Board Interlocks, ESG Compensation, and CEO Pay Structures

by

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Thesis Summary

This dissertation examines the diffusion and impact of ESG-linked compensation practices and CEO pay structures among U.S.-listed firms, focusing on board interlocks and compensation consultants. Covering data from 2002 to 2021, the study offers insights into how these compensation practices spread, their effects on executive compensation, and the role of consultants in shaping pay structures. Chapter 2 explores peer effects in the adoption of ESG-linked compensation. The analysis, based on 14,219 firm-year observations, reveals that firms are 2.7% more likely to implement ESG-linked pay if their board-connected peers have adopted it. Despite this peer influence, there is no significant improvement in ESG performance, suggesting that the adoption of ESG-linked compensation is influenced more by peer dynamics than by genuine sustainability goals. Chapter 3 investigates the impact of ESG-linked pay on CEO compensation and corporate performance. The study finds that integrating ESG criteria into compensation schemes significantly increases CEO pay, especially through variable components like stock awards. However, this increase in compensation does not translate into notable improvements in ESG performance, indicating a gap between financial incentives and actual sustainability outcomes. Chapter 4 assesses the effect of compensation consultants on CEO pay structures. The research shows that firms using multiservice consultants exhibit higher pay similarity and align their compensation practices with industry standards following regulatory changes. This alignment often helps justify higher CEO pay, highlighting the strategic influence of consultants in executive compensation. Overall, the dissertation reveals complex dynamics in executive compensation, emphasizing the need for more effective alignment between pay practices and genuine corporate sustainability objectives.

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Chapter 1: Introduction

The evolving landscape of corporate governance has seen an increasing emphasis on Environmental, Social, and Governance (ESG) criteria, which has reshaped how firms approach executive compensation. This dissertation explores the diffusion and impact of ESG-linked compensation practices and CEO pay structures among U.S.-listed firms, focusing particularly on the role of board interlocks and compensation consultants. This research aims to uncover how these compensation practices propagate through corporate networks, how the integration of ESG criteria affects corporate performance, and the influence of compensation consultants on the uniformity of CEO pay structures.

Corporate governance has increasingly incorporated ESG considerations into executive compensation structures to align managerial incentives with long-term sustainability objectives. However, the effectiveness and motivations behind these changes remain widely debated. On the one hand, proponents argue that ESG-linked pay fosters responsible corporate behavior, aligning managerial decision-making with societal and investor expectations. On the other hand, skeptics highlight potential limitations, including the risk of superficial ESG adoption driven by peer influence or external pressure rather than a genuine commitment to sustainable business practices. This dissertation contributes to this debate by providing empirical evidence on whether firms adopt ESG-linked compensation due to peer effects rather than intrinsic motivations and whether such adoption translates into meaningful improvements in corporate ESG performance. Additionally, it examines how executive compensation consultants contribute to the standardization of CEO pay structures, particularly in response to regulatory interventions aimed at increasing transparency.

By integrating these distinct but interconnected topics, this dissertation offers a holistic perspective on executive compensation strategies in the modern corporate environment. The

first study focuses on how board interlocks facilitate the diffusion of ESG-linked compensation policies among firms, emphasizing the role of peer effects in corporate decision-making. The second study evaluates the impact of ESG-linked pay on CEO compensation levels and corporate sustainability outcomes, addressing the fundamental question of whether ESG incentives achieve their intended purpose. The third study shifts focus to compensation consultants, exploring how their advisory role influences CEO pay structures and firm-level compensation decisions. Together, these three studies provide a nuanced understanding of the forces shaping executive compensation in response to ESG trends and regulatory changes.

Chapter 2 investigates whether the adoption of ESG-linked compensation policies is influenced by peer effects within corporate networks. Using detailed directors' employment data from BoardEx, the study identifies interlocked directors and constructs peer groups for each firm. An analysis of detailed data from 2002 to 2021, based on a sample of 14,219 firm-year observations from 2,139 U.S.-listed firms, reveals that firms are 2.7% more likely to adopt ESG-linked pay if at least one of their board-connected peers has done so. This finding underscores the significant role of peer effects in the adoption of ESG practices. Despite this, the study finds that these peer-induced adoptions do not lead to tangible improvements in ESG performance. The research also examines how various roles of interlocked directors impact ESG-linked compensation, providing robust evidence of peer learning effects on compensation policies.

The third chapter delves into the impact of incorporating ESG criteria into executive compensation frameworks on CEO pay scales and overall corporate ESG performance. The analysis, spanning from 2006 to 2021, reveals that ESG-linked compensation significantly increases CEO total compensation, suggesting that such incentives are effective beyond mere ethical alignment. However, despite these increased financial incentives, there is a notable lack of significant improvement in firms' ESG performance. This discrepancy highlights a potential

disconnect between the intended sustainability goals of ESG-linked pay and the actual outcomes. The findings call for a reevaluation of how ESG metrics are integrated into executive compensation to ensure they drive meaningful corporate sustainability rather than superficial compliance.

The fourth chapter examines the role of compensation consultants in shaping CEO pay structures, particularly in light of regulatory changes. Utilizing firm-pair level data from 2006 to 2022 and leveraging the 2009 SEC Disclosure Rule Amendment as a natural experiment, the study finds that firms employing multiservice consultants exhibit a higher degree of CEO pay similarity. This alignment is attributed to the consultants' influence, which is further amplified by the regulatory requirements aimed at enhancing transparency and reducing conflicts of interest. The research also indicates that firms with higher CEO compensation are more likely to engage compensation consultants to justify their pay structures. These findings extend the literature on compensation consultants by highlighting their strategic role in shaping executive compensation practices and the impact of regulatory interventions on these practices.

This dissertation makes several key contributions to the literature on corporate governance, executive compensation, and ESG practices. First, it advances the understanding of how ESG-linked pay policies spread across firms through interlocking directorates, providing new insights into peer influence in corporate governance. Second, it critically examines the effectiveness of ESG incentives in improving corporate sustainability, addressing the gap between ESG-linked compensation and actual ESG performance. Third, it highlights the role of compensation consultants in shaping executive pay structures, particularly in the context of regulatory shifts aimed at curbing excessive compensation. By offering empirical evidence on these interconnected topics, this research informs policymakers, investors, and corporate boards on the effectiveness and potential shortcomings of ESG-linked pay and the broader mechanisms driving CEO compensation decisions.

Overall, this dissertation provides comprehensive insights into the dynamics of ESG-linked compensation practices and CEO pay structures. It highlights the significant role of peer effects and compensation consultants in shaping executive compensation policies while also pointing to the limitations of current ESG-linked pay practices in achieving substantial improvements in corporate sustainability. The findings contribute to the ongoing discourse on aligning executive incentives with long-term corporate goals and offer valuable implications for policymakers, corporate boards, and investors. Future research should continue to explore these dynamics, focusing on optimizing the design and effectiveness of compensation practices to better align with genuine sustainability objectives.

Chapter 2: Propagation of ESG-Linked Compensation through Boardroom Connections

2.1 Introduction

The integration of environmental, social, and governance (ESG) criteria into executive compensation is transforming corporate governance worldwide. The adoption of ESG-linked compensation schemes surged from 3% of firms in 2010 to over 30% by 2021 (Cohen et al., 2023). This remarkable increase prompts a critical question: what factors are driving this trend?

One potential driver is the influence of peers, which has significant precedents in shaping corporate behaviors such as options backdating (Bizjak et al., 2009), merger and acquisition (M&A) transactions (Cai et al., 2014), earnings management (Chiu et al., 2013), and tax avoidance (Brown and Drake, 2014). This study seeks to determine whether firms are making autonomous strategic decisions regarding ESG-linked compensation, or if they are influenced by peer effects, potentially facilitated by interlocking directorates.

Peer influence in corporate decision-making is well-documented, particularly in areas where best practices and emerging trends lack standardized guidelines. The adoption of ESG-linked compensation is no exception, as firms often look to their industry peers or board-connected counterparts for cues on new governance practices. One key mechanism facilitating this diffusion is interlocking directorates, where shared board members serve as conduits for knowledge transfer and norm-setting. Directors who serve on multiple boards are exposed to diverse compensation strategies and may advocate for ESG-linked pay adoption based on their experiences elsewhere. This network-based transmission can reduce uncertainty, as firms perceive ESG pay adoption by peers as a form of legitimization or best practice.

Beyond legitimacy concerns, the propagation of ESG pay through networks may also stem from competitive and reputational pressures. Firms operating in the same industry or peer

group may feel compelled to adopt ESG-linked compensation to signal alignment with investor expectations and sustainability standards. Institutional investors and proxy advisory firms increasingly scrutinize executive pay structures, and firms may adopt ESG pay to maintain credibility and avoid shareholder activism. Moreover, compensation consultants—who often advise multiple firms—can act as additional vectors of diffusion by promoting ESG-linked pay as part of a standardized executive compensation framework. Collectively, these mechanisms suggest that firms do not adopt ESG pay solely based on internal strategic deliberations but are also influenced by network effects that amplify its spread across corporate landscapes.

However, the answers to these questions are not straightforward, given the conflicting perspectives on the impact of board interlocks on firm decision-making. Agency theory highlights potential downsides: directors who are interlocked across multiple boards may show diminished commitment, reducing the effectiveness of board oversight (Fich & Shivdasani, 2007; Field et al., 2013). Additionally, conflicts of interest may arise when interlocked firms share business interests, compromising directors' ability to fulfill their fiduciary duty of loyalty (Talley, 1998). Conversely, social capital theory and resource dependency theory posit significant benefits from board interlocks. Board connections can enhance information and resources sharing, improve coordination among firms, promote better corporate strategy and oversight, and potentially foster a collusive stance that strengthens firms' market influence (Azar et al., 2018). Given these contrasting views, the direction of the effect of board interlocks on ESG-linked compensation remains an empirical question.

We empirically investigate whether firms' adoption of ESG-linked pay practices transmits through board networks. We conduct an Ordinary Least Squares (OLS) regression analysis on a sample of U.S. listed firms with 14,219 firm-year observations (2,139 unique firms) between 2002 and 2020. Our findings indicate that the likelihood of a firm implementing ESG-linked compensation is influenced not only by its intrinsic attributes but also by the prevalence of such

practices among firms connected through shared board membership. Specifically, we observe a positive and significant network effect on the adoption of ESG-linked pay. The probability that a firm adopts ESG criteria in executive compensation design increases by approximately 2.7% if at least one of its board-connected peers has adopted these pay criteria.

Next, we investigate whether the transmission of ESG contracting via board links serves as an effective governance mechanism, resulting in real ESG performance improvements, or if it merely constitutes mimicking behavior to provide a superficial signal of ESG intentions without producing tangible benefits. Using detailed ESG scores as proxies for firms' different dimensions of ESG performance, we find that focal firms adopting ESG-pay practices following their board-interlocked peers' adoption do not improve their ESG performance. This finding suggests that the adoption of ESG-pay might primarily serve as a form of window dressing rather than a genuine effort to enhance firms' ESG performance.

One challenge in our research is the endogenous formation of board interlocks, suggesting that a director's presence on multiple boards may not result from random selection. It is possible that firms sharing similar characteristics might attract the same directors, leading them to hold positions in both. Consequently, the observed correlation between board interlocks and ESG-linked compensation practices might not necessarily indicate causality but could instead be driven by other underlying similarities between the firms or by comparable external environmental factors.

To address this problem, we adopt an instrumental variables (IV) approach following Aghamolla and Thakor (2022). They recommend using the lagged values of policy proxies from the peers of peers as an instrument to assess peer policy adoption. The instrument should be strongly correlated with the average adoption of the ESG-linked compensation policy by network firms but must be orthogonal to the focal firm's ESG-pay policy. Furthermore, in our sample, we ensure that the peers of peers are not direct peers of the focal firm. We find that our

main results continue to hold even after instrumenting for peer firms' integration of the ESG-linked compensation policy. This suggests that our findings are unlikely to be driven by the endogeneity of board interlocks.

Board interlock networks are characterized by distinct elements such as the roles of the directors on the boards of the focal and peer firms, as well as the directors' specific characteristics and expertise. To gauge the extent to which the effect of board peers on the propagation of ESG-pay practices could be driven by these characteristics, we perform three sets of analyses. Specifically, we examine: (i) whether the roles of common board members, such as CEO, Chairman, and Independent Director, in connected firms affect firm herding; (ii) how the characteristics of shared directors, such as tenure, board seats, network size, and gender (e.g., female directors), within focal firms influence the relationship of board peers on the dissemination of ESG-pay practices; and (iii) how the directors' memberships on either the compensation committees or the CSR/sustainability committees affect the relationship of board peers on the dissemination of ESG-pay practices.

We find that the diffusion of ESG-linked pay practices across boards primarily involves directors who are executives on one board and provide advisory services, highlighting their key role in advancing ESG-pay policies within focal firms. In contrast, directors serving exclusively as independent directors, and thereby in a monitoring role, do not exhibit a similar influence on the policy's adoption.

In addition, we observe that female interlocking directors, and directors with longer tenures, multiple board appointments, and extensive networks, are more likely to facilitate the adoption of ESG-linked pay in the focal firm. Furthermore, interlocked directors serving on the compensation committees of one or both interconnected firms advocate for the adoption of ESG-linked compensation policies. Interestingly, directors with CSR expertise do not appear

to be as influential in encouraging the adoption of ESG-linked pay compared to their counterparts without such expertise.

We also explore the heterogeneity in the effect of board interlocks on ESG-linked pay practices. First, we find a stronger positive effect among firms with smaller boards, CEO and chairman duality, a CSR committee presence, and worse prior-year ESG performance. To the extent that ESG-linked pay propagates through common board members who share information and insights within their networks, the increased adoption of ESG-linked pay practices may be concentrated among focal firms with higher information asymmetry and competitive pressure. Our findings support the view that firms with higher information opaqueness and competitive pressures are more likely to mimic the ESG-pay policies of their board-connected peers.

Our main results are robust to using alternative measurements for the board-connected peer firms' ESG-linked pay and employing different regression models. Furthermore, to isolate the influence of board interlocks, we control for industry contagion effects by excluding board-connected firm pairs when the focal firm and the board-connected peers are in the same industry (based on 3-digit SIC industry code). Additionally, we account for potential network effects arising from common ownership and common compensation consultants by including control variables indicating whether board-connected peers share ownership or compensation consultants with focal firms. The results remain consistent after incorporating these controls.

This chapter contributes to two strands of literature. First, it adds to the existing research on the determinants of ESG-linked pay practices. This is the first study to provide evidence of the network effects on firms' ESG-linked pay adoption within board-interlock networks. We identify board interlocks as a novel determinant of ESG-linked pay, even after controlling for other determinants such as common industrial classifications (Grennan, 2019; Leary and Roberts, 2014), product markets (Hoberg et al., 2014), and common compensation consultants

(Murphy & Sandino, 2020). Also, this chapter contributes to the literature on the real consequences of implementing ESG-linked pay practices. We add to the debate on the real outcomes of ESG contracting by demonstrating that mimicking peers' ESG-pay practices do not lead to significant improvements in ESG performance.

Second, our study contributes to the literature on the dynamics of board interlocking networks. Prior research has demonstrated that board interlocks serve as an informational channel and a mechanism for propagating firms' policies and practices, such as governance practices (Brown & Drake, 2014), option backdating (Bizjak et al., 2009), earnings management (Chiu et al., 2013), and tax avoidance (Brown & Drake, 2014). This study is among the first studies to examine the interplay between strategic herding behavior and information quality within network effects, providing new insights into how board interlocks influence the adoption of ESG-linked compensation practices.

The rest of this chapter is structured as follows. Section 2 reviews related literature and develops our main hypothesis. Section 3 explains the data and variable construction. Section 4 presents the empirical models and discusses the results. Section 5 reports cross-sectional analyses. Section 6 addresses the endogeneity concerns. Section 7 discusses robustness tests. Section 8 concludes the chapter.

2.2 Board-Network-Peer Effects and ESG-Linked Compensation

2.2.1 Literature on ESG-linked Compensation

A key issue in corporate governance is the efficient incentivization of CEOs and other top executives to create shareholder value (Bebchuk & Tallarita, 2022). In U.S. public firms, where ownership is dispersed, shareholders often lack sufficient incentives to monitor and discipline managerial behavior. This situation allows CEOs to exert considerable influence over boards of directors and potentially extract significant value from companies through excessive

compensation packages (Bebchuk & Fried, 2004). The high levels of CEO compensation have garnered substantial attention from both the public and academic researchers (Edmans et al., 2017).

ESG-linked executive compensation policy is an emerging mechanism in corporate governance. Due to information asymmetries between the 'principal' (shareholders, represented by the board of directors) and the 'agent' (senior managers), aligning a company's ESG performance with executive compensation serves as an incentive package. This strategy not only guides and motivates management but also represents a novel aspect of corporate response to the low-carbon transition and ESG-driven pressures from institutional investors (Ritz, 2020).

Managerial incentives serve as tools for shareholders to align managers' interests with those of the shareholders. The increasing incorporation of sustainability metrics into executive pay evaluative criteria stems from the growing recognition that sustainability strategies can drive growth, enhance profitability, and increase shareholder value. To date, several studies have investigated the effects of ESG-linked executive compensation on firm performance.

Keddie and Magnan (2023) find that firms with ESG incentives experience a 32% reduction in excess annual cash bonuses when led by a powerful top management team. Conversely, firms tend to award excess bonuses if they operate in environmentally sensitive industries, have a corporate social responsibility (CSR) committee, or are supported by long-term view institutional shareholders. Cohen et al. (2023) note that the adoption of ESG metrics in executive compensation is associated with increased engagement, voting, and trading activities by institutional investors, and can align management’s objectives with the preferences of certain shareholder groups. Additionally, firms implementing ESG Pay can improve key ESG outcomes. However, such compensation does not necessarily lead to improved financial performance.

There is conflicting evidence on whether ESG pay facilitates rent extraction. Bebchuk and Tallarita (2022) argue that ESG Pay enables rent extraction, while Cohen et al. (2023) find it unrelated to abnormal CEO compensation. Flammer et al. (2019) conclude that incorporating CSR variables into executive compensation generally improves firms' financial performance. However, Cohen et al. (2023) suggest that the rationale for adopting ESG Pay aligns with an increasing number of shareholders who favor environmental and social criteria, even at the potential expense of lower financial returns, as supported by Hartzmark and Sussman (2019).

Prior literature indicates the importance of considering broader non-financial stakeholder criteria in executive compensation (Berrone & Gomez-Mejia, 2009) and there is an argument that the sustainable bonuses have emerged because of the regular bonuses have become controversial after the financial crisis (Kolk & Perego, 2014). Another potential reason for taking the sustainability-related bonus is it can seek inclusion and legitimacy from relevant stakeholders (Kolk & Perego, 2014).

Traditional agency theory posits that corporate owners are primarily concerned with firms' financial performance, rather than broader societal metrics such as those encompassed by ESG variables. However, ESG outcomes are increasingly recognized as leading indicators of future financial performance. Consequently, the rationale for incorporating ESG pay is akin to that for including non-financial variables—such as customer satisfaction, employee satisfaction, and product quality—in managerial incentive contracts (Dikolli, 2001; Dutta & Reichelstein, 2003; Ittner et al., 1997; Sliwka, 2002). ESG metrics may also serve as indicators of a firm's future risk exposures, including risks like stranded assets due to climate change. This aligns with evidence concerning various ESG-related risks, such as climate risk and social unrest. Additionally, a significant number of institutional investors recognize the financial implications of climate risks for their portfolio companies (Gibson Brandon et al., 2022).

Existing agency models provide an efficient contracting rationale for ESG Pay, as ESG metrics are increasingly viewed as critical indicators of future financial performance and potential risks. Consistent with the notion of efficient incentive contracting, Cohen et al. (2023) find that the adoption of ESG Pay correlates with variables that likely capture the costs and benefits of ESG factors for shareholders. Specifically, ESG Pay is more prevalent in industries with a larger environmental footprint, in countries with stricter ESG regulations, and in contexts with greater social sensitivity toward sustainability. Moreover, ESG Pay is more common among larger firms and those with relatively high levels of emissions, aligning with the idea that heavier emitters face higher costs for carbon emissions and larger firms are under more public scrutiny regarding their ESG performance.

Additionally, firms that adopt ESG Pay exhibit a higher percentage of institutional ownership and demonstrate a positive association with engagement, voting, and trading activities by these institutional investors (Cohen et al., 2023). This supports the argument that adopting ESG Pay can align managerial objectives with the interests of select stakeholder groups, including the firm's shareholders.

Furthermore, firms can signal their commitment to ESG issues by adopting ESG Pay. However, large institutional investors and the primary retail shareholders' association have opposed the introduction of sustainable bonuses. They argue that firms do not need to address sustainability as a separate dimension (Kolk & Perego, 2014). Additionally, they contend that using a series of indicators could disperse efforts and introduce opacity, as some targets might be easily achieved. There is a need to demonstrate how sustainability can deliver long-term value through better alignment with traditional incentive programs.

2.2.2 Literature on Peer Effects in Corporate Policies

Peer effects posit that the average behavior of a group influences the behavior of its individual members (Manski, 1993). This concept has garnered increasing attention across various fields of economics and finance, where it has been studied both theoretically and empirically. To explore peer effects, prior research has defined peer groups in diverse ways. These definitions include common industrial classifications (Grennan, 2019; Leary & Roberts, 2014), product markets (Hoberg et al., 2014), compensation contract disclosures (Bizjak et al., 2009), analyst coverage (Kaustia & Rantala, 2015), executives' business school experience (Shue, 2013), and boardroom connections (Song & Wang, 2024).

Prior literature demonstrates the influence of peer effects on corporate policies such as capital structures and financial strategies (Leary & Roberts, 2014), precautionary cash holdings (Hoberg et al., 2014), and investment decisions (Foucault & Fresard, 2014). Specifically, firms within the same industry are significantly influenced by their peers when determining their capital structures and financial policies (Leary & Roberts, 2014). Adhikari and Agrawal (2018) present robust evidence that firms' payout policies, including dividends and share repurchases, are significantly influenced by the policies of their industry peers. Grennan (2019) also indicates that firms' decisions to change their dividend policies are subject to peer effects, with firms increasing payments by 16% in response to peer changes, defining peer groups by 3-digit SIC based on industry. Seo (2021) finds that management forecast disclosures made by industry peers induce similar disclosures by firms. Additionally, firms' investment decisions are influenced by their peers' stock prices, with peer firms defined within the Text-based Network Industry Classification (TNIC) developed by Hoberg and Phillips (2016). A one standard deviation increase in peer firms' valuation is associated with a 5.9% increase in corporate investment (Foucault & Fresard, 2014). Recent studies using TNIC as a proxy for peer firms also highlight the role of peer effects in employee welfare policies (Rind et al.,

2021a). Kaustia and Rantala (2015) find that firms are more likely to split their stock if their peers have recently done so, although they note that there is no clear benefit to following successful peer splitters.

Gomes et al. (2023) utilize analyst network peers to demonstrate significant impacts on corporate capital structures, including leverage and equity issuance decisions. Additionally, existing studies highlight peer effects at the household level, revealing that peer distress leads to a decline in individual leverage and average debt (Kalda, 2019). Social interactions also influence the disposition effect among some traders (Heimer, 2016). Furthermore, Maturana and Nickerson (2019) find that workplace peers play a crucial role in household financial decisions, notably in mortgage refinancing choices.

Studies also suggest that the behavior of peer firms matters for executive compensation through companies' compensation peers. Specifically, Denis et al. (2020) document that firms will reduce CEO compensation following weak 'say on pay' votes experienced by their compensation peers.

2.2.3 Hypothesis Development

In this section, we motivate the hypothesis that the adoption of ESG contracting generates peer effects for firms connected through shared board directors. We focus on shared directors for several compelling reasons. First, board members have access to information and insights within their networks that often surpass what is directly accessible to company executives, making directors primary sources of decision-making and monitoring insights for many firms. Consequently, shared directors represent a critical and direct conduit for inter-firm information exchange (Mizruchi, 1996).

The board of directors plays a crucial role in guiding corporate strategy and managerial oversight (Bizjak et al., 2009). Due to the limited pool of qualified candidates, it is common

for board members to serve on multiple firms' boards. On one hand, board interlocks can facilitate efficient information exchange and knowledge transfer, as members bring valuable corporate experience from other firms, providing real benefits to interlocked firms. On the other hand, firms linked by joint board members may face compromised board independence, which could exacerbate agency problems and hinder the effective fulfillment of the board's monitoring and advising functions.

Board interlocks represent a type of social network. A review of prior literature reveals several mainstream theories underpinning social network analysis, including structural capital (Borgatti & Foster, 2003), resource access (Hillman et al., 2009), contagion (Chiu et al., 2013), as well as theories such as organizational learning (Huber, 1991) and herding (Seo, 2021). Specifically, the structural capital focus implies that benefits derive from actors' positions within the network, independent of their immediate connections (Borgatti & Foster, 2003). The contagion paradigm explains how behaviors spread through immediate connections and influence actors. The use of board interlocks serves as a primary conduit for transferring organizational practices such as earnings management (Chiu et al., 2013), stock option backdating (Bizjak et al., 2009), quarterly disclosure guidance (Cai et al., 2014), corporate governance practices (Bouwman, 2011), and aggressive corporate tax reporting and avoidance strategies (Brown, 2011; Brown & Drake, 2014).

Our study is based on resource access, which integrates social capital theory with resource dependency theory. Specifically, social capital theory suggests that central actors in a network have privileged access to information and resources (Adler & Kwon, 2002). For instance, previous studies have demonstrated an association between firm performance and the network centrality of boards (Larcker et al., 2013) or CEOs (El-Khatib et al., 2015). Combining resource dependency theory with social capital theory posits that firms are affected and constrained by

their embedded environments and, as a result, attempt to manage resource dependencies (Hillman et al., 2009).

Prior studies indicate that board interlocks have both positive and negative effects on the dissemination of business practices. Specifically, interlocks can reduce information acquisition costs and increase access to new information, directly influencing firms' strategies and performance (Caiazza et al., 2019). On the negative side, effects often stem from the contagion of practices among boards, such as backdating stock options (Bizjak et al., 2009), aggressive tax reporting (Brown, 2011), and earnings management (Chiu et al., 2013). Conversely, positive effects of board networks include improvements in firm performance (Larcker et al., 2013), financial reporting quality (Intintoli et al., 2018), and managerial guidance (Schabus, 2022).

There are conflicting views regarding the influence of board interlock on companies. On the one hand, two agency conflicts associated with board overlap may have detrimental impacts. Firstly, serving on multiple boards may diminish a director's dedication, potentially undermining the efficacy of board oversight (Fich & Shivdasani, 2007; Field et al., 2013). Secondly, concerns exist about interlocked directors' ability to consistently maintain an unwavering fiduciary duty of loyalty, especially in cases where interlocked companies share business interests, potentially leading to conflicts of interest (Talley, 1998). On the other hand, overlapping boards can enhance access to and mobilization of information and resources, potentially improving coordination among firms, refining corporate strategy and oversight, and even enabling a collusive stance to bolster market influence (Azar et al., 2018).

Prior evidence supports the view that board interlocks serve as a crucial channel for the transfer of information and practices across firms, albeit transferring both beneficial and detrimental practices. For instance, Bouwman (2011) finds that firms with greater director overlap exhibit greater similarity in board characteristics and governance practices (both

positive and questionable), such as board size, CEO duality, and total compensation for CEOs and directors. Recent studies reveal that firms with common directors also share other corporate practices, both valuable and questionable, such as options backdating (Bizjak et al., 2009), earnings management (Chiu et al., 2013), and tax avoidance (Brown & Drake, 2014). Cai and Sevilir (2012) investigate M&A transactions between firms with current board connections and find that acquirers obtain higher announcement returns in transactions involving a first-degree connection where the acquirer and the target share a common director. Conversely, Amin et al. (2020) that a well-connected board can enhance firms' CSR performance, while Fich and Shivdasani (2007) report that a firm is more likely to face a financial lawsuit if it shares a board member with another firm previously sued for fraud.

Drawing on prior literature and without initially taking a stance on the benefits or costs of board network effects, we postulate that board interlocks facilitate the transmission of ESG contracting practices. Our central hypothesis is thus formulated as follows:

H1: The adoption of ESG contracting by focal firms is associated with the adoption of this practice in firms with which they share common directors.

2.3 Data and Variable Construction

2.3.1 Sample Construction

We use several sources to construct our sample of U.S. publicly listed firms. We collect information on directors' employment history from the BoardEx North America database to construct board connections. ESG-linked compensation data, available starting in 2002, are collected from Refinitiv. Financial data come from Compustat, while analyst data are sourced from the I/B/E/S database. Common ownership data are obtained from the Thomson Reuters Institutional Holdings (13F) database, and compensation consultant data from ISS Incentive Lab.

Our initial sample comprises a cross-section of firms available in BoardEx and those that have ESG-linked pay data in Refinitiv. After merging these data with Compustat, we drop observations with missing data on key analysis variables. Our final sample includes 14,219 firm-year observations for 2,139 unique firms spanning from 2002 to 2020.

2.3.2 Construction of Board-Connected firms

We use BoardEx as the primary data source for identifying board-connected firms. BoardEx began collecting data on top managers and directors in public firms in 1999. The database assigns a unique identification number to each director, enabling us to identify interlocking directors who serve on the boards of different firms. It also records the start and end dates of each board position, allowing us to construct a panel in which each observation corresponds to a firm-director-position-year. This setup enables us to identify common directors between two firms in a given year. We exclude director observations at the beginning and end of their tenures that do not correspond to a full year of service. Consequently, this filtering process also automatically excludes board connections that last less than a year, specifically when a common director served for less than a year on the board of one of the interlocking companies.

About 9% of the remaining board interlocking observations involve firms from the same industry, identified based on a 3-digit SIC code. This figure is comparable to that reported in prior studies (Song & Wang, 2024) and aligns with evidence suggesting that the majority of board connections are formed between firms in different industries. Sharing directors with industry peers can lead to security and privacy concerns.

By design, our final sample includes only those firm-year observations that correspond to firms sharing at least one director with another board-linked peer firm in a given year. Approximately 95% of our final sample observations represent firms with at least one board connection, a figure that aligns with the findings of Foroughi et al. (2021), where 90% of firms

in their sample shared at least one director with other firms. Additionally, the average number of board connections per focal firm is four.

2.3.3 ESG-Linked Compensation Proxies

Our dependent variable, *ESG_Pay_Focal,* is an indicator variable that equals one if a firm's executive compensation is linked to ESG goals in a given year, and zero otherwise.[1] Our independent variable, *ESG_Pay_Peer*, measures the presence of ESG-linked compensation policies in the board-connected peers of focal firms. *ESG_Pay_Peer* is a dummy variable that equals one if at least one of the board-connected peers has ESG-linked compensation policy in a given year, and zero otherwise.

2.3.4 Control Variables

Following prior research (Flammer et al., 2019), we include a set of firm-level control variables that are commonly identified as determinants of executive compensation and ESG policies. These controls help account for firm-specific factors that may influence the adoption of ESG-linked compensation.

First, we control for firm size (*Size*), measured as the natural logarithm of total assets, deflated to 2009 levels using the Consumer Price Index (CPI). Larger firms tend to have more complex governance structures and greater exposure to investor scrutiny, making them more likely to adopt ESG-linked compensation (Cohen et al., 2023; Flammer et al., 2019). Second, we include profitability (*ROA*), calculated as the ratio of net income to the total book value of assets. More profitable firms may have greater financial flexibility to implement ESG-linked

[1] The data item in Refinitiv used to construct *ESG_Pay_Focal* is "Policy Executive Compensation ESG performance", which is defined as equal to one if the firm's pay policy includes remuneration for CEO, executive directors, non-board executives, and other management bodies based on ESG or sustainability factors.

pay structures, as they are less constrained by short-term financial pressures. Third, we control for leverage (*Leverage*), defined as the ratio of long-term and short-term debt to the total book value of assets. Higher leverage may constrain a firm's ability to adopt ESG policies due to pressure from creditors who prioritize financial stability over discretionary ESG-related expenditures. Finally, we include cash holdings (*Cash*), measured as the ratio of cash and short-term investments to the total book value of assets. Firms with higher cash reserves may be more likely to implement ESG-linked pay structures, as they have the necessary liquidity to accommodate such initiatives.

In addition to firm-specific characteristics, we also incorporate the average values of these variables for board-connected peers in a given year. This accounts for potential peer effects in firm decision-making, where firms may benchmark their compensation structures against their networked counterparts. We winsorize all continuous variables at the top and bottom one percentile. Table A.1 in the Appendix provides detailed definitions of all variables used in the analysis.

2.4 Empirical Results

2.4.1 Descriptive Statistics

Panel A of Table 2.1 presents the descriptive statistics. The mean value of the focal firms' ESG-linked compensation (*ESG_Pay_Focal*) is 0.289, indicating that 28.9% of the sample firm-year observations represent firms with an ESG-linked compensation policy. This ratio is consistent with similar variables reported in Flammer et al. (2019).[2] Similarly to previous studies on peer effects (Adhikari & Agrawal, 2018), the average values of all control variables for the board-connected peers in our sample are comparable to those for the focal firms.

[2] Flammer et al. (2019) report that approximately 24% of the S&P 500 companies in their sample use CSR criteria in executive compensations. Their sample period is 2004-2013.

Moreover, the standard deviations of these variables are generally lower for the portfolios of board-connected peers than for the focal firms.

Panel B of Table 2.1 presents the sample distribution over time. Column (1) indicates that the number of sample firms gradually increases from 207 in 2002 to 1,897 in 2020, consistent with the expansion of coverage by Refinitiv.[3] Column (3) reveals that the number of focal firms with ESG-linked pay also increases almost tenfold during the sample period, from only 48 firms in 2002 to 570 firms in 2020. While this increase is partially due to improved coverage of firms by Refinitiv, it is also attributable to the more frequent adoption of this policy by firms in general. The overall percentage of focal firms that have ESG-linked pay in our sample is 28.95% (Column 4).

[3] Refinitiv began reporting ESG ratings for companies in the Standard & Poor's 500 and NASDAQ 100 indexes in 2002. In 2016, Refinitiv expanded its data coverage to include the Russell 2000 and Russell 3000 indexes. As a result, the number of firms covered in our sample has increased substantially since 2016.

Table 2.1: Summary Statistics

The sample includes all firms from the merged BoardEx, Refinitiv, and Compustat databases from 2002 to 2020 with non-missing data for all analysis variables (see Table A.1 in Appendix). Panel A presents the summary statistics for key variables used in the main regression analyses. Panel B reports the sample distribution by year. All continuous variables are winsorized at the 1st and 99th percentiles.

Panel A: Full sample summary statistics

	N	Mean	SD	Min	p25	Median	p75	Max
ESG Pay Focal	14,219	0.289	0.454	0	0	0	1	1
ESG Pay Peer	14,219	0.604	0.489	0	0	1	1	1
Focal size	14,219	13.943	1.816	9.584	12.805	13.931	15.151	18.631
Focal leverage	14,219	0.434	0.231	0.01	0.286	0.433	0.571	1.163
Focal cash	14,219	0.164	0.201	0.001	0.032	0.088	0.207	0.933
Focal ROA	14,219	0.021	0.133	-0.677	0.008	0.039	0.08	0.27
Peer size	14,219	14.188	1.505	10.148	13.293	14.333	15.254	17.354
Peer leverage	14,219	0.44	0.162	0.03	0.348	0.44	0.532	0.923
Peer cash	14,219	0.158	0.165	0.003	0.058	0.106	0.187	0.854
Peer ROA	14,219	0.023	0.107	-0.52	0.013	0.044	0.072	0.199

Panel B: Sample distribution by year

year	Firm-year observations	% of full sample annually	Num of firms using ESG-contracting	% of firms using ESG-contracting
	(1)	(2)	(3)	(4)
2002	207	1.46	48	23.19
2003	204	1.43	58	28.43
2004	267	1.88	51	19.10
2005	311	2.19	34	10.93
2006	314	2.21	45	14.33
2007	348	2.45	64	18.39
2008	454	3.19	108	23.79
2009	496	3.49	140	28.23
2010	516	3.63	181	35.08
2011	538	3.78	210	39.03
2012	535	3.76	213	39.81
2013	558	3.92	219	39.25
2014	578	4.06	210	36.33
2015	885	6.22	267	30.17
2016	1,216	8.55	330	27.14
2017	1,478	10.39	404	27.33
2018	1,627	11.44	453	27.84
2019	1,790	12.59	511	28.55
2020	1,897	13.34	570	30.05
Total	14,219	100	4,118	28.95

2.4.2 Peer Effects of ESG-linked Pay

We use the following model to empirically test our central hypothesis that the adoption of an ESG-linked pay policy by board-connected peers increases the probability of the focal firm adopting this policy:[4]

$$\text{ESG\_Pay\_Focal}_{i,t} = \beta_0 + \beta_1 \text{ESG\_Pay\_Peer}_{i,t} + \gamma X_{i,t} + \lambda Y_{i,t} + \mu_j + \varphi_t + \varepsilon_{i,t}, \quad (1)$$

where the indices *i, j,* and *t* refer to the firm, three-digit SIC classification, and year, respectively. *ESG_Pay_Focal* is a proxy for the presence of ESG pay criteria in the executive compensation policy of the focal firm; *ESG_Pay_Peer* measures the presence of an ESG pay policy among the board-connected peers; *X* represents a vector of the focal firm's characteristics; *Y* denotes a vector of the average characteristics of peer firms; μ_j controls for industry fixed effects[5]; φ_t represents the year fixed effects; and $\varepsilon_{i,t}$ is the firm-specific error term that is clustered at the firm level.[6] Our main hypothesis predicts a positive and statistically significant effect of the ESG_Pay_Peer variable ($\beta 1>0$).

Table 2.2 reports the main results, which strongly and consistently support our central hypothesis that the adoption of ESG-linked compensation policies by board-interlocked peer firms positively influences the focal firms' propensity to adopt the same policy. The coefficient estimates on the proxies for peers' ESG-linked pay in Columns (1) through (4) are all positive and statistically significant at the 5% level or better. The results are also economically

[4] Prior research (Greene, 2004) indicate that the coefficient estimates of nonlinear models (e.g., probit and logit) with fixed effects are biased and inconsistent, so the estimation results are difficult to interpret. However, this chapter also runs the probit and logit models for the main tests and reports the results in the robustness test section.

[5] We use industry fixed effects rather than firm fixed effects due to the structure of our data, which includes both focal firms and their board-connected peers. Unlike a standard panel dataset where each observation corresponds to a single firm over time, our dataset incorporates peer firm characteristics, which vary for each focal firm-year observation. This structure makes the application of firm fixed effects less suitable, as it would absorb much of the variation in peer firm influence—one of the primary variables of interest in our analysis.

[6] We use the contemporaneous proxies for *ESG_Pay_Peer* to limit the time for firms to respond to one another (Leary and Roberts, 2014). We check that our main conclusions remain unchanged when we use a one-year lag of proxies for ESG-linked pay of board connected peers (see the results in Panel D of Table 10).

meaningful. For example, a coefficient of 0.027 in Column (4) suggests that, all else being equal, if at least one peer firm has an ESG-linked compensation policy (*ESG_Pay_Peer*), there is a 2.7% higher probability that the focal firm will also implement this policy. The coefficients on the control variables are generally consistent with expectations. We find that focal firms are more likely to have an ESG-pay policy if they are larger in size.

Table 2.2: Peer Effects on ESG-linked Compensation

This table presents the baseline regression results using an OLS model specification. The dependent variable is *ESG_Pay_Focal*, and the independent variables is *ESG_Pay_Peer*. Standard errors, shown in parentheses, are clustered at the firm level. Year and industry fixed effects, based on the 3-digit SIC code, are included in the regression, as indicated. All variables are defined in Table A.1 in the Appendix. All control variables are winsorized at the 1st and 99th percentiles. Statistical significance is denoted by ***, **, and * at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.153***	0.088***	0.102***	0.027**
	(0.014)	(0.013)	(0.013)	(0.012)
Focal_size			0.042***	0.053***
			(0.006)	(0.007)
Focal_leverage			0.083**	0.037
			(0.036)	(0.037)
Focal_cash			-0.144***	-0.061
			(0.049)	(0.049)
Focal_ROA			-0.073	0.039
			(0.055)	(0.054)
Peer_size			-0.001	0.006
			(0.006)	(0.006)
Peer_leverage			-0.013	0.023
			(0.042)	(0.038)
Peer_cash			-0.071	-0.054
			(0.058)	(0.058)
Peer_ROA			-0.156**	0.074
			(0.064)	(0.059)
Constant	0.197***	0.236***	-0.334***	-0.557***
	(0.010)	(0.010)	(0.108)	(0.108)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.027	0.223	0.063	0.255

2.4.3 Window-Dressing Signal or ESG-Inducing Learning?

Our main result indicates that ESG-linked pay practices are transmitted through board interlocks. However, an important question remains unanswered: Does the adoption of such practices, induced by board-connected peers, translate into actual improvements in ESG performance? Do focal firms learn these practices from their interlocked peers and adopt them to change executives' ESG behaviors and enhance real ESG outcomes? Or do focal firms merely mimic the ESG pay practices of their interlocked peers as a low-cost window-dressing signal to investors, without producing any actual improvements in ESG performance?

To examine whether ESG-linked pay adoption leads to substantive ESG improvements or merely serves as a symbolic signal, we analyze its impact on firms' ESG performance, using ESG Score (*ESG Score*), Combined Score (*Combined*), and Controversies Score (*Controversies*) as key proxies. The Combined Score captures both a firm's reported ESG efforts and its exposure to ESG controversies, offering a holistic measure of ESG performance. If firms that adopt ESG-linked pay show significant improvements in their Combined Score, this suggests that peer-induced adoption leads to meaningful ESG enhancements, supporting the ESG-inducing learning hypothesis. Conversely, if the adoption of ESG-linked pay does not lead to improved ESG performance, this raises concerns that firms are engaging in window dressing, adopting ESG pay primarily to meet investor expectations or regulatory pressures rather than to drive real change.

Additionally, we assess the Controversies Score, which reflects a firm's exposure to negative ESG-related events. A reduction in ESG controversies following the adoption of ESG-linked pay would indicate that such policies help mitigate ESG-related risks, further reinforcing the ESG-inducing learning hypothesis. However, if firms continue to experience high levels of ESG controversies despite adopting ESG pay, it suggests that their commitment to ESG initiatives may be superficial, aligning with the window-dressing hypothesis. By distinguishing

between these two potential outcomes, we provide deeper insights into whether ESG-linked pay serves as a genuine mechanism for improving ESG performance or merely as a symbolic compliance tool.

To differentiate between these two possible motives for the transmission of the ESG-pay practices, we implement the following OLS model:

$$
\begin{aligned}
ESG\_Score\_Focal_{i,t} &= \beta_0 + \beta_1 ESG\_Pay\_Peer_{i,t} \times ESG\_Pay\_Focal_{i,t} \times Post\_Adopt\_Peer_{i,t} \\
&+ \beta_2 ESG\_Pay\_Peer_{i,t} + \beta_3 ESG\_Pay\_Focal_{i,t} \\
&+ \beta_4 ESG\_Pay\_Peer_{i,t} \times ESG\_Pay\_Focal_{i,t} + \beta_5 Post\_Adopt\_Peer_{i,t} \\
&+ \beta_6 ESG\_Pay\_Peer_{i,t} \times Post\_Adopt\_Peer_{i,t} \\
&+ \beta_7 ESG\_Pay\_Focal_{i,t} \times Post\_Adopt\_Peer_{i,t} + \gamma X_{i,t-1} + \lambda Y_{i,t-1} + \theta Z_{t-1} \\
&+ \varphi_i \\
&+ \varepsilon_{i,t}, \qquad (2)
\end{aligned}
$$

where ESG_Score_Focal is the proxy for focal firms' detailed ESG performance, utilizing the overall ESG score (*ESG Score*, *Combined*, *Controversies*), the overall scores for the E, S, and G pillars (*E Score*, *S Score*, *G Score*), and detailed scores for the environmental pillar (*Resource Use*, *Emission*, *Envir Innovation*) and the social pillar (*Workforce*, *Human Right*, *Community*) separately. $Post\_Adopt\_Peer$ is an indicator variable set to one if the year of the focal firm's first adoption of an ESG-linked compensation policy is after any of its board-connected peers has adopted such a policy, and zero otherwise. All other variables are as defined in the main model (1). ESG_Pay_Focal is an indicator variable equal to one if at least one peer firm has adopted an ESG-linked compensation policy, and zero otherwise.

Model (2) is the full model, in which we include all three stand-alone effects (ESG_Score_Focal , ESG_Pay_Focal , $Post\_Adopt\_Peer$) along with all necessary interaction terms. However, some of the stand-alone and interaction effects are subsumed by

the fixed effects and are therefore dropped from the model. Consequently, our final estimation model for ESG performance is as follows:

$$
\begin{aligned}
ESG\_Score\_Focal_{i,t} &= \beta_0 + \beta_1 ESG\_Pay\_Peer_{i,t} \times ESG\_Pay\_Focal_{i,t} \times Post\_Adopt\_Peer_{i,t} \\
&+ \beta_2 ESG\_Pay\_Peer_{i,t} + \beta_3 ESG\_Pay\_Focal_{i,t} \\
&+ \beta_4 ESG\_Pay\_Peer_{i,t} \times ESG\_Pay\_Focal_{i,t} + \gamma X_{i,t-1} + \lambda Y_{i,t-1} + \theta Z_{t-1} + \varphi_i \\
&+ \varepsilon_{i,t}, \qquad (3)
\end{aligned}
$$

Our key coefficient of interest, β_1, captures the effect on the ESG performance resulting from the adoption of an ESG-pay policy by the focal firm following its adoption by one of its board-linked peers.

The analysis across Panels A to E of Table 2.3 reveals that the coefficients of the triple interaction terms are generally not significant, with the exception of Column (3) in Panel C. This suggests that when a focal firm adopts an ESG-pay policy after one of its board-linked peers has done so, there is no significant change in the overall ESG score or in the individual E, S, and G pillar scores, as evidenced in Panel B of Table 2.3. However, the significant and positive coefficient in Column (3) of Panel C indicates that the environmental innovation score increases by approximately 0.3 points under these circumstances, at a 5% significance level.

Table 2.3: ESG Performance Change

This table presents the regression results for whether the adoption of ESG-pay, induced by board-connected peers, translates into actual improvements in ESG performance. The dependent variables are ESG overall score (*ESG Score*, *Combined*, *Controversies*), E, S and G Pillar overall scores (*E Score*, *S Score*, *G Score*), detailed environmental pillar scores (*Resource Use*, *Emission*, *Envir Innovation*), and detailed social pillar score (*Workforce*, *Human Right*, *Community*) separately. Other variables are defined in Appendix Table A.1. Year and Industry fixed effects are included in the regression. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: ESG Overall Score

Dependent Variable:	ESG Score	Combined	Controversies
	(1)	(2)	(3)
ESG_Pay_Peer*ESG_Pay_Focal*Post_Adopt_Peer	-0.004	-0.015	-0.048
	(0.027)	(0.027)	(0.041)
ESG_Pay_Peer	0.094***	0.101***	0.016
	(0.017)	(0.017)	(0.015)
ESG_Pay_Focal	0.130***	0.130***	0.002
	(0.029)	(0.029)	(0.021)
ESG_Pay_Peer*ESG_Pay_Focal	0.067**	0.057*	-0.021
	(0.033)	(0.034)	(0.039)
Controls	Yes	Yes	Yes
Constant	1.108***	1.545***	6.549***
	(0.090)	(0.101)	(0.189)
Year and Industry FE	Yes	Yes	Yes
Observations	14,219	14,219	14,219
Adjusted R-squared	0.477	0.410	0.242

Table 2.3: ESG Performance Change – Continues

Panel B: E, S and G Score

Dependent Variable:	E Score	S Score	G Score
	(1)	(2)	(3)
ESG_Pay_Peer*ESG_Pay_Focal*Post_Adopt_Peer	-0.049	0.000	0.004
	(0.057)	(0.031)	(0.035)
ESG_Pay_Peer	0.181***	0.070***	0.103***
	(0.045)	(0.019)	(0.023)
ESG_Pay_Focal	0.044	0.055	0.211***
	(0.085)	(0.034)	(0.035)
ESG_Pay_Peer*ESG_Pay_Focal	0.253***	0.083**	-0.009
	(0.095)	(0.038)	(0.044)
Controls	Yes	Yes	Yes
	Yes	Yes	Yes
Constant	-2.513***	0.796***	2.728***
	(0.243)	(0.105)	(0.119)
Year and Industry FE	Yes	Yes	Yes
Observations	10,602	14,219	14,219
Adjusted R-squared	0.386	0.433	0.229

Table 2.3: ESG Performance Change – Continues

Panel C: Environmental Pillar Score

Dependent Variable:	Resource Use	Emission	Envir Innovation
	(1)	(2)	(3)
ESG_Pay_Peer*ESG_Pay_Focal*Post_Adopt_Peer	-0.006	0.092	0.333**
	(0.100)	(0.099)	(0.132)
ESG_Pay_Peer	0.312***	0.327***	0.102*
	(0.060)	(0.058)	(0.057)
ESG_Pay_Focal	0.307***	0.321***	0.237**
	(0.103)	(0.107)	(0.111)
ESG_Pay_Peer*ESG_Pay_Focal	0.193	0.048	-0.019
	(0.124)	(0.128)	(0.133)
Controls	Yes	Yes	Yes
	Yes	Yes	Yes
Constant	-7.434***	-7.021***	-5.072***
	(0.322)	(0.332)	(0.388)
Year and Industry FE	Yes	Yes	Yes
Observations	14,219	14,219	14,213
Adjusted R-squared	0.518	0.509	0.451

Table 2.3: ESG Performance Change – Continues

Panel D: Social Pillar Score

Dependent Variable:	Workforce	Human Right	Community	Product
	(1)	(2)	(3)	(4)
ESG_Pay_Peer*ESG_Pay_Focal*Post_Adopt_Peer	-0.036	-0.022	0.037	-0.058
	(0.040)	(0.129)	(0.026)	(0.080)
ESG_Pay_Peer	0.094***	0.117**	0.074***	0.097**
	(0.028)	(0.056)	(0.019)	(0.048)
ESG_Pay_Focal	0.092*	0.203*	0.052	0.092
	(0.049)	(0.105)	(0.036)	(0.081)
ESG_Pay_Peer*ESG_Pay_Focal	0.140**	0.239*	-0.011	0.162
	(0.055)	(0.134)	(0.038)	(0.102)
Controls	Yes	Yes	Yes	-0.058
	Yes	Yes	Yes	(0.080)
Constant	-0.222	-6.313***	2.004***	0.097**
	(0.156)	(0.332)	(0.102)	(0.048)
Year and Industry FE	Yes	Yes	Yes	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.353	0.467	0.275	0.332

Table 2.3: ESG Performance Change – Continues

Panel E: Governance Pillar Score

Dependent Variable:	Management	Shareholder	CSR Strategy
	(1)	(2)	(3)
ESG_Pay_Peer*ESG_Pay_Focal*Post_Adopt_Peer	-0.006	0.009	0.069
	(0.044)	(0.058)	(0.112)
ESG_Pay_Peer	0.144***	-0.014	0.321***
	(0.030)	(0.033)	(0.057)
ESG_Pay_Focal	0.284***	0.026	0.256**
	(0.049)	(0.066)	(0.103)
ESG_Pay_Peer*ESG_Pay_Focal	-0.056	0.144*	0.253**
	(0.060)	(0.079)	(0.125)
Controls	Yes	Yes	Yes
	Yes	Yes	Yes
Constant	2.931***	3.391***	-8.076***
	(0.156)	(0.205)	(0.336)
Year and Industry FE	Yes	Yes	Yes
Observations	14,219	14,219	14,219
Adjusted R-squared	0.158	0.141	0.508

These findings imply that although focal firms appear to adopt ESG-pay practices influenced by their interlocked peers, this behavior does not lead to significant improvements in their ESG scores. Thus, it suggests that the adoption of ESG-pay might primarily serve as a form of window dressing, rather than a genuine effort to enhance overall ESG performance.

2.4.4 The Impact of Common Directors' Roles on ESG-Pay Policy

We next hypothesize that the influence of board peers on the propagation of ESG-pay practices may depend on the specific roles occupies by the shared directors on the boards of the focal and peer firms. For example, Amin et al. (2020) demonstrate that independent directors with higher network connectedness can enhance firms' CSR performance. According to agency theory, as the monitoring role is a key responsibility of independent directors, they actively work to collect information and resources from networks and facilitate information transmission. Meanwhile, it is often the executive directors who act as advisors on firms' policies. Thus, occupying an executive role on the board of one of the connected firms (either focal or peer) may be essential for transmitting ESG-pay practices across networks.

To empirically test whether the peer effects of ESG-linked pay are more pronounced in firms with interlocking directors occupying specific roles, we perform the following OLS regression model:

$$ESG\_Pay\_Focal_{i,t} = \beta_0 + \beta_1 ESG\_Pay\_Peer_{i,t} \times CommonDirector\_Role_{i,t} + \beta_2 ESG\_Pay\_Peer_{i,t} + \beta_3 CommonDirector\_Role_{i,t} + \gamma X_{i,t} + \lambda Y_{i,t} + \mu_j + \varphi_t + \varepsilon_{i,t}, \quad (4)$$

where $CommonDirector\_Role_{i,t}$ represents one of nine indicator variables, each equal to the number of the interlocking directors fulfilling one of the following roles: (1) CEO, (2) Chairman/Chairwoman, (3) independent director of (a) either the focal firm only, (b) the interlocking peer firm only, or (c) on both boards. The pairwise combination of criteria (1)-(3)

with sub-criteria (a) through (c) creates nine distinct indicator variables. We expect a positive and significant coefficient on all interaction terms in model (2) ($\beta_1 > 0$).

The result in Column (1) of Table 2.4 shows positive and significant coefficients on the interaction terms for regressions where the common director serves exclusively as the CEO of the focal firm. The coefficient of 0.025 on the interaction term in Column (1) suggests that the likelihood of a focal firm adopting an ESG-pay policy increases by 2.5% when it shares a director with another firm, where that director acts as CEO of the focal firm.

The result in Column (8) of Table 2.4 shows positive and significant coefficients for the interaction terms, where the interlocking director serves as an independent director in the interlocked peer firm and as an executive in the focal firm. Specifically, the coefficient of 0.025 on the interaction term in Column (8) indicates that the likelihood of a focal firm adopting an ESG-pay policy increases by 2.5% when it shares a director with another firm, where that director acts as an independent director on the interlocked peer firm's board and as an executive on the focal firm's board.

However, the coefficients on the interaction terms in Column (4) to (6) of Table 2.4 are consistently positive yet not significant. This result suggests that a shared director who acts as chairman or chairwoman on the boards of either the focal firm, the peer firm, or both does not significantly influence the adoption of ESG-linked pay policies in the focal firm.

Overall, these results can be interpreted as evidence that a director who fulfils an advising role (i.e., serves as an executive) exclusively on the focal firms' board plays an important role in propagating ESG-pay policies within that firm. However, a director who fulfils a monitoring role (i.e., serves as an independent director) only on the focal firm's board does not play a similarly significant role in the transmission of these policies.

Table 2.4: Cross-sectional Tests on Interlocking Directors' Role

This table presents the cross-sectional results of the peer effects on ESG-linked pay, highlighting the differing role of interlocking directors. It shows the results when the common director serves as CEO, Chairman (or Chairwoman), or Independent Director in the focal firm (in Columns (1), (4), and (7)), in the peer firm (in Columns (2), (5), and (8)), or in both firms (in Columns (3), (6), and (9)), respectively. All variables are defined in Appendix Table A.1. Standard errors, shown in parentheses, are clustered at the firm level. Year and industry fixed effects are included in the regression. All control variables are winsorized at the 1st and 99th percentiles. Levels of statistical significance are denoted by ***, **, and *, corresponding to the 1%, 5%, and 10% levels, respectively.

	CEO			Chairman/Chairwoman			Independent Director		
	Focal Firm	Peer Firm	Both Firms	Focal Firm	Peer Firm	Both Firms	Focal Firm	Peer Firm	Both Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ESG_Pay_Peer* CommonDirector_Role	0.025*	-0.018	-0.042	0.013	0.010	0.032	0.014	0.025***	0.003
	(0.014)	(0.017)	(0.052)	(0.009)	(0.012)	(0.021)	(0.009)	(0.009)	(0.003)
ESG_Pay_Peer	0.017	0.032**	0.028**	0.018	0.023*	0.023*	0.017	0.012	0.001
	(0.014)	(0.013)	(0.012)	(0.014)	(0.014)	(0.012)	(0.014)	(0.014)	(0.019)
CommonDirector_Role	-0.025**	0.015	-0.005	-0.003	-0.013	-0.024	-0.005	0.025***	0.003
	(0.010)	(0.016)	(0.047)	(0.006)	(0.011)	(0.015)	(0.008)	(0.009)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.555***	-0.561***	-0.555***	-0.553***	-0.560***	-0.553***	-0.546***	-0.556***	-0.483***
	(0.108)	(0.108)	(0.108)	(0.108)	(0.109)	(0.109)	(0.108)	(0.108)	(0.111)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,219	14,219	14,219	14,219	14,219	14,219	14,219	14,219	14,219
Adjusted R-squared	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.256	0.257

2.4.5 The Impact of Common Directors' Characteristics on ESG-Pay Policy

In this section, we examine whether the effect of board peers on the propagation of ESG-pay practices depends on the various characteristics held by the shared directors on the boards of the focal firms. We use *Tenure*, *Board Seats*, *Network Size* and *Female Director* as proxies for the characteristics of common directors.

We perform the similar OLS regression as in Model (3), replacing *CommonDirector_Role* with *CommonDirector_Char*, which represents *Tenure*, *Board Seats*, *Network Size*, and *Female Director*. The results are shown separately in Columns (1) to (4).

The coefficients on the interaction terms in Columns (1) to (3) of Table 2.5 are consistently positive and significant at the 1% level. These results indicate that interlocking directors with longer tenures, more board seats, and larger network size play an important role in propagating ESG-pay policies in the focal firm. The coefficient on the interaction terms in Column (4) of Table 2.5 is positive and significant at the 10% level, suggesting that female directors are more likely to facilitate the propagation of ESG-linked pay in the focal firm.

Table 2.5: Board-Linked Directors' Characteristics

This table presents the cross-sectional results of the peer effects on ESG-linked pay by identifying the interlocking directors' power, measured by tenure in the focal firm (in Column (1)), total number of board seats (in Column (2)), network size (in Column (3)), and whether they are female (in Column (4)), separately. All variables are defined in Appendix Table A.1. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Tenure	Board Seats	Network Size	Female Director
	(1)	(2)	(3)	(4)
ESG_Pay_Peer* CommonDirector_Char	0.032***	0.033***	0.027***	0.031*
	(0.010)	(0.011)	(0.010)	(0.017)
ESG_Pay_Peer	-0.082**	-0.069**	-0.234**	-0.002
	(0.034)	(0.034)	(0.094)	(0.017)
CommonDirector_Char	-0.002	-0.007	0.008	0.019
	(0.008)	(0.010)	(0.008)	(0.015)
Controls	Yes	Yes	Yes	Yes
Constant	-0.486***	-0.493***	-0.454***	-0.466***
	(0.109)	(0.109)	(0.116)	(0.110)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.256	0.256	0.257	0.257

2.4.6 The Impact of Expertise of Interlocking Directors on ESG-Pay Policy

In this section, we examine whether the expertise of shared board members in compensation or ESG matters can be instrumental in implementing ESG-pay practices. We assess whether common directors possess compensation or ESG-related expertise by identifying their participation on compensation committees and CSR/sustainability committees, respectively. Members of the compensation committee are responsible for setting executive compensation and can leverage their external experience to provide recommendations on compensation design and guide the board in setting these policies (Zhang, 2021). Similarly, directors who have seats on CSR or sustainability committees in either the focal firm or board-connected peer firms are likely to place greater emphasis on providing incentives for executives to invest in ESG initiatives.

We divided the sample into two groups based on whether the common director serves on the compensation or CSR/sustainability committee only in focal/peer firm or in both firms. Table 2.6 presents the regression results for Model (1) when the shared director is a member of the compensation committee on the board of either the focal firm, the peer firm, or both. The coefficients on *ESG_Pay_Peer* in all odd-numbered groups are positive and statistically significant, suggesting that interlocked directors who are members of compensation committee on either or both boards of interlocked firms promote ESG-linked compensation policies in the focal firms.

Panel B of Table 2.6 presents the results for examining the role in the propagation of ESG-pay practices by interlocking directors who are members of CSR or sustainability committee on either or both board-connected firms. The coefficient estimates on *ESG_Pay_Peer* in all even-numbered groups are positive and statistically significant, suggesting that if the focal firm shares at least one director with a peer that has an ESG-pay policy and that director is not on the CSR/sustainability committee of either or both firms, then the probability that the focal firm adopts ESG-linked pay increases by 2.6% to 3.3%. In other words, common directors who

possess CSR-related knowledge are less likely to promote the adoption of ESG-linked pay compared to those without CSR expertise. One possible explanation for this result is that directors with ESG expertise may have more concerns about ESG-pay and do not believe that linking incentives with ESG issues will necessarily address the underlying problems. The finding is consistent with the notion proposed by Bursztyn et al. (2014), who identified heterogeneous learning effects and noted that less sophisticated individuals react more strongly to others' decisions while more sophisticated individuals' decisions have a greater impact on others.

Overall, these results demonstrate that shared directors who are members of the compensation committee on either or both the focal and board-linked firms play a crucial role in transmitting ESG-related pay policies.

An important extension of our analysis is to consider whether CEO pay or ESG performance could serve as mediating variables in the relationship between board-connected peers' ESG-linked pay adoption and the focal firm's own adoption decision. While our primary findings indicate that ESG-linked pay diffuses through boardroom networks, the underlying mechanisms remain an open question. It is possible that the influence of interlocked peers operates indirectly—either through compensation incentives influencing CEO behavior or through changes in ESG performance affecting the firm's strategic compensation decisions.

One plausible pathway is through CEO compensation incentives as a mediating mechanism. If a focal firm's board observes that peers offering ESG-linked incentives also reward their CEOs with higher pay or improved career prospects, it may motivate the focal firm to follow suit. Recent research by Chang et al. (2024) provides empirical evidence that CEOs are influenced by their compensation peers' corporate social responsibility (CSR) performance, particularly when CEO pay is explicitly tied to CSR outcomes. Their findings suggest that firms improve their CSR performance when their compensation peer firms have

stronger CSR performance, implying that compensation peer effects play a crucial role in shaping ESG-related initiatives. This aligns with the broader idea that executive compensation structures can serve as an incentive mechanism, reinforcing ESG adoption among firms with interconnected governance networks. If board-connected peers' ESG-linked pay practices indirectly affect a focal firm's adoption decision through changes in CEO incentives or career concerns, this would suggest that CEO pay mediates the observed diffusion effects.

Another potential mediator is ESG performance itself. If a firm sees tangible improvements in ESG performance after adopting ESG-linked pay, it may serve as a positive reinforcement mechanism, increasing the likelihood of other firms in its network adopting similar policies. Conversely, if no meaningful ESG improvements are observed, ESG-linked pay may function more as a symbolic or reputational tool rather than a performance-driven strategy. This perspective is crucial in distinguishing whether ESG-linked pay serves as a substantive governance mechanism or simply as a window-dressing signal. Future research could explore whether firms are more likely to adopt ESG-linked pay when they see a credible improvement in ESG performance among their board-connected peers.

While our current analysis does not empirically test these mediation effects, recognizing their potential importance adds depth to our understanding of how ESG-linked pay propagates within corporate networks. The findings of Chang et al. (2024) reinforce the idea that CEO incentives play a crucial role in shaping corporate sustainability practices, providing a relevant lens through which to interpret our results. Future studies may consider a more detailed examination of whether CEO compensation structures or observed ESG performance improvements mediate the diffusion of ESG-linked pay across interlocked firms.

Table 2.6: Expertise of Interlocking Directors

This table displays the cross-sectional results of the peer effects on ESG-linked pay by examining whether the common directors specialize in areas related to ESG-linked pay. We assess whether there is at least one interlocking director who served on the compensation committee (in Panel A) or a CSR-related committee (in Panel B) in the focal firm (Column (1) and (2)), peer firm (Column (3) and (4)), or both firms (Column (5) and (6)), separately. All variables are defined in Appendix Table A.1. Standard errors, shown in parentheses, are clustered at the firm level. Year and industry fixed effects are included in the regression. All control variables are measured for the fiscal year and are winsorized at the 1st and 99th percentiles. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Compensation Committee Member

	Focal Firm		Peer Firm		Both Firms	
	Yes	No	Yes	No	Yes	No
	is member	Not member	is member	Not member	is member	Not member
	(1)	(2)	(3)	(4)	(5)	(6)
ESG_Pay_Peer	0.030**	0.020	0.031**	0.021	0.039*	0.020
	(0.015)	(0.015)	(0.014)	(0.016)	(0.020)	(0.013)
Test of Coefficient Equality		-0.010***		-0.010***		-0.019***
(*p*-value)		(0.000)		(0.000)		(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.538***	-0.496***	-0.665***	-0.396***	-0.434**	-0.588***
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,788	6,413	8,625	5,575	3,296	10,904
Adjusted R-squared	0.250	0.276	0.260	0.261	0.269	0.258

Table 2.6: Expertise of Interlocking Directors - Continues

Panel B: CSR/Sustainability Committee Member

	Focal Firm		Peer Firm		Both Firms	
	Yes	No	Yes	No	Yes	No
	is member	Not member	is member	Not member	is member	Not member
	(1)	(2)	(3)	(4)	(5)	(6)
ESG_Pay_Peer	-0.026	0.033***	-0.010	0.026**	-0.158	0.028**
	(0.040)	(0.013)	(0.030)	(0.013)	(0.110)	(0.012)
Test of Coefficient Equality		0.059***		0.037***		0.186***
(*p*-value)		(0.000)		(0.000)		(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.468***	-0.457***	-0.648**	-0.495***	-2.632***	-0.542***
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,306	12,897	2,100	12,096	155	14,040
Adjusted R-squared	0.397	0.240	0.320	0.241	0.510	0.249

2.5 Cross-Sectional Tests

In this section, we explore possible heterogeneity in our results based on the information environment, and the competitive landscape in which the focal firms operate.

2.5.1 Heterogeneity of Peer Effects by Firm's Information Asymmetry

According to resource dependence theory, board members can gain strategic resources from their external engagements, thereby providing valuable information to their firms (Amin et al., 2020). However, the effectiveness of their two primary roles—monitoring and advising—depends on the firm's information environment. If the cost of acquiring information is low, then outside directors are more effective in fulfilling their roles. Conversely, a high cost of information acquisition inhibits the effective fulfillment of directors' roles (Duchin et al., 2010). Nevertheless, board connections present another mechanism for valuable information transmission and knowledge exchange between firms, even if they operate in a high information asymmetry environment (Aghamolla & Thakor, 2022). Therefore, we hypothesize that the impact of shared directors on the transmission of ESG-linked policies from the interlocked peer to the focal firm will be more pronounced for focal firms operating in environments with high information asymmetry.

To empirically test this hypothesis, we construct four proxies for information asymmetry following prior literature (Drobetz et al., 2010; Duchin et al., 2010): the bid-ask spread (*Bid-Ask Spread*), number of analysts following the focal firm (*Number of Analysts*), dispersion of EBITDA forecasts (*Std EBITDA*), and the proportion of intangible assets (*Intangible Assets*). Detailed definitions of these variables are available in Table A.1 in the Appendix.

We perform the main regression Model (1) separately on the subsamples on firms operating in high and low information environments and present results in Table 2.7. The coefficient estimates for all proxies of peers' ESG-pay policy are positive and statistically

significant at better than the 10% level in the regressions on the subsample of firms operating in a high information asymmetry environment (Columns (1), (3), (5), and (7)).

Table 2.7: Firm Information Asymmetry

This table presents subgroup regression results using an OLS model specification to examine whether peer effects differ based on the level of information asymmetry faced by a focal firm. The dependent variable, *ESG_Pay_Focal*, is a dummy variable equal to one if the company adopts the ESG-linked compensation policy, and zero otherwise. We use four measures of information asymmetry, including *Bid-Ask Spread*, *Number of Analysts*, *Std EBITDA*, and *Intangible Assets*. See Table A.1 in the Appendix for detailed descriptions of each variable. The high asymmetry (*High*) group is shown in the odd Columns and the low asymmetry group (*Low*) in the even Columns, divided based on whether the focal firm was above or below the median in terms of *Bid-Ask Spread*, *Std EBITDA*, and *Intangible Assets* (the opposite is true for the use of *Number of Analysts*). All variables are defined in Table A.1 in the Appendix. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. Levels of statistical significance are denoted by ***,**, and *, corresponding to the 1%, 5%, and 10% levels, respectively.

	Bid-Ask Spread		Number of Analyst		Std EBITDA		Intangible Assets	
	High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG_Pay_Peer	0.028*	0.021	0.036**	0.027	0.023*	0.028	0.070***	0.014
	(0.015)	(0.019)	(0.017)	(0.017)	(0.014)	(0.021)	(0.023)	(0.014)
Test of Coefficient Equality	-0.007***		-0.008***		0.004***		-0.056***	
(*p*-value)	(0.000)		(0.000)		(0.000)		(0.000)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.599***	-0.491***	-0.135	-0.768***	-0.599***	-0.338**	-0.260	-0.630***
	(0.118)	(0.165)	(0.147)	(0.211)	(0.133)	(0.170)	(0.212)	(0.122)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8,649	5,461	6,467	7,015	11,023	3,169	2,931	11,271
Adjusted R-squared	0.272	0.266	0.254	0.301	0.263	0.239	0.418	0.238

Overall, these results are consistent with our conjecture that board-connected peer effects are more pronounced in firms operating in high information asymmetry environments. These firms derive greater value from valuable board connections and are more likely to implement new policies, such as ESG-pay, under the influence of board peers. In contrast, firms operating in low information environments have other information channels available to them and are less likely to implement new policies, such as ESG-pay, simply because their board-connected peers have adopted such policies.

2.5.2 Heterogeneity of Peer Effects by Firm's Competition Pressure

In this section, we explore potential competition channels based on rivalry-based theories. These theories suggest that firms facing higher competition intensity in the product market are strongly motivated to mimic their peer (Lieberman & Asaba, 2006). Additionally, peer mimicking allows firms to maintain their relative position in the competitive market (Rind et al., 2021b). In our case, adopting an ESG-linked executive compensation policy can provide firms with several competitive advantages relative to their counterparts. Cao et al. (2019) indicate that engaging in CSR activities can enhance a firm's value by gaining a competitive advantage and document that a firm's CSR policy can be influenced by its peers' practices. Furthermore, incorporating ESG metrics into the compensation package can attract the attention of institutional investors.

As discussed above, firms that adopt ESG-linked executive compensation policies gain competitive advantages. Consequently, firms without an ESG-contract are at a relative disadvantage when a peer firm adopts such a policy. To remain competitive, a firm will increase its propensity to adopt the policy upon observing a peer firm undertake the ESG-contract. In other words, the marginal benefit of not adopting the ESG-linked compensation policy decreases following the policy adoption by a peer firm. Overall, these arguments suggest that

competitive pressure in the product market may result in peer effects in the adoption of ESG-linked compensation policies.

To empirically test the results, this chapter calculates a Herfindahl-Hirschman Index (*HHI index*), which is measured using firms' sales data based on the 3-digit SIC industry classification level. The data are collected from the Compustat database. The HHI measures the concentration of an industry in a given year and can serve as a proxy for firms' competition pressure. If an industry is dispersed among multiple firms, it is considered less concentrated and thus more competitive. Conversely, if firms in an industry are concentrated in a small number of firms, the industry is deemed less competitive.

Additionally, we use the *Marketshare* as a second measures of the level of competitive pressure that firms face. *Marketshare* is calculated as the ratio of a firm's market share to the total value of the 3-digit SIC industry's market shares, based on sales data. A higher *Marketshare* value indicates that a firm faces less competitive pressure. Conversely, a lower *Marketshare* value suggests that a firm is under a higher level of competitive pressure.

In addition, this study also uses *CR4*, *CR6* and *CR8* as the alternative measurements of industry's concentration ratio to proxy for the degree of competition pressure. To be specific, *CR4* is the four-firm concentration ratio which is measured as the total sales of the four largest firms in 3-digit SIC industry to the total value of the industry. Similarly, *CR6* is the six-firm concentration ratio which uses he total sales of the six largest firms in 3-digit SIC industry to the total value of the industry and CR8 is the eight-firm concentration ratio which uses he total sales of the eight largest firms in 3-digit SIC industry to the total value of the industry. The higher value of three different measures of concentration ratio represents lower competition pressure. In the same time, the lower value of concentration ratio means higher level of competition pressure that firms in the given industry faced.

Table 2.8 presents the results of the peer effects on ESG-linked compensation policies for firms facing varying levels of competitive pressure. Columns (1) and (2) display results for groups with lower and higher competition, respectively, using the *HHI index*. The lower competition pressure group (*Lower Com*) is defined as firms with an *HHI index* higher than the median for a given year. Conversely, the higher competition pressure group (*Higher Com*) is defined as firms with an *HHI index* lower than the median for that year. Columns (3) and (4) show results using *Market Share* to proxy for competitive pressure. The sample is split using the median *Market Share* value for the year: the lower competition pressure group consists of firms whose *Market Share* exceeds the median value of *Market Share* in their 3-digit SIC industry, while the higher competition pressure group includes firms whose *Market Share* is below the median. Columns (5) to (10) use *CR4*, *CR6*, and *CR8* to measure levels of industry concentration separately. Similarly, the lower competition pressure group (*Lower Com*) includes firms with values of *CR4*, *CR6*, and *CR8* higher than the median value of these concentration measures in their respective 3-digit SIC industry. The higher competition pressure group (*Higher Com*) comprises firms with values of *CR4*, *CR6*, and *CR8* lower than the median values for these concentration measures in their respective industry.

As discussed above, we predict that peer effects are more pronounced if the focal firm faces a higher degree of competition pressure. The results across five different measures of firms' competition level consistently show that the coefficients for firms experiencing higher levels of competitive pressure are positive and statistically significant.

Table 2.8: Firm Competition Pressure

This table presents the subgroup regression results using an OLS model specification to examine whether peer effects differ based on the level of competitive pressure that a focal firm faces. The dependent variable, *ESG_Pay_Focal*, is a dummy variable that equals one if the company adopts the ESG-linked compensation policy, and zero otherwise. We use five measures of firm competition pressure, including *HHI Index*, *Market Shares*, *CR4*, *CR6*, and *CR8*. See Table A.1 in the Appendix for detailed descriptions of each variable. The lower competition group (*Lower Com*) is shown in the odd Columns, and the higher competition group (*Higher Com*) is shown in the even Columns, split based on whether the focal firm was above or below the median for these four proxies. All variables are defined in Table A.1 in the Appendix. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. Levels of statistical significance are denoted by ***, **, and *, corresponding to the 1%, 5%, and 10% levels, respectively.

