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Does CEO Compensation Reflect Managerial Ability or Managerial Power? Evidence from the Compensation of Powerful CEOs*

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Abstract

This paper examines the relation between managerial power and compensation for Chief Executive Officers of S&P 500 companies from 1993 through 2012. We find that more-powerful CEOs earn more than less-powerful CEOs. We refer to this additional compensation as a "power premium" and investigate this power premium based on two competing views. The managerial ability view argues that the power premium compensates CEOs for their better managerial talent while the managerial power view argues that the power premium reflects the CEO's ability to extract excessive compensation. Overall, our results are more consistent with the managerial ability view. Empirically, we find that the power premium and the fraction of equity-based compensation are invariant to whether the CEO is newly hired or not. We also find that the likelihood of having an explicit employment contract is similar between new and incumbent CEOs.

I. Introduction

Prior research finds that powerful CEOs receive a compensation premium; that is, the level of total compensation is higher for more-powerful CEOs than for less-powerful CEOs (Murphy, 1985; Core et al., 1999; Morse et al., 2011). In this paper, we investigate whether this power premium is attributable to managerial talent or rent extraction. The literature presents two main views of the power premium. The managerial ability view argues that the power premium is compensation for managerial talent, which is priced in the managerial labor market (Graham et al., 2012). In particular, ability matching theory postulates that managerial talent is tenure-invariant and more-talented managers are matched with larger firms (Rosen, 1981&1982; Gabaix and Landier, 2008; and Baranchuk et al., 2011). Therefore, more-talented managers are given more authority and greater compensation because they contribute more to firm performance than do less-talented managers. Similarly, bargaining theory offers the same predictions but these predictions are built on the relative bargaining power between the CEO and the board of directors (Hermalin and Weisbach, 1998). More-talented CEOs have better bargaining power and negotiate for more authority and greater compensation. Nevertheless, this theory also assumes that managerial talent is tenure-variant and relies on the CEO's performance.

In contrast, the managerial power view argues that the CEO power premium is evidence of rent-extraction ability, a factor that is increasing with the CEO's incumbency. This is because powerful CEOs can exert influence in selecting new directors who oversee the compensation arrangements of these CEOs (Shivdasani and Yermack, 2002). This influence will grow over the CEO's tenure as more directors are hand-picked by longer tenured CEOs. Therefore, longer tenured CEOs have better rent-extracting ability because they are more capable of capturing the board (Bebchuk et al., 2010). However, this rent-extraction ability is constrained by the potential for unfavorable reactions from shareholders. To avoid such unfavorable reactions, powerful

CEOs use opaque and inefficient compensation arrangements to camouflage their rent extraction activities.

Because managerial talent and rent-extracting ability are latent and also positively correlated with CEO power, the positive relation between CEO power and higher compensation is consistent with both views. To distinguish between the managerial ability view and the managerial power view, we separate CEOs into newly hired CEOs ("new CEOs") and existing CEOs ("incumbent CEOs"). Because new CEOs are chosen by the board of directors (who were not selected by the incoming CEO), new CEO compensation arrangements should be solely based on their talent. Therefore, the power premium for new CEOs is a compensation premium for managerial talent ("talent premium"). In contrast, the power premium for incumbent CEOs is the sum of this talent premium and a premium determined by their rent-extraction ability ("rent-extraction premium").

If the power premium is identical for new and incumbent CEOs, this indicates that the power premium for incumbent CEOs is a compensation premium for managerial talent. On the other hand, if the power premium is larger for incumbent CEOs than for new CEOs, this indicates a possibility that incumbent CEOs are entrenched and receive unwarranted compensation. However, note that both views predict that the power premium could increase over the CEO's tenure. As argued above, the managerial power view predicts that the rent-extraction ability grows with the CEO's tenure. Nonetheless, the managerial ability view also allows managerial talent to increase over the CEO's tenure for at least two reasons. First, CEOs might learn on the job, effectively increasing their ability to manage the firm. Second, the board of directors might learn about the quality of the CEO-firm match over time, suggesting that retained CEOs are more-able CEOs (Pan et al., 2015; Hermalin and Weisbach, 2017). To account for these possibilities, we consider the changing power premium over a CEO's tenure. If the power premium grows with CEO tenure, we cannot determine the source of this additional

power premium but if the power premium does not grow with CEO tenure, then the power premium can be largely attributed to CEO talent.

To further distinguish between the managerial ability view and the managerial power view, we also study whether powerful CEOs are less likely to have an explicit employment contract. Companies are required to disclose these contracts which typically contain ex-ante explicit terms of incentive pay. Because the managerial power view assumes that opaque compensation arrangements are used to camouflage rent extraction activities, powerful CEOs should avoid making employment contracts transparent. Additionally, explicit contracts can make contract rigging difficult because shareholders can observe whether CEOs readjust compensation terms specified in these contracts ex-post (Morse et al., 2011). Therefore, the managerial power view predicts that more-powerful CEOs are less likely than less-powerful CEOs to have an explicit employment contract and this negative relation should be significantly stronger for incumbent CEOs than for new CEOs.

Similarly, we analyze whether powerful CEOs receive a higher proportion of equity-based compensation. This is because the managerial power view also argues that equity-based compensation plans, particularly stock options plans, are used to camouflage rent-extraction activities by powerful CEOs (Bebchuk et al., 2002). However, the managerial ability view also suggests that a higher proportion of equity-based compensation should be given to more-talented CEOs. For example, stock incentives are used as a signaling device to sort out managerial talent (Morfov and Santos, 2018). In a separating equilibrium, more-talented CEOs are paid a higher proportion of equity-based compensation. If CEO talent is tenure-invariant, the managerial ability view predicts that the relation between CEO power and equity-based compensation should not differ for new CEOs and incumbent CEOs. However, if stock incentives are used to extract shareholder rents as predicted by the managerial power view, the relation between CEO power and equity compensation should be more positive for incumbent CEOs (who have

captured the board) than for new CEOs.

We use an unbalanced panel consisting of 12,334 CEO-year observations that were included in the S&P 500 index between 1993 and 2012 in our tests. We follow prior research and operationalize powerful CEOs as those who are also the chairman of the board; the founder of the company; or the chairman of the board and holds a key executive title (Adams et al., 2005; Morse et al., 2011; Khanna et al., 2015; Humphery-Jenner et al., 2017; Li et al., 2018). We further construct an index for CEO power (POWER) which is the sum of three binary indicators that capture the above-mentioned CEO power attributes. Our results indicate that the estimated power premium is large: a one standard deviation increase in POWER (0.82), holding other variables at the sample means, increases CEO total compensation by 7.39 percent (or $722,455).

Regarding the source of this premium, our findings are more consistent with the managerial ability view than with the managerial power view. First, consistent with the ability matching theory, which assumes that CEO talent is tenure-invariant, we find that the power premium is similar between new and incumbent CEOs and does not grow with CEO tenure. Second, the relation between CEO power and the proportion of equity-based pay is also similar between new and incumbent CEOs. Third, we find no evidence to suggest that powerful CEOs avoid having an explicit employment contract and our findings indicate that the relation between CEO power and the likelihood of having an explicit employment contract is similar for new and incumbent CEOs.

This paper adds to the literature in several ways. First, our tests are comprehensive and use different combinations of CEO characteristics—new versus incumbent; longer tenured versus shorter tenured; and outside versus inside—to explain the compensation arrangement of powerful CEOs. Our research design is appropriate to distinguish the two competing views because new CEOs cannot extract rents from the board, particularly those hired from outside the companies. Our research design is also less exposed to endogeneity, a common concern in prior

research, which uses the proportion of directors appointed by the incumbent CEO to measure CEO power (Core et al., 1999; Morse et al., 2011; Coles et al, 2014).

