Competitive Target Pay Practices for CEO Compensation

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Abstract:

The competitive target pay policy sets a target dollar number for total CEO compensation within a specified range of the amount paid to CEO peers. If such a policy were widely adopted by compensation committees, we would observe a negative cross-sectional association between the stock price performance of a firm and change in the equivalent shares awarded to the CEO. That is exactly what we document in our sample of 21,614 firm-year observations, drawn from Execucomp covering the years 1992 to 2018. We go on to demonstrate, via simulations, that such a practice penalizes the sensitivity of CEO wealth to stock price performance as poor (superior) stock price performance is rewarded with larger (smaller) equity grants. Directors' equity compensation is also strongly consistent with competitive pay policies. Finally, we document that Institutional Support Services (ISS)'s recommendations on CEO pay proposals do not appear to recognize the weakened link between CEO wealth and performance due to competitive pay policy.

Keywords: CEO, compensation, target pay, competitive pay policy, compensation committee, director pay

JEL: G34, G38, J31, J33, J38, K22, K34, M12, M41, M48, M52

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1.0 Introduction

The objective of this paper is to document (i) the wide-spread prevalence of the "competitive pay policy" in guiding CEO compensation; and (ii) how that policy undermines CEO pay for performance. The competitive pay method sets a target amount of total compensation – salary, bonus and equity - within a specified range of the amount paid to executive peers. Peers are typically chosen to be similarly sized firms in the same industry.

The basic goals of executive compensation have changed little since the advent of large corporations in the late 19th century: provide strong incentives to increase shareholder value, retain key talent and limit shareholder cost. The practitioner literature, however, claims that the guiding policy used to achieve these objectives has indeed been revised. In the first half of the 20th century, the guiding policy was fixed percentage sharing in a measure of value added, typically, an economic profit measure (e.g., 5% in profits to the CEO). Since that time, the guiding policy has been competitive pay policy, that is, providing target dollar compensation at market pay levels regardless of past performance (O'Byrne, 2013).

The theory of competitive pay policy is that targeting pay at market (i) retains key talent as that target pay does not fall below the market wage for the executive; (ii) controls shareholder cost as pay does not rise above the market wage for the executive; and (iii) achieves strong incentives as long as a company has a high percent of pay at risk. In this paper, we document the widespread prevalence of competitive pay policy and provide evidence that the policy creates an inherent performance penalty - poor performance is rewarded with larger share grants, while superior performance is penalized with fewer shares. Such a performance penalty undermines the strength of incentives given to the manager.

We use data from Execucomp from 1992 to 2018, which covers executive compensation for the CEO and other top executives in S&P 1500 firms. Based on 21,614 firm-year observations, we show that *fixed number* option grants, a policy documented by Shue and Townsend (2017), has become less frequent in recent years especially after 2010, when their sample ends. *Fixed value* grants have become more popular since.

We go on to find a monotonic and inverse relation between the stock price performance of the firm and the change in the equivalent shares awarded to the CEO. This evidence is consistent with the hypothesis that in order to keep the value of the equity grant constant, firms that suffered a decline (increase) in the stock price increase (decrease) the number of equivalent shares granted to the CEO.

We turn next to the question of which component of stock price changes, idiosyncratic or systematic, is associated with changes in shares given to the CEO. On average, compensation committees appear to offset 40% of the firm-specific component of the stock price changes and 55% of the industry component of such stock price changes. Hence, compensation committees appear to partially shield CEO pay from factors outside her control such as industry performance.

Prior work (Hayes et al. 2012, Bakke et al. 2016, Humphrey-Jenner et al 2016, Mao and Zhang 2018, Aboody et al. 2018, Ferri and Li 2020) has flagged the potentially transformative impact of expensing stock option awards post FAS 123R. After 2006, when FAS 123R came into being, we find that the application of the competitive pay policy has increased significantly.

Three additional results are potentially interesting. First, we find that directors' equity compensation appears to be adhere even more strongly with the philosophy of competitive pay policies relative to CEO's equity compensation. On average, 88% of the increase (decrease) in stock prices is offset by an downward (upward) revision in the number of shares awarded to directors. Second, we demonstrate, via simulations, that adherence to competitive pay policy philosophy penalizes the sensitivity of CEO wealth to stock price performance. Finally, we investigate whether the objections of Institutional Support Services (ISS), the key proxy advisory service, reflect the delinking of pay and performance imposed by competitive pay policy. Remarkably, we find that the competitive pay schemes reduce the odds of a negative vote recommendation by ISS. That is, ISS is more likely to recommend a positive vote on a compensation package for senior managers in a proxy statement that practices competitive pay policy despite evidence presented here that such a policy weakens the link between CEO pay and performance.

The closest paper in the literature is Shue and Townsend (2017), which documents the prevalence of equity grants of fixed number of shares to CEOs. As mentioned earlier, we document that the practice of giving out option or stock grants, covering the same number of underlying shares, is less likely to be observed in the data especially after 2010, where their sample ends. In particular, we find that after an initial decade of almost monotonic growth (1993-2003), the number of fixed number option grants reaches its peak in 2003 (208 grants), then progressively declines. Very few fixed number grants are observed in the more recent years.

We believe we are among the first in the literature (i) to document the increasing popularity of the competitive pay policy, suggesting fixed value equity grants, both for CEOs and directors; (ii) to document that the competitive pay policy weakens the link between CEO wealth and firm performance; and (iii) to show that the recommendations of ISS, the premier proxy advisor, on CEO pay proposals do not appear to recognize the weakening of the link between CEO wealth and firm performance on account of competitive pay policy.

The remainder of the paper is as follows: in section 2 we describe the background of incentive problems with two examples of competitive pay policy. We also sketch the structure of empirical tests to document the competitive pay policy. In section 3 we present our data and test results, in section 4 we explain the consequences of competitive pay policy and section 5 concludes.

2.0 Background

2.1 Examples of competitive pay policy at Walmart and Marathon Oil

Consider two examples of the competitive pay policy at work, one at Walmart and one at Marathon Oil. In 2017, when the stock price on the grant date was $66.65, equity compensation given to Walmart CEO C. Douglas McMillon consisted of 57,562 restricted shares and 188,260 performance shares. In 2020, when the grant date stock price was $115.88, equity compensation for Mr. McMillon comprised of 33,159 restricted shares and 108,280 performance shares. The 2020 grant date stock price was 174% of the 2017 grant date stock price, but the number of shares granted in 2020 was only 54% of the number of shares granted in 2017. More important, the aggregate dollar grant value in 2020, that is, number of shares times the stock price, was roughly the same in both years, $16.4 million. This is an example of competitive pay policy at work. Even if there were a huge increase in the stock price, the total dollar equity grant value does not increase with the stock price. The competitive pay policy maintains the target dollar grant value. Let us consider the impact of competitive pay policy in another setting where stock prices have been falling.

In 2015, when the grant date stock price was $29.06, equity compensation for Marathon Oil CEO Lee Tillman consisted of 256,591 options, 81,292 restricted shares and 135,487 performance shares. In 2018, when the grant date stock price was $14.52, equity compensation for Tillman comprised of 298,914 options, 170,455 restricted shares and 284,091 performance shares. The 2018 grant stock price was 50% of the 2015 grant stock price but the number of equivalent shares in 2018 was 159% of number of equivalent shares given in 2015. At first glance, it looks as though Tillman was modestly penalized for the 50% decline in the stock price because the aggregate value of shares times grant price declined by 20%, but that observation ignores the shift away from lower valued option shares. Options, which the company valued at 24% of the grant date stock price in 2015 and at 40% of the grant date stock price in 2018, declined from 54% of total grant shares in 2015 to 40% in 2018. The aggregate equity compensation grant value, as reported by the company, was $8,054,680 in 2015 and was barely changed at $8,342,683 in 2018. In this case, despite a huge decline in the stock price, the total dollar equity grant value did not decline with the stock price. The compensation committee appears to have provided the company's target pay value, which varies with competitive pay levels, but not with the company's stock price.

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 says, in its 2020 proxy, that it "provide[s] competitive pay to attract and retain highly-qualified talent at all levels," and that it "set[s] our NEOs' target TDC at competitive levels relative to our peer groups" and pay is "aligned with shareholder interests" because "73-75% of NEO (named executive officer) TDC (total direct compensation) is performance-based and a majority is in the form of equity." Marathon, in its 2019 proxy, says that "we provide market-competitive pay levels to attract and retain the best talent, and regularly benchmark each component of our pay program, including our benefit programs, to ensure we remain competitive." The proxy further notes that "our program is designed to reward executives for their performance" and "ninety percent of our CEO's total target direct compensation is influenced by Company performance."

2.2 Incentive problems underemphasized

A remarkable feature of modern proxy disclosure is the nearly complete absence of any discussion of the performance penalty inherent in target dollar pay levels and its impact on management incentives. For example, a search of proxy filings on the SEC's Edgar over the 20 years since 2001 shows only 26 references to "fixed share grant" and only 25 references to "fixed share basis." These rare instances recognize that a fixed shares policy is better at aligning management's incentives with shareholders (as formally documented in section 4 to follow). For example, the 2003 Compensation Committee Report for Vornado Realty Trust says "The Compensation Committee believes that the interests of the Company's shareholders and executive officers, including the Chief Executive Officer, will be aligned if executive officers are given the opportunity to own the Company's Shares through substantial option and restricted share awards that are granted on a fixed share basis without adjusting the number of shares granted to offset changes in the Company's stock price." Similarly, the 2013 proxy for DDR company notes that "the benefit of the fixed share grant is that it aligns our director pay with shareholders by subjecting director pay to both increases and decreases in shareholder value."

Practitioner discussions of competitive pay policy highlight potential problems with such a policy although the attendant incentive problems are rarely mentioned. For example, in an article tilted, "Determining Equity Grant Sizes in the Volatile COVID-19 Environment," Walmart's compensation consulting firm, Pay Governance (2020), discusses potential problems of target dollar pay levels. It notes that "most companies typically start the award calibration process with a targeted dollar value for each participant and procced to determine the number of units to grant based on the current stock price and other factors."

"Below we illustrate the process using a target grant value of $250,000 delivered in restricted stock units (RSUs) at an assumed March 1 stock price of $50 and compare it with the same calibration using a March 31 price of $25. For example, for a grant of RSUs, a company will divide a targeted dollar value of $250,000 by the company's closing stock price on the date of grant (e.g., $50/share) in order to determine a grant of 5,000 RSUs ($250,000/$50). However, a not unrealistic share price decline of -50% in the past 30 days (to $25 in this example) suggests that *the company would need twice as many shares to deliver the same targeted dollar value* ($250,000/$25 = 10,000 RSUs)."[1] (italics in the original). Pay Governance concludes that "for most companies, using this historical approach – combined with the recent collapse in share prices – would create an untenable situation for a variety of reasons including the expected impact on the burn rate, dilution and share reserve life, and possible proxy advisor and shareholder reactions." Pay Governance's list of the possible problems associated with target dollar pay levels, however, makes no mention of any incentive issues.

Pay Governance reflects a long history – among compensation consultants – of overlooking the incentive problems of competitive pay policies. Writing in 1978, Bud Crystal, one of the two most famous compensation consultants of the post-World War II period[2], noted that "until recently, in fact, the usual practice was to make large grants at infrequent intervals – for example, once every five years."[3] Crystal goes on to say that "a better approach is to establish annual grant

[1] David Fitt, Joe Mallin, Matt Qaurles, Josh Bright, Mike Grasso and Phil Johnson, "Determining Equity Grant Sizes in the Volatile COVID-19 Environment", April 7, 2020, available at www.paygovernance.com.

[2] The other is Arch Patton of McKinsey.

[3] Graef S. Crystal, Executive Compensation: Money, Motivation, and Imagination, AMACOM: New York, 1978, p. 153. We'll show below that a shift from grants every five years to annual grants significantly increases the negative incentive effect of competitive pay policy.

multiples for various salary levels….Using survey data, the company discovers that a competitive five year option grant multiple at the $50,000 salary level is 1.8 times salary. This figure is then applied to the $50,000 base salary midpoint and divided by the current market value per share of the company's stock to obtain a guideline number of option shares for that particular year's grant." We question this long-standing consensus that competitive pay policy is a sound basis for executive compensation.[4]

Competitive pay policy has been discussed in the academic literature by Hall (1999) and Shue and Townsend (2017). These papers assume that companies choose between compensation policies that either grant a fixed number of shares or a fixed value of equity to the CEO. In section 3, we show that fixed number of option grants, a policy documented by Shue and Townsend (2017), has become less frequent in recent years especially after 2010, where their sample ends. Fixed value grants have become more popular.

To summarize, if competitive target pay is indeed the best descriptor, on average, of CEO pay practices, we would expect to empirically observe a negative correlation between the number of shares awarded and past stock price performance of firms. We turn to the empirical tests next.

2.3 Empirical test to document competitive target pay

We use data from Execucomp from 1992 to 2018, which covers executive compensation for the CEO and other top executives in S&P 1500 firms. We limit attention to CEOs in our analysis. For option compensation, we begin with individual grant-level data to better identify competitive target pay when grants are given at different dates in the year. However, exact grant date information is only available after 2006. Before 2006, firms were only required to report the

[4] A small group of practitioners have recognized the incentive problems of competitive pay policy since the early 1990s. See O'Byrne, Linking Management Performance Incentives to Shareholder Wealth, Journal of Corporate Accounting and Finance (Autumn 1991), and O'Byrne, What Pay for Performance Looks Like – The Case of Michael Eisner, Journal of Applied Corporate Finance (Summer 1992).

expiration date of an option grant. In those years, we follow the literature (e.g., Aboody and Kasznik (2000)) and infer the grant date from the expiration date under the assumption that expiration dates occur on grant date anniversaries.

We begin by converting reported equity compensation to equivalent common shares. To do so, we divide the fair value of each option/equity grant by the firm stock price at grant date. Stock price is adjusted for stock splits and share dividends to enable cross-sectional and inter-temporal comparisons.[5] Equivalent common shares calculated over the same fiscal year for an individual CEO are then aggregated to define a unique CEO-year variable indicating, each year, the total value of the equity compensation of the CEO expressed as number of common shares. The concept of competitive pay implies the following equation connecting number of shares granted to the CEO with stock prices:

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

In equation (1) above, 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 $change_t$ is the expected change in CEO's compensation induced by changes in the market pay levels for CEOs. All variable definitions can be found in Table A1 in the appendix. In practice, Mkt $change_t$ is usually measured as the market level of the CEO's compensation (Mkt_Comp) divided by his/her actual compensation in the previous year (Execucomp item TDC1)[6]:

[5] 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).

[6] 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: companies often take several years to adjust target compensation for new CEOs to market pay levels and TDC_{t-1} will deviate from target pay_{t-1} even though target pay_{t-1} is equal to market pay_{t-1}."

$$Mkt\ Change_t = \frac{(MktComp_t)}{(TDC1_{t-1})} \quad (2)$$

Conversations with compensation consultants and a look at the professional literature suggest that a CEO's market pay for a year (Mkt_Comp) is determined primarily by the industry and size of the firm (see, for instance, Hallock and Torok (2009) and, for one of the earliest examples, Patton (1955)). In particular, we empirically estimate the main determinants of Mkt_Comp_t by regressing, for every industry-year, the CEO's compensation (natural logarithm of TDC1 as per Execucomp) on firm's size (natural logarithm of a firm's revenue):

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

The regression coefficients of estimating (3) for the year (*t-1)* together with $Sales_{t-1}$ are then used to estimate CEO's market compensation of year t:[7]

$$Mkt\_Comp_{i,t} = e^{a_{t-1}+b_{t-1}x\ Ln\ (Sales_{i,t-1})} \quad (4)$$

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). In order to classify those 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.

[7] We followed the literature by using the natural log-natural log model to capture the nonlinear relationship between size and compensation (Roberts,1956 and Gabaix et al. 2013).

A total of 47,239 firm-year observations is available for the estimation of the market level compensation of CEOs from 1993 to 2018. Table A2 in the Appendix presents the average intercept and slope of the model for each industry (averaged across years).

Rearranging terms in (1) leads to equation (5) and (6) below:

$$\text{N\_shares}_t = \frac{\text{N\_shares}_{t-1} \times \text{P}_{t-1} \times \text{mkt\_change}}{\text{P}_t} \quad (5)$$

$$\frac{\text{N\_shares}_t}{\text{N\_shares}_{t-1}} = \frac{\text{P}_{t-1}}{\text{P}_t} \times \text{mkt\_change} \quad (6)$$

We convert equation (6) into natural logarithms for ease of estimation and obtain the following equation:

$$\Delta \ln \text{N\_shares} = - \Delta \ln \text{P} + \ln (\text{mkt\_change}) \quad (7)$$

In equation (7), mkt_change is defined as in (2) and Δ ln stands for log change i.e., the variation from year t and year t-1 of the log variables. Assuming that the competitive pay policy describes the data, the change in the number of shares granted ought to be inversely related to the change in the stock price but positively related to the change in the market level of the CEO's compensation.

On the contrary, a policy of granting a fixed number of shares, as suggested by Shue and Townsend (2017), would imply the CEO is granted the same number of shares irrespective of the dynamic of the stock price over the year implying that:

$$\Delta \ln \text{N\_shares} = 0 \quad (8)$$

Therefore, we can assess the relevance of competitive pay policy, as opposed to the fixed number policy, by considering the sign and statistical significance of the coefficient *b* and *c* in the following linear regression:

$$\Delta \ln \text{N\_shares} = a + b \text{ x } \Delta \ln \text{P} + c \text{ x } \ln (\text{Mkt\_change}) + \varepsilon \quad (9)$$

The empirical test to distinguish (9) from (8) boils down to the coefficient *b* and on *c*. Under the competitive pay policy, we would expect b =-1 and c= 1. Under the fixed share policy, we would expect $b = 0$ and $c = 0$.

3 Data and test results

3.1 Data and descriptive statistics

Our analysis covers all firms at the intersection of the Execucomp and CRSP databases between 1992 and 2018. In order to be included in the analysis, firms must have a stock price on CRSP and the CEO must receive equity compensation for at least two consecutive years. A total of 21,855 CEO-firm-year observations is available for our analysis after the application of these data filters. As is common practice in the literature, we winsorize all variables at the top or bottom one percent of the distribution for the relevant year to minimize the effect of extreme values on the inferences.

Table 1 summarizes the statistical distribution of the variables involved in the analysis. The Appendix at the end of the paper describes how each variable is calculated (Table A1), but a few additional comments are warranted. The Execucomp database offers grant-level *option* award data throughout our sample period. However, grant-level *stock* award data is available only after 2006. Therefore, prior to 2006, we assume that equity compensation is granted on the same date as options. In about 20% of the cases, CEOs receive more than one grant per year. In these cases, we calculate N_shares_t as the total number of equivalent common share granted to the CEO in fiscal year t and P_t as the average stock price at each grant date, with weights given by the number of equivalent common shares of each grant. As can be seen, the mean (median) total compensation (TDC1), in the sample, is $4.64 million ($2.71 million). The mean (median) equity compensation

(EQ_COMP) is $2.78 million ($1.26 million). More revealing, 44.2% of the total compensation for the average firm is comprised of equity compensation.

Table 2 reports average Pearson (above diagonal) and Spearman (below diagonal) cross-sectional correlations among the variables in Table 1. In all cases, we calculate the pairwise correlation each year and report averages of correlations across years. Consistent with the competitive pay hypothesis, we find a positive and significant Pearson correlation between the change in actual compensation and the market pay (0.42 correlation between Δ ln TDC1 and ln_Mkt_change) and a significant negative correlation (-0.18 correlation) between the change in the number of equivalent shares (Δ ln N shares) and the stock price (Δ ln P).

In order to formally assess the relation between the change in the number of equivalent shares and changes in stock price, we group firm-year observations in portfolios according to the yearly change in stock price (<-50%, -50% to -25%, -25% to 0%, 0 to 25%, 25%-50%, > 50%) and report the average annual change in the number of equivalent shares in each group. As reported in Table 3, we find a monotonic and inverse relation between the stock price performance of the firm and the change in the equivalent shares awarded to the CEO. As stock prices increase from the < -50% portfolio to > 50% portfolio, the change in the average number of shares granted to the CEO ((Δ ln N shares) moves from 0.39 to -0.20. On average, to keep the dollar value of the grant constant, firms that suffered a decline in stock prices appear to increase the number of equivalent shares granted to the CEO and vice versa.

In particular, the average price performance of the worst performing firms (i.e., decline in price greater than 50%, or Δ ln P_Mean) is -82.6% while the number of shares granted increases by 39.3%. A similar dynamic is observed in the group of firms with a drop in price between -50% and -25% and -25% and 0% (respectively: average change in price -35.4%, average change in the number of shares granted +17.6%; average change in price -10.58%, average change in the number of shares granted of 9.00%). Finally, the negative relation between price performance and shares granted characterizes the groups with positive price performance as well.

Because groupings in Panel A are likely to present relevant clusters in time (for instance, the worst performance group being dominated by observations coming from years of market downturns), the negative relation between price change and shares granted could be driven by some omitted time varying macro-economic factor rather that firm level performance. To assure an even distribution of firms in the various portfolios by year, in Panel B, we sort firms on their relative price performance. In each year, firms are sorted on stock price change and allocated into ten equal portfolios (deciles); for each portfolio, we then report, across the years, the mean log-change in (i) price and (ii) number of shares granted. The negative correlation between change in stock price and change in the number of shares granted continues to come through.

Panel C of Table 3 plots and interpolates the average change in the number of shares granted and the average change in price of each portfolio (both variations are referred to the natural logarithm of the variables). The relation is remarkably linear [R^2=0.9789] with the following parameters:

$$\Delta \ \ln N\_shares = 0.0383 - 0.4048 * \Delta \ ln\ P \qquad (10)$$

Firms with no change in the stock price over the year, on average, increase the number of shares granted to the CEO's by roughly 3.8%, a data point consistent with the increasing trend in market pay for top executives. Firms that experience a change in price offset roughly 40% of this change when setting the number of shares granted in the new year.

Overall, the evidence presented in Table 3 suggests that equity compensation policies adjust to past stock price performance. Hence, the results presented here are hard to reconcile with claims of widespread use of fixed share number compensation policies in prior work (Shue and Townsend 2017).

Figure 1 documents the decline, in the most recent years, of the fixed number compensation policies highlighted by Shue and Townsend (2017). After an initial decade of almost monotonic growth (1993-2003), the number of fixed number option grants reaches its peak in 2003 (208 grants), then progressively declines, with just a few instances of fixed share grants recorded in the most recent years.

3.2 Model estimation with firm stock price and market index performance

In this section, we capture the joint effect of stock price performance and market pay on the CEO's equity compensation. This is done by introducing CEO and year fixed effects in model (9):

$$\Delta \ln N\_shares = a + b \times \Delta \ln P + c \times \ln (Mkt\_change) + \text{Year fixed effects} + \text{CEO fixed effects} + \varepsilon \quad (11)$$

Under the competitive pay policy process described earlier, we expect *b* to be negative and *c* to be positive. Under a 'perfect' competitive policy regime, we would expect b=-1 and *c*=1. If c were to equal one, the CEO's compensation tracks the level of the market pay one to one: a 1% difference between actual market pay and prior year actual compensation translates into 1% increase in the actual pay of the CEO. If *b* = -1, any change in the value of the equity compensation, driven by a change in the stock price, is completely offset by an equal but opposite change in the number of shares awarded. That is, a 1% increase in the stock price is offset by a 1% reduction in the number of shares.

The first column in Table 4 reports the estimates of the coefficients of the model. The coefficient on market pay is remarkably close to one (0.967) 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 -0.448, indicating that, on average, compensation committees adjust the number of shares awarded to offset 45% of the change in the company's stock price.

In the second column of Table 4, we decompose the change in the firm's stock price into an industry component (firms in the same GICS code as the focal firm except for the focal firm) and a residual firm-specific component. One would expect the compensation committee to shield executive's compensation from factors outside of their short run control, such as the industry's performance, while holding managers fully responsible for their controllable actions, traditionally measured by the firm-specific component of the change in the stock price (Durnev et al. 2003; Bertrand and Mullainathan, (2001)). Under such circumstances, the coefficient of the industry component of the price change should be -1 while the coefficient on the firm-specific component should be zero. Our results show that the estimated coefficient of the industry component of the price change is, indeed, lower than the coefficient of the firm-specific component, but much less than expected. On average, compensation committees offset 40% of the firm-specific component of the price change and 55% of the industry component of the firm's stock price change. As such, we cannot say that the revision in the number of shares we observe is driven by the desire to shield CEO 's pay from factors outside her control.

3.2.1 Post FAS 123R

The last column of Table 4 introduces a time-based indicator variable aimed at assessing whether the sensitivity of the number of shares granted to the stock price changed after FAS123R went in effect in 2006. FAS123R eliminates the possibility of using APB 25's intrinsic value method of accounting in the measurement of equity compensation. Under APB 25, issuing stock options to employees generally resulted in recognition of no compensation costs in the income statement. All public companies are required to measure and disclose the grant-date fair value of all share-based payment transactions with employees. By eliminating the intrinsic value-based accounting method, FAS 123R greatly improved the comparability of CEO's compensation, which, in turn, allowed the development of competitive pay policies based on simple, observable measures. The literature views FAS 123R as a significant relatively exogenous event that changed how options are granted (Hayes et al. 2012, Bakke et al. 2016, Humphrey-Jenner et al 2016, Mao and Zhang 2018, Aboody et al. 2018, Ferri and Li 2020). Hence, it may be worth understanding whether the competitive pay policy regime weakened or strengthened post FAS123R. After 2006, when FAS123R came into effect, we find a greater prevalence of the practice of increasing (decreasing) the number of shares granted when the stock price decreases (increases) in order to keep the compensation of the CEO stable: the coefficient on the dummy variable interacted with the price variable is equal to -0.192 and statistically significant, meaning that the price change coefficient becomes more negative after 2006, falling from -.349 to -.541 (i.e. -0.349 + (-0.192)). Overall, our empirical evidence suggests a stricter adherence of compensation policies to the competitive pay model after FAS123R went in effect post 2006.

3.2.2 Separating firms that do and do not penalize performance

The analysis presented thus far is consistent with the prevalence of competitive pay policy for the average company in the average year. Clearly not all firms follow a competitive pay policy in all years. In order to better characterize the use of competitive pay policy, we split the sample in two groups: firms that have a track record of penalizing or not penalizing performance. We expect to find a negative and larger coefficient (in absolute terms) on the stock price variable for the sub-sample of companies with a tradition of penalizing performance.

The first step of the analysis is the identification of such sub-samples. We do so by estimating model (7) at the firm level with an expanding window regression ensuring that at least five observations are available for a firm:

$$\Delta \ln N\_shares_t = \alpha + \beta \times \ln (Mkt\_change_t) + \chi \times \Delta \ln P_t + \varepsilon_t \qquad \text{by firm, for all } t<T \qquad (12)$$

The coefficient χ is our firm/year level discriminatory variable. Each year, a firm is characterized as penalizing (not penalizing) performance if the estimated χ is less (more) than -0.2. In un-tabulated analysis, we verify that our results are robust to the selection of different cutoffs in the range 0/-0.4.

Due to the additional data requirement imposed by the firm level regression (12), we are only able to classify a total of 9,979 firm-year observations (relative to the original sample of 21,614 firm year observations). Of these, 9,979 firm-year observations, 6,425 (3,554) are classified as penalizing performance (non-penalizing performance). The base model is then estimated on these two groups of companies and the results are reported in Table 5. The regression for the group that does not penalize performance shows a slope of the price change variable of -0.382, while the regression for the group that penalizes performance reflects a slope of -0.566.

To investigate further, in columns 3 and 4 we classify firms based on χ measured two years before and find a further decrease of the slope of the price variable (-0.474) in the group that did not penalize performance, while in the group that penalized performance, the slope is virtually unchanged at -0.546. In un-tabulated analysis we see that the coefficients of the two groups completely converge four years after the classification. In summary, this analysis provides additional evidence of the progressive shift of compensation policies toward the competitive pay model.

3.2.3 Directors pay

In Table 6, we apply the competitive pay model to the compensation of the members of the board of directors. Director pay continues to be simplified as companies eliminate board and committee meeting fees and make up for such elimination with a corresponding increase in cash and equity retainers. We test whether directors' equity awards share common characteristics with CEOs' awards. We find that directors' equity compensations show an even stricter adherence to competitive pay policies. The coefficient of the change in price is -0.88 (adjusted R^2 of the model = 0.51) meaning that, on average, 88% of the (natural log) change in price is offset by an opposite revision in the number of shares awarded. We remind the reader that the corresponding coefficient for CEOs is -0.45 (adjusted R^2 of the model is 0.43, see Table 4).

4. Consequences of competitive pay policy

4.1 Competitive pay policy affects pay for performance

In this section, we present a simulation analysis of the implications that fixed number or fixed value policies have on CEO's wealth. In the simulation, we project either a fixed number of shares (N_0) granted or a fixed dollar amount of shares (FV_0) given by the compensation committee to a CEO for 10 consecutive years and observe the difference in CEO's final wealth (W_{10}) associated with the two different policies. The number or the dollar value of the shares granted each year is set equal to the number or the dollar value of the shares actually granted to the CEOs in the base year (year 0) of the simulation. We estimate 17 sets of simulations, one for each year in the 1992-2008 period. The difference in the CEO's final wealth under the two policies is solely driven by the observed yearly change in the stock price for a given firm. Under the fixed number scheme, the CEO's wealth is just a function of the initial number of shares N_0 and the final stock price (P_{10}).

Under the fixed value policy, the full stream of prices P_1-P_{10} matters as the intermediate prices determine the number of shares in the corresponding year:

$$W_{10\_Fixed\_N} = \sum_{t=0}^{9} N_0 \; x \; P_{10} = 10 \; x \; N_0 x P_{10} \tag{13}$$

$$W_{10\_Fixed\_FV} = \sum_{t=0}^{9} \frac{FV_0}{P_t} x \; P_{10} = \sum_{t=0}^{9} N_t \; x \; P_{10} \tag{14}$$

As an example, Table 7 shows a case study of such a simulation develops for IBM. Samuel Palmisano, CEO of IBM, in 2002 (base year) was awarded 134,410 (equivalent) shares (N_0) valued at $13.058 million ($FV_0$) ($P_0$ at grant date $97.15). The top row of the table presents the stock price for IBM at the subsequent grant date anniversary. Panel A reports the number of shares that would have been granted over the years to Mr. Palmisano under the fixed number policy along with their valuation, while Panel B does the same assuming a fixed value policy. The evolution of the stock price in the initial years, up to 2008, is such that the wealth of the CEO would be higher under the fixed value policy. Then, after 2008, the rapid increase of the stock price starts 'penalizing' the CEO's wealth, who would be better off under the fixed number policy. The simulation ends with a final wealth of the CEO of $263 million under the fixed number policy relative to a $236 million number under the fixed value policy.

In Table 8, we repeat the IBM case study for every firm in the sample. After doing so, we sort firm-year observations into deciles based on the 10-year stock performance $\ln(P_{10}/P_0)$ and report the distribution, within each decile, of the difference in the wealth of the CEO simulated under the alternative compensation policies $\ln(W_{10\_Fixed\_FV}) - \ln(W_{10\_Fixed\_N})$. Table 8 clearly shows that CEOs of poor performing companies in portfolio 1 and portfolio 2 are better off under the fixed value scheme: as such, this scheme rewards 'bad' CEOs. For instance, consider the firms with positive price change in portfolios 3 to 10. We see that CEOs of firms in portfolio 4 are penalized under the fixed value scheme compared to the fixed number alternative as such CEOs are less wealthy. As expected, the extent of the penalty widens as we progress to portfolios with higher stock performance: competitive pay penalizes stock price performance, and the better the performance is, the higher is the penalty.

4.2 Do ISS' votes reflect performance penalties?

Our last test examines whether the investment community is aware of the performance penalty inherent in competitive pay polices. We identify a set of 31,493 vote recommendations issued by ISS, the well-known proxy advisory service, from 2006 to 2018 on the shareholders meeting agenda Item "Advisory Vote to Ratify Named Executive Officers' Compensation." The sample include 27,603 "For" recommendations, 3,890 "Against" recommendations and 210 "Abstain" or lack of recommendations. As a result, in about 87.5% of the cases, ISS recommended a positive vote on the proposed compensation package. We test whether companies with a history of CEO compensation policies that penalize stock price performance are more likely to receive an "Against' recommendation.

Our test needs a firm level measure of performance penalty in CEO's compensation. As the reader might remember, we have introduced such a measure in Table 5: the slope of the price coefficient χ in the individual company regression (12). Merging ISS vote recommendations with the firm level measures of performance penalty χ results in a sample of 2,702 observations that we use to estimate, by logistic regression (columns 1-3) and linear probability model (column 4), the probability of a negative vote recommendation on CEO compensation given χ and the set of control variables. The key control variables, consistent with prior work (Malenko and Shen. 2016, Ertimur et al. 2013), are (i) total shareholder return (of prior one year and three years), a variable that ISS says it considers while making its recommendation; (ii) dollar value of ex-ante CEO compensation; and (iii) percentage change in the growth in the dollar value of the ex-ante CEO compensation. Besides these, we control for the usual firm characteristics such as size, market-to-book ratio, ROE and institutional and insider ownership.

As reported in Table 9, all regression specifications estimate a direct effect of the performance penalty variable χ on the probability of a negative recommendation after controlling for other relevant variables. As χ is negative for firms with a tradition of penalizing performance in favor of competitive pay policies, our findings are consistent with hypothesis that the competitive pay schemes reduce the odds of a negative vote recommendation. As the economic interpretation of logit models is not intuitive, in column 4 we also provide OLS estimates of the coefficients (i.e., the linear probability model).[8] In this model, the coefficient on the performance penalty variable χ is 0.014. Because the regression is estimated as a linear probability model, the result in column 4 indicates that the probability of observing a negative ISS recommendation for firms adopting competitive pay policies ($\chi = -1$) is 1.4 percentage points lower than firms not adopting competitive pay policies ($\chi = 0$).

These results suggest that ISS' recommendations do not reflect the penalty imposed by competitive pay policies.

5. Conclusions

We highlight, perhaps for the first time in the literature, that the concept of competitive pay policy is widespread practice used to compensate U.S. CEOs. The competitive pay method sets a target amount of total compensation within a specified range of the amount paid to executive peers. Consistent with the growing popularity of the competitive pay model, fixed number grants are

[8] The linear model assumes that the probability p is a linear function of the regressors, while the logistic model assumes that the natural log of the odds p/(1-p) is a linear function of the regressors.

rarely seen in recent years relative to fixed value grants. We find systematic evidence consistent with the competitive pay idea in that changes in the number of shares awarded to CEOs annually exhibit a strong negative association with changes in stock prices of their companies. When stock price changes are decomposed into an industry and a firm specific component, it does not appear as though compensation committees completely shield CEOs from industry performance. Director pay follows the competitive pay model even more strongly than CEO pay. Simulations reveal that the competitive pay model hurts pay for performance incentives in that CEO wealth is inversely responsive to stock price performance under the fixed value grants model relative to the fixed number grants regime. Somewhat surprising, the recommendations of ISS, the premier proxy advisor, on compensation packages do not recognize the disincentives created by the competitive pay model.

Competitive pay model is a significant development in the world of executive compensation. Much remains to be done in exploring the implications of this model for CEO actions and hence for firm value.

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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)
MKT_CHANGE	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)
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
ΔP_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: $\Delta \ln N\_shares_t = \alpha + \beta \times \ln(mkt\_change_t) + \chi \times \Delta \ln P_t + \varepsilon_t$
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 ($ mln)	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 1992-2018 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. Years	Intercept	$\ln(Sale_{t-1})$	_ADJ R2_
1010	Energy	27	5.34915	.37028	.40493
1510	Materials	27	4.68468	.43138	.43259
2010	Capital Goods	27	4.53344	.45868	.51153
2020	Commercial & Professional Services	27	5.12674	.37871	.24711
2030	Transportation	27	4.01674	.47113	.41487
2510	Automobiles & Components	27	4.12255	.48493	.60523
2520	Consumer Durables & Apparel	27	4.03021	.53790	.39989
2530	Consumer Services	27	4.27847	.51564	.38117
2540	Media (discontinued effective close of September 30, 2018)	27	4.89548	.45036	.42819
2550	Retailing	27	4.77625	.39881	.30921
3010	Food & Staples Retailing	27	3.19552	.51088	.37808
3020	Food, Beverage & Tobacco	27	4.39009	.47055	.43714
3030	Household & Personal Products	27	3.69335	.57809	.60888
3510	Health Care Equipment & Services	27	5.34162	.37442	.41858
3520	Pharmaceuticals, Biotechnology & Life Sciences	27	5.99729	.34436	.51105
4010	Banks	27	4.74651	.43416	.47934
4020	Diversified Financials	27	5.79721	.34938	.28862
4030	Insurance	27	5.50305	.33797	.27866
4040	Real Estate (discontinued effective close of August 31, 2016)	19	5.74903	.30088	.24766
4510	Software & Services	27	5.60624	.34834	.20461
4520	Technology Hardware & Equipment	27	5.09344	.39365	.38194
4530	Semiconductors & Semiconductor Equipment	21	5.59911	.36457	.53523
5010	Telecommunication Services	27	4.83543	.45201	.59312
5020	Media & Entertainment	1	4.41724	.52556	.37293
5510	Utilities	27	3.87860	.49458	.50959
6010	Real Estate	4	5.93743	.33894	.30003

Figure 1. Distribution of CEO fixed number option grants by year

This graph shows the distribution over the years 1993-2019 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).

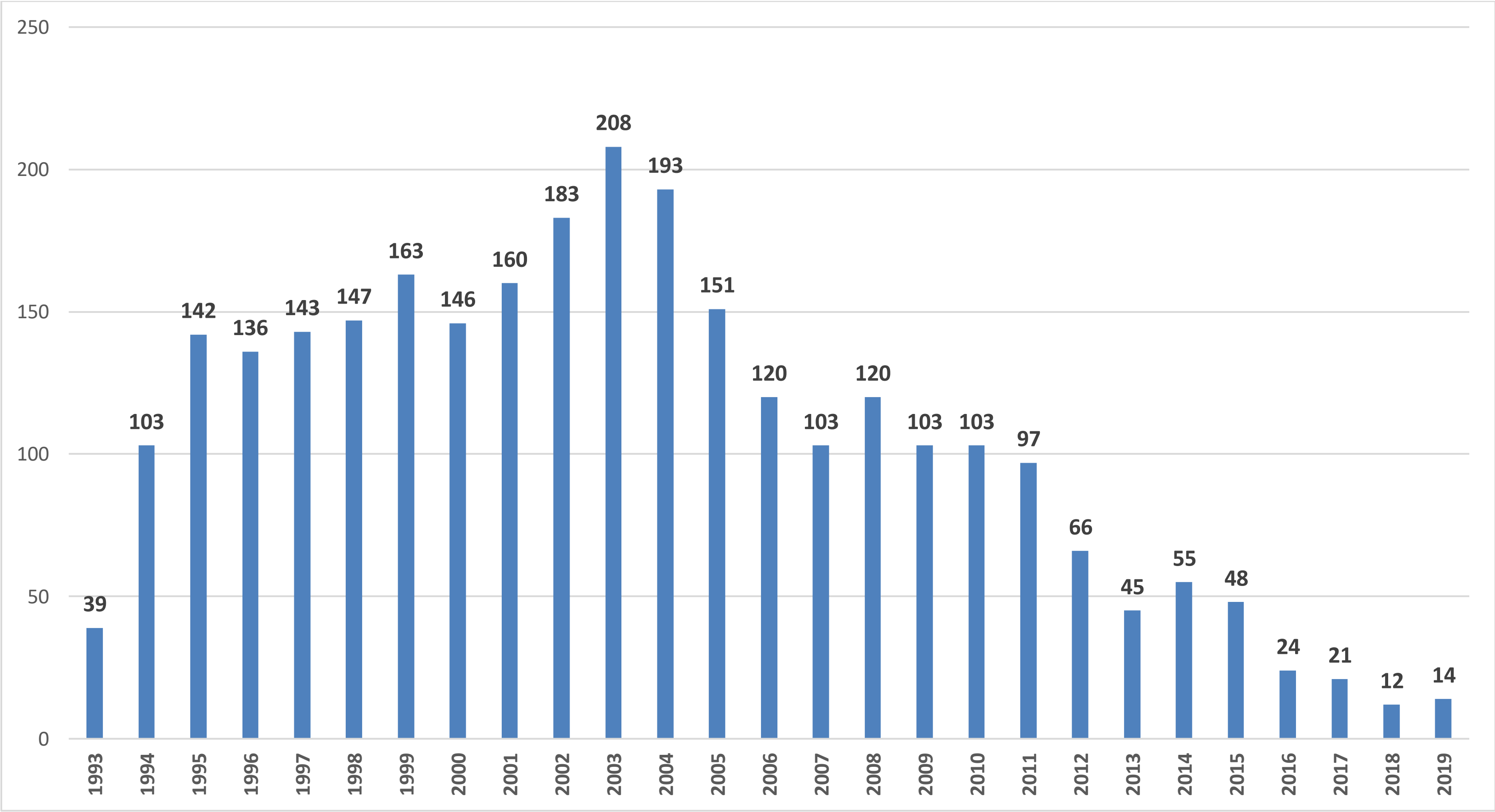

Table 1. Distribution of variables in the analysis

This table reports descriptive statistics from the period 1992-2018 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. ln_Mkt_change 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 Δln_P and Δln P_Peers. The distributions are from data pooled over firms and years. For the calculation of means and standard deviations (but not the percentiles), variables are winsorized at the top and bottom 1%.

Var Name	N	Mean	StdDev	P1	P2	P5	P10	P30	P50	P70	P90	P95	P98	P99
TDC1	43,716	4,646	5,468	172	277	441	644	1,476	2,712	4,940	10,897	15,743	23,444	31,574
EQ_COMP	37,963	2,789	4,146	0	0	0	0	470	1,265	2,834	7,324	10,750	17,062	24,759
%EQ_COMP	37,207	.442	.272	.000	.000	.000	.000	.297	.474	.617	.783	.856	.922	.960
Δ ln_TDC1	35,064	.058	.646	-2.161	-1.698	-1.072	-.656	-.113	.064	.265	.762	1.140	1.628	2.004
Δ ln_EQ_COMP	23,274	.072	.811	-2.637	-2.019	-1.321	-.828	-.150	.067	.322	.981	1.415	2.084	2.622
Δ ln N_shares	21,855	.015	.739	-2.374	-1.808	-1.246	-.808	-.222	.000	.250	.869	1.301	1.833	2.312
Δ ln_P	21,855	.058	.397	-1.300	-1.002	-.666	-.413	-.070	.087	.233	.494	.655	.921	1.122
Δ ln_P_Peers	21,855	.064	.228	-.745	-.607	-.381	-.220	.002	.091	.178	.303	.384	.492	.563
ΔP_Firm_comp	21,855	-.006	.333	-1.112	-.863	-.585	-.394	-.122	.005	.130	.366	.526	.760	.942
ln_Mkt_change	35,073	.016	.739	-2.025	-1.655	-1.198	-.865	-.319	-.003	.342	.930	1.249	1.717	2.210

Table 2. Mean cross-sectional correlations between variables used in the Analysis, with Pearson correlations on the upper diagonal and Spearman correlations on the lower diagonal

This table reports average cross-sectional correlations for the period 1992-2018. 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. ln_Mkt_change 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. Pearson correlations are presented in the upper diagonal and Spearman correlations in the lower diagonal. For the Pearson correlations, variables are winsorized at the top/bottom 1%.

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	ln_Mkt_change
TDC1	1	0.90	0.39	0.29	0.19	0.14	0.14	0.05	0.13	-0.35
EQ_COMP	0.86	1	0.59	0.27	0.26	0.21	0.13	0.05	0.12	-0.30
%EQ_COMP	0.52	0.82	1	0.26	0.34	0.30	0.07	0.04	0.06	-0.24
Δ ln TDC1	0.29	0.26	0.21	1	0.81	0.70	0.28	0.11	0.25	0.42
Δ ln EQ_COMP	0.20	0.27	0.29	0.80	1	0.88	0.28	0.11	0.26	0.32
Δ ln N_shares	0.12	0.20	0.26	0.63	0.80	1	-0.18	-0.08	-0.16	0.32
Δ ln P	0.16	0.14	0.06	0.27	0.30	-0.22	1	0.38	0.89	0.00
Δ ln_P Peers	0.05	0.06	0.04	0.11	0.12	-0.09	0.38	1	-0.06	0.04
ΔP_Firm_comp	0.15	0.13	0.04	0.24	0.26	-0.19	0.85	-0.08	1	-0.02
ln_Mkt_change	-0.45	-0.36	-0.24	0.37	0.28	0.29	-0.02	0.04	-0.04	1

Table 3. Average change in the number of equivalent shares granted to the CEO for different levels of price change

In this table, firm/year observations for the period 1993-2018 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

Δ ln P	FREQ	Δ ln P_Mean	Δ ln N_shares_Mean
<-50%	1729	-.82597	.39257
(-50% - 25%)	1943	-.35359	.17636
(-25%,0%)	4660	-.10581	.09004
(0%,25%)	7404	.12248	-.01917
(25%,50%)	3988	.35419	-.13325
>50%	2131	.72996	-.20861

Panel B

Portf	FREQ	Δ ln P_Mean	Δ ln N_shares_Mean
0	2185	-.74865	.35926
1	2186	-.29041	.14079
2	2185	-.12833	.11804
3	2186	-.02463	.05209
4	2184	.05119	.01100
5	2187	.12085	-.01812
6	2186	.19302	-.06329
7	2185	.27975	-.09480
8	2186	.40252	-.14857
9	2185	.72422	-.20848

Panel C

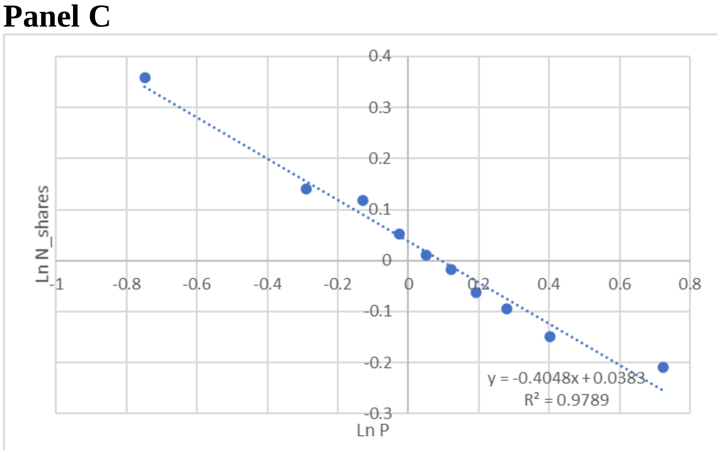

Table 4. Coefficient estimates of the competitive pay model

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, along with cluster-robust t-statistics, average adjusted R-squared and number of observations covering 1993-2018. All regressions include CEO/year fixed effects (un-tabulated). ln(Mkt_change) 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. ∆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. To minimize the influence of outliers, the top and bottom 1% of the explanatory variables were winsorized at the top/bottom 1%. t-statistics are adjusted for clusters and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Parameters	**(1)**	**(2)**	**(3)**
ln (Mkt_change)	0.967***	0.971***	0.911***
t-statistic	48.3	48.41	34.9
∆ ln P	-0.448***		-0.349***
t-statistic	-26.1		-14.3
∆ P_Firm_comp		-0.407***	
t-statistic		-21.3	
∆ ln P_Peers		-0.556***	
t-statistic		-17.4	
ln (Mkt_change)*post2006			0.126***
t-statistic			3.97
∆ ln P*post2006			-0.192***
t-statistic			-5.93
CEO/year fixed effects	Yes	Yes	Yes
Adj. R^2	0.429	0.429	0.431
N	21,614	21,614	21,614

Table 5. Coefficient estimates of the competitive pay model on different subsamples

In this table, the sample in split in two groups: the group of firms that do and do not penalize stock performance when granting equity to CEOs. Model 1 and model 2 in Table 4 are then run on each subsample covering 1998-2018 with CEO/year fixed effects (un-tabulated). Firms that do/do not penalize performance are identified based on the size of the coefficient 'χ' in the following firm level, expanding window regression, subject to the availability of a minimum of 5 observations: $\ln \Delta N\_shares_t = \alpha + \beta^* \ln(Mkt\_change_t) + \chi^* \ln \Delta P_t + e_t$.

Firm/year observations with $\chi > -0.2$ are classified as firms that do not penalize stock price performance, while firm/year observations with $\chi < -0.2$ are classified as ones that do penalize stock price performance. ln(Mkt_change) 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. All logchange variables (Δln) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1. To minimize the influence of outliers, the top and bottom 1% of the explanatory variables were winsorized at the top/bottom 1%. t-statistics are adjusted for clusters and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Sub-samples			
	Classification according to prior year firm level regression coefficient χ		**Classification according to the two years before firm level regression coefficient χ**	
Parameters	**Do Not Penalize Perf**	**Do Penalize Perf**	**Do Not Penalize Perf**	**Do Penalize Perf**
ln (Mkt_change)	1.005***	0.868***	1.028***	0.917***
t-statistic	22.4	22.8	21.3	22.3
Δ ln P	-0.382***	-0.566***	-0.474***	-0.546***
t-statistic	-8.60	-18.3	-9.02	-14.8
CEO/year fixed effects	Yes	Yes	Yes	Yes
N	3,554	6,425	3,106	5,478

Table 6. Coefficient estimates of the competitive pay model on directors' equity compensation

In this table, 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 2018. 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. ln(Mkt_change) is the difference between the natural logarithm of the CEO's market compensation (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 logchange variables (Δln) are the difference between the natural logarithm of the variable in fiscal year t and fiscal year t-1. To minimize the influence of outliers, the top and bottom 1% of the explanatory variables were winsorized at the top/bottom 1%. t-statistics are adjusted for clusters and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Parameters	**(1)**	**(2)**
ln (Mkt_change)	0.033**	0.037**
t-statistic	2.15	2.42
Δ ln P	-0.883***	
t-statistic	-37.3	
Δ P_Firm_comp		-0.827***
t-statistic		-32.6
Δ ln P_Peers		-1.031***
t-statistic		-26.6
Firm/year fixed effects	Yes	Yes
Adj. R^2	0.506	0.513
N	10,771	10,771

Table 7. The simulation applied to IBM in 2002

In this table, as an example, we detail the steps involved in the simulation of CEO's wealth for a specific firm/year observation, IBM in 2002. P is the market price of the common share at the grant date adjusted for stock splits and share dividends. N is the number of shares granted each year. Σ N is the cumulative number of shares granted. Wealth is cumulative number of shares granted Σ N at market price P. Panel A projects the wealth of the CEO over ten years in which, in each year, the CEO is given a fixed number of shares. Panel B projects the wealth of the CEO over ten years in which, in each year, the CEO is given a number of shares with a fixed value.

	2002 (t_0)	**2003 (t_1)**	**2004 (t_2)**	**2005 (t_3)**	**2006 (t_4)**	**2007 (t_5)**	**2008 (t_6)**	**2009 (t_7)**	**2010 (t_8)**	**2011 (t_9)**	**2012 (t_{10})**
P at Grant Date	97.15	78.56	91.6	82.89	103.29	124.92	107.49	123.72	164.34	195.14	196.35
Panel A. Fixed N											
N	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	**134.41**	
Σ N	134.41	268.82	403.23	537.64	672.05	806.46	940.87	1075.31	1209.75	1344.19	
Wealth (=ΣN *P)	13,058	21,118	36,936	44,565	69,416	100,743	101,134	133,037	198,810	262,305	263,932
Panel B. Fixed FV											
FV	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	**13,058**	
N (=FV/P)	134.41	166.216	142.554	157.533	126.42	104.53	121.48	105.544	79.4568	66.9157	
Σ N	134.41	300.626	443.18	600.713	727.133	831.664	953.144	1058.69	1138.15	1205.06	
Wealth (=ΣN *P)	13,058	23,617	40,595	49,793	75,106	103,891	102,453	130,981	187,043	235,156	236,614

Table 8. Comparison of fixed value vs fixed number compensation policies for portfolios of firms sorted on price performance

In this table, we simulate CEO's end wealth after ten years in which, in each year, the CEO is given (i) a fixed number of shares or (ii) a number of shares with a fixed value. The tables reports the distribution of the log difference of the CEO's final wealth associated to the two alternative compensation policies (Δ ln Simulated Wealth = ln(wealth $_{Fixed\ FV}$) – ln(wealth $_{Fixed\ N}$) within deciles of the cumulative change in the firm's stock price ($\Delta \ln P = \ln P_{10} - \ln P_0$).
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.

			ln(wealth $_{Fixed\ FV}$) – ln(wealth $_{Fixed\ N}$)			
Port	**Avg N. Firms per year**	**Δ ln P**	**Mean**	**10th percentile**	**Median**	**90th percentile**
1	348	-1.18467	.72402	.08240	.62411	1.44403
2	348	-.25508	.21139	-.14858	.18051	.64013
3	348	.09636	.00923	-.29214	-.00710	.30463
4	349	.32679	-.09478	-.37259	-.11690	.19451
5	348	.51398	-.18377	-.48063	-.19119	.12640
6	348	.68754	-.29186	-.54792	-.30652	.01015
7	349	.88919	-.38076	-.67027	-.39321	-.09278
8	348	1.10707	-.47165	-.75530	-.48095	-.15996
9	348	1.39950	-.60327	-.90931	-.61191	-.27728
10	348	2.01339	-.85609	-1.2487	-.84107	-.46118

Table 9. Performance penalty and ISS vote recommendations

In this table, we model the probability of a negative vote recommendation on CEO compensation in the period 2006-2018 on the measure of performance penalty in CEO equity compensation χ estimated by the following firm level expanding window regression:

$\Delta \ln N\_shares_t = \alpha + \beta \times \ln(mkt\_change_t) + \chi \times \Delta \ln P_t + \varepsilon_t$.

ln(Mkt_change) 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. See Table A1 in the Appendix for the definition of the control variables. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Parameters	**(1)**	**(2)**	**(3)**		**(4)**
		Logit			*OLS*
χ	0.382***	0.241**	0.210*		0.014*
Wald Chisq	14.52	4.70	3.43	*t-stat*	1.85
TSR (-1)		-1.938***	-1.646***		-0.100***
Wald Chisq		33.87	24.64	*t-stat*	-5.55
TSR (-3)		-4.066***	-3.732***		-0.225***
Wald Chisq		77.46	64.66	*t-stat*	-8.81
Institutional ownership %		0.129	-0.552		-0.059
Wald Chisq		0.042	0.73	*t-stat*	-1.24
Insider ownership %		2.557***	1.899**		0.210***
Wald Chisq		12.90	6.35	*t-stat*	3.33
TDC1 ($mln)		0.117***	0.164***		0.016***
Wald Chisq		67.52	72.24	*t-stat*	10.44
Growth in TDC1		0.175*	0.105		0.013
Wald Chisq		3.25	1.14	*t-stat*	1.33
%EQ_COMP		-0.174	0.239		0.007
Wald Chisq		0.11	0.20	*t-stat*	0.18
Log of Market Cap			-0.316***		-0.035***
Wald Chisq			13.31	*t-stat*	-5.68
Market-to-book			0.003		0.001
Wald Chisq			0.25	*t-stat*	1.23
ROE			-0.114		-0.010
Wald Chisq			1.01	*t-stat*	-1.59
Industry/year FE	Yes	Yes	Yes		Yes
R^2	0.031	0.108	0.114		0.126
N	2702	2439	2439		2439