Pay for Future Returns

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Abstract

We show that firms use inside information on future performance to determine executive compensation. Our research strategy - to focus on salary raises - is based on actual contract practice from 649 hand-collected CEO employment contracts. Provisions for compensation reviews are prevalent in 55% of contracts, and almost all provisions link reviews to fixed compensation. Firms with review provisions give 7.5% more salary raises and are 8.1% less likely to explain them with observable performance measures. These raises predict events and performance next year – 24% more product announcements with 0.3% higher announcement returns. A hypothetical long-short portfolio investing in salary-raising firms could earn annual abnormal returns of 6%. Our paper underscores the importance of "pay for future returns" in motivating long-term performance.

Keywords: pay for performance, executive compensation, long-term compensation, inside information, compensation reviews, stock returns, research and development

JEL: G12, G14, G34, J41, O32

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Monitoring and compensating managerial contribution to long-term performance is the central task of boards (Adams, Hermalin, and Weisbach, 2010; Burkart, Miglietta, and Ostergaard, 2017). However, setting managerial incentives for long-term performance is difficult because publicly observable measures take time to realize.[1] Such delay makes compensation based on observable measures a costly and inefficient long-term incentive for risk-averse managers (Kahl, Liu, and Longstaff, 2003; Hall and Murphy, 2002; Meulbroek, 2001). Theoretically, firms should therefore reward managers based on inside information that reflects their contribution to long-term performance (Baker, Gibbons, and Murphy, 1994; Hayes and Schaefer, 2000; Prendergast, 2002).[2] But, whether firms indeed do so is questionable. This is because outside investors, by definition, observe neither the inside information on which reviews should be based nor the information quality of the directors who conduct the review (Murphy and Oyer, 2003). Such short-term opacity opens the door for potential conflicts of interests, such as favoritism (Prendergast and Topel, 1996) and performance manipulation (Hallock and Oyer, 1999). Understanding whether and how firms "pay for future returns" is therefore important not only as a fundamental ingredient to compensation design, but for corporate governance in general (Cornelli, Kominek, and Ljungqvist, 2013).

To document the nature and very existence of "pay for future returns," we construct the first data set of CEO contract terms on compensation reviews, using 649 contracts of S&P 500 firms. We find that 55% of all contracts schedule reviews. The review clauses are more prevalent for CEO-firm pairs when theory predicts that early reviews are most likely to be useful (e.g., firms with higher information asymmetry, higher R&D investment, and firms that hired an outside CEO). This heterogeneity in contract terms suggests that the clauses are not only boilerplate.

Almost all terms related to reviews appear in the section of "Base Salary" and are explicitly linked to potential raises in salary. Changes to bonus and equity compensation to the CEOs of our sample are rarely linked to reviews, but are frequently linked to company-wide policies and – in the case of equity-based compensation – subject to shareholder approval to protect against dilution. Based on these contractual practices, we propose an indicator for the outcome of reviews: real CEO salary increases in the absence of contemporaneous changes in equity-based

[1] For example, it is difficult for outside investors to predict how research and development (R&D) activities affect firm value (Chan, Lakonishok, and Sougiannis, 2001; Eberhart, Maxwell, and Siddique, 2004; Cohen, Diether, and Malloy, 2013; Hirshleifer, Hsu, and Li, 2013); also, firms may not want to announce success in R&D too early for competitive reasons.

[2] Following Murphy and Oyer (2003)'s definition, such reviews are based on performance measures that are observable to the supervisor, but are not verifiable by the courts (and need not be perfectly observable by the subordinate).

compensation. Positive reviews (stand-alone salary increases) predict long-term stock returns (Figure 1 and Table 6). A hypothetical long-short portfolio strategy – one that invests in firms at the time of positive reviews and takes a short position in firms of no positive reviews – could earn significantly positive abnormal returns of 6% for the year after the raise. Within that year, firms with positive reviews make more announcements of new product developments and receive greater abnormal returns around these announcements. Return predictability ends after 1.5 years, the average time to the disclosure of the signal.

[[INSERT Figure 1 about Here]]

Although the dollar magnitude of a salary increase is much smaller than a typical increase in equity-based compensation, the total wealth effects of salary increases are larger. This is because bonuses and pensions are usually calculated in multiples of the salary (De Angelis and Grinstein, 2015; Bebchuk and Jackson Jr, 2005; Stefanescu, Wang, Xie, and Yang, 2018). Assuming that the increase is permanent (salary decreases occur only in 5% of all firm-years, compared to 69% firm-years with salary raises), we can estimate its effects on future bonuses and pensions. In total, the present value of a median increase in salary amounts to 76% of the total annual compensation.

Using salary raises to encourage long-term performance is also consistent with the notion that bonus and equity-based compensation incentives could be inefficient and short-term (e.g., Bizjak, Brickley, and Coles, 1993; Shilon, 2018). In contrast, cash compensation and its raises have gained growing support as a way to reward long-term performance and sustainability. Consistent with a trend away from compensation as a function of observable measures, companies and institutions are increasingly cutting their incentives plans. Beer et al. (2004), for example, report on the elimination of thirteen incentive plans at Hewlett-Packard. Other examples include Dupont, Schering-Plough, Fujitsu (Banker et al., 2015), Glaxo SmithKline[3], and the Chinese Academy of Sciences (CAS)[4].

Independent of contractual practices, a focus on salary increases instead of total compensation also allows us to overcome empirical challenges. Equity grants set explicit incentive effects that should improve subsequent performance (Mehran, 1995; Murphy, 1999; Laffont and Mar-

[3]GlaxoSmithKline unveiled an initiative in 2010 stating that the company would no longer link bonuses to sales targets and instead reward sales staff for their scientific knowledge. Bloomberg News. http://bloom.bg/11CW2C9.

[4]CAS recently has reduced the reliance of their scientists' salaries on competitive grants to 30% from 70% (Cyranoski, 2014)

timort, 2002) and can indicate market timing (Yermack, 1997; Lie, 2005). Future returns after raises in equity pay are likely to be largely caused by these reasons, rather than the reason for the raises themselves. Our focus on salary increases in the absence of equity-based compensation raises thus helps us isolate the review outcomes we want to measure from those other concerns that underpin equity grant raises.

We complement our contract data with ex-post outcome data from proxy statements on the disclosed explanations for compensation changes. CEOs with performance clauses receive 7.5% more stand-alone salary raises, and firms justify such raises in their compensation statements 8.1% more often with "subjective" explanations (or offer no explanations at all). These results further suggest that our salary measure is consistent with ex-ante incentive design and its ex-post review feedback.

If firms use inside information to account for the CEO's contribution to future returns, then such information should eventually be revealed to the market, and such raises should predict better future performance. We find that, consistent with "pay for future returns", a hypothetical long-short portfolio strategy – one that invests in firms at the time of positive reviews and takes a short position in firms of no positive reviews – could earn significantly positive abnormal returns of 0.2%-0.5% per month (2.4%–6% per year) after the raise. Predictability remains positive and significant for about a year, but disappears after 15 months (Figure 1 and Table 6). Note that replicating this strategy based on the official announcement of a CEO' salary is not possible. The salary increases are only made public about 1.5 years (mostly 15 or 16 months) after the raise, precisely the time period for which the predictive power in returns disappears (Figure 2.1). Within that 1.5 year delay, firms that offer stand-alone salary raises make more product-related news announcements than firms that do not offer such raises, especially around 13 and 15 months after the raise (Figure 2.2).

[[INSERT Figure 2 about Here]]

While we interpret the positive correlation between compensation changes and subsequent stock performance as a result of rewarding early success that later is impounded into the stock price, other explanations are entirely plausible. For example, salary increases may be correlated with other omitted variables that drive long-term firm performance. Moreover, compensation increases can incentivise CEOs to work harder (Akerlof, 1982, 1984). These arguments would also predict a positive relationship between compensation changes and the subsequent stock

performance. We therefore conduct a cross-sectional and placebo tests to provide additional support for our conclusion.

First, inside information should be more valuable in determining pay for future performance when objective performance measures are noisier, for example in firms with greater information opacity, or for CEOs who are still early in their tenure. Indeed, we find that salary raises offered by firms with more dispersed analyst forecasts, greater idiosyncratic risk, and bid-ask spreads, as well as those offered by firms with early-tenure CEOs, predict higher monthly stock returns.

Second, better governance should improve the quality of compensation reviews, especially in interpreting information on future returns. Consistent with this argument, the return-prediction power of salary increases is higher in firms with more effective boards or compensation committees, as measured by fewer outside engagements (serving on multiple boards) and independence of directors.

Third, one might argue that CEO salary changes simply reflect an general upwards trend in compensation, for example in a growing industry. To test this possibility, we construct a long–short portfolio that invests in firms whose industry peers (defined as having the same first two digits of the SIC code) experienced a stand-alone salary increase on average and takes a short position in firms whose industry peers experienced no increase in salary. This measure does not predict stock returns. This result suggests that the correlation between raises and returns is unlikely to be caused by omitted peer compensation factors.

Fourth, paying a wage higher than the market equilibrium rate increases the cost of dismissal, which itself may cause the CEO to work harder or shirk less (Akerlof, 1982, 1984). As a result, it is possible that the good performance after salary raises stems from the improvement in performance caused by the raise. To test this possibility, we double sort firms on stand-alone salary raises and abnormal compensation, as in Gillan, Hartzell, and Parrino (2009). If return predictability can be fully explained by the incentive effect of efficiency wages, then salary raises of CEOs with negative abnormal compensation should not predict future returns. A long-short portfolio that invests in firms with negative abnormal compensation that offer stand-alone salary increases does predict future returns. Thus, efficiency wages cannot fully explain our results.

In addition, we show that our results are robust to alternative constructions of stand-alone salary raises based on nominal salary increases and various ways to control for changes in equity-based pay. Finally, we construct compensation measures using increases in bonus multiples and equity-based pay. These measures do not predict stock returns as our measure based on salary

does. As CEO compensation is a package of many compensation components, the lack of return predictability of raises in bonus and equity compensation casts further doubt on the argument that our results are fully explained by the causal influence of base salary on performance (e.g., via an efficiency wage channel).

Previous literature names R&D as one main example for delays in stock price reactions. We show that, consistent with the literature, salary increases are associated with positive R&D outcomes. One year following CEO salary increases, the number of news articles about new product developments compared to the last year increases by 24%, with average positive abnormal returns of 0.3% per product announcement.[5] These findings suggest that firms offer salary increases to CEOs as a reward for early R&D investment success that has yet to be reflected in objective performance measures.

Our paper contributes to the managerial compensation literature that primarily focuses on the pay for *past* performance (cf. Jensen and Murphy, 1990; Hall and Liebman, 1998). We show that pay for *future* returns based on inside information is also an integral part of the CEO compensation practice. Thus, our paper lends support to the theoretical literature on subjective performance reviews (Hölmstrom, 1979; Baker, Gibbons, and Murphy, 1994; Fuchs, 2015) that incorporates compensation based on subjective performance measures as part of the contract design. We are part of a small literature that links compensation to *subsequent* returns. Event studies relate stock returns to corporate governance regulation events to CEO pay (**?**). Core, Holthausen, and Larcker (1999) show that the component of compensation that can be predicted from governance variables has a negative relation with future stock returns, where our focus is on unexplained compensation. The closest to our paper is **?** which shows a negative relationship between equity-based CEO pay and returns for periods up to five years after the end of the compensated year. In contrast to these findings, we document a positive relationship between salary raises and returns in the first 18 months after the salary raise.

With our focus on cash compensation, we contribute to recent discussions on the downsides of equity compensation. Notable examples include manipulation of the used explicit measures (For example, Hallock and Oyer, 1999; Murphy, 2000; Department for Business, Innovation & Skills, 2011). In addition, restricted stocks and options have major effects on the optimal investment and consumption strategies and therefore are very costly to risk-averse executives

[5]The average number of product announcements in our sample is 4, so the total abnormal return due to new product development is approximately 1.2%.

(Kahl, Liu, and Longstaff, 2003; Hall and Murphy, 2002; Meulbroek, 2001). The literature also suggests that there are negative long-term effects of equity vesting on firm activities, such as repurchases and M&A (Edmans, Fang, and Huang, 2017), investment (Ladika and Sautner, 2017), and CEO turnover (Jochem, Ladika, and Sautner, 2018; Gopalan, Huang, and Maharjan, 2016). These concerns call for cash compensation based on inside information to complement traditional equity-based pay in rewarding long-term performance.

Our analysis is closely related to the literature on discretionary bonus compensation. Although (Murphy and Oyer, 2003) find that discretionary bonuses are less prevalent with CEOs than with lower-level managers, we nevertheless build heavily on the similar arguments and empirical designs of this literature. Consistent with this literature, we find that compensation changes in firms with greater information asymmetry have a greater predictive power of returns in the long run. While some papers (Ittner, Larcker, and Rajan, 1997; Baker, Jensen, and Murphy, 1988) point to negative consequences of discretionary compensation such as managerial entrenchment, other research (Bushman, Indjejikian, and Smith, 1996; Gibbs, Merchant, Van der Stede, and Vargus, 2004) finds that the use of discretionary compensation is positively related to long-term investment in tangibles, growth opportunities, and the length of product development. Based on the evidence from actual contracts, we explore in depth the nature of base salary and thus complement the literature on discretionary bonuses.

Second, we offer an empirical analysis of private information in executive compensation. Our paper shows that firms use inside information to guide long-term performance. This contributes to the growing literature on the role of boards (Adams and Ferreira, 2007; Adams, Hermalin, and Weisbach, 2010; Schwartz-Ziv and Weisbach, 2013; Burkart, Miglietta, and Ostergaard, 2017). Our paper underscores the important role that boards play in monitoring CEOs on behalf of shareholders who are less informed and, hence, unable to monitor CEOs themselves (Burkart, Miglietta, and Ostergaard, 2017). We also complements the growing literature on boards' decision-making (Malenko, 2013). The use of inside and soft information by boards emphasizes the importance of communication among board members before reaching a consensus view on compensation practices.

Within the literature on boards and information, we particularly build on Cornelli, Kominek, and Ljungqvist (2013), which links board information about non-verifiable performance to CEO turnover decisions in private equity-backed firms. CEO turnover provides a convenient setting for researchers to study such information as we can observe CEO turnovers. A structural es-

timation by Taylor (2010) further indicates that such information has a more than five times larger influence on boards in deciding on CEO turnovers, when compared to information contained in profitability. Our paper focuses on inside board information in a different setting – CEO compensation – and presents positive evidence how widely-held public US firms use private information to reward CEOs. Our findings based on CEO contracts also confirm the intuition of Hayes and Schaefer (2000) who establish a link between cash compensation raises and subsequent changes in return on equity (ROE) and interpret this link as evidence for usage of private information in implicit incentive contracts. Our empirical test focuses on stock returns instead of ROE. Since stock returns incorporate public information, examining them enables us to distinguish private from public information that takes time to materialize into operational performance.

Third, this paper contributes to the empirical literature on contracts. Schwab and Thomas (2005) describe a sample of 375 CEO employment contracts from a legal perspective. Cronqvist and Fahlenbrach (2013) study 20 CEO contracts in private equity-sponsored firms. Kaplan and Strömberg (2003) study 213 contracts between venture capitalists and entrepreneurs. Yermack (2006) examines CEO separation agreements and finds that most severance pay is awarded on a discretionary basis by boards of directors. Finally, Gillan, Hartzell, and Parrino (2009) report that many CEOs operate without an explicit contract and study the choice between explicit and implicit contracts. We focus on the compensation section of CEO contracts and link contract clauses to ex-post changes in compensation. To the best of our knowledge, ours is the first study to show that CEO contracts explicitly cater for subsequent dynamics in compensation.

1 Data

We analyze CEO compensation and stock returns for all firms that were part of the S&P 500 in one of the years between 1994 and 2008. In addition to using standard sources, we obtain and provide information of ex-ante CEO contracts and ex-post narratives on compensation changes. Our final data set consists of 8,190 firm-year observations, including 3,250 observations of firms that disclose their CEO employment agreements or details thereof. Because CEOs are often compensated for fewer months than one full year in the first and the last fiscal years of their tenure, compensation changes during those years could be due to reasons other than performance. We therefore exclude the first and the last years of a CEO's tenure. After

excluding such years, we are left with 5,121 observations.

We construct our sample of compensation contracts by screening proxy statements and forms 10K, 10Q, and 8K (and their corresponding exhibits) for explicit employment agreements. US Securities and Exchange Commission Regulation S-K (§229.601) requires the disclosure of any contracts or any compensatory plan of named executive officers as defined by item 402(a)(3) (§229.402(a)(3)). When agreements are not available, we screen the same filings for indications of whether CEOs are subject to any agreements containing compensation related clauses. In total, 649 employment agreements are publicly available.

The portion (40%) of our sample firms whose CEOs have explicit contracts is in line with findings in the literature. For instance, Gillan, Hartzell, and Parrino (2009) report that about 46% of S&P 500 firms had comprehensive written employment agreements with their CEOs in the year 2000, Yermack (2006) finds that 33% of CEOs have employment contracts at the time of their exit, and Schwab and Thomas (2005) report that 42% of the firms they surveyed had contracts with their CEOs. It is, however, worth mentioning that, despite making an exhaustive search of many filings, we cannot be certain that those firms not disclosing an employment agreement do not actually have one. Hence, a nondisclosing firm might be wrongly classified as one whose CEO operates without a contract. Such misclassification is likely to result in a downward bias concerning the relationship between compensation and stock returns, which means that our findings represent a *lower* bound. This is because some CEO compensation increases are the result of subjective performance reviews and could be wrongly treated as occurring in the absence of such evaluations.

We also hand-collect justifications for compensation changes from firms' proxy statements. This information is reported in the "compensation table" of those statements. Other data come from standard sources. We obtain firms' financial information from Compustat, stock returns from the Center for Research in Security Prices (CRSP), realized compensation data from ExecuComp, board and corporate governance information from Institutional Shareholder Services (ISS) and Boardex, financial analyst estimates from the Institutional Brokers' Estimate System (I/B/E/S), and product announcements from S&P Capital IQ.

[[INSERT Table 1 about Here]]

Table 1 gives summary statistics of the explanatory variables that we use: firm characteristics, CEO characteristics, and labor market characteristics. For each variable, we report its

mean, median, and standard deviation, as well as minimum and maximum values (See Appendix 1 for the definitions of these variables). Our sample firms have an average of $23.9 billion in assets and $10.4 billion in sales; their average return on assets (ROA) is 8% and average leverage ratio is 33%. The idiosyncratic risk (as defined by Wurgler and Zhuravskaya, 2002) of our sample firms averages 30%, and the analyst forecast dispersion is 12%. About 14% of CEOs are either hired from outside the firm or have worked in the firm for less than a year before becoming an CEO. The mean of CEO tenure is seven years, and the mean CEO age is 56. About 67% of a typical board is comprised of independent directors, and 29% of all boards are "busy" boards (as compared with 21% in Fich and Shivdasani, 2006). The annual industry turnover rate for CEOs averages about 12%, but varies, across industries from a minimum of no turnover during the sample period to a maximum of 75% turnover.

2 Compensation Reviews

A delay in the absorption of performance information in observable measures makes it costly to encourage risk-averse CEOs to undertake promising long-term investment projects, especially when CEO faces high discount factors or need more liquidity. For example, (Kahl, Liu, and Longstaff, 2003; Hall and Murphy, 2002; Meulbroek, 2001) show that the most common managerial long-term performance incentives – restrictions on the ability to sell shares or options – have major effects on the optimal investment and consumption strategies of their recipients. Stocks and options that vest after five years are only worth around 50% of their market value to risk-averse executives. One solution to this problem is to reward executives with raises based on information not yet reflected in market or accounting measures (Hölmstrom, 1979; Baker, Gibbons, and Murphy, 1994; Fuchs, 2015). In this section, we investigate whether firms indeed reward CEOs for future performance based on inside information. To this end, we document review-related terms in actual ex-ante CEO employment contracts and link them to ex-post compensation outcomes.

2.1 Evidence from CEO Compensation Disclosure

This section summarizes main findings from contracts and compensation reports in proxy statements. We provide a detailed account in the Internet Appendix.

First, many compensation contracts describe review practices. In Panel A of Table 2, we

provide an overview of the frequency of review clauses and their content. More than half (54.7%) of the contracts require future reviews, and most contracts specify the review frequency (usually each year). Some contracts (less than 15%, see Panel B of Table 2) explicitly list factors considered for reviews, such as CEO performance and peer firm compensation, and among others. The most frequently mentioned review component is performance (8.6% of contracts).

[[INSERT Table 2 about Here]]

Second, most contracts link positive reviews to increases in base salary. More than 75.5% of contracts explicitly prescribe salary adjustments as a consequence of positive reviews, as compared with 4.93% and 13.41% for bonus and equity adjustments (see Panel C of Table 2), respectively. Mr. Freeman's contract in Appendix 2 is a typical example. It calls for reviews only when discussing salary; in contrast, any adjustments to bonus or equity are subject to company-wide compensation policies that leave little discretion to the board.

Firms must justify compensation raises in proxy statements. In Panel A of Table 3, we give summary statistics for these ex-post explanations for raises and lists the keywords we use to signify different types. For example, 7.4% of salary increases are justified using explicit measures of financial performance (i.e., objective performance reflected by net income, ROA, and so forth), and 39.9% of salary increases are justified using general financial performance. In contrast, 16.8% of salary increases are described as a reward for subjectively evaluated performance – leadership, strategic planning, accomplishing an expansion or restructuring, and so forth. No justification is given (in proxy statements) for nearly a third of salary increases.[6]

[[INSERT Table 3 about Here]]

In Panel B of Table 3, we link these justifications to ex-ante contracts. Salary increases of CEOs with explicit review clauses are more likely to be justified subjectively (45.3% when no justification is given, and in 61.1% of firm-years when either no justification is given or their performance is evaluated subjectively). The corresponding numbers for CEOs with no contractual reviews are significantly lower: 31.5% and 51.9%, respectively. In contrast, CEOs with review clauses receive salary increases with justifications that use specific, objective measures in only 5% of all firm-years and use general financial performance in 30.5% of firm-years. The

[6]There are also explanations for compensation changes that are not based on performance. In the sample, 29% of changes result from the benchmarking of CEO compensation to other executives who work in the same industry. Further increases followed contract renewals or adjustments for inflation.

corresponding numbers for CEOs with no contractual reviews are significantly higher: 7.7% and 41.2%, respectively. In Panel C, we report results for CEOs who must undergo annual reviews; these results are similar to those in Panel B.

The consistency between ex-ante and ex-post compensation narratives suggests that salary increases are unlikely to reflect arbitrary firm decisions but are indeed linked to the reviews described in the contracts. However, it is not obvious from a theoretical perspective why firms should use salary increases to reward for future performance – rather than bonus and equity-based pay. Indeed, an overall increase in compensation would keep the ratio between salary and equity-based compensation constant instead of reducing the fraction of equity-based compensation. One explanation is the perception of increases in fixed compensation as more long-term than equity-based compensation (e.g., Bizjak, Brickley, and Coles, 1993; Shilon, 2018), which typically vests after three to five years (Gopalan, Milbourn, Song, and Thakor, 2014). Raises in fixed compensation, in contrast, are rarely reversed (Shue and Townsend, 2017; Taylor, 2013) and affect bonuses and pensions which are usually calculated in multiples of the salary (De Angelis and Grinstein, 2015; Bebchuk and Jackson Jr, 2005; Stefanescu, Wang, Xie, and Yang, 2018). In the next section, we provide suggestive evidence of the magnitudes of such effects.

2.2 Magnitudes of Base Salary Changes

The previous section shows that contracts link successful CEO reviews to raises in base salary, but only rarely bonus and equity compensation. But intuitively, such rewards seem small compared to the magnitudes of equity-based compensation. In this section, we document the total wealth effects of salary changes and show that they are actually rather large. This is because salary increases are rarely reversed (Shue and Townsend, 2017; Taylor, 2013), and bonuses and pensions are usually calculated in multiples of the salary (De Angelis and Grinstein, 2015; Bebchuk and Jackson Jr, 2005; Stefanescu, Wang, Xie, and Yang, 2018).

[[INSERT Table 4 about Here]]

First, we confirm that base salaries are smaller than equity-compensation in our sample. Table 4 reports summary statistics for compensation and changes, separated for firm-years with increases and decreases. To take a conservative approach in classifying changes in salary as *raises*, we do so only if the "real" (i.e., inflation-adjusted) salary growth is positive. In other

words, we do not consider an upward adjustment that does not exceed the inflation rate to be a raise. The average increase in salary is 9.5% of a salary of $0.7 million. This compares to an annual $3.9 million equity-based compensation and $0.6 million bonus for those firm-years with salary raises. Across the sample, equity-based compensation is about seven to eight times as high as salary. So indeed, salary raises seem small compared to equity compensation.

Second, we document that salary raises are rarely reversed. Panel A of Table 4 presents the frequency of years with salary cuts, no changes, and raises (and their magnitudes) in columns 1, 2, and 3, respectively. Salary cuts are rare, though we include all cuts, even if only nominal; they occur in only 5.2% of all firm-years and average -13.3%. In only 25.4% of firm-years do CEOs receive the same salary (or a salary increase of less than the inflation rate). Salary raises are frequent in comparison; they occur in 69.4% of all firm-years and average 9.5%.

Cuts in equity compensation, in contrast, are more frequent. Panel B presents frequency of years with equity cuts, no change, and raises and their magnitudes in columns 1, 2, and 3, respectively. Equity cuts occur in 13% of all firm-years. Years with no changes in equity are frequent; they occur in 71% of all firm-years. In 16% of firm-years, CEOs receive equity raises.

Given that salary increases are rarely reversed, we can perform a back-of-envelope calculation of the present value of a permanent salary increase to future salary, bonus and pension payments. We report the estimates in Panel C of Table 4. For a conservative estimation, we assume that the CEO retires after the current year. The CEO receives the actual salary change (increase or decrease) and a bonus based on the increased salary. We use the minimum bonus multiple over the CEO's entire tenure in our sample (past and future) to compute the new bonus. We then compute the change in annual pension as the benefit factor times years in service times the change in salary and bonus (Rauh, Stefanescu, and Zeldes, 2013). We use the benefit factor (0.02), discount rate (5.5%), and annuity factor from (Stefanescu, Wang, Xie, and Yang, 2018) which takes mortality rates into account.

The total effect of salary increases is large. We report the total effect of salary raises as a percentage of the current total annual compensation (TDC1); our conservative estimate is as high as 20% (column 1, row 1). For a CEO who stays for the average tenure of leaving CEOs (base case, column 2) and using the median bonus multiple, the corresponding number is 42%. For a CEO who stays until age 65 and using the maximum bonus multiple, the total effect of salary raises is 142%, or 1.4 times the current total compensation (high case, column 3). The effect of an average percentage increase in salary is 83% in the base case, the one of a median

increase 76%, and the one of one standard deviation 79% of the annual total compensation.

The average year-on-year increase in equity-based compensation, for years with such an increase, is 23.5% (Panel B). Given that such increases are almost as frequent as decreases (16% vs. 13%), their effects are not likely to be persistent. In addition, risk-averse CEOs may value restricted grants less than the firm (Kahl, Liu, and Longstaff, 2003; Hall and Murphy, 2002; Meulbroek, 2001), further reducing their value to the recipient. Compared with changes in equity-based compensation, salary increases are thus more valuable to the CEO by a magnitude compared to increases in equity-based compensation.

2.3 Review Outcomes in the Data

To link compensation review outcomes to subsequent performance, we construct an indicator based on the contractual praxis. This section describes our review outcome measure and links it to the compensation narrative.

Separating the outcome of performance reviews from other reasons for compensation changes is challenging because the actual review is not observable. Yet this separation is important as compensation changes can be positively related to future returns for very different reasons. First, good outside options related to external market conditions or positive past performance can lead to renegotiations; raