.98)
<i>R&D</i>		0.0463 (1.00)		0.0477 (1.05)		0.0446 (1.02)
<i>MTB</i>		-0.0002 (-0.49)		-0.0003 (-0.59)		-0.0003 (-0.62)
<i>IOR</i>		-0.0306 (-1.26)		-0.0262 (-1.07)		-0.0233 (-0.97)
<i>ln(Analyst)</i>		0.0055 (0.58)		0.0039 (0.41)		0.0034 (0.36)
<i>ln(Compensation)</i>		0.0067 (1.63)		0.0061 (1.50)		0.0060 (1.47)
<i>ln(Number of Loans)</i>		0.0020 (0.25)		0.0015 (0.19)		0.0015 (0.20)
Observations	11,977	11,977	12,152	12,152	12,369	12,369
Adjusted R-squared	0.5682	0.5689	0.5674	0.5680	0.5685	0.5691
Cohort × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm	Firm	Firm

Notes: This table reports the regression result of how banks' voluntary ESG initiatives affect their borrowers' ESG pay adoption. The dependent variable is *ESG-linked Pay*, an indicator variable, which equals to 1 if the firm has ESG pay scheme in a given year. *Treat* is the indicator variable for firms in the treatment group based on different exposure thresholds (40% for column (1) & column (2), 50% for column (3) & column (4), 60% for column (5) & column (6). *Post* is the indicator variable for years that after the initial treatment year. We include *Cohort* × *Firm* and *Cohort* × *Year* fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed variable definitions.

Table 8: Banks' ESG Regulatory Pressure and Borrowing Firms' ESG-linked Pay: Robustness Tests

Panel A: Alternative Thresholds for Treated and Control Firms

	(1)	(2)	(3)	(4)
Dependent Variable	<i>ESG-linked Pay</i>			
	Threshold = 40%		Threshold = 60%	
<i>Treated</i> × <i>Post</i>	0.0513** (2.31)	0.0493** (2.24)	0.0590*** (2.65)	0.0571*** (2.59)
Observations	9,772	9,772	10,108	10,108
Adjusted R-squared	0.6012	0.6032	0.6010	0.6030
Control Variables	No	Yes	No	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm

Panel B: Alternative Sample Periods

	(1)	(2)	(3)	(4)
Dependent Variable	<i>ESG-linked Pay</i>			
Sample Period	2009-2021		2000-2021	
<i>Treated</i> × <i>Post</i>	0.0539** (2.47)	0.0516** (2.38)	0.0492** (2.54)	0.0475** (2.45)
Observations	15,806	15,806	27,069	27,069
Adjusted R-squared	0.6351	0.6368	0.5842	0.5849
Control Variables	No	Yes	No	Yes
Cohort × Firm FE	Yes	Yes	Yes	Yes
Cohort × Year FE	Yes	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm	Firm

Notes: Panel A in Table 8 reports the robustness test regression result of the effect of ESG disclosure regulations targeting banks on their borrowers' ESG-linked Pay adoption. Column (1) and (2) show the result for threshold 40%, while Column (3) and (4) for 60%. Robust standard errors are clustered at firm level and the robust t-statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively. Panel B in Table 8 reports the robustness test regression result of the effect of ESG disclosure regulations targeting banks on their borrowers' ESG-linked Pay adoption. Column (1) and (2) show the results of sample period from 2009 to 2021, while column (3) and (4) for sample period from 2000 to 2021. We include *Cohort* × *Firm* and *Cohort* × *Year* fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Appendix A provides detailed variable definitions.