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 pay to peers regardless of performance, weakens this link by inversely correlating share grants and stock performance. We document significant recent CPP adoption, particularly after the 2006 rule requiring options expensing. CPP reduces long-term CEO wealth sensitivity to stock prices, despite increasing short-term incentives through greater equity pay. Governance mechanisms fail to address CPP's misalignment, as boards and proxy advisors *encourage* CPP. These findings challenge assumptions about rising equity pay automatically strengthening incentive alignment.

Keywords: CEO compensation, peer benchmarked compensation, competitive pay policy, board of director compensation, corporate governance, proxy advisors

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

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Competitive Target Pay Practices for CEO Compensation

1. Introduction

Competitive Pay Policy (CPP) has become a predominant approach in setting executive compensation across U.S. companies. At its core, CPP aims to align executive pay with market rates by benchmarking compensation against a target range of peer pay. Typically, compensation consultants assess the "going rate" for a CEO position, considering factors like company size and sector, and set a target dollar amount for total compensation - encompassing salary, bonuses, and equity grants - within a competitive range. CPP seeks to ensure that companies remain attractive to top executive talent by offering compensation packages that do not fall below the market average, thereby retaining key leadership, while also controlling shareholder costs by not significantly exceeding market rates. Motivated by its increasing adoption, this paper performs the first large-sample analysis of the prevalence and consequences of CPP.

Proponents argue that CPP provides a straightforward, defensible, and fair method of setting compensation, particularly in highly competitive labor markets where pay transparency and comparisons are commonplace. Moreover, 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, CPP may have unintended consequences, particularly on the alignment of CEO incentives with shareholder interests. Unlike traditional performance-based pay models that directly link compensation to company success, CPP sets fixed compensation targets based on external benchmarks, often irrespective of the firm's actual performance. This can create perverse incentives: when stock prices decline, the fixed dollar value of equity awards results in a larger number of shares being granted, effectively rewarding poor performance with increased compensation. Conversely, rising stock prices lead to fewer shares, thus penalizing strong performance.

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 Competitive Pay Policy (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.[1] 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 be optimal given other goals of compensation, such as 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 Competitive Pay Policy (CPP). Our approach involves analyzing equity compensation data from

[1] https://www.forbes.com/sites/shivaramrajgopal/2022/10/23/most-us-companies-pay-ceos-under-a-competitive-pay-policy-but-dont-confuse-it-for-pay-with-performance/

the Execucomp database, covering CEO compensation for S&P 1500 firms from 1992 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 model the relationship between the change in the number of shares granted and stock price movements. By examining the coefficients of this regression, we can determine the extent to which companies offset changes in stock prices with corresponding adjustments in the number of shares granted, thereby assessing their adherence to CPP. A coefficient of -1 on stock price change would indicate full commitment to CPP, where each percent change in stock price is completely offset by an equivalent but opposite change in shares granted, while deviations from this value suggest partial or no commitment to the policy.

Using this methodology, we document a significant inverse correlation, consistent with the predictions of CPP. Specifically, the regression model demonstrates that for each 1% increase in stock price, there is an average 0.512% reduction in the number of shares granted, indicating that compensation committees adjust equity awards to partially offset stock price changes. This result implies that, while companies have embraced CPP, they have not yet fully implemented it to the theoretical extent where each stock price change would be fully counterbalanced by an opposite change in equity grants. This incomplete commitment suggests there may be heterogenous adherence to this compensation philosophy, both in the cross-section and across time.

To explore this heterogeneity, 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, we observe that the coefficient linking stock price changes to share grants has become more negative over time, with a notable acceleration after 2006. The coefficients are -0.3 at the beginning of our sample period, sharply declining around 2006 and reaching -0.7 in 2022. This trend suggests a deepening commitment to CPP, as firms increasingly adjust share grants in response to stock price fluctuations.

The growing adoption of CPP since 2006 can be attributed to several key factors, including changes in accounting rules, SEC mandated peer group disclosure, declining use of fixed share grants, and evolving proxy advisor guidelines. The mandatory expensing of stock options from 2006 (SFAS123R) encouraged a shift in compensation focus from shares to dollar values, aligning with CPP's market-based approach. 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 the increase in CPP is significantly greater for firms that are affected by the adoption of SFAS123R, providing suggestive evidence for accounting’s role in the rise of CPP.

Despite the intended purpose of CPP to standardize CEO compensation relative to peers, our analysis highlights a critical downside: a significant performance penalty that dilutes the incentive strength of equity-based compensation. To evaluate this misalignment, we develop and employ "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 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 short 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 measuring wealth leverage over a longer time horizon, CPP's performance penalty reduces the sensitivity of future pay to stock price changes, leading to a net decline in wealth leverage over time. Specifically, the 2022 CEO experiences a 15.2% reduction in shares granted following a 25% stock price increase, compared to an only 6.5% reduction in shares for the 1996 CEO, reflecting the stronger performance penalty under CPP. This results in substantially lower wealth leverage for the 2022 CEO; for a 15-year CEO tenure, a 1% increase in shareholder wealth is associated with a 0.309% increase in CEO wealth in 1996 and a 0.234% increase in CEO wealth 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 its intended effect.

Given the issues in incentive alignment that CPP raises, we next test if traditional forms of governance, such as proxy advisors or the board, can help curb CPP usage. External governance monitors, such as proxy advisors like ISS, have played a pivotal role by favoring compensation structures that align with market benchmarks, even when these structures inadvertently penalize performance. We analyze ISS vote recommendations to understand how proxy advisors may be unintentionally reinforcing the adoption of CPP. Our firm-level examination reveals that companies with greater performance penalties in their CEO compensation are *less likely* to receive a negative vote recommendation from ISS. Specifically, firms with a history of CPP are 12.7%

(1.3 pp) 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. As such, proxy advisors play a crucial role in shaping compensation practices, further entrenching CPP within executive pay structures.

We next look at internal governance and find that board of director pay is *more exposed* to CPP pay than CEO pay; for each 1% increase in stock price, there is an average 0.942% reduction in the number of shares granted. This suggests that boards are explicitly paid fixed-dollar renumerations.[2] Furthermore, when we split firms into high-CPP and low-CPP boards, we find that CEO CPP adoption is significantly more prevalent in firms with high-CPP boards. This suggests that while boards have the capacity to provide oversight and limit CPP usage, their own CPP-based pay structures may reduce their inclination to do so.

This study makes several contributions to the executive compensation literature. First, to the best of our knowledge, this study provides the first large-sample, systematic evidence on Competitive Pay Policy (CPP), a compensation approach that has become increasingly prevalent yet remains largely unexamined. Rather than making claims about the optimality of CPP, we aim to document how current compensation structures operate and how they diverge from theoretical models. 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,

[2] 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/354950/000035495023000101/hd-20230330.htm, page 78.

we show that under CPP, superior stock performance reduces the number of shares granted, diminishing long-term wealth sensitivity and incentive alignment.

