

# Competitive Pay Policies in CEO Compensation

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## Abstract

CEO equity pay has risen dramatically since 1993, fostering beliefs of increased CEO-shareholder incentive alignment. However, the concurrent rise of “competitive pay policy” (CPP), which benchmarks dollar pay to peers regardless of performance, weakens this link by rewarding poor stock performance with larger share grants and penalizing strong performance with smaller grants. We provide the first large-sample evidence on CPP and document three main findings. First, CPP adoption has grown significantly, and its accelerated adoption is partially driven by SFAS123R, the 2006 rule requiring stock options expensing. Second, while the higher proportion of equity pay increases short-term wealth sensitivity to stock prices, CPP reduces long-term wealth sensitivity by penalizing strong stock performance with smaller future share grants. Third, traditional governance mechanisms fail to address CPP misalignment, as boards and proxy advisors *encourage* CEO pay with CPP characteristics. These findings challenge assumptions about rising equity pay strengthening incentive alignment.

**Keywords:** Executive Compensation, Competitive Pay Policy, Peer Benchmarked Compensation, Corporate Governance, Fixed Value Pay, CEO Wealth Sensitivity

**JEL:** G34, G38, J33, J38, M12, M41, M48

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# **Competitive Pay Policies in CEO Compensation**

## **1. Introduction**

Executive compensation practices have increasingly emphasized equity-based pay, with the share of CEO compensation paid in equity rising substantially since the 1990s (Edmans et al. 2017). This shift is often interpreted as evidence of improved incentive alignment between executives and shareholders, as executive pay is considered more “at risk” when a larger share is in the form of equity. However, the structure of equity awards, particularly the widespread use of fixed-dollar grant values, may unintentionally weaken long-term performance incentives. We refer to this practice as Competitive Pay Policy (CPP). Under CPP, firms set target compensation by benchmarking levels of pay to peer firms and then granting equity awards with fixed dollar values. While compensation benchmarking itself has been well documented in prior work (e.g., Bizjak et al., 2011; Faulkender and Yang, 2010, 2013), these studies primarily examine how benchmarking creates an inflationary effect in the level of pay. In this paper, we extend this literature by documenting the rise of CPP and showing how its fixed-value equity grant structure weakens long-term incentive alignment between CEOs and shareholders.

Proponents argue that CPP provides a transparent and fair method of setting compensation, particularly in highly competitive labor markets where peer comparisons are commonplace. CPP's reliance on established market data can mitigate biases and ensure that pay decisions are grounded in objective market realities rather than subjective assessments of an executive's contribution or idiosyncratic firm performance. However, fixed-dollar equity pay results in an inverse correlation between firm performance and share grants. That is, when a firm's stock price rises, the executive receives fewer shares; when the stock price falls, more shares are granted to maintain the fixed dollar value. While this structure may help standardize compensation costs or satisfy market

comparability goals, it introduces a *performance penalty*: executives may see future awards shrink precisely when performance is strong and expand when it is weak.

The implications of this approach are significant. By disconnecting pay from performance, CPP risks undermining one of the foundational goals of executive compensation: to incentivize value creation and align the interests of executives with those of shareholders. As a result, understanding the effects of CPP on CEO incentives and corporate governance becomes crucial, particularly as the trend towards such policies continues to grow.

Chevron Corporation provides a clear example of how CPP can lead to outcomes that seem at odds with the intended purpose of aligning CEO incentives with company performance. Over the three-year period from 2019 to 2021, Chevron's CEO, Michael Wirth, received equity awards that remained relatively stable in dollar terms - \$11.6 million in 2019, \$11.2 million in 2020, and \$12.2 million in 2021 - despite significant fluctuations in the company's stock price. During this time, the strike prices of the options granted (typically the stock price on the last working day in January of each year) varied considerably, reflecting Chevron's stock performance: \$113 in 2019, \$110 in 2020, and \$88 in 2021. Notably, as Chevron's stock price fell by 28% from 2019 to 2021, the number of options granted to the CEO increased by 34%, or roughly the amount needed to make the total value constant. While the stark increase in options awarded despite a declining stock price may help achieve other goals, such as CEO retention, the example demonstrates how CPP can hurt incentive alignment by inadvertently rewarding CEOs for poor stock performance.

We begin by presenting a methodology to quantify the extent of companies' commitment to CPP, using equity compensation data for S&P 1500 firms from 1993 to 2022. To capture how companies adjust equity grants in response to stock price changes, we first convert reported equity compensation into equivalent common shares. We then estimate how firms adjust their share

grants in response to stock price changes. Specifically, we regress the change in shares granted on stock price changes; a coefficient of -1 indicates full CPP adherence, where a 1% stock price decrease is fully offset by a 1% increase in shares granted. Deviations from this value reflect partial or no commitment to CPP.<sup>1</sup>

Our analysis reveals a significant negative relationship: on average, a 1% increase in stock price is associated with a 0.511% reduction in shares granted. This suggests that firms systematically adjust equity awards to offset price changes, consistent with partial adherence to CPP. We disaggregate the time-series and show a growing adherence to CPP over the past 30 years, with significant changes occurring post-2006. Across annual regressions from 1993 to 2022, the coefficient begins at roughly -0.3 in the early 1990s and ends at -0.7 by 2022, indicating deepening commitment to CPP over the sample period.

To investigate the drivers of this trend, we examine the impact of SFAS123R, the 2006 accounting rule that required firms to expense stock options on the income statement. We hypothesize that by making the dollar cost of equity compensation more salient on the income statement, the rule shifted attention toward managing reported pay expense, making fixed-dollar equity grants appear more prudent and contributing to CPP's broader adoption. Following the methodology in Hayes et al. (2012) and Bakke et al. (2016), we explicitly test for the effect of options expensing in a differences-in-differences specification around the adoption of SFAS123R in 2005Q2, exploiting variation in adoption timing and ex-ante options expensing. We find that

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<sup>1</sup> We adopt an ex-post correlation-based approach to identify CPP, as opposed to ex-ante identification through contractual terms in proxy statements, due to lacking disclosure of key contractual terms in proxies. Textual analysis approaches also do not work well, as terms like "competitive pay" are widely used but often lack the specificity needed to identify the fixed-value, peer-benchmarked contracts central to CPP, leading to significant measurement error in CPP assignment. More details on our methodological choices can be found in Section 4.2 and Appendix B.

firms affected by the rule exhibit significantly greater increases in CPP, providing suggestive evidence for accounting's role in CPP's rise.

Our analysis highlights a critical downside of CPP: a significant performance penalty that dilutes the incentive strength of equity-based compensation. To estimate the degree of misalignment, we introduce "wealth leverage," a measure that captures the sensitivity of a CEO's total wealth - including current equity holdings and the present value of expected future pay - to changes in shareholder wealth. Wealth leverage improves upon delta, the traditional measure of wealth sensitivity in the executive compensation literature, by accounting not only for current effects of equity-based pay but also for effects through adjustments to expected future pay.

Using a comparative framework between 1996 and 2022, we analyze how the joint rise of equity-based pay and CPP has shaped CEO incentives over time. Over the past 30 years, the equity component of CEO pay has increased from 40% to 65%, which, in theory, should strengthen incentive alignment by making CEO wealth more sensitive to shareholder wealth. Indeed, when measuring wealth leverage over a 1-year time horizon, we find that a 1% increase in shareholder wealth is associated with a 0.427% increase in CEO wealth in 1996 and a 0.677% increase in CEO wealth in 2022, demonstrating the stronger short-term incentive alignment in 2022.

However, when considering long-term effects, the performance penalty embedded in CPP erodes incentive strength by reducing the size of future share grants. In 2022, a 25% stock price increase leads to a 15.2% reduction in future shares granted, compared to just 6.1% in 1996. As a result, *long-term wealth leverage declines by 35%*: for a CEO with 15 years of tenure, a 1% increase in shareholder wealth increases CEO wealth by 0.315% in 1996, but only 0.234% in 2022. The share reduction penalty compounds as tenure increases and if the CEO has multiple outstanding equity grants. Thus, the very mechanism meant to enhance incentive alignment -

greater reliance on equity pay - has been undermined by the performance penalty embedded in CPP, offsetting much of higher equity pay's intended effect.

Given the issues in incentive alignment that CPP raises, we next test if governance mechanisms can mitigate CPP usage. We begin with proxy advisors, particularly ISS, which emphasizes market benchmarking in its pay-for-performance evaluations. Analyzing ISS vote recommendations, we find that firms with a history of CPP are 33.3% less likely to receive a negative recommendation compared to those without such policies. This finding suggests that, despite ISS's stated aim to align pay with performance, their evaluation metrics may inadvertently promote compensation strategies that prioritize market alignment over performance sensitivity.

Finally, we assess the role of corporate boards. We find that director compensation is *more exposed* to CPP pay than CEO pay; for each 1% increase in stock price, director equity awards fall by 0.942%, compared to 0.511% for CEOs. This suggests that boards are explicitly paid fixed-dollar renumerations.<sup>2</sup> Moreover, firms with boards highly exposed to CPP are significantly more likely to adopt CPP for CEOs. This suggests that while boards could constrain CPP use, their own pay structures may limit their willingness to do so.

This study makes several contributions to the executive compensation literature. First, we contribute to the compensation benchmarking literature (e.g., Albuquerque et al., 2013; Bizjak et al., 2008, 2011; Cadman and Carter, 2014; Faulkender and Yang, 2010, 2013) by providing large-sample, systematic evidence on Competitive Pay Policy (CPP), a compensation approach that has become increasingly prevalent yet remains largely unexamined in terms of consequences. While prior research focuses primarily on how benchmarking may be an efficient contracting tool or can

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<sup>2</sup> For example, in Home Depot's 2023 proxy statement, although 82% of director pay is done in stock, the amount is given in fixed-dollar form: directors receive \$230,000 in equity, regardless of Home Depot's stock price. <https://www.sec.gov/Archives/edgar/data/354950/00003549502300101/hd-20230330.htm>, page 78.

contribute to pay level inflation, we focus on the performance penalty embedded in fixed-dollar equity benchmarking. Foundational studies in agency theory, including Fama (1980), Holmstrom and Milgrom (1987), and Gibbons and Murphy (1992), posit that performance improvements should translate into higher expected pay, thereby aligning CEO incentives with shareholder interests. However, we show that CPP weakens long-term incentives by reducing the sensitivity of future compensation to stock price performance. In doing so, we reframe benchmarking as a mechanism that interacts with, and potentially distorts, incentive design.

We also document why CPP has been heavily adopted in recent years, providing suggestive evidence that the 2006 implementation of SFAS123R shifted compensation frameworks from share-based to dollar-based targets. This builds on Shue and Townsend (2017), who document that fixed-share plans were relatively common in the early 2000s but declined sharply after the mid-2000s following the introduction of stock option expensing. Their analysis ends in 2010, and we extend this line of inquiry by examining trends in compensation plans through 2022, during which period CPP adoption accelerated significantly. We find that this shift has not been driven solely by the decline of fixed-share grants, which represented a minority of overall plans, even at their peak in 2003. Rather, CPP adoption has come from a variety of compensation plans as firms sought to manage costs and maintain competitive pay levels.

Second, we contribute by examining the role of governance mechanisms in shaping executive compensation. Recent studies have shown that compensation complexity and convergence are often driven by external institutional forces. For example, Albuquerque et al. (2024) document that compensation complexity stems largely from institutional and industry norms, which can result in inefficient contract designs and lower firm performance. Similarly, Cabezon (2024) finds that increased involvement from institutional investors, proxy advisors, and

disclosure regimes has led to growing homogeneity in executive pay structures, frequently at the expense of firm-specific tailoring. Building on these findings, we show that governance monitors are a driving force for CPP adoption. Proxy advisors like ISS, despite their stated goal of aligning pay with performance, inadvertently encourage CPP adoption through their voting practices. Similarly, boards compensated under CPP are more likely to reinforce CPP adoption for CEOs. These findings highlight how governance practices can deviate from theoretical goals of incentivizing performance, instead entrenching compensation structures that emphasize market benchmarking over firm-specific performance alignment.

Third, our study challenges the prevailing assumption that the rising proportion of equity-based pay ensures proper incentive alignment. We show that despite increasing the dollar value of equity pay, CPP introduces a performance penalty by reducing the number of shares granted as firm performance improves. This approach diminishes long-term wealth sensitivity, diverging from theoretical models that emphasize incentive alignment through performance-contingent compensation (Edmans et al. 2012). Our findings suggest that widely used equity pay ratios may overstate true incentive strength, and we advocate for incorporating our new measure, wealth leverage, as a tool to estimate wealth sensitivity. By highlighting how benchmarking can obscure rather than enhance incentive alignment, we contribute to the broader debate on incentive pay design and call for a reassessment of compensation structures that prioritize market comparability over firm-specific performance sensitivity.

## **2. Background and Related Literature**

### **2.1. Institutional Background**

The primary objectives of executive compensation – aligning CEO incentives with shareholder value, retaining key talent, and controlling shareholder costs – have remained

consistent since the emergence of large corporations in the late 19th century. However, the mechanisms to achieve these goals have evolved significantly. Early models, such as General Motors fixed-sharing system in the early 20th century, allocated 10% of profits exceeding a defined return on capital to a bonus pool for cash and equity awards. This formula, largely unchanged for 65 years, provided a direct link between performance and compensation.

In the post-World War II period, firms increasingly turned to compensation surveys and benchmarking practices, giving rise to Competitive Pay Policy (CPP). Under CPP, executive pay is benchmarked against peers, with target compensation levels tied to market rates rather than firm-specific performance. CPP aims to balance three goals: retaining key talent by avoiding pay below market rates, controlling costs by limiting pay above market rates, and incentivizing performance by allocating a high percentage of compensation to equity and other at-risk components. However, CPP's reliance on fixed-dollar equity grants has introduced challenges for incentive alignment, as demonstrated by recent examples.

For instance, in 2017, Walmart awarded its CEO, C. Douglas McMillon, equity compensation of 57,562 restricted shares and 188,260 performance shares at a grant price of \$66.65, totaling \$16.4 million in value. By 2020, despite Walmart's stock price rising to \$115.88, McMillon's equity grant fell to 33,159 restricted shares and 108,280 performance shares, maintaining the same \$16.4 million grant value. The inverse adjustment of shares to maintain a fixed dollar value highlights CPP's core mechanism: target grant value remains stable regardless of stock performance, weakening the link between pay and firm-specific performance.<sup>3</sup>

A contrasting case is Marathon Oil, where falling stock prices led to higher share grants. In 2015, CEO Lee Tillman received equity awards of 256,591 options, 81,292 restricted shares,

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<sup>3</sup> Note that the targeted amounts are based on peer pay, not a specific dollar amount per se. The amounts can thus increase over time if market pay increases, but the incentive issues with targeted dollar pay remain.

and 135,487 performance shares at a grant price of \$29.06, totaling \$8.05 million. By 2018, Marathon’s stock price had halved to \$14.52, but Tillman’s equity awards rose to 298,914 options, 170,455 restricted shares, and 284,091 performance shares, valued at \$8.34 million. While the grant value remained consistent, the increased share count effectively rewarded Tillman for declining stock performance. These cases demonstrate CPP’s inherent “*performance penalty*,” where falling stock prices increase share grants, and rising prices reduce them, disconnecting CEO compensation from shareholder returns.

The proxy statement disclosures of Walmart and Marathon Oil show that they appear to fully subscribe to three key premises of modern executive pay: (i) retention is a key objective of executive pay; (ii) target pay levels tied to the labor market (and hence, independent of company stock price changes) are the key to retaining key talent; and (iii) a high percent of pay at risk ensures a strong incentive for the CEO to add shareholder value. Walmart’s 2020 proxy highlights the importance of “competitive pay to attract and retain highly qualified talent” and asserts that 73–75% of CEO pay is performance-based and equity-driven.<sup>4</sup> Marathon’s 2019 proxy echoes these sentiments, emphasizing “market-competitive pay levels” and linking 90% of its CEO’s target compensation to company performance.<sup>5</sup> Yet, these statements overlook the broader consequences of CPP’s fixed-dollar approach, which prioritizes market alignment at the expense of strong incentive structures. Specifically, the disclosures do not address the core incentive misalignment: the *performance penalty* embedded in fixed-dollar equity grants.

Compensation consultants also underplay CPP’s incentive issues. For instance, Pay Governance (2020) acknowledges potential challenges of fixed-dollar grants, such as share dilution and burn rate concerns, especially during volatile periods like the COVID-19 pandemic.

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<sup>4</sup> <https://www.sec.gov/Archives/edgar/data/104169/000120677420001271/wmt3661691-def14a.htm>

<sup>5</sup> [https://www.sec.gov/Archives/edgar/data/1510295/000151029519000021/def14a\\_2019mpcproxystateme.htm](https://www.sec.gov/Archives/edgar/data/1510295/000151029519000021/def14a_2019mpcproxystateme.htm)

However, the discussion omits any consideration of incentive misalignment. This oversight reflects a long-standing consensus among compensation consultants that CPP is a sound framework. Indeed, compensation consultants have established survey-driven compensation guidelines as the de facto standard in practice (Crystal 1978). While CPP may effectively control costs and ensure market competitiveness, its neglect of incentive alignment raises questions about its suitability as a long-term compensation strategy. This paper explores the extent and consequences of the practice of competitive pay policy.

## **2.2. Related Literature**

We build on two primary literatures: (1) agency theory and incentive alignment and (2) peer benchmarking practices. Our study contributes by examining how CPP reshapes incentive structures, evolves over time, and interacts with governance institutions.

The foundational logic for equity-based compensation rests on agency theory, which emphasizes the alignment of managerial and shareholder interests through pay-performance sensitivity. Classic models (e.g., Fama, 1980; Holmstrom and Milgrom, 1987) and extensions (e.g., Gibbons and Murphy, 1992; Edmans and Gabaix, 2016) argue that variable equity pay strengthens incentives by increasing the CEO's wealth sensitivity to stock performance. This literature provides the baseline against which we assess how CPP may erode long-term alignment due to its fixed-dollar structure, despite CPP being equity heavy. Our study engages directly with this tension by quantifying both short- and long-run effects on incentive alignment.

A second literature examines how compensation committees use peer benchmarking to set executive pay levels (e.g., Albuquerque et al., 2013; Cadman and Carter, 2014). Studies such as Faulkender and Yang (2010, 2013) and Bizjak et al. (2011) show that peer group selection can be strategic, often inflating pay by anchoring to higher-paid comparable firms. De Vaan et al. (2019)

further document that increased compensation peer group disclosures may not have reduced the upward bias of pay caused by benchmarking. Jochem et al. (2024) identify a related shift toward industry-size benchmarking, showing that cross-sectional variation in CEO pay has declined due to firms increasingly selecting industry peers of similar size. We contribute to this literature by identifying an embedded performance penalty embedded in CPP's dollar-denominated benchmarking logic, an effect not previously captured in studies of benchmarking's role in compensation inflation.

### **3. Hypothesis Development**

#### **3.1. Performance-Shares Relation Under CPP**

Agency theory predicts that executive pay should increase with performance to align managerial and shareholder interests (Fama, 1980; Holmstrom and Milgrom, 1987). Empirically, this has led to an emphasis on increasing the percent of total compensation that is paid in equity, which strengthens wealth sensitivity and promotes shareholder value creation (Hall, 1999; Edmans and Gabaix, 2016).<sup>6</sup> However, the structure of the Competitive Pay Policy (CPP) introduces a tension in this incentive alignment logic. Under CPP, the target value of equity compensation is fixed in dollar terms and adjusted annually through external benchmarking. This design creates a mechanical inverse relationship between stock price and the number of shares granted: when share prices fall, more shares must be issued to meet the dollar target; when prices rise, fewer shares are granted. Our study formalizes this logic by hypothesizing that the link between stock performance

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<sup>6</sup> In a survey, Edmans et al. (2023) found that directors and investors generally agree that compensation should be performance-based. However, 67% of directors acknowledge a willingness to compromise shareholder value to avoid controversy on CEO compensation, reducing the alignment of CEO pay with shareholder value creation.

and share grants is negative in current executive compensation contracts, in contrast to the predictions of classical incentive alignment models.

*H1: Firms exhibit a negative relationship between stock performance and the number of shares granted, reflecting a performance penalty that reduces incentive alignment.*

### **3.2. Time Series Trends in CPP Adoption**

While CPP adoption has increased over time, the pattern is uneven across firms and periods. We argue that a key driver of this variation is the 2006 implementation of SFAS123R, which required firms to recognize the cost of stock options as an expense on the income statement. By moving option costs from footnotes into reported earnings, SFAS123R heightened the visibility of equity compensation expenses to external stakeholders, including investors, analysts, and boards. This shift increased pressure on firms to manage reported compensation costs more actively. Unlike traditional equity grants based on share quantities, CPP anchors pay to fixed dollar values, allowing firms to control reported expense levels even when share prices fluctuate. As a result, CPP became a more attractive design choice in the post-SFAS123R environment. Our study builds on prior findings by examining how accounting pressures contributed to changes in executive compensation (Shue and Townsend 2017). We extend the time horizon of prior studies, showing that the post-2006 environment incentivized firms to adopt fixed-dollar targets to standardize compensation costs reported in financial statements.

*H2: The adoption of Competitive Pay Policy increased significantly following the 2006 SFAS123R accounting regulatory changes.*

### **3.3. Effect of CPP on Incentive Alignment**

Equity-based compensation is intended to strengthen the alignment between CEO and shareholder wealth. In theory, as the equity share of total compensation increases, so too should

the CEO's responsiveness to stock price performance. However, under CPP, the short-term benefits of increased equity pay may be undermined by the long-term consequences of the performance penalty embedded in fixed-dollar awards.

We build on theories of incentive alignment between shareholders and CEO's wealth specifically (Gibbons and Murphy 1992; Edmans and Gabaix 2016) and introduce the concept of wealth leverage. Wealth leverage captures the sensitivity of a CEO's total expected wealth, including both current holdings and *future anticipated equity grants*, to changes in shareholder value. Under CPP, short-term wealth leverage may remain high due to equity-heavy annual pay. However, over longer horizons, the performance penalty accumulates and reduces the incentive to sustain high performance.

*H3: Competitive Pay Policy strengthens short-term incentive alignment but reduces long-term incentive alignment, as evidenced by changes in wealth leverage.*

### **3.4. Effect of Governance on CPP**

Finally, a critical aspect of CPP's persistence is the failure of governance at both the internal board level and the external proxy advisor level. Externally, Institutional Shareholder Services (ISS) plays a significant role in influencing how executive compensation is structured through its recommendations to shareholders. ISS's assessments often emphasize competitive benchmarks rather than true pay-for-performance alignment, inadvertently supporting CPP. We propose that firms receiving favorable recommendations from ISS are more likely to adhere to CPP practices, reinforcing the prevalence of this compensation approach.

Internally, boards of directors are central to pay design but may themselves be compensated under CPP. Bebchuk et al. (2010) show that directors receiving opportunistically timed options are correlated with more CEO-friendly compensation, suggesting the possibility of pay

interdependence. Frye et al. (2024) documents that peer benchmarking can introduce upward bias in director pay, implying that directors may favor benchmarking practices for personal gain.

We hypothesize that external monitors (e.g., ISS) reinforce CPP by rewarding its benchmarking logic, while internal monitors (e.g., directors) may implement CPP structures in CEO pay due to shared compensation norms.

*H4A: Firms that follow Competitive Pay Policy are more likely to receive favorable vote recommendations from Institutional Shareholder Services.*

*H4B: Boards are paid under a Competitive Pay Policy.*

*H4C: Boards with stronger Competitive Pay Policy-based pay are more likely to extend similar policies to CEO compensation.*

## 4. Data and Measurement

### 4.1. Data and Descriptive Statistics

Our analysis covers all firms at the intersection of the Execucomp and CRSP databases between 1993 and 2022. We focus specifically on CEOs and include firms that have available stock prices on CRSP and CEOs who receive equity compensation for at least two consecutive years. After applying these criteria, we obtain a total of 29,328 CEO-firm-year observations. To minimize the impact of extreme values, we winsorize all variables at the top and bottom one percent of the distribution.

To enable consistent cross-sectional and intertemporal comparisons, we convert reported equity compensation values into equivalent common shares. This is done by dividing the fair value of equity grants (options or stock awards) by the firm's stock price on the grant date, adjusted for stock splits and dividends. When multiple grants occur in a single year, we aggregate them by weighting the grant dates' stock prices based on the number of equivalent common shares. For

years prior to 2006, where detailed stock award data is unavailable, we assume that equity compensation is granted on the same date as option awards.

Table 1, Panel A provides summary statistics for the key variables in the analysis, while Table A1 in the Appendix details the calculation of each variable. The mean (median) total CEO compensation (TDC1) is \$6.89 million (\$4.67 million), and the mean (median) equity compensation (EQ\_COMP) is \$4.75 million (\$3.15 million). Equity compensation constitutes 56.2% of total pay for the average firm-year observation. Table 1, Panel B reports average Pearson and Spearman correlations across the key variables in our regressions, highlighting a significant positive correlation (0.313) between log changes in total compensation ( $\Delta \ln TDC1$ ) and market pay ( $\Delta \ln Mkt$ ) and a significant negative correlation (-0.276) between log changes in shares granted ( $\Delta \ln N$  shares) and the stock price ( $\Delta \ln P$ ).

#### **4.2. Measurement of CPP**

To quantify CPP, we adopt a share-based approach that tracks the relationship between the number of shares awarded and stock price changes.<sup>7</sup> The principle of competitive pay implies that the dollar value of equity compensation remains fixed, even as stock prices fluctuate. Mathematically, this relationship can be expressed as:

$$N_{\text{shares}_t} \times P_t = N_{\text{shares}_{t-1}} \times P_{t-1} \times \text{Mkt\_change}_t \quad (1)$$

Where  $N_{\text{shares}_t}$  is the number of equivalent shares granted in year  $t$ ,  $P_t$  is the stock price at the grant date, and  $\text{Mkt\_Change}_t$  represents the expected change in CEO equity compensation induced by changes in the market pay levels for CEOs.

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<sup>7</sup> To properly split-adjust the grant-level data we follow Shue and Townsend (2017) and assume that, following SEC requirements, firms do not report the number of options originally in a grant, but instead the number of options in a grant as of the proxy date (SRCDATE in ExecuComp).

To estimate  $Mkt\_Change_t$ , we define:<sup>8,9</sup>

$$Mkt\_Change_t = \frac{Mkt\_Comp_t}{TDC1_{t-1}} \quad (2)$$

where  $Mkt\_Comp_t$  is the estimated market pay for a CEO in year  $t$ .<sup>10</sup> Conversations with compensation consultants and a review of the literature suggest that a CEO's market pay for a year ( $Mkt\_Comp_t$ ) is determined primarily by the industry and size of the firm (Hallock and Torok 2009, Patton 1955). Market pay is calculated using industry-year regressions of actual CEO compensation ( $\ln(TDC1_{i,t})$ ) on firm size ( $\ln(Sales_{i,t-1})$ ) for all firms in the sample:

$$\ln(TDC1_{i,t}) = a_t + b_t \times \ln(Sales_{i,t-1}) + \varepsilon_{i,t} \quad (3)$$

The fitted values from this regression provide the estimate for  $\ln(Mkt\_Comp_{i,t})$ , which is then exponentiated to yield  $Mkt\_Comp_{i,t}$ .<sup>11</sup>

$$Mkt\_Comp_{i,t} = e^{\ln(\widehat{TDC1}_{i,t})} \quad (4)$$

We classify firms based on the 24 GICS (Global Industry Classification Standard) industry groups, corresponding to the 4-digit GICS codes. As GICS codes are available only since 1999, we fill all missing data before 1999 with the industry classification the firm had in 1999 (i.e., the first known value). Table A2 in the Appendix presents the average intercept and slope of the model for each industry (averaged across years).

<sup>8</sup> We assume that market change in total compensation is a good proxy for market change in equity compensation. This assumption understates the market equity change because equity compensation has increased more rapidly than total compensation in the years since the start of the Execucomp database (Murphy 2012).

<sup>9</sup> We use the pay change needed to get to market pay, ( $MktComp_t/TDC_{t-1}$ ), rather than the change in market pay, ( $MktComp_t/MktComp_{t-1}$ ), for two reasons: (i) companies often take several years to adjust target compensation for new CEOs to market pay levels; and (ii)  $TDC_{t-1}$  will deviate from target  $pay_{t-1}$  even though target  $pay_{t-1}$  is equal to market  $pay_{t-1}$ .

<sup>10</sup> After taking logs, for notational simplification, we hereafter write log market change as  $\Delta ln\_Mkt$ .

<sup>11</sup> We followed the literature by using the natural log-natural log model to capture the nonlinear relationship between size and compensation (Roberts 1956, Gabaix et al. 2013). Regression equations like (3) have been reported in compensation surveys for decades. For example, the Conference Board's 2009 Top Executive Compensation Report devotes 48 pages to reporting these equations for total and cash compensation for the CEO and the #1 through #5 executive for 24 industry categories.

To operationalize CPP in regression form, we rearrange terms in equation (1) and take logs of both sides:

$$N_{\text{shares}_t} = \frac{N_{\text{shares}_{t-1}} \times P_{t-1} \times Mkt\_change}{P_t} \quad (5)$$

$$\frac{N_{\text{shares}_t}}{N_{\text{shares}_{t-1}}} = \frac{P_{t-1}}{P_t} \times Mkt\_change \quad (6)$$

$$\Delta \ln(N_{\text{shares}}) = -\Delta \ln P + \Delta \ln(Mkt) \quad (7)$$

where  $\Delta \ln$  denotes the year-over-year log change.

To assess the degree of CPP adoption, we estimate the following regression:

$$\Delta \ln(N_{\text{shares}}) = \beta_0 + \beta_1 \Delta \ln P + \beta_2 \Delta \ln(Mkt) + \text{Year FE} + \text{CEO FE} + \varepsilon \quad (8)$$

where  $\beta_1$  measures the sensitivity of share grants to stock price changes, and  $\beta_2$  measures the sensitivity to expected changes in market pay. Under a “perfect” competitive pay regime,  $\beta_1=-1$  (a 1% price increase fully offsets share grants) and  $\beta_2=1$  (expected changes in market pay are fully reflected in actual pay). In contrast, under a fixed-share policy as described by Shue and Townsend (2017),  $\beta_1=0$  and  $\beta_2=0$ . We hypothesize that CEOs are compensated under a competitive pay policy but do not assume perfect competitive pay, i.e., we expect  $\beta_1 < 0$  and  $\beta_2 > 0$ .

### 4.3. Limitations and Measurement Challenges

Our measurement approach is not intended to perfectly identify CPP at the contractual level. Rather, it provides a practical framework to describe how compensation structures function in practice by focusing on the sensitivity of share grants to stock price changes and market pay benchmarks. There are three key challenges that limit the precision of CPP identification.

First, disclosure limitations prevent a clean ex-ante classification of CPP based on formal contracts. While a natural alternative would involve coding contract structures directly from proxy statements, these disclosures rarely provide sufficient detail to verify whether a firm is explicitly adhering to CPP’s two core features: (i) fixed-dollar grant values, and (ii) peer-based

benchmarking. While textual analysis could supplement this effort by examining proxy statement language to identify patterns indicative of CPP, the widespread use of generic terms such as "competitive pay" or "target pay" complicates accurate classification. These phrases often appear in compensation disclosures but do not necessarily reflect adherence to CPP's key principles. Alternatively, firms may claim that they are not targeting fixed-value compensation to peer group levels when correlations suggest that they are. Consequently, textual analysis would risk misclassifying firms.<sup>12</sup>

Second, realized versus expected pay measurement introduces limitations in interpreting incentive effects. Our data reflect grant-date fair values and share counts, rather than realized compensation at the time of vesting. While this means we do not capture post-grant variation in equity value due to stock price performance, our focus is on how firms structure future incentives through the number of shares granted. If share counts are fixed at the time of grant, our analysis will still capture the forward-looking incentive environment designed by the firm.<sup>13</sup>

Third, identification is descriptive rather than causal. Compensation structure and expected pay levels are jointly determined, and the observed patterns in share grants likely reflect endogenous decisions shaped by firm performance expectations, peer dynamics, and governance influences. Our aim is not to isolate exogenous variation in pay design, but rather to provide a

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<sup>12</sup> To illustrate this challenge, in Appendix B, we include text excerpts from the 2023 proxy statements of Walmart and Ross Stores. Based on the excerpts, we assign Walmart to the CPP group and Ross Stores to the non-CPP group. However, when we examine the correlation between shares granted and stock performance, both firms appear to adhere to CPP. This comparison underscores the difficulty of reliably identifying CPP through text-based methods.

<sup>13</sup> Bettis et al. (2018) explore the shift from time-vesting to performance-vesting equity awards (PVSAs) in large U.S. firms. They analyze compensation data from 1998 to 2012, showing that PVSAs have become prevalent. However, PVSAs typically represent a minority share of total equity compensation (Pawliczek 2021). More importantly, the fixed-dollar nature of the grant value applies regardless of whether shares ultimately vest based on performance or time. That is, even PVSAs are typically sized in dollar terms at grant and converted into a target number of shares using the stock price, consistent with the mechanics of CPP. Thus, PVSAs do not change the fundamental design logic we study: that strong stock performance reduces the number of shares granted when pay is set in dollar terms. As such, PVSAs do not materially affect our estimates of the performance penalty embedded in CPP.

descriptive characterization of how CPP operates in practice. We view compensation benchmarking and incentive design as fundamentally intertwined; therefore, our estimates reflect how firms' decision to optimize for market benchmarking creates poor incentive alignment.

## 5. Results

### 5.1. Performance-Shares Sensitivity

The first column in Table 2 reports estimates of the coefficients of the CPP model in Equation (8). The coefficient on market pay is remarkably close to one (0.907) indicating that the level of the compensation of the peers is a major determinant of firm level CEO compensation. The coefficient on the firm's stock price change is -0.511, indicating that, on average, compensation committees adjust the number of shares awarded to offset 51% of the change in the company's stock price.<sup>14</sup> The size of the stock price change coefficient suggests that competitive pay policy has had a substantial impact on equity grant decisions over the past thirty years but that companies have not fully embraced competitive pay policy. In line with CPP being a peer-driven effect, the effect from changes in peer stock price is larger than the effect from the idiosyncratic component of the firm itself (-0.603 vs -0.475). After including industry-year fixed effects to control for time-varying shocks to industry pay behavior in columns (3) and (4), the coefficient on market pay approaches closer to 1 (0.958) and the effects of changes in stock price are unchanged.

Table 3 shows our  $\Delta \ln(N\_shares)$  regression (equation (8) without FE) for each year from 1993 to 2022. The average ln price change coefficient is -0.439 and the average ln difference from market coefficient is 0.363. These coefficients are close to those in the panel regression (Table 2)

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<sup>14</sup> One concern is that controlling for market pay may mechanically induce a negative correlation between share grants and firm performance, particularly if firms dynamically select larger, higher paying peers after strong performance. However, in untabulated regressions, the negative coefficient on firm-level stock price changes remains large (-0.458) and significant in specifications that omit  $\Delta \ln(Mkt)$  entirely. This suggests that the observed performance penalty is not simply a result of dynamic peer selection effects.

that include fixed effects.<sup>15</sup> The results show that  $\Delta \ln P$  coefficient has become increasingly negative over time, reflecting a growing performance penalty. As shown in Figure 1, the trendline demonstrates a steady increase in the performance penalty, with no evidence of plateauing.

## 5.2. Time Series Trends

Figure 1 clearly shows a growing performance penalty after 2006, bringing S&P 1500 companies much closer to “pure” CPP by 2022 (i.e., a coefficient of -1 on log change in shares). Competitive pay concepts have been part of executive pay discussions for almost 75 years, so why has commitment to CPP increased so much in the last twenty years?

One potential driver of this trend is the 2006 accounting rule change under SFAS123R, which required companies to recognize options-based compensation expense on the income statement. By forcing companies to recognize the *dollar cost* of equity awards explicitly, the regulation made total dollar pay more salient to managers, boards, and shareholders. As a result, compensation discussions increasingly focused on managing reported dollar expense, rather than granting a fixed number of shares. This shift in framing made fixed-dollar equity grants, a hallmark of CPP, appear more consistent with prudent pay design, contributing to their broader adoption in the years following the rule change.<sup>16</sup>

To assess the impact of this regulatory shift on the adoption of CPP, we employ a difference-in-differences (DD) framework inspired by Hayes et al. (2012). The treatment group includes firms more affected by the expensing requirements due to their heavier reliance on stock option pay prior to the rule change, while control firms were less impacted. We remove firms that

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<sup>15</sup> We cannot include CEO or year fixed effects in the year-by-year models because the dataset is at the CEO-year level. The absence of fixed effects is the reason that the  $\ln$  market change coefficients are well below 1.0.

<sup>16</sup> Clementi and Cooley (2023) observed that in the period 1994-2020 option awards were largely replaced by stock grants. While we specifically focus on CPP adoption, this change in equity structuring was also likely driven by the changes in accounting and disclosure regulations around 2006.

voluntarily adopted the standard between the initial mandatory date of June 15, 2005, and the SEC's delayed mandatory date of December 15, 2005, to reduce selection bias between our treatment and control firms (Shue and Townsend 2017). To augment the performance-shares sensitivity regression from Section 5.1, the regression specification examines the interaction of treatment, adoption timing (pre- and post-SFAS123R), and stock price changes ( $\Delta \ln(P)$ ), with additional controls for firm and market conditions. Specifically, the equation takes the form:

$$\begin{aligned}
\Delta \ln(N_{shares}) = & \beta_0 + \beta_1 Treat + \beta_2 Post + \beta_3 (Treat \times Post) + \beta_4 \Delta \ln(P) \\
& + \beta_5 (Treat \times \Delta \ln(P)) + \beta_6 (Post \times \Delta \ln(P)) \\
& + \beta_7 (Treat \times Post \times \Delta \ln(P)) + Controls + Year \text{ fixed effects} \\
& + CEO \text{ fixed effects} + \varepsilon
\end{aligned} \tag{9}$$

where  $\beta_7$ , the coefficient on the triple interaction term, captures the effect of SFAS123R on CPP.

In Table 4,  $\beta_7$  is negative and significant across all models, indicating that CPP adoption increased more significantly for firms affected by the SFAS123R mandate. We assess the parallel trends assumption by testing for pre-trends, as illustrated in Figure 2, which shows no evidence of differential trends between treated and control firms prior to the SFAS123R rule change.

As robustness tests, we perform two additional analyses, detailed in Table A3. First, in place of the methodology from Hayes et al. (2012), we use the methodology from Bakke et al. (2016), which uses two sets of firms as control firms: (i) voluntary adopters of SFAS123R on or before 2002 and (ii) firms that did not use options expensing in the pre-period.<sup>17</sup> The remaining firms are considered treated. We find similar results. Second, we run the analysis with the full sample of firms in both the Bakke et al. (2016) and Hayes et al. (2012) methodologies, without

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<sup>17</sup> We thank Preeti Choudhary for sharing this data.

removing firms that adopted the standard between June 15 and December 15, 2005; we again find consistent results that suggest SFAS123R had an effect on CPP adoption.

### 5.3. Incentive Alignment

Over the past 30 years there has been a significant increase in the equity component of the CEO's compensation. Figure 3 draws the mean equity compensation as a percent of CEO pay (TDC1) by year, together with the 25<sup>th</sup> and 75<sup>th</sup> percentile of the annual distribution of the variable.

This increase in the proportion of pay allocated to equity is often presumed to strengthen incentives. Equity-based compensation ties CEO wealth directly to shareholder wealth, enhancing alignment in the current year and in future years, particularly up to the end of the vesting period.<sup>18</sup> However, since 2006, the growing commitment to CPP has introduced a countervailing force by reducing the sensitivity of *expected future pay* to shareholder wealth.

Our goal is to measure the net impact of these two factors. To do so, we introduce a metric called wealth leverage, which captures the overall sensitivity of CEO wealth to changes in shareholder wealth. Specifically:

$$\text{Wealth Leverage} = \frac{\ln(\text{Change in CEO Wealth})}{\ln(\text{Change in Shareholder Wealth})} \quad (10)$$

where Change in Shareholder Wealth is measured as change in stock price, and CEO wealth is the sum of stock and option holdings plus the present value of expected future pay. Expected future pay is assumed to consist of a mix of fixed cash compensation and variable equity compensation, where equity grants are tied to stock price performance. Under CPP, equity compensation targets a quasi-fixed dollar value, meaning the number of shares granted declines as stock prices rise. This "performance penalty" reduces the alignment of future compensation with shareholder wealth,

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<sup>18</sup> Previously, Edmans et al. (2009) provide analytical solutions for measuring CEO incentives, and they show that CEO pay optimally increases with firm size but at a decreasing rate. Their model has been extended to a dynamic model with risk aversion and private saving in Edmans et al. (2012).

which we measure using our penalty estimates from the time-varying performance-shares sensitivity regressions in Table 3 and Figure 1.

Wealth leverage is similar to the delta measure used previously in the literature, which captures the sensitivity of CEO wealth to stock price changes through equity holdings. However, delta focuses narrowly on short-term, direct incentives and does not account for indirect effects of performance on *future pay*, such as changes in bonus targets, future grant sizes, or adjustments in salary. By incorporating these future effects, wealth leverage offers a more comprehensive view of CEO incentives over the CEO's entire expected tenure. This improvement is particularly relevant when evaluating policies like CPP, where long-term distortions in future pay sensitivity play a crucial role in diluting the incentive effects of equity-based compensation.

To explore the dynamics of wealth leverage under CPP, in Table 5, we analyze two illustrative CEO compensation profiles: one from 1996 and one from 2022. The 1996 profile assumes 40% of pay in equity with a share sensitivity to price of  $-0.283$ , while the 2022 profile assumes 65% of pay in equity with a share sensitivity to price of  $-0.738$ . All assumptions are taken directly from the data; the equity pay is taken from the summary statistics in Figure 3, and the share sensitivity measures are taken from the 4-year moving averages in Figure 1.<sup>19</sup> For both profiles, we assume an annual initial compensation of 1.000, such that the 1996 (2022) CEO is initially paid 0.400 (0.650) in equity and a fixed 0.600 (0.350) in cash. To demonstrate the long-term effects of CPP, we assume an expected tenure of 15 years and assume all wealth is generated during the 15 year period. We evaluate the effect of a 25% increase in shareholder wealth to illustrate how CPP influences incentive alignment.

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<sup>19</sup> We use a four-year moving average to smooth out noise in our annual cross-sectional regression estimates, and because CEO equity grants typically vest over three to five years.

In the current year (Year 0), the impact of a 25% increase in shareholder wealth on equity value and total pay is shown in Table 5. For the 1996 profile, a 25% increase in price raises equity value from 0.400 to 0.500, increasing total pay from 1.000 to 1.100. For the 2022 profile, equity value rises from 0.650 to 0.813, increasing total pay from 1.000 to 1.163. Using these values, wealth leverage for the current year is calculated as the ratio of the logarithmic change in CEO wealth to the logarithmic change in shareholder wealth (1.25, given the 25% increase in price). For the 1996 (2022) profile, wealth leverage is 0.427 (0.677):

$$Wealth\ Leverage_{1996} = \frac{\ln(1.100/1.000)}{\ln(1.25)} = 0.427. \quad (11)$$

$$Wealth\ Leverage_{2022} = \frac{\ln(1.163/1.000)}{\ln(1.25)} = 0.677. \quad (12)$$

That is, for every 1% of increased shareholder wealth, CEO wealth increases by 0.427% in 1996 and 0.677% in 2022. To the extent that compensation plans are constructed to match the incentives and payoffs between shareholders and CEOs, these results suggest that in the short term, the 2022 profile CEO has stronger and more aligned incentives, due to the larger equity allocation. This result is what practitioners refer to when they claim that higher percent equity pay increases incentive alignment.<sup>20</sup>

However, when evaluating wealth leverage over a CEO's entire 15-year expected tenure, we must account for future pay dynamics. Over a multi-year horizon, wealth leverage is affected by: (1) discounting future pay to present values, and (2) the performance penalty under CPP, where fewer shares are granted in future years when stock prices rise. While the effect of discounting is clear, we must calculate the specific reduction in shares for each profile, given our time-varying

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<sup>20</sup> Note that there are no performance penalty effects of CPP yet, as the reduction in share grants does not kick in until year 2.

assumptions. For the 1996 and 2022 profiles, we can take the estimated  $\beta_1$  coefficients on  $\Delta \ln P$  from Figure 1 to calculate the change in shares as a result of the 25% share price appreciation:<sup>21</sup>

$$\text{Share Ratio}_{1996} = \exp(\beta_{1,1996MA} \Delta \ln P) = \exp(-0.283 \cdot \ln(1.25)) \approx 0.939 \quad (13)$$

$$\text{Share Ratio}_{2022} = \exp(\beta_{1,2022MA} \Delta \ln P) = \exp(-0.738 \cdot \ln(1.25)) \approx 0.848 \quad (14)$$

This means that in 1996, 93.9% of the shares are preserved, and 6.1% are "lost" due to the performance penalty under CPP. But in 2022, due to the larger CPP penalty, only 84.8% of the shares are preserved, and 15.2% are "lost". This demonstrates that the reduction in the number of future shares weakens the sensitivity of future equity pay to stock performance.

With the share reduction penalty, we can calculate total expected wealth under the baseline, 1996, and 2022 scenarios. The baseline scenario of fixed 1.000 annual pay for 15 years results in a present valued total wealth of 8.606. In 1996, after the 25% increase in price and 6.5% reduction in shares, the present valued total wealth equals 9.234. Using the wealth leverage formula:

$$\text{Wealth Leverage}_{1996} = \frac{\ln(9.234/8.606)}{\ln(1.25)} = \frac{\ln(1.071)}{\ln(1.25)} \approx 0.315 \quad (15)$$

Similarly, in 2022, after the 25% increase in price and 15.2% reduction in shares, the present valued total wealth equals 9.066. Notice how the larger share penalty results in reduced total wealth for the same percentage increase in price. This results in wealth leverage of:

$$\text{Wealth Leverage}_{2022} = \frac{\ln(9.066/8.606)}{\ln(1.25)} = \frac{\ln(1.054)}{\ln(1.25)} \approx 0.234 \quad (16)$$

That is, for a 1% increase in shareholder wealth, CEO wealth increases by 0.315% in 1996 and 0.234% in 2022. The wealth leverage has decreased dramatically from the single-year wealth leverages, especially for the 2022 CEO, due to the compounding effect of the share performance

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<sup>21</sup> Given the volatility in the yearly sensitivities in Table 3, we use the values from the 4-year moving average in Figure 1, as opposed to choosing the coefficients from a specific year. The intuition and results would be similar if we used the -0.250 and -0.704 sensitivities in the first and last years (1993 and 2022) of our dataset.

penalty. Furthermore, the 1996 profile CEO has *35% higher wealth leverage* (0.315 vs 0.234) if expected tenure is 15 years, despite having a lower proportion of equity pay.<sup>22</sup>

These findings emphasize two implications. First, while the 2022 profile demonstrates stronger short-term incentives due to greater equity pay, the performance penalty embedded in CPP reduces the responsiveness of future pay to stock price changes, resulting in weaker long-term alignment. Second, traditional metrics like delta, which focus on the immediate sensitivity of CEO wealth to stock price changes, fail to capture these long-term dynamics.

#### **5.4. Role of Governance**

Given the misalignment between CEO incentives and shareholder interests created by CPP, traditional forms of corporate governance, such as external monitoring or board oversight, may influence the degree to which CPP is adopted. This section examines the role of external (proxy advisors) and internal (board of directors) governance in shaping CPP reliance.

We begin by studying if external monitors, such as the leading proxy advisor, Institutional Shareholder Services (ISS), can influence the adoption of Competitive Pay Policy (CPP) through their Say on Pay voting recommendations. A key consideration is the impact of ISS's evaluation criteria on the alignment of CEO pay with performance. In 2012, ISS adopted "Multiple of Median" as one of its three primary measures of Pay-Performance Alignment. This measure flags "high concern" when a CEO's pay exceeds twice the median pay of their peers, irrespective of the company's performance.<sup>23</sup> Prior to this change, ISS primarily focused on opposing excessive bonus payouts that lacked justifiable performance linkage.

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<sup>22</sup> Untabulated results show that the 1996 profile also exhibits 16% higher wealth leverage (0.327 vs. 0.282) at five years and 29% higher wealth leverage (0.319 vs. 0.246) at ten years, underscoring the compounding CPP penalty embedded in the 2022 profile over longer horizons.

<sup>23</sup> The ISS Multiple of Median cap of 2.0 keeps a significant minority of companies from tying relative pay to relative performance. For 5 year periods, 17% of S&P 1500 companies have relative performance ratios greater than 2.0. For

The adoption of the "Multiple of Median" measure indicates a shift in ISS's evaluation approach: it no longer solely penalizes high pay without performance justification but also discourages high pay even if it is linked to strong performance. Conversely, this measure does not penalize companies that offer median pay for poor performance. As a result, companies are incentivized to target market-level pay regardless of performance, aligning with CPP principles where compensation is based on peer benchmarks rather than firm-specific performance.<sup>24</sup>

To test whether ISS indirectly encourages CPP through its voting recommendations, we extend our analysis to measure whether firms with performance penalties in CEO compensation are more likely to receive favorable Say-on-Pay votes. Using an expanding window regression (minimum 5 years of data), we estimate a firm-level CPP coefficient ( $\chi$ ) from the following model:

$$\Delta \ln(N\_shares_t) = \beta_0 + \beta_1 \Delta \ln\text{-Mkt} + \chi \Delta \ln P_t + \varepsilon_t, \text{ by firm, for all } t < T \quad (17)$$

where  $\chi$  captures the degree to which performance penalties are embedded in CEO equity grants at the firm level. Firms with  $\chi < -0.2$  are classified as penalizing performance. After merging these firm-level  $\chi$  estimates with available ISS recommendations, we have a sample of 3,984 firm-year observations from 2011–2021.<sup>25</sup> We test the effect of CPP on ISS recommendations with the following regression:

$$ISS\ Vote = \beta_0 + \beta_1\ Penalty + \Gamma X + Industry\ FE + Year\ FE + \varepsilon_t \quad (18)$$

where *ISS Vote* is an indicator variable equal to 1 (0) when ISS votes for (against) the compensation plan, *Penalty* is the indicator variable indicating CPP-based CEO pay, and *X* is a list of control variables.

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<sup>24</sup> 10 year periods, 27% of S&P 1500 companies have relative performance ratios greater than 2.0 (authors' calculations using Compustat data for 1980-2022). For these companies, setting relative pay equal to performance would trigger "high concern" from ISS.

<sup>25</sup> ISS employs other metrics, such as Relative Degree of Alignment and Pay-TSR Alignment, which consider performance outcomes, making the net effect of ISS's policies on CPP adoption an empirical question.

<sup>25</sup> ISS stopped providing data to academics in 2021.

The results can be found in Table 6. In all regressions, we control for key factors consistent with prior research, including total shareholder return (one- and three-year), ex-ante CEO compensation levels, growth in ex-ante CEO pay, and firm characteristics such as size, market-to-book ratio, ROE, and ownership structure (Malenko and Shen, 2016; Ertimur et al., 2013). Logistic and linear probability regressions reveal that firms with CPP-based payment schemes are significantly more likely to receive a negative ISS recommendation.<sup>26</sup> Specifically, the OLS model estimates that a firm with a penalizing payment scheme is 3.4 percentage points more likely to receive a yes vote from ISS than a firm without performance penalties.<sup>27</sup> Compared to the unconditional mean of 10.2% of receiving an against vote, this represents an economically meaningful 33.3% decrease in the likelihood of ISS opposition.

We next study if board of directors' payments exhibit CPP. We use the same regression as in equation (8) and Table 2, but replace CEO pay variables with corresponding board variables and CEO fixed effects with firm fixed effects. In Table 7, we find that boards are paid in line with CPP. In fact, board payments are *more exposed* to CPP than CEO payments. For a 1% increase in share price performance, board payments fall by 0.942%.<sup>28</sup> Like in the case of CEOs, board pay also responds more to peer stock price movements than own-firm idiosyncratic movements, although both exhibit nearly perfect CPP behavior (-1.004 for peers vs -0.913 for own firm prices). This near-unitary negative coefficient indicates that board pay structures are predominantly fixed-value contracts, aligning closely with CPP principles.

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<sup>26</sup> We use the ppmlhdfe Stata package (Correia, Guimarães, and Zylkin, 2020) to estimate the logit model so we can include high-dimensional fixed effects. While originally designed for count data, Poisson MLE remains consistent and robust when the dependent variable is binary (Gourieroux, Monfort, and Trognon, 1984).

<sup>27</sup> Copat and Parupati (2024) found that ISS does not support of front-loaded equity awards, which can create highly divergent realized CEO pay due to the multi-year nature of the awards. This is consistent with our results, as ISS is more likely to approve policies that are benchmarked to peers (CPP).

<sup>28</sup> This analysis can only be run after 2006, when stock grant data is first reported for directors, which partially explains the larger CPP coefficient.

Next, we test if board payment policies are associated with CEO compensation policies. We ask, if a board member's pay is committed to competitive pay policy, are they less likely to question CPP's desirability for CEOs? We again calculate firm specific values of  $\chi$ , for board pay instead of CEO pay, to split the sample of firms into those that exhibit board-CPP pay and those that do not. We use the yearly median value of board  $\chi$  to define high-CPP and low-CPP boards.<sup>29</sup> Using this threshold, we find that firms with stronger board-CPP payment schemes exhibit significantly stronger CEO CPP payment schemes (-0.949 vs. -0.465). While this is purely associative, it provides suggestive evidence that boards may have an impact on the degree to which CPP is used to compensate CEOs. However, through their own contracting terms, the effectiveness of board monitoring can be reduced.

These findings indicate that external and internal monitors may inadvertently reinforce the adoption of CPP. ISS voting recommendations, influenced by benchmarking measures like Multiple of Median, appear to favor firms with performance-penalizing pay schemes, further entrenching CPP as a standard compensation policy. Similarly, boards compensated under CPP are associated with stronger CEO CPP adoption, suggesting limited scrutiny of such practices.

## 6. Conclusion

This study investigates the adoption and implications of Competitive Pay Policy (CPP), a compensation practice that has grown increasingly prevalent in recent decades. By benchmarking fixed-dollar pay against peers, CPP aims to maintain market competitiveness, but it also weakens the alignment between CEO incentives and shareholder interests. Our research contributes to the

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<sup>29</sup> The results are robust to different thresholds between 0 and -0.5.

literature by defining CPP, developing a methodology to measure it, and demonstrating the trends and consequences of its growing adoption.

Our findings reveal several key insights. First, CPP significantly influences CEO equity grants, with compensation committees offsetting, on average, 51% of stock price changes through share adjustments. Although firms have not yet fully embraced CPP, the growing performance penalty over time indicates a steady shift toward full adoption. Second, we find that the adoption of CPP may be partially driven by the SFAS123R accounting rule change, highlighting the role of accounting regulations in shaping compensation practices. Third, the introduction of wealth leverage allows us to examine the broader impact of CPP on CEO incentives. While the increased equity allocation in CEO pay enhances short-term alignment, CPP weakens long-term incentive alignment due to its performance penalty, which reduces the size of future share grants. Finally, we find that internal and external governance mechanisms often reinforce CPP adoption. ISS recommendations, influenced by benchmarking measures such as "Multiple of Median," appear to favor firms adopting CPP, reducing the likelihood of negative votes and further entrenching this compensation model. Similarly, boards compensated under CPP are associated with stronger CEO-CPP alignment, suggesting limited scrutiny of such practices.

These findings have important implications for practice, policy, and academic work in compensation. For compensation committees, the results emphasize the need to strike a balance between market benchmarking and performance sensitivity to maintain effective incentives. Proxy advisors, particularly ISS, might reconsider metrics like "Multiple of Median," which inadvertently incentivize CPP adoption while penalizing performance-linked pay. From a policy perspective, clearer guidelines from ISS on equity grant best practices could mitigate the unintended consequences of fixed-dollar targeting on incentive alignment. For academics, the

results highlight the value of studying compensation design as an outcome shaped by institutional and regulatory forces, not just incentive theory. Our approach offers a framework for empirically capturing pay policies like CPP, opening new avenues for research on how firms operationalize compensation in response to external pressures.

Our study is subject to several caveats. First, estimating CPP relies on share-based regressions, which may not capture all dimensions of the policy. Second, the time-series regressions used to derive firm-specific measures introduce potential delayed effects in identifying CPP adoption. Third, much of the analysis is associative, as the primary aim is to document how executive compensation is conducted in practice. Finally, we do not assess CPP's optimality as a strategy, as there are other reasons CPP pay may be optimal, such as CEO retention. Instead, our findings focus on the reduction in incentive alignment relative to past contracts, which can exacerbate misaligned CEO incentives.

We believe there are several opportunities for future research on CPP. Enhanced measurement techniques, such as identifying CPP with text analysis or generative AI, could provide deeper insights into CPP adoption. Examining CPP in different samples, such as at the rank-and-file level or among international firms, could reveal whether these patterns extend beyond CEOs in the USA. Finally, exploring the real effects of CPP adoption on product markets or firm investments could uncover broader economic consequences. Together, these avenues can advance our understanding of the extent and consequences of competitive pay policies. We leave these questions to future research.

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## Figures and Tables

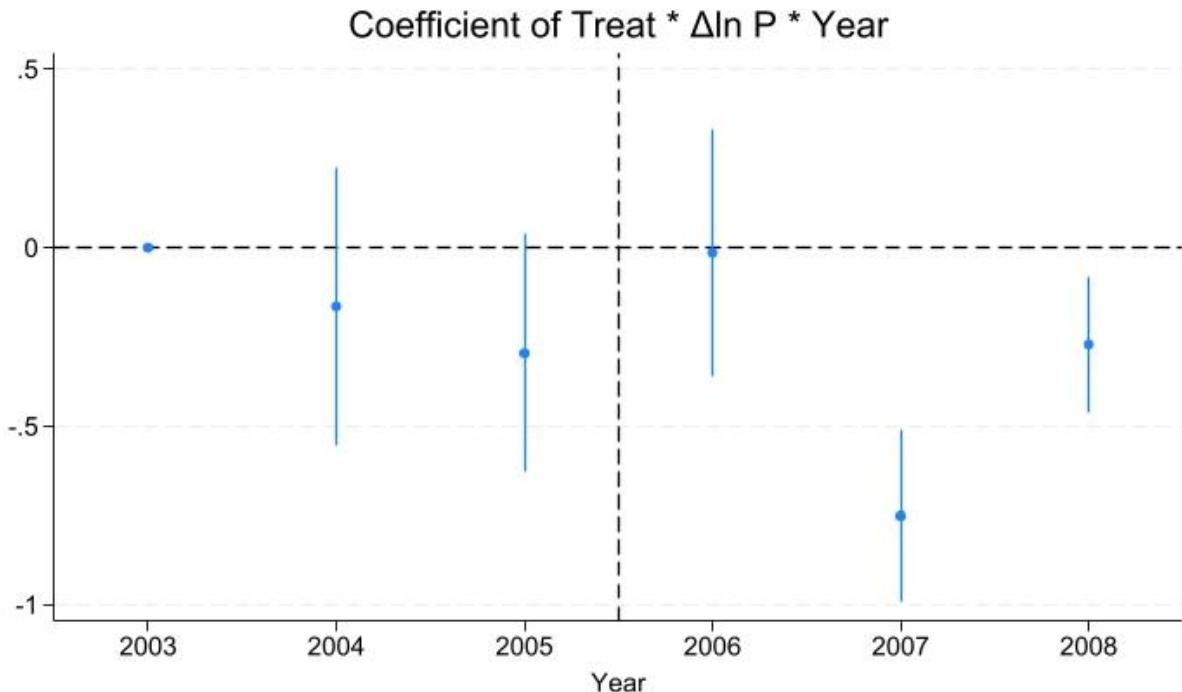
**Figure 1. Trends in CPP Over Time**

This figure presents the 4-year moving average of the annual Log( $\Delta$ Price) coefficients from Table 3. A stronger negative correlation begins in about 2006 and continues until the end of our sample in 2022.



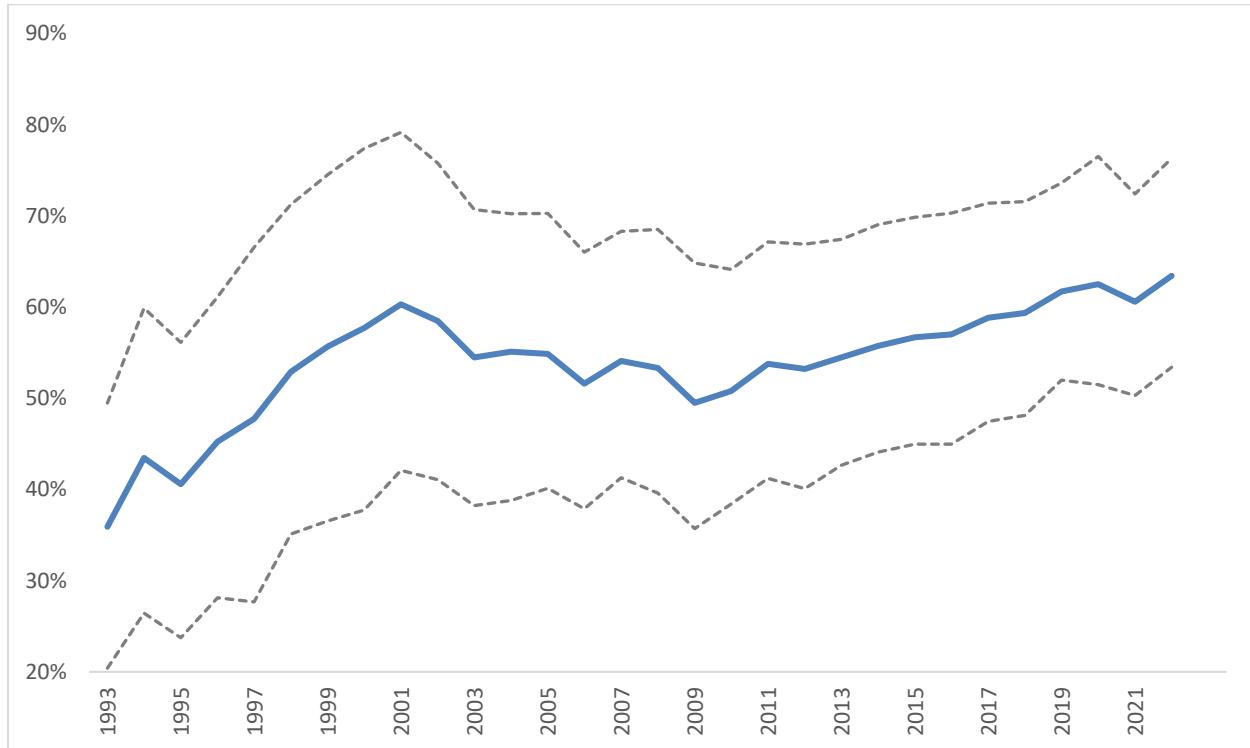
**Figure 2. Parallel Trends Analysis for SFAS123R Test**

This figure shows the parallel trend test result for the generalized difference-in-difference regression from Table 4. It plots the coefficients and confidence intervals of Treat \*  $\Delta \ln P * Year$ . More details can be found in Table 4.



**Figure 3. Trends in Proportion of CEO Equity Pay**

This figure shows the mean equity compensation as a percentage of total CEO pay (TDC1) from 1993 to 2022, highlighting the increase in the equity component of CEO compensation over the past 30 years. The solid line represents the mean value, while the dashed lines indicate the 25th and 75th percentiles of the annual distribution.



**Table 1. Summary Statistics**

Panel A (B) reports descriptive statistics (correlations) from the period 1993-2022 for variables used in the empirical analysis. TDC1 is Total Compensation on ExecuComp. EQ\_Comp is the sum of the fair value of all equity and option grants awarded to the CEO during the fiscal year. %EQ\_Comp is EQ\_Comp/TDC1. All log change variables ( $\Delta \ln$ ) represent the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1.  $\Delta \ln_{\text{Mkt}}$  is the difference between the natural logarithm of MKT\_COMP in year t and the natural logarithm of the actual total compensation in year t-1 ( $TDC1_{t-1}$ ). MKT\_COMP is estimated by a cross sectional regression of the form  $\ln(TDC1_t) = a + b * \ln(\text{Sales}_{t-1}) + \epsilon_t$  run by year and GICS Industry Groups. N\_shares is the total number of equivalent common shares granted to the CEO during the fiscal year. Equivalent common shares are calculated dividing the fair value of the equity/option grant by the market price of the common share at the grant date adjusted for stock splits and share dividends. P is the market price of the common share at the grant date adjusted for stock splits and share dividends. When there are multiple grants over the fiscal year, P is the average price of each grant, with weights given by the number of equivalent shares awarded in each grant. P\_Peers is the price of a portfolio of companies in the same GICS industry Group excluding the company under analysis.  $\Delta P_{\text{firm\_comp}}$  is the difference between  $\Delta \ln_P$  and  $\Delta \ln_{P_{\text{Peers}}}$ . The distributions are from data pooled over firms and years.

**Panel A: Descriptive Statistics**

	Mean	SD	P10	Med	P90	N
TDC1	6.895	9.112	1.318	4.671	14.409	29,315
EQ_COMP	4.752	6.902	0.611	3.150	10.228	19,892
%EQ_COMP	0.562	0.191	0.290	0.585	0.791	19,890
$\Delta \ln_{\text{N\_shares}}$	0.013	0.685	-0.729	-0.000	0.795	29,328
$\Delta \ln_{\text{Mkt}}$	-0.139	0.573	-0.836	-0.119	0.537	29,328
$\Delta \ln_P$	0.064	0.392	-0.399	0.089	0.494	29,328
$\Delta \ln_{P_{\text{Peers}}}$	0.074	0.218	-0.185	0.096	0.307	29,328
$\Delta P_{\text{Firm comp}}$	-0.010	0.329	-0.393	0.003	0.357	29,328

**Panel B: Correlation Matrix**

Variables	$\Delta \ln_{\text{TDC1}}$	$\Delta \ln_{\text{N\_shares}}$	$\Delta \ln_{\text{Mkt}}$	$\Delta \ln_P$	$\Delta \ln_{P_{\text{Peers}}}$	$\Delta P_{\text{Firm comp}}$
$\Delta \ln_{\text{TDC1}}$	1.000					
$\Delta \ln_{\text{N\_shares}}$	0.614	1.000				
$\Delta \ln_{\text{Mkt}}$	0.313	0.301	1.000			
$\Delta \ln_P$	0.285	-0.276	-0.002	1.000		
$\Delta \ln_{P_{\text{Peers}}}$	0.182	-0.153	0.028	0.547	1.000	
$\Delta P_{\text{Firm comp}}$	0.220	-0.225	-0.021	0.826	-0.006	1.000

**Table 2. Competitive Pay Model**

This table reports coefficient estimates from panel regressions of the change in the number of equivalent shares granted to the CEO on the contemporaneous change in the stock price and market pay. All regressions include CEO/year fixed effects (un-tabulated).  $\Delta \ln_{-Mkt}$  is the difference between the natural logarithm of  $MKT\_COMP$  in year t and the natural logarithm of the actual total compensation in year t-1 ( $TDC1_{t-1}$ ).  $MKT\_COMP$  is estimated by a cross sectional regression of the form  $\ln(TDC1_t) = a + b * \ln(Sales_{t-1}) + \epsilon_t$  run by year and GICS Industry Groups. P is the market price of the common share at the grant date adjusted for stock splits and share dividends. When there are multiple grants over the fiscal year, P is the average price of each grant, with weights given by the number of equivalent shares awarded in each grant.  $P_{-Peers}$  is the price of a portfolio of companies in the same GICS industry Group excluding the company under analysis.  $\Delta P_{-firm\_comp}$  is the difference between  $\Delta \ln_{-P}$  and  $\Delta \ln_{-P_{-Peers}}$ . All log change variables ( $\Delta \ln$ ) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1. Standard errors are clustered at the year level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

	(1) $\Delta \ln_{-N\_shares}$	(2) $\Delta \ln_{-N\_shares}$	(3) $\Delta \ln_{-N\_shares}$	(4) $\Delta \ln_{-N\_shares}$
$\Delta \ln_{-Mkt}$	0.907*** (29.14)	0.909*** (29.01)	0.958*** (37.25)	0.960*** (36.95)
$\Delta \ln_{-P}$	-0.511*** (-12.97)		-0.507*** (-13.29)	
$\Delta \ln_{-P_{-Peers}}$		-0.603*** (-13.10)		-0.581*** (-12.62)
$\Delta P_{-Firm\_comp}$		-0.475*** (-12.06)		-0.483*** (-12.81)
CEO FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No
Industry-Year FE	No	No	Yes	Yes
Observations	28,102	28,102	28,096	28,096
R-squared	0.378	0.377	0.414	0.413

**Table 3. Annual Estimates of Competitive Pay Model (1993-2022)**

This table reports coefficient estimates from annual regressions of the change in the number of equivalent shares granted to the CEO on the contemporaneous change in stock price ( $\Delta \ln P$ ) and the change in market pay ( $\Delta \ln_{Mkt}$ ) for each year from 1993 to 2022, as in Equation (9). All logchange variables ( $\Delta \ln$ ) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1.

Year	Intercept	$\Delta \ln P$	$\Delta \ln_{Mkt}$	N	Adj R <sup>2</sup>
1993	-0.029	-0.228	0.361	162	0.064
1994	0.361	-0.777	0.415	438	0.140
1995	-0.063	-0.114	0.544	596	0.142
1996	0.157	-0.015	0.387	644	0.061
1997	0.174	-0.442	0.357	697	0.101
1998	0.160	-0.300	0.416	797	0.123
1999	0.289	-0.165	0.415	856	0.123
2000	0.151	-0.132	0.329	856	0.101
2001	0.104	-0.420	0.380	873	0.155
2002	0.001	-0.390	0.377	897	0.131
2003	-0.003	-0.181	0.322	838	0.107
2004	-0.023	-0.238	0.349	851	0.129
2005	-0.048	-0.105	0.326	785	0.088
2006	-0.066	-0.306	0.443	782	0.118
2007	0.100	-0.329	0.413	927	0.119
2008	0.092	-0.431	0.357	1189	0.148
2009	0.106	-0.571	0.375	1245	0.227
2010	0.106	-0.485	0.418	1294	0.170
2011	0.087	-0.503	0.339	1306	0.136
2012	0.078	-0.425	0.429	1305	0.185
2013	0.084	-0.531	0.376	1301	0.171
2014	0.042	-0.504	0.269	1304	0.128
2015	0.085	-0.677	0.290	1274	0.184
2016	0.133	-0.733	0.374	1260	0.298
2017	0.065	-0.583	0.236	1200	0.179
2018	0.079	-0.631	0.318	1101	0.270
2019	0.107	-0.605	0.346	1086	0.266
2020	0.097	-0.851	0.235	1107	0.389
2021	0.187	-0.791	0.357	1147	0.354
2022	0.074	-0.704	0.322	1098	0.265
Average	0.090	-0.439	0.363	974	0.169

**Table 4. Difference-in-differences regression around SFAS123R**

This table reports coefficient estimates from DD regressions examining the impact of SFAS123R on the relationship between changes in CEO equity grants and changes in stock price. The treatment indicator, *treat*, is set to 1 for firms where the average accounting impact during the pre-FAS 123R period (2003-2005) is above the median value, as in Hayes et al. (2012), and 0 for control firms. The sample excludes firms that voluntarily adopted SFAS123R in their first quarterly report following June 15, 2005, rather than waiting for the amended mandatory adoption date of December 15, 2005, which required firms to implement the new expensing rules starting with the first quarter following their fiscal year-end after this date. Robustness to this assumption is presented in the Appendix. P is the market price of the common share at the grant date adjusted for stock splits and share dividends. When there are multiple grants over the fiscal year, P is the average price of each grant, with weights given by the number of equivalent shares awarded in each grant. P\_Peers is the price of a portfolio of companies in the same GICS industry Group excluding the company under analysis. All log change variables ( $\Delta \ln$ ) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1. t-statistics are adjusted for year-clustering, and \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

	(1) $\Delta \ln N\_shares$	(2) $\Delta \ln N\_shares$	(3) $\Delta \ln N\_shares$
Treat	-0.0569* (-2.21)	-0.0566* (-2.22)	
Post	0.0202 (0.57)		
Treat * Post	0.0304 (0.65)	0.0331 (0.73)	-0.0326 (-0.55)
$\Delta \ln P$	-0.335*** (-6.54)	-0.351*** (-7.58)	-0.397*** (-7.80)
Treat * $\Delta \ln P$	0.388*** (6.08)	0.389*** (6.02)	0.305** (2.97)
Post * $\Delta \ln P$	-0.110 (-1.43)	-0.0362 (-0.66)	0.0507 (0.51)
Treat * Post * $\Delta \ln P$	-0.338** (-3.15)	-0.345** (-3.42)	-0.276* (-2.13)
$\Delta \ln\_Mkt$	0.348*** (19.26)	0.351*** (18.45)	0.826*** (7.71)
$\Delta \ln P\_Peers$	-0.139** (-2.74)	-0.143* (-2.48)	-0.191*** (-4.55)
Constant	0.0294*** (4.09)	0.0398** (3.42)	0.112** (3.59)
Firm FE	No	No	Yes
Year FE	No	Yes	Yes
Adj. R <sup>2</sup>	0.129	0.136	0.162
N	3387	3387	3387

**Table 5. Wealth Sensitivity in 1996 and 2022**

This table illustrates the impact of a 25% increase in shareholder wealth on the present value of CEO pay and wealth leverage for executives with compensation profiles from 1996 and 2022, assuming a 15-year expected tenure and a 10% discount rate for future pay. The table compares the change in equity value, total pay, and wealth leverage for both profiles. The 1996 profile assumes 40% of pay in equity with a share sensitivity to log price change of -0.283, while the 2022 profile assumes 65% of pay in equity with a share sensitivity to log price change of -0.738, derived from observed patterns in the data. All assumed values are in blue. The calculations consider the present value (PV) of total pay, including the effects of equity grants and adjustments to expected future pay based on stock price changes. Wealth leverage =  $\ln(\text{change in CEO wealth}) / \ln(\text{change in shareholder wealth})$ . The table shows that while the 2022 profile CEO initially has stronger equity incentives, the impact of expected future pay adjustments leads to higher wealth leverage for the 1996 profile CEO over a longer tenure, particularly as the expected tenure extends beyond one year.

Assumptions																	
Overall																	
25%	$\Delta\text{Shareholder wealth}$						Share Sensitivity to Price (Table 5)										
10%	Discount rate						$\text{Share Ratio} = \exp(-0.283 * \ln(1+25\%))$										
15 yrs	Expected CEO tenure						Year 2-15 change in Equity Value = $1.25 * 0.939 - 1$										
Results																	
Baseline																	
1996																	
Year	PV Of Original Total Pay	Percent Change in Equity Value	New Equity Value	New Total Pay	PV Of New Total Pay	Percent Change in Equity Value	New Equity Value	New Total Pay	PV Of New Total Pay	2022							
0	1.000	0.400	25.0%	0.500	1.100	0.650	25.00%	0.813	1.163	1.163							
1	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.945							
2	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.859							
3	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.781							
4	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.710							
5	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.645							
6	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.587							
7	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.533							
8	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.485							
9	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.441							
10	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.401							
11	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.364							
12	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.331							
13	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.301							
14	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.274							
15	1.000	0.400	17.3%	0.469	1.069	0.650	6.02%	0.689	1.039	0.249							
Total CEO Wealth	8.606				9.234					9.066							
		Change in CEO wealth = $9.234 / 8.606 =$						1.073	Change in CEO wealth = $9.066 / 8.606 =$								
		Change in Shareholder Wealth						1.250	Change in Shareholder Wealth								
		Wealth leverage = $\ln(1.073) / \ln(1.25) =$						0.315	Wealth leverage = $\ln(1.053) / \ln(1.25) =$								
Percent difference in wealth leverage										35%							

**Table 6. Performance penalty and proxy vote recommendations**

In this table, we model the probability of a negative vote recommendation on CEO compensation in the period 2006-2020 on the measure of performance penalty in CEO equity compensation  $\chi$  estimated by the following firm level expanding window regression:  $\Delta \ln N_{\text{shares}_t} = \alpha + \beta \times \Delta \ln Mkt + \chi \times \Delta \ln P_t + \varepsilon_t$ .

Penalty is an indicator variable, taking the value of 1 when  $\chi \leq -0.2$ , and 0 otherwise.

Columns 1-2 estimate a logit regression, while column 4 estimates a linear probability model. See Table A1 in the Appendix for the definition of the control variables. Standard errors are clustered at the year-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

Parameters	(1)	(2)	(3)	(4)
	<i>Logit</i>		<i>OLS</i>	
Penalty	0.051*** (3.39)	0.047*** (4.43)	0.046*** (3.14)	0.041*** (4.15)
TSR (-1)		-0.063*** (-3.12)		-0.052** (-2.68)
TSR (-3)		0.089*** (5.31)		0.073*** (4.79)
TDC1 (\$Million)		-0.017*** (-5.79)		-0.010*** (-6.71)
%EQ_COMP		0.103 (1.25)		0.066 (0.87)
$\Delta \ln TDC1$		0.152*** (5.79)		0.111*** (5.45)
ROE		-0.011 (-0.34)		-0.016 (-0.56)
Market-to-book		-0.000** (-1.97)		-0.000* (-2.08)
Log of Market Cap		0.057*** (3.00)		0.043** (2.31)
InstOwn %		-0.079** (-2.00)		-0.063 (-1.76)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3,925	3,604	3,984	3,657
R-squared			0.416	0.437
Pseudo R-squared	0.017	0.018		

**Table 7. Competitive pay model on directors' equity compensation**

In Panel A, we apply the competitive pay model to the equity compensation of the members of the board of directors. Due to data limitations the sample spans 2007 to 2022. In Panel B, we examine CEO compensation, splitting the sample based on when director pay exhibits stronger or weaker CPP characteristics, defined as above or below median values of board-level  $\chi$  in each year, respectively. Given the requirement of at least 5 years of data to estimate firm-specific values of board-level  $\chi$ , Panel B data runs from 2011 to 2022. The dependent variable is the total number of equivalent common shares awarded to board members during the fiscal year divided by the number of members of the board in the same year. Variables are defined in Appendix. Standard errors are clustered at the year-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: CPP in Director Pay

Parameters	(1)	(2)
$\Delta \ln_{-}Mkt$	0.750*** (18.57)	0.747*** (18.52)
$\Delta \ln_{-}P$	-0.942*** (-37.01)	
$\Delta P_{-}Firm_{-}comp$		-0.913*** (-37.66)
$\Delta \ln_{-}P_{-}Peers$		-1.004*** (-25.59)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	17,431	17,431
R-squared	0.609	0.610

Panel B: CPP in CEO Pay, Split by Board CPP Orientation

Parameters	(1)	(2)
	High CPP Board	Low CPP Board
$\Delta \ln_{-}Mkt$	0.885*** (14.83)	0.802*** (11.78)
$\Delta \ln_{-}P$	-0.949*** (-23.25)	-0.465*** (-7.24)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	2,787	2,956
R-squared	0.590	0.371

## Appendix A

**Table A1. Variable definitions**

Variables	Description
TDC1	CEO's Total Compensation on ExecuComp (#TDC1)
$\Delta \ln_{-}TDC1$	Log(TDC1 in year t / TDC1 in year t-1)
MKT_COMP	Market level of CEO's compensation, estimated by a cross sectional regression of the form $\ln(TDC1_t) = a + b * \ln(\text{Sales}_{t-1}) + \varepsilon_t$ run by GICS Industry Groups (#GGROUP)
$\Delta \ln_{-}Mkt$	Log expected change in market pay. Difference between $\ln(MKT\_COMP_t)$ and $\ln(TDC1_{t-1})$
EQ_COMP	Sum of the fair value of all equity and option grants awarded to the CEO during the fiscal year (#BLKSHVAL, #RSTKGRNT, #FAIR_VALUE)
%EQ_COMP	EQ_COMP / TDC1
P	Market price of the common share at the grant date adjusted for stock splits and share dividends. (#PRC, #CFACPR, #GRANT_DATE)
$\Delta \ln P$	Difference between $\ln P$ and $\ln P_{t-1}$
N_shares	Total number of equivalent common shares granted to the CEO during the fiscal year, calculated as EQ_COMP/P
P_Peers	Price Index of a portfolio of all companies in the same GICS industry Group excluding the company under analysis
$\Delta \ln P_{-}Peers$	Difference between $\ln P_{-}Peers$ and $\ln P_{-}Peers_{t-1}$
$\Delta P_{-}Firm_{-}comp$	Difference between $\Delta \ln P$ and $\Delta \ln P_{-}Peers$ .
$\chi$	A firm/year level measure of performance penalty in CEO equity compensation estimated as the coefficient $\chi$ of the following firm level expanding window regression: $\Delta \ln N_{-}shares_t = \alpha + \beta \times \Delta \ln Mkt + \chi \times \Delta \ln P_t + \varepsilon_t$
Penalty	Indicator variable taking the value of 1 when $\chi < -0.2$ , and 0 otherwise
TSR (-1)	One-year total shareholders return
TSR (-3)	Three-year total shareholders return
Institutional ownership %	Total institutional ownership in fraction of shares outstanding (Instown_Perc from Thomson Reuters 13F).
Market Cap (\$ million)	Market value of equity
Market-to-book	Market value of equity/Book value of equity
ROE	Earnings before extraordinary items / book value of equity

**Table A2. Average coefficient estimates of the market pay model by industry group**

This table shows the average across years 1993-2022 of the annual coefficients of the following cross sectional regression, estimated by GICS Industry Groups:  $\ln(TDC1_t) = a + b * \ln(\text{Sales}_{t-1}) + \varepsilon_t$ . TDC1 is CEO's Total Compensation on Execucomp and Sales is firm's revenues. GICS is a widely accepted approach to classifying firms by industry in the US capital market.

GICS group	Industry Group Name	N (Yrs)	Intercept	$\ln(\text{Sale}_{t-1})$	ADJ R2
1010	Energy	31	5.41203	.37018	.40228
1510	Materials	31	4.77187	.43072	.45230
2010	Capital Goods	31	4.58851	.46051	.50874
2020	Commercial & Professional Services	31	5.08187	.39480	.26588
2030	Transportation	31	3.97057	.48701	.43831
2510	Automobiles & Components	31	4.25527	.47407	.55837
2520	Consumer Durables & Apparel	31	4.09136	.53951	.41432
2530	Consumer Services	31	4.36886	.51507	.39334
2540	Media (discontinued effective close of September 30, 2018)	27	4.88242	.45493	.42183
2550	Retailing	31	4.87583	.39617	.31321
3010	Food & Staples Retailing	31	3.59982	.48135	.39056
3020	Food, Beverage & Tobacco	31	4.48853	.46715	.46708
3030	Household & Personal Products	31	3.80662	.57100	.61832
3510	Health Care Equipment & Services	31	5.35211	.38324	.45499
3520	Pharmaceuticals, Biotechnology & Life Sciences	31	6.10306	.34015	.51521
4010	Banks	31	4.87611	.42363	.45742
4020	Diversified Financials	31	5.77845	.35804	.29546
4030	Insurance	31	5.48050	.35085	.31706
4040	Real Estate (discontinued effective close of August 31, 2016)	19	5.82812	.29088	.23531
4510	Software & Services	31	5.56791	.36604	.23349
4520	Technology Hardware & Equipment	31	5.14131	.39494	.38433
4530	Semiconductors & Semiconductor Equipment	25	5.63374	.36974	.52413
5010	Telecommunication Services	31	5.02102	.43738	.59273
5020	Media & Entertainment	6	5.45011	.36605	.31361
5510	Utilities	31	3.82066	.51370	.57393
6010	Real Estate	8	5.98327	.35509	.27866

**Table A3. Robustness Tests on FAS 123R Tests**

This table presents the coefficient estimates from difference-in-differences (DD) regressions examining the effect of FAS 123R on the relationship between changes in CEO equity grants and changes in stock price, using alternative definitions and sample variations. The regressions are similar to those in Table 4, but the samples and treatment groups are defined differently. In the first two specifications, the treatment groups are defined as in Bakke et al. (2016), in which the control group includes firms that either did not grant options to CEOs in 2003-2004 or had preemptively adopted FAS 123R's fair value expensing provisions on or before 2002, and the treatment group includes all other firms. The "Dropped Data" sample excludes firms that voluntarily adopted FAS 123R in their first quarterly report following June 15, 2005, rather than waiting for the amended mandatory adoption date of December 15, 2005, which required firms to implement the new expensing rules starting with the first quarter following their fiscal year-end after this date. "Full Data" includes all observations. Standard errors are clustered at the year-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

	Treat * Log( $\Delta$ Price) * Year		
Bakke et al. (2016) – Dropped Data	-0.699 *** (-6.59)	-0.714 *** (-6.61)	-0.469 * (-2.13)
Adj. R <sup>2</sup>	0.126	0.133	0.160
N	3387	3387	3387
Bakke et al. (2016) – Full Data	-0.934 *** (-7.01)	-0.925 *** (-6.51)	-0.813 *** (-6.27)
Adj. R <sup>2</sup>	0.122	0.126	0.144
N	3929	3929	3929
Hayes et al. (2012) – Full Data	-0.323 * (-2.35)	-0.323 * (-2.46)	-0.203 (-1.31)
Adj. R <sup>2</sup>	0.123	0.127	0.144
N	3929	3929	3929
Firm FE	No	No	Yes
Year FE	No	Year	Yes

**Table A4. Binned Univariate Correlations of Competitive Pay Model**

In this table, firm/year observations for the period 1993-2022 are grouped in buckets according to the change in firm's stock price P. P is the market price of the common share at the grant date adjusted for stock splits and share dividends. In Panel A, buckets are defined by fixed ranges of price change. In panel B buckets are based on deciles of price change. Both panels report the number of firm/year observation in each bucket along with the average change in the stock price and the average change in the number of equivalent shares granted to the CEO.

**Panel A: Fixed Ranges**

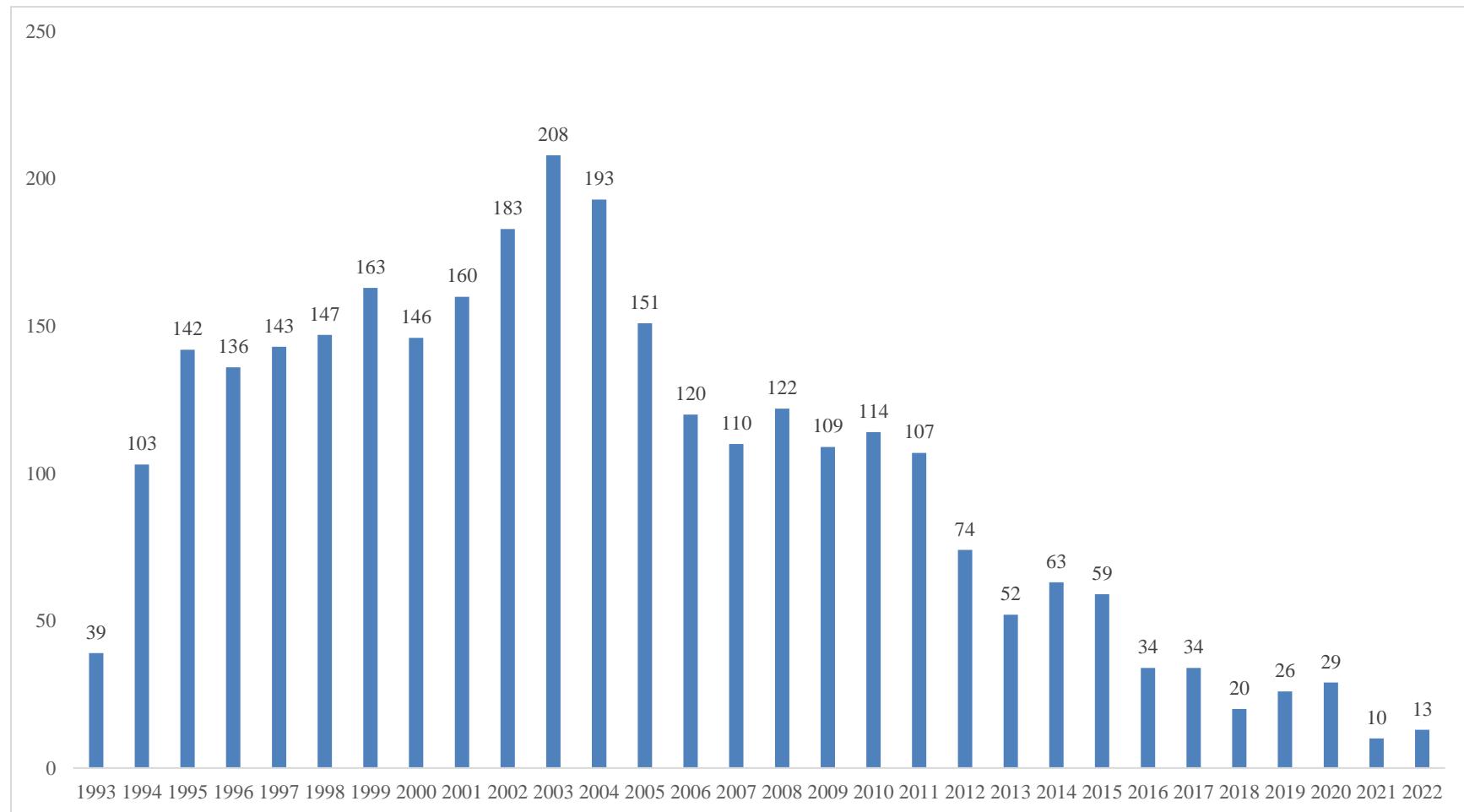
$\Delta \ln P$	FREQ	$\Delta \ln P\_Mean$	$\Delta \ln N\_shares\_Mean$
<-50%	2,206	-.81825	.44281
(-50% - 25%)	2,677	-.35420	.22372
(-25%,0%)	6,404	-.10493	.09590
(0%,25%)	10,100	.12290	-.01908
(25%,50%)	5,516	.35481	-.14682
>50%	2,905	.73571	-.27573

**Panel B: Decile Bins**

Price Change Portfolio	FREQ	$\Delta \ln P\_Mean$	$\Delta \ln N\_shares\_Mean$
0	2,966	-.59975	.34215
1	2,983	-.26034	.15104
2	2,984	-.12381	.11272
3	2,987	-.03352	.06448
4	2,980	.04080	.02521
5	2,986	.11125	-.02586
6	2,987	.18267	-.03668
7	2,984	.26527	-.08448
8	2,984	.38511	-.15955
9	2,967	.67248	-.25891

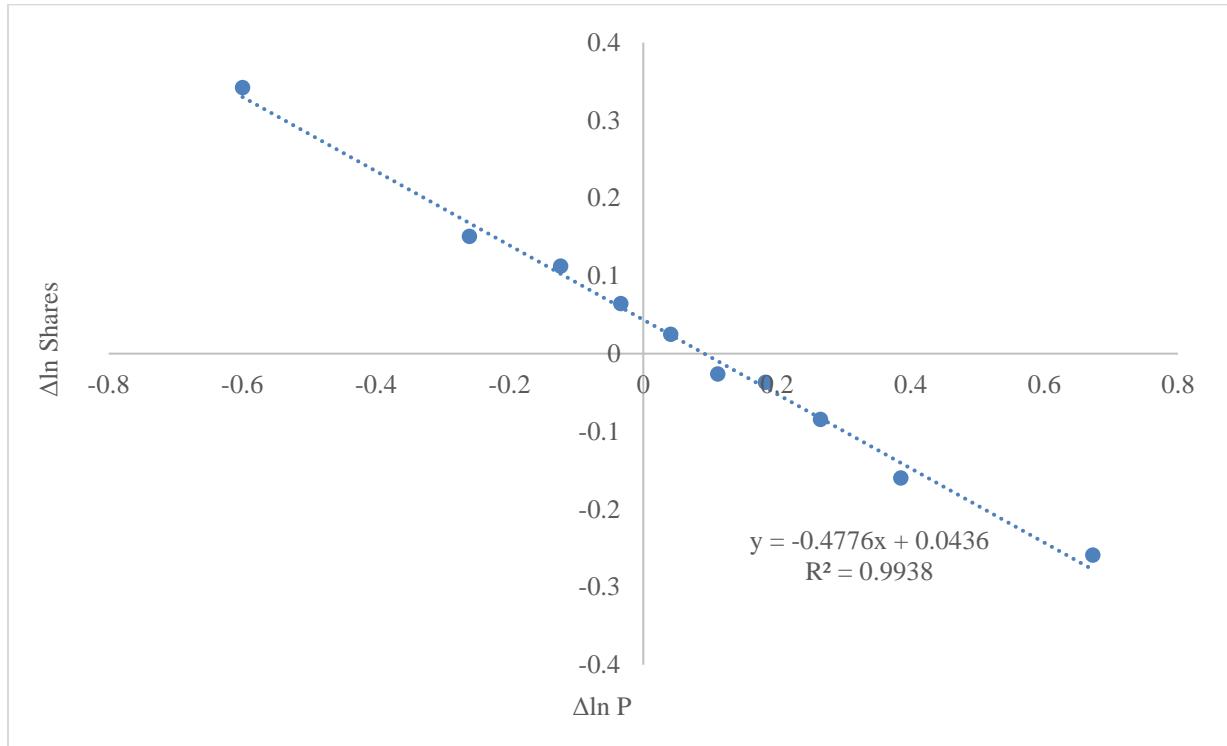
**Figure A1. Distribution of CEO fixed number option grants by year**

This figure shows the distribution over the years 1993-2022 of the frequency of fixed number option grants. The sample is limited to Chief Executive Officers (CEOs) who receive options in the current and previous year (i.e., CEO that get zero options in two consecutive years are not classified as receivers of a ‘fixed’ number of option grants).



**Figure A2. Binned Scatter Plot Results**

This figure shows the results of the binned scatter plot from Table A4. It plots the average change in equivalent shares against the average change in stock price for each bucket, with an interpolation line indicating the trend across different levels of price change.



## Appendix B: Text-Based Classification of CPP

This Appendix demonstrates the difficulties in using text-based disclosures in firm proxy statements to assign CPP classifications, using two firms in the retail industry (Ross Stores and Walmart). Based on the below excerpts, Ross Stores would be classified as non-CPP, while Walmart would be classified as CPP.

- Ross Stores 2023 Proxy Excerpt: “Although the Committee considers the compensation practices of peer companies, it **does not make any determinations or changes in compensation in reaction to that market data alone and does not target compensation to a specific point or range within any peer group.**”<sup>30</sup>
- Walmart 2023 Proxy Excerpt: “Benchmarking data is used as a general guide to setting appropriately competitive compensation consistent with our emphasis on performance-based compensation, [and] to ensure our NEOs’ target TDC are set at competitive levels relative to our peer group.”<sup>31</sup>

In Table B1 and Figure B1, we assign CPP classifications using the methodology developed in Section 4.2, based on actual compensation data. In contrast to the above excerpts, both Ross Stores and Walmart appear to adhere to CPP. In Table B1, both firms have coefficients of approximately -1 on log change in price, suggesting that a 1% reduction in price is compensated for by a ~1% increase in shares granted, as predicted by CPP. In Figure B1, we plot the year-over-year changes in price and share grants for both companies and again find a clear negative correlation between changes in share grants and changes in price for Ross Stores and Walmart, suggesting both firms adhere to CPP.

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<sup>30</sup> <https://investors.rossstores.com/static-files/d369d341-12b4-489e-9873-54d5e7fe5721#page=33.05>

<sup>31</sup> <https://corporate.walmart.com/content/dam/corporate/documents/newsroom/2023/04/20/walmart-releases-2023-annual-report-and-proxy-statement/walmart-inc-2023-proxy-statement.pdf#page=57.07>

Table B1: Competitive Pay Model

This table reports coefficient estimates from firm-level, time-series regressions of the change in the number of equivalent shares granted to the CEO on the contemporaneous change in the stock price ( $\Delta \ln P$ ) and change in market pay ( $\Delta \ln Mkt$ ). The analysis is conducted for Ross Stores and Walmart, covering the periods during which their current CEOs have led the firm (2014–present). Standard errors are clustered at the year-level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

	(1) Ross Stores	(2) Walmart
$\Delta \ln_{Mkt}$	0.912 (0.976)	0.099 (0.820)
$\Delta \ln P$	-1.083 (-1.570)	-0.959*** (-8.178)
Constant	0.443 (1.148)	0.101 (1.176)
r2	0.694	0.935
N	8	8

Figure B1: Scatter Plot

This figure reports a scatter plot of year-over-year changes in price and changes in shares granted for Walmart and Ross Stores from 2014 – present.