	HHI Index		Market Shares		CR4		CR6		CR8	
	Lower Com	Higher Com	Lower Com	Higher Com	Lower Com	Higher Com	Lower Com	Higher Com	Lower Com	Higher Com
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ESG_Pay_Peer	0.012	0.041**	0.009	0.042***	0.013	0.038**	0.020	0.035*	0.016	0.036*
	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.018)	(0.016)	(0.018)	(0.015)	(0.019)
Test of Coefficient Equality	0.029***		0.033***		0.025***		0.015***		0.020***	
(*p*-value)	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.572***	-0.535***	-0.533***	-0.245*	-0.586***	-0.524***	-0.581***	-0.515***	-0.628***	-0.447***
	(0.146)	(0.154)	(0.185)	(0.134)	(0.141)	(0.154)	(0.143)	(0.156)	(0.141)	(0.152)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7,228	6,987	7,110	7,089	7,461	6,754	7,870	6,345	8,170	6,045
Adjusted R-squared	0.284	0.222	0.320	0.193	0.279	0.227	0.280	0.224	0.277	0.239

2.6 Instrumental Variables Specification

The main question we wish to consider is whether (and how) peer effects propagate ESG-linked compensation through a network of interlocking directors. We hypothesize that firms sharing directors with other firms that have adopted ESG-linked criteria in their compensation are more likely to adopt the same practice. A key challenge in analyzing the diffusion of ESG-linked pay practices through boardroom networks is the potential for endogeneity, which may arise from reverse causality, omitted variable bias, or the endogenous formation of board interlocks.

To address these concerns, we follow Aghamolla and Thakor (2022) and employ an instrumental variable (IV) approach, using the ESG-pay policy of peers' peers as an instrument for the ESG pay policy of directly connected peers. In our study, each firm has a distinct board-connected peer group, meaning that peer groups do not perfectly overlap across firms. This setting allows us to use the lagged value of the ESG-linked compensation policy of a board-connected peer of the focal firm's peer—which is not a direct peer of the focal firm—as an instrument for the peer's ESG-linked compensation policy.[7] While the peer-of-peer IV approach has been applied in the IPO literature, its use in this context remains conceptually appropriate because it leverages the network structure of board interlocks to isolate exogenous variation in peer ESG pay adoption. The rationale for using peers' peers as an instrument extends beyond IPO settings because peer effects often propagate through indirect connections, making second-degree network effects a valid exogenous source of variation.

This approach helps address the following endogeneity concerns. One major concern is that firms do not just adopt ESG-linked pay because of their board-connected peers, but rather that firms with similar governance structures and compensation philosophies may cluster

[7] For example, consider four firms: A, B, C, and D. Suppose that firms A and B are direct peers because they share one board director. Firm A does not share any directors with firms C and D. However, Firm B has two direct peers — firms C and D — as it shares directors with these firms. In this example, firms C and D are peers of peers, as they are peers of Firm B, which is a direct peer of the focal firm A.

together. This could mean that the observed correlation between peer ESG pay adoption and focal firm adoption is not necessarily causal, but instead reflects shared underlying characteristics. By using the ESG pay adoption of peers' peers as an instrument, we introduce an exogenous source of variation that affects the focal firm's ESG pay adoption only through its direct board-connected peers, mitigating concerns that the focal firm's characteristics are directly driving the observed relationship.

Another endogeneity concern is the presence of unobservable factors that may simultaneously influence both a firm's ESG-linked pay decision and its peers' decisions. For example, unobserved industry trends, investor pressures, or regulatory expectations could independently drive firms within a network to adopt ESG-linked pay. If these unobserved factors are correlated with both the independent variable (peer ESG pay adoption) and the dependent variable (focal firm ESG pay adoption), standard regression estimates may be biased and inconsistent. The instrumental variable approach helps isolate the exogenous variation in peer ESG pay adoption by leveraging an additional network layer—peers' peers—which is less likely to be directly influenced by the same unobservable firm-specific factors.

A common issue in peer effect studies is simultaneity bias, often referred to as the reflection problem (Manski, 1993), where it is difficult to disentangle whether firms are influencing their peers or simply responding to the same external pressures at the same time. If firms within a network adopt ESG-linked pay concurrently due to common industry shifts or macroeconomic trends, then a simple correlation does not necessarily imply causal peer influence. The use of peers' peers as an IV helps overcome this problem by ensuring that the variation in a firm's decision to adopt ESG-linked pay is not directly influenced by its immediate peers' concurrent decisions, but rather by an indirect mechanism that operates through network connections.

The above variable satisfies the relevance and exclusion conditions required for a valid instrument for peer effects. For the relevance condition to hold, the instrument must be correlated with the suspected endogenously determined independent variable, which in this case is the peer firms' adoption of ESG-linked compensation policies. As our main results indicate, a firm's ESG-pay policy is directly influenced by the presence of this policy among its board-connected peers. For the exclusion condition to hold, the instrument should be related to the dependent variable, which is the focal firms' adoption of ESG-linked compensation policies, only through the intermediate variable (peer firms' adoption of ESG-linked compensation policies) after controlling for other factors.

We define our instruments in a way that is consistent with the variation of the dependent variable and use *Peer's Peer ESG_Pay* to instrument for *ESG_Pay_Peer*. We then transform our baseline Model (1) into a two-stage least squares estimation (2SLS). In the first stage, we regress *ESG_Pay_Peer* on the respective *Peer's Peer ESG_Pay* instrument and use the fitted values of *ESG_Pay_Peer* from this first stage in our main Model (1). We apply the same control variables and fixed effects in both the first and second stages of estimation as used previously.

Columns (1) and (3) of Table 2.9 report the results of the first-stage IV estimation. The coefficient estimates for all variations of *Peer's Peer ESG_Pay* are positive and statistically significant ($p < 0.000$), confirming that there is a higher probability of the focal firm's peer adopting the ESG-pay policy if its peers have this policy, consistent with our main results. The Cragg-Donald Wald F-statistic in the main models is 274.527, indicating that *Peer's Peer ESG_Pay* is unlikely to be a weak instrument. Overall, the first-stage results suggest that the integration of the ESG-linked compensation policy by peers of peers is a strong predictor of peer firms' adoption of this policy.

Columns (2) and (4) of Table 2.9 report the results of the second-stage IV estimation. The coefficient estimates on the instrumental variables are positive and highly significant ($p < 0.000$)

across all regressions, suggesting that our main results remain robust even after instrumenting for peer firms' adoption of ESG-linked compensation policies. Overall, these results confirm that our main conclusions are not driven by endogeneity or reverse causality concerns.

Table 2.9: Instrumental Variables Approach (2SLS-IV)

This table presents results examining the propensity for the adoption of an ESG-linked compensation policy based on whether a peer firm has the policy, using an instrumental variable strategy. Columns (1) and (3) show the estimates of the first-stage regression, which relate the instrumental variable, *Peer's Peer ESG_Pay*, to the interlocked peer firms' ESG-linked compensation policy. Columns (2) and (4) display the estimates of the second-stage regressions, which relate the instrumented peer firms' ESG-linked compensation policy from the first stage to the focal firm's compensation policy. All variables are defined in Table A.1 in the Appendix. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. Levels of statistical significance are denoted by ***, **, and *, corresponding to the 1%, 5%, and 10% levels, respectively.

Dependent Variable:	ESG_Pay_Peer	ESG_Pay_Focal	ESG_Pay_Peer	ESG_Pay_Focal
	First Stage	Second Stage	First Stage	Second Stage
	(1)	(2)	(3)	(4)
$\widehat{\text{ESG\_Pay\_Peer}}$		1.335***		1.225***
		(0.049)		(0.049)
Peer's Peer ESG_Pay	0.221***		0.120***	
	(0.012)		(0.012)	
Controls	No	No	Yes	Yes
Constant	0.459***	-0.522***	-1.514***	-0.867***
	(0.011)	(0.026)	(0.086)	(0.100)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	13,897	13,897	13,897	13,897
Cragg-Donald Wald F statistic	128.068		274.527	
Adjusted R-squared	0.143	0.303	0.237	0.322

2.7. Robustness

2.7.1 Alternative Measurements and Models

In this section, we conduct several robustness tests to validate the main findings.

First, we use *ESG_Pay_Peer_Num* as an alternative measurement for the board-connected peer firms' ESG-linked pay. Specifically, *ESG_Pay_Peer_Num* is defined as the natural logarithm of the number of peer firms that have an ESG-linked executive compensation policy plus one. Panel A of Table 2.10 presents the regression results, which remain consistent with the baseline findings. The coefficients are positive and statistically significant, reinforcing the idea that peer adoption influences a focal firm's likelihood of implementing ESG-linked pay. The estimated coefficient of 0.030 on *ESG_Pay_Peer_Num* suggests that an additional board connection with an ESG-linked pay policy (approximately equal to one standard deviation of *ESG_Pay_Peer_Num*) increases the probability of a focal firm implementing this policy by about 9.21%.

Secondly, given that our dependent variable is binary, we employ logit and probit models as alternative estimation methods to check for robustness. reported in Panel B of Table 2.10, remain consistent with the baseline regression, demonstrating that the relationship between board-connected peers' ESG pay adoption and a focal firm's likelihood of adopting similar practices is not sensitive to the choice of model specification.

Third, to account for potential confounding effects stemming from industry and location-based networks, we exclude peer firms that share the same 3-digit SIC industry code or are located in the same Metropolitan Statistical Area (MSA) as the focal firm. By restricting the sample in this way, we ensure that our findings are not merely driven by industry-wide trends or local peer effects. The results, presented in Panel C of Table 2.10, remain qualitatively unchanged, further supporting the robustness of our findings.

Fourthly, to address potential endogeneity concerns and ensure that our findings capture peer influence rather than concurrent decision-making, we introduce a one-year lag in the independent variables. This approach helps mitigate reverse causality by ensuring that the adoption of ESG-linked pay among board-connected peers precedes the focal firm's decision to implement such policies. The results, reported in Panel D of Table 2.10, remain consistent with the main analyses, with the coefficients retaining their positive sign and statistical significance. This reinforces the robustness of our findings and suggests that peer influence is not merely a contemporaneous effect but persists over time.

Overall, these robustness tests confirm that our main results are not sensitive to alternative variable definitions, estimation methods, industry or location-based peer effects, or potential endogeneity concerns arising from simultaneity.

Table 2.10: Robustness Tests

This table presents the results of robustness tests using alternative variable measurements and models. The dependent variable, *ESG_Pay_Focal*, is a dummy variable equal to one if the company adopts the ESG-linked compensation policy, and zero otherwise. Panel A uses *ESG_Pay_Peer_Num* as an alternative measure for peer firms' adoption of ESG-linked pay, defined as the natural logarithm of one plus the number of peer firms that have the ESG-linked executive compensation policy. Panel B displays regression results using Logit and Probit models separately. Panel C presents results after excluding boardroom-connected peers within the same industry and location. Panel D reports results by lagging the independent variables for one year. Year and Industry fixed effects are included in the regression. All variables are defined in Table A.1 in the Appendix. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Alternative Measurement of the Main Independent Variable

	(1)	(2)	(3)	(4)
ESG_Pay_Peer_Num	0.158***	0.098***	0.108***	0.030**
	(0.014)	(0.013)	(0.014)	(0.013)
Controls	Yes	Yes	Yes	Yes
Constant	0.194***	0.230***	-0.238**	-0.522***
	(0.010)	(0.010)	(0.108)	(0.110)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.038	0.228	0.067	0.255

Table 2.10: Robustness Tests – Continues

Panel B: Nonlinear Models

	Logit Model		Probit Model	
	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.547***	0.175**	0.319***	0.103**
	(0.073)	(0.083)	(0.043)	(0.047)
Controls	Yes	Yes	Yes	Yes
Constant	-4.145***	-7.670***	-2.451***	-4.397***
	(0.585)	(1.319)	(0.340)	(0.743)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Observations	14,219	13,502	14,219	13,502
Pseudo R-squared	0.057	0.217	0.057	0.215

Table 2.10: Robustness Tests – Continues

Panel C: Excluding Intra-industry and Same MSA Connections

	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.142***	0.080***	0.094***	0.022*
	(0.014)	(0.013)	(0.014)	(0.013)
Controls	Yes	Yes	Yes	Yes
Constant	0.213***	0.251***	-0.319***	-0.564***
	(0.011)	(0.010)	(0.110)	(0.111)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Observations	13,395	13,395	13,395	13,395
Adjusted R-squared	0.023	0.224	0.055	0.254

Table 2.10: Robustness Tests – Continues

Panel D: Lagged the Independent Variables for One Year Period

	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.150***	0.084***	0.101***	0.025*
	(0.015)	(0.014)	(0.015)	(0.014)
Controls	Yes	Yes	Yes	Yes
Constant	0.221***	0.261***	-0.289**	-0.530***
	(0.012)	(0.011)	(0.124)	(0.124)
Year FE	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes
Observations	11,562	11,562	11,562	11,562
Adjusted R-squared	0.025	0.240	0.060	0.271

2.7.2 Common Ownership

Prior studies suggest that institutional investors play an significant role in corporate governance and can influence firms' decisions regarding ESG-linked pay (Cohen et al., 2023). Large institutional investors often encourage firms to adopt ESG-related policies to align executive incentives with long-term sustainability goals. Given this, it is possible that the observed relationship between board-connected peers and ESG-linked pay adoption is not purely driven by boardroom network effects, but rather by common institutional ownership among these firms. If the same institutional investors hold significant stakes in both the focal firm and its board-connected peers, they may simultaneously push for similar ESG compensation policies across their portfolio firms, creating an alternative mechanism for policy diffusion.

To capture the influence of common institutional ownership, we introduce four alternative measures that account for different dimensions of investor overlap between focal firms and their board-connected peers. *CommonOwner_Num* represents the total number of institutional investors that hold shares in both the focal firm and at least one of its board-connected peers. *CommonOwner_Ratio* measures the proportion of a firm's institutional investors that also have ownership stakes in its board-connected peers, providing a relative measure of investor overlap. To assess more concentrated investor influence, we include *CommonOwner_Half*, a binary variable that equals 1 if at least half of the focal firm's institutional investors also invest in its board-connected peers, indicating a significant level of shared ownership. Lastly, *CommonOwner_One* is a binary indicator set to 1 if the focal firm and its board-connected peers share at least one common institutional investor, capturing the minimum level of investor overlap. These measures allow for a comprehensive assessment of whether institutional investor influence could be driving the observed relationship between boardroom networks and ESG-linked pay adoption.

The results, presented in Panel A of Table 2.11, show that after controlling for common ownership, the coefficient of peers' ESG pay adoption remains positive and statistically significant. This suggests that the diffusion of ESG-linked compensation policies through boardroom networks is not solely driven by shared institutional investors, but rather by the peer learning and network effects embedded within interlocking directorships.

By incorporating these additional tests, we strengthen the validity of our findings by ruling out a key alternative explanation—that institutional investor influence, rather than board interlocks, is driving ESG pay adoption. This reinforces the argument that boardroom networks facilitate knowledge transfer and shape compensation practices independently of external ownership structures.

2.7.3 Common Compensation Consultants

Another concern regarding the influence of board-connected networks on firms' adoption of ESG-linked pay is the potential effect of common compensation consultants. Firms may seek advice on setting compensation from these consulting firms. Thus, we identify whether the focal and connected peer firms use common compensation consultants. We collect data on firms' compensation consultant from the ISS Incentive Lab database. The results are displayed in Panel B of Table 2.11. In Columns (1) to (4), we incorporate four measures of common compensation consultants (*CommonConsult_Num*, *CommonConsult_Ratio*, *CommonConsult_Half* , and *CommonConsult_One*) into the regression. The definitions of these variables are provided in Appendix Table A.1. The coefficient of peers' ESG-pay adoption remains positive and statistically significant, confirming that our results are robust to ruling out the alternative explanations involving the effects of common compensation consultants among the board-interlocked networks.

Table 2.11: Other Potential Effects

This table presents the results of robustness tests that include controls for common ownership and common compensation consultants in the regression models. The dependent variable, *ESG_Pay_Focal*, is a dummy variable equal to one if the company adopts the ESG-linked compensation policy, and zero otherwise. Panel A shows results using four measures of common ownership (*CommonOwner_Num*, *CommonOwner_Ratio*, *CommonOwner_Half*, and *CommonOwner_One*). Panel B reports the regression results after controlling for common compensation consultants with measures including *CommonConsult_Num*, *CommonConsult_Ratio*, *CommonConsult_Half*, and *CommonConsult_One*. All variables are defined in Appendix Table A.1. Year and Industry fixed effects are included in the regression. Standard errors, shown in parentheses, are clustered at the firm level. All control variables are winsorized at the 1st and 99th percentiles. Levels of statistical significance are denoted by ***, **, and *, corresponding to the 1%, 5%, and 10% levels, respectively.

Panel A: Common Ownership

	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.023*	0.026**	0.026**	0.026**
	(0.013)	(0.012)	(0.012)	(0.012)
CommonOwner_Num	0.014			
	(0.012)			
CommonOwner_Ratio		0.021		
		(0.017)		
CommonOwner_Half			0.024*	
			(0.015)	
CommonOwner_One				0.016
				(0.014)
Controls	Yes	Yes	Yes	Yes
Constant	-0.535***	-0.558***	-0.559***	-0.558***
	(0.113)	(0.108)	(0.108)	(0.108)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.255	0.255	0.255	0.255

Table 2.11: Other Potential Effects - Continues

Panel B: Common Compensation Consultant

	(1)	(2)	(3)	(4)
ESG_Pay_Peer	0.031**	0.032**	0.032**	0.031**
	(0.014)	(0.014)	(0.014)	(0.014)
CommonConsult_Num	0.011			
	(0.030)			
CommonConsult_Ratio		0.002		
		(0.076)		
CommonConsult_Half			-0.024	
			(0.040)	
CommonConsult_One				0.011
				(0.030)
Controls	Yes	Yes	Yes	Yes
Constant	-0.508***	-0.502***	-0.501***	-0.510***
	(0.125)	(0.126)	(0.125)	(0.124)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	14,219	14,219	14,219	14,219
Adjusted R-squared	0.208	0.208	0.208	0.208

2.8 Conclusion

This study examines whether peer effects exist in firm's integration of ESG-linked pay and whether these effects enhance ESG performance. We collected detailed directors' employment information from BoardEx to identify interlocked directors and construct peer groups for each focal firm. Using an unbalanced panel of 14,219 firm-year observations for 2,139 distinct U.S.-listed firms from 2002 to 2020, we find that peer effects significantly influence the adoption of ESG contracting. Specifically, our main result shows that there is a 2.7% higher probability that a firm will implement ESG-pay practices if at least one of its board-connected peers has adopted them. However, we also demonstrate that the integration of ESG contracting induced by its presence in their interlocked peers does not provide tangible benefits in the form of improvements in ESG performance. Additionally, we explore the impact of various roles occupied by the interlocked directors on the integration of ESG contracting by the focal firm.

Further analysis reveals that the role and position of interlocked directors within the boardroom network significantly shape the transmission of ESG pay policies. For instance, the probability of a focal firm adopting ESG-linked pay increases by 2.5% when it shares a director with another firm where that director serves as CEO of the focal firm. Similarly, when a shared director serves as an executive on the focal firm's board and as an independent director on an interlocked peer firm's board, the likelihood of ESG pay adoption also increases by 2.5%. These findings suggest that directors in advising roles (i.e., executives) play a crucial role in propagating ESG pay policies within firms, while those in monitoring roles (i.e., independent directors) do not exert a similarly strong influence. Additionally, we find that female directors are more likely to facilitate the propagation of ESG-linked pay, highlighting potential differences in governance and leadership dynamics.

Our results also emphasize the importance of compensation committees in driving ESG-linked pay diffusion. Specifically, shared directors who serve on the compensation

committee of either or both the focal firm and board-linked firms play a key role in transmitting ESG-related pay policies. This suggests that ESG pay adoption is not simply a passive peer effect but may be actively shaped by directors who hold decision-making authority over executive compensation.

Despite strong peer effects in ESG pay adoption, we find no significant evidence that such adoption leads to tangible improvements in ESG performance. This suggests that firms may be adopting ESG-linked pay primarily as a symbolic or reputational strategy rather than as a mechanism to drive substantive ESG outcomes. The findings contribute to the broader debate on whether ESG pay incentives genuinely enhance corporate sustainability or serve as a window-dressing tool to appease investors and stakeholders.

Further, we find that peer effects are more pronounced in firms operating in high-information asymmetry environments. Firms facing greater uncertainty and resource constraints derive more value from board connections and are therefore more likely to implement ESG-linked pay when their peers do so. In contrast, firms in low-information asymmetry environments—which have alternative sources of governance and strategic insights—are less likely to follow their board-connected peers in adopting ESG-linked pay. Additionally, we find that competition pressure strengthens the effect of peer influence, suggesting that firms facing more intense market competition are more likely to align their executive compensation policies with peer firms to maintain competitiveness and legitimacy.

Our results are robust across alternative model specifications and the instrumental variable approach. While our findings indicate a strong association between board connections and the adoption of ESG-linked compensation, we do not establish a direct causal relationship. Instead, this research suggests that resources and information exchanged via board connections play a dominant role in shaping executive compensation contracts. This provides new empirical evidence on the potential presence of peer learning effects in compensation policies.

This study makes several key contributions to the literature on corporate governance, executive compensation, and ESG practices. First, it provides new empirical evidence on how peer effects operate in shaping ESG-linked pay adoption, highlighting the role of board interlocks, compensation committees, and gender diversity in governance. Second, it challenges the assumption that ESG-linked pay necessarily improves ESG performance, raising important questions about the effectiveness of ESG incentives in driving real sustainability outcomes. Third, by examining how firm characteristics—such as information asymmetry and competition pressure—moderate peer effects, we offer new insights into the heterogeneous nature of ESG pay adoption across firms.

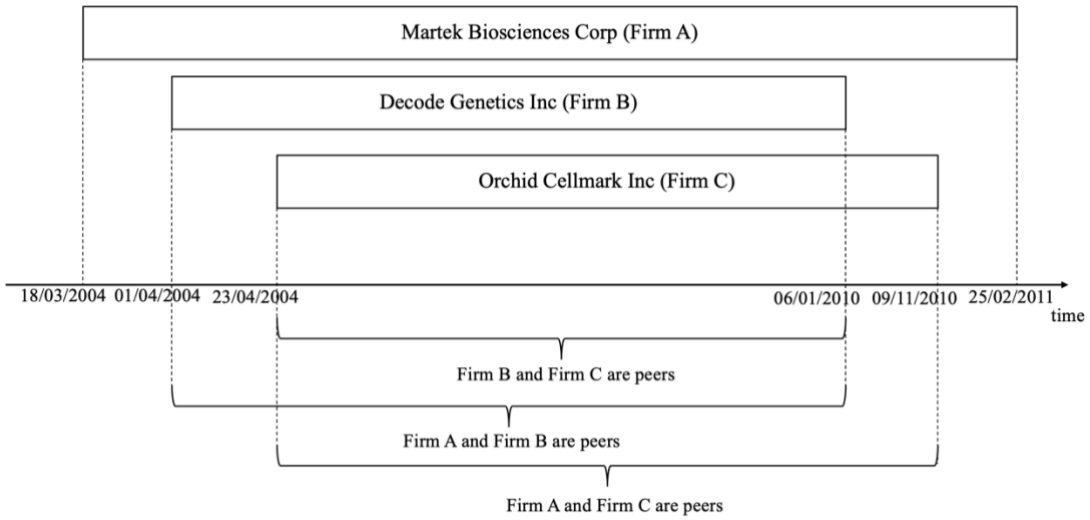
From a practical perspective, our findings have important implications for corporate boards, investors, and policymakers. Boards should recognize that ESG pay adoption is not purely an independent strategic decision but is shaped by peer networks and governance structures. Investors should critically assess whether firms adopting ESG-linked compensation are genuinely committed to sustainability or merely responding to external pressures and peer influence. Policymakers, in turn, may need to consider stricter oversight and transparency requirements to ensure that ESG-linked pay serves as an effective tool for improving corporate ESG performance rather than a symbolic compliance mechanism.

Overall, this study provides robust empirical evidence that peer effects play a dominant role in the diffusion of ESG-linked pay policies, but that such adoption does not necessarily translate into meaningful improvements in ESG performance. The findings highlight the complex interplay between board networks, executive incentives, and corporate governance strategies, shedding light on both the drivers and limitations of ESG-linked compensation practices. Future research could further explore the long-term effects of ESG pay adoption, investigate whether certain types of ESG pay incentives yield stronger performance outcomes,

and examine how regulatory changes influence the diffusion of ESG-linked pay across corporate networks.

Appendix

Figure A.1. Illustration of the board connection



Notes: This figure uses the employment history of Director Jim Beery from March 18, 2004, to February 25, 2011, at three firms to illustrate board connections and the matching process for peer firms. He served as an independent director at Firm A and Firm B. Additionally, he held board seats at Firm C, serving as an independent director from April 23, 2004, to August 25, 2009, and as an independent Chairman from August 25, 2009, to September 11, 2010.

Table A.1 Variables Definitions

Variable	Definition	Data Source
Focal Firms' ESG-Pay		
ESG_Pay_Focal	A dummy variable that equals one if the company adopts the ESG-linked compensation policy, and zero otherwise.	Refinitiv
Peer Firms' ESG-Pay		
ESG_Pay_Peer	A dummy variable that equals one if at least one peer firm has the ESG-linked compensation policy, and zero otherwise.	Calculation based on data from Refinitiv.
ESG_Pay_Peer_Num	The natural logarithm of one plus the number of peer firms that have adopted the ESG-linked executive compensation policy.	Calculation based on data from Refinitiv.
Firm-level Controls		
Size	The natural logarithm of total assets deflated to the year 2009 by the adjusted Consumer Price Index for all urban consumer. Ln (at * adjusted_cpi_2009).	Calculation based on data from Compustat.
Leverage	The ratio of long- and short-term debt to total assets. ((dltt+lct)/at)	Calculation based on data from Compustat.
Cash	Cash holdings are calculated as the ratio of cash and short-term investments to the book value of total assets. che/at	Calculation based on data from Compustat.
ROA	The ratio of net income to total assets. ni/at	Calculation based on data from Compustat.
Information Asymmetry Variables		
Bid-Ask Spread	The firm's bid-ask spread in a given year.	Calculation based on data from CRSP.

Number of analysts	The number of analysts who posted forecasts about the firm in a given year. Forecasts from the same analyst and the same brokerage house are considered to originate from a single analyst.	IBES
Std EBITDA	The standard deviation of EBITDA divided by total assets. ebitda/at	Calculation based on data from Compustat.
Intangible Assets	The firm's intangible assets divided by total assets. intan/at	Calculation based on data from Compustat.
Competition Level Variables		
HHI Index	The Herfindahl-Hirschman Index is calculated using firms' sales data and is based on the 3-digit SIC industry classification.	Calculation based on data from Compustat.
Market Shares	The ratio of a firm's market share to the total value of the 3-digit SIC industry's market shares, calculated using sales data.	Calculation based on data from Compustat.
CR4	The four-firm concentration ratio is measured as the total sales of the four largest firms in a 3-digit SIC industry relative to the total value of the industry.	Calculation based on data from Compustat.
CR6	The six-firm concentration ratio is measured as the total sales of the six largest firms in a 3-digit SIC industry relative to the total value of the industry.	Calculation based on data from Compustat.
CR8	The eight-firm concentration ratio is measured as the total sales of the eight largest firms in a 3-digit SIC industry relative to the total value of the industry.	Calculation based on data from Compustat.
Directors' Role Variables		
CEO	A dummy variable that equals one if the director is the CEO of the firm in a given year, and zero otherwise.	BoardEx
Chairman/Chairwoman	A dummy variable that equals one if the director serves as the Chairman or Chairwoman of the firm in a given year, and zero otherwise.	BoardEx
Independent Director	A dummy variable that equals one if the director serves as an independent director for the firm in a given year, and zero otherwise.	BoardEx

Directors' Characteristic Variables		
Tenure	The natural logarithm of the years plus one that the directors served in a given firm.	Calculation based on data from BoardEx.
Board Seats	The natural logarithm of one plus the number of years that the directors have served in a given firm.	Calculation based on data from BoardEx.
Network Size	The natural logarithm of one plus the size of the director's network.	Calculation based on data from BoardEx.
Female Director	A dummy variable that equals one if the director is female, and zero otherwise.	Calculation based on data from BoardEx.
Compensation Committee Member	A dummy variable that equals one if the director serves on the compensation committee of a given firm, and zero otherwise.	Calculation based on data from BoardEx.
CSR/sustainability Committee Member	A dummy variable that equals one if the director serves on the CSR or sustainability-related committee in a given firm, and zero otherwise.	Calculation based on data from BoardEx.
Firms' Characteristic Variables		
Board Size	The natural logarithm of the boardroom size.	Refinitiv
CEO Chairman Duality	A dummy variable that equals one if the CEO and chairman (or chairwoman) are the same person, and zero otherwise.	Refinitiv
CSR Committee	A dummy variable that equals one if the firm has a CSR or sustainability committee, and zero otherwise.	Refinitiv
ESG Performance	The firm's ESG score from year t-1.	Refinitiv
Firm ESG Performance Variables		
ESG Score	The overall ESG score, used for measuring firms' ESG performance, is an aggregate company score based on self-reported information across the environmental, social, and corporate governance pillars.	Refinitiv

Combined	The ESG Combined Score is an overall company score based on reported information across the environmental, social, and corporate governance pillars (ESG Score), with an ESG Controversies overlay.	Refinitiv
Controversies	The ESG controversies category score measures a company's exposure to environmental, social and governance controversies and negative events as reflected in global media.	Refinitiv
E Score	The environmental pillar measures a company's impact on living and non-living natural systems, including the air, land, and water, as well as complete ecosystems. It reflects how effectively a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities, thereby generating long-term shareholder value.	Refinitiv
S Score	The social pillar measures a company's capacity to generate trust and loyalty with its workforce, customers, and society, through its use of best management practices. It reflects the company's reputation and the health of its license to operate, both of which are key factors in determining its ability to generate long-term shareholder value.	Refinitiv
G Score	The corporate governance pillar measures a company's systems and processes that ensure board members and executives act in the best interests of its long-term shareholders. It reflects the company's capacity, through its use of best management practices, to direct and control its rights and responsibilities. This involves creating incentives as well as checks and balances to generate long-term shareholder value.	Refinitiv
Resource Use	The resource use category score reflects a company's performance and capacity to reduce the use of materials, energy, or water and to find more eco-efficient solutions through improved supply chain management.	Refinitiv

Emission	The emissions category score measures a company's commitment and effectiveness in reducing environmental emissions in its production and operational processes.	Refinitiv
Envir Innovation	The environmental Innovation category score reflects a company's capacity to reduce environmental costs and burdens for its customers, thereby creating new market opportunities through innovative environmental technologies, processes, or eco-designed products.	Refinitiv
Workforce	The workforce category score measures a company's effectiveness in ensuring job satisfaction, maintaining a healthy and safe workplace, supporting diversity and equal opportunities, and providing development opportunities for its workforce.	Refinitiv
Human Right	The human rights category score measures a company's effectiveness in respecting fundamental human rights conventions.	Refinitiv
Community	The community category score measures the company's commitment to being a good citizen, protecting public health, and respecting business ethics.	Refinitiv
Product	The product responsibility category score reflects a company's capacity to produce quality goods and services while integrating considerations for the customer's health and safety, integrity, and data privacy.	Refinitiv
Management	The management category score measures a company's commitment and effectiveness in adhering to best practice corporate governance principles.	Refinitiv
Shareholder	The shareholders category score measures a company's effectiveness in ensuring equal treatment of shareholders and the use of anti-takeover devices.	Refinitiv
CSR Strategy	The CSR strategy category score reflects a company's practices to demonstrate how it integrates the economic (financial), social, and environmental dimensions into its daily decision-making processes.	Refinitiv

Other Variables		
ESG_Pay_Focal	A dummy variable that equals one if the focal firm has adopted an ESG-linked compensation policy.	Constructed by the authors based on the dataset.
ESG_Pay_Peer	A dummy variable that equals one if at least one of the peers has adopted an ESG-linked compensation policy.	Constructed by the authors based on the dataset.
Post_Adopt_Peer	A dummy variable that equals one if the year of the focal firm's first adoption of the ESG-linked compensation policy is after any of its peers have adopted it.	Constructed by the authors based on the dataset.
CommonOwner_Num	The number of board-linked peer firms that have ESG pay and share common ownership with the focal firm.	Constructed by the authors based on the Thomson Reuters Institutional (13F) database.
CommonOwner_Ratio	The number of board-linked peer firms that have ESG pay and share common ownership with the focal firm, divided by the total number of board-linked peers.	Constructed by the authors based on the Thomson Reuters Institutional (13F) database.
CommonOwner_Half	A dummy variable that equals one if more than half of the board-linked peer firms have ESG pay and share common ownership with the focal firm, and zero otherwise.	Constructed by the authors based on the Thomson Reuters

		Institutional (13F) database.
CommonOwner_One	A dummy variable that equals one if the firm has at least one board-linked peer firm that has ESG pay and shares common ownership with the focal firm, and zero otherwise.	Constructed by the authors based on the Thomson Reuters Institutional (13F) database.
CommonConsult_Num	The number of board-linked peer firms that have ESG pay and share a common compensation consultant with the focal firm.	Constructed by the authors based on the ISS database.
CommonConsult_Ratio	The number of board-linked peer firms that have ESG pay and share a common compensation consultant with the focal firm, divided by the total number of board-linked peers.	Constructed by the authors based on the ISS database.
CommonConsult_Half	A dummy variable that equals one if the firm have more than half of the board-linked peer firm who have ESG pay and share common compensation consultant with the focal firm, and zero otherwise.	Constructed by the authors based on the ISS database.
CommonConsult_One	A dummy variable that equals one if the firm has at least one board-linked peer firm that has ESG pay and shares a common compensation consultant with the focal firm, and zero otherwise.	Constructed by the authors based on the ISS database.

Table A.2 Sample Selection

	Director level
Directors' employment history from 2002 to 2020 (individual-level with employment duration) from BoardEx	304,088
Cross-merged employment history	426,138
Less: Time filter (employment overlap of less than 1 year)	(121,410)
Converting data to director-year level format	1,164,301
Less: Missing director information	(39,918)
Sub-total:	1,124,383
	Director-firm pair-year level
Director-level data	1,124,383
Less: Missing ESG-linked pay data (available only from 2002) and control variables	(1,074,707)
Sub-total:	49,676
	Firm-year level
Director-firm pair-year level data	49,676
Converting to focal-firm-level data	(35,457)
Total: Firm-year observations	14,219
Total: Number of distinct firms	2,139

Chapter 3: The Real Effect of ESG Contracting

3.1 Introduction

The integration of Environmental, Social, and Governance (ESG) criteria into executive compensation frameworks represents a significant evolution in corporate governance. This shift is particularly noteworthy in an era where global stakeholders increasingly hold firms accountable not only for financial performance but also for sustainable and ethical operations. ESG-linked compensation therefore emerges as a critical mechanism to align executive incentives with broader sustainability goals, potentially transforming corporate strategies and stakeholder relationships.

The significance of ESG-linked compensation is emphasized by an expanding body of research exploring the nexus between executive pay and sustainability outcomes. Notable studies, such as those by Kolk and Perego (2014), demonstrate how traditional compensation frameworks, originally aimed at maximizing shareholder value, are being adapted to integrate sustainability targets. This shift recognizes the critical role of sustainable practices in ensuring long-term corporate viability and risk management.

The increasing adoption of ESG criteria in compensation packages, as noted by Cohen et al. (2023), indicates a significant shift from purely financial metrics to more comprehensive models that integrate environmental, social, and governance factors. This trend reflects the

pressures exerted by regulatory bodies, activist investors, and a more conscientious public demanding greater transparency and accountability from corporations.

The central question this research seeks to answer is whether ESG-linked compensation leads to genuine improvements in corporate ESG performance, or if it merely constitutes a form of greenwashing. This inquiry is critical in determining whether these compensation mechanisms serve as effective governance tools or are simply strategic responses to external pressures without substantial internal change. Our primary hypothesis, H1a, suggests that ESG contracting might increase the CEO's total compensation. This hypothesis is based on the managerial power theory, which posits that executives with significant influence over their compensation might use ESG metrics to justify higher pay (Bebchuk et al., 2002; Bebchuk & Fried, 2004). This scenario is particularly plausible if the ESG goals set are either insufficiently challenging or vaguely defined, allowing executives to meet these goals without genuinely enhancing the firm's ESG performance (Ittner et al., 1997). Conversely, our null hypothesis, H1b, suggests that ESG contracting does not affect the CEO's total compensation. This perspective is informed by stakeholder theory, which argues that the integration of ESG criteria is intended not to enhance executive pay but to align executive actions with broader, socially beneficial outcomes (Edmans, 2012; Freeman, 2010).

Extending the inquiry into the effectiveness of ESG-linked compensation, hypothesis H2 explores its impact on corporate ESG performance. H2a posits that ESG contracting leads to improved ESG performance, suggesting that linking executive compensation to ESG metrics may reflect a firm's genuine commitment to enhancing its sustainability practices (Flammer et

al., 2019; Haque & Ntim, 2020). This linkage could yield operational benefits such as reduced environmental impact and better ESG ratings. Conversely, hypothesis H2b contends that ESG contracting has no significant effect on ESG performance, indicating that the incorporation of ESG metrics into executive pay may be more symbolic and serve as potential greenwashing, without leading to substantial improvements in the firm's ESG outcomes (Delmas & Burbano, 2011). These hypotheses test the dual possibilities of ESG contracting—whether it acts as a mechanism for enhancing executive remuneration and aligning corporate objectives with sustainability goals, or merely as a symbolic gesture with limited real-world impact.

In conducting this study, we draw upon an extensive and comprehensive dataset to analyze the impacts of Environmental, Social, and Governance (ESG) criteria integrated into executive compensation frameworks. Our primary dataset is sourced from multiple databases, offering a robust platform for this empirical analysis. The initial sample includes U.S.-listed firms covered by the ISS Incentive Lab, which provides detailed insights into executive compensation and incentive awards derived from proxy statements. Spanning from 2006 to 2021, the data covers a critical period in which ESG considerations have notably risen to prominence within corporate governance paradigms. After addressing missing values in regression variables, our final sample consists of 12,288 firm-year observations, corresponding to 1,202 unique firms and 2,371 CEOs. This breadth of data supports rigorous statistical analysis.

ESG contracting, our focal variable, is operationalized as the 'ESG Pay Dummy'—a binary indicator that signifies whether a firm has linked the CEO's compensation to ESG

performance targets in a given year. This binary classification is enriched by further delineating the ESG criteria into environmental, social, and governance components, allowing for a nuanced analysis of the specific impact of each aspect.

To comprehensively assess the impact of ESG-linked compensation on CEO pay, our study employs three distinct measures. First, we analyze CEOs' total compensation, which includes base salary, bonuses, equity-based compensation, and other benefits. Each component is logged to normalize the data, facilitating more robust statistical analysis. This measure evaluates the direct financial impact of ESG-linked pay policies on CEO remuneration. Second, we dissect the structure of CEO compensation by examining the proportions of salary, bonuses, stock options, and other pay elements relative to the total compensation package. This analysis helps us understand how ESG-linked compensation might shift the balance between fixed and variable pay components, aligning incentives with long-term corporate sustainability goals. Third, we quantify the complexity of compensation packages by counting the distinct types of compensation components awarded to CEOs. This measure reflects the intricacy of compensation structures, which may increase as firms incorporate diverse ESG metrics into their executive pay schemes. Understanding compensation complexity is crucial for assessing whether ESG criteria effectively align executive actions with broader ESG objectives or simply complicate the pay structure.

To accurately assess the effectiveness of ESG-linked compensation, our study employs a robust framework for measuring ESG performance across multiple dimensions. First, we utilize the RepRisk database to gather data on firm-level ESG incidents, categorizing them into

environmental, social, and governance groups. This approach allows us to evaluate the frequency and severity of ESG-related incidents, providing detailed insight into each firm's specific challenges and successes in ESG performance. Secondly, to address potential greenwashing, we analyze the alignment between firms' internal actions (reflecting actual operational changes and CSR practices) and their external communications (public and stakeholder engagements on CSR). This comparison helps identify discrepancies that may suggest superficial or misleading representations of a firm's ESG efforts, rather than substantive engagement. Thirdly, utilizing the Refinitiv database, we assess comprehensive ESG rankings that evaluate firms on environmental, social, and governance criteria. These rankings include individual scores for each ESG aspect and a combined score that integrates these with an ESG Controversies overlay, providing a holistic view of a firm's overall ESG performance and its responsiveness to ESG-related issues. These measures are critical for understanding the real-world impacts of ESG-linked executive compensation, exploring not just the financial implications but also the broader effects on corporate transparency, accountability, and genuine ESG engagement.

Our main findings reveal that the introduction of Environmental, Social, and Governance (ESG) criteria into executive compensation frameworks significantly increases overall CEO pay. Specifically, our study finds that firms implementing ESG-linked pay witness an approximate 7.90% increase in total CEO compensation compared to those without such policies. This substantial increase underscores that while ESG-linked pay is intended to promote sustainable practices and align CEO incentives with long-term corporate goals, it also

serves as a robust mechanism for enhancing executive remuneration. Economically, this suggests that ESG-linked compensation may be leveraged by executives to secure higher pay, potentially complicating its role in driving genuine ESG enhancements.

Furthermore, we observe that while there are strategic shifts in compensation structures towards more stock-based and variable components, these changes do not radically transform the overall compensation framework. The adjustments suggest a shift towards aligning executive actions with sustainable and shareholder values over the long term, but they are relatively subtle and do not constitute a comprehensive overhaul of existing compensation practices. This subtle realignment reflects a cautious approach to integrating ESG criteria, balancing the need to incentivize executives while adhering to sustainable practices.

Additionally, the complexity of CEO compensation packages increases with the adoption of ESG-linked pay, reflecting the incorporation of multiple layers of ESG-related performance metrics. This added complexity introduces economic challenges, as it may complicate the assessment of executive performance and the alignment of compensation with corporate sustainability goals. It also raises the administrative burden of managing compensation structures and necessitates enhanced oversight to ensure that these complex structures do not obscure key performance outcomes or undermine the intended ethical standards.

Overall, while ESG-linked compensation strategies successfully raise CEO pay and introduce some adjustments to executive compensation structures, their overall impact on the compensation framework is less transformative than anticipated. These findings underscore the

complexities of designing and implementing compensation strategies that genuinely balance enhancing executive remuneration with advancing corporate sustainability objectives. They highlight the need for careful evaluation of ESG-linked pay practices to ensure they are structured in a way that genuinely supports the intended ESG goals, rather than merely serving as a vehicle for increasing executive compensation.

Next, we further explore the implications of ESG-linked compensation on firm-level ESG performance. Despite the notable increase in CEO pay associated with the integration of ESG metrics, the findings regarding actual ESG outcomes are somewhat concerning. Our research reveals that while firms with ESG-linked compensation exhibit a strong commitment to embedding sustainability within their executive reward structures, this does not necessarily translate into improved ESG performance. Specifically, the empirical results indicate that the introduction of ESG metrics into compensation packages does not lead to statistically significant improvements in the reduction of ESG incidents across environmental, social, and governance dimensions. This suggests that the adoption of ESG-linked pay might be more symbolic in nature, potentially serving as a form of greenwashing rather than effecting genuine changes in corporate behavior and sustainability practices.

Furthermore, the study assesses potential greenwashing by analyzing the alignment between firms' internal actions and external communications concerning ESG initiatives. The results indicate that the presence of ESG-linked pay does not significantly enhance transparency or meaningfully alter firms' internal versus external ESG actions, thus providing little evidence to refute the possibility of greenwashing practices. Additionally, while ESG

rankings from external databases provide a measure of how firms are perceived in terms of their ESG efforts, the increase in ESG-linked compensation does not consistently correlate with higher ESG scores. This suggests a disconnect between compensation incentives and actual ESG performance outcomes.

These findings raise important questions about the efficacy of ESG-linked compensation strategies. While such strategies successfully increase CEO compensation and nominally reflect a shift toward more sustainable practices, they may not be sufficient on their own to drive substantive improvements in firm-level ESG outcomes. This exposes a critical gap between the intention of aligning executive incentives with long-term sustainability goals and the actual effectiveness of these measures in promoting real and measurable ESG advancements. Overall, while ESG-linked pay mechanisms are effective at enhancing executive pay under the guise of promoting sustainability, the lack of significant improvement in ESG performance underscores the need for a more rigorous and authentic integration of sustainability goals into corporate strategies. It suggests that merely attaching ESG criteria to compensation packages is insufficient to ensure genuine sustainability outcomes and may require a deeper, more systemic approach to embedding these values into the core operational and strategic frameworks of firms.

Our findings are confirmed through a series of robustness checks, ensuring the reliability of our results regarding the impact of ESG-linked compensation on CEO pay and corporate ESG performance. To address potential endogeneity issues, we employed propensity score matching and entropy balancing, which reaffirmed the robustness of our initial findings.

This chapter makes several notable contributions to the literature on ESG-linked compensation. First, it deepens existing research by examining the implications of ESG-linked pay on CEO compensation. While foundational studies such as those by Kolk and Perego (2014), who explored corporate sustainability implications, and Cohen et al. (2023), who focused on governance structures, have set the stage, our analysis delves further into the direct impacts on CEO compensation structures. We enrich this discourse by empirically investigating how ESG-linked pay influences both the level and structure of CEO compensation, providing new insights into how sustainability practices affect executive remuneration. Our inquiry extends the theoretical frameworks established by Bebchuk and Fried (2004) on executive compensation dynamics under various governance scenarios.

Secondly, our analysis contributes to the debate on the effectiveness of ESG-linked compensation in achieving actual ESG outcomes within firms. Previous studies, such as those by Delmas and Burbano (2011), have questioned the tangible impacts of corporate sustainability initiatives, often critiquing the superficial adoption of green practices. Building on this skepticism, our research provides empirical evidence suggesting that, despite the promising setup, the integration of ESG criteria into compensation packages does not significantly enhance ESG outcomes, revealing a potential disconnect between compensation strategies and actual sustainability achievements. This finding aligns with recent empirical explorations by Haque and Ntim (2020), who also reported mixed outcomes on the effectiveness of ESG initiatives.

Third, our research highlights the complexity of ESG-linked compensation structures. Echoing concerns by Edmans (2012) regarding the alignment of executive incentives with long-term corporate goals, our study demonstrates that while ESG metrics are integrated into executive pay, they lead to increased complexity in compensation packages. This complexity often fails to result in clearer alignment with sustainability goals, thus complicating the transparency and effectiveness of such programs. By providing a detailed examination of how these compensation structures are crafted and their impacts assessed, our study offers a crucial perspective on the nuanced challenges in designing executive compensation policies that genuinely support sustainable development.

Fourth, the implications of our study extend beyond academic discourse to inform policy and practice in corporate governance and sustainability. Our findings provide critical insights for policymakers and corporate leaders about the actual effects of ESG-linked compensation on executive behavior and corporate sustainability outcomes. By demonstrating that ESG-linked pay does not inherently lead to improved ESG performance, our research underscores the need for more rigorous frameworks and clearer benchmarks for ESG compensation practices. This could involve developing standardized guidelines that enhance the transparency and accountability of ESG reporting and compensation alignment. For corporate practitioners, our study recommends a cautious approach to designing ESG-linked compensation packages, advocating for more tangible and enforceable ESG targets to ensure that these incentives truly drive sustainable development. The insights garnered should serve as a basis for revising corporate policies and practices to foster genuine sustainability efforts

that go beyond mere compliance or superficial measures, ultimately contributing to more sustainable and ethical corporate practices.

The remainder of this chapter is organized as follows: Section 2 presents the related literature and hypotheses. Section 3 describes the data and methodology. Sections 4 and 5 present the main results. Section 6 provides robustness tests. Section 7 concludes the chapter.

3.2 Literature Review and Hypothesis Development

3.2.1 The Definition and Importance of ESG Contracting

In the realm of corporate governance, a significant evolution is evident in the structure of executive compensation contracts. Traditionally anchored to financial performance metrics such as stock price appreciation, earnings per share, or return on equity, these contracts have historically aimed to align the interests of executives with those of shareholders, incentivizing managers to boost the firm's financial value. However, recent shifts in societal expectations and corporate responsibility paradigms have led to the integration of sustainability performances into these compensation formulas, giving rise to what is now termed as Environmental, Social, and Governance (ESG) contracting (Kolk & Perego, 2014).

ESG contracting expands the traditional focus of executive compensation by incorporating criteria that address broader environmental, social, and governance concerns into the incentive structures guiding executive decision-making. This approach not only integrates traditional financial metrics but also includes diverse ESG metrics, such as carbon emissions reduction, diversity and inclusion initiatives, employee safety standards, and adherence to

ethical governance principles. By embedding these criteria into compensation packages, ESG contracting encourages behaviors that support long-term sustainability and social responsibility, effectively broadening the scope of executive accountability beyond mere financial performance.

The rationale behind adopting ESG-linked compensation is multifaceted. It reflects a shift in corporate governance towards recognizing the interests of a broader range of stakeholders, beyond just shareholders. This change is driven by the understanding that sustainable business practices can significantly enhance a firm's reputation, mitigate risks, and contribute to long-term financial success (Kolk & Perego, 2014). As the investment community increasingly considers ESG factors in their decisions, firms are incentivized to demonstrate their commitment to sustainable practices by linking executive pay with ESG outcomes. Thus, the trend towards ESG-linked compensation is not merely a nod to changing societal values but also a strategic response to growing demands for greater corporate transparency and accountability.

The adoption of ESG-linked compensation is particularly pronounced in industries where environmental and social risks are most acute, such as the energy, mining, and consumer goods sectors. However, this trend is also spreading across other sectors including finance and technology, driven by investor pressures and evolving regulatory landscapes. Recent studies indicate a significant increase in the number of large publicly traded companies in the U.S. and Europe incorporating ESG metrics into their executive compensation plans, signaling a broader shift towards sustainable corporate governance (Cohen et al., 2023).

While traditional compensation models primarily focus on short-term financial returns, ESG-linked compensation schemes are designed to align executive incentives with the firm's long-term sustainability objectives. This approach not only compels executives to consider the broader implications of their decisions but also better equips the firm to address risks associated with environmental and social factors. However, integrating ESG metrics into compensation structures is complex and requires meticulous consideration of how these metrics are defined, measured, and balanced against traditional financial performance indicators.

In conclusion, the emergence of ESG contracting as a prominent practice in corporate governance marks a significant transformation in the role of corporations within society. By aligning executive compensation with ESG outcomes, firms are not only responding to stakeholder demands for heightened accountability but also promoting sustainable and responsible business practices. This represents a significant shift from a focus solely on shareholder value to a more comprehensive approach to value creation, reflecting a broader consideration of environmental, social, and governance factors.

3.2.2 Hypothesis Development

The inclusion of Environmental, Social, and Governance (ESG) criteria in executive compensation contracts marks a significant shift in corporate governance practices. Traditionally, executive pay has been closely tied to financial performance metrics, such as stock prices or earnings, aligning the interests of executives with those of shareholders. However, as the role of corporations in society evolves, there is a growing recognition of the

importance of sustainability and social responsibility. This awareness is driving the adoption of ESG-linked compensation, reflecting a broader perspective on value creation that encompasses environmental and social impacts.

This shift raises important questions about the impact of ESG contracting on CEO compensation. On one hand, the adoption of ESG criteria could lead to increased compensation for CEOs. According to the managerial power theory, executives who have substantial influence over their pay structures might leverage ESG metrics to justify higher compensation. This is particularly likely when ESG goals are either easily achievable or vaguely defined, allowing executives to secure additional bonuses or higher overall pay without significantly improving the firm's ESG performance (Bebchuk & Fried, 2004; Ittner et al., 1997). Furthermore, the complexity introduced by ESG contracting could obscure the true basis for compensation, enabling executives to extract greater financial rewards. This perspective suggests that ESG contracting might be used as a tool to increase executive compensation, rather than solely to align incentives with long-term corporate objectives.

On the other hand, there is a countervailing argument that ESG contracting may not necessarily lead to increased CEO compensation. From the perspective of stakeholder theory, firms are increasingly accountable to a broad range of stakeholders beyond just shareholders, including employees, customers, communities, and regulators (Edmans, 2012; Freeman, 2010; Freeman & Velamuri, 2008). The integration of ESG criteria into compensation packages is seen as a response to these broader stakeholder demands, aiming to align executive incentives with the long-term sustainability and ethical commitments of the firm. Under this framework,

the primary function of ESG contracting is not to increase pay, but to ensure that executives are motivated to achieve socially beneficial outcomes. Therefore, the introduction of ESG-linked compensation might not necessarily lead to higher overall pay, as its intent is to reflect a shift in the priorities of the firm rather than to enhance executive remuneration.

Furthermore, from a shareholder theory perspective, the purpose of executive compensation is to mitigate agency problems arising from the separation of ownership and control (Grossman & Hart, 1980; Jensen & Meckling, 1976). When ESG metrics are integrated into compensation packages, they can serve to better align managers' incentives with those of shareholders, particularly where traditional performance indicators are imperfect (Banker & Datar, 1989; Feltham & Xie, 1994; Holmström, 1979). However, this realignment of incentives does not inherently justify an increase in total compensation; rather, it represents a refinement of performance evaluation criteria within the existing pay structure.

Institutional theory provides another perspective that supports the view that ESG contracting does not lead to increased compensation. According to this theory, firms adopt practices like ESG contracting to gain legitimacy and conform to evolving societal norms and expectations (Bansal, 2005; Carpenter & Feroz, 2001; Scott, 2013). As pressure from investors, regulators, and other stakeholders to demonstrate responsible and sustainable business practices grows, firms may incorporate ESG metrics into executive compensation as a signal of their commitment to these values. This adoption, however, is more about maintaining legitimacy and meeting external expectations than about increasing executive pay. Thus, the introduction of ESG-linked compensation might not result in higher total executive

compensation, as the primary goal is to align with institutional norms rather than to financially benefit executives. Based on these theoretical considerations, we propose two competing hypotheses to be tested:

Hypothesis 1a (H1a): Firms with ESG contracting will increase the CEO's total compensation.

Hypothesis 1b (H1b): Firms with ESG contracting will have no effect on the CEO's total compensation.

These hypotheses explore the dual possibilities that ESG contracting could either serve as a mechanism for enhancing executive pay or merely represent a shift in the criteria for evaluating performance without impacting overall compensation levels.

As ESG contracting becomes increasingly common, it is crucial to investigate its real impact on firms. Linking executive compensation to ESG metrics might signal a firm's genuine commitment to ESG performance, according to agency theory and stewardship perspective (Bonham & Riggs-Cragun, 2022). Research has shown that operational metrics such as customer satisfaction and product quality enhance the efficiency of managerial incentive contracts (Dikolli, 2001; Dutta & Reichelstein, 2003; Ittner et al., 1997; Sliwka, 2002). Recent studies indicate that ESG contracting can lead to improvements in environmental and social performance—reducing carbon emissions and boosting ESG ratings (Derchi et al., 2021; Flammer et al., 2019; Haque & Ntim, 2020), and potentially spurring innovation through enhanced employee well-being and increased managerial risk-taking (Tsang et al., 2021).

However, the effectiveness of ESG-linked pay is a matter of debate. ESG issues are multifaceted and challenging to encapsulate in a few measurable KPIs, raising concerns that ESG targets might not reflect genuine improvements but rather actions the firm would have taken anyway, contributing to potential 'window-dressing' or 'greenwashing' (Delmas & Burbano, 2011; Marquis et al., 2016). The complexity of setting and measuring ESG targets, alongside the critical role of intrinsic motivation and personal reputation over compensation incentives (Edmans et al., 2023; Walker, 2022), makes it essential to empirically test the actual impact of ESG-linked pay on corporate ESG engagement and performance. Accordingly, this research proposes the following hypotheses to be tested:

Hypothesis 2a (H2a): Firms with ESG contracting will lead to improved ESG performance.

Hypothesis 2b (H2b): Firms with ESG contracting will have no effect on firms' ESG performance.

These hypotheses address whether ESG-linked compensation serves as a mechanism for genuine improvement in corporate ESG metrics or merely as a symbolic gesture without substantial effect on ESG outcomes.

3.3 Sample, Data, and Descriptive Statistics

3.3.1 Sample and Data Sources

We sourced our data from multiple databases: (1) firm-level accounting data from the Compustat database, (2) firm-level market data from the I/B/E/S database, (3) information on

firms' ESG compensation contracting and CEOs' compensation from the ISS Incentive Lab database, (4) firms' ESG incidents data from the RepRisk database, (5) firms' ESG rankings and detailed ESG metrics from the LSEG (Refinitiv) database, and (6) CEO characteristics data from the BoardEx and Compustat databases.

Our initial sample includes U.S.-listed firms covered by the ISS Incentive Lab, which extracts detailed information on executive compensation and incentive awards from proxy statements (DEF 14A, 10-K, etc.). The sample period spans from 2006, the inception of CEO compensation information coverage by the ISS Incentive Lab, to 2021, the most recent year data is available. After eliminating missing values in regression variables, our final sample consists of 12,288 firm-year observations, representing 1,202 unique firms and 2,371 CEOs.

3.3.2 Measures of ESG Contracting

Our primary measure of ESG contracting, the 'ESG Pay Dummy', indicates whether a firm has linked the CEO's compensation to at least one ESG performance target in a given year. This data is extracted and verified manually from the ISS Incentive Lab database according to the classification system by Cohen et al. (2023). ESG-linked metrics are categorized into three types: Environmental, Social, and Corporate Governance. Specific metrics include emission reduction for Environmental, safety and diversity for Social, and compliance for Governance. We further break down ESG contracting into Environmental Pay, Social Pay, and Governance Pay, using the metrics provided in the ISS database, as detailed in Appendix A.3.

3.3.3 Measures of CEO Pay

CEO Pay Level

Total compensation for CEOs consists of several key elements: base salary, bonuses, equity-based compensation, and a variety of additional benefits. These additional benefits include deferred compensation, contributions to retirement plans, payments related to change-in-control provisions, perquisites, and other personal benefits. A significant part of this compensation package, equity-based compensation, includes the values of options grants and restricted stock awards. Previous studies suggest that CEOs often exert considerable influence over their compensation, which may result in more opportunistic remuneration strategies that disproportionately benefit them, leading to elevated levels of CEO pay (Hoi et al., 2019). Consequently, our analysis focuses on the levels of total CEO compensation, as these figures broadly indicate the extent of managerial rent-seeking behavior. The variable *Ln(Total Pay)* is the natural logarithm of one plus CEO total compensation as reported in the ISS Incentive Lab database for a firm in a given year. While not the primary focus of our study, we also present findings related to the CEO's different forms of compensation: *Ln(Salary)* is the natural logarithm of one plus CEO cash salary as reported in the ISS Incentive Lab database for a firm in a given year. *Ln(Bonus)* is the natural logarithm of one plus CEO bonus as reported in the ISS Incentive Lab database for a firm in a given year. *Ln(Stock Awards)* is the natural logarithm of one plus stock awards as reported in the ISS Incentive Lab database for a firm in a given year. *Ln(Option Awards)* is the natural logarithm of one plus option awards as reported in the ISS Incentive Lab database for a firm in a given year. *Ln(Non-Equity)* is the natural logarithm

of one plus non-equity compensation as reported in the ISS Incentive Lab database for a firm in a given year. *Ln(Change in Pension)* is the natural logarithm of one plus CEO's change in pension value and nonqualified deferred compensation earnings. *Ln(Other Compensation)* is the natural logarithm of one plus CEO's other compensation. To mitigate the influence of extreme observations, we winsorize these CEO compensation variables at the 1% and 99% levels.

Measures of CEO Pay Structure

We construct seven dependent variables—*Salary%*, *Bonus%*, *Stock%*, *Option%*, *Non-Equity%*, *Pension%*, and *Other Pay%*—to serve as proxies for the structure of CEO compensation. Each percentage is calculated by dividing the specific compensation component (e.g., salary) by the total CEO pay and then multiplying the result by 100.

Measures of CEO Pay Complexity

In our study, we adopt a measure of CEO pay complexity that differs from the approach used by (Albuquerque et al., 2024). While their methodology defines complexity based on the variety of incentive types included at the time of compensation design, our approach focuses on the actual number of distinct compensation components realized in the CEO's final pay package. Specifically, we quantify complexity by counting the number of separate pay elements awarded, including salary, bonus, stock options, non-equity incentives, pensions, and other forms of compensation. This measure, denoted as *# of Pay Components*, is constructed

using data from Incentive Lab and reflects the realized structure of CEO pay rather than its initial design. Our measure of compensation complexity offers several advantages. First, it captures the full scope of pay structures as they are ultimately awarded, providing a more accurate representation of how complex CEO compensation arrangements become over time. This is particularly relevant given that incentive structures can evolve due to changes in firm performance, governance decisions, or renegotiations. Second, by relying on realized compensation components rather than pre-set contractual elements, our approach mitigates concerns related to theoretical pay structures that may not fully materialize. Finally, this method is more aligned with studies examining how CEO incentives translate into actual compensation outcomes, making it well-suited for analyzing the impact of compensation complexity on executive decision-making and firm performance.

However, our approach also has certain limitations. Unlike the methodology of Albuquerque et al. (2024), which focuses on intended incentive structures, our measure does not explicitly account for the complexity of contractual pay design at the outset. Instead, it reflects ex-post compensation outcomes, meaning that it may be influenced by firm performance, discretionary bonuses, or exogenous adjustments to CEO pay. Additionally, while a higher count of distinct pay components generally suggests greater complexity, it does not necessarily capture the weighting or interaction effects between different components, which may be relevant for understanding the true incentive alignment between CEOs and shareholders.

Overall, our preferred measure of CEO pay complexity provides a practical and realized-based approach to understanding how compensation structures evolve in practice. While it differs from existing methodologies by focusing on final awarded compensation rather than initial design, this approach offers a more direct assessment of how CEOs actually experience complex pay structures. By making these distinctions clear, we contribute to the broader discussion on how CEO pay complexity influences corporate decision-making and governance outcomes.

3.3.4 Measures of ESG Performance

Measures of ESG incidents

We retrieve raw data on firm-level incident counts from RepRisk, covering all public firms from 2007 to 2021. Each month, we tabulate the total number of ESG-related incidents as well as the counts in each of the 30 ESG categories for every firm. These incidents are then classified into Environmental (E), Social (S), and Governance (G) groups. For analytical purposes, we use the logarithm of one plus the number of total ESG incidents (Ln(ESG Incidents)), along with the logarithm of one plus the number of environmental-related incidents (Log(E Incidents)), social-related incidents (Ln(S Incidents)), and governance-related incidents (Ln(G Incidents)) as proxies for firms' ESG outcomes. This logarithmic transformation stabilizes variance and normalizes the distribution of incident counts, allowing for more robust statistical analysis. We focus specifically on realized negative incidents, capturing a comprehensive view of firms' ESG profiles starting from 2007.

An ideal measure of CSR impact would consider both negative and positive ESG incidents; however, comprehensive data on positive ESG impacts at the firm level is scarce. This scarcity is due to the challenges in quantifying such impacts: positive events are rarely covered by the media and are more often reported by firms as promises or actions, the actual effects of which are often questionable, as noted by Li and Wu (2020). Thus, in our analysis, we operationalize improvements in ESG outcomes as reductions in the quantified negative ESG incidents.

Measures of Greenwashing

Measuring greenwashing—the practice of misrepresenting a firm's environmental or social commitments to appear more sustainable than it truly is—is inherently challenging. We employ a modified version of the framework developed by Hawn and Ioannou (2016) to critically assess potential greenwashing by examining the alignment between firms' internal corporate social responsibility (CSR) actions and their external communications.

Internal actions (*Internal*) are quantified as the sum of internally oriented CSR disclosures, representing actual commitments that directly impact organizational operations and employee relations. These may include investments in sustainable processes, workforce diversity initiatives, or internal environmental policies. External actions (*External*) are quantified as the sum of externally oriented CSR disclosures, which reflect public representations of a firm's CSR commitments. These may include marketing campaigns,

sustainability reports, or ESG-related press releases aimed at external stakeholders, such as investors, customers, and regulators.

To evaluate greenwashing potential, we construct two key variables: *Real Diff* and *Abs Diff*. *Real Diff* measures the difference between external and internal actions to determine whether external claims align with actual internal practices. A higher *Real Diff* suggests that firms make ambitious public ESG claims without corresponding internal investments, signaling potential greenwashing. *Abs Diff* captures the absolute differences between external and internal actions, offering a non-directional measure of the magnitude of misalignment. This accounts for both positive and negative discrepancies, recognizing that firms may either understate or exaggerate their ESG commitments. The data for this analysis are sourced from the Refinitiv database, which provides a standardized and verifiable set of CSR-related disclosures, ensuring robustness in measurement. The detailed indices used to classify internal and external CSR actions are outlined in Appendix A.4.

Several approaches have been used in the literature to measure greenwashing, each with distinct advantages and limitations. Some studies (Kim & Lyon, 2015; Marquis et al., 2016) assess greenwashing by tracking ESG-related controversies, such as lawsuits, regulatory fines, or NGO accusations of misleading sustainability claims. This approach captures only detected cases of greenwashing and relies on external whistleblowing, potentially underestimating the true prevalence of the practice. Studies such as Torelli et al. (2020) compare ESG ratings from different providers to identify inconsistencies in firms' reported ESG performance. However, ESG ratings are highly subjective and methodology-dependent, leading to measurement

inconsistencies. Our approach captures firm-level ESG misalignment rather than relying on external controversies or sentiment analysis and avoids subjectivity associated with textual analysis or ESG rating discrepancies. By incorporating both directional and non-directional measures, our framework ensures a comprehensive understanding of how firms manage their ESG commitments—whether they genuinely integrate ESG principles or merely engage in symbolic sustainability efforts. By utilizing *Real Diff* and *Abs Diff*, we provide a quantifiable, firm-level measure of ESG misalignment, offering a more precise and transparent assessment of greenwashing behavior.

Measures of ESG rankings

We evaluate corporate ESG performance using several key variables derived from the Refinitiv database, which is frequently utilized as a standard source for ESG scoring. This comprehensive database provides detailed scores based on a firm's self-reported and publicly available information across various ESG dimensions. The *ESG Score* is an aggregate measure of a firm's performance across environmental, social, and governance (ESG) pillars. This score reflects the overall effectiveness of a company in integrating ESG principles into its operations, based on self-disclosed data. Additionally, we use the *Combined Score*, which integrates the ESG Score with an ESG Controversies overlay. This score provides a holistic view of the firm's ESG performance by combining its proactive ESG efforts with its reactive measures to manage and mitigate ESG-related controversies as they arise. The *Controversies Score* specifically measures a company’s exposure to ESG controversies and negative events as reported in global media. This score helps in understanding the extent to which ESG issues could impact the firm's

reputation and stakeholder trust. Further breaking down the ESG components to *E Score*, *S Score*, and *G Score*, the *E Score* assesses the environmental impact of a company, highlighting how well it manages ecological responsibilities and opportunities to enhance long-term shareholder value through best management practices. The *S Score* evaluates the firm's ability to maintain trust and loyalty among its workforce, customers, and the broader society. This score reflects the company's social capital and its operational license, which are critical for sustaining its long-term value. The *G Score* measures the effectiveness of a company's governance structures and processes, ensuring that actions by its board and executives align with the long-term interests of its shareholders.

3.3.5 Descriptive Statistics

Table 3.1 presents summary statistics of the variables used in our tests. Among our sample, only about 6.6% of firm-year observations, as represented by the ESG Pay Dummy variable, demonstrate the presence of ESG criteria in CEO compensation contracts. Additionally, the ESG Pay Number, which quantifies the number of ESG-related criteria within CEO compensation packages, has a mean value of 0.076, with a standard deviation of 0.311, ranging from 0 to a maximum of five criteria. This suggests a modest level of ESG criteria integration within the compensation strategies analyzed. Further breakdowns reveal more specific aspects of ESG compensation. Environmental Pay shows a mean of 0.008, suggesting minimal integration of environmental factors into CEO compensation, with values ranging up to a maximum of five. Social Pay has a slightly higher occurrence with a mean of 0.044 and a

maximum value of six, indicating a greater but still limited focus on social criteria within CEO compensation. Governance Pay, with a mean of 0.037 and a maximum of four, reflects the incorporation of governance-related criteria to a modest extent. These statistics illustrate the current landscape of ESG integration into executive compensation across the sampled firms, highlighting the emergent but varied adoption of environmental, social, and governance factors in executive remuneration practices.

Appendix A.1, Panel B, presents the distribution of ESG-linked pay adoption among firms by year, showing a significant trend towards integrating Environmental, Social, and Governance (ESG) criteria into compensation structures. By 2021, 26% of the firms in our sample (173 out of 668) included ESG-linked strategies in their compensation packages. We categorize the metrics according to the three pillars of ESG: Environmental (E), Social (S), and Governance (G). Notably, the Social and Governance pillars have seen more widespread adoption, particularly in areas such as Employee, Customer, and Culture pay, alongside Compliance and Governance metrics. While the adoption of Environmental pay has been slower, the increasing numbers over recent years indicate a growing corporate commitment to sustainability. This pattern reflects a broader shift in corporate compensation strategies, increasingly aligning with global sustainability and ethical governance standards, highlighting how firms are progressively prioritizing social and environmental considerations within their operational and reputational frameworks.

Figure 1 illustrates the prevalence of ESG-linked pay among U.S. firms from 2006 to 2021, as tracked by the ISS Incentive Lab. The figure clearly depicts an increasing trend in the

adoption of ESG metrics in CEO compensation contracts. In 2006, the percentage of firms incorporating ESG pay was relatively low, with only a small fraction of firms engaging in such practices. However, this number gradually increases over the years, with a notable surge beginning in 2017 and peaking in 2021. The bar graph (represented in orange) shows the percentage of firms each year that include ESG metrics in their CEO's compensation contracts, plotted against the left y-axis. It starts with a modest figure in 2006 and shows a steady increase, with a significant upward trajectory post-2016. By 2021, this percentage rose to just over 25%, indicating that a quarter of the sampled firms had integrated ESG criteria into their executive compensation strategies. Simultaneously, the line graph (depicted in blue) tracks the absolute number of firms with ESG pay, aligned with the right y-axis. This number exhibits a more pronounced increase from 2017 onwards, reaching a high of 173 firms in 2021. This sharp rise highlights a growing commitment among corporations to align CEO compensation with broader ESG objectives, reflecting an enhanced focus on sustainable and responsible business practices. This trend underscores the evolving corporate emphasis on sustainability and governance, with firms increasingly embedding ESG considerations into their strategic and compensation frameworks. The data presented in Figure 1, therefore, provides empirical support to the observation of an expanding integration of ESG factors in executive remuneration, aligning corporate leadership incentives with long-term sustainability and ethical governance goals.

Table 3.1: Summary Statistics

This table presents the descriptive statistics for the main variables used in our analyses. *ESG Pay Dummy* equals one if firms CEO has any ESG criterion in the compensation contract in that year, and zero otherwise. *ESG Pay Number* is the number of ESG-related criterion for the firm's CEO in the compensation contract in a given year. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level.

Variables	Obs	Mean	SD	p25	Median	p75	Max
Proxies for ESG-linked Pay							
ESG Pay Dummy	12,288	0.066	0.248	0.000	0.000	0.000	1.000
Environmental Pay	12,288	0.008	0.105	0.000	0.000	0.000	5.000
Social Pay	12,288	0.044	0.264	0.000	0.000	0.000	6.000
Governance Pay	12,288	0.037	0.223	0.000	0.000	0.000	4.000
Proxies for CEOs' Compensation							
Ln(Total Pay)	12,288	8.882	0.751	8.428	8.939	9.394	10.571
Ln(Salary)	12,288	6.801	0.439	6.621	6.868	7.048	7.824
Ln(Bonus)	12,288	0.882	2.232	0.000	0.000	0.000	8.323
Ln(Stock Awards)	12,288	7.122	2.667	7.023	7.962	8.635	9.957
Ln(Option Awards)	12,288	4.294	3.703	0.000	6.381	7.572	9.440
Ln(Non-Equity)	12,288	6.324	2.601	6.399	7.191	7.759	9.271
Ln(Change in Pension)	12,288	2.479	3.210	0.000	0.000	5.890	8.784
Ln(Other Compensation)	12,288	4.457	1.565	3.458	4.648	5.571	7.834
Salary%	12,288	15.049	10.307	8.848	12.378	17.649	63.860
Bonus%	12,288	1.901	6.464	0.000	0.000	0.000	38.746
Stock%	12,288	39.346	23.993	22.241	39.406	57.258	91.020

Option%	12,288	15.310	18.080	0.000	11.158	25.084	77.313
Non-Equity%	12,288	20.101	14.873	10.501	18.309	27.280	70.440
Pension%	12,288	4.903	9.619	0.000	0.000	4.485	43.885
Other Pay%	12,288	2.730	4.196	0.508	1.441	3.174	28.571
# of Pay Components	12,288	4.893	0.916	4.000	5.000	6.000	7.000
Control Variables							
Stock Return	12,288	0.137	0.400	-0.098	0.113	0.326	1.707
Stock Volatility	12,288	0.327	0.190	0.199	0.278	0.395	1.143
CEO Tenure	12,288	6.899	6.603	2.000	5.000	9.000	33.000
CEO Age	12,288	56.873	6.471	52.000	57.000	61.000	73.000
CEO Ownership	12,288	1.242	2.957	0.062	0.276	0.988	17.476
Firm Size	12,288	8.903	1.423	7.900	8.808	9.835	12.578
Book Leverage	12,288	0.290	0.199	0.140	0.272	0.407	0.932
Cash Holdings	12,288	0.128	0.135	0.030	0.082	0.179	0.632
Sales Growth	12,288	0.068	0.192	-0.016	0.053	0.134	0.914
ROA	12,288	0.052	0.078	0.020	0.050	0.090	0.277
Market to Book	12,288	3.524	6.406	1.357	2.318	4.026	43.904
Firm Age	12,288	34.425	19.430	18.000	29.000	52.000	71.000
CEO compensation data from ISS Incentive Lab							
CEO total pay (in $1000)	12,288	9,313.413	6,878.438	4,570.568	7,620.180	12,016.076	38973.768
CEO salary (in $1000)	12,288	973.691	369.586	750.000	960.000	1,150.000	2500.000
CEO bonus (in $1000)	12,288	153.542	595.190	0.000	0.000	0.000	4117.500
CEO stock awards (in $1000)	12,288	4,010.115	4,036.702	1,120.602	2,867.823	5,625.044	21095.069

CEO option awards (in $1000)	12,288	1,390.224	2,129.833	0.000	589.288	1,942.862	12583.891
CEO non-equity incentives (in $1000)	12,288	1,783.842	1,844.280	600.519	1,326.175	2,340.483	10625.000
CEO change in pension (in $1000)	12,288	520.470	1,188.694	0.000	0.000	360.413	6530.282
CEO other pay (in $1000)	12,288	226.172	368.343	30.747	103.392	261.577	2522.792
Firms ESG Incidents							
Ln(ESG Incidents)	11,661	0.788	1.052	0.000	0.000	1.386	5.318
Ln(E Incidents)	11,661	0.361	0.739	0.000	0.000	0.693	4.934
Ln(S Incidents)	11,661	0.523	0.860	0.000	0.000	0.693	4.812
Ln(G Incidents)	11,661	0.402	0.728	0.000	0.000	0.693	4.718
Firms Greenwashing							
Internal	7,050	0.664	0.186	0.501	0.699	0.846	0.956
External	7,050	0.270	0.197	0.133	0.267	0.400	0.733
Real Diff	7,050	-0.392	0.118	-0.469	-0.391	-0.314	-0.100
Abs Diff	7,050	0.392	0.118	0.314	0.391	0.469	0.673
Firms ESG Rankings							
ESG Score	7,062	51.142	19.248	35.974	51.184	66.916	95.162
Combined Score	7,062	48.232	17.874	34.684	47.508	61.933	94.665
Controversies Score	7,062	85.109	27.603	83.333	100.000	100.000	100.000
E Score	7,062	52.715	21.175	35.788	52.381	69.284	98.011
S Score	7,062	57.049	21.231	42.041	58.784	73.901	99.441
G Score	7,062	41.583	28.090	17.453	41.848	66.092	98.126

3.4 ESG Contracting and CEO Pay

3.4.1 Research Design

In this section, we explore the association between ESG Pay and CEO compensation using the following empirical specification:

$$CEO\ Pay_{i,t} = \beta_0 + \beta_1 ESG\ Pay_{i,t} + \beta_2 Controls_{i,t} + Ind\ FE + Year\ FE + \varepsilon_{i,t}, \quad (1)$$

where the indices *i,t* refer to firm and year, respectively. The dependent variable, CEO Pay, primarily refers to the CEO's total compensation, denoted as *Log(Total Pay)*. Additionally, CEO compensation is detailed through a variety of other variables to provide a comprehensive view of how executives are remunerated. These include *Log(Salary)*, which captures the log-transformed base salary; *Log(Bonus)*, for bonus payments; *Log(Stock Awards)* and *Log(Option Awards)*, which account for the values of stock and option awards respectively; *Log(Non-Equity)*, which includes non-equity incentive plan compensation; *Log(Change in Pension)*, reflecting changes in the value of pension and deferred compensation; and *Log(Other Compensation)*, which encompasses all other forms of compensation not categorized elsewhere. Further granularity is achieved through the percentage breakdown of each compensation component relative to the total compensation, measured as *Salary%*, *Bonus%*, *Stock%*, *Option%*, *Non-Equity%*, *Pension%*, and *Other Pay%*. Additionally, the complexity of the compensation package is quantified through the variable *# of Pay Components*, which counts the distinct types of compensation awarded to the CEO.

ESG Pay is an indicator variable that equals one if the company incorporates any ESG criterion in CEO compensation contract in that year, and zero otherwise. In our baseline

regression, we control for a range of firm-level and CEO-level characteristics that have been shown to influence CEO compensation in prior literature. These controls help account for potential confounding factors that may drive variations in CEO pay, ensuring that our key explanatory variables capture the true effect of interest. We include the firm's annual stock return (*Stock Return*) to control for the pay-for-performance relationship in executive compensation. CEOs of firms with strong stock performance are typically rewarded with higher pay, particularly through bonuses and stock-based incentives (Murphy, 1985). The annualized standard deviation of the firm's daily stock returns (*Stock Volatility*) is used to measure firm risk. Higher volatility may lead to greater CEO compensation, as riskier firms often offer higher pay to compensate executives for the increased uncertainty in their earnings potential. We control for the *Firm Size* (the natural logarithm of book value of total assets), since larger firms require more skilled leadership and offer higher compensation to attract and retain top executives (Murphy, 1986). We include *Book Leverage* (the total debt scaled by total assets) in the regression as firms with higher leverage may either (1) provide lower CEO compensation due to financial constraints or (2) offer higher pay to compensate CEOs for managing a more highly leveraged and financially risky firm. In addition, we control for the *Cash Holdings* (the ratio of cash and short-term investments to the book value of total assets), since firms with higher cash reserves may have more flexibility in compensating executives, as they have the liquidity to fund generous pay packages. However, excessive cash holdings may also signal managerial entrenchment, leading to inefficient pay structures. We control *ROA* (net income scaled by total assets) as higher ROA is generally associated with better firm performance,

which can lead to higher CEO pay through incentive-based compensation (Murphy, 1985). We include the firm's *Market to Book* (the market value of equity divided by book value of Compustat common equity) as proxy for growth opportunities in the regression model. Firms with higher growth potential may offer higher CEO pay to attract talent that can capitalize on these opportunities (Smith Jr & Watts, 1992). In addition, we control for *Firm Age*, since older firms tend to have more stable operations and established governance structures, which can influence executive pay. The CEO-level variables including *CEO Tenure*, which is the years CEO is in his or her position at firms. Longer-tenured CEOs often have greater influence over the board, allowing them to negotiate higher compensation (Murphy, 1986). *CEO Age* is the CEO's age as reported in ExecuComp. Older CEOs tend to have more experience and bargaining power, which may lead to higher pay. In addition, we control for the *CEO Ownership*, which is the CEO ownership in percent. Higher ownership aligns the CEO's interests with shareholders, potentially leading to lower base salaries but higher equity-based compensation. Conversely, low ownership CEOs may demand higher cash-based pay as they have less direct financial exposure to the firm's stock performance. We also include industry and year fixed effects.[8] $\varepsilon_{i,t}$ is the firm-specific error term that is assumed to be correlated within the firm and heteroskedastic. The coefficient of interest is β1 in this chapter. We hypothesize that the adoption of ESG-linked pay may lead to an increase in CEO compensation, thus

[8] The industry classification is based on 4-digit SIC code. We employ industry fixed effects rather than firm fixed effects due to the limited within-firm variation in the dependent variable over time. ESG-linked compensation adoption is often a long-term strategic decision rather than a frequently changing policy, meaning that once a firm adopts ESG-linked pay, it is unlikely to revert or undergo significant modifications in the short run. As a result, using firm fixed effects would absorb much of the relevant variation in ESG-linked pay adoption, leaving little room to identify meaningful effects.

expecting β1 to be positive. However, it is also plausible that β1 could be non-significant, indicating no effect of ESG-linked pay on CEO compensation, reflecting the potential for no direct relationship or an effect masked by other variables.

3.4.2 Results

ESG-Linked Compensation and the Level of CEO Pay

Table 3.2 presents the baseline regression results examining the relationship between ESG-linked pay and various components of CEO compensation. The dependent variables include *Ln(Total Pay)*, *Ln(Salary)*, *Ln(Bonus)*, *Ln(Stock)*, *Ln(Option)*, *Ln(Non-Equity)*, *Ln(Pension)* and *Ln(Other Pay)*, representing the diverse facets of compensation influenced by the inclusion of ESG criteria in compensation contracts. Column (1) of the table highlights the regression results of Model (1), demonstrating the effect of ESG Pay on CEO's overall pay (*Ln(Total Pay)*). The coefficient on *ESG pay* is positive and significant at the 1% level, indicating an association between the adoption of ESG-related compensation policies and an increase in CEO total pay. This finding is economically significant as the coefficient value of 0.076 suggests that, all else being equal, companies implementing ESG-linked pay policies witness an approximate 7.90% increase in CEO total pay compared to firms without such policies, underscoring the substantial economic impact of these policies on executive remuneration.[9]

While our primary focus is on the impact of ESG contracting on CEOs' total pay, exploring how such policies influence other compensation components provides further insights into the

[9] The 7.90% increase is calculated using the formula: ($e^{0.076}$ - 1) x 100%.

nuanced effects of ESG metrics. These components include salary (*Ln(Salary)*), bonus (*Ln(Bonus)*), stock awards (*Ln(Stock)*), option awards (*Ln(Option)*), non-equity incentive

Table 3.2: ESG-linked Pay and the Level of CEOs Compensation

This table presents the baseline regression results of the relationship between ESG-linked Pay and the level of CEOs' compensation. The dependent variables are *Ln(Total Pay)*, *Ln(Salary)*, *Ln(Bonus)*, *Ln(Stock)*, *Ln(Option)*, *Ln(Non-Equity)*, *Ln(Pension)* and *Ln(Other Pay)*. The independent variable is *ESG Pay Dummy* which equals one if CEOs have any ESG criterion in the compensation contract in that year, and zero otherwise. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Total Pay)	Ln(Salary)	Ln(Bonus)	Ln(Stock)	Ln(Option)	Ln(Non-Equity)	Ln(Pension)	Ln(Other Pay)
ESG Pay Dummy	0.076***	0.031**	0.024	0.340***	-0.156	0.200*	0.347**	0.156**
	(0.026)	(0.015)	(0.118)	(0.094)	(0.186)	(0.110)	(0.142)	(0.075)
Stock Return	0.025*	0.009	0.004	-0.010	-0.013	0.175**	-0.002	0.012
	(0.014)	(0.009)	(0.060)	(0.058)	(0.079)	(0.070)	(0.049)	(0.030)
Stock Volatility	-0.126***	-0.046	0.412**	-0.546***	-0.467*	-1.234***	-0.199	-0.058
	(0.045)	(0.030)	(0.169)	(0.210)	(0.277)	(0.201)	(0.211)	(0.120)
CEO Tenure	0.008***	0.008***	0.002	-0.010	0.006	-0.005	0.019**	0.002
	(0.002)	(0.002)	(0.008)	(0.009)	(0.011)	(0.008)	(0.008)	(0.006)
CEO Age	0.003	0.001	-0.001	0.007	-0.017	-0.003	0.024***	0.016***
	(0.002)	(0.002)	(0.007)	(0.008)	(0.011)	(0.007)	(0.009)	(0.005)
CEO Ownership	-0.019***	-0.024***	0.018	-0.160***	0.013	-0.059***	-0.061***	0.004
	(0.006)	(0.006)	(0.014)	(0.026)	(0.026)	(0.019)	(0.018)	(0.016)

Firm Size	0.348***	0.133***	-0.007	0.474***	0.405***	0.309***	0.464***	0.376***
	(0.010)	(0.008)	(0.046)	(0.054)	(0.077)	(0.048)	(0.064)	(0.030)
Book Leverage	0.102	0.092**	-0.199	0.171	0.640	0.483*	0.069	0.319*
	(0.063)	(0.041)	(0.257)	(0.311)	(0.402)	(0.265)	(0.312)	(0.188)
Cash Holdings	0.240**	-0.102*	0.630*	-0.847*	-0.297	-0.023	-0.593	-0.868***
	(0.094)	(0.059)	(0.361)	(0.448)	(0.615)	(0.393)	(0.430)	(0.268)
Sales Growth	0.104***	-0.093***	0.376***	-0.111	-0.312	0.975***	-0.490***	-0.425***
	(0.034)	(0.022)	(0.138)	(0.145)	(0.191)	(0.155)	(0.136)	(0.083)
ROA	0.696***	0.285***	-0.736	-0.245	0.973	5.473***	1.831***	0.979***
	(0.125)	(0.071)	(0.478)	(0.584)	(0.748)	(0.549)	(0.494)	(0.302)
Market to Book	0.006***	0.001	-0.010***	0.009*	0.025***	-0.002	0.004	0.001
	(0.001)	(0.001)	(0.004)	(0.005)	(0.007)	(0.004)	(0.005)	(0.003)
Firm Age	0.001	0.001**	0.002	0.003	0.007	0.001	0.027***	0.009***
	(0.001)	(0.000)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.002)
Constant	5.481***	5.471***	0.752	2.892***	1.285	3.688***	-3.980***	-0.133
	(0.132)	(0.113)	(0.541)	(0.665)	(0.850)	(0.581)	(0.698)	(0.363)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,288	12,288	12,288	12,288	12,288	12,288	12,288	12,288
Adj. R-squared	0.555	0.453	0.105	0.295	0.292	0.196	0.484	0.371

plans (*Ln(Non-Equity)*), changes in pension value and nonqualified deferred compensation earnings (*Ln(Pension)*), and other forms of compensation (*Ln(Other Pay)*). Columns (2) through (8) of Table 3.2 report coefficients from baseline regressions, revealing a generally positive impact of *ESG Pay Dummy* on various compensation elements.

The coefficients for *Ln(Salary)*, *Ln(Stock)*, *Ln(Non-Equity)*, *Ln(Pension)*, and *Ln(Other Pay)* are positive and statistically significant, indicating that ESG-linked pay influences these aspects of compensation. The significant results in these areas suggest that ESG-linked compensation is effectively integrated into both the fixed and variable components of pay that align with long-term sustainability goals. For instance, the positive impacts on *Ln(Stock)* and *Ln(Non-Equity)* reflect the strategic use of long-term incentives to align executives' actions with broader corporate sustainability objectives over an extended period.

On the other hand, the lack of significant impacts on *Ln(Bonus)* and *Ln(Option)* suggests a more complex interaction between ESG performance targets and short-term incentive mechanisms. The non-significance in *Ln(Option)* might indicate that these long-term equity-based incentives are not directly or immediately responsive to annual ESG criteria, possibly due to their vesting schedules or the nature of the performance conditions tied to stock option grants.

These findings illustrate that the influence of ESG-linked pay varies across different types of compensation, depending on their strategic importance and the nature of the incentives. The substantial effects on salary, stock awards, non-equity incentives, pensions, and other compensation highlight the depth of ESG integration into compensation policies, promoting a

holistic approach to executive remuneration that not only rewards financial performance but also fosters adherence to environmental, social, and governance standards.

This analysis underscores the need for firms to carefully consider the design of ESG compensation policies, ensuring that they effectively motivate executives towards achieving both immediate and long-term ESG goals while aligning with the firm's overall strategic objectives.

ESG-Linked Compensation and the Structure of CEO Pay

Table 3.3 shows the impact of ESG-linked pay policies on the structural components of CEO compensation, analyzed using ordinary least squares (OLS) regression with firm-level clustered standard errors. The dependent variables include various facets of CEO pay such as *Salary%*, *Bonus%*, *Stock%*, *Option%*, *Non-Equity%*, *Pension%*, and *Other Pay%*. The coefficients for *Salary%* and *Stock%* highlight nuanced shifts within the compensation structure of CEOs at firms integrating ESG criteria. Specifically, the coefficient for *Salary%* is significantly negative (-0.831, $p < 0.10$), indicating a reduction in the fixed salary proportion of total compensation. Although statistically significant, the economic impact of this decrease is relatively modest, reflecting minor adjustments rather than a substantial overhaul of pay structures. This subtle shift suggests a strategic realignment towards variable pay components that emphasize long-term performance and sustainability goals. Conversely, the positive coefficient for *Stock%* (1.992, $p < 0.10$) suggests an increase in the proportion of compensation derived from stock awards. While this change aligns CEO incentives with long-term value

creation, the overall economic significance of these alterations remains limited. These findings imply that while there is a noticeable shift towards performance-aligned pay components, the overall structure of CEO compensation exhibits only slight modifications, indicating an overarching growth in total pay with minor redistributions among its components.

Although the introduction of ESG pay policies is linked with adjusting compensation structures, the empirical analysis suggests that these modifications may not significantly alter the overall compensation framework. While ESG-linked compensation initiatives are designed to align executive incentives with sustainable and long-term value creation, the impact on the structure of these incentives appears more nuanced.

The emphasis on variable pay components, particularly stock awards, reflects a strategic shift towards aligning CEO remuneration with corporate performance and ESG objectives. However, this shift does not necessarily denote a radical transformation in the overall pay architecture. The evidence indicates only modest adjustments across various pay components such as salary reductions and increases in stock-based compensation. These changes, while strategically oriented towards promoting long-term corporate goals, do not fundamentally redefine the compensation landscape but rather suggest incremental adjustments to existing structures.

This targeted realignment, emphasizing long-term incentives over fixed pay, ostensibly supports the integration of corporate sustainability goals into executive pay strategies. Yet, the lack of substantial overall change in the compensation framework points to the complex nature of fully integrating ESG criteria into executive remuneration. It underscores the challenge of

balancing traditional financial incentives with emerging ESG priorities within the constraints of existing compensation models.

In conclusion, the shift prompted by ESG-linked pay policies, while reflective of a broader corporate movement towards sustainability, has not yet resulted in a profound restructuring of CEO compensation. Instead, these policies appear to fine-tune the existing frameworks to better align with long-term sustainability goals, suggesting a gradual evolution rather than a wholesale transformation in how CEOs are incentivized.

Table 3.3: ESG-linked Pay and the Structure of CEOs' Compensation

This table shows the regression results of the relationship between firms' ESG-linked Pay and the structure of CEOs' compensation. The dependent variables are *Salary%*, *Bonus%*, *Stock%*, *Option%*, *Non-Equity%*, *Pension%* and *Other Pay%*. The independent variable is *ESG Pay Dummy* which equals one if CEOs have any ESG criterion in the compensation contract in that year, and zero otherwise. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Salary%	Bonus%	Stock%	Option%	Non-Equity%	Pension%	Other Pay%
ESG Pay Dummy	-0.831*	-0.273	1.992*	-0.858	-0.167	0.432	0.062
	(0.431)	(0.251)	(1.056)	(0.755)	(0.736)	(0.508)	(0.173)
Stock Return	-0.332	0.103	-0.647	-0.155	1.708***	-0.234	-0.055
	(0.256)	(0.175)	(0.524)	(0.438)	(0.393)	(0.164)	(0.094)
Stock Volatility	3.195***	1.004**	-0.537	-1.310	-2.278*	-0.833	0.476
	(0.786)	(0.474)	(1.837)	(1.441)	(1.273)	(0.633)	(0.304)
CEO Tenure	0.016	0.005	-0.041	0.093*	-0.075	0.036	-0.021
	(0.033)	(0.022)	(0.079)	(0.054)	(0.050)	(0.024)	(0.017)
CEO Age	-0.004	0.003	-0.054	-0.152***	0.069	0.064**	0.054***
	(0.033)	(0.022)	(0.070)	(0.051)	(0.045)	(0.025)	(0.017)
CEO Ownership	0.159*	0.116**	-1.019***	0.185	0.151	-0.094**	0.184***
	(0.094)	(0.056)	(0.193)	(0.143)	(0.122)	(0.048)	(0.057)
Firm Size	-2.954***	-0.037	2.245***	0.573	-0.273	0.448**	0.045

	(0.182)	(0.156)	(0.466)	(0.386)	(0.277)	(0.184)	(0.073)
Book Leverage	-0.459	-0.741	-0.461	2.020	0.440	-0.325	0.104
	(1.061)	(0.824)	(2.570)	(2.146)	(1.528)	(0.855)	(0.576)
Cash Holdings	-3.985***	2.125**	-2.748	5.602*	-1.600	-1.135	0.254
	(1.518)	(1.055)	(4.162)	(3.191)	(2.150)	(1.104)	(0.660)
Sales Growth	-2.736***	0.659*	-1.155	-0.989	6.695***	-1.087***	-1.040***
	(0.575)	(0.381)	(1.272)	(1.008)	(0.921)	(0.382)	(0.257)
ROA	-7.910***	-1.963	-16.964***	-5.459	30.747***	2.589*	-0.222
	(2.013)	(1.608)	(4.751)	(4.093)	(3.258)	(1.389)	(0.808)
Market to Book	-0.068***	-0.028***	0.045	0.122***	-0.063**	0.018	-0.012
	(0.015)	(0.010)	(0.045)	(0.037)	(0.028)	(0.011)	(0.009)
Firm Age	-0.002	0.011	-0.066**	-0.011	-0.000	0.071***	0.006
	(0.011)	(0.007)	(0.027)	(0.021)	(0.017)	(0.014)	(0.005)
Constant	41.864***	1.275	27.692***	17.527***	17.677***	-4.911**	-1.135
	(2.328)	(1.722)	(5.531)	(4.444)	(3.305)	(1.984)	(1.064)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,288	12,288	12,288	12,288	12,288	12,288	12,288
Adj. R-squared	0.299	0.102	0.337	0.266	0.178	0.357	0.151

ESG-Linked Compensation and the Complexity of CEO Pay

The results from Table 3.4 illustrate a significant relationship between ESG-linked pay and the complexity of CEO compensation packages, as indicated by the number of pay components. Across the models, the estimations on *ESG Pay Dummy* are positive and significant at the above 10% level when dependent variable is *# of Pay Components*. Using data without control variables (Column (1)), we find that the ESG Pay Dummy is associated with an increase in the number of compensation components by 0.077, significant at the 10% level. When control variables such as firm performance metrics and CEO characteristics are introduced (Column (2)), the coefficient for ESG Pay Dummy increases slightly to 0.085 and achieves significance at the 5% level. A one standard deviation increase in ESG Pay corresponds to approximately a 2.13% increase in CEO total pay, highlighting the meaningful economic impact of ESG-linked compensation policies. This suggests that the adoption of ESG-linked pay not only aligns with sustainability objectives but also has a notable influence on executive remuneration. These results suggest that ESG-linked pay policies lead to more complex compensation structures, potentially due to the incorporation of diverse incentives that align CEO behaviors with environmental, social, and governance goals. To be specific, firms with ESG pay have their CEO compensation complexity increased by 0.085 components on average, compared to firms without such a policy.

The increase in complexity may be due to the incorporation of various performance metrics that target environmental, social, and governance outcomes, alongside traditional financial metrics. This multifaceted approach could necessitate a broader range of

compensation tools, such as deferred compensation, equity awards linked to sustainability targets, and bonuses tied to non-financial performance metrics.

The analysis also shows significant effects from other firm-specific variables. For instance, *Firm Size* and Return on Assets (*ROA*) both positively affect the complexity of compensation, which might reflect larger and more profitable firms' capacity and willingness to implement intricate compensation structures to motivate and retain top executive talent. Conversely, variables such as *Stock Volatility* and *Book Leverage* show a negative association, possibly indicating that firms in more volatile or heavily leveraged positions opt for simpler, more straightforward compensation packages to maintain clarity and focus on executive incentives.

Interestingly, CEO-specific factors like *Age* and *Tenure* do not show a statistically significant impact on compensation complexity, suggesting that the decision to complexify compensation packages is less about individual CEO characteristics and more about broader strategic and governance considerations.

Table 3.4: ESG-linked Pay and the Complexity of CEOs' Compensation

This table presents the regression results of the relationship between ESG-linked Pay and the complexity of CEOs' compensation. The dependent variable is *# of Pay Components*, which is the number of the components in CEOs' compensation contract. The independent variables are *ESG Pay Dummy*, which equals one if a firms' CEO has any ESG criterion in the compensation contract in that year, and zero otherwise. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: *# of Pay Components*		
	(1)	(2)
ESG Pay Dummy	0.077*	0.085**
	(0.042)	(0.041)
Stock Return		-0.002
		(0.019)
Stock Volatility		-0.276***
		(0.067)
CEO Tenure		-0.001
		(0.003)
CEO Age		-0.000
		(0.003)
CEO Ownership		-0.031***
		(0.007)
Firm Size		0.099***
		(0.017)
Book Leverage		0.184*
		(0.096)
Cash Holdings		-0.419***
		(0.130)
Sales Growth		-0.030
		(0.047)

ROA		0.793***
		(0.163)
Market to Book		0.001
		(0.002)
Firm Age		0.005***
		(0.001)
Constant	4.887***	3.940***
	(0.016)	(0.188)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	12,288	12,288
Adj. R-squared	0.278	0.331

3.5 ESG Pay and Firms ESG Outcomes

3.5.1 Research Design

In this section, we aim to explore the real effect of ESG-linked pay on firms' ESG outcomes. The rising adoption of ESG contracting may be driven by shareholder demands for enhanced ESG performance. Nonetheless, this trend could also indicate greenwashing rather than genuine efforts to bolster ESG outcomes. For example, ESG metrics might constitute only a minor portion of executive compensation, or the targets set within these contracts could be relatively easy to achieve. To address this issue, we assess whether the increase in ESG contracting correlates with actual improvements in firms' ESG performance. Initially, we investigate firms' ESG incidents. Subsequently, we examine whether ESG pay serves as a tool for greenwashing. Finally, we evaluate the impact of ESG pay on firms' ESG rankings. For this analysis, we employ equation (1) and replace the dependent variables with proxies for ESG incidents (*ESG Incidents*, *E Incidents*, *S Incidents* and *G Incidents*), greenwashing (*Internal*, *External*, *Real Diff* and *Abs Diff*), and ESG rankings (*ESG Score*, *Combined Score*, *Controversies Score*, *E Score*, *S Score* and *G Score*).

We use the same firm- and CEO-level controls in both regressions because both CEO pay and ESG performance are shaped by similar firm fundamentals and governance factors. The control variables account for firm characteristics that could otherwise confound the observed relationship between ESG-linked pay and the dependent variables. Using the same set of control variables for both hypotheses is appropriate because both CEO pay and ESG performance are shaped by firm characteristics, financial conditions, and governance structures.

While some controls may be more relevant for one regression than the other, maintaining a consistent model specification allows for a more direct comparison of the effects of ESG-linked pay on different outcomes. Furthermore, our robustness checks ensure that the findings are not driven by omitted variable bias or inconsistent model specifications.

3.5.2 Results

ESG Pay and ESG Incidents

To empirically test whether ESG-linked pay leads to improved ESG performance, we conduct regression analysis using model (1) and replace the dependent variables with *ESG Incidents*, *E Incidents*, *S Incidents* and *G Incidents*. We use *ESG Pay Dummy*, *E Pay*, *S Pay* and *G Pay* as the main independent variables, separately. Table 3.5 presents the results across Panels A to D. The coefficients of all the main independent variables are positive but not statistically significant. These findings suggest that firms with ESG-linked pay do not show a statistically significant relationship with improvements in ESG performance, as measured by the number of ESG incidents. Despite investigating the detailed categories of ESG-linked pay—including whether incentives are related to environmental, social, or governance issues—the results remain consistent.

While the initial hypothesis posited that ESG-linked pay would positively impact a company's ESG performance, the empirical results do not support this assertion. The regression analysis across different categories of ESG incidents—encompassing environmental, social,

and governance dimensions—reveals that the presence of ESG-linked compensation does not statistically correlate with a decrease in the number of ESG incidents reported.

This absence of significance could be attributed to several factors. First, the effectiveness of ESG-linked incentives might be diluted by the nature of the ESG goals set within the compensation packages. If these targets are not sufficiently challenging or are not directly linked to measurable outcomes, they might not effectively drive behavioral changes in executive actions. Additionally, the positive but non-significant coefficients suggest that while there might be a directional intent towards improving ESG outcomes, the actual impact of such compensation structures is too subtle to detect within the scope of the current data set.

Moreover, the broader corporate culture and internal controls may also play a significant role in mediating the relationship between ESG pay and incident outcomes. If the overall organizational environment does not strongly support ESG initiatives, even well-designed incentive schemes may fail to produce tangible results. This implies a need for firms to align their internal ESG policies and culture more closely with their compensation strategies to enhance the effectiveness of ESG-linked pay.

Lastly, the timeframe over which ESG outcomes are evaluated could also affect the observed results. Changes in ESG practices driven by compensation adjustments may require a longer period to manifest in measurable incident reductions. Future research could thus benefit from longitudinal studies that track the impact of ESG-linked compensation over extended periods to capture more gradual improvements in ESG performance.

In summary, while the current findings do not demonstrate a statistically significant impact of ESG-linked compensation on reducing ESG incidents, they highlight the complexity of designing effective ESG incentives and the potential need for a multifaceted approach that includes cultural alignment, stringent target setting, and a longer-term perspective on ESG objectives.

Table 3.5: ESG-linked Pay and Firms' ESG Incidents

This table presents the regression results of the relationship between ESG Contracting and firms' ESG incidents. We use *ESG Incidents*, *E Incidents*, *S Incidents* and *G Incidents* as proxies for firms' ESG incidents. *ESG Incidents* is the logarithm of the number of firm's ESG incidents plus one. *E Incidents* is the logarithm of the number of firm's environmental-related incidents plus one. *S Incidents* is the logarithm of the number of firm's social-related incidents plus one. *G Incidents* is the logarithm of the number of firm's governance-related incidents plus one. We use *ESG Pay Dummy*, *Environmental Pay*, *Social Pay* and *Government Pay* as proxies for CEOs' ESG-linked pay. ESG *Pay Dummy* equals one if CEOs have any ESG criterion in the compensation contract in that year, and zero otherwise. *Environmental Pay* is the number of carbon emission incentives and other environmental incentives for CEOs in a given year. *Social Pay* is the number of safety-, diversity-, employee-, and customer- related incentives for CEOs in a given year. *Government Pay* is the number of culture-, compliance-, and governance- related incentives for CEOs in a given year. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Overall ESG Incidents

Dependent Variable: ESG Incidents	
ESG Pay Dummy	0.208
	(0.435)
Stock Return	0.098
	(0.144)
Stock Volatility	0.618
	(0.538)
CEO Tenure	-0.053***
	(0.020)
CEO Age	-0.049**
	(0.022)
CEO Ownership	0.170***
	(0.042)
Firm Size	3.112***

	(0.289)
Book Leverage	0.372
	(0.963)
Cash Holdings	7.108***
	(1.468)
Sales Growth	-1.437***
	(0.346)
ROA	2.585
	(1.633)
Market to Book	0.021
	(0.020)
Firm Age	0.054***
	(0.013)
Constant	-24.450***
	(2.519)
Year FE	Yes
Industry FE	Yes
Observations	11,658
Adj. R-squared	0.487

Panel B: Environmental-related Incidents

Dependent Variable: E Incidents		
	(1)	(2)
ESG Pay Dummy	0.397	
	(0.326)	
Environmental Pay		1.043
		(1.665)
Stock Return	-0.111	-0.112
	(0.079)	(0.079)
Stock Volatility	0.097	0.097
	(0.299)	(0.299)
CEO Tenure	-0.011	-0.011
	(0.011)	(0.011)
CEO Age	-0.029*	-0.029*

	(0.015)	(0.015)
CEO Ownership	0.063***	0.064***
	(0.022)	(0.022)
Firm Size	1.082***	1.079***
	(0.161)	(0.161)
Book Leverage	-0.375	-0.364
	(0.532)	(0.532)
Cash Holdings	2.530***	2.524***
	(0.604)	(0.599)
Sales Growth	-0.522**	-0.505**
	(0.210)	(0.209)
ROA	-0.081	-0.112
	(0.729)	(0.733)
Market to Book	0.004	0.005
	(0.009)	(0.009)
Firm Age	0.029**	0.029**
	(0.012)	(0.012)
Constant	-7.852***	-7.797***
	(1.194)	(1.182)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,658	11,658
Adj. R-squared	0.413	0.413

Panel C: Social-related Incidents

Dependent Variable: S Incidents		
	(1)	(2)
ESG Pay Dummy	0.229	
	(0.283)	
Social Pay		0.356
		(0.272)
Stock Return	0.100	0.101
	(0.123)	(0.123)

Stock Volatility	0.294	0.288
	(0.454)	(0.452)
CEO Tenure	-0.028**	-0.028**
	(0.013)	(0.013)
CEO Age	-0.044**	-0.043**
	(0.018)	(0.018)
CEO Ownership	0.082***	0.083***
	(0.032)	(0.032)
Firm Size	1.962***	1.960***
	(0.298)	(0.298)
Book Leverage	0.289	0.293
	(0.696)	(0.696)
Cash Holdings	4.993***	4.985***
	(1.029)	(1.030)
Sales Growth	-0.572**	-0.563**
	(0.260)	(0.259)
ROA	1.124	1.116
	(1.486)	(1.483)
Market to Book	0.014	0.014
	(0.016)	(0.016)
Firm Age	0.027***	0.026***
	(0.010)	(0.010)
Constant	-14.695***	-14.682***
	(2.438)	(2.437)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,658	11,658
Adj. R-squared	0.415	0.415

Panel D: Governance-related Incidents

Dependent Variable: G Incidents		
	(1)	(2)
ESG Pay Dummy	0.060	

	(0.186)	
Government Pay		0.345
		(0.272)
Stock Return	0.235**	0.235**
	(0.109)	(0.109)
Stock Volatility	0.146	0.144
	(0.327)	(0.327)
CEO Tenure	-0.023**	-0.023**
	(0.011)	(0.011)
CEO Age	-0.026**	-0.025**
	(0.012)	(0.012)
CEO Ownership	0.088***	0.087***
	(0.022)	(0.022)
Firm Size	1.499***	1.501***
	(0.222)	(0.222)
Book Leverage	-0.428	-0.439
	(0.523)	(0.524)
Cash Holdings	3.021***	3.025***
	(0.830)	(0.829)
Sales Growth	-0.957***	-0.968***
	(0.198)	(0.198)
ROA	2.136*	2.161*
	(1.266)	(1.264)
Market to Book	0.013	0.012
	(0.012)	(0.011)
Firm Age	0.021***	0.021***
	(0.007)	(0.007)
Constant	-11.680***	-11.704***
	(1.992)	(1.995)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,658	11,658
Adj. R-squared	0.375	0.375

ESG Pay and Greenwashing

Table 3.6 presents a detailed analysis of the relationship between ESG-linked pay and potential greenwashing activities within firms, utilizing metrics such as *Internal*, *External*, *Real Diff*, and *Abs Diff* to evaluate the authenticity of ESG-related disclosures and actions. The findings are divided into several panels, each addressing different components of ESG compensation.

In Panel A, where *ESG Pay Dummy* serves as the independent variable, the analysis reveals mixed results. The coefficients for both *Internal* ($\beta = 0.0086$) and *External* ($\beta = 0.0109$) measures are positive, suggesting a tendency for firms with ESG-linked compensation to engage more in ESG disclosures. However, these coefficients are not statistically significant, indicating that the presence of ESG-linked pay alone does not conclusively lead to increased transparency or action in ESG practices.

Panels B through D provide a breakdown by specific ESG pay components—Environmental, Social, and Governance Pay. Here, the *Environmental Pay* component in Panel B stands out by showing a statistically significant positive impact on both *External* disclosures ($\beta = 0.0320$) and *Real Diff* ($\beta = 0.0377$), suggesting that linking compensation directly to environmental goals may encourage more substantive environmental practices and reporting. Conversely, the coefficients related to *Social Pay* and *Governance Pay* in Panels C and D display mixed and generally insignificant results, suggesting that these components do not consistently deter superficial ESG commitments.

Overall, these findings underscore the complexity of implementing ESG-linked compensation as a tool for enhancing corporate sustainability practices. While certain

components like Environmental Pay demonstrate potential for promoting genuine ESG engagement, the broader impact across different ESG dimensions appears limited. This analysis suggests that simply adopting ESG-linked pay policies is insufficient for achieving substantial improvements in ESG performance or reducing greenwashing, without a targeted and effectively enforced strategy.

Table 3.6: ESG-linked Pay and Firms' Greenwashing

This table presents the regression results of the relationship between ESG-linked Pay and firms' greenwashing. We use *Internal*, *External*, *Real Diff* and *Abs Diff* as proxies for firms' greenwashing. *Internal* measures the values of firms' internally oriented disclosure and claims actions. *External* is the values of firms' externally oriented disclosure and claims actions. *Real Diff* is the real values of the difference between firms' external and internal actions. *Abs Diff* is the absolute values of the difference between firms' external and internal actions. We use *ESG Pay Dummy*, *ESG Pay Number*, *Environmental Pay*, *Social Pay* and *Government Pay* as proxies for firms' ESG-linked pay. ESG *Pay Dummy* equals one if CEOs have any ESG criterion in the compensation contract in that year, and zero otherwise. *ESG Pay Number* is the number of ESG-related criterion for the firm's CEO in the compensation contract in a given year. *Environmental Pay* is the number of carbon emission incentives and other environmental incentives for the CEO in a given year. *Social Pay* is the number of safety-, diversity-, employee-, and customer- related incentives for the CEO in a given year. *Government Pay* is the number of culture-, compliance-, and governance- related incentives for the CEO in a given year. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Use ESG Pay Dummy as Independent Variable

	(1)	(2)	(3)	(4)
	Internal	External	Real Diff	Abs Diff
ESG Pay Dummy	0.0086	0.0109	0.0031	-0.0031
	(0.0069)	(0.0089)	(0.0075)	(0.0075)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	7,050	7,050	7,050	7,050
Adj. R-squared	0.6527	0.6114	0.3150	0.3150

Panel B. Use Environmental Pay as Independent Variable

	(1)	(2)	(3)	(4)
	Internal	External	Real Diff	Abs Diff
Environmental Pay	-0.0056	0.0320**	0.0377***	-0.0377***
	(0.0099)	(0.0157)	(0.0102)	(0.0102)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	7,050	7,050	7,050	7,050
Adj. R-squared	0.6526	0.6116	0.3165	0.3165

Panel C. Use Social Pay as Independent Variable

	(1)	(2)	(3)	(4)
	Internal	External	Real Diff	Abs Diff
Social Pay	0.0053	0.0028	-0.0017	0.0017
	(0.0055)	(0.0086)	(0.0072)	(0.0072)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	7,050	7,050	7,050	7,050
Adj. R-squared	0.6526	0.6112	0.3150	0.3150

Panel D. Use Governance Pay as Independent Variable

	(1)	(2)	(3)	(4)
	Internal	External	Real Diff	Abs Diff
Governance Pay	0.0053	0.0147*	0.0097	-0.0097
	(0.0073)	(0.0089)	(0.0067)	(0.0067)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	7,050	7,050	7,050	7,050
Adj. R-squared	0.6526	0.6115	0.3153	0.3153

ESG Pay and Firm ESG Rankings

For a comprehensive understanding of the relationships between ESG-linked pay and firm ESG rankings, Table 3.7 provides a detailed exploration across various metrics. Each panel of the table investigates different dimensions of ESG performance, revealing nuanced insights into how ESG-linked compensation influences broader ESG rankings and specific ESG categories.

Panel A reveals that while the coefficients for *ESG Score* (0.652) and *Combined Score* (0.375) are positive, they are not statistically significant, suggesting that although firms with ESG-linked pay policies might exhibit an improvement in overall ESG performance, these results do not conclusively support a robust impact. The *Controversies Score* shows a negative coefficient (-1.598), indicating a potential reduction in ESG controversies with ESG-linked compensation, though again, the lack of significance calls for cautious interpretation. In the analysis of E, S, and G Scores, all coefficients appear positive for E (1.343) and S (1.554) Scores, suggesting potential improvements in environmental and social governance aspects respectively. However, these results are not statistically significant, indicating that the evidence is insufficient to firmly conclude that ESG-linked pay has a definitive impact on these dimensions. Similarly, the negative coefficient for G Score (-0.953) also lacks statistical significance, further suggesting that the relationship between ESG-linked compensation and governance outcomes remains inconclusive.

Panel B examines the effects of *Environmental Pay* on various ESG outcomes. The coefficients suggest a trend where *Environmental Pay* has a negative impact on the *Controversies*, which could imply a reduction in environmental controversies. However, it is

important to note that the coefficient is not statistically significant, indicating that the data do not provide strong evidence to conclusively support these potential impacts.

In Panel C, the analysis focuses on the effect of *Social Pay* on various ESG performance measures. The coefficient for *ESG Score* (1.568) is positive and statistically significant at the 5% level, indicating that higher *Social Pay* is associated with improved overall ESG performance. Similarly, the coefficients for *E Score* (2.366) and *S Score* (1.898) are both positive and significant at the 5% level, suggesting that *Social Pay* has a strong positive impact on environmental and social governance aspects of the firm's ESG performance. However, the coefficients for *Combined Score* (0.836) and *G Score* (0.266) are positive but not statistically significant, indicating a weaker relationship between *Social Pay* and these aspects of ESG performance. On the other hand, the *Controversies Score* has a negative coefficient (-2.371), implying that higher Social Pay might be associated with a reduction in ESG-related controversies, but this result is not statistically significant. Overall, the results from Panel D suggest that *Social Pay* can significantly enhance certain dimensions of ESG performance, particularly in the environmental and social pillars.

In Panel D, the analysis examines the impact of *Governance Pay* on various ESG performance measures. The results show that the coefficient for *G Score* is -3.450 and statistically significant at the 5% level, indicating that an increase in *Governance Pay* is associated with a significant reduction in the *G Score*. This suggests that while firms may be allocating more resources towards governance-related compensation, it might paradoxically be linked to a deterioration in governance practices, or perhaps heightened scrutiny that lowers

the *G Score*. On the other hand, the coefficients for *ESG Score* (-0.981), *Combined Score* (-0.647), *Controversies Score* (0.912), *E Score* (-0.946), and *S Score* (0.980) are all statistically insignificant, indicating no clear relationship between *Governance Pay* and these aspects of ESG performance. The lack of significance in these other areas suggests that while governance-related compensation might be intended to improve overall governance, its impact on broader ESG outcomes and controversies is less evident. Overall, the results from Panel D indicate a complex relationship between *Governance Pay* and *ESG performance*, with the significant negative impact on *G Score* highlighting potential areas for further investigation.

The results indicate that Social Pay has a positive and statistically significant impact on overall ESG performance (ESG Score), as well as on E Score (environmental) and S Score (social). This suggests that firms incorporating social responsibility criteria into executive compensation are more likely to achieve measurable improvements in their environmental and social practices. This aligns with prior literature suggesting that socially responsible compensation can incentivize executives to implement more effective sustainability and diversity initiatives, enhancing firms' ESG commitments (Flammer et al., 2019).

In contrast, Governance Pay is associated with a statistically significant negative impact on G Score (governance performance), raising important questions about the effectiveness of governance-related incentives. This could indicate that governance-related pay mechanisms do not necessarily translate into stronger governance practices, and in some cases, might even be counterproductive. One possible explanation is that Governance Pay might be used as a symbolic mechanism to appease investors and stakeholders rather than as a genuine driver of

governance improvements. Additionally, firms that implement governance-linked pay may also be those facing governance challenges or external pressure, which could result in lower G Scores due to increased scrutiny and disclosure of governance deficiencies (Bebchuk & Fried, 2006).

These findings collectively illustrate that while ESG-linked compensation does influence certain specific areas of ESG performance, particularly environmental and social metrics, the overall effectiveness varies across different types of ESG pay and their targeted outcomes. The analysis underlines the complexity of aligning compensation strategies with broad ESG goals and suggests that more targeted approaches may be necessary to realize significant improvements in corporate sustainability and governance. These analyses underscore that incorporating ESG standards into compensation policies alone is insufficient to substantially improve a firm's ESG outcomes. This indicates the need for a deeper consideration of how these incentives are implemented and their alignment with corporate strategies when designing ESG-related incentive mechanisms. Future research might need to explore additional factors, such as corporate culture, internal execution mechanisms, and external regulatory environments, all of which could impact the effectiveness of ESG policies.

Table 3.7: ESG-linked Pay and Firms' ESG Rankings

This table shows the regression results of the relationship between ESG-linked Pay and firms' ESG rankings. We use *ESG Score*, *Combined Score*, *Controversies Score*, *E Score*, *S Score* and *G Score* as proxies for firms' ESG rankings. *ESG Score* measures firms' overall ESG score used for measuring firms' ESG performance. *Combined Score* is firms' 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. *Controversies Score* is firms' ESG controversies category score measures a company's exposure to environmental, social and governance controversies and negative events reflected in global media. *E Score* is firms' environmental pillar score. *S Score* is firms' social pillar score. *G Score* is firms' corporate governance pillar score. The independent variables are *ESG Pay Dummy*, *Environmental Pay*, *Social Pay* and *Government Pay*. ESG *Pay Dummy* equals one if CEOs have any ESG criterion in the compensation contract in that year, and zero otherwise. *Environmental Pay* is the number of carbon emission incentives and other environmental incentives for the CEO in a given year. *Social Pay* is the number of safety-, diversity-, employee-, and customer- related incentives for the CEO in a given year. *Government Pay* is the number of culture-, compliance-, and governance- related incentives for the CEO in a given year. All variables are defined in Appendix A.2. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Use ESG Pay Dummy as Independent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	ESG Score	Combined Score	Controversies Score	E Score	S Score	G Score
ESG Pay Dummy	0.652	0.375	-1.598	1.343	1.554	-0.953
	(0.962)	(0.991)	(1.337)	(1.281)	(1.083)	(1.470)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,062	7,062	7,062	7,062	7,062	7,062
Adj. R-squared	0.573	0.448	0.307	0.580	0.542	0.322

Table 3.7: ESG-linked Pay and Firms' ESG Rankings - Continues

Panel B. Use Environmental Pay as Independent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	ESG Score	Combined Score	Controversies Score	E Score	S Score	G Score
Environmental Pay	1.765	0.890	-1.805	2.747	0.855	1.302
	(2.095)	(2.435)	(3.043)	(2.441)	(1.912)	(2.445)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,062	7,062	7,062	7,062	7,062	7,062
Adj. R-squared	0.573	0.448	0.307	0.580	0.541	0.322

Table 3.7: ESG-linked Pay and Firms' ESG Rankings - Continues

Panel C. Use Social Pay as Independent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	ESG Score	Combined Score	Controversies Score	E Score	S Score	G Score
Social Pay	1.568**	0.836	-2.371	2.366**	1.898**	0.266
	(0.738)	(0.851)	(1.561)	(0.943)	(0.948)	(1.210)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,062	7,062	7,062	7,062	7,062	7,062
Adj. R-squared	0.573	0.448	0.307	0.580	0.542	0.322

Table 3.7: ESG-linked Pay and Firms' ESG Rankings - Continues

Panel D: Use Governance Pay as Independent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	ESG Score	Combined Score	Controversies Score	E Score	S Score	G Score
Government Pay	-0.981	-0.647	0.912	-0.946	0.980	-3.450**
	(1.106)	(1.067)	(1.095)	(1.508)	(1.317)	(1.611)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,062	7,062	7,062	7,062	7,062	7,062
Adj. R-squared	0.573	0.448	0.307	0.580	0.541	0.323

3.6 Robustness Tests

A key challenge in this analysis is the potential endogeneity between ESG-linked pay, CEO compensation, and ESG performance. Specifically, firms that adopt ESG-linked pay may have unobservable characteristics that simultaneously influence CEO pay or ESG outcomes, raising concerns about reverse causality, omitted variable bias, and selection bias.

One potential source of reverse causality is that poor ESG performance may itself drive firms to implement ESG-linked compensation as a corrective measure rather than ESG pay directly influencing ESG outcomes. Firms facing ESG-related controversies or investor pressure may adopt ESG pay policies as a symbolic response to improve their sustainability image, which could bias the estimated effect of ESG pay on actual ESG performance. Similarly, CEOs with greater bargaining power may advocate for ESG-linked pay as a justification for higher compensation, making it unclear whether ESG pay drives CEO compensation or vice versa.

To mitigate these endogeneity concerns, we employ Propensity Score Matching (PSM) and entropy balancing, two widely used techniques in corporate governance and executive compensation research. The Propensity Score Matching (PSM) method constructs a control group of firms that did not adopt ESG pay but are otherwise similar to those that did, reducing selection bias. By matching firms on observable characteristics such as firm size, industry, financial performance, and governance structures, we ensure that differences in CEO compensation and ESG outcomes are more likely to be attributable to ESG pay adoption rather than pre-existing firm characteristics. To further strengthen the robustness of our results, we

apply entropy balancing, which ensures that the distribution of key covariates is statistically identical between the treatment and control groups. This method provides more accurate estimates of the impact of ESG-linked pay by weighting observations so that treated and control firms are balanced on all observed characteristics.

While these approaches significantly improve the internal validity of our analysis, we acknowledge that they may not fully eliminate endogeneity concerns. For example, unobserved firm culture, board dynamics, or investor activism may still influence both the decision to adopt ESG pay and subsequent changes in CEO pay or ESG performance. Addressing these concerns fully would require the use of instrumental variable (IV) techniques or dynamic panel models, which are beyond the scope of this study but present an opportunity for future research.

Additionally, we recognize the importance of lead-lag dynamics in assessing the causal relationship between ESG-linked pay and firm outcomes. While we do not explicitly estimate lead-lag models, our PSM and entropy balancing approaches inherently account for pre-treatment differences, ensuring that firms adopting ESG pay are comparable to those that do not. Future research could explore the long-term effects of ESG pay adoption by implementing dynamic models or event studies to further disentangle the direction of causality.

3.6.1 Propensity Score Matching

One of the key concerns in assessing the effect of ESG-linked compensation on firm outcomes is the potential for endogeneity, particularly selection bias and reverse causality. Firms that adopt ESG-linked pay may have inherent characteristics that also influence CEO compensation

and ESG performance, making it difficult to isolate the causal effect of ESG pay on firm outcomes. For instance, firms with progressive corporate cultures, stronger governance frameworks, or heightened regulatory pressures may be both more likely to implement ESG pay and more inclined to improve ESG performance, introducing potential selection bias into the analysis. Additionally, reverse causality is a concern, as poor ESG performance may lead firms to introduce ESG-linked pay as a corrective mechanism, rather than ESG pay driving improvements in ESG performance.

To address these concerns, we employ Propensity Score Matching (PSM) to create a more comparable control group of firms that do not adopt ESG-linked pay but share similar characteristics with those that do. This approach reduces selection bias by ensuring that differences in firm outcomes are not driven by pre-existing firm characteristics but instead reflect the impact of ESG-linked compensation.

Following Fang et al. (2014), we implement a logistic regression model where the ESG Pay Dummy serves as the dependent variable, incorporating all control variables specified in our initial model. We apply nearest-neighbor matching without replacement and set a caliper of 0.01 to ensure that firms in the treatment and control groups are well-balanced in terms of observable characteristics. This process yields a balanced matched sample of 1,060 firm-year observations per group.

To assess the effectiveness of the matching process, we conduct pre-matching and post-matching diagnostic tests. The logistic regression model produces a pseudo-R^2 value close to zero, and the highly significant chi-square statistic confirms that the model accurately predicts

ESG-linked pay adoption. After matching, the covariate balance test reveals no statistically significant differences among the covariates between treated and control firms, ensuring that the groups are comparable. The post-matching pseudo-R^2 is markedly lower, and a chi-square test p-value of 1.00 confirms that the model does not exhibit any systematic bias in covariate effects after matching.

Using the matched sample, we re-estimate our baseline regression model to validate our initial findings. The results, presented in Panel C, remain consistent with our main analysis, reinforcing the robustness of our findings. Specifically, we find that ESG-linked pay is positively associated with total CEO pay, supporting our hypothesis that ESG-linked incentives may serve as a mechanism for increasing executive compensation rather than purely aligning managerial incentives with ESG goals. These findings align with prior studies (Flammer et al., 2019), which suggest that while ESG-linked pay is often introduced to enhance sustainability commitments, it may also create an avenue for pay increases without delivering significant ESG improvements.

While PSM helps mitigate selection bias, it does not fully address reverse causality concerns, particularly regarding the possibility that firms adopt ESG-linked pay in response to poor ESG performance. To further ensure robustness, we implement entropy balancing, which allows for a more precise adjustment of covariate distributions while retaining the full sample size.

Table 3.8: Propensity Score Matching

This table presents the baseline regression results using a propensity score matched sample. Panel A reports the pre-matching propensity score regression and post-matching diagnostic test results. The dependent variable is *ESG Pay Dummy*, a dummy variable that equals one if firms' CEO has any ESG criterion in the compensation contract in that year. Panel B reports the post-matching balance test results. Panel C reports the regression results. The dependent variable is *Total Pay*, which is the logarithm of CEO's total compensation plus one. All variables are defined in Appendix A.2 All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Propensity Score Regression and Diagnostic Test

	(1)	(2)
	ESG Pay Dummy	ESG Pay Dummy
Stock Return	-0.037	0.006
	(0.123)	(0.191)
Stock Volatility	-0.074	-0.454
	(0.351)	(0.526)
CEO Tenure	0.004	-0.011
	(0.012)	(0.018)
CEO Age	-0.005	-0.003
	(0.013)	(0.017)
CEO Ownership	0.032	0.013
	(0.033)	(0.045)
Firm Size	-0.056	-0.034
	(0.079)	(0.100)
Book Leverage	0.847*	-0.429
	(0.481)	(0.557)
Cash Holdings	-0.237	-0.013
	(0.689)	(1.029)
Sales Growth	0.258	0.254
	(0.261)	(0.353)
ROA	-1.298	-0.308
	(0.830)	(1.205)

Market to Book	0.018**	0.010
	(0.009)	(0.012)
Firm Age	0.012**	-0.000
	(0.006)	(0.007)
Constant	-4.456***	0.841
	(1.386)	(1.938)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	9,201	1,060
Pseudo R2	0.222	0.038
p-value of $\chi 2$	0.000	1.000

Table 3.8: Propensity Score Matching - Continues

Panel B: Balance Test

	(1) ESG Pay Dummy=0 (N=530)	(2) ESG Pay Dummy=1 (N=530)	(3) Difference in mean	(4) t-statistic
Stock Return	0.127	0.126	0.001	0.000
Stock Volatility	0.331	0.331	0.001	0.050
CEO Tenure	6.987	6.719	0.268	0.650
CEO Age	57.500	57.217	0.283	0.800
CEO Ownership	0.968	1.072	-0.104	-0.600
Firm Size	9.430	9.370	0.060	0.650
Book Leverage	0.324	0.317	0.007	0.600
Cash Holdings	0.098	0.110	-0.011	-1.450
Sales Growth	0.048	0.069	-0.021	-1.550
ROA	0.035	0.039	-0.004	-0.850
Market to Book	3.078	3.670	-0.593	-1.300
Firm Age	40.008	38.579	1.429	1.150

Table 3.8: Propensity Score Matching - Continues

Panel C: Regression Results

	Total Pay
ESG Pay Dummy	0.113***
	(0.035)
Stock Return	0.010
	(0.047)
Stock Volatility	-0.023
	(0.122)
CEO Tenure	0.013***
	(0.004)
CEO Age	0.001
	(0.004)
CEO Ownership	0.006
	(0.013)
Firm Size	0.382***
	(0.019)
Book Leverage	-0.087
	(0.139)
Cash Holdings	0.509**
	(0.254)
Sales Growth	0.091
	(0.083)
ROA	0.422
	(0.261)
Market to Book	0.009***
	(0.003)
Firm Age	-0.000
	(0.001)
Constant	5.155***
	(0.297)
Year FE	Yes
Industry FE	Yes
Observations	1,060
Adj. R-squared	0.595

3.6.2 Entropy Balancing

To further refine our approach, we apply entropy balancing, a method that ensures the treatment and control groups have identical covariate distributions in terms of mean, variance, and skewness. Unlike PSM, which relies on matched pairs and reduces the sample size, entropy balancing reweights observations to achieve perfect covariate balance while preserving all firm-year observations. This approach provides a more flexible and efficient way to mitigate selection bias in the estimation of ESG pay effects.

Using entropy balancing, we re-estimate the baseline regression model (Table 3.9). The balance test results (Panel A) confirm that the covariates between treatment and control groups are statistically identical, supporting the validity of the approach. The regression results (Panel B) again confirm that ESG-linked pay is positively related to total CEO pay, reinforcing our primary hypothesis.

These findings contribute to the growing body of literature on ESG incentives and executive compensation. Our results indicate that firms that adopt ESG-linked pay tend to compensate CEOs at a higher level, even after controlling for firm characteristics, governance factors, and potential selection bias. While this could be consistent with an incentive-alignment theory, where ESG-linked pay attracts and rewards executives committed to sustainability goals, it could also reflect managerial opportunism, where CEOs leverage ESG incentives as a tool for increasing their compensation.

By implementing PSM and entropy balancing, we effectively reduce selection bias and enhance the credibility of our estimates regarding the impact of ESG-linked pay on CEO

compensation. Our findings remain consistent across different methodological approaches, indicating that ESG pay adoption is associated with higher CEO compensation, even after addressing endogeneity concerns. However, we recognize that reverse causality remains a potential issue, particularly regarding whether firms adopt ESG pay as a reactive measure to poor ESG performance. Future research could explore longitudinal models or instrumental variable techniques to further disentangle causality and ESG pay motivations.

Table 3.9: Entropy Balancing

This table presents the baseline regression results using an entropy balancing matched sample. Panel A reports the balance test results. *ESG Pay Dummy* is a dummy variable that equals one if firms CEO has any ESG criterion in the compensation contract in that year. Panel B reports the regression results. *Total Pay* is the logarithm of CEO's total compensation plus one. All variables are defined in Appendix A.2 All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Balance Test

	ESG Pay Dummy =1			ESG Pay Dummy =0 before Matching			ESG Pay Dummy =0 after Matching		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mean	Variance	Skewness	Mean	Variance	Skewness	Mean	Variance	Skewness
Stock Return	0.126	0.158	0.856	0.138	0.160	0.924	0.126	0.171	1.010
Stock Volatility	0.341	0.042	1.847	0.326	0.036	1.856	0.341	0.048	1.803
CEO Tenure	6.693	44.040	1.823	6.913	43.570	1.651	6.693	40.320	1.702
CEO Age	57.570	33.000	-0.054	56.820	42.460	0.128	57.570	38.110	0.094
CEO Ownership	0.975	7.331	4.727	1.261	8.839	4.086	0.975	6.530	4.793
Firm Size	9.525	1.969	-0.112	8.859	2.000	0.311	9.525	2.095	0.123
Book Leverage	0.334	0.035	0.432	0.286	0.040	0.699	0.334	0.038	0.557
Cash Holdings	0.100	0.014	2.316	0.130	0.018	1.641	0.100	0.012	2.139
Sales Growth	0.068	0.056	1.070	0.069	0.035	1.119	0.068	0.042	1.379
ROA	0.032	0.007	-0.867	0.054	0.006	-0.713	0.032	0.006	-1.281
Market to Book	3.780	71.890	2.690	3.506	38.870	2.917	3.780	54.510	3.351
Firm Age	41.350	421.500	0.075	33.940	370.900	0.416	41.350	405.500	-0.079

Table 3.9: Entropy Balancing - Continues

Panel B: Regression Results

	Total Pay
ESG Pay Dummy	0.084***
	(0.024)
Stock Return	0.022
	(0.023)
Stock Volatility	-0.081
	(0.071)
CEO Tenure	0.012***
	(0.003)
CEO Age	-0.001
	(0.003)
CEO Ownership	-0.005
	(0.008)
Firm Size	0.347***
	(0.013)
Book Leverage	0.056
	(0.093)
Cash Holdings	0.336**
	(0.143)
Sales Growth	0.091*
	(0.047)
ROA	0.578***

	(0.168)
Market to Book	0.008***
	(0.002)
Firm Age	0.001
	(0.001)
Constant	5.639***
	(0.185)
Year FE	Yes
Industry FE	Yes
Observations	12,288
Adj. R-squared	0.585

3.7 Conclusion

This chapter has critically examined the impacts of ESG-linked compensation within corporate governance frameworks, uncovering pivotal insights into how sustainability-linked pay schemes influence executive compensation and broader corporate outcomes. The research findings reveal that while ESG-linked compensation is aimed at aligning CEO incentives with long-term sustainability and ethical objectives, its implementation often results in increased total pay for CEOs, highlighting a potential enrichment mechanism under the guise of fostering corporate responsibility.

The study demonstrates that the integration of ESG criteria into executive pay does lead to an overall increase in CEO compensation, contradicting the simplistic expectation that such policies merely align with broader sustainability goals without additional financial benefits to the executives. This increase is particularly pronounced in variable pay components such as stock awards, which suggests a strategic adaptation by firms to align perceived long-term value creation with immediate financial incentives for their leaders.

However, the investigation also indicates that these changes in compensation structure are not necessarily accompanied by substantive improvements in ESG performance. The evidence suggests that the adjustments to pay frameworks are often incremental and symbolic, rather than transformative, casting doubt on the efficacy of ESG-linked pay schemes in driving genuine enhancements in corporate sustainability practices.

This nuanced understanding calls for a reassessment of how ESG criteria are incorporated into executive compensation. It suggests that without rigorous enforcement, clear

performance metrics, and a deep alignment with a company's strategic and cultural fabric, ESG-linked pay may not fulfill its potential as a tool for promoting sustainable corporate development. Moving forward, research should delve deeper into the interactions between internal corporate governance mechanisms and external regulatory frameworks to optimize the design and effectiveness of ESG-linked compensation. This would ensure that such schemes do more than just augment executive salaries and genuinely contribute to the long-term sustainability objectives that they purport to support.

Figures

Figure 1. Prevalence of ESG pay

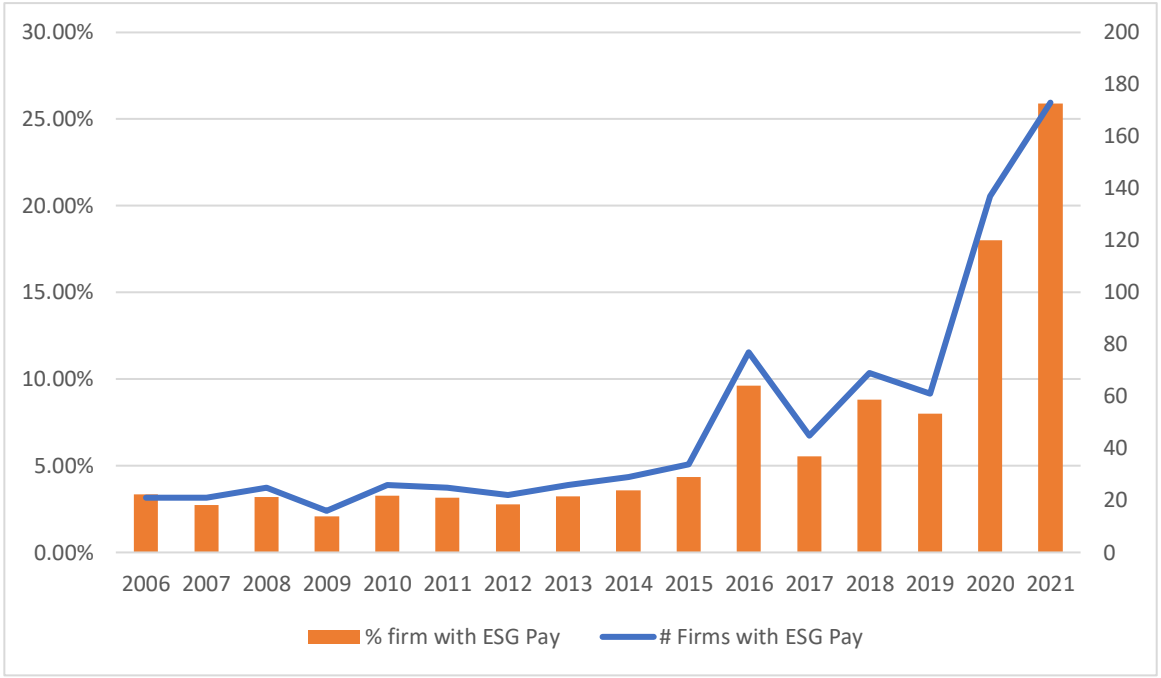


Figure 1. –This figure shows the prevalence of ESG pay (i.e., the inclusion of ESG-related metrics in CEO compensation contracts) over our sample periods. The data include all U.S firms covered by ISS Incentive Lab from 2006 to 2021 (1,202 firms). The bars represent the percentage of firms that include ESG metrics in their CEO's compensation contracts in a given sample year (left axis). The solid line represents the number of firms that include ESG metrics in their CEO's compensation contracts in a given sample year (right axis).

Appendix

Appendix A.1 Sample Distribution

Panel A. Sample selection

Manually checked the performance incentive metrics on ISS Incentive Lab and converting director-metric-year level data to CEO-firm-year level data from 1998 to 2021.	21,448
Less: missing CEO compensation data from ISS Incentive Lab from 2006 to 2021.	(7,505)
Less: missing control variables	(1,655)
# Firm-Years Observations	12,288
# Distinct Firms	1,202
# Distinct CEOs	2,371

Appendix A.1 Sample Distribution - Continues

Panel B. ESG-Linked Pay Distribution by Year

Year	# Obs.	# Firms with ESG Pay	Environmental Pay		Social Pay					Governance Pay		
			Emission	Environment	Safety	Diversity	Employee	Customer	Culture	Compliance	Governance	other
2006	627	21	1	2	3	1	2	2	12	0	0	0
2007	765	21	1	1	3	0	1	3	14	0	0	0
2008	779	25	0	1	3	1	7	3	13	0	0	0
2009	772	16	0	1	2	0	4	3	8	0	0	0
2010	790	26	0	3	7	0	3	5	10	2	0	0
2011	788	25	1	2	5	0	3	6	8	1	2	0
2012	791	22	0	2	10	0	5	3	5	1	0	0
2013	800	26	0	0	8	0	7	3	7	2	1	0
2014	808	29	1	1	11	0	4	3	9	1	1	0
2015	783	34	1	3	12	0	3	5	14	1	1	0
2016	801	77	1	3	16	3	15	9	19	5	17	1
2017	812	45	1	3	10	2	8	9	15	3	3	0
2018	782	69	2	4	15	2	14	8	18	6	23	1
2019	762	61	2	2	10	2	11	6	20	3	21	0
2020	760	137	10	11	30	9	39	13	31	5	37	3
2021	668	173	14	19	21	37	48	13	25	0	42	11
Total	12,288	807	35	58	166	57	174	94	228	30	148	16

Appendix A.2 Variables Definitions and Data Source

Variables	Definition	Data source
Proxies for ESG-linked Pay		
ESG Pay Dummy	Indicator variable that equals to one if the firm's CEO has any ESG criterion in the compensation contract in that year, and zero otherwise.	ISS Incentive Lab
Carbon Emission Pay	The number of specific GHG emission metrics in the CEO compensation contract in a given year.	ISS Incentive Lab
Other Environmental Pay	The number of environmental ESG metric in CEO compensation contract that is not specific to GHG emissions in a given year.	ISS Incentive Lab
Safety Pay	The number of incentives related to workplace safety and ethnic diversity for the CEO in a given year.	ISS Incentive Lab
Diversity Pay	The number of incentives related to gender and ethnic diversity for the CEO in a given year.	ISS Incentive Lab
Employee Pay	The number of incentives in CEO compensation contract that are related to workforce training and employee satisfaction.	ISS Incentive Lab
Customer Pay	The number of incentives in CEO compensation contract that are related to customer satisfaction and product quality.	ISS Incentive Lab
Culture Pay	The number of incentives in CEO compensation contract that are related to corporate mission, culture, and ethics.	ISS Incentive Lab
Compliance Pay	The number of incentives in CEO compensation contract that are related to compliance with various financial and non-financial regulations.	ISS Incentive Lab
Governance Pay	The number of incentives that are related to governance for the CEO in a given year.	ISS Incentive Lab

ESG other Pay	The number of incentives that are related to ESG issues but cannot be classified due to the vague word.	ISS Incentive Lab
Environmental Pay	The number of carbon emission incentives and other environmental incentives for the CEO in a given year.	ISS Incentive Lab
Social Pay	The number of safety-, diversity-, employee-, and customer- related incentives for the CEO in a given year.	ISS Incentive Lab
Government Pay	The number of culture-, compliance-, and governance- related incentives for the CEO in a given year.	ISS Incentive Lab
Proxies for CEOs' Compensation		
Ln(Total Pay)	Logarithm of CEO's total compensation plus one.	ISS Incentive Lab
Ln(Salary)	Logarithm of CEO's basic salary plus one.	ISS Incentive Lab
Ln(Bonus)	Logarithm of CEO's bonus plus one.	ISS Incentive Lab
Ln(Stock Awards)	Logarithm of one plus CEO's stock awards.	ISS Incentive Lab
Ln(Option Awards)	Logarithm of one plus CEO's option awards.	ISS Incentive Lab
Ln(Non-Equity)	Logarithm of one plus CEO's non-equity incentive plan compensation.	ISS Incentive Lab
Ln(Change in Pension)	Logarithm of one plus CEO's change in pension value and nonqualified deferred compensation (NQDC) earnings.	ISS Incentive Lab
Ln(Other Compensation)	Logarithm of one plus CEO's other compensation.	ISS Incentive Lab
Salary%	The percentage of CEOs' salary divided by CEOs' total pay.	ISS Incentive Lab
Bonus%	The percentage of CEOs' bonus divided by CEOs' total pay.	ISS Incentive Lab

Stock%	The percentage of CEOs' stock awards divided by CEOs' total pay.	ISS Incentive Lab
Option%	The percentage of CEOs' option awards divided by CEOs' total pay.	ISS Incentive Lab
Non-Equity%	The percentage of CEOs' non-equity divided by CEOs' total pay.	ISS Incentive Lab
Pension%	The percentage of CEOs' pension divided by CEOs' total pay.	ISS Incentive Lab
Other Pay%	The percentage of CEOs' other pay divided by CEOs' total pay.	ISS Incentive Lab
# of Pay Components	The number of the components of the CEO's compensation package.	ISS Incentive Lab
Control Variables		
Stock Return	Annual stock return of firm i in year t.	I/B/E/S
Stock Volatility	Annualized standard deviation of firm i's daily stock return in year t.	I/B/E/S
CEO Tenure	The years CEO is in his or her position at firm i in year t.	BoardEx and ExecuComp
CEO Age	CEO's age as reported in ExecuComp.	ExecuComp
CEO Ownership	CEO ownership in percent at firm i in year t. (SHROWN_TOT_PCT)	Refinitiv Database
Firm Size	Natural logarithm of book value of total assets (at).	Compustat
Book Leverage	Total debt scaled by total assets. Total debt is the sum of long-term debt and the debt in current liabilities. (dltt+dlc)/at	Compustat
Cash Holdings	The cash holding is the ratio of cash and short-term investments to the book value of total assets. che/at	Compustat
Sales Growth	The year-over-year percentage change in sales. (sale-l.sale)/l.sale	Compustat
ROA	Net income scaled by total assets. ni/at	Compustat

Market to Book	The market value of equity divided by book value of common equity. (csho*prcc_f)/(seq-pstkl+txditc)	Compustat
Firm Age	The number of years from the first appearance of the company in the Compustat database to the current year.	Compustat
Firms ESG Incidents		
Ln(ESG Incidents)	Logarithm of the number of firm's ESG incidents plus one.	RepRisk
Ln(E Incidents)	Logarithm of the number of firm's environmental-related incidents plus one.	RepRisk
Ln(S Incidents)	Logarithm of the number of firm's social-related incidents plus one.	RepRisk
Ln(G Incidents)	Logarithm of the number of firm's governance-related incidents plus one.	RepRisk
Firms Greenwashing		
Internal	The sum of the values of firms' internally oriented disclosure and claims actions.	Authors calculation based on Refinitiv data
External	The sum of the values of firms' externally oriented disclosure and claims actions.	Authors calculation based on Refinitiv data
Real Diff	The real values of the difference between external and internal actions.	Authors calculation based on Refinitiv data
Abs Diff	The absolute values of the difference between external and internal actions.	Authors calculation based on Refinitiv data
Firms ESG Rankings		
ESG Score	Firms' overall ESG score used for measuring firms' ESG performance. It is an overall company score based on the self-reported information in	Refinitiv Database

	the environmental, social and corporate governance pillars.	
Combined Score	Firms' ESG combined score. It 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 Database
Controversies Score	Firms' ESG controversies category score measures a company's exposure to environmental, social and governance controversies and negative events reflected in global media.	Refinitiv Database
E Score	Firms' environmental pillar score. It measures a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value.	Refinitiv Database
S Score	Firms' social pillar score. It measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value.	Refinitiv Database
G Score	Firms' corporate governance pillar score. It measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity,	Refinitiv Database

	through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value.	

Appendix A.3 ESG-linked Metrics in CEOs Compensation Incentives

ESG-related Incentives Classification	Detailed Classifications	Incentive Metric name in ISS Incentive lab
Environmental (E)	Emission reduction Metrics	lithium carbonate, hydrocarbon, carbon disclosure, emission, co2, carbon, ghg, greenhouse, green house, scope 1.
Environmental (E)	Environmental-related Metrics	environment, climate change and energy use, environmental protection, emission, carbon disclosure, enviroment, envirioment, ecolog, clean energy, climate, energy efficiency, safety, Environment, Health & environment, co2, carbon, environment compliance, protection of the environment, environment-human, planet, sustainability, uncharged water.
Social (S)	Safety-related Metrics	safety, injury, injuries, fatalities, incident, days away, dart, accident, osha, tcir, ltifr, trir, lost time incidence rate, medical incidence rate, trcfr, fatality, critical risk, critical control, damage, emergency response time, lost workday, health, security, lost day, disability, hazard, tphr, nuclear, outage, loss of life, occupational exposure, safe tours completed, safe delivery, dot crash, safe production, sick pay, hsse, recordable case rate, group afr, eh&s, slams, covid, RIR.
Social (S)	Diversity-related Metrics	diversity, diverse, women, female, feminization, feminisation, inclusion, gender, indigenous, balanced gender, black, minority, minorities, inclusive, non-white, same opportunity, equal opportunities, b-bbee.

Social (S)	Employee-related Metrics	management development, talent, retention, people development, development of people, personnel, workplace development, human capital, leadership development, employee engagement, employee turnover, turnover rate, leadership, filled internally, employee survey, engagement survey, employee satisfaction, workforce, member engagement, great place to work, best place to work, better place to work, place people are proud to work, human resources, hr and organization, people empowerment, people leadership, people engagement, positive workplace, training, trained, teamwork, leadership quality, capability, skill, workplace health, recruitment, colleague, staff, stuff, succession, organizational health, motivation, employee, people, engagement, engage, simplify work, team, turnover, hiring, job security, wellness, employment, quality of life, candidate experience, promotion, labor, hr and csr, resignation, member satisfaction, professionals, employer of choice, disciplinary factor, loyalty, human resource, workers compensation, bullying, harassment, employment equity, future of work, connect with work, top employer, workplace satisfaction, formation, star rating, workplace welfare, size of life-licensed sales force.
Social (S)	Culture-related Metrics	cultural development, employee culture, culture and values, conduct and culture,

		organizational culture, code of conduct, ethics, ethical, community, culture, cultur, communities, integrity, value, societ, social, stakeholder, commun criteria, persimmon way.
Social (S)	Compliance-related Metrics	slavery, compliance, bribery, corruption, reputation, human rights, perception, corporate image, regulator, animal welfare, migrant labor, dot complaint, build quality, mccsr ratio.
Corporate Governance (G)	Governance-related Metrics	corporate governance, governance, corporate stewardship, shareholder.
Corporate Governance (G)	Customer-related Metrics	customer, saifi, saidi, client, consumer, costumer, guest satisfaction, response time, service level, likelihood to recommend, reliability, net promoter score, nps, call center, quality of service, on time action, reclamation, user satisfaction, rate of satisfaction.
Other	ESG/CSR related Metrics	csr, social, corporate social responsibility, environment.

Appendix A.4 The Composition of Internal and External Indices

Internal Indices	Metric name in Refinitiv
Percentage of women on the board of directors.	womenmanagersscore
Percentage of non-executive board members on the audit committee as stipulated by the company.	auditcommitteenonexecutivemember
Percentage of non-executive board members on the nomination committee.	nominationcommitteenonexecutivem
Percentage of independent board members as reported by the company.	independentboardmembers
Does the company have a policy to support the skills training or career development of its employees?	policyskillstraining
Does the company have a policy to improve employee health & safety within the company and its supply chain?	policyemployeehealthsafety
Does the company use environmental criteria (ISO 14000, energy consumption, etc.) In the selection process of its suppliers or sourcing partners?	environmentalsupplychainmanageme
Does the company make use of renewable energy?	renewableenergyuse
Does the company have a policy to improve its energy efficiency?	policyenergyefficiency
Does the company have a policy to improve its water efficiency?	policywaterefficiency
Does the company develop products or technologies that are used for water treatment, purification, or that improve water-use efficiency?	watertechnologies
Does the company have a policy to reduce emissions?	policyemissions
Does the company have a policy for ensuring equal treatment of minority shareholders, facilitating shareholder engagement, or limiting the use of anti-takeover devices?	shareholderrightspolicyscore

Does the company's statutes or by-laws require that stock options be only granted with a vote at a shareholder meeting?	shareholdersapprovalstockcompens
Does the company have a policy for performance-oriented compensation that attracts and retains the senior executives and board members?	policyexecutivecompensationperfo
Does the company have a policy for maintaining a well-balanced membership of the board?	boardstructurepolicyscore
Does the company have an audit committee with at least three members and at least one "financial expert" within the meaning of Sarbanes-Oxley?	auditcommitteeexpertise
Does the company have a CSR committee or team?	csrsustainabilitycommittee
Does the company have a policy to guarantee the freedom of association universally applied independent of local laws? AND Does the company have a policy for the exclusion of child, forced, or compulsory labor?	humanrightspolicy
Does the company have a competitive employee benefits policy or ensure good employee relations within its supply chain? AND Does the company have a policy for maintaining long-term employment growth and stability?	policysupplychainhealthsafety
Does the company have a work–life balance policy? AND Does the company have a diversity and equal opportunity policy?	policydiversityandopportunity
External Indices	**Metric name in Refinitiv**
Does the company reportedly develop or market products and services that foster specific health and safety benefits for the consumers (healthy, organic or nutritional food, safe cars, etc.)?	healthyfoodorproducts
Does the company claim to favor promotion from within?	internalpromotion
Does the company report on policies or programs on HIV/AIDS for the workplace or beyond?	hivaidsprogram

Does the company report on crisis management systems or reputation disaster recovery plans to reduce or minimize the effects of reputation disasters?	crisismanagementsystems
Does the company report about environmentally friendly or green sites or offices?	greenbuildings
Does the company report on initiatives to reduce, reuse, substitute, or phase out toxic chemicals or substances?	toxicchemicalsreduction
Does the company report on initiatives to reduce the environmental impact of transportation of its products or its staff?	stafftransportationimpactreducti
Does the company report on initiatives to recycle, reduce, reuse, substitute, treat, or phase out total waste?	wastereductioninitiatives
Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC)?	vocemissionsreduction
Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out sox (sulphur oxides) or nox (nitrogen oxides) emissions?	noxandsoxemissionsreduction
Is the company's CSR report published in accordance with the GRI guidelines?	grireportguidelines
Does the company's extra-financial report take into account the global activities of the company?	csrsustainabilityreportglobalact
Does the company report or show to be ready to end a partnership with a sourcing partner if human rights criteria are not met?	humanrightsbreachescontractorsco
Does the company report or show to use human rights criteria in the selection or monitoring process of its suppliers or sourcing partners?	humanrightscontractor
Does the company claim to provide daycare services for its employees?	daycareservices
Does the company have a policy to strive to be a good corporate citizen or endorse the Global Sullivan Principles? AND Does the company have a policy to respect business ethics or has the company signed the UN Global Compact or does it follow the OECD guidelines?	oecdguidelinesformultinationalen

Does the company have an external auditor of its CSR/H&S/Sustainability report?	csrsustainabilityexternalaudit
Does the company claim to provide flexible working hours or working hours that promote a work–life balance?	flexibleworkinghours
Does the company claim to provide regular staff and business management training for its managers?	managementtraining

Chapter 4: Compensation Consultants and CEO Pay Similarity

4.1 Introduction

The landscape of executive compensation is undergoing significant transformation, marked by a trend towards standardization across firms (Edmans et al., 2017; Jochem et al., 2021). This shift is propelled by factors such as increased transparency, regulatory changes, and pressures from institutional investors, which collectively promote uniform compensation practices. These changes, intended to simplify governance processes, may also restrict the customization needed to align compensation with firm-specific strategic objectives and the individual characteristics of CEOs. Compensation consultants play a crucial role in this context, wielding substantial influence over the design and implementation of compensation structures due to their access to extensive market and industry data. While their expertise can help standardize compensation practices, it also raises concerns about potential conflicts of interest that could lead to inflated executive pay and misaligned incentive structures, highlighted by regulatory scrutiny and reforms by bodies like the SEC (Edmans et al., 2017; Murphy, 2013).

This chapter explores how the engagement of compensation consultants impacts the similarity and structure of CEO pay across firms. We examine whether consultants contribute to greater industry alignment and, if so, whether it undermines firm-specific strategic incentives. These inquiries are vital for understanding the broader implications of standardized compensation practices on corporate governance and firm performance, providing new insights into the complex dynamics between consultant-driven influences and executive compensation outcomes (Bebchuk et al., 2002; Bebchuk & Fried, 2003; Cadman et al., 2010).

In our research, we adopt a holistic approach to examining CEO compensation structures, focusing on how compensation consultants influence these structures across various firms. We consider the entire structure of compensation contracts, comparing them holistically, and define

CEO Pay Similarity as the degree of similarity between compensation contracts across different firms. This approach allows us to capture the nuanced ways in which compensation elements interact within the broader executive pay framework. By analyzing the comprehensive makeup of compensation packages—including salary, bonuses, stock and option awards, non-equity incentives, and other forms of remuneration—we provide a detailed perspective on how similarly firms structure their executive rewards. This analysis not only sheds light on the standardization of compensation practices prompted by consultants but also evaluates the potential impacts of such standardization on aligning executive incentives with company performance and strategic objectives.

This examination is crucial for understanding the broader trends in executive compensation and the role of external advisors in shaping these trends. By utilizing a combination of Execucomp data and additional resources, we ensure a robust analysis of CEO pay structures from 2006 through 2021, offering insights into the evolution of executive compensation over time and the pivotal role of compensation consultants in this landscape.

Executive compensation design intricately combines various pay elements tailored to align with a firm's strategic objectives and the specific characteristics of its executives. However, there is a growing standardization of compensation practices, influenced significantly by the advisory roles of compensation consultants. This trend has led to a convergence in CEO pay structures across firms, which may not always align with individual corporate strategies or executive incentives. Researchers such as Edmans et al. (2017) and Jochem et al. (2021) have documented a decreasing variation in compensation practices, driven by enhanced transparency, regulatory changes, and institutional investor influences. These shifts suggest a movement towards more uniform compensation packages, potentially eroding the ability of firms to customize executive pay to unique corporate contexts.

Our research explores the extent to which compensation consultants contribute to the

similarity in CEO pay structures across firms. We investigate whether firms utilizing these consultants are more likely to align their compensation structures with prevailing industry standards or those of their peers, potentially fostering a uniformity that overshadows firm-specific strategic needs. Preliminary findings indicate that firms engaged with compensation consultants show a higher degree of similarity in CEO pay structures compared to those without such consultants, suggesting that the influence of these advisors may extend beyond mere compliance to regulatory norms to actively shaping compensation strategies in line with broader market practices. This insight underscores the pivotal role that compensation consultants play in the standardization of pay practices, highlighting significant implications for corporate governance and the strategic alignment of executive incentives with long-term firm performance.

The analysis extends to examining the dynamics between firms that share compensation consultants and their impact on CEO pay structure similarity among product market competitors. This study reveals that firms utilizing common compensation consultants tend to exhibit significantly greater similarity in their executive compensation structures compared to those that do not share these consultants. The regression results robustly support this finding across multiple model specifications, emphasizing the role of shared consultants in standardizing pay practices not just within a single firm, but across an entire industry. These insights highlight the substantial influence of compensation consultants in shaping industry-wide compensation norms and suggest that their role transcends individual firm boundaries, influencing broader market trends in executive pay.

The 2009 SEC Disclosure Rule Amendment is pivotal in understanding the influence of regulatory changes on compensation consultants' practices and the ensuing effects on CEO pay structures. Our investigation is segmented into three distinct analyses to comprehensively assess these impacts. The initial analysis reveals that the amendment led to a significant

increase in the similarity of CEO pay structures. The regulatory change, which aimed at increasing transparency and reducing conflicts of interest among compensation consultants, appears to have standardized compensation practices considerably. This shift is indicative of the regulation's effectiveness in aligning consultant practices with shareholder interests.

In exploring the dynamics of CEO compensation, we conduct several robustness tests to evaluate the influence of compensation consultants. Utilizing a difference-in-differences (DiD) approach, we analyze the impact of the 2009 SEC Disclosure Rule Amendment as a regulatory shock that notably reduced rent-seeking behaviors by multiservice consultants. This regulatory change aimed to enhance transparency and mitigate conflicts of interest, potentially aligning consultant behaviors more closely with shareholder interests. The findings confirm that the amendment led to an increase in the similarity of CEO pay structures, particularly among firms using multiservice consultants, suggesting that the regulation effectively curbed consultant practices that may not have aligned with shareholder goals.

Further, we investigate changes in CEO total pay following the regulatory amendment, anticipating a reduction in pay levels due to the tightened regulations on consultant activities. The results indicate a significant decrease in CEO pay among firms that engaged multiservice consultants, affirming the amendment’s role in curbing excessive compensation practices facilitated by potential consultant conflicts of interest.

Lastly, we explore why firms employ compensation consultants, particularly focusing on firms with higher-than-average CEO pay. Our analysis suggests that these firms are more likely to hire consultants as a strategy to justify their compensation levels and align them with industry standards, potentially to mitigate scrutiny from shareholders and regulatory bodies. This underscores the strategic use of compensation consultants in aligning CEO pay with market expectations and enhancing the legitimacy of compensation practices amidst external pressures.

We conducted a robustness test using propensity score matching to address potential selection bias, effectively comparing firms that employ compensation consultants against a control group. The matched sample confirmed our primary findings, reinforcing the substantial influence of compensation consultants on the similarity of CEO pay structures across firms.

Our study makes significant contributions to the burgeoning field of executive compensation research, particularly regarding the impact of compensation consultants. It is the first to establish a robust positive relationship between the employment of compensation consultants and the similarity in CEO pay structures, demonstrating this effect's persistence across firm-specific variances and over time. Additionally, we highlight an underexplored phenomenon—the decline in pay dispersion among executives. This trend, largely unnoticed until now, suggests a broader shift towards standardized compensation practices influenced by both regulatory changes and market pressures, contributing new insights into the dynamics of executive pay.

This chapter makes significant practical contributions to the field of corporate governance, particularly for corporate boards, compensation committees, and policymakers. By providing empirical evidence on the impact of compensation consultants on CEO pay structures, the study offers valuable guidance for boards when deciding whether to engage these external advisors and how to oversee their influence. The findings suggest that while compensation consultants can help design executive compensation packages, there is a risk that these packages may become overly standardized, potentially misaligning with the specific needs of the firm. This insight is crucial for boards aiming to tailor compensation to their unique circumstances rather than following industry norms.

The research also has implications for regulatory bodies and policymakers by highlighting the broader effects of standardized pay structures and the role of consultants in promoting these practices. This could inform ongoing discussions about transparency and conflicts of interest

in executive compensation, potentially leading to new regulatory measures. Additionally, for compensation consultants and advisory firms, the study underscores the importance of maintaining ethical standards and independence, encouraging a move towards more customized advisory practices. Investors and shareholders can also benefit from the study's insights, using them to make more informed decisions and to engage more effectively with corporate management on executive compensation issues. Overall, the chapter contributes to a deeper understanding of how compensation consultants influence executive pay, offering practical recommendations for improved governance and oversight.

This chapter continues as follows: Section 2 presents the related literature and hypothesis. Section 3 describes the data and methodology. Section 4 presents the main results. Section 5 shows the channel test. Section 6 provides additional tests. Section 7 shows the robustness tests. Section 8 concludes the chapter.

4.2 Literature Review and Hypothesis Development

4.2.1 Trends in Executive Compensation Standardization

Components and Design of Compensation Structures

Executive compensation packages encompass a variety of components, including salary, bonuses, stock and option awards, non-equity incentives, pensions, and perquisites. Edmans et al. (2017) suggest that the proportions of these pay elements should be tailored to align with a firm's specific characteristics like size, industry, competitive environment, and strategic objectives. This alignment is critical, as Fama (1980), Manso (2011), and Nalebuff and Stiglitz (1983) indicate, because it ensures that compensation structures reflect the unique needs and goals of the firm. Additionally, Gibbons and Murphy (1992), Mirrlees (1976), and Stiglitz (1975) emphasize the importance of designing these structures to account for individual CEO

factors such as risk tolerance, cost of effort, wealth, and career concerns, thus enhancing the congruence between executive incentives and organizational goals.

Dynamics Leading to Standardization

Recent years have marked a notable shift towards the standardization of executive compensation structures across firms, driven by various factors. Jochem et al. (2021) report a significant decline in the dispersion of CEO compensation, indicating a move towards more uniform compensation packages. This shift is largely attributed to enhanced transparency, regulatory changes, and the increased influence of institutional investors. Cabezon (2024) notes a trend towards a "one-size-fits-all" approach in compensation structuring, spurred by the involvement of institutional investors and heightened disclosure requirements. This trend reflects the governance norms impacting compensation practices, as discussed by Hou et al. (2017) and Murphy (2018). The practice of reciprocal benchmarking, detailed by Jochem et al. (2021), where firms include other firms as compensation peers, also plays a critical role in this standardization process, compounded by mandatory disclosure requirements and the influences of proxy advisors.

Regulatory and Advisory Influences

The regulatory landscape has significantly influenced executive compensation practices, particularly with the rise of proxy advisory firms and compensation consultants as key players in shaping pay structures.

Proxy advisory firms, such as Institutional Shareholder Services (ISS) and Glass Lewis, influence compensation indirectly by issuing voting recommendations to institutional investors. These firms assess whether a company’s executive compensation structure aligns with best governance practices and propose shareholder votes on pay-related issues (Gordon, 2009; Hou

et al., 2017). Their influence has contributed to a more standardized approach to compensation, as companies attempt to align with proxy advisor expectations to secure favorable votes. However, Matsusaka and Shu (2020) argue that the oligopolistic nature of the proxy advisory industry leads to one-size-fits-all recommendations, which may not reflect firm-specific conditions.

In contrast, compensation consultants provide direct advisory services to firms, helping to design and evaluate executive pay structures. Unlike proxy advisors, who influence compensation externally, compensation consultants work within firms, guiding compensation committees and boards of directors on competitive pay practices (Cadman et al., 2010).

Primary compensation consultants specialize solely in executive pay advisory services, working directly with boards and compensation committees to design pay structures that align with firm strategy. Multiservice consultants, in contrast, provide a broad range of corporate services beyond compensation advice, such as risk management, benefits administration, and actuarial services. The dual role of these firms raises concerns about conflicts of interest, as their compensation advisory recommendations may be influenced by other business relationships with the firm (Waxman, 2007).

Both proxy advisors and compensation consultants shape standardization trends in executive pay, albeit through different mechanisms. Proxy advisors promote governance-driven convergence by pressuring firms to follow universal best practices, while compensation consultants contribute to pay homogenization through benchmarking and advisory influence(Cadman et al., 2010; Murphy & Sandino, 2020).

Critiques and Consequences of Standardization

While the standardization of compensation structures simplifies governance processes, it also carries mixed implications for firm behavior and value. On one hand, standardized contracts

might enhance firm value when boards are well-informed about optimal compensation practices (Bebchuk et al., 2002; Bebchuk & Fried, 2003). On the other hand, such standardization may prevent firms from tailoring contracts to specific CEO needs and strategic goals, potentially undermining shareholder value (Edmans et al., 2023). Gipper (2021) connects increased transparency with potentially higher compensation due to reduced flexibility in making post-hoc adjustments. Additionally, the dominance of a few proxy advisory firms leads to a uniformity in compensation recommendations which may not always be in the best interest of the firms or their shareholders (Gordon, 2009; Hou et al., 2017; Murphy, 2018).

Empirical Gaps and Future Directions

Despite the prevalence of standardized executive compensation structures, empirical evidence on their effectiveness remains mixed. There is an ongoing debate on whether the benefits of such standardization, such as enhanced comparability and governance, outweigh the potential drawbacks related to the loss of customization and adaptability essential for addressing unique firm and executive needs. Future research is needed to further explore these dynamics and assess their long-term impact on firm value and managerial behavior.

4.2.2 Role of Compensation Consultants in Executive Pay

Overview of Compensation Consultants' Functions

Most large corporations employ executive compensation consultants, who advise on pay levels, incentive structures, and regulatory compliance. These consultants play a critical role in determining the composition of executive pay packages, including salary, bonuses, stock awards, and long-term incentives (Murphy & Sandino, 2020). Their influence extends beyond

compensation committees, as they often provide guidance on broader corporate governance trends (Cadman et al., 2010).

However, the type of consultant engaged can significantly impact the objectivity and structure of executive pay recommendations. Primary compensation consultants work exclusively on executive compensation and are typically retained by the board's compensation committee, reducing the likelihood of external influence. Multiservice consultants, on the other hand, provide compensation advisory services alongside other business services, such as insurance brokerage, risk management, and pension administration. This dual role creates a potential conflict of interest, as compensation consultants may feel pressured to align their recommendations with other business relationships they maintain with the firm (Waxman, 2007).

Empirical research suggests that firms using multiservice consultants tend to exhibit higher CEO pay levels and greater similarity to peer firms, reinforcing concerns that their recommendations may be driven by conflicts of interest rather than firm-specific needs (Murphy & Sandino, 2020).

Ethical Concerns and Conflicts of Interest

While executive compensation consultants are expected to provide independent advice, concerns about conflicts of interest have been widely debated. The Waxman Report (2007) revealed that multiservice consultants often earn significantly more from non-compensation-related services provided to their client firms than from direct compensation advisory fees. This raises concerns that these consultants may recommend higher pay packages or promote standardization to maintain strong client relationships across multiple business functions (Murphy & Sandino, 2020).

To address these concerns, the U.S. Securities and Exchange Commission (SEC) has implemented disclosure requirements mandating firms to report whether their compensation consultants also provide other corporate services. The Dodd-Frank Act (2010) further strengthened governance rules, requiring compensation committees to assess consultant independence before making pay decisions.

Despite these regulatory measures, empirical research suggests that firms that engage multiservice consultants still tend to exhibit higher CEO pay similarity, reinforcing concerns that these consultants promote compensation practices that align with standardized market norms rather than firm-specific performance incentives (Cadman et al., 2010; Murphy & Sandino, 2020).

Regulatory Responses and Disclosure Requirements

In response to these concerns, the U.S. Securities and Exchange Commission (SEC) has implemented several measures to enhance transparency and reduce conflicts of interest. Starting in 2006, the SEC required that firms disclose any consultants advising on executive compensation, specifying whether these consultants were hired by the compensation committee or management. This was further strengthened by the Dodd-Frank Act, which mandated more detailed disclosures and considered the independence of compensation consultants. These regulations aim to ensure that compensation committees have the necessary tools and unbiased information to make informed decisions about executive pay.

Impact of Consultants on Compensation Design

While consultants are expected to tailor compensation packages to the specific needs of the firm and its executives, empirical evidence suggests a trend towards standardization in compensation practices. This paradox arises despite the theoretical expectation that

compensation should vary significantly across firms based on unique managerial incentives and firm-specific conditions. Scholars like Jensen and Murphy (1990) and Hart and Holmstrm (1986) argue that social, economic, and political pressures often override the tailored approach, leading to more uniform compensation practices across the industry.

Hypothesis Development

Compensation consultants play a significant role in shaping executive pay structures, leveraging their expertise, extensive compensation databases, and industry benchmarking practices (Cadman et al., 2010). These consultants provide firms with insights into market trends, competitive pay practices, and governance requirements, influencing how executive compensation packages are structured. While they are often employed to design firm-specific, performance-driven compensation schemes, their reliance on benchmarking and industry norms may lead to greater standardization across firms rather than customized incentive alignment (Murphy & Sandino, 2010).

The influence of compensation consultants can be understood through the lens of institutional theory, particularly the concepts of normative and mimetic isomorphism (DiMaggio & Powell, 1983). According to this perspective, organizations face institutional pressures to conform to widely accepted practices, particularly when uncertainty exists regarding the "optimal" way to structure executive compensation. Firms may rely on compensation consultants not only for technical expertise but also to legitimize their pay decisions in the eyes of shareholders, proxy advisors, and regulators (Westphal & Zajac, 1998).

Despite their ability to design customized compensation packages, compensation consultants frequently promote standardized pay structures due to several factors. Firstly, developing fully bespoke compensation contracts requires significant time, resources, and legal expertise, which can be costly. To minimize these costs, firms may opt for standardized

templates provided by consultants, leading to greater pay similarity across firms (Abernethy et al., 2015). Secondly, compensation consultants rely heavily on benchmarking, which involves comparing a firm's executive pay structure to those of similar firms in the industry (Bizjak et al., 2008). While benchmarking helps firms remain competitive in talent acquisition and retention, it also promotes pay convergence by encouraging firms to align their CEO pay with industry standards, thereby increasing similarity in pay structures across firms (Cadman et al., 2010). Thirdly, Firms may adopt similar compensation structures as a defensive mechanism to avoid external scrutiny from regulators, investors, and proxy advisory firms (Westphal & Zajac, 1998). And mimetic isomorphism suggests that firms experiencing uncertainty about optimal pay structures will imitate successful or peer firms, particularly those recommended by compensation consultants, leading to homogenization of CEO pay practices (DiMaggio & Powell, 1983). Fourthly, compensation consultants operate as inter-firm knowledge networks, facilitating the exchange of best practices, trends, and methodologies across client firms (Murphy & Sandino, 2010). This information-sharing role further reinforces pay standardization, as firms subscribing to the same consultant often receive similar recommendations, further aligning their compensation structures with market norms (Cadman et al., 2010).

Given these theoretical foundations and empirical insights, we propose that firms engaging compensation consultants will exhibit higher levels of CEO pay similarity compared to firms that do not rely on such consultants. This expectation is driven by the standardization pressures introduced through benchmarking, legitimacy concerns, and cost efficiencies, all of which encourage firms to adopt compensation structures that align with industry norms rather than tailored, firm-specific incentives.

Thus, we formalize the following hypothesis:

Hypothesis 1: Firms that engage compensation consultants are more likely to exhibit higher levels of CEO pay structure similarity compared to firms without such consultants.

4.3 Data and Methodology

We source our executive compensation data from the Execucomp database, which aggregates information from each company's annual proxy statement (DEF14A SEC form). Our dataset includes companies from the S&P 1500 index, encompassing current members, past members, and firms that have exited the index but remain active in trading. We enhance the Execucomp data by integrating it with additional information using the Global Company Key (GVKEY) as the identifier. Compensation consultant data is extracted from the ISS Incentive Lab database for the years 2006 through 2021.

Our primary analysis utilizes six components of compensation: salary, bonus, stock awards, option awards, non-equity incentives, and other forms of compensation. Salary and bonus represent fixed and performance-based fiscal year earnings, respectively. Stock awards are valued at market price on the grant date, this includes time-lapse restricted stock and performance shares. Options awards are assessed using various adaptations of the Black and Scholes (1973) model to reflect their value at the grant date. Non-equity incentives are measured at the target amount, or the average of the minimum and maximum levels if the target is unspecified. Other compensation includes encompasses perks, signing bonuses, severance payments, and excess interest on deferred compensation.

Financial metrics are obtained from Compustat, with all variables winsorized at the 1% and 99% levels to mitigate the influence of outliers. Our baseline sample spans from 2006 to 2021 and includes 2,252 firms accounting for 25,439 firm-year observations. We provide a breakdown of the average CEO compensation package, detailing the proportion of salary, bonuses, stock awards, options, non-equity incentives, and other compensation forms. The

average CEO receives nearly 24% of her total compensation in salary, 4.2% in bonuses, 34.3% in stock awards, 13.6% in options, 18.16% in non-equity incentive plans, and 4.93% in other compensation. The summary statistics for these ratios are comparable to those reported for identical variables in prior studies, such as Murphy (2013) and Edmans et al. (2017).

4.3.1 Measure of CEO Pay Structure Similarity

The pay similarity measure used in this study quantifies the degree of similarity between the CEO compensation structures of two firms (i and j). This measure is particularly useful for evaluating whether firms that engage compensation consultants exhibit greater standardization in their executive pay practices compared to those that do not. The similarity measure is calculated using the cosine similarity method, a widely used approach in vector analysis to determine the angular similarity between two vectors representing compensation components (Cabezon, 2024). The calculation of pay similarity involves several key steps. First, each firm's compensation components are standardized to calculate the percentage contribution of each component to the total CEO pay. These values are then used to construct the compensation vectors for firms i and j. The next step is to compute the dot product of the vectors, which measures the alignment of their pay structures. Following this, the Euclidean norms of each vector are calculated using Equation (1). Finally, the cosine similarity formula in Equation (2) is applied to obtain the similarity score, which quantifies the degree of structural similarity between the compensation packages of the two firms.

Construction of Compensation Vectors

For each executive, compensation is broken down into six primary components: salary, bonus, stock awards, option awards, non-equity incentives, and other compensation. To standardize comparisons across different firms and to shift focus from absolute payment values to structural

composition, we convert the monetary value of each compensation component into a proportion of the total compensation package for that individual:

$$v_{it} = \left[\frac{\text{salary}_{it}}{\text{total}_{it}}, \frac{\text{bonus}_{it}}{\text{total}_{it}}, \frac{\text{stock}_{it}}{\text{total}_{it}}, \frac{\text{options}_{it}}{\text{total}_{it}}, \frac{\text{non\_eq}_{it}}{\text{total}_{it}}, \frac{\text{other}_{it}}{\text{total}_{it}} \right], \quad (1)$$

where $total_{it}$ is the sum of all compensation components for executive i at time t.

Similarity Measure Using Cosine Similarity

To quantify the similarity in compensation structures between pairs of executives, we compute the cosine similarity between their compensation vectors. Cosine similarity measures the cosine of the angle between two vectors in a multi-dimensional space, providing a scale from zero (orthogonal vectors, indicating no similarity) to one (identical vectors, indicating perfect similarity). The similarity score ranges from 0 to 1, where a score of 1 indicates identical compensation structures, while a score of 0 suggests no similarity in the composition of CEO pay. This method is particularly robust as it measures relative composition rather than absolute pay levels, which is important when comparing firms of different sizes and industries. A higher similarity score indicates that the CEO compensation structures of the firms are more alike. The hypothesis tested in this study posits that firms engaging compensation consultants will exhibit higher similarity scores, suggesting that these consultants contribute to pay standardization through benchmarking and normative influence.

$$\text{Similarity}(i, j) = \frac{\sum_{n=1}^{6} v_{it}^{n} \cdot v_{jt}^{n}}{\sqrt{\sum_{n=1}^{6} \left(v_{it}^{n}\right)^2} \cdot \sqrt{\sum_{n=1}^{6} \left(v_{jt}^{n}\right)^2}} \quad \text{with } v_{ij}^{n} = n^{\text{th}} \text{ element of } v_{ij}, \quad (2)$$

This metric is particularly useful in contexts where the magnitude of the vectors is less relevant than the orientation, which in our case translates to focusing more on the structure of the pay rather than its size. This approach offers a quantitative and objective method to assess whether compensation consultants influence the convergence of CEO pay structures. The use of cosine similarity not only enhances the transparency and replicability of the analysis but also addresses potential concerns about measurement clarity. By providing a detailed explanation of the mathematical formula, calculation process, and interpretation of results, this method aligns well with the study's objective to evaluate standardization trends in executive compensation practices.

Aggregate Similarity Calculation

For each firm, we aggregate the cosine similarity measures across all other firms within the Execucomp database to determine the average similarity of its compensation structure relative to the market:

$$\text{Pay Similarity}_i = \frac{\sum_{j=1}^{N} \text{Similarity}(i,j)}{N}, \qquad (3)$$

where N represents the total number of firms in the database.

4.3.2 Detailed Analysis of Compensation Consultants Utilization

Our analysis of compensation consultants across firms reveals a nuanced landscape of consultancy utilization within executive compensation structures. According to our sample, firms engage a range of 0 to 10 compensation consultants, with an average of approximately 1.57 consultants per firm. The distribution is positively skewed, with 50% of firms employing only one consultant, and the 75th and 90th percentiles employing up to 2 and 3 consultants,

respectively. This indicates a general trend towards minimal consultancy use, although a small subset of firms significantly relies on a broader array of external expertise.

For primary compensation consultants, the findings are more concentrated. The majority of firms (50%) employ exactly one primary consultant, with a very narrow spread in the number employed: 90% of firms report having at most one primary consultant, and only a few firms report as many as four, showcasing a more conservative approach in the designation of primary consultancy roles. This likely reflects a preference for maintaining consistency and a strong advisory relationship with a primary consultant, minimizing the complexity that might arise from having multiple leading advisory voices.

Furthermore, our findings suggest a common practice of consultant sharing among firms, highlighting a networked consultancy landscape where expertise and advisory roles are not limited to individual firms but are spread across multiple entities, potentially influencing compensation practices across the industry. This shared use of consultants could play a crucial role in standardizing compensation packages, as consultants bring cross-firm insights that help align executive pay more closely with market norms and regulatory expectations.

4.3.3 Description of the Data

Table 4.1 summarizes the descriptive statistics for the key variables employed in our analyses, which are detailed comprehensively in Appendix A. The variable *Pay Similarity*, which is scaled from 0 to 1, exhibits an average of 0.612, indicating a moderate level of similarity in CEO pay structures across the firms in our sample. This metric suggests that there is a tendency towards convergence in compensation practices among the sampled firms.

Furthermore, the variable *Consultants* has an average value of 0.504, demonstrating that slightly over half of the firms utilize at least one compensation consultant. This is indicative of

a prevalent reliance on external expertise in structuring executive compensation within the sample.

The control variables included in our study reflect characteristics typical of the sampled firms and align with parameters used in prior research, thereby ensuring the comparability of our results. The average *Firm Size*, represented by a logarithmic value of 7.880, corresponds well with benchmarks in existing literature, suggesting that our sample is representative of the general corporate environment. *Book Leverage* has an average value of 0.252, indicating a moderate reliance on debt financing across the firms. *Cash Holdings* average at 0.161, pointing to a conservative liquidity management strategy among the sampled companies.

Additional variables such as *Sales Growth*, Return on Assets (*ROA*), and *Market to Book* ratio are reported to further characterize the financial health and operational dynamics of the firms. Specifically, *Sales Growth* has an average of 0.088, *ROA* is at 0.036, and the *Market to Book* ratio stands at 2.031, collectively reflecting a healthy market valuation and profitability metrics that are consistent with previous findings in the field.

These statistics provide a robust foundation for our subsequent analyses, confirming the adequacy of our data in capturing the nuances of executive compensation structures across a diverse set of firms.

Table 4.1: Summary Statistics

This table presents the descriptive statistics for the main variables used in our analyses. *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity compared to other firms. *Consultants* equals one if firm have at least one compensation consultant. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level.

	N	Mean	SD	p25	Median	p75	Max
Pay Similarity	25,439	0.612	0.150	0.521	0.647	0.728	0.845
Consultants	25,439	0.504	0.500	0.000	1.000	1.000	1.000
Firm Size	25,439	7.880	1.741	6.640	7.776	9.022	12.604
Leverage	25,439	0.252	0.207	0.071	0.233	0.375	0.930
Cash Holdings	25,439	0.161	0.169	0.036	0.102	0.228	0.763
Sales Growth	25,439	0.088	0.239	-0.019	0.061	0.158	1.242
ROA	25,439	0.036	0.109	0.013	0.046	0.085	0.283
Market to Book	25,439	2.031	1.356	1.193	1.580	2.338	8.398
PP&E	25,439	0.488	0.405	0.165	0.361	0.746	1.792

4.4 Compensation Consultants and CEO Pay Similarity

4.4.1 Empirical Model

This section examines the relationship between the employment of compensation consultants and the similarity in CEO pay structures among firms. Utilizing a regression model, we investigate if the presence of compensation consultants is associated with increased uniformity in CEO compensation across firms. The model is specified as follows:

$$Pay\ Similarity_{i,t} = \beta_0 + \beta_1 Consultants_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where *i* and *t* represent the firm and year, respectively. The dependent variable, *Pay Similarity*, is measured on a scale from 0 to 1, where higher values denote greater similarity in CEO pay structures compared to other firms reported on Compustat for a given year. The primary explanatory variable, *Consultants*, is a binary indicator reflecting whether a firm employed at least one compensation consultant in year t. X encompasses a vector of control variables specific to the firm. Firm Size is measured as the natural logarithm of total assets, deflated to a base year (e.g., 2009) using the Consumer Price Index (CPI). Larger firms typically have more complex organizational structures and greater resources, which can influence executive compensation practices (Gabaix & Landier, 2008). Studies indicate that larger firms may standardize pay structures to enhance internal consistency and facilitate governance practices, potentially contributing to higher pay similarity (Murphy, 2013). Leverage is defined as the ratio of total debt (long-term and short-term) to total assets. Firms with higher leverage may adopt more standardized compensation practices to signal stability and maintain investor confidence, as suggested by agency theory, where debt holders prefer predictable and transparent governance practices (Hart & Holmstrom, 1987). Cash Holdings are measured as the ratio of cash and short-term investments to total assets. Higher cash reserves provide firms

with greater liquidity, which can influence executive compensation strategies. According to Jensen (1986), firms with higher cash holdings might exhibit managerial entrenchment, potentially leading to higher CEO pay and less similarity in pay structures due to the greater discretion available to managers. Alternatively, cash-rich firms may use standardized pay practices as a risk management strategy, particularly when engaging with external compensation consultants (Murphy & Sandino, 2010). Sales Growth is calculated as the year-over-year percentage change in sales revenue. This variable serves as a proxy for firm performance and growth opportunities (Smith Jr & Watts, 1992). Firms experiencing high sales growth may adopt more innovative compensation practices to attract and retain talent, potentially reducing pay similarity if tailored incentives are used. Conversely, firms with lower growth may adopt standardized pay structures to maintain cost control and governance discipline (Edmans et al., 2017). ROA is defined as the ratio of net income to total assets, providing a measure of operational efficiency and profitability. The inclusion of ROA as a control variable helps account for the influence of firm performance on compensation practices, as well-performing firms might adopt bespoke pay packages that could reduce pay similarity compared to the standardized practices recommended by compensation consultants. The Market-to-Book ratio is calculated as the market value of equity divided by the book value of equity. Firms with higher market-to-book ratios are often in high-growth industries, where innovative and flexible compensation practices may be more prevalent, potentially leading to lower pay similarity. However, in mature industries, where market-to-book ratios are typically lower, firms may prefer standardized pay practices, aligning with compensation consultant recommendations (Bizjak et al., 2008). PP&E is measured as the ratio of net property, plant, and equipment to total assets. This variable captures the tangibility of firm assets, which influences a firm's capital intensity and financial flexibility. Firms with high asset tangibility may adopt standardized compensation structures as part of a conservative governance approach,

particularly in industries with lower operational risk (Bebchuk & Fried, 2006). Including PP&E as a control variable helps account for the asset structure of the firm, which may indirectly affect CEO pay similarity. Both year and firm fixed effects are included to control for unobservable heterogeneity, with standard errors clustered at the firm level to account for within-firm correlation over time.

4.4.2 Results and Discussion

Table 4.2 presents the baseline regression results exploring this relationship. Across all model specifications, the coefficients on *Consultants* are consistently positive and statistically significant, indicating a clear association between the use of compensation consultants and higher levels of pay similarity. The magnitude of the relationship, as evidenced in Column (4), suggests that the presence of compensation consultants is associated with an increase of approximately 0.023 in the Pay Similarity index, compared to firms without such consultants.

These findings are economically significant as well. They imply that the engagement of compensation consultants systematically aligns CEO pay more closely with prevailing industry standards or with pay structures in similar firms, hence enhancing uniformity. This result supports the hypothesis that the involvement of compensation consultants leads to higher levels of CEO compensation similarity, possibly through the adoption of industry benchmarks or best practices in compensation design.

The regression analyses, detailed in Table 4.2, affirm the positive impact of compensation consultants on the convergence of executive compensation practices across firms, contributing valuable insights into the dynamics of corporate governance and executive remuneration strategies.

Table 4.2: Compensation Consultants and CEO Pay Similarity

This table presents the baseline regression results of the relationship between compensation consultants and CEO Pay Similarity. The dependent variable is *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity. *Consultants* equals one if firm have at least one compensation consultant. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Pay Similarity				
	(1)	(2)	(3)	(4)
Consultants	0.032***	0.023***	0.021***	0.023***
	(0.004)	(0.005)	(0.006)	(0.006)
Firm Size		0.001	0.012***	0.012***
		(0.002)	(0.004)	(0.004)
Leverage		0.020*	0.001	-0.002
		(0.011)	(0.011)	(0.012)
Cash Holdings		-0.068***	0.002	-0.003
		(0.015)	(0.014)	(0.014)
Sales Growth		-0.024***	-0.006	-0.008*
		(0.005)	(0.004)	(0.005)
ROA		0.086***	0.053***	0.065***
		(0.016)	(0.014)	(0.015)
Market to Book		-0.008***	-0.003**	-0.003*
		(0.002)	(0.002)	(0.002)
PP&E		0.003	0.023**	0.012
		(0.008)	(0.011)	(0.012)
Constant	0.596***	0.610***	0.502***	0.501***
	(0.003)	(0.019)	(0.032)	(0.035)
Year FE	No	Yes	Yes	No
Firm FE	No	No	Yes	Yes
Industry FE	No	Yes	No	No
Year*Industry FE	No	No	No	Yes
Observations	25,439	25,439	25,439	25,439
Adjusted R-squared	0.011	0.259	0.550	0.552

4.5. Channel: Common Compensation Consultants

4.5.1 Influence of Common Compensation Consultants on Pay Structure Similarity among Product Market Competitors

In this section, we delve deeper into the influence of shared compensation consultants on CEO pay structure similarity across firms within the same product market. We hypothesize that common compensation consultants serve as a channel for aligning executive compensation strategies among competing firms. To explore this proposition, we employ a regression model at the firm-pair level:

$$Pay\ Similarity\_Competitors_{\ i,j,t} = \beta_0 + \beta_1 Common\ Consultants_{\ i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}, \quad (5)$$

where *i, j* and *t* denote the firm, product market peer and year, respectively. The dependent variable, *Pay Similarity_Competitors*, ranges from 0 to 1, with higher values indicating greater similarity in CEO pay structures between each pair of competing firms. The key independent variable, *Common Consultants*, is a binary indicator that equals one if the firm shares at least one compensation consultant with its product market competitors. X represents a vector of control variables. Depending on the model specification, we incorporate year fixed effects, firm or industry fixed effects, or industry-year joint fixed effects (based on 3-digit SIC codes). Standard errors are clustered at the firm-pair level to account for interdependencies within pairs.

4.5.2 Results

Table 3.3 outlines the regression results, which consistently show positive and statistically significant coefficients for *Common Consultants* across various model specifications. Column (1) presents the most basic specification without control variables or fixed effects, providing

an initial look at the raw relationship between shared consultants and pay structure similarity. The coefficient for *Common Consultants* is significantly positive at 0.066, suggesting that the presence of shared consultants is associated with a 6.6% increase in the similarity of pay structures across firm pairs. Column (2) introduces year and industry fixed effects to control for external temporal and sector-specific variations that might influence the pay structures independently of consultant influence. The coefficient remains positively significant at 0.050, indicating that even after controlling for time-specific and industry-specific factors, shared consultants contribute to increased similarity in CEO compensation. Column (3) employs year and firm fixed effects, aiming to control for both temporal changes and unobserved heterogeneity within firms that could affect their compensation strategies. The coefficient for *Common Consultants* slightly decreases to 0.046 but retains statistical significance, reinforcing the assertion that common consultants influence pay structure similarity beyond the individual firm characteristics or temporal effects. Column (4) represents the most comprehensive model, incorporating firm fixed effects and industry-year joint fixed effects. These fixed effects control for unobservable intra-firm characteristics that could influence compensation practices and account for industry trends specific to particular years. The coefficient for *Common Consultants is 0.045*, significant at the 1% level. This finding substantiates the role of shared consultants in promoting pay structure similarity across firms. The persistence of this significant result, even after controlling for firm-specific idiosyncrasies and industry-year variations, underscores the robustness of our conclusions that compensation consultants act as conduits for the dissemination of similar compensation practices across firms within the same industry.

These findings robustly suggest that the presence of shared compensation consultants is associated with increased similarity in CEO compensation structures among competitors. Notably, in model (4), the introduction of a common consultant is linked with an increase of

0.045 in the similarity score, relative to pairs without such commonality. This enhancement in similarity score underscores the substantial role that shared consultants play in harmonizing pay practices across firms.

The results are both statistically and economically significant, implying that compensation consultants act as key conduits through which firms may inadvertently or deliberately standardize their compensation strategies to mirror those of their competitors. This could be driven by consultants' tendency to propagate best practices or industry norms among their client base, thereby reducing the variability in compensation packages across firms that face similar market conditions.

These findings lend strong support to the theory that common compensation consultants facilitate the alignment of executive compensation practices across product market competitors. By doing so, they not only influence individual firm behavior but also shape the competitive dynamics within industries. Further research might explore the long-term effects of this alignment on firm performance and executive behavior, potentially examining whether such standardization impacts innovation, risk-taking, or long-term strategic positioning.

Table 4.3: Common Consultants: Product Market Competitor – Firm Pair Level

This table presents the regression results of the relationship between common compensation consultants among product market competitors and CEO Pay Similarity compared with the product market competitors at the firm-pair level. The dependent variable is *Pay Similarity_Competitors*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity among firm-pair. *Common Consultants* equals one if firm have at least one common compensation consultant with their product market competitors. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm-pair level level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Pay Similarity_Competitors				
	(1)	(2)	(3)	(4)
Common Consultants	0.066***	0.050***	0.046***	0.045***
	(0.002)	(0.002)	(0.002)	(0.002)
Firm Size		0.005***	0.013***	0.014***
		(0.000)	(0.000)	(0.001)
Leverage		-0.011***	0.014***	-0.027***
		(0.003)	(0.003)	(0.004)
Cash Holdings		-0.012***	-0.039***	0.042***
		(0.004)	(0.004)	(0.005)
Sales Growth		-0.010***	0.001	0.004***
		(0.001)	(0.001)	(0.001)
ROA		0.028***	-0.016***	0.001
		(0.004)	(0.004)	(0.004)
Market to Book		-0.005***	0.000	-0.000
		(0.001)	(0.000)	(0.001)
PP&E		0.013***	0.072***	0.037***
		(0.002)	(0.001)	(0.003)
Constant	0.639***	0.608***	0.503***	0.506***
	(0.001)	(0.004)	(0.004)	(0.011)
Year FE	NO	YES	YES	NO
Firm FE	NO	NO	YES	YES
Ind FE	NO	YES	NO	NO
Year*Ind FE	NO	NO	NO	YES
Observations	670,278	670,278	670,278	670,278
Adjusted R-squared	0.006	0.034	0.190	0.216

4.6. Additional Tests

4.6.1 2009 SEC Disclosure Rule Amendment: Impact on Multiservice Consultants

Background and Rationale

The SEC's 2009 Disclosure Rule Amendment serves as an exogenous shock for examining the influence of compensation consultants on CEO pay structure similarity. The amendment aimed to address potential rent-seeking behaviors of multiservice consultants, who, due to their broader service offerings, might have incentives to engage in practices that are not entirely aligned with shareholder interests. Multiservice consultants, by offering multiple services, could face conflicts of interest, particularly in their advisory roles during the pay-setting process. These conflicts might lead to rent-extracting behaviors such as colluding with management to set higher or more individualized compensation packages that benefit the CEO, but deviate from industry norms (Cadman et al., 2010; Murphy & Sandino, 2010).

In December 2009, the SEC introduced rules requiring firms to disclose fees paid for both compensation consulting and other ancillary services provided by these consultants. This rule was designed to enhance fee transparency and allow shareholders to better assess the independence of consultants, thereby increasing the costs and reducing the incentives for collusion and rent extraction by firms and their multiservice consultants.

Prior to the amendment, rent-seeking behaviors by multiservice consultants often resulted in customized and firm-specific compensation practices that deviated from broader industry norms. These individualized pay structures were tailored to maximize the CEO's personal benefits rather than being aligned with industry standards or shareholder interests. As a result, such behaviors contributed to a wide variation in CEO pay structures across firms, even within the same industry.

The introduction of the SEC rule increased transparency, reducing the ability of multiservice consultants to engage in opportunistic practices such as setting pay packages that

disproportionately favored CEOs. With the reduction in rent-seeking, consultants were more likely to adhere to standard compensation practices that were consistent with market norms. This led to a convergence in pay structures, as firms began to adopt more similar compensation policies in line with industry benchmarks, rather than allowing excessive variation driven by consultant-management collusion.

Thus, the regulation not only curbed consultant practices that were previously misaligned with shareholder goals but also resulted in an overall homogenization of CEO pay structures across firms. The reduction in conflict of interest made it more difficult for consultants to deviate from industry-standard compensation schemes, leading to increased similarity in CEO pay structures among firms using multiservice consultants.

Empirical Test

This study employs a difference-in-differences (DiD) approach to assess the impact of the 2009 SEC Disclosure Rule Amendment on the similarity of CEO pay structures among firms engaging different types of compensation consultants. The SEC rule, effective for fiscal years ending after February 2010, mandated firms to disclose the potential conflicts of interest associated with multiservice compensation consultants, whose advisory roles extend beyond executive compensation into broader corporate services such as risk management, insurance, and human resources consulting. The rule aimed to increase transparency and reduce rent-seeking behavior, particularly among multiservice consultants, by exposing situations where consulting firms might recommend compensation policies that align with their own business interests rather than the firm's best interests (Waxman, 2007). Multiservice consultants provide a wide range of services, including executive pay consulting and other corporate advisory services. They may face conflicts of interest if their compensation recommendations are influenced by the desire to secure additional service contracts with the client firm (Cadman et

al., 2010). Primary (compensation-only) consultants focus exclusively on executive compensation, offering advisory services to boards and compensation committees without providing other corporate services. Their independence is generally considered higher, as their fees are not typically contingent on other consulting engagements. The DiD model is specified as follows:

$$Pay\ Similarity_{i,t} = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 Treat_i \times Post_t + \beta_4 X_{i,t} + \varepsilon_{i,t}, \quad (6)$$

where $Pay\ Similarity_{i,t}$ is the CEO pay structure similarity for firm i in year t. $Treat_i$ is a dummy variable equal to one if firm's consultant is a multiservice consultant, and 0 if the consultant is compensation-only. $Post_t$ is a dummy variable set to 1 for post-SEC rule periods (fiscal years ending after February 2010) and 0 otherwise. $X_{i,t}$ represents a vector of control variables (e.g., firm size, leverage, profitability). Firm fixed effects and industry-year fixed effects are included to control for time-invariant firm characteristics and industry-specific time trends. The interaction term ($Treat_i \times Post_t$) captures the differential impact of the rule on firms using multiservice consultants relative to those using compensation-only consultants.

The coefficient β_3 on the interaction term is expected to be positive, suggesting that the 2009 SEC Rule led to an increase in pay similarity for firms using multiservice consultants. This would indicate that increased transparency requirements prompted multiservice consultants to adopt more standardized compensation practices, potentially to mitigate conflicts of interest or align with broader market practices. Conversely, a non-significant or negative β_3 would suggest that the rule change did not alter the behavior of multiservice consultants, highlighting the limitations of regulatory interventions in curbing rent-seeking incentives.

By using firms with compensation-only consultants as the control group, the analysis primarily contrasts the impact on multiservice consultants without directly examining the

effects on compensation-only consultants themselves. This approach could be perceived as at odds with the broader motivation of the chapter, which aims to explore the role of compensation consultants more generally. The control group choice limits the ability to generalize findings about compensation consultants' practices outside of multiservice settings.

Results

The results, as presented in Table 4.4, show that the interaction term *Treat* × *Post* is significant and positive in Column (4) with an estimate of 0.029. This finding indicates that the similarity in CEO compensation increased by approximately 2.9 percentage points for firms employing multiservice consultants relative to those using pay-only consultants post-amendment.

Before the rule amendment, multiservice consultants had incentives to engage in rent-seeking behaviors, such as tailoring compensation packages to maximize the CEO's benefits, often deviating from standard industry practices. These customized compensation packages contributed to greater variation in CEO pay structures across firms, especially those using multiservice consultants. The 2009 SEC Disclosure Rule increased transparency and required firms to disclose fees for compensation consulting and other services, reducing the ability of multiservice consultants to engage in such behaviors without shareholder scrutiny.

With the increased transparency, multiservice consultants were incentivized to adopt more standardized compensation practices aligned with industry norms, leading to a convergence in CEO pay structures across firms. The regulation essentially curbed consultants' ability to extract rents through highly customized pay packages, thus promoting greater homogeneity in pay structures. This increase in similarity post-amendment reflects the reduced latitude for consultants to create firm-specific pay schemes that would have previously diverged from industry standards.

This significant increase in compensation similarity for the treatment group post-rule

suggests that the regulation effectively altered the dynamics of consultant influence on pay structures, supporting our hypothesis that the rule change reduced the rent-seeking incentives of multiservice consultants. By limiting opportunities for excessive variation in CEO compensation, the rule helped align pay practices more closely with industry benchmarks, leading to greater uniformity across firms.

Overall, the results from our DiD tests provide robust evidence supporting the hypothesis that the 2009 SEC Disclosure Rule significantly impacted the relationship between multiservice consultants and CEO pay structure similarity. This analysis not only underscores the effectiveness of regulatory interventions in modifying consultant behaviors but also highlights the broader implications for corporate governance and executive compensation practices. While the DiD approach provides valuable insights into the impact of regulatory changes on multiservice consultants, the study acknowledges its methodological limitations, particularly regarding the choice of the control group and the generalizability of the findings. Future research could expand on this analysis by exploring alternative comparison groups and considering instrumental variable (IV) approaches to better address potential endogeneity. Additionally, examining the long-term impacts of the SEC Rule on compensation practices across different types of consulting arrangements could provide a richer understanding of how regulatory transparency measures influence corporate governance and executive compensation strategies.

Table 4.4: SEC's 2009 Disclosure Rule Amendment

This table reports the results from difference-in-difference (DiD) tests surrounding the SEC's 2009 Disclosure Rule Amendment. The treatment group consists of all multiservice consultants each year. The control group comprises consultants that only offered compensation consultant services in that year. *Treat* is a dummy variable equals one for the multiservice consultants and equals zero for the consultant that only offered compensation consultant services. *Post* is a dummy variable equals one for firms with fiscal year ended after January 2010 and equals zero otherwise. The dependent variable is *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity relative other firms. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm-pair. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Pay Similarity				
	(1)	(2)	(3)	(4)
Treat*Post	0.023***	0.034***	0.031***	0.029***
	(0.005)	(0.004)	(0.004)	(0.005)
Treat	0.004	-0.008**	-0.022***	-0.019***
	(0.003)	(0.004)	(0.004)	(0.004)
Firm Size		0.004**	0.013***	0.014***
		(0.002)	(0.004)	(0.004)
Leverage		0.019*	-0.001	-0.003
		(0.011)	(0.011)	(0.012)
Cash Holdings		-0.066***	0.001	-0.003
		(0.015)	(0.014)	(0.014)
Sales Growth		-0.024***	-0.005	-0.008*
		(0.005)	(0.004)	(0.005)
ROA		0.085***	0.053***	0.065***
		(0.016)	(0.014)	(0.015)
Market to Book		-0.007***	-0.003**	-0.003*
		(0.002)	(0.002)	(0.002)
PP&E		0.005	0.025**	0.014
		(0.008)	(0.011)	(0.012)
Constant	0.535***	0.595***	0.502***	0.503***
	(0.002)	(0.017)	(0.032)	(0.035)
Year FE	No	Yes	Yes	No
Firm FE	No	No	Yes	Yes
Industry FE	No	Yes	No	No
Year*Industry FE	No	No	No	Yes
Observations	25,439	25,439	25,439	25,439
Adjusted R-squared	0.098	0.260	0.552	0.552

4.6.2 The Change in CEO's Total Pay

This section investigates the impact of hiring compensation consultants on CEO total pay, especially following the 2009 SEC Disclosure Rule Amendment aimed at enhancing transparency and curbing potential rent-seeking behaviors among multiservice consultants. These regulatory changes were expected to potentially reduce CEO pay by limiting the ability of consultants to influence excessively generous compensation packages.

We analyze the effects using a difference-in-differences approach with the following model specification:

$$Total\ Pay_{i,t} = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 Treat_i \times Post_t + \beta_4 X_{i,t} + \varepsilon_{i,t}, \quad (7)$$

where $Total\ Pay_{i,t}$ represents CEO total compensation of firm i in year t. $Treat_i$ is a dummy indicating whether the firm's consultant provides multiple services, suggesting potential conflicts of interest, and $Post_t$ denotes the period after the SEC's rule implementation. $X_{i,t}$ includes control variables such as firm size and financial metrics to adjust for other influences on pay. The focal point of our analysis, β_3, measures the interaction effect between multiservice consultant usage and the post-regulation period. A significant negative β_3 would indicate a reduction in CEO pay for firms using multiservice consultants relative to those employing only pay-specific consultants, suggesting that the regulation effectively curtailed excessive pay practices facilitated by such consultants.

The results presented in Table 4.5, particularly in Column (4), show a significant coefficient of -0.041 for Treat × Post, indicating a decrease in CEO total pay among firms using multiservice consultants after the regulation compared to those using specialized consultants. This coefficient is significant at the 5% level (p-value < 0.05), supporting the hypothesis that increased regulatory scrutiny and the requirement for greater fee disclosure have led to more moderate CEO compensation practices. The decrease in total pay could be attributed to firms

adjusting their compensation policies to align more closely with shareholder expectations and industry norms, in response to the new transparency requirements.

Table 4.5: Additional Test: CEO's Total Pay

This table reports the results from difference-in-difference (DiD) tests surrounding the SEC's 2009 Disclosure Rule Amendment. The treatment group consists of all multiservice consultants each year. The control group comprises consultants that only offered compensation consultant services in that year. *Treat* is a dummy variable equals one for the multiservice consultants and equals zero for the consultant that only offered compensation consultant services. *Post* is a dummy variable equals one for firms with fiscal year ended after January 2010 and equals zero otherwise. The dependent variable is *CEO total pay*. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm-pair. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: CEO total pay				
	(1)	(2)	(3)	(4)
Treat*Post	-0.135***	-0.078***	-0.061***	-0.041*
	(0.031)	(0.024)	(0.020)	(0.023)
Treat	0.830***	0.233***	0.060***	0.043*
	(0.034)	(0.030)	(0.021)	(0.023)
Firm Size		0.385***	0.382***	0.374***
		(0.014)	(0.016)	(0.019)
Leverage		0.206***	-0.153***	-0.171***
		(0.055)	(0.049)	(0.053)
Cash Holdings		0.061	0.038	0.085
		(0.101)	(0.063)	(0.067)
Sales Growth		-0.000	0.051***	0.032
		(0.030)	(0.019)	(0.022)
ROA		0.304***	0.365***	0.281***
		(0.081)	(0.059)	(0.063)
Market to Book		0.080***	0.076***	0.074***
		(0.010)	(0.007)	(0.008)
PP&E		-0.018	0.118**	0.082*
		(0.043)	(0.046)	(0.049)
Constant	7.669***	4.983***	5.093***	5.175***
	(0.024)	(0.126)	(0.145)	(0.165)
Year FE	No	Yes	Yes	No
Firm FE	No	No	Yes	Yes
Industry FE	No	Yes	No	No
Year*Industry FE	No	No	No	Yes
Observations	25,439	25,439	25,439	25,439
Adjusted R-squared	0.165	0.560	0.768	0.766

In conclusion, these findings validate the effectiveness of regulatory interventions in moderating executive compensation. The 2009 SEC Disclosure Rule appears to have significant implications for corporate governance by influencing the behavior of compensation consultants and thereby affecting CEO pay structures. This underscores the role of transparency in ensuring that executive compensation aligns with shareholder interests and market standards, potentially curbing practices that could lead to excessive or unjustified pay relative to company performance and industry benchmarks.

Overall, our analysis illustrates the critical impact of regulatory frameworks on executive compensation practices. By mandating clearer disclosures, the SEC has not only addressed conflicts of interest but also fostered a more equitable approach to executive pay, reinforcing the importance of regulatory oversight in maintaining corporate accountability.

4.6.3 Why Firms Use Compensation Consultants?

This section explores the reasons firms engage compensation consultants, with a particular focus on the relationship between CEO pay levels and the impact of hiring these consultants on pay similarity. The rationale for engaging compensation consultants often stems from a firm's need to align CEO pay with industry norms and manage shareholder expectations. Firms with higher-paid CEOs might attract greater scrutiny from shareholders and regulatory bodies, prompting them to seek external validation or justification for their compensation packages.

We hypothesize that firms with above-average CEO compensation are more likely to utilize compensation consultants as a strategic approach to justify and defend high CEO pay levels. This engagement of consultants is intended to enhance the legitimacy and defensibility of executive compensation packages, particularly when these packages exceed industry norms. Rather than analyzing the likelihood of hiring consultants, our model aims to assess whether

higher CEO pay, in conjunction with the use of consultants, influences the degree of pay similarity with industry peers.

To empirically test this hypothesis, we propose the following regression model:

$$Pay\ Similarity_{i,t} = \beta_0 + \beta_1 Consultant_{i,t} + \beta_2 Higher\ Pay_{i,t} + \beta_3 Consultant_{i,t} \times Higher\ Pay_{i,t} + \beta_4 X_{i,t} + \varepsilon_{i,t}, \quad (8)$$

where $Consultant_{i,t}$ is a binary variable indicating whether firm *i* in year *t* utilizes a compensation consultant. $Higher\ Pay_{i,t}$ is a dummy variable set to one if the CEO's total pay is above the industry mean, and zero otherwise. $X_{i,t}$ includes control variables like firm size and leverage, among other financial indicators. The interaction term ($Consultant_{i,t} \times Higher\ Pay_{i,t}$) is critical in this analysis as it captures whether firms with higher CEO pay that also engage compensation consultants exhibit greater alignment of their pay structures with industry benchmarks. The model thus evaluates whether the combined effect of high CEO pay and the use of consultants contributes to increased pay similarity, reflecting a strategic alignment with market practices.

The regression results, presented in Table 4.6, show that the interaction term between *Consultant* and *Higher Pay* is consistently positive and statistically significant across all specifications. This finding indicates that firms with higher-paid CEOs that also employ compensation consultants are more likely to have CEO pay structures that closely align with those of their industry peers. Such alignment indicates that consultants are frequently utilized to normalize or justify outsized compensation packages relative to industry standards, thereby mitigating potential shareholder and regulatory scrutiny.

The significant positive coefficients on both *Consultant* and *Higher Pay* further suggest that each independently contributes to greater similarity in pay structures within the industry. This underscores the role of compensation consultants in shaping pay practices to conform to

broader market norms, thereby helping firms manage external perceptions and mitigate shareholder concerns regarding executive pay.

The SEC's focus on enhancing disclosure and accountability in executive compensation likely incentivizes firms to adopt compensation practices that are closely aligned with peer benchmarks. Such regulatory pressures encourage firms to engage compensation consultants to ensure compliance and to align CEO pay more closely with industry norms. This regulatory alignment serves to reduce deviations from accepted compensation practices that could attract negative scrutiny or regulatory penalties.

The expectation of greater pay similarity following these regulations is predicated on the regulatory intent to curb excessively high executive compensation that is not substantiated by company performance or industry standards. Compensation consultants play a pivotal role in this framework; they facilitate the alignment of CEO compensation with accepted norms, supporting the regulatory goal of promoting fairness and minimizing unjustified pay disparities within industries.

While greater pay similarity might initially seem to reduce a firm's flexibility in designing unique executive compensation packages, it should be viewed as a strategic alignment towards more transparent, fair, and governance-enhancing practices. This alignment ensures that compensation practices are not only competitive but also justifiable in the eyes of regulators and shareholders alike. By maintaining a balance between individuality and conformity, firms can still offer competitive yet compliant compensation packages that reflect both the CEO's value and regulatory standards.

In conclusion, the role of compensation consultants is crucial in helping firms navigate these regulatory landscapes by ensuring that their compensation strategies are not only competitive but also compliant. This analysis highlights the practical roles of compensation consultants in corporate governance and underscores their strategic importance in aligning

CEO pay with shareholder expectations and market practices. By fostering a deeper understanding of these dynamics, firms can leverage consultants' expertise to enhance corporate governance transparency and adapt to evolving market and regulatory expectations.

Table 4.6: Additional Tests: CEO Higher Total Pay

This table reports the results for examining whether firms with higher CEO pay are more likely to have the pay structure similarity with other firms. The dependent variable is *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity relative other firms. *Higher Pay* is a dummy variable that equals one if the CEOs total pay is above the mean value within the industry (based on 3-digit SIC classification) in a given year, and zero otherwise. All variables are defined in Appendix A. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Pay Similarity		
	(1)	(2)
Consultant*Higher Pay	0.010*	0.011*
	(0.006)	(0.006)
Consultant	0.016**	0.013**
	(0.007)	(0.007)
Higher Pay	0.015***	0.014***
	(0.004)	(0.004)
Firm Size		0.009**
		(0.004)
Leverage		0.002
		(0.011)
Cash Holdings		0.001
		(0.014)
Sales Growth		-0.006
		(0.004)
ROA		0.052***
		(0.014)
Market to Book		-0.003**
		(0.002)
PP&E		0.022**
		(0.011)
Constant	0.592***	0.517***
	(0.003)	(0.032)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	25,439	25,439
Adjusted R-squared	0.551	0.552

4.7 Robustness Tests

4.7.1 Propensity Score Matching

To address potential selection bias in the treatment effect of consultants on CEO compensation structures, we employ a propensity score matching (PSM) technique. Following the methodology outlined by Fang et al. (2014) , we calculate propensity scores using a logistic regression model where the binary variable *Consultants* is regressed against all control variables specified in the baseline model. This approach ensures that firms in the treatment and control groups are comparable in terms of observable characteristics. We perform nearest-neighbor matching without replacement, adhering to a stringent caliper of 0.01 to ensure close matches and maintain common support. This process yields a final matched sample comprising 8,311 firm-year observations for both the treatment and control groups.

Table 4.7 delineates the results derived from employing a propensity score matched sample to assess the influence of consultants. The evaluation was conducted in two stages: before and after the matching procedure.

Initially, the propensity score was calculated to determine the likelihood of firms employing consultants based on a logit model. In Panel A, Column (1) presents the pre-matching estimates, where a pseudo-R^2 of 0.396 and a p-value less than 0.001 from the chi-square test indicate a strong predictive capability of the model regarding the use of consultants.

After implementing the matching, Column (2) in Panel A illustrates the diagnostic checks on the matched data. Here, the regression coefficients for all control variables turned out to be non-significant, confirming no residual confounding in the matched groups. The substantial drop in pseudo-R^2 to 0.004 further supports the effective elimination of systematic differences between the groups. This is corroborated by the chi-square test showing a p-value of 1.000, allowing us to accept the null hypothesis that differences between covariates are non-existent in the matched sample.

Panel B reports the balance test results, which show no significant disparities in observable characteristics between the groups post-matching. This validates the effectiveness of our matching strategy.

Finally, Panel C reports the outcomes of the regression analysis using the propensity-matched sample. The results are consistent with our earlier findings, which verifies the integrity of the analysis and suggests that the employment of consultants is robustly assessed under a controlled setup, minimizing any selection bias.

Table 4.7: Propensity Score Matching

This table presents the baseline regression results using a propensity score matched sample. Panel A reports the pre-matching propensity score regression and post-matching diagnostic test results. The dependent variable is *Consultants*, a dummy variable that equals one if a firm hire compensation consultants each year. Panel B reports the post-matching balance test results. Panel C reports the regression results. The dependent variable is *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity. All variables are defined in Appendix A.1 All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Propensity Score Regression and Diagnostic Test

	(1)	(2)
	Consultants	Consultants
Firm Size	1.485***	-0.001
	(0.078)	(0.050)
Leverage	0.037	-0.154
	(0.277)	(0.289)
Cash Holdings	1.855***	0.195
	(0.375)	(0.378)
Sales Growth	-0.651***	0.082
	(0.119)	(0.127)
ROA	0.368	-0.106
	(0.405)	(0.423)
Market to Book	0.401***	-0.006
	(0.041)	(0.041)
PP&E	0.752***	-0.098
	(0.182)	(0.195)
Year FE	Yes	Yes
Firm FE	Yes	Yes
N	25,353	8,311
Pseudo R^2	0.396	0.004
p-value of χ^2	0.000	1.000

Panel B: Balance Test

	(1) Consultants (N=4,156)	(2) Consultants (N=4,155)	(3) Difference in mean	(4) t-statistic
Firm Age	7.881	7.867	0.015	0.500
Firm Size	0.266	0.260	0.007	1.450
CapEx	0.158	0.167	-0.009	-2.300
Book Leverage	0.084	0.090	-0.005	-1.100
ROA	0.041	0.042	-0.001	-0.100
R&D Intensity	2.040	2.069	-0.028	-0.900
Cash Flow	0.496	0.480	0.017	1.850

Panel C: Regression Results

	(1) Pay Similarity	(2) Pay Similarity	(3) Pay Similarity
Consultants	0.024***	0.022***	0.019**
	(0.005)	(0.007)	(0.009)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	No	No
Firm FE	No	Yes	No
Year*Industry FE	No	No	Yes
N	8,309	7,924	6,954
Adj R^2	0.332	0.582	0.574

4.7.2 Entropy Balancing

To enhance the robustness of our analysis, we apply entropy balancing, a reweighting method that ensures identical covariate distributions between the treatment and control groups. Unlike propensity score matching (PSM), which involves matched pairs and may lead to a reduced sample size, entropy balancing adjusts weights on observations to achieve perfect balance in mean, variance, and skewness of covariates while maintaining the full sample size. This method offers a more flexible and efficient approach to mitigate selection bias when evaluating the impact of compensation consultants on CEO pay similarity.

Using entropy balancing, we re-estimate the baseline regression model as presented in Table 3.8. The balance test results in Panel A demonstrate that the covariate distributions between firms using compensation consultants and those that do not are statistically identical. The mean, variance, and skewness of all control variables align closely between the treatment and control groups, confirming the validity of this method in achieving robust balance.

The regression results shown in Panel B further substantiate our primary hypothesis. The Consultants variable remains positively and statistically significant ($p < 0.01$) in its relationship with CEO pay similarity, reinforcing the conclusion that compensation consultants contribute to the standardization of executive pay structures. These findings align with the main analysis, demonstrating that the positive effect of consultants is not driven by selection bias, but rather reflects a genuine influence on pay practices.

The significance of control variables such as ROA and PP&E, combined with the insignificance of Firm Size, Leverage, and Sales Growth, suggests that firm performance and asset tangibility are important drivers of pay similarity, while other financial metrics play a less critical role. The use of entropy balancing thus enhances the credibility of the findings, offering additional evidence that firms engage compensation consultants not merely as a symbolic

gesture, but as a strategic tool to achieve alignment with industry norms and regulatory expectations.

Table 4.8: Entropy Balancing

This table presents the baseline regression results using an entropy balancing matched sample. Panel A reports the balance test results. *Consultants* is a dummy variable that equals one if a firm hire compensation consultants each year. Panel B reports the regression results. The dependent variable is *Pay Similarity*, ranging from 0 to 1, with higher value implying higher level of CEO pay structure similarity. All variables are defined in Appendix A.1. All continuous variables are winsorized at the 1% level. Standard errors shown in parentheses are clustered by firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Balance Test

	Consultants =1			*Consultants* =0 before Matching			*Consultants* =0 after Matching		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mean	Variance	Skewness	Mean	Variance	Skewness	Mean	Variance	Skewness
Firm Size	8.888	2.116	0.1883	6.847	1.836	0.5566	8.887	3.907	0.3197
Leverage	0.2831	0.03875	0.762	0.2239	0.04617	0.9331	0.2831	0.04492	0.7988
Cash Holdings	0.139	0.02069	1.703	0.1782	0.03529	1.397	0.139	0.02289	1.684
Sales Growth	0.07421	0.04578	1.67	0.102	0.06852	1.632	0.07421	0.04133	1.221
ROA	0.05088	0.007957	-1.759	0.02187	0.01517	-2.026	0.05085	0.005039	-0.6064
Market to Book	3.413	51211	31.94	2.255	1301	-34.26	3.413	1262	6.952
PP&E	0.5132	0.1662	0.8274	0.4803	0.1673	1.1	0.5132	0.1837	1.018

Panel B: Regression Results

	Pay Similarity
Consultants	0.021***
	(0.007)
Firm Size	0.012
	(0.009)
Leverage	0.025
	(0.023)
Cash Holdings	0.004
	(0.025)
Sales Growth	-0.004
	(0.008)
ROA	0.054*
	(0.029)
Market to Book	-0.000*
	(0.000)
PP&E	0.065***
	(0.025)
Constant	0.443***
	(0.086)
Year FE	Yes
Firm FE	Yes
Observations	23,789
Adj. R-squared	0.648

4.8 Conclusion

This study has provided insightful contributions to the understanding of CEO pay structure similarities across firms, particularly in the context of the use of compensation consultants and regulatory changes. By exploring the nuanced effects of the 2009 SEC's disclosure rule amendment, we observed a significant shift in the behavior of multiservice consultants and their impact on executive compensation strategies. The findings indicate that firms utilizing multiservice consultants exhibit a higher level of CEO pay similarity, especially after the implementation of regulatory requirements that potentially curbed rent-seeking incentives among these consultants.

Our research exploits this regulatory change as an exogenous shock, providing a robust methodological framework to examine the causal effects of changes in consultant behavior on pay structures. The results from difference-in-difference analyses and propensity score matching confirm that the amendment led to a noticeable alignment in pay practices with industry standards, presumably as firms and their consultants adjusted to enhance transparency and reduce conflicts of interest.

Moreover, our study delves into the reasons behind firms' employment of compensation consultants, revealing that firms with higher CEO pay are more likely to engage these consultants. This is indicative of an effort by firms to justify and rationalize CEO compensation packages that stand out from the norm, potentially to mitigate scrutiny from shareholders and regulatory bodies.

Through these analyses, our study extends the literature on the impact of compensation consultants by highlighting how regulatory interventions and the inherent characteristics of firms interact to shape executive compensation practices. We contribute to a deeper understanding of the strategic roles that compensation consultants play in corporate governance,

particularly in an era where transparency and alignment with shareholder interests are paramount.

These findings have practical implications for policymakers, corporate boards, and investors. They underscore the importance of regulatory oversight in maintaining fair compensation practices and suggest that firms may need to consider more carefully the roles and influence of consultants in designing compensation packages that not only comply with regulations but also align with shareholder value creation.

In conclusion, this research underscores the complexity of executive compensation management and the significant role that external consultants and regulatory frameworks play in shaping these practices. Future research might further investigate the long-term effects of these alignments on firm performance and governance structures to provide a more comprehensive view of the dynamics at play.

Appendix

Appendix A.1 Variable Definitions

Variable	Definition	Data Source
Dependent Variable		
Pay Similarity	Firm's CEO compensation structure similarity relative to all other firms.	Compustat
Pay Similarity_Competitors	Firm's CEO compensation structure similarity relative to their product market competitors.	Compustat and Hoberg-Phillips Data Library
CEO Total Pay	The natural logarithm of CEO total pay.	ISS Incentive Lab
Independent Variable		
Consultants	A dummy variable that equals to one if the firm has at least one compensation consultants, and zero otherwise.	Authors calculated based on ISS Incentive Lab
Common Consultants	A dummy variable that equals to one if the focal firms have at least one common compensation consultants with their product market competitors, and zero otherwise.	ISS Incentive Lab and Hoberg-Phillips Data Library
Firm Size	The natural logarithm of total assets deflated to year 2009 by the adjusted Consumer Price Index for all urban consumer. Log (at * adjusted_cpi_2009)	Compustat
Leverage	The ratio of book value of debt to total assets. ((dltt+lct)/at)	Compustat
Cash Holdings	The ratio of cash and short-term investments to total assets. (che/at)	Compustat
Sales Growth	Firm's sales growth. (sale-l.sale)/l.sale	Compustat
ROA	The ratio of net income to total assets. (ni/at)	Compustat
Market to Book	The ratio of market value of assets to book value of assets. (csho*prcc_f)/(seq-pstkl+txditc)	Compustat
PP&E	The ratio of total property, plant, and equipment to total asset. ppegt/at	Compustat
Higher Pay	A dummy variable that equals one if the CEOs total pay is above the mean value within the industry (based on 3-digit SIC classification) in a given year, and zero otherwise.	ISS Incentive Lab

Chapter 5: Conclusion

5.1 Summary of Key Findings and Contributions

This dissertation has explored the complex dynamics of executive compensation, focusing on the integration of Environmental, Social, and Governance (ESG) criteria, the influence of board interlocks, and the role of compensation consultants within corporate governance frameworks. Through three distinct yet interconnected studies, this research provides critical insights into how peer effects, regulatory interventions, and the strategic use of consultants shape executive pay practices, often with implications that extend beyond the intended objectives.

Chapter 2 examined the peer effects influencing firms' adoption of ESG-linked compensation policies. By analyzing a comprehensive dataset of U.S.-listed firms from 2002 to 2020, this study demonstrated that firms with board-connected peers who have implemented ESG-pay are 2.7% more likely to adopt similar policies. However, the analysis also highlighted a disconnect between policy adoption and actual ESG performance, suggesting that peer influence, while powerful, may lead to symbolic adoption rather than substantive improvement in corporate sustainability. This contributes to the literature on corporate governance by revealing that network effects may inadvertently drive superficial compliance with ESG initiatives.

Chapter 3 extended this analysis by investigating the broader implications of ESG-linked compensation within corporate governance. The study found that while ESG-linked pay aim to align CEO incentives with sustainability goals, it often results in increased total CEO compensation, particularly through variable pay components like stock awards. This findings suggest that ESG-linked compensation may act as a mechanism for executive enrichment, with limited evidence of significant improvements in ESG performance. This challenges the

effectiveness of ESG pay practices and calls for a more rigorous integration of performance metrics to ensure that executive incentives translate into tangible corporate outcomes.

Chapter 4 focused on the influence of compensation consultants, particularly after the 2009 SEC disclosure rule amendment. The study revealed that firms using multiservice consultants exhibited greater similarity in CEO pay structures, particularly following the regulatory change. This suggests that the disclosure rule helped mitigate rent-seeking behavior and promoted greater alignment with industry standards. Additionally, firms with higher CEO pay were more likely to engage consultants, potentially to justify higher compensation packages. These findings contribute to the ongoing debate on the role of external advisors in corporate governance and highlight how regulatory frameworks can influence market behaviors.

5.2 Contributions to Corporate Governance and Executive Compensation Literature

This dissertation makes several important contributions to the academic literature and corporate governance practices. Firstly, this study demonstrates that peer effects significantly impact the diffusion of ESG-linked compensation, contributing to a broader understanding of how corporate networks influence governance practices. Secondly, it provides empirical evidence that while ESG-linked pay is designed to promote corporate responsibility, it may also serve as a tool for executive compensation increases, highlighting the need for stronger performance linkages. Thirdly, this study shows how the 2009 SEC rule altered consultant practices, leading to greater pay similarity and suggesting that regulatory transparency requirements can effectively curb opportunistic behaviors.

5.3 Limitations of the Research

While this dissertation offers valuable insights, it also has several limitations that should be considered. Firstly, although robustness checks like propensity score matching (PSM) and entropy balancing were applied, the possibility of endogeneity in the relationship between ESG-linked pay and firm performance cannot be entirely ruled out. Secondly, the study relies on publicly available data, which may not fully capture internal firm dynamics or the strategic intentions behind executive pay policies. Thirdly, the research focuses on U.S.-listed firms, which may limit the generalizability of the findings to other regions with different governance frameworks and regulatory environments.

5.4 Suggestions for Future Research

Building on these findings, several avenues for future research are proposed. Future studies could explore the longitudinal impact of ESG-linked compensation on sustainability performance, particularly to examine whether policy adoption leads to real changes in corporate behavior. In addition, extending the analysis to international markets could provide insights into how different regulatory environments affect the role of compensation consultants and the diffusion of ESG practices. Further research could investigate how other governance tools (e.g., board diversity, shareholder activism) interact with compensation strategies to influence corporate outcomes.

5.5 Conclusion: Strategic Implications and Policy Recommendations

This dissertation underscores the multifaceted nature of executive compensation management and the critical influence of peer networks, regulatory interventions, and consulting practices. The findings highlight the potential for symbolic adoption of policies like ESG-linked pay, which may not fully deliver on promises of sustainability and transparency. Policymakers and corporate boards must focus on designing compensation policies that not only align with

industry norms but also promote genuine value creation. Stronger performance metrics, enhanced regulatory oversight, and transparent governance practices are crucial to ensuring that executive compensation strategies support long-term corporate success and shareholder interests.

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