Second, this paper builds on prior work by Rose and Shepard (1997) and Murphy (2002) to study the effects of CEO power on equity-based compensation and explicit employment contracts. By studying equity-based compensation and explicit employment contracts, we can directly evaluate the validity of the two dominant rent-extracting mechanisms advocated by the managerial power view. Prior research studies contract rigging, a rent-extracting mechanism, indirectly by examining actual ex-post compensation (Morse et al., 2011; Wan, 2014). However, any examination of contract rigging requires the strong assumption that CEOs have an explicit contract. In reality, explicit employment contracts do not exist for the majority of S&P 500 firms (Gillan et al., 2009; Song and Wan, 2017). Therefore, this study investigates whether explicit contracts are used by powerful CEOs. In related work, Song and Wan (2017) find that CEOs are paid considerably more when they have an explicit employment contract. However, their proxy for CEO power is only dual service as chairman of the board or chairman and company president. In contrast, the focus on power is richer and more comprehensive in this study because we construct an aggregate power index based on three measures of CEO power, specifically we consider CEO duality, the CEO's founder status, and concentration of the CEO's titles.

Last, CEO power is likely to be endogenously determined by differences in unobserved characteristics that are also correlated with the level and structure of CEO compensation. To address this concern, we apply an instrumental variable (IV) approach for the most significant individual measure of CEO power, namely the CEO's founder status (Adams et al., 2005). Our IV results are qualitatively similar to our OLS results and also more consistent with the managerial ability view in that the power premium as well as the relation between CEO power and the proportion of equity-based compensation are similar between new and incumbent CEOs.

II. Sample and Data

To mitigate the potential survivorship bias, our initial sample begins with firms that were included in the S&P 500 index between 1993 and 2012. We exclude observations with missing data required in our tests in the Compustat and Execucomp databases. To mitigate the undue influence of univariate outliers, we also exclude observations if the log of annual total compensation is greater than ten standard deviations from the sample mean (Guthrie et al., 2012a).[1] Our final sample consists of an unbalanced panel that comprises 12,334 CEO-year observations. We collect data on comprehensive employment contracts from financial statements. We also manually collect information on the CEO's founder status from proxy statements and other internet sources. We obtain data on compensation, equity ownership, and executive characteristics from the Execucomp and data on firm characteristics from the Compustat.

Our first measure of CEO compensation is total compensation (TOTPAY), which is the sum of base salary, bonus, long-term incentive payouts, other annual compensation, stock options granted (Black-Scholes value), restricted stocks granted (market value), and all other compensation earned in the year. Because the distribution of total compensation is highly skewed, we take the natural logarithm of total compensation. Our second measure of CEO compensation is the proportion of equity-based compensation (FEQUITY), which is the ratio of stock-based compensation to total compensation in the year, where stock-based compensation is the sum of stock options granted and restricted stocks granted (both at market value) in the year.

We construct a power index (Power) as the sum of three binary measures of CEO power so its value ranges from 0 to 3. The first measure is CEO duality (DUALITY), which is a binary variable equal to one if the CEO is also the chairman of the board. This measure is relevant because CEO duality can present a conflict of interest for two reasons. First, allowing the

[1] The distribution of log total CEO compensation is asymmetric with a fat lower tail. In particular, the total compensation of a few CEOs is very large, i.e., greater than a hundred million dollars but some CEOs obtain only one dollar in total compensation. Our trimming threshold eliminates these extreme values.

current CEO to also serve as the chairman of the board increases the CEO's influence in nominating new directors and board members nominated by the CEO can be excessively loyal to the current CEO (Finkelstein and D'Aveni, 1994). Second, a major function of the board is to remove non-performing CEOs. Thus, CEO duality weakens the board's ability to replace non-performing CEOs. Empirically, Goyal and Park (2002) find that the sensitivity of CEO turnover to firm performance is significantly lower when the CEO is also the chairman. In addition, many proxy advisory firms, institutional shareholders, and corporate governance critics view CEO duality as a poor corporate governance practice and recommend the separation of the role of chairman and CEO.[2,3]

The second measure of CEO power is the CEO's founder status (FOUNDER), which is a binary variable equal to one if the CEO is also a founder of the company. Due to their pre-existing ties with the board of directors, founder CEOs can exert influence on major corporate policies including their own compensation (Guthrie et al., 2012a&2012b). Extant studies indicate that the CEO's founder status is the most robust individual measure of power (Adams et al., 2005) but this measure is incomplete because it does not incorporate other important dimensions of CEO power. The third measure of CEO power is the concentration of the CEO's titles (CONCTITLE), which is a binary variable equal to one if the CEO is the chairman of the board and also holds at least one of the following titles: president, chief operating officer, or chief finance officer. We use these additional titles to capture the structural power of the CEO (Finkelstein, 1992). In addition, prior studies find that the CEO's power is more concentrated if she also holds one of these additional titles (Adams et al., 2009; Morse et al., 2011; Humphery-Jenner et al., 2017). This is because in a relay succession, companies typically groom the next

[2] For more than a decade, the Institutional Shareholder Services (ISS) has been a strong advocate demanding companies to separate the CEO and chairman roles ("CEO Pay Depends on Board's Independence", *Wall Street Journal*, March 9, 2016).

[3] In contrast, other studies find that CEO duality can be value enhancing because it speeds up the decision-making process and is particularly valuable in a dynamic business environment (Brickley et al., 1997; Adam et al., 2005; Li et al., 2018).

CEO by appointing potential successors as either president or chief operating officer (Naveen, 2006).[4]

We follow extant literature and include seven firm characteristics to explain the level and structure of CEO compensation. These firm characteristics are firm sales (SALES), performance (RET and ROA), risk (SDROA), growth opportunity (M/B), investment intensity (INV), and research and development expenditure (R&D). SALES is the natural logarithm of firm sales; RET is the natural log of one plus the annual stock return (with dividends reinvested); ROA is the natural logarithm of one plus net income before extraordinary items scaled by the book value of assets; SDROA is the natural log of the standard deviation of the annual return on asset for the prior five years; M/B is the firm's market value of equity to book value of equity; INV is the ratio of capital expenditures to tangible long-term assets; and R&D is research and development expenditures divided by the total assets and is set to zero if missing.

In addition, we include five CEO characteristics that can determine the level and structure of CEO compensation. They are whether the CEO is hired from outside of the company (OUTSIDE), CEO tenure (CEOTENURE), CEO stock ownership (OWN), CEO stock options holdings (OPTHOLD), and whether the current CEO has an employment contract (EA). OUTSIDE is a binary variable that equals to one if the current CEO had worked for the company for less than one year before she was appointed to the role of CEO; CEOTENURE is the length of time (in years) to date since the CEO's appointment as CEO; OWN is the fraction of the company's shares owned by the CEO; OPTHOLD is the dollar value of options held by the CEO; and EA is a binary variable equal to one if the CEO has a comprehensive employment

[4] Prior research indicates that CEOs who also serve as the chairman of the board are more powerful than CEOs who has an additional operating title such as president, chief operating officer, or chief finance officer (Vancil, 1987). To reflect the importance of the chairman of the board title, we define CEOs are more powerful if they are the chairman of the board and also hold a key executive title. The board-chair requirement is necessary because it allows us to distinguish this CEO power measure from CEO duality. Our (unreported) results remain qualitatively similar (but statistically weaker) if we drop the board chair requirement in our definition for the concentration of the CEO's titles.

contract for the compensation-year.[5]

Because prior studies find that executive compensation differs meaningfully across industries and years, we include a set of industry binary variables based on two-digit standard industry classification codes and a set of year binary variables. To mitigate the potential influence of outliers, we winsorize RET, ROA, OWN, OPTHOLD, INV, R&D, M/B, and ABPAY—at the top and bottom 0.5 percentiles. All variables measured in dollar terms are inflation-adjusted and expressed in 2012 dollars.

III. Empirical Results

A. Econometric Specification

To investigate the effect of power on the level and structure of compensation, we use the following baseline model:

$$(1)\quad Y_{i,t} = \alpha + \gamma P_{i,t} + \mathbf{X}'\boldsymbol{\beta} + v_{i,t}$$

where $Y_{i,t}$ is CEO compensation, $P_{i,t}$ is CEO power, $\mathbf{X}$ is a vector of control variables, and $v_{i,t}$ is the error term. The subscript *i* denotes firm *i* and *t* denotes the compensation year.

B. Descriptive Statistics

Table 2 provides descriptive statistics for the full sample (column 1) and for two subsamples: the incumbent CEO subsample (column 2) and the new CEO subsample (column 3). New CEOs are defined as CEOs in their second year in office and incumbent CEOs are defined as those serving in their third or later years in office. We classify second-year CEOs as "new" CEOs for two reasons. First, first-year CEOs often serve in office for less than one full fiscal year (Rose and Shepard, 1997). Second, compensation for first-year CEOs is unusual. This is especially true for outside CEOs because they receive significant hiring grants (e.g., stock

[5] Additional details on comprehensive employment contracts are available in Gillan et al. (2009) and Song and Wan (2017).

options and restricted stock grants) at the time of their appointments (Fee and Hadlock, 2003).[6]

In our sample, the mean total compensation is $9.77 million and the mean fraction of equity-based compensation is 51.6 percent. Thus, equity-based compensation constitutes a significant portion of a CEO's total compensation. The mean power index in our sample is approximately one, suggesting that the average CEO is either the chairman of the board or a founder of the company. Further analyses reveal that, in 70 percent of our sample observations, the CEO also serves as the chairman of the board; in 27 percent of our sample observations, the CEO-chair also holds another key executive title; and in 9 percent of our sample observations, the CEO is a founder of the company. Our descriptive statistics on CEO power are similar to those in extant studies (Adams et al., 2005; Humphery-Jenner et al., 2017). Finally, in approximately 37 percent of our sample observations, CEOs have an explicit employment contract.

As expected, the means of total compensation and CEO power are considerably smaller for new CEOs than for incumbent CEOs. The mean total compensation for new CEOs is $8.26 million, compared with $9.89 million for incumbent CEOs. Only 51 percent of new CEOs in our sample are also the chairman of the board, compared with 76 percent for incumbent CEOs. In addition, the means of stock ownership and options holdings are meaningfully larger for incumbent CEOs than for new CEOs. Given that incumbent CEOs have already had substantially more equity-based holdings than new CEOs, it is not surprising that their pay packages constitute a smaller fraction of equity-based compensation.

To study if there are any observable differences between more-powerful and less-powerful CEOs, we divide our sample into terciles based on the CEO power index. Table 3 provides summary statistics for two of these CEO groups: more-powerful CEOs (with a power index score in the top tercile) in column (1), less-powerful CEOs (with a power index score in

[6] We find qualitatively similar results if new CEOs are defined as CEOs in their first year in office.

the bottom tercile) in column (2), and their difference in column (3). As expected, the power premium is large. More-powerful CEOs earn on average $1.37 million more than less-powerful CEOs. However, more-powerful CEOs receive a smaller proportion of equity-based compensation than less-powerful CEOs. In addition, pay-for-performance sensitivity is significantly larger for more-powerful CEOs because their stock and options holdings are larger than for less-powerful CEOs. Consistent with the managerial ability view, stock returns are slightly better for firms with more-powerful CEOs. This occurs even though these firms have significantly lower risk and smaller R&D investments but are nearly identical in size and growth opportunities relative to firms with less-powerful CEOs.

C. Regression Results

(1) Total Compensation

Table 4 reports results from regressing the natural log of total CEO compensation on various measures of CEO power using OLS regression and all sample observations. Column (1) presents the baseline result when the power index (POWER) is used to proxy for CEO power and columns (2)–(4) present results when its components, i.e., CEO duality (DUALITY), concentration of the CEO's titles (CONCTITLE), and the CEO's founder status (FOUNDER), respectively, are used to proxy for CEO power. The results reveal that CEO compensation increases with the level of CEO power. Furthermore, the power premium is large and economically significant. Specifically, a one standard deviation increase in POWER (0.82), holding other variables at the sample means, increases the CEO's total compensation by 7.39 percent (or $722,455). We also find that the CEO's total pay increases by 16.88 percent (or $1.65 million), on average, if the CEO is also the chairman of the board.[7] However, we find little

[7] The OLS estimate of the coefficient on POWER is 0.087, so a one standard deviation increase in the power index (0.82) translates to an increase in total compensation of 7.39 percent (= $\exp^{0.087\times0.82} - 1$) or $722,455 (=0.0739×$9.77 million). Similarly, the OLS estimate of the coefficient on DUALITY is 0.156, which implies that total

evidence to suggest that total compensation increases with CEO tenure and even if it does, the effect is economically small. The largest estimated coefficient on CEO tenure (CEOTENURE) is 0.007 in column (3). This implies that CEO total compensation increases by 0.7 percent (or $68,630), on average, for each additional year of CEO tenure. Overall, our results indicate that CEO pay is tenure-invariant which is more consistent with the ability matching theory and the managerial ability view than with the managerial power view. Consistent with Murphy (2002) and the managerial ability view, we also find that total compensation is significantly larger for outside CEOs than for inside CEOs.

The other estimates reported in Table 4 are consistent with those reported in extant studies (Murphy, 1985; Chhaochharia and Grinstein, 2009; Guthrie et al., 2012a; Song and Wan, 2017). For example, the elasticity of total compensation to firm sales is approximately 0.35. CEO compensation increases when firm stock return performance improves but it is not responsive to accounting performance. We also find that total compensation increases when the CEO has an explicit employment contract. Moreover, total compensation decreases by 4.81 percent when the CEO's stock ownership increases by one percentage point, but increases significantly when the CEO's options holdings increase. Finally, CEO compensation also increases with the firm's growth opportunities and research and development investments.

Table 5 reports ordinary least squares regressions of the natural log of total CEO compensation using observations with incumbent CEOs in columns (1)-(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). A firm is classified as a good (bad) performing firm if its stock return is above (below) the industry median in the year prior to the new CEO's appointment. As discussed earlier, the managerial ability view predicts that the power premium should be identical between new and incumbent CEOs if CEO talent is tenure-invariant. In contrast, the

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compensation increases by 16.88 percent (= $\exp^{0.156} - 1$) or $1.65 million (=0.1688×$9.77 million) when the CEO is also the chairman of the board.

managerial power view predicts that the power premium should be larger for incumbent CEOs than for new CEOs and the power premium should increase over the CEO's tenure.

Overall, our results are more consistent with the managerial ability view than with the managerial power view. We find that the power premium is constant over the CEO's tenure. For longer-tenured CEOs, the coefficient on POWER×CEOTENURE is 0.002 in column (1), which is statistically indistinguishable from zero. Again, this result indicate that CEO talent is tenure-invariant. Second, the coefficient on POWER for incumbent CEOs, at 0.097 in column (2), is slightly smaller than that for new CEOs, at 0.117 in column (3). This implies that the power premium is quite similar between new and incumbent CEOs. For example, a firm with a one standard deviation increase in POWER, keeping other variables at sample means, increases the total compensation of new CEOs by 10.07 percent ($831,379), compared with 8.28 percent ($818,699) for incumbent CEOs.

Third, our results are unlikely to be performance driven because the power premium for new CEOs is nearly identical regardless of firm performance in the year prior to the new CEO's appointment. This result is less consistent with the bargaining power theory because it predicts that CEOs have better (weaker) bargaining power over the boards of directors in bad (good) performing firms. Thus, new CEOs should negotiate for a larger (smaller) power premium in bad (good) performing firms at the time of their appointments. Thus, the power premium is not driven by prior firm performance.

(2) Fraction of Equity-based Compensation

Table 6 reports results from Tobit regressions investigating the fraction of equity-based compensation using all four measures of CEO power and all sample observations. Overall, there is no evidence to suggest that more-powerful CEOs receive a higher fraction of compensation in equity than less-powerful CEOs. Among the four measures of power, only one power measure

(POWER) is statistically significant at the conventional levels but the estimated effect of CEO power on the fraction of equity-based compensation is very small. For example, the coefficient on POWER, at 0.011 in column (1), indicates that a firm with a one standard deviation increase in POWER (0.82), holding other variables at the sample means, increases the CEO's equity-based pay as a fraction of total pay by less than one percent.[8]

Table 7 reports the results from Tobit regressions using all sample observations with incumbent CEOs in columns (1)–(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). As discussed above, the managerial ability view predicts that the effect of power on the fraction of equity-based compensation should be identical between new and incumbent CEOs if ability is tenure-invariant. In contrast, the managerial power view predicts that the effect of power on the fraction of equity-based compensation should be greater for incumbent CEOs than for new CEOs. In addition, the managerial power view also predicts that the effect of power on the proportion of equity-based compensation should increase over the CEO's tenure.

Again, our results are more consistent with the managerial ability view than with the managerial power view. First, the effect of CEO power on the proportion of equity-based compensation does not vary over the CEO's tenure. The coefficient on POWER×CEOTENURE in column (1) is close to zero and is statistically indistinguishable from zero. Second, the coefficient on POWER for new CEOs, at 0.018 in column (3), is slightly larger than (or similar to) that for incumbent CEOs, at 0.012. Importantly, none of these coefficients are statistically or economically significant at conventional levels. Finally, our results are unlikely to be driven by prior firm performance because the coefficients on POWER are similar for new CEOs in good and bad performing firms. Overall, there is no evidence to suggest that more-powerful CEOs obtain a higher proportion of equity-based compensation than less-powerful CEOs.

[8] Specifically, a one standard deviation increase in the power index (0.82) translates to an increase in total compensation by 0.9 percent (= 0.011×0.82).

(3) Explicit Employment Contracts

As argued above, the managerial power view predicts that there is a negative relation between CEO power and the likelihood of having an explicit employment contract. Table 8 presents marginal effects for having an explicit employment contract (EA) using logit regressions. We follow the literature and include abnormal CEO compensation (ABPAY) and the fraction of equity-based compensation (FEQUITY) as explanatory variables in our regressions (Gillan et al., 2009; Song and Wan, 2017). Abnormal compensation is a proxy for the rate of return on the CEO's firm-specific human capital investment which is vulnerable to the risk of appropriation by current employers. ABPAY is measured as the residual from a model that regresses total CEO compensation on industry and year fixed effects using all the CEO observations in the ExecuComp database.

The tabulated results reveal that the likelihood of having an explicit employment contract is lower for more-powerful CEOs than for less-powerful ones. None of the coefficients are statistically or economically significant except for the CEO's founder status (FOUNDER). The coefficient on FOUNDER, at 0.114 in column (4), indicates that the likelihood of having an explicit employment contract is 11.4 percent greater for founder CEOs than for non-founder CEOs. This evidence is inconsistent with the managerial power view because founder CEOs are considered to be powerful CEOs and powerful CEOs should prefer to have no explicit employment contracts. Instead, this evidence is more consistent with prior research on incomplete contracting theory, which predicts that the use of explicit employment contracts increases with the extent of firm-specific human capital that is vulnerable to appropriation by the CEO's employer (Klein et al., 1978; Song and Wan, 2017).

As explained above, CEOs receiving abnormal compensation are more likely to have an explicit employment contract because this abnormal compensation is vulnerable to appropriation

by the CEO's employer. Consistent with our expectations, the coefficient on ABPAY, at 0.067 in column (1), is statistically significant at the conventional levels. This implies that, all else equal, a CEO is approximately 6.7 percent more likely to have an explicit employment contract when abnormal CEO compensation is greater by 1 percent.

The other estimates reported in Table 8 are consistent with the predictions in Klein et al. (1978) and results reported in Song and Wan (2017). For example, outside CEOs are on average 34 percent more likely than inside CEOs to have an explicit employment contract. Moreover, CEOs of larger firms, of firms with larger market to book ratios, and with substantial R&D investments are significantly less likely to have an explicit employment contract. In contrast, CEOs of risky firms and CEOs that have lower levels of stock ownership are more likely to have an explicit employment contract.

Table 9 reports marginal effects for having an explicit employment contract in a logit model using observations with incumbent CEOs in columns (1)–(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). Overall, our results are more consistent with the managerial ability view and less consistent with the managerial power view. First, our results indicate that the relation between CEO power and the likelihood of having an explicit employment contract increases slightly over the CEO's tenure. However, this effect is not economically significant. Second, the results in column (2) indicate that, in the sample of incumbent CEOs, more-powerful CEOs are just as likely as less-powerful ones to have an explicit employment contract. Last, the estimated effect of CEO power on the likelihood of having an explicit employment contract is similar for new and incumbent CEOs. This result is unlikely to be driven by contract rigging.

IV. Endogeneity Issue

Because CEO power could be determined by differences in unobserved characteristics

that are also correlated with the level and structure of CEO compensation, least squares estimates of the effect of CEO power on the level and structure of CEO compensation in Section III could be biased. To address this potential endogeneity concern, we apply an instrumental variable (IV) approach for the CEO's founder status. According to evidence in Adams et al. (2009), this is the most significant individual measure of CEO power on corporate performance. We follow Adams et al., (2009) and apply instrumental variable (IV) estimation in a three-stage procedure as follows:

(i) First-stage procedure: We use a logistic regression to model CEO power using a set of instrumental variables and relevant control variables as follows:

$$(2)\ P_{i,t} = a_0 + \mathbf{Z}'\boldsymbol{\psi} + \mathbf{H}'\boldsymbol{\tau} + \zeta_{i,t}$$

where **Z** is a vector of instrumental variables for CEO power, **H** is a vector of relevant control variables, and $\zeta_{i,t}$ is the random error. We identify two instrument variables for the CEO's founder status. The first instrument is deceased founder (DEADFOUNDER) and the second instrument is the number of founders (NUMFOUNDER). DEADFOUNDER is a binary variable equal to one if the founder died before the year. For a firm with multiple founders, we take the average of this variable among all founders. NUMFOUNDER is the natural log of the number of founders of each firm.[9] The presence of a deceased founder is negatively correlated with the likelihood that the firm is led by a founder CEO because dead founders cannot be CEOs. We also expect that the number of founders is positively correlated with the likelihood that the firm is led by a founder CEO because there are more potential founder candidates for the CEO position.

The set of control variables includes firm characteristics: size (SALES), age (FIRMAGE), risk (SDROA), and CEO characteristics: CEO tenure (CEOTENURE), stock ownership (OWN), equity-based compensation as a fraction of total pay (FEQUITY), as well as

[9] Approximately five percent of observations have missing data on dead founders or the number of founders. We replace the missing value by the sample average.

industry fixed effects and year fixed effects.

(ii) Second-stage procedure: To obtain a consistent estimate of CEO power, in the second-stage, we include the fitted value of the CEO power ($\hat{P}_{i,t}$) from the first-stage regression as an explanatory variable and we re-estimate CEO power as follows:

$$(3)\ P_{i,t} = b_0 + b_1\hat{P}_{i,t} + \mathbf{X}'\boldsymbol{\beta} + \xi_{i,t}$$

where $\hat{P}_{i,t} = \hat{a}_0 + \mathbf{Z}'\hat{\psi} + \mathbf{H}'\hat{\tau}$ is the fitted value of the CEO power estimated in the first-stage procedure, $\mathbf{X}$ is a vector of explanatory variables and $\xi_{i,t}$ is the random error.

(iii) Third-stage procedure: We use the fitted value of the CEO power ($\hat{P}_{i,t} = \hat{b}_0 + \hat{b}_1\hat{P}_{i,t} + \mathbf{X}'\hat{\beta}$) estimated in the second-stage procedure as our instrument for CEO power and we model CEO compensation as follows:

$$(4)\ Y_{i,t} = \alpha + \gamma^{IV}\hat{P}_{i,t} + \mathbf{X}'\boldsymbol{\beta} + v_{i,t}$$

where γ^{IV} is our IV estimate for CEO power and $v_{i,t}$ is the random error.

Table 10 reports the results from IV regressions of the natural log of total CEO compensation in columns (1)–(2), the fraction of equity-based compensation in columns (3)–(4), and the presence of explicit employment contracts in columns (5)–(6). Columns (1), (3), and (5) report IV estimates using observations with incumbent CEOs and columns (2), (4), and (6) report those using observations with new CEOs only.[10] Overall, our IV results are similar to those from OLS regressions in that they are less consistent with the managerial power view but more consistent with the managerial ability view. The IV estimates on FOUNDER in columns (1)–(4) are statistically indistinguishable from zero. This implies that there is no compensation premium for founder CEOs, who are considered to be more-powerful CEOs. This result holds regardless of whether or not CEO founders are newly appointed. Similarly, there is no evidence that more-

[10] As Table 2 shows, only 1.22% of new CEOs are founder CEOs, so we caution the reader regarding the interpretation of these results.

powerful CEOs obtain a higher proportion of equity-based compensation than less-powerful CEOs. Our coefficients on the IV for FOUNDER indicate that founder CEOs receive the same proportion of equity-based compensation as non-founder CEOs, regardless of whether they are newly appointed.

More consistent with the managerial ability view, we find that, in the sample of incumbent CEOs, more-powerful CEOs are more likely to have an explicit employment contract than less-powerful CEOs. Our coefficient on the IV for FOUNDER in column (5) indicates that the likelihood of having an explicit employment contract is 16.8 percent higher for incumbent founder CEOs than for incumbent non-founder CEOs. However, coefficient on the IV for FOUNDER for new CEOs, at -0.220 in column (6), is statistically indistinguishable from zero. This suggests that the likelihood of having an explicit employment contract is similar between new founder CEOs and new non-founder CEOs. Again, the evidence is inconsistent with the managerial power view.

V. Robustness Tests

We conduct additional tests to examine the robustness of our results. Because the CEO's ability to extract rents may increase over the CEO's tenure but in a nonlinear manner, we create two binary measures of CEO tenure. The first measure is whether the CEO's tenure exceeds three years and the second is whether the CEO's tenure exceeds the sample median. The former measure is motivated by the ability-learning model because it takes approximately three years for the board of directors to learn about the CEO's ability. Empirically, stock return volatility declines significantly over a CEO's first three years in office (Pan et al., 2015&2016). The latter measure is motivated by the fact that longer-tenured CEOs should be more entrenched than shorter-tenured CEOs. Our results remain qualitatively similar if we replace our continuous CEO tenure measure (CEOTENURE) with each of these measures in our regressions. Because

of career concerns, one may argue that the CEO's preference for entrenchment begins only once the CEO reaches a certain age, e.g., the normal retirement age. As such, we eliminate CEOs who are older than 62 from the sample and re-estimate our regressions. Again, our results remain qualitatively similar.

If the preference for rent extraction is a characteristic of the management team rather than only the CEO and the successor CEO is a member of the old management team, we expect that the power premium should be similar between newly promoted and incumbent CEOs. Thus, a "new" CEO who is promoted from within the company is not truly new since she inherits the position and the entrenchment preference of the team. In this case, we expect that the power premium for new CEOs who are promoted from within the company ("inside CEOs") to be larger than the power premium for new CEOs hired from outside the company ("outside CEOs"). Therefore, we separate new CEOs into two groups: inside CEOs and outside CEOs. Our untabulated regression results indicate that the power premium, the effect of CEO power on the fraction of equity-based compensation, and the likelihood of having an explicit employment contract do not differ between new inside CEOs and new outside CEOs.

Because our sample is derived from the ExecuComp database, our results are vulnerable to a potential sample selection bias due to the practice of backfilling in the ExecuComp database (Gillan et al., 2018). Thus, we eliminate backfilled observations from our sample and re-estimate all the regressions. Our results are qualitatively similar and robust to this potential backfilling issue.

VI. Conclusions

Corporate governance critics have argued that powerful CEOs abuse their influence to obtain unwarranted compensation. However, high amounts of compensation paid to powerful CEOs could be warranted if the compensation is a reward for their better managerial talent. To

distinguish between these competing views, we contrast the pay packages of newly appointed CEOs with those of incumbent CEOs. Our identification strategy relies on the fact that newly appointed CEOs have no pre-existing ties with the board of directors, so their power premium can be viewed as a premium for managerial talent. In contrast, the power premium for incumbent CEOs can contain two components: a premium for managerial talent and one for rent-extraction ability. Therefore, the power premium of new CEOs can serve as a natural benchmark to determine whether higher compensation paid to incumbent CEOs results from rent extraction.

Overall, our results are more in line with the managerial ability view, which states that higher compensation for powerful CEOs is a reward for better managerial talent than the managerial power view, which states that higher compensation for powerful CEOs is excessive reflecting powerful CEOs extract shareholder rents. First, the direct effect of CEO power on compensation (i.e., the power premium) is large. Second, more importantly, the power premium and the fraction of equity-based compensation are nearly identical for new and incumbent CEOs. Third, the relation between CEO power on the likelihood of having explicit employment contracts is also similar between new and incumbent CEOs. In summary, our results shed light on the controversial debates related to the large increase in CEO compensation in the 1990s and suggest that, on average, higher CEO compensation reflects better CEO talent rather an abuse of CEO power.

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Table 1: Variable Definitions

Variable	Definition
TOTPAY($mil)	Sum of base salary, bonus, long-term incentive payouts, other annual compensation, stock options granted (Black-Scholes value), restricted stocks granted (market value), and all other compensation earned in the compensation year.
FEQUITY	The ratio of equity-based compensation (restricted stocks and stock option grants) to total compensation in the compensation year. For observations with missing values, we compute this ratio using data in the compensation year.
DUALITY	Binary variable equals to one if the CEO is also the chairman of the board, and zero otherwise.
CONCTITLE	Binary variable equals to one if the CEO is also the chairman of the board and holds one additional title as president, chief operating officer, or chief finance officer, and zero otherwise.
FOUNDER	Binary variable equals to one if the CEO is the founder of the company, and zero otherwise.
POWER	The sum of three binary measures of CEO power including DUALITY, CONCTITLE, and FOUNDER. Thus, its value ranges from 0 to 3.
SALES	Natural log of firm's sales for the year prior to the compensation year
RET	Natural log of one plus firm's stock performance computed as the stock market return for the year prior to the compensation year
ROA	Natural log of one plus firm's accounting performance computed as the ratio of earnings before interest and taxes to the total assets for the year prior to the compensation year.
SDROA	Natural log of standard deviation of the annual return on asset for the prior five years.
M/B	Natural log of the firm's year-end market-to-book ratio for the year prior to the compensation year.
INV	The ratio of capital expenditures to tangible long-term assets (property, plant, and equipment) for the year prior to the compensation year.
R&D	The ratio of research and development expenditure to tangible long-term assets (property, plant, and equipment) for the year prior to the compensation year.
OUTSIDE	Binary variable equals to one if the current CEO joins the company for less than one year before the CEO is appointed as the CEO of the company, and

	zero otherwise.
CEOTENURE	The length of time (in years) since the executive took the CEO appointment.
OWN	Fraction of the company's shares owned by the CEO for the year prior to the compensation year
OPTHOLD	Dollar value of options held by the CEO for the year prior to the compensation year
EA	Binary variable equals to one if the CEO has a comprehensive employment contract in the compensation year, and zero otherwise.
ABPAY	The residual from a model predicting the level of log total CEO compensation for the year prior to the compensation year. Specifically, we regress the natural log of total CEO compensation on natural log of firm sales, natural log of one plus stock return, and natural log of one plus return on assets, and dummies for year and industry for all CEOs in the ExecuComp database. For observations with missing values, we use the residual in the compensation year.
DEADFOUNDER	Binary variable equals to one if the founder died before the compensation year, and zero otherwise. For a firm with multiple founders, we take the average of this variable among all founders.
NUMFOUNDER	Number of people founding the firm
FIRM AGE	Number of years since the firm is founded or incorporated

Table 2: Descriptive Statistics

This table presents the descriptive statistics of major variables used in our study. The numbers in brackets are standard deviations. Table 1 contains the descriptions of all variables reported in this table.

	(1) Full sample	(2) Incumbent CEOs	(3) New CEOs
Total compensation; $mil (TOTPAY)	9.770	9.889	8.256
	[17.79]	[18.84]	[10.96]
Fraction of equity-based pay (FEQUITY)	0.516	0.502	0.599
	[0.309]	[0.311]	[0.292]
Power index (POWER)	1.064	1.148	0.770
	[0.816]	[0.794]	[0.823]
CEO duality (DUALITY)	[0.700	0.755	0.508
	[0.458]	[0.430]	[0.500]
Concentration of titles (CONCTITLE)	0.272	0.283	0.250
	[0.445]	[0.451]	[0.433]
Founder CEO (FOUNDER)	0.0924	0.110	0.0122
	[0.290]	[0.313]	[0.110]
Sales; $mil (SALES)	12.79	12.53	14.09
	[26.55]	[26.10]	[28.38]
Stock return (RET)	15.59	16.49	11.36
	[49.59]	[48.98]	[53.83]
Return on assets (ROA)	5.020	5.274	3.535
	[7.633]	[7.371]	[9.093]
Volatility of return on assets (SDROA)	4.220	4.121	5.018
	[10.16]	[10.11]	[11.52]
Investment intensity (INV)	0.103	0.104	0.0980
	[0.0818]	[0.0833]	[0.0744]
Growth opportunity (M/B)	3.621	3.632	3.584
	[4.309]	[4.274]	[4.573]
R&D expenditure (R&D)	0.0839	0.0843	0.0798
	[0.201]	[0.202]	[0.188]
Outside CEO (OUTSIDE)	0.204	0.196	0.251
	[0.403]	[0.397]	[0.434]
CEO tenure (CEOTENURE)	7.734	9.166	1.607
	[7.109]	[7.095]	[0.304]
CEO stock ownership; percent (OWN)	1.318	1.565	0.250
	[4.019]	[4.382]	[1.095]
CEO option holdings; $mil (OPTHOLD)	16.11	18.41	6.201
	[39.86]	[42.81]	[21.50]
Employment contract (EA)	0.365	0.354	0.414
	[0.481]	[0.478]	[0.493]
Observations	12,334	10,100	1,313

Table 3: Descriptive Statistics by Power Index

This table presents the means of major variables of two of the three CEO groups based on the CEO power index. The first CEO group includes observations with more-powerful CEOs in column (1) and the second CEO group includes those with less-powerful CEOs in column (2). More-powerful (less-powerful) CEOs are referred to CEOs who have a power index score in the top (bottom) tercile, i.e., POWER>1 (POWER<1). Differences in their means are reported in column (3). The numbers in brackets are standard deviations. Table 1 contains the descriptions of all variables reported in this table. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) More-powerful CEOs	(2) Less-powerful CEOs	(3) Differences
Total compensation; $mil (TOTPAY)	9.858	8.490	1.368***
	[20.46]	[12.38]	[3.42]
Fraction of equity-based pay (FEQUITY)	0.505	0.568	-0.0631***
	[0.312]	[0.305]	[-8.77]
Sales; $mil (SALES)	11.07	10.76	0.308
	[22.39]	[28.79]	[0.52]
Stock return (RET)	17.86	15.22	2.637*
	[53.91]	[52.26]	[2.13]
Return on assets (ROA)	5.067	4.898	0.169
	[7.564]	[8.612]	[0.90]
Volatility of return on assets (SDROA)	4.149	5.523	-1.374***
	[6.918]	[16.84]	[-4.70]
Investment intensity (INV)	0.105	0.106	-0.000908
	[0.0864]	[0.0807]	[-0.47]
Growth opportunity (M/B)	3.583	3.583	0.000168
	[4.315]	[3.981]	[0.00]
R&D expenditure (R&D)	0.0840	0.112	-0.0281***
	[0.195]	[0.246]	[-5.49]
Outside CEO (OUTSIDE)	0.187	0.217	-0.0302**
	[0.390]	[0.412]	[-3.24]
CEO tenure (CEOTENURE)	9.115	4.663	4.452***
	[8.207]	[4.467]	[28.41]
CEO stock ownership; percent (OWN)	1.970	0.633	1.337***
	[4.933]	[2.241]	[14.66]
CEO option holdings; $mil (OPTHOLD)	17.10	10.39	6.706***
	[42.27]	[28.60]	[7.88]
Employment contract (EA)	0.377	0.399	-0.0215
	[0.485]	[0.490]	[-1.90]
Observations	3962	3452	7414

Table 4: Total Compensation of Powerful CEOs

This table reports least squares regressions of the natural log of CEO total compensation (TOTPAY) on four measures of CEO power using all sample observations. Column (1) presents the baseline result when the power index (POWER) is used to proxy for CEO power and columns (2)–(4) present results when CEO duality (DUALITY), concentration of the CEO's titles (CONCTITLE), and the CEO's founder status (FOUNDER), respectively, are used to proxy for CEO power. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Power index (POWER)	0.087***			
	[0.016]			
CEO duality (DUALITY)		0.156***		
		[0.030]		
Concentration of titles (CONCTITLE)			0.077***	
			[0.025]	
Founder CEO (FOUNDER)				0.155*
				[0.090]
CEO tenure (CEOTENURE)	0.004	0.004	0.007**	0.004
	[0.003]	[0.003]	[0.003]	[0.003]
Employment contract (EA)	0.217***	0.220***	0.222***	0.217***
	[0.032]	[0.032]	[0.032]	[0.032]
Outside CEO (OUTSIDE)	0.171***	0.158***	0.166***	0.186***
	[0.034]	[0.034]	[0.034]	[0.034]
Stock return (RET)	0.209***	0.213***	0.210***	0.208***
	[0.026]	[0.026]	[0.026]	[0.026]
Return on assets (ROA)	-0.091	-0.088	-0.113	-0.063
	[0.174]	[0.174]	[0.175]	[0.174]
Firm size (SALES)	0.348***	0.342***	0.351***	0.353***
	[0.018]	[0.018]	[0.018]	[0.018]
Firm risk (SDROA)	0.011	0.013	0.011	0.010
	[0.013]	[0.014]	[0.014]	[0.014]
R&D expenditure (R&D)	0.307**	0.318**	0.295**	0.277**
	[0.125]	[0.124]	[0.127]	[0.127]
Growth opportunity (M/B)	0.134***	0.134***	0.134***	0.133***
	[0.024]	[0.024]	[0.024]	[0.024]
Investment intensity (INV)	0.675***	0.710***	0.703***	0.623***
	[0.220]	[0.220]	[0.221]	[0.220]
CEO stock ownership (OWN)	-0.047***	-0.046***	-0.046***	-0.048***
	[0.007]	[0.007]	[0.007]	[0.007]
CEO option holdings (OPTHOLD)	3.336***	3.304***	3.394***	3.356***
	[0.489]	[0.485]	[0.494]	[0.492]
Observations	12,334	12,334	12,334	12,334
R-squared	0.421	0.421	0.418	0.418

Table 5: Total Compensation of New and Incumbent CEOs

This table reports ordinary least squares regressions of the natural log of total CEO compensation using observations with incumbent CEOs in columns (1)-(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). A firm is classified as a good (bad) performing firm if its stock return is above (below) the industry median in the year prior to the new CEO's appointment. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Incumbent	(2) Incumbent	(3) New	(4) New:Good	(5) New:Bad
CEO tenure×Power index	0.002				
	[0.004]				
CEO tenure (CEOTENURE)	0.001				
	[0.007]				
Power index (POWER)	0.072**	0.097***	0.117***	0.098***	0.101***
	[0.034]	[0.020]	[0.024]	[0.036]	[0.036]
Employment contract (EA)	0.202***	0.201***	0.168***	0.066	0.250***
	[0.035]	[0.034]	[0.053]	[0.080]	[0.078]
Outside CEO (OUTSIDE)	0.141***	0.137***	0.125**	0.222**	0.099
	[0.038]	[0.038]	[0.060]	[0.088]	[0.086]
Stock return (RET)	0.237***	0.236***	0.193***	0.237***	0.185**
	[0.030]	[0.030]	[0.052]	[0.078]	[0.080]
Return on assets (ROA)	-0.042	-0.037	-0.286	-0.372	-0.439
	[0.219]	[0.220]	[0.227]	[0.399]	[0.286]
Firm size (SALES)	0.350***	0.348***	0.343***	0.365***	0.315***
	[0.019]	[0.019]	[0.021]	[0.035]	[0.028]
Firm risk (SDROA)	0.010	0.008	0.010	0.063*	-0.060*
	[0.015]	[0.015]	[0.024]	[0.034]	[0.034]
R&D expenditure (R&D)	0.290**	0.289**	0.381**	0.407	0.544***
	[0.138]	[0.138]	[0.166]	[0.270]	[0.181]
Growth opportunity (M/B)	0.134***	0.134***	0.100***	0.100*	0.052
	[0.026]	[0.026]	[0.036]	[0.052]	[0.057]
Investment intensity (INV)	0.567**	0.570**	0.997**	0.832	1.402**
	[0.238]	[0.240]	[0.410]	[0.587]	[0.618]
CEO stock ownership (OWN)	-0.047***	-0.044***	-0.030	-0.032	-0.029
	[0.007]	[0.007]	[0.026]	[0.033]	[0.051]
CEO option holdings (OPTHOLD)	3.382***	3.482***	4.224**	1.872	7.884***
	[0.503]	[0.489]	[1.979]	[1.959]	[1.886]
Observations	10,100	10,125	1,313	556	660
R-squared	0.426	0.426	0.467	0.509	0.472

Table 6: Fraction of Equity-based Compensation of Powerful CEOs

This table reports results from Tobit regressions investigating the fraction of equity-based compensation (FEQUITY) using all four measures of CEO power and all sample observations. Column (1) presents the baseline result when the power index (POWER) is used to proxy for CEO power and columns (2)–(4) present results when CEO duality (DUALITY), concentration of the CEO's titles (CONCTITLE), and the CEO's founder status (FOUNDER), respectively, are used to proxy for CEO power. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Tobit	(2) Tobit	(3) Tobit	(4) Tobit
Power index (POWER)	0.011**			
	[0.005]			
CEO duality (DUALITY)		0.011		
		[0.009]		
Concentration of titles (CONCTITLE)			0.011	
			[0.009]	
Founder CEO (FOUNDER)				0.042
				[0.026]
Outside CEO (OUTSIDE)	0.033***	0.033***	0.033***	0.038***
	[0.011]	[0.011]	[0.011]	[0.011]
Stock return (RET)	-0.026***	-0.026***	-0.026***	-0.027***
	[0.008]	[0.008]	[0.008]	[0.008]
Return on assets (ROA)	-0.147***	-0.147***	-0.150***	-0.138**
	[0.056]	[0.056]	[0.056]	[0.056]
Firm size (SALES)	0.022***	0.022***	0.022***	0.023***
	[0.005]	[0.005]	[0.005]	[0.005]
Firm risk (SDROA)	0.006	0.006	0.006	0.006
	[0.004]	[0.004]	[0.004]	[0.004]
R&D expenditure (R&D)	0.092**	0.092**	0.091**	0.087**
	[0.040]	[0.040]	[0.040]	[0.040]
Growth opportunity (M/B)	0.049***	0.049***	0.049***	0.049***
	[0.008]	[0.008]	[0.008]	[0.008]
Investment intensity (INV)	0.218***	0.221***	0.221***	0.201***
	[0.063]	[0.064]	[0.063]	[0.064]
CEO tenure (CEOTENURE)	-0.003***	-0.003***	-0.003***	-0.003***
	[0.001]	[0.001]	[0.001]	[0.001]
Employment contract (EA)	0.025***	0.025***	0.025***	0.024***
	[0.009]	[0.009]	[0.009]	[0.009]
CEO stock ownership (OWN)	-0.015***	-0.015***	-0.015***	-0.015***
	[0.002]	[0.002]	[0.002]	[0.002]
CEO option holdings (OPTHOLD)	0.569***	0.569***	0.576***	0.567***
	[0.139]	[0.140]	[0.140]	[0.138]
Observations	12,334	12,334	12,334	12,334
pseudo R-squared	0.453	0.452	0.452	0.453
Log Lik.	-3231	-3234	-3235	-3229

Table 7: Fraction of Equity-based Compensation of New and Incumbent CEOs

This table reports the results from Tobit regressions using all sample observations with incumbent CEOs in columns (1)–(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). A firm is classified as a good (bad) performing firm if its stock return is above (below) the industry median in the year prior to the new CEO's appointment. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Incumbent	(2) Incumbent	(3) New	(4) New: Good	(5) New: Bad
CEO tenure×Power index	-0.000				
	[0.001]				
CEO tenure (CEOTENURE)	-0.001				
	[0.002]				
Power index (POWER)	0.015	0.012*	0.018*	0.017	0.008
	[0.010]	[0.006]	[0.009]	[0.013]	[0.014]
Employment contract (EA)	0.012	0.012	0.073***	0.037	0.109***
	[0.010]	[0.010]	[0.017]	[0.024]	[0.025]
Outside CEO (OUTSIDE)	0.008	0.009	0.091***	0.094***	0.068**
	[0.012]	[0.012]	[0.018]	[0.029]	[0.027]
Stock return (RET)	-0.018*	-0.017*	-0.026	-0.038	-0.005
	[0.009]	[0.009]	[0.021]	[0.029]	[0.029]
Return on assets (ROA)	-0.156**	-0.157**	0.039	-0.149	0.001
	[0.067]	[0.067]	[0.088]	[0.125]	[0.113]
Firm size (SALES)	0.022***	0.023***	0.017**	0.003	0.027***
	[0.006]	[0.006]	[0.008]	[0.011]	[0.011]
Firm risk (SDROA)	0.005	0.006	0.000	0.016	-0.016
	[0.005]	[0.004]	[0.009]	[0.012]	[0.012]
R&D expenditure (R&D)	0.088**	0.089**	0.127**	0.066	0.217***
	[0.045]	[0.045]	[0.052]	[0.073]	[0.072]
Growth opportunity (M/B)	0.049***	0.049***	0.049***	0.050***	0.036*
	[0.009]	[0.009]	[0.013]	[0.018]	[0.021]
Investment intensity (INV)	0.199***	0.200***	0.295**	0.302*	0.277
	[0.069]	[0.069]	[0.124]	[0.155]	[0.238]
CEO stock ownership (OWN)	-0.015***	-0.016***	-0.015	-0.018	-0.005
	[0.002]	[0.002]	[0.012]	[0.012]	[0.024]
CEO option holdings (OPTHOLD)	0.620***	0.580***	0.803***	0.708**	0.901**
	[0.143]	[0.138]	[0.226]	[0.293]	[0.377]
Observations	10,100	10,100	1,313	556	660
pseudo R-squared	0.459	0.458	0.693	1.001	0.623
Log Lik.	-2719	-2725	-136.6	0.211	-80.31

Table 8: Employment Contract of Powerful CEOs

This table reports marginal effects for having an explicit employment contract (EA) in a logit model using all four measures of CEO power and all sample observations. Column (1) presents the baseline result when the power index (POWER) is used to proxy for CEO power and columns (2)–(4) present results when CEO duality (DUALITY), concentration of the CEO's titles (CONCTITLE), and the CEO's founder status (FOUNDER), respectively, are used to proxy for CEO power. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Power index (POWER = 1)	-0.020			
	[0.024]			
Power index (POWER = 2)	0.028			
	[0.023]			
Power index (POWER = 3)	0.002			
	[0.073]			
CEO duality (DUALITY)		0.007		
		[0.021]		
Concentration of titles (CONCTITLE)			0.006	
			[0.018]	
Founder CEO (FOUNDER)				0.114**
				[0.047]
Outside CEO (OUTSIDE)	0.338***	0.335***	0.335***	0.348***
	[0.027]	[0.027]	[0.027]	[0.027]
CEO tenure (CEOTENURE)	-0.000	-0.001	-0.001	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]
Abnormal CEO pay (ABPAY)	0.067***	0.068***	0.068***	0.065***
	[0.010]	[0.010]	[0.010]	[0.010]
Fraction of equity-based pay (FEQUITY)	0.038*	0.040*	0.039*	0.034
	[0.023]	[0.023]	[0.023]	[0.023]
Stock return (RET)	0.017	0.019	0.019	0.016
	[0.013]	[0.013]	[0.013]	[0.013]
Return on assets (ROA)	-0.039	-0.037	-0.038	-0.010
	[0.088]	[0.088]	[0.088]	[0.087]
Firm size (SALES)	-0.020**	-0.022**	-0.021**	-0.019**
	[0.010]	[0.010]	[0.009]	[0.009]
Firm risk (SDROA)	0.029***	0.029***	0.029***	0.029***
	[0.010]	[0.010]	[0.010]	[0.010]
CEO stock ownership (OWN)	-0.012***	-0.012***	-0.012***	-0.013***
	[0.004]	[0.004]	[0.004]	[0.004]
CEO option holdings (OPTHOLD)	0.115	0.100	0.104	0.091
	[0.228]	[0.228]	[0.228]	[0.230]
Investment intensity (INV)	-0.094	-0.093	-0.093	-0.140
	[0.127]	[0.128]	[0.128]	[0.128]
R&D expenditure (R&D)	-0.153**	-0.153**	-0.154**	-0.158**
	[0.076]	[0.076]	[0.076]	[0.075]
Growth opportunity (M/B)	-0.054***	-0.055***	-0.055***	-0.054***
	[0.016]	[0.016]	[0.016]	[0.015]
Observations	12,276	12,276	12,276	12,276
pseudo R-squared	0.168	0.167	0.167	0.170
Log Lik	-6704	-6716	-6716	-6695

Table 9: Employment Contract of New and Incumbent CEOs

This table reports marginal effects for having an explicit employment contract in a logit model using all sample observations with incumbent CEOs in columns (1)–(2), new CEOs in column (3), new CEOs in good performing firms in column (4), and new CEOs in bad performing firms in column (5). A firm is classified as a good (bad) performing firm if its stock return is above (below) the industry median in the year prior to the new CEO's appointment. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Incumbent	(2) Incumbent	(3) New	(4) New: Good	(5) New: Bad
CEO tenure×Power index	0.004**				
	[0.002]				
CEO tenure (CEOTENURE)	-0.005				
	[0.003]				
Power index (POWER = 1)	-0.036	-0.018	0.010	-0.049	0.034
	[0.029]	[0.027]	[0.031]	[0.051]	[0.040]
Power index (POWER = 2)	-0.016	0.039	-0.016	-0.105**	0.041
	[0.036]	[0.027]	[0.031]	[0.045]	[0.043]
Power index (POWER = 3)	-0.129	0.009			
	[0.083]	[0.073]			
Outside CEO (OUTSIDE)	0.333***	0.332***	0.351***	0.391***	0.339***
	[0.030]	[0.030]	[0.032]	[0.051]	[0.038]
Abnormal CEO pay (ABPAY)	0.064***	0.064***	0.053***	0.021	0.096***
	[0.011]	[0.011]	[0.020]	[0.033]	[0.025]
Fraction of equity-based pay (FEQUITY)	0.001	0.001	0.221***	0.139	0.328***
	[0.026]	[0.026]	[0.051]	[0.086]	[0.066]
Stock return (RET)	0.033**	0.033**	-0.012	-0.039	-0.006
	[0.015]	[0.015]	[0.036]	[0.055]	[0.049]
Return on assets (ROA)	0.013	0.007	-0.095	-0.512*	0.136
	[0.101]	[0.101]	[0.157]	[0.269]	[0.195]
Firm size (SALES)	-0.023**	-0.022**	-0.024**	-0.039**	-0.021
	[0.010]	[0.010]	[0.011]	[0.015]	[0.016]
Firm risk (SDROA)	0.024**	0.024**	0.044***	0.035*	0.068***
	[0.010]	[0.010]	[0.014]	[0.018]	[0.020]
CEO stock ownership (OWN)	-0.013***	-0.012***	-0.032**	-0.022*	-0.101**
	[0.004]	[0.004]	[0.015]	[0.012]	[0.044]
CEO option holdings (OPTHOLD)	0.199	0.174	0.929*	1.936***	-1.121
	[0.226]	[0.225]	[0.532]	[0.681]	[0.732]
Investment intensity (INV)	-0.030	-0.044	-0.377	-0.942***	0.271
	[0.133]	[0.134]	[0.230]	[0.325]	[0.314]
R&D expenditure (R&D)	-0.177**	-0.174**	-0.046	-0.040	-0.150
	[0.079]	[0.079]	[0.085]	[0.115]	[0.120]
Growth opportunity (M/B)	-0.060***	-0.060***	-0.060***	-0.044	-0.062**
	[0.017]	[0.017]	[0.021]	[0.035]	[0.030]
Observations	10,054	10,079	1,290	534	654
pseudo R-squared	0.162	0.159	0.250	0.304	0.293
Log Lik	-5432	-5519	-656.7	-250.6	-318.4

Table 10: Instrumental Variable Estimation

This table reports the results from instrumental variable regressions of the natural log of total CEO compensation (TOTPAY) in columns (1)–(2), the fraction of equity-based compensation (FEQUITY) in columns (3)–(4), and the marginal effects for having an explicit employment contract (EA) in a logit model in columns (5)–(6). Columns (1), (3), and (5) report IV estimates using observations with incumbent CEOs, and columns (2), (4), and (6) those using observations with new CEOs only. All the regressions include industry and year fixed effects. Table 1 contains the descriptions of all variables used in this table. The numbers in brackets are heteroscedasticity-robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) TOTPAY Incumbent CEOs	(2) TOTPAY New CEOs	(3) FEQUITY Incumbent CEOs	(4) FEQUITY New CEOs	(5) EA Incumbent CEOs	(6) EA New CEOs
Founder CEO (FOUNDER)	0.072	0.503	0.026	0.069	0.168***	-0.220
	[0.124]	[0.441]	[0.033]	[0.189]	[0.060]	[0.277]
Stock return (RET)	0.237***	0.200**	-0.017	-0.014	0.031	-0.051
	[0.037]	[0.071]	[0.012]	[0.029]	[0.019]	[0.044]
Return on asset (ROA)	-0.144	-0.376	-0.263***	-0.075	0.030	-0.013
	[0.283]	[0.309]	[0.081]	[0.112]	[0.120]	[0.199]
Firm size (SALES)	0.359***	0.354**	0.023***	0.020**	-0.030**	-0.033**
	[0.023]	[0.026]	[0.007]	[0.009]	[0.012]	[0.014]
Firm risk (SDROA)	0.017	0.011	0.009	0.013	0.003	0.053***
	[0.019]	[0.031]	[0.005]	[0.010]	[0.012]	[0.017]
R&D expenditure (R&D)	0.193	0.489**	0.023	0.107*	-0.161*	-0.114
	[0.184]	[0.207]	[0.057]	[0.055]	[0.092]	[0.105]
Growth opportunity (M/B)	0.136***	0.108**	0.051***	0.033*	-0.048**	-0.059**
	[0.035]	[0.050]	[0.011]	[0.018]	[0.023]	[0.027]
Investment intensity (INV)	0.603**	0.195	0.188**	0.177	-0.100	-0.141
	[0.293]	[0.419]	[0.081]	[0.135]	[0.155]	[0.264]
CEO Tenure (CEOTENURE)	0.007*	0.117	-0.001	-0.018	-0.002	-0.127***
	[0.004]	[0.087]	[0.001]	[0.029]	[0.002]	[0.048]
Employment contract (EA)	0.235***	0.157**	0.015	0.046**		
	[0.044]	[0.060]	[0.012]	[0.020]		
CEO stock ownership (OWN)	-0.049***	-0.051	-0.015***	-0.013	-0.018***	-0.030*
	[0.008]	[0.035]	[0.003]	[0.017]	[0.006]	[0.016]
CEO option holdings (OPTHOLD)	3.616***	2.622	0.822***	0.590**	0.203	0.933*
	[0.613]	[2.053]	[0.170]	[0.296]	[0.284]	[0.567]
Abnormal CEO pay (ABPAY)					0.075***	0.062**
					[0.014]	[0.026]
Fraction of equity-based pay (FEQUITY)					0.002	0.157**
					[0.032]	[0.071]
Observations	7,035	829	7,046	830	6,987	811
R-squared	0.429	0.495	0.474	0.824	0.101	0.170

Log Lik	-1878	-47.19	-3819	-420.2

Does CEO Compensation Reflect Managerial Ability or Managerial Power?

Evidence from the Compensation of Powerful CEOs

Highlights

- The level of total compensation is higher for more-powerful CEOs than for less-powerful CEOs (or power premium)
- The power premium is invariant to whether the CEO is newly hired or not
- The fraction of equity-based compensation is similar between new and incumbent CEOs
- The likelihood of having an explicit employment contract is similar between new and incumbent CEOs
- Additional pay for powerful CEOs is a compensation premium for better CEO talent