We also document why CPP has been heavily adopted in recent years, providing suggestive causal evidence that the 2006 implementation of SFAS 123R 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, our paper introduces wealth leverage as a measure of CEO incentive alignment, capturing both direct effects of equity-based pay and the indirect effects of future pay adjustments. Rather than using pay-for-performance sensitivity, which does not consider wealth, or delta, which does not consider future equity grants, we construct the wealth leverage measure to comprehensively understand how compensation affects CEO incentives. Using this measure, we document that while increased equity pay enhances short-term wealth sensitivity, the performance penalty embedded in CPP leads to lower long-term incentive alignment, particularly as CEO tenure increases. Relatedly, our research highlights a broader issue in executive compensation: the dominance of market benchmarks over true incentive strength in determining pay practices. The reliance on market benchmarks, rather than firm-specific performance, leads to the erroneous belief among firms, institutional investors, and proxy advisors that the market-wide increase in proportion of equity pay is sufficient to align CEO and shareholder interests.

Third, we contribute by examining the role of governance mechanisms in shaping executive compensation. Our findings reveal that board pay structures closely adhere to CPP principles, and boards compensated under CPP are more likely to reinforce CPP adoption for CEOs. Similarly, we show that proxy advisors like ISS, despite their stated goal of aligning pay with performance, may inadvertently encourage CPP adoption through benchmarking metrics such as “Multiple of Median.” 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.

Finally, our work contributes to the ongoing debate on the optimal design of executive compensation by highlighting the performance penalty inherent in CPP. Unlike theoretical models, such as the Dynamic Incentive Account (DIA) proposed by Edmans et al. (2012), which aims to balance performance sensitivity with wealth leverage, CPP adjusts the number of shares granted without compensating CEOs for the lost value, thereby eroding incentive alignment. This finding advocates for more sophisticated measures of incentive strength beyond simple equity pay ratios, emphasizing the need to consider wealth leverage to better capture the true incentive effects of CEO compensation packages (Edmans and Gabaix 2016). By bringing these issues to the forefront, our study calls for a re-evaluation of CPP’s role in executive compensation and urges stakeholders to consider the broader implications of compensation structures that prioritize market benchmarks over genuine performance alignment. This work lays the groundwork for future research to explore alternative models that better reconcile market-based compensation with the goal of incentivizing long-term value creation.

2. Background

2.1. History of Executive Compensation Practices

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 the 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 (O'Byrne 2013). 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.[3]

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, 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.[4] Marathon's 2019 proxy echoes these sentiments, emphasizing "market-competitive pay levels" and linking 90% of its CEO's target compensation to company performance.[5] Yet, these statements overlook the broader

[3] Note that the targeted amounts are based on peer pay, not a specific dollar amount per se. The amounts can thus increase over time, but the incentive issues with targeted dollar pay remain.

[4] https://www.sec.gov/Archives/edgar/data/104169/000120677420001271/wmt3661691-def14a.htm

[5] https://www.sec.gov/Archives/edgar/data/1510295/000151029519000021/def14a_2019mpcproxystateme.htm

consequences of CPP's fixed-dollar approach, which prioritizes market alignment at the expense of strong incentive structures.

2.2. Incentive Problems Underemphasized

Despite CPP's widespread adoption, modern proxy disclosures rarely address its core incentive misalignment: the performance penalty embedded in fixed-dollar equity grants. Companies seldom discuss why they favor CPP over fixed-share grants or alternative models that adjust for relative performance. A review of SEC filings since 2001 reveals only 26 references to "fixed share grants" and 25 to "fixed share basis," with rare endorsements of their benefits. For instance, Vornado Realty Trust's 2003 compensation report argued that fixed-share grants better align management incentives with shareholder interests by tying grant value directly to stock price fluctuations. Similarly, DDR's 2013 proxy statement emphasized that fixed-share grants align director pay with shareholder returns by exposing compensation to both increases and decreases in value.

While fixed-share grants strengthen incentives by tying compensation to company-specific performance, they also expose executives to broader market volatility unrelated to their actions. A more efficient approach, combining competitive benchmarking with adjustments for relative performance, could address CPP's incentive flaws. For example, target pay could be scaled by trailing relative performance, so a company outperforming its peers by 25% would adjust its competitive pay target upward by the same percentage. Yet, few companies disclose such practices, leaving CPP's performance penalty unmitigated.

Practitioner discussions of CPP also underplay these 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.

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.[6]

3. Hypothesis Development

3.1. Performance-Shares Relation Under CPP

A central objective of executive compensation is to align the interests of CEOs with those of shareholders by incentivizing performance. Agency theory posits that compensation should increase with performance, ensuring that executives are rewarded for actions that enhance shareholder wealth. Foundational works in this area, including those by Fama (1980), Holmstrom and Milgrom (1987), and Gibbons and Murphy (1992), emphasize the importance of pay sensitivity to performance as a critical driver of managerial effort and decision-making. These models assume that compensation structures inherently align CEO incentives with performance, predicting that superior outcomes should naturally lead to increased future rewards.

CPP, which sets target pay levels relative to peer compensation rather than linking directly to firm-specific performance, diverges from this traditional agency theory framework. While CPP's dollar-benchmarked equity grants are intended to maintain competitive pay levels, they inadvertently reduce the sensitivity of CEO pay to performance by adjusting the number of shares

[6] A small group of practitioners have recognized the incentive problems of competitive pay policy since the early 1990s. See O'Byrne (1991) and O'Byrne (1992).

granted in response to stock price changes. This mechanism weakens the alignment of CEO incentives with shareholder interests, as superior stock performance results in fewer shares being granted, while poor stock performance results in more shares being granted, a phenomenon referred to as the "performance penalty."

Building on prior literature (Hall 1999), we examine how adherence to CPP affects the incentive alignment between CEOs and shareholders. Unlike fixed-share plans, which inherently link compensation to performance through rising stock prices, CPP fundamentally shifts the focus to maintaining fixed dollar values, thereby altering the traditional pay-for-performance relationship. To test this, we use a regression framework to quantify the sensitivity of share changes to stock price changes. A negative relationship between stock price performance and share grants would reflect a systematic deviation from agency theory predictions, illustrating how CPP introduces a performance penalty.

H1: Firms committed to Competitive Pay Policy will 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

The evolution of executive compensation practices from performance-linked models to those heavily influenced by market benchmarks has been significantly driven by external factors, including regulatory changes. The 2006 accounting changes under SFAS 123R, which required firms to expense stock options, created a substantial shift in how companies approached executive pay. This regulatory change likely accelerated the adoption of CPP as firms sought to manage perceived costs and mitigate shareholder concerns.

There is evidence that compensation policies have evolved in the past thirty years. For instance, Shue and Townsend (2017) find a decline in fixed-share grants after compensation disclosures and options expensing were mandated by the SEC and FASB. While the shift away from fixed-share grants might suggest an automatic increase in fixed-dollar CPP grants, it is important to note that fixed-share and target-dollar grants are not the only two types of compensation plans available. Indeed, Shue and Townsend (2017) highlight that the majority of plans in their sample are neither fixed-share nor fixed-value. Furthermore, Figure A1 in our sample reveals that fixed-share grants peaked in 2003 with only 208 plans among S&P 1500 firms, suggesting that even before SFAS 123R, the vast majority of firms were not employing fixed-share plans. Thus, the causal impact of SFAS 123R on the adoption of CPP remains an empirical question. To explore this shift, we employ a differences-in-differences approach around the adoption of SFAS 123R.

H2: The adoption of Competitive Pay Policy increased significantly following the 2006 SFAS 123R accounting regulatory changes, driven by external pressures to manage compensation costs and align with new accounting standards.

3.3. Effect of CPP on Incentive Alignment

While CPP aims to maintain competitive pay levels, it may undermine the alignment of CEO incentives with shareholder interests. By prioritizing market benchmarks over firm-specific performance metrics, CPP reduces the effectiveness of equity-based compensation in driving performance. This misalignment can be quantitatively assessed through the concept of "wealth leverage," which measures the sensitivity of a CEO's wealth to changes in shareholder wealth.

H3: The use of Competitive Pay Policy reduces the long-term alignment of CEO incentives with shareholder interests, as evidenced by diminished wealth leverage, indicating weaker incentive strength in equity compensation.

3.4. Effect of Governance on CPP

Finally, a critical aspect of CPP's persistence is the failure of governance at both the board level and among proxy advisors like Institutional Shareholder Services (ISS). 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.

Similarly, boards are charged with overseeing executive compensation and ensuring that it aligns with shareholder interests, primarily through incentivizing performance. However, in many cases, boards rely heavily on competitive benchmarking and peer surveys rather than scrutinizing how compensation structures impact actual performance alignment. This overreliance on CPP by boards suggests a governance failure, where the focus on market competitiveness overshadows the need for performance sensitivity in pay packages. In fact, boards themselves may be paid by CPP, which may exacerbate governance failures.

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 1992 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 29,808 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 for each year.

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 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 $5.28 million ($3.23 million), and the mean (median) equity compensation (EQ_COMP) is $3.45 million ($1.75 million). Equity compensation constitutes 48.1% of total pay for the average firm-year observation. Table 2 reports average Pearson and Spearman correlations across key variables, highlighting a significant positive correlation (0.41) between changes in total compensation (Δ ln TDC1) and market pay (Δ ln Mkt) and a significant negative correlation (-0.24) between changes in shares granted (Δ ln N shares) and the stock price (Δ 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.[7] 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:

$$\mathrm{N}_{\mathrm{shares}_t} \times \mathrm{P}_t = \mathrm{N}_{\mathrm{shares}_{t-1}} \times \mathrm{P}_{t-1} \times \mathrm{Mkt\_change}_t \quad (1)$$

Where N_shares_t is the number of equivalent shares granted in year t, P_t is the stock price at the grant date, and Mkt_change_t represents the expected change in CEO equity compensation induced by changes in the market pay levels for CEOs. To estimate Mkt_change_t, we define:[8,9]

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

[10]

where Mkt_Comp_t is the estimated market pay for a CEO in year t. Conversations with compensation consultants and a review of the practitioner literature suggest that a CEO's market pay for a year (Mkt_Comp) 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 ($lnTDC1_{i,t}$) on firm size ($lnSales_{i,t-1}$) for all firms in the sample:

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[7] 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).

[8] 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).

[9] 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}.

[10] After taking logs, for notational simplification, we hereafter write log market change as Δln_Mkt.

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

The fitted values from this regression provide the estimate for $\ln Mkt\_Comp_{i,t}$, which is then exponentiated to yield $Mkt\_Comp_{i,t}$:[11]

$$Mkt\_Comp_{i,t} = e^{\ln\left(\widehat{TDC1_{i,t}}\right)} \tag{4}$$

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). To classify firms without a GICS code in 1999, we first map historical SIC codes into GICS codes using the post 1999 sample. The GICS code most frequently associated with the firm's SIC in the mapping table is then used to fill the missing industry classifications. A total of 56,277 firm-year observations are available for the estimation of the market level compensation of CEOs from 1993 to 2022. Table A2 in the Appendix presents the average intercept and slope of the model for each industry (averaged across years).

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

$$N\_shares_t = \frac{N\_shares_{t-1} \times P_{t-1} \times Mkt\_change}{P_t} \tag{5}$$

$$\frac{N\_shares_t}{N\_shares_{t-1}} = \frac{P_{t-1}}{P_t} \times Mkt\_change \tag{6}$$

$$\Delta\ln(N\_shares) = -\Delta\ln P + \Delta\ln(Mkt) \tag{7}$$

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

[11] 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 assess the degree of CPP adoption, we estimate the following regression:

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

where β_1 measures the sensitivity of share grants to stock price changes, and β_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 $\beta_2 > 0$. While this measurement approach is not intended to perfectly identify CPP, it provides a practical framework to describe current compensation practices. By focusing on share-price sensitivity and changes in market pay, our approach captures key dimensions of CPP as implemented in practice.

5. Results

5.1. Performance-Shares Sensitivity

The first column in Table 3 reports the estimates of the coefficients of the model. The coefficient on market pay is remarkably close to one (0.912) 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 -0.512, indicating that, on average, compensation committees adjust the number of shares awarded to offset 51% of the change in the company's stock price. 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 (-0.477 vs -0.604).

Table 4 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 0.360. These coefficients are close to the coefficients in the panel regression (Table 3) without fixed effects.[12] The results indicate that the ln price 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" competitive pay policy 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 competitive pay policy increased so much in the last twenty years?

One potential driver of this trend is the 2006 accounting rule change under SFAS 123R, which required companies to recognize expenses for stock option grants. By mandating that stock-based compensation be expensed, SFAS 123R may have shifted the focus of compensation discussions from share quantities to dollar amounts (Shue and Townsend 2017), increasing awareness among investors and stakeholders of the explicit costs associated with equity compensation. This heightened focus on dollar-based expenses could have encouraged firms to adopt compensation structures that emphasize dollar-value targets over share quantities, like CPP.

[12] The absence of fixed effects is the reason that the ln market change coefficients are well below 1.0.

To assess the causal 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 voluntarily adopted the standard between the initial mandatory date of June 15, 2005, and the SEC's delayed mandatory date of December 15, 2005, as in Shue and Townsend (2017). We remove these firms to reduce selection bias between our treatment and control firms. To augment the performance-shares sensitivity regression from Section 5.1, the regression specification examines the interaction of treatment, adoption timing (pre- and post-SFAS 123R), and stock price changes (log ΔP), with additional controls for firm and market conditions. Specifically, the equation takes the form:

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

where β_7, the coefficient on the triple interaction term, captures the effect of the expensing standard on CPP.

The results support a causal link: β_7 is negative and significant across all models, indicating that CPP adoption increased more significantly for firms more 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 SFAS 123R 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.[13] 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 removing firms that adopted the standard between June 15 and December 15, 2005; we again find consistent results that suggest SFAS123R had a causal 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 4 draws the mean equity compensation as a percent of CEO pay (TDC1) by year, together with the 25th and 75th 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. 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:

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

[13] We thank Preeti Choudhary for sharing this data.

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, which we measure using our penalty estimates from the time-varying performance-shares sensitivity regressions in Table 4 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, 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 −0.301, while the 2022 profile assumes 65% of pay in equity with a share sensitivity to price of −0.737. 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. 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.

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 6. 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):

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

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

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.

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 assumptions. For the 1996 and 2023 profiles, we can take the estimated β_1 coefficients on $\Delta \ln P$ from Figure 1 to calculate the change in shares as a result of the 25% share price appreciation:[14]

$$Share\ Ratio_{1996} = \exp\left(\beta_{1,1996MA} \Delta \ln P\right) = exp\big(-0.301 \cdot ln(1.25)\big) \approx 0.935 \qquad (13)$$

$$Share\ Ratio_{2022} = \exp\left(\beta_{1,2022MA} \Delta \ln P\right) = exp(-0.737 \cdot ln(1.25)) \approx 0.848 \qquad (14)$$

This means that in 1996, 93.5% of the shares are preserved, and 6.5% 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 shares because of CPP 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 9.220. Using the wealth leverage formula:

$$Wealth\ Leverage_{1996} = \frac{ln(9.220/8.606)}{ln(1.25)} = \frac{ln(1.071)}{ln(1.25)} \approx 0.309 \qquad (15)$$

Similarly, in 2023, after the 25% increase in price and 15.2% reduction in shares, the present valued total wealth equals 9.067. Notice how the larger share penalty results in reduced total wealth for the same percentage increase in price. This results in wealth leverage of:

$$Wealth\ Leverage_{2022} = \frac{ln(9.067/8.606)}{ln(1.25)} = \frac{ln(1.054)}{ln(1.25)} \approx 0.234 \qquad (16)$$

That is, for a 1% increase in shareholder wealth, CEO wealth increases by 0.309% in 1996 and 0.234% in 2022. The wealth leverage has decreased dramatically from the single-year wealth

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[14] Given the volatility in the yearly sensitivities in Table 4, 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.

leverages, especially for the 2022 CEO, due to the compounding effect of the share performance penalty. Furthermore, now, the 1996 profile CEO has *32% higher wealth leverage* (0.309 vs 0.234) if expected tenure is 15 years, despite having a lower proportion of equity pay.[15]

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

[15] Untabulated results show that the 1996 profile also exhibits 14% higher wealth leverage (0.321 vs. 0.282) at five years and 27% higher wealth leverage (0.312 vs. 0.246) at ten years, underscoring the compounding CPP penalty embedded in the 2022 profile over longer horizons.

company's performance.[16] Prior to this change, ISS primarily focused on opposing excessive bonus payouts that lacked justifiable performance linkage.[17]

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.[18]

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 - those that reduce equity awards for high stock price performance - are more likely to receive favorable Say-on-Pay votes. Using an expanding window regression (minimum 5 years data necessary), we estimate a firm-level CPP coefficient (χ) from the following model:

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

where χ 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.[19]

We merge these firm-level χ estimates with ISS recommendations for 3,242 observations from 2011–2020.[20] In all regressions, we control for key factors consistent with prior research,

[16] 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 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.

[17] Institutional Shareholder Services, "ISS U.S. Corporate Governance Policy 2006 Updates", p. 16.

[18] 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.

[19] The results are robust to different thresholds between 0 and -0.5.

[20] ISS stopped providing data to academics in 2021.

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 (Table 7) reveal that firms with more negative χ (indicating stronger performance penalties) are significantly less likely to receive a negative ISS recommendation. Specifically, the OLS model estimates that a firm adopting a fully competitive pay policy ($\chi=-1$) is 1.3 percentage points less likely to receive a negative recommendation from ISS than a firm without performance penalties ($\chi=0$). Compared to the unconditional mean of 10.2% of receiving an against vote, this represents an economically meaningful 12.7% decrease in the likelihood of ISS opposition.

We next study if board of directors' payments exhibit CPP. In Table 8, 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%.[21] Like in the case of CEOs, board pay also responds more to peer stock price movements than own-firm idiosyncratic movements, although both exhibit closer to 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.

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 χ, 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 χ to define high-CPP and low-CPP boards.[22]

[21] This analysis can only be run after 2006, when stock grant data is first reported for directors.

[22] The results are robust to different thresholds between 0 and -0.5.

Using this threshold, we find that firms with stronger board-CPP payment schemes exhibit significantly stronger CEO CPP payment schemes (-1.279 vs. -0.337). 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. Conclusions

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 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 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 identify a causal link between the adoption of CPP and the 2006 SFAS 123R 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 sensitivity of future pay to stock price performance. 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 on equity grant practices could mitigate the unintended consequences of fixed-dollar targeting on incentive alignment. Lastly, the study highlights the importance of incorporating both direct and indirect pay-performance links into metrics like wealth leverage, which provide a more nuanced understanding of CEO incentives.

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, but our findings suggest that it reduces incentive alignment relative to past contracts, potentially exacerbating misaligned CEO incentives.

Given this is the first study to focus on CPP, there are several opportunities for future research. 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 implications of CPP adoption for 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(ΔPrice) coefficients from Table 4. A stronger negative correlation begins in about 2006 and continues until the end of our sample in 2022.

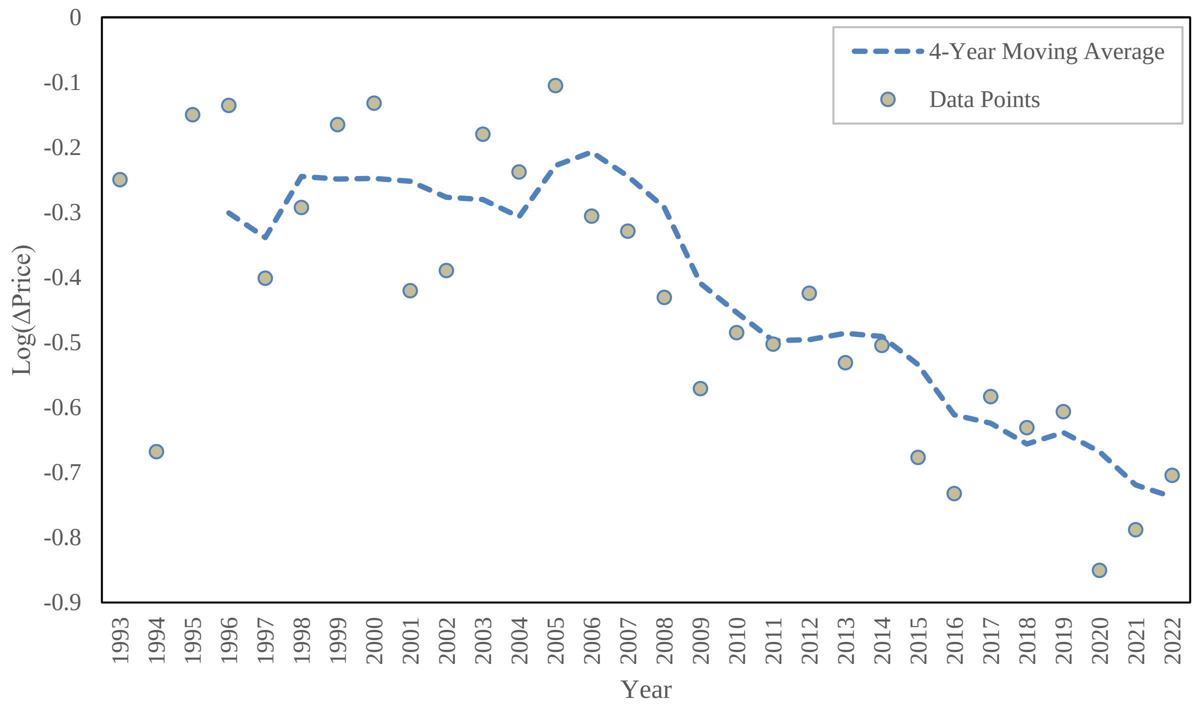

Figure 2. Parallel Trends Analysis for SFAS123R Test

This figure shows the parallel trend test result for the generalized difference-in-difference regression from Table 5. It plots the coefficients and confidence intervals of Treat * Δ ln P * Year. More details can be found in Table 5.

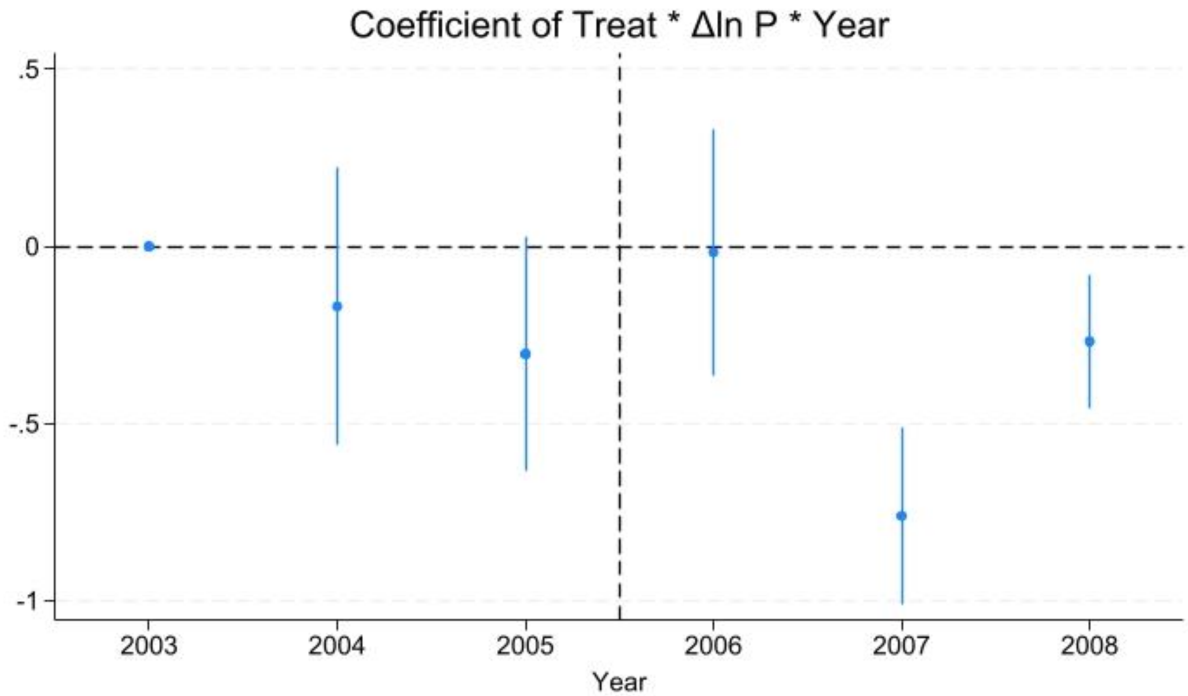

Figure 3. Trends in Proportion of CEO Equity Pay

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.

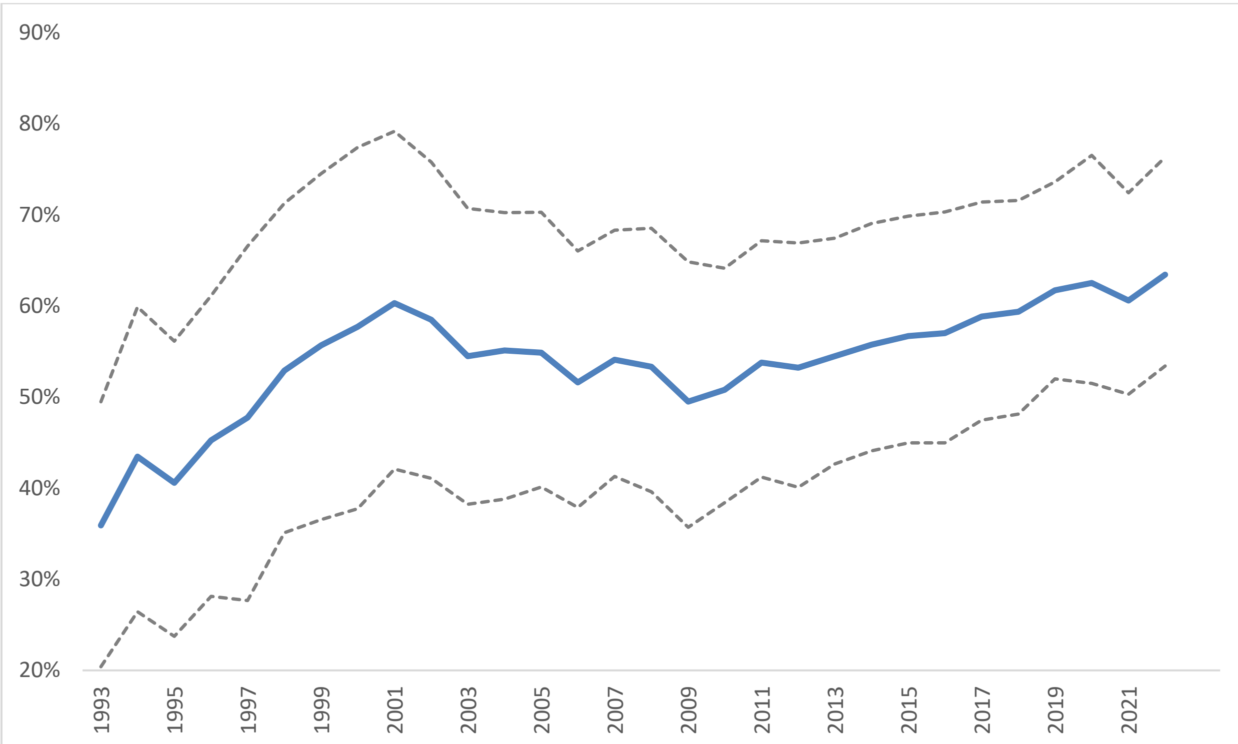

Table 1. Summary Statistics

This table reports descriptive statistics from the period 1992-2022 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 (Δln) represent the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1. Δ 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 $\ln(TDC1_t) = a + b*\ln(Sales_{t-1}) + \varepsilon_t$ 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. ΔP firm_comp is the difference between Δ ln_P and Δ ln P_Peers. The distributions are from data pooled over firms and years.

Var Name	N	Mean	StdDev	P1	P2	P5	P10	P30	P50	P70	P90	P95	P98	P99
TDC1	57,106	5,275	5.913	150	277	456	688	1.676	3.230	5.857	12.460	17.282	24.611	33.396
EQ_COMP	47,715	3,452	4.726	0	0	0	0	674	1.750	3.750	8.927	12.570	19.000	27.904
%EQ_COMP	47,433	0.481	0.271	0	0	0	0	0.351	0.521	0.653	0.807	0.878	0.958	1.001
Δ ln_TDC1	46,445	0.064	0.624	-2.141	-1.635	-1.021	-0.597	-0.089	0.067	0.245	0.728	1.100	1.610	2.016
Δ ln_EQ_COMP	31,228	0.076	0.739	-2.440	-1.869	-1.181	-0.724	-0.097	0.070	0.278	0.882	1.304	1.932	2.512
Δ ln N_shares	29,808	0.013	0.688	-2.229	-1.701	-1.145	-0.731	-0.208	0.000	0.227	0.798	1.195	1.743	2.208
Δ ln_P	29,808	0.064	0.391	-1.271	-0.979	-0.634	-0.398	-0.065	0.089	0.234	0.494	0.659	0.934	1.132
Δ ln_P_Peers	29,808	0.075	0.217	-0.695	-0.558	-0.337	-0.183	0.009	0.097	0.181	0.307	0.391	0.493	0.567
ΔP_Firm_comp	29,808	-0.010	0.329	-1.099	-0.861	-0.585	-0.393	-0.125	0.002	0.125	0.356	0.515	0.738	0.929
Δ ln_Mkt	46,104	0.014	0.725	-1.980	-1.607	-1.154	-0.833	-0.313	-0.015	0.315	0.909	1.243	1.731	2.286

Table 2. Correlation Matrix

This table reports average cross-sectional correlations for the period 1992-2022. Reported correlations are averages of annual correlation coefficients across the 27 years in the sample period. 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. All logchange variables (Δln) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1.
Δ 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 $\ln(TDC1_t) = a + b*\ln(Sales_{t-1}) + \varepsilon_t$ 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 the grants, 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. ΔP firm_comp is the difference between Δ ln_P and Δ ln P_Peers. Pearson correlations are presented in the upper diagonal and Spearman correlations in the lower diagonal.

Var Name	TDC1	EQ_COMP	%EQ_COMP	Δ ln TDC1	Δ ln EQ_COMP	Δ ln N_shares	Δ ln P	Δ ln P Peers	ΔP_Firm_comp	Δ ln_Mkt
TDC1	1	0.911	0.398	0.287	0.199	0.138	0.131	0.045	0.122	-0.347
EQ_COMP	0.871	1	0.585	0.266	0.255	0.196	0.121	0.050	0.109	-0.288
%EQ_COMP	0.519	0.800	1	0.235	0.318	0.275	0.064	0.057	0.046	-0.236
Δ ln TDC1	0.278	0.230	0.179	1	0.809	0.682	0.258	0.106	0.229	0.413
Δ ln EQ_COMP	0.187	0.252	0.274	0.780	1	0.853	0.269	0.099	0.246	0.301
Δ ln N_shares	0.105	0.172	0.234	0.590	0.750	1	-0.241	-0.102	-0.210	0.302
Δ ln P	0.154	0.138	0.056	0.255	0.285	-0.290	1	0.381	0.892	-0.015
Δ ln_P Peers	0.047	0.060	0.055	0.106	0.111	-0.122	0.382	1	-0.056	0.021
ΔP_Firm_comp	0.138	0.116	0.034	0.220	0.250	-0.246	0.850	-0.080	1	-0.027
Δ ln_Mkt	-0.442	-0.350	-0.246	0.349	0.261	0.268	-0.031	0.022	-0.042	1

Table 3. 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). Δ 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 $\ln(TDC1_t) = a + b*\ln(Sales_{t-1}) + \varepsilon_t$ 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. ΔP firm_comp is the difference between Δ ln_P and Δ ln P_Peers. All log change variables (Δln) 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.

Parameters	(1)	(2)
Δ ln_Mkt	0.912***	0.914***
t-statistic	53.6	53.7
Δ ln P	-0.512***	
t-statistic	-37.3	
Δ P_Firm_comp		-0.477***
t-statistic		-31.1
Δ ln P_Peers		-0.604***
t-statistic		-23.3
CEO fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R^2	0.428	0.427
N	29,723	29,723

Table 4. 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 (Δ ln P) and the change in market pay (Δ ln_Mkt) for each year from 1993 to 2022, as in Equation (9). All logchange variables (Δln) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1.

Year	Intercept	Δ ln P	Δ ln_Mkt	N	Adj R^2
1993	-0.015	-0.250	0.354	187	0.070
1994	0.322	-0.668	0.441	519	0.133
1995	-0.065	-0.150	0.523	704	0.138
1996	-0.065	-0.136	0.386	743	0.069
1997	0.179	-0.401	0.360	752	0.099
1998	0.162	-0.292	0.414	801	0.121
1999	0.157	-0.165	0.415	853	0.123
2000	0.289	-0.132	0.329	853	0.101
2001	0.151	-0.420	0.380	870	0.155
2002	0.104	-0.390	0.377	894	0.131
2003	0.001	-0.180	0.322	834	0.107
2004	-0.003	-0.238	0.349	848	0.129
2005	-0.023	-0.105	0.326	782	0.088
2006	-0.048	-0.306	0.443	779	0.118
2007	-0.066	-0.329	0.413	924	0.119
2008	0.100	-0.431	0.357	1187	0.148
2009	0.092	-0.571	0.375	1242	0.227
2010	0.106	-0.485	0.420	1292	0.170
2011	0.106	-0.503	0.340	1304	0.136
2012	0.088	-0.425	0.428	1303	0.185
2013	0.077	-0.531	0.376	1298	0.171
2014	0.084	-0.504	0.267	1300	0.128
2015	0.042	-0.677	0.291	1271	0.184
2016	0.085	-0.733	0.374	1257	0.298
2017	0.133	-0.583	0.235	1197	0.179
2018	0.065	-0.631	0.318	1098	0.270
2019	0.079	-0.606	0.337	1065	0.266
2020	0.107	-0.851	0.232	1104	0.389
2021	0.097	-0.788	0.307	1144	0.354
2022	0.187	-0.704	0.322	1095	0.265
Average	0.084	-0.439	0.360	983	0.169

Table 5. Difference-in-differences regression around SFAS 123R

This table reports coefficient estimates from DD regressions examining the impact of SFAS 123R 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 SFAS 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. 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. ∆P firm_comp is the difference between ∆ ln_P and ∆ ln P_Peers. All log change variables (∆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)	(2)	(3)
Treat	-0.0568*	-0.0566*	
t-statistic	(-2.23)	(-2.25)	
Post	0.0202		
t-statistic	(0.57)		
Treat * Post	0.0303	0.0329	-0.0331
t-statistic	(0.65)	(0.73)	(-0.56)
∆ ln P	-0.683**	-0.717***	-0.802*
t-statistic	(-3.55)	(-4.21)	(-2.19)
Treat *∆ ln P	0.391***	0.392***	0.308**
t-statistic	(6.11)	(6.06)	(2.98)
Post *∆ ln P	-0.111	-0.0369	0.0500
t-statistic	(-1.42)	(-0.64)	(0.49)
Treat * Post *∆ ln P	-0.336**	-0.343**	-0.275*
t-statistic	(-3.14)	(-3.41)	(-2.11)
∆ ln_Mkt	0.348***	0.351***	0.826***
t-statistic	(19.14)	(18.34)	(7.70)
∆ P_Firm_comp	0.347	0.365*	0.402
t-statistic	(1.83)	(2.13)	(1.09)
∆ ln P_Peers	0.206	0.220	0.211
t-statistic	(0.96)	(1.05)	(0.54)
Constant	0.0297***	0.0401**	0.112**
t-statistic	(4.26)	(3.49)	(3.60)
Firm fixed effect	No	No	Yes
Year fixed effect	No	Yes	Yes
Adj. R^2	0.129	0.136	0.162
N	3387	3387	3387

Table 6. 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 -0.188, while the 2022 profile assumes 65% of pay in equity with a share sensitivity to log price change of -0.835, 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 change in CEO wealth / ln 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		1996		2022	
25%	ΔShareholder wealth	Share Sensitivity to Price (Table 5)	-0.301	Share Sensitivity to Price (Table 5)	-0.737
10%	Discount rate	Share Ratio = exp(-0.301*ln(1+25%))	0.935	Share Ratio = exp(-0.737*ln(1+25%))	0.848
15 yrs	Expected CEO tenure	Year 2-15 change in Equity Value = 1.25*0.935-1	0.169	Year 2-15 change in Equity Value = 1.25*0.848-1	0.060

Results

Baseline: Year	Baseline: Total Pay	Baseline: PV Of Original Total Pay	1996: Percent Equity	1996: Percent Change in Equity Value	1996: New Equity Value	1996: New Total Pay	1996: PV Of New Total Pay	2022: Percent Equity	2022: Percent Change in Equity Value	2022: New Equity Value	2022: New Total Pay	2022: PV Of New Total Pay
0	1.000	1.000	0.400	25.0%	0.500	1.100	1.100	0.650	25.00%	0.813	1.163	1.163
1	1.000	0.909	0.400	16.9%	0.468	1.068	0.970	0.650	6.04%	0.689	1.039	0.945
2	1.000	0.826	0.400	16.9%	0.468	1.068	0.882	0.650	6.04%	0.689	1.039	0.859
3	1.000	0.751	0.400	16.9%	0.468	1.068	0.802	0.650	6.04%	0.689	1.039	0.781
4	1.000	0.683	0.400	16.9%	0.468	1.068	0.729	0.650	6.04%	0.689	1.039	0.710
5	1.000	0.621	0.400	16.9%	0.468	1.068	0.663	0.650	6.04%	0.689	1.039	0.645
6	1.000	0.564	0.400	16.9%	0.468	1.068	0.603	0.650	6.04%	0.689	1.039	0.587
7	1.000	0.513	0.400	16.9%	0.468	1.068	0.548	0.650	6.04%	0.689	1.039	0.533
8	1.000	0.467	0.400	16.9%	0.468	1.068	0.498	0.650	6.04%	0.689	1.039	0.485
9	1.000	0.424	0.400	16.9%	0.468	1.068	0.453	0.650	6.04%	0.689	1.039	0.441
10	1.000	0.386	0.400	16.9%	0.468	1.068	0.412	0.650	6.04%	0.689	1.039	0.401
11	1.000	0.350	0.400	16.9%	0.468	1.068	0.374	0.650	6.04%	0.689	1.039	0.364
12	1.000	0.319	0.400	16.9%	0.468	1.068	0.340	0.650	6.04%	0.689	1.039	0.331
13	1.000	0.290	0.400	16.9%	0.468	1.068	0.309	0.650	6.04%	0.689	1.039	0.301
14	1.000	0.263	0.400	16.9%	0.468	1.068	0.281	0.650	6.04%	0.689	1.039	0.274
15	1.000	0.239	0.400	16.9%	0.468	1.068	0.256	0.650	6.04%	0.689	1.039	0.249
Total CEO Wealth		8.606					9.220					9.067
			Change in CEO Wealth = 9.220 / 8.606 =				1.071	Change in CEO Wealth = 9.067 / 8.606 =				1.054
			Change in Shareholder Wealth				1.250	Change in Shareholder Wealth				1.250
			Wealth leverage = ln(1.071) / ln(1.25) =				**0.309**	**Wealth leverage = ln(1.054) / ln(1.25) =**				**0.234**
Percent difference in wealth leverage												**32%**

Table 7. 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 χ estimated by the following firm level expanding window regression: $\Delta \ln N\_shares_t = \alpha + \beta \times \Delta \ln\_Mkt + \chi \times \Delta \ln P_t + \varepsilon_t$.
Columns 1-3 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)
		Logit		*OLS*
χ	0.329***	0.175*	0.209*	0.013*
	13.33	2.89	3.43	1.89
TSR (-1)		-1.178***	-1.646***	-0.071***
		17.53	24.64	-4.36
TSR (-3)		-3.514***	-3.732***	-0.208***
		67.70	64.66	-8.76
Institutional ownership %		-0.771	-0.552	-0.082**
		1.899	0.73	-2.00
TDC1 ($Million)		0.000***	0.164***	0.000***
		114.9	72.24	13.03
Growth in TDC1		-0.021	0.105	0.002
		0.129	1.14	0.28
%EQ_COMP		-0.012	0.239	-0.021
		0.006	0.20	-0.64
Log of Market Cap		-0.367***	-0.316***	-0.038***
		23.57	13.31	-7.37
Market-to-book		0.002	0.003	0.000
		0.147	0.25	1.14
ROE		-0.077	-0.114	-0.008
		0.729	1.01	-1.56
Insider ownership %			1.899**	
			6.35	
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.028	0.106	0.114	0.118
N	3,242	2,922	2,439	2,922

Table 8. 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 χ in each year, respectively. Given the requirement of at least 5 years of data to estimate firm-specific values of board-level χ, 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)
Δ ln_Mkt	0.750***	0.747***
t-statistic	18.567	18.522
Δ ln P	-0.942***	
t-statistic	-37.010	
Δ P_Firm_comp		-0.913***
t-statistic		-37.658
Δ ln P_Peers		-1.004***
t-statistic		-25.594
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R^2	0.556	0.557
N	17,431	17,431

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

Parameters	(1)	(2)
	High CPP Board	Low CPP Board
Δ ln_Mkt	0.889***	0.803***
t-statistic	14.600	12.151
Δ ln P	-1.279***	-0.337
t-statistic	-6.648	-0.881
Δ P_Firm_comp	0.282	-0.150
t-statistic	1.407	-0.370
Δ ln P_Peers	0.349*	-0.123
t-statistic	1.876	-0.353
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R^2	0.464	0.197
N	2,787	2,956

Appendix

Table A1. Variable definitions

Variables	Description
TDC1	CEO's Total Compensation on ExecuComp (#TDC1)
MKT_COMP	Market level of CEO's compensation, estimated by a cross sectional regression of the form $\ln(TDC1_t) = a + b*\ln(Sales_{t-1}) + \varepsilon_t$ run by GICS Industry Groups (#GGROUP)
Δ 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)
Δ 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
Δ ln P_Peers	Difference between ln P_Peers and ln P_Peers_{t-1}
Δ P_Firm_comp	Difference between Δln_P and Δln P_Peers.
χ	A firm/year level measure of performance penalty in CEO equity compensation estimated as the coefficient χ of the following firm level expanding window regression: $\Delta \ln N\_shares_t = \alpha + \beta \times \Delta \ln\_Mkt + \boldsymbol{\chi \times \Delta \ln P_t} + \varepsilon_t$
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).
Insider ownership %	The estimated fraction of shares held by top management and directors, as reported in the firm's most recent proxy statement (InsidersPctg from GMI Ratings).
Growth in TDC1	(CEO Total Compensation in year t - CEO Total Compensation in year t-1)/CEO Total Compensation in year t-1
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: $\ln(TDC1_t) = a + b*\ln(Sales_{t-1}) + \varepsilon_t$. 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.

GICS group	Industry Group Name	N (Yrs)	Intercept	$\ln(Sale_{t-1})$	_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 5, 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(ΔPrice) * Year		
Bakke et al. (2016) – Dropped Data	-0.694***	-0.709***	-0.464*
t-statistic	(-6.56)	(-6.54)	(-2.12)
Adj. R^2	0.126	0.133	0.159
N	3387	3387	3387
Bakke et al. (2016) – Full Data	-0.932***	-0.923***	-0.810***
t-statistic	(-7.03)	(-6.52)	(-6.23)
Adj. R^2	0.122	0.126	0.144
N	3929	3929	3929
Hayes et al. (2012) – Full Data	-0.323*	-0.323*	-0.204
t-statistic	(-2.34)	(-2.45)	(-1.31)
Adj. R^2	0.122	0.126	0.144
N	3929	3929	3929
Year fixed effect	No	Yes	Yes
Firm fixed effect	No	No	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 C plots and interpolates the average change in the number of shares granted and the average change in price of each portfolio.

Panel A: Fixed Ranges

Δ ln P	FREQ	Δ ln P_Mean	Δ 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	Δ ln P_Mean	Δ 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).

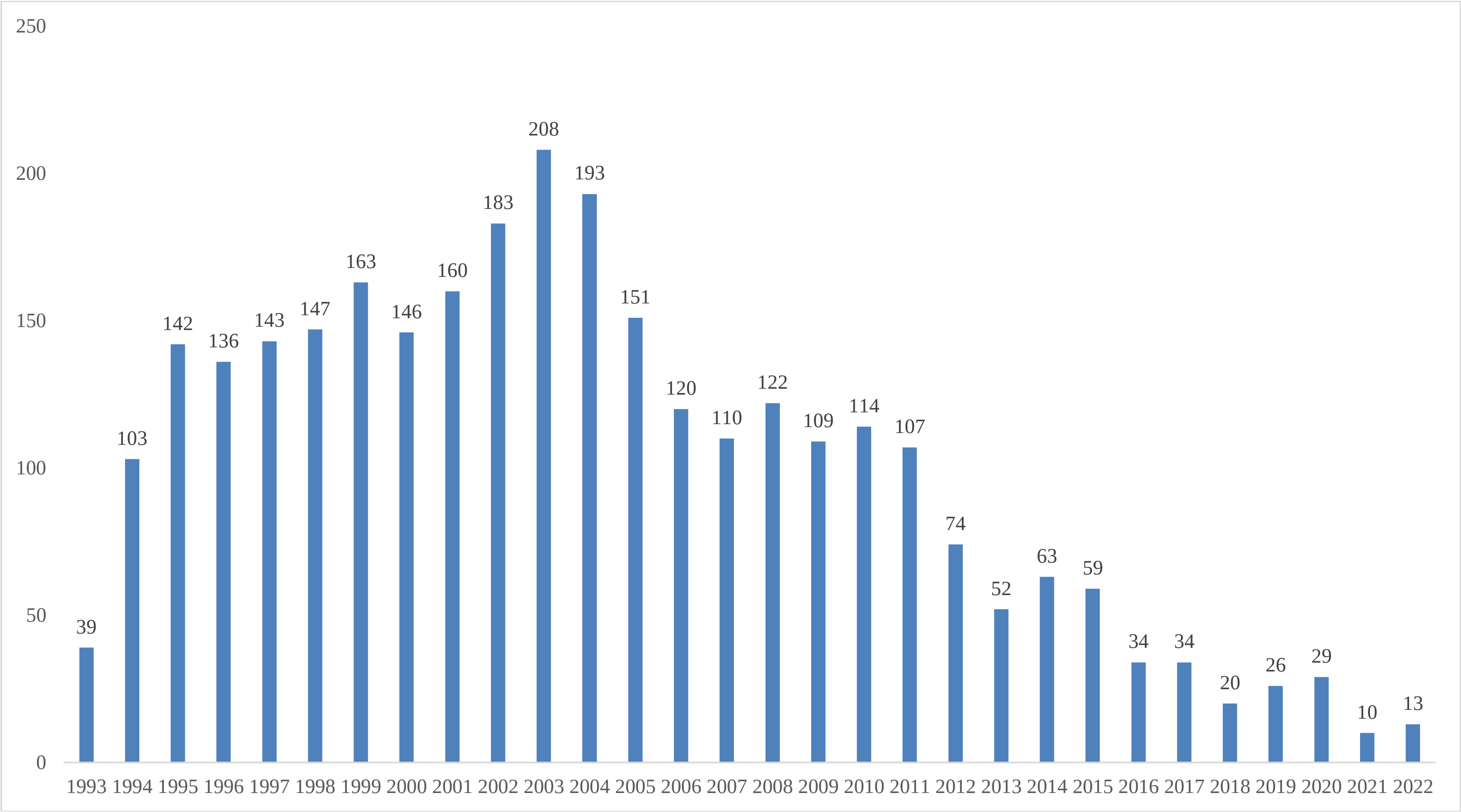

Figure A2. Binned Scatter Plot Results

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.