



The CEO compensation paradox: Evidence from a natural experiment in corporate governance

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Abstract

In this paper, we examine the impact of mandated board independence on total CEO compensation by exploiting the 2003 exchange mandate requiring publicly traded firms to adopt outsider-controlled boards as a natural experiment in corporate governance. Using a difference-in-differences framework on a panel of 1,113 U.S. firms from 1997 to 2012, we compare firms required to restructure their boards with firms that were already compliant. The results indicate that the mandate had a statistically significant effect on CEO compensation, with total CEO pay increasing by approximately 7.6 percent among treated firms. These findings are consistent with the optimization view of executive compensation, which suggests that stronger governance mechanisms increase monitoring intensity, risk exposure, and accountability, requiring higher compensation to attract, retain, and motivate executives. In contrast to the managerial-power view, which predicts that stronger governance should constrain executive pay, the evidence indicates that governance reforms can lead to higher, rather than lower, compensation levels. Overall, we provide causal evidence that governance reforms reshape, rather than simply constrain, executive compensation, highlighting the importance of evaluating corporate governance and CEO pay as an integrated and jointly determined system. These findings have important implications for policymakers and practitioners, as regulatory interventions intended to strengthen governance may produce unintended consequences for executive compensation design.

Keywords:

Board independence
CEO compensation
Corporate governance
Managerial power
Optimization.

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Publisher:

Scientific Publishing Institute

Received: 7 April 2026

Revised: 20 June 2026

Accepted: 2 July 2026

Published: 10 July 2026

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Funding: This study received no specific financial support.

Institutional Review Board Statement: Not applicable.

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

1. Introduction

Agency theory provides the foundation for this study by highlighting conflicts that arise when corporate decision-makers do not bear the full consequences of their actions (Jensen & Meckling, 1976). CEOs are often characterized as self-interested agents, creating a need for effective oversight mechanisms to align managerial actions with shareholder interests (Fama & Jensen, 1983; Fan, 2004). A board composed of independent directors is widely regarded as a key governance safeguard for mitigating these agency conflicts (Bathala & Rao, 1995; Hermalin & Weisbach, 2003). In response to a series of high-profile corporate scandals in the early 2000s, U.S. stock exchanges, with support from the Securities and Exchange Commission, implemented a 2003 mandate requiring listed firms to adopt outsider-controlled boards. While the regulatory intent was to curb managerial opportunism and strengthen oversight, its effect on CEO compensation remains contested.

We examine whether mandated board independence affects total CEO compensation by exploiting the 2003 exchange requirement as an exogenous shock to corporate governance. Competing theoretical perspectives yield contrasting predictions. The managerial-power view argues that more independent boards constrain excessive compensation and improve pay-performance alignment by limiting executives' ability to influence their own pay through control over the board, thereby reducing rent extraction (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005; Hill, Lopez, & Reitenga, 2016). In contrast, the optimization view suggests that governance structures and compensation arrangements are jointly determined, and that increased monitoring may require higher compensation to offset greater managerial risk and accountability (Duchin, Matsusaka, & Ozbas, 2010; Benjamin E Hermalin, 2005). These competing perspectives motivate an empirical examination of how firms adjust executive compensation in response to mandated changes in board composition. More broadly, they reflect competing views regarding whether governance mechanisms and compensation contracts operate as substitutes or complements within the firm's overall contracting environment. This perspective is consistent with the broader view that governance structures and compensation arrangements are jointly determined rather than independently chosen (Armstrong, Guay, & Weber, 2010).

To evaluate these competing predictions and provide causal evidence, we employ a difference-in-differences research design that exploits the 2003 exchange mandate as a natural experiment in corporate governance. Using a fifteen-year panel surrounding the mandate, we find that firms required to transition to outsider-controlled boards experienced a statistically significant increase in total CEO compensation relative to firms that were already compliant. The estimated effect of approximately 7.6 percent indicates that firms adjusted compensation upward following the mandate. These findings are consistent with the optimization view, suggesting that while independent boards may enhance monitoring and incentive alignment, firms respond by increasing total compensation to offset heightened risk exposure faced by executives.

We contribute to the literature in several important ways. First, by leveraging the 2003 exchange mandate as an exogenous shock and employing a difference-in-differences framework over an extended panel, we address key limitations of prior research related to endogeneity, voluntary governance changes, short observation windows, and empirical design constraints (Adams, Hermalin, & Weisbach, 2010; Chhaochharia & Grinstein, 2009; Fahlenbrach, 2009; Guthrie, Sokolowsky, & Wan, 2012; Hermalin & Weisbach, 2003; Ryan Jr & Wiggins III, 2004). Second, we contribute to the executive compensation literature by demonstrating that governance reforms can increase CEO compensation, suggesting that monitoring mechanisms and compensation contracts function as complementary rather than substitutive governance tools. This evidence supports the optimization view of executive compensation (Duchin et al., 2010; Hermalin, 2005) while challenging the managerial-power perspective (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005) which predicts that stronger governance should reduce executive pay. Third, by examining compensation outcomes over an extended post-mandate period, we provide evidence on the long-run consequences of governance reforms rather than the short-run adjustments that have characterized much of the existing literature.

At a broader level, our analysis advances the literature by showing that governance reforms reshape the contracting environment between firms and executives. Rather than simply constraining managerial behavior, mandated board independence alters the balance between monitoring, risk, and incentives, leading to adjustments in compensation structures. These findings highlight that corporate governance and executive compensation should be evaluated as an integrated and jointly determined system rather than as independent mechanisms (Armstrong et al., 2010) and suggest that governance reforms intended to strengthen oversight may have unintended consequences for executive compensation design.

2. Literature Review

Understanding the relationship between board composition and CEO compensation requires both historical context and a review of competing theoretical perspectives. Mace (1971) identified two primary functions of corporate boards: monitoring top executives and advising firm strategy. While advisory responsibilities once dominated, governance failures such as the collapse of Penn Central Railroad in the 1970s prompted a shift toward stronger oversight (Gordon, 2007). Independent directors grew in number based on the belief that outside boards could reduce agency costs and better align CEO behavior with shareholder interests (Jensen, 1993). This view continues to receive support in contemporary governance research. For example, Al Koni, Najjar, Nour, and Nabulsi (2025) find that effective board governance is associated with

lower agency costs among industrial firms in emerging markets, reinforcing the importance of board oversight as a mechanism for mitigating agency conflicts.

A substantial body of research has examined the determinants of executive compensation and the role of governance in shaping pay outcomes. Jensen and Murphy (1990) emphasize that effective compensation contracts should align managerial incentives with shareholder value, while Core, Holthausen, and Larcker (1999) find that weaker governance structures are associated with higher levels of CEO compensation. Subsequent research suggests that observed compensation levels may reflect both optimal contracting and managerial influence, complicating the interpretation of pay outcomes (Core, Guay, & Thomas, 2005; Murphy, 1999). These studies highlight the importance of governance mechanisms, including board composition, in determining executive compensation structures.

In the early 2000s, major accounting scandals led regulators to impose more stringent governance standards. With backing from the Securities and Exchange Commission, Amex, NASDAQ, and the New York Stock Exchange introduced a 2003 mandate requiring listed firms to have outsider-controlled boards, meaning boards composed of a majority of independent directors. Before the mandate, firms that adopted independent boards did so voluntarily, introducing potential selection bias in earlier studies. In contrast, the mandate represented an exogenous shock, enabling researchers to examine causal effects of board independence on CEO compensation (Chhaochharia & Grinstein, 2007). Regulatory interventions such as the Sarbanes-Oxley Act and exchange listing requirements have been widely used to identify causal effects in corporate governance research, as they mitigate concerns related to endogeneity and unobserved heterogeneity (Guo, Lach, & Mobbs, 2015; Romano, 2005; Wintoki, 2007).

A growing body of literature questions whether increased board independence universally improves governance outcomes. Adams and Ferreira (2007) argue that more independent boards may reduce the flow of firm-specific information between management and directors, potentially weakening the advisory function of the board. Similarly, Coles, Daniel, and Naveen (2008) and Gani and Jermias (2006) suggest that optimal board structure varies across firms, implying that a uniform increase in independence may not be value maximizing. Harris and Raviv (2008) highlight tradeoffs between board control and effectiveness, while Renée Birgit Adams (2012) emphasizes that governance reforms can produce unintended consequences, particularly during periods of financial instability. Related evidence further suggests that governance structures can influence broader firm outcomes such as innovation, highlighting the potential tradeoffs associated with increased board independence (Balsmeier, Fleming, & Manso, 2017). These findings underscore that board independence may involve tradeoffs between monitoring intensity and advisory capacity, a key consideration in evaluating its impact on executive compensation.

One related institutional mechanism is the compensation committee, which plays a central role in setting executive pay. Some scholars suggest that committee structure may matter more than overall board composition. However, compensation outcomes ultimately remain under the authority of the full board.

Following changes in board independence, it is the board that determines the type of compensation committee to form, whether assertive, compliant, or passive, and whether to ratify, revise, or reject its recommendations (Chhaochharia & Grinstein, 2009). Moreover, guidelines established by the U.S. Securities and Exchange Commission (1994) require that compensation committees be composed entirely of independent directors for firms to qualify for exemption from the one-million-dollar cap on deductible executive salaries (Murphy, 2013). These provisions underscore that while compensation committees are relevant, the structure of the full board remains a critical factor in shaping CEO compensation.

Behavioral perspectives further suggest that board effectiveness depends not only on formal independence but also on social dynamics and incentives within the boardroom. For example, personal or professional relationships between CEOs and board members may reduce monitoring effectiveness despite formal structural independence (Westphal, 1999) while the ability of boards to influence strategic decisions depends on both formal authority and behavioral incentives (Golden & Zajac, 2001). In addition, evidence suggests that governance failures can impose significant reputational costs on directors, indicating that monitoring is imperfect even in the presence of formal governance mechanisms (Fich & Shivdasani, 2007). These insights highlight that formal governance reforms may not fully eliminate managerial influence, reinforcing the importance of examining how changes in board composition translate into compensation outcomes.

Empirical evidence on the relationship between corporate governance and executive compensation remains mixed. While some studies suggest that stronger governance mechanisms constrain executive pay and improve monitoring, other research finds that governance reforms may alter compensation structures without necessarily reducing pay levels. This ambiguity extends beyond the United States and has attracted considerable international attention, with findings varying across institutional environments.

Evidence from China indicates that governance characteristics such as board independence and CEO duality are positively associated with executive remuneration, suggesting that stronger monitoring may require higher incentive compensation (Rehman, Ali, Hussain, & Waheed, 2021). In contrast, evidence from Brazil highlights the persistence of managerial power, where governance mechanisms may fail to constrain compensation and can instead be associated with abnormal CEO compensation contracts (Silva, Santos, & Rodrigues, 2020). Broader cross-country comparisons further indicate that differences in legal systems,

ownership concentration, labor markets, and investor protections contribute to substantial variation in executive compensation practices (Conyon & Murphy, 2000; Goergen & Renneboog, 2011).

Taken together, the international evidence suggests that the relationship between board independence and CEO compensation is highly context dependent. In some settings, stronger governance appears to increase compensation by raising monitoring intensity and managerial accountability, while in others governance mechanisms appear insufficient to fully constrain managerial influence. These mixed findings suggest that governance reforms should not be evaluated in isolation, but rather as part of a broader system of governance and incentive arrangements. Consistent with this perspective, Armstrong et al. (2010) argue that governance mechanisms and executive compensation are jointly determined within a broader contracting framework, where firms adjust multiple governance and incentive mechanisms simultaneously in response to agency conflicts and information conditions. These mixed findings underscore the need for a well-identified empirical setting capable of distinguishing between competing theoretical explanations and isolating the causal effect of board independence on CEO compensation.

2.1. Managerial-Power View

The managerial-power view argues that CEOs historically exerted significant influence over insider-dominated boards, enabling them to secure excessive compensation packages that are weakly tied to firm performance (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005; Berger, Ofek, & Yermack, 1997). Under this framework, agency costs arise when boards fail to effectively monitor management, allowing executives to extract rents. Increasing board independence is expected to mitigate these agency problems by strengthening oversight and reducing managerial influence. As a result, more independent boards should lead to lower total CEO compensation and improved pay-for-performance sensitivity.

Empirical evidence consistent with this view suggests that governance mechanisms can constrain executive pay when boards are sufficiently independent. However, behavioral and institutional factors may limit the effectiveness of these mechanisms. For example, social ties between CEOs and directors may weaken monitoring even in formally independent boards (Westphal, 1999) while variations in board power and incentives can influence the extent to which governance reforms translate into meaningful oversight (Golden & Zajac, 2001). International evidence further indicates that managerial power can persist despite governance reforms, resulting in compensation structures that deviate from optimal contracting (Silva et al., 2020).

2.2. Optimization View

In contrast, the optimization view posits that both governance structures and executive compensation arrangements are determined efficiently based on firm-specific characteristics and market conditions (Duchin et al., 2010). Firms operate within a complex environment that includes shareholders, labor markets, product markets, and regulatory constraints, all of which impose discipline on managerial behavior. Under this framework, insider-controlled boards may represent an optimal governance choice, particularly when CEOs possess firm-specific knowledge that enhances the advisory role of the board (Almazan & Suarez, 2003; Laux, 2008).

Mandating greater board independence may disrupt this equilibrium by weakening the advisory function and increasing monitoring intensity. As a result, CEOs may face greater performance pressure, higher dismissal risk, and increased exposure to firm-specific outcomes. To compensate for these changes and maintain incentive alignment, firms may respond by increasing total CEO compensation. Empirical evidence supports this perspective, showing that stronger governance mechanisms can be associated with higher levels of executive pay as firms adjust compensation structures to reflect increased managerial risk and accountability (Rehman et al., 2021).

2.3. Contribution

Despite extensive research on board independence and executive compensation, several important gaps remain. First, much of the existing literature relies on voluntary changes in board composition, making it difficult to disentangle causal effects from firm specific characteristics and selection bias (Adams et al., 2010; Hermalin, 2005). Second, prior studies often focus on short-term outcomes surrounding governance reforms, limiting the ability to assess long-run adjustments in compensation structures (Chhaochharia & Grinstein, 2009; Guthrie et al., 2012). Third, empirical findings remain mixed, with some studies supporting the managerial-power view and others supporting the optimization view, suggesting that the net effect of board independence on CEO compensation remains unresolved.

This study addresses these limitations by exploiting the 2003 exchange mandate as an exogenous shock to board composition and examining its long-run impact on CEO compensation using a difference-in-differences framework and a fifteen-year panel. This approach provides causal evidence from a regulatory setting, focuses on long-term compensation adjustments, and contributes to the literature by clarifying how mandated governance reforms influence executive pay while reconciling competing theoretical predictions.

3. Hypotheses

Despite the passage of more than two decades since the 2003 mandate, the literature remains divided. Some studies support the managerial-power view and report decreases in CEO pay, while others find evidence consistent with the optimization view and report increases. Moreover, methodological limitations undermine many earlier studies.

To address these limitations, this study examines the long-run effects of the 2003 board-independence mandate on total CEO compensation using a quasi-experimental design and a fifteen-year panel. The competing theoretical perspectives yield opposing predictions. Under the managerial-power view, the addition of independent directors strengthens monitoring and constrains managerial influence, leading to lower CEO compensation. In contrast, the optimization view suggests that increased monitoring raises managerial risk and accountability, requiring firms to offer higher total compensation to attract and retain executives. Based on these competing predictions, we test the following hypotheses: *H1a: The total compensation package for CEOs of publicly traded firms will decrease as a result of adding outside (independent) members to the board.* *H1b: The total compensation package for CEOs of publicly traded firms will increase as a result of adding outside (independent) members to the board.*

To test these hypotheses, we exploit the 2003 exchange mandate as an exogenous shock to board composition and employ a difference-in-differences framework that compares changes in CEO compensation between firms required to transition to outsider-controlled boards and those already in compliance.

4. Research Method

We addressed the effect of board composition on CEO compensation by mitigating omitted variable bias, a form of endogeneity that arises when unobserved characteristics influence the independent variable (Hermalin & Weisbach, 2003). To control for this concern, we leveraged a natural experiment: the 2003 exchange mandate. We compared insider-controlled firms affected by the mandate to a control group of firms already compliant with board-independence requirements (Adams et al., 2010). Because changes in board composition could otherwise reflect unobservable CEO traits, the mandate served as an exogenous shock that strengthened causal inference (Hermalin & Weisbach, 2003).

We employed a difference-in-difference approach as our primary estimation strategy, consistent with methods used by Chhaochharia and Grinstein (2009); Guo et al. (2015); Chung and John (2017); Lu and Wang (2015); Lu and Wang (2018) and Pandya and Van Deventer (2023). This approach allowed us to estimate the treatment effect of the mandate by comparing the differential change in CEO compensation between affected firms and already-compliant firms. We accounted for the compliance window provided to firms and, consistent with assumptions made by Chhaochharia and Grinstein (2009) and Lu and Wang (2018) we assumed that any concurrent policy shocks affected both groups similarly. Since no other known shocks uniquely targeted insider-controlled firms during this period, we treated the mandate as an isolated event (Chhaochharia & Grinstein, 2007; Wintoki, 2007). We used the following regression equation.

$$\ln(\text{Total Compensation})_{it} = \beta_0 + \beta_1 (\text{Inside Board}_i * \text{Post Mandate}_{it}) + \Gamma X_{it} + \delta_i + Y_t + \varepsilon_{it} \quad (1)$$

We defined total compensation to include salary, bonuses, stock options, restricted stock grants, and other forms of annual compensation (Lucian Bebchuk & Grinstein, 2005; Coles, Daniel, & Naveen, 2014; Fahlenbrach, 2009). We applied the natural log transformation to total compensation so that a one-unit change in an independent variable reflected a percentage change in pay. We suppressed the intercept to avoid the dummy variable trap (Adams & Ferreira, 2009) and we designated ε as the error term.

We coded *Inside Board* as a binary variable identifying the treatment group, firms with a majority of inside directors in 2000, based on definitions from Chhaochharia and Grinstein (2007); Duchin et al. (2010); Bhagat and Bolton (2013); Guo et al. (2015) and Pandya and Van Deventer (2025). We designated firms with insider-controlled boards in 2000 as the treatment group, since they were noncompliant with the mandate and were required to change their board structure. Firms that already met the board-independence requirement formed the control group. We coded the variable *Inside Board* as 1 for firms in the treatment group, where inside directors comprised 50 percent or more of the board in 2000, and 0 for firms in the control group.

We defined *Post Regulation* as a dummy variable equal to 1 for years 2002 and beyond. Although 2003 marked the formal adoption of the mandate, we used 2002 as the event year because some firms preemptively changed board composition (Knyazeva, Knyazeva, & Masulis, 2013).

The interaction term *Inside Board * Post Regulation* captured the treatment effect. This coefficient estimated the change in compensation for treated firms after the mandate, relative to their own pre-mandate levels and to changes in the control group.

To control for cross-sectional and time-series variation, we included firm-level variables such as *Total Sales*, *Return on Assets*, and *Annual Return*, as used in prior studies (Bebchuk & Fried, 2005; Chhaochharia & Grinstein, 2009; Coles et al., 2014; Jensen & Murphy, 1990). We expressed *Total Sales* as the natural log of net sales to capture firm size. We also applied a logarithmic transformation to *Return on Assets* and *Annual Return*, both of which serve as proxies for firm performance. To reduce concerns about reverse causality, where compensation might influence performance outcomes, we lagged all control variables by one year (Lucian Bebchuk & Grinstein, 2005).

We incorporated firm fixed effects (δ_i) to account for unobservable firm traits, including culture, CEO tenure, and governance norms (Chhaochharia & Grinstein, 2009; Graham, Li, & Qiu, 2012). We also included year fixed effects (Y_t) to absorb time-specific shocks. Because of these fixed effects, the model subsumed the coefficients for *Inside Board* and *Post Regulation*. To address serial correlation and ensure robustness to heteroscedasticity, we clustered standard errors at the firm level (Chhaochharia & Grinstein, 2009; Guthrie et al., 2012).

5. Results

We used a comprehensive panel of publicly traded U.S. firms to examine how changes in board composition influenced CEO compensation over time. The dataset combines CEO compensation data from ExecuComp (1996–2012), board composition data from RiskMetrics (1996–2009), and firm-level financial data from CompuStat (1997–2012). To prevent distortions in compensation trends, Apple, Inc. and Fossil, Inc. are excluded due to their outsized influence on executive pay during the sample period (Guthrie et al., 2012). Descriptive evidence shows larger compensation increases among treated firms, and regression results confirm a positive and statistically significant treatment effect that is robust across specifications.

5.1. Descriptive Statistics

Table 1 reports summary statistics for the full sample of 1,113 firms across 14,424 firm-year observations, along with subsamples based on board composition in 2000. The average firm reports total sales of \$6.4 billion, return on assets of 3.77%, and an annual stock return of 15.10%. The average annual total CEO compensation package is \$5.5 million.

Table 1. Summary Statistics.

Variables	Total Firms	Inside Board	Independent Board	T-Statistics
	(1)	(2)	(3)	(4)
Number of Firms	1,113	243	870	
Total Sales (in million)	\$6,413	\$3,692	\$7,155	3.80***
Return on Assets	3.77%	4.36%	3.60%	1.68*
Annual Return	15.10%	15.45%	15.00%	0.45
Total Compensation (in 000s)	\$5,488	\$4,363	\$5,794	4.11***

Note: All variables used in the tables are winsorized at the top and bottom 1% to reduce the influence of outliers. Compensation amounts are reported in thousands of dollars. Statistical significance is denoted by *, **, and *** for the 10%, 5%, and 1% levels, respectively. T-statistics in comparative tables are clustered at the firm level.

Columns 2 and 3 of Table 1 distinguish between firms with insider-controlled and outsider-controlled boards. Of the sample, 243 firms are classified as insider-controlled, while 870 firms are outsider-controlled. Insider-controlled firms are smaller on average, with total sales of \$3.7 billion compared to \$7.2 billion for outsider-controlled firms, but they exhibit slightly higher return on assets. Stock returns are similar across both groups. CEO compensation is lower among insider-controlled firms (\$4.4 million) relative to outsider-controlled firms (\$5.8 million). The t-statistics reported in Table 1 indicate that differences in firm size and compensation are statistically significant, while differences in stock returns are not statistically significant.

Overall, the descriptive statistics suggest meaningful differences between firms prior to the mandate, although they do not establish causal relationships.

5.2. Analysis of Compensation Trends

To examine how CEO compensation evolved over time, Table 2 presents total compensation before and after the implementation of the 2003 exchange mandate for both groups. Total compensation increased across all firms following the mandate, consistent with broader trends in executive pay during the sample period.

Table 2. Total CEO Compensation Trends.

Variables	Total Firms	Inside Board	Independent Board	T-Statistics
	(1)	(2)	(3)	(4)
Pre-Regulation	\$4,787	\$3,630	\$5,105	3.79***
Post-Regulation	\$5,839	\$4,735	\$6,138	3.78***

Note: All variables used in the tables are winsorized at the top and bottom 1% to reduce the influence of outliers. Compensation amounts are reported in thousands of dollars. Statistical significance is denoted by *, **, and *** for the 10%, 5%, and 1% levels, respectively. T-statistics in comparative tables are clustered at the firm level.

However, the magnitude of the increase differs across groups. As shown in Table 2 firms with insider-controlled boards experienced a 30 percent increase in total compensation, rising from \$3.6 million before the mandate to \$4.7 million after. In contrast, firms with outsider-controlled boards experienced a 20 percent increase, from \$5.1 million to \$6.1 million.

These patterns indicate that compensation growth was more pronounced among firms required to restructure their boards. However, because these comparisons are descriptive, they do not isolate the causal effect of the mandate. To address this limitation, we employ a difference-in-differences framework to estimate the treatment effect.

5.3. Regression using Difference-in-Difference Estimates

Table 3 reports least squares regression results estimating the effect of the 2003 exchange mandate using a difference-in-differences approach. Column 1 presents the baseline model, while Columns 2 through 4 provide robustness checks. All regressions include firm and year fixed effects, and standard errors are heteroscedasticity consistent and clustered at the firm level.

Table 3. Board Composition and CEO Compensation Results.

Variables	Main Model	Collapsed Time-Series	Different Classification	Falsification Test
	(1)	(2)	(3)	(4)
Inside Board * Post Regulation	0.076*	0.080*	0.085**	-0.111
	(0.045)	(0.046)	(0.037)	(0.147)
Ln (Total Sales) _{t-1}	0.074***	0.181***	0.077***	0.012
	(0.012)	(0.029)	(0.010)	(0.011)
Ln (Return on Assets) _{t-1}	0.443***	1.265***	0.449***	0.394***
	(0.084)	(0.315)	(0.081)	(0.133)
Ln (Annual Return) _{t-1}	16.179***	34.419***	15.440***	15.304***
	(1.318)	(6.482)	(1.227)	(1.834)
Observations	14424	2226	16747	6264
R-squared	0.698	0.897	0.696	0.756
Firm Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Number of Firms	1113	1113	1283	1113

Note: All variables used in the tables are winsorized at the top and bottom 1% to reduce the influence of outliers. Compensation amounts are reported in thousands of dollars. Statistical significance is denoted by *, **, and *** for the 10%, 5%, and 1% levels, respectively. T-statistics in comparative tables are clustered at the firm level. For regression analyses, standard errors are heteroscedasticity consistent. All regressions include firm and year fixed effects, and standard errors are clustered at the firm level.

5.3.1. Main Model

In Column 1 of Table 3 the interaction term (*Inside Board * Post Regulation*) is positive and statistically significant (0.076), indicating that CEO compensation increased by approximately 7.6 percent for firms that transitioned from insider-controlled to outsider-controlled boards relative to firms that were already compliant. This result provides support for H1b, which predicts that CEO compensation increases following mandated board independence, and does not support H1a, which predicts a decrease in compensation. The positive association suggests that firms adjusted compensation upward following changes in board structure. The control variables, including firm size (Total Sales), profitability (Return on Assets), and stock performance (Annual Return), are all positively associated with CEO compensation, consistent with prior literature (Bebchuk & Fried, 2005; Chhaochharia & Grinstein, 2009; Coles et al., 2014; Jensen & Murphy, 1990).

5.3.2. Collapsed Time Series

Bertrand, Dufo, and Mullainathan (2004) caution that serial correlation in panel data can inflate statistical significance; to address this concern, we collapse the dataset into pre- and post-mandate periods by averaging all variables within each time frame and re-estimate the model following (Guo et al., 2015). In Column 2 of Table 3, the interaction term remains positive and statistically significant (0.080), closely aligning with the baseline estimate, indicating that the main findings are not driven by serial correlation and remain robust under an alternative specification.

5.3.3. Alternative Definition for Inside Board

To assess whether the results are sensitive to the definition of insider-controlled boards, we adopt an alternative classification following (Pandya & Van Deventer, 2023). Firms are classified as insider-controlled if they have a majority of inside directors in two consecutive years prior to 2003, rather than in 2000 alone. In Column 3 of Table 3, the interaction term remains positive and statistically significant (0.085). The magnitude is slightly larger than in the baseline model, reinforcing the robustness of the results to alternative definitions of board composition.

5.3.4. Falsification Test

To further evaluate the causal interpretation, we conduct a falsification test by estimating the baseline model using only pre-mandate data and assigning 2000 as a pseudo-event year, consistent with (Pandya & Deventer, 2023). Roberts and Whited (2013) emphasize the importance of such tests in ruling out spurious relationships caused by confounding factors. In Column 4 of Table 3, the interaction term is statistically insignificant (-0.111), in contrast to the positive and significant estimates in the baseline model. The absence of a pre-treatment effect supports the identification strategy and suggests that the observed increase in CEO compensation is associated with the 2003 exchange mandate rather than earlier regulatory changes. Although Duchin et al. (2010) note that broader governance reforms began prior to 2003, the lack of significance in the falsification test strengthens the causal interpretation of the main findings.

5.4. Summary of Findings

Across all specifications, the results consistently indicate that firms required to adopt outsider-controlled boards experienced a relative increase in CEO compensation following the mandate. The estimated effect is economically meaningful and robust to multiple alternative specifications, suggesting that firms subject to the mandate adjusted CEO compensation upward in a manner that remains stable across descriptive, trend-based, and regression analyses.

6. Discussion

The results indicate that mandated board independence reshapes both corporate governance and CEO compensation in ways that extend beyond improved monitoring. From a governance perspective, the evidence highlights tradeoffs between oversight and advisory effectiveness, questions the efficiency of uniform governance mandates, reveals the limitations of structural independence, and underscores the potential for unintended regulatory consequences. From a compensation perspective, the findings show that CEO pay is not solely a reflection of managerial power but is closely tied to changes in governance structure, with increased board independence raising monitoring intensity, accountability, and managerial risk, prompting firms to adjust compensation upward. Collectively, these insights demonstrate that corporate governance and executive compensation are jointly determined and function as an integrated system, reconciling competing theoretical perspectives while emphasizing the importance of second-order effects and the need for alignment between governance structures and compensation policies. Overall, the evidence suggests that governance reforms reshape the broader contracting environment, influencing both managerial incentives and firm-level outcomes.

6.1. Implications for Corporate Governance

Corporate governance reforms, particularly mandated board independence, should not be viewed as unambiguously beneficial. While independent boards are intended to strengthen monitoring and reduce agency conflicts (Fama & Jensen, 1983; Jensen & Meckling, 1976) the results indicate that such reforms introduce meaningful tradeoffs by enhancing oversight while potentially weakening the board's advisory role through reduced firm-specific knowledge and information flow between management and directors (Adams & Ferreira, 2007; Coles et al., 2008). This shift suggests that governance reforms alter the balance between monitoring and advising rather than strictly improving governance quality, particularly when uniform mandates are applied across firms. Consistent with this perspective, Pandya and Van Deventer (2025) find that the operating-performance effects of mandated board independence vary across firm subsamples, suggesting that governance reforms do not affect all firms uniformly. Together, these findings support the view that optimal governance structures may depend on firm-specific characteristics and that a single governance model may not be equally effective across organizations.

Although mandated board independence is intended to strengthen oversight, structural independence does not necessarily translate into improved monitoring outcomes. Prior research suggests that optimal board structures vary with firm characteristics such as complexity, information asymmetry, and reliance on managerial expertise (Coles et al., 2008; Harris & Raviv, 2008) implying that the 2003 exchange mandate may have disrupted previously efficient governance arrangements (Adams et al., 2010; Hermalin, 2005). Moreover, behavioral and institutional factors, including CEO-director social ties and internal board dynamics, can weaken oversight even in formally independent boards (Golden & Zajac, 2001; Westphal, 1999). Finally, the results highlight that governance reforms can produce unintended consequences, as the mandate increased CEO compensation rather than constraining it, underscoring broader concerns that regulatory interventions may shift firm behavior in unexpected ways rather than achieving their intended objectives (Renée Birgit Adams, 2012; Romano, 2005).

6.2. Implications for CEO Compensation

The evidence provides strong support for the optimization view of executive compensation, which posits that compensation contracts reflect the economic environment in which managers operate (Duchin et al., 2010; Hermalin, 2005). As board independence increases, CEOs face greater monitoring intensity, higher

performance expectations, and increased dismissal risk, prompting firms to adjust compensation upward to attract, retain, and motivate executives under more demanding governance conditions. Accordingly, the observed increase in total CEO compensation is consistent with a risk–return tradeoff in managerial labor markets rather than solely a manifestation of managerial power. This interpretation suggests that higher CEO pay should not be viewed as evidence of weak governance or rent extraction, but instead as an economically rational response to changes in governance structure and managerial incentives (Core et al., 2005; Jensen & Murphy, 1990) challenging the traditional managerial-power view that stronger governance should reduce compensation (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005).

An important implication is that corporate governance and executive compensation are jointly determined, with changes in board composition leading to corresponding adjustments in compensation design, indicating that these mechanisms function as complements rather than substitutes. This interdependence is consistent with prior research suggesting that governance structures, financial reporting, and compensation contracts evolve within a broader contracting system (Armstrong et al., 2010) implying that compensation should be evaluated within the governance framework in which it is embedded (Core et al., 1999; Murphy, 2013). In addition, the increase in CEO compensation among affected firms may generate spillover effects in the executive labor market, as peer benchmarking and competitive pressures elevate compensation across firms (Acharya, Baghai, & Subramanian, 2014) raising concerns that governance reforms may amplify compensation trends beyond their intended scope.

6.3. Implications for Theory and Practice

The findings contribute to the ongoing debate between the managerial-power and optimization views of executive compensation. While the managerial-power perspective predicts that stronger governance should constrain CEO pay (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005) the evidence is more consistent with the optimization view, which emphasizes efficient contracting in response to changes in governance and market conditions (Duchin et al., 2010). By providing causal evidence from a natural experiment, this study helps reconcile these perspectives, suggesting that governance reforms may reduce managerial discretion while simultaneously increasing the compensation required to sustain incentive alignment.

The results also highlight important implications for policy and practice. Regulators should anticipate second-order effects, as reforms intended to strengthen oversight may alter firm behavior in unintended ways, while practitioners should align governance structures and compensation policies to reflect increased monitoring and accountability. Overall, the evidence indicates that governance reforms reshape the contracting environment between firms and executives, leading to higher, but potentially more efficient, compensation outcomes rather than simply reducing CEO pay.

6.4. Summary of Implications

Overall, the evidence demonstrates that mandated board independence does not simply constrain managerial behavior but fundamentally reshapes the relationship between governance and executive compensation. While stronger board independence enhances monitoring and accountability, it also increases managerial risk and performance pressure, prompting firms to adjust compensation upward. These results indicate that corporate governance and executive compensation are jointly determined and should be evaluated as an integrated system rather than as independent mechanisms. From both a theoretical and practical perspective, the evidence supports the optimization view, suggesting that higher CEO pay under stronger governance may reflect efficient contracting rather than managerial excess. Accordingly, policymakers and practitioners should recognize that governance reforms may not reduce compensation levels but instead lead to more complex adjustments in incentives and monitoring.

7. Conclusion

Our results indicate that total CEO compensation increased in the long run for firms required to transition to outsider-controlled boards following the 2003 exchange mandate. Specifically, insider-controlled firms experienced a 30 percent increase in total compensation, compared to a 20 percent increase for firms that were already outsider-controlled. The difference-in-differences estimate of 7.6 percent for insider-controlled firms supports the optimization view, which posits that stronger monitoring necessitates higher total compensation to offset increased risk and accountability (Fahlenbrach, 2009; Murphy, 2013). Consistent with this interpretation, international evidence shows that governance characteristics such as board independence and CEO duality are positively associated with executive remuneration (Rehman et al., 2021). This effect is robust across multiple specifications and consistent with a causal interpretation of the mandate's impact on executive pay.

The results are robust across multiple specifications designed to address identification concerns, including adjustments for serial correlation in panel data (Bertrand et al., 2004) and tests to rule out spurious relationships (Roberts & Whited, 2013). At the same time, our results contrast with short-run evidence presented by Chhaochharia and Grinstein (2009) and Guthrie et al. (2012) who report decreases in CEO compensation following governance changes. Related evidence from emerging markets further supports the

managerial-power perspective, suggesting that governance mechanisms may fail to constrain executive compensation and can be associated with abnormal pay structures (Silva et al., 2020). However, our long-run results indicate that the transition to outsider-controlled boards led to adjustments in total CEO compensation rather than a reduction in pay levels.

The evidence provides strong support for the optimization view of executive compensation, which posits that governance structures and compensation arrangements are jointly determined in response to firm-specific conditions and market forces (Duchin et al., 2010; Hermalin, 2005). As board independence increases, CEOs face greater monitoring intensity, higher performance expectations, and increased risk of dismissal. In response, firms adjust compensation upward to attract, retain, and motivate executives operating under more demanding governance conditions. This interpretation is consistent with prior evidence suggesting that effective compensation contracts reflect the risk–return tradeoff faced by managers and are designed to maintain incentive alignment (Core et al., 2005; Jensen & Murphy, 1990).

Although the regulatory change may have increased CEO compensation among a subset of firms, these increases may reflect economically justified adjustments and are consistent with improved firm performance documented in prior research (Pandya & Van Deventer, 2023). At the same time, the results challenge the managerial-power view, which predicts that stronger governance mechanisms should constrain CEO compensation (Bebchuk & Fried, 2004; Bebchuk & Fried, 2005). Rather than observing a reduction in pay, we find that governance reforms altered the contracting environment between firms and executives, leading to higher compensation levels. This suggests that increased CEO pay following governance changes should not necessarily be interpreted as evidence of rent extraction, but may instead reflect economically rational adjustments to changes in monitoring, accountability, and managerial risk.

More broadly, the results highlight that corporate governance reforms involve important tradeoffs. While increased board independence strengthens oversight, it may also weaken the advisory role of the board by reducing firm-specific knowledge and information flow (Adams & Ferreira, 2007; Coles et al., 2008). In addition, the effectiveness of independent boards may be influenced by behavioral and institutional factors, such as social ties and board dynamics, which can limit the extent to which formal independence translates into effective monitoring (Golden & Zajac, 2001; Westphal, 1999). These considerations underscore that governance structures are complex and context dependent, and that uniform regulatory mandates may not be optimal for all firms (Adams et al., 2010; Hermalin, 2005).

The results also have broader implications for policy and market outcomes. Regulatory interventions designed to strengthen governance may produce unintended consequences by shifting firm behavior in ways that offset their intended objectives (Renée Birgit Adams, 2012; Romano, 2005). In this setting, the mandate increased CEO compensation among affected firms and may have contributed to spillover effects in the executive labor market, placing upward pressure on compensation more generally. Consistent with the framework of Acharya and Volpin (2010) and related evidence on labor-market spillovers Acharya et al. (2014) these dynamics suggest that governance reforms can alter the equilibrium between oversight and incentives, rather than simply improving governance outcomes.

By providing causal evidence from a regulatory natural experiment, the findings demonstrate that mandated board independence does not simply constrain managerial behavior but fundamentally reshapes the relationship between corporate governance and executive compensation. Governance and compensation should therefore be viewed as an integrated system rather than as independent mechanisms. This perspective is consistent with prior research emphasizing that governance structures, financial reporting, and compensation contracts are jointly determined within a broader contracting framework (Armstrong et al., 2010). From this perspective, higher CEO pay in the presence of stronger governance may reflect efficient contracting rather than managerial excess, suggesting that governance reforms can alter, rather than reduce, executive compensation.

Future research could extend this analysis by examining how different components of compensation, including equity-based incentives and cash compensation, respond to changes in governance structure. In addition, further work could explore how board independence interacts with other governance mechanisms, such as ownership concentration, executive tenure, and compensation committee structure, to influence compensation outcomes across different institutional settings. In a broader context, continued investigation into the joint determination of governance and compensation may further clarify the conditions under which governance reforms enhance firm performance and the circumstances in which they generate unintended economic consequences.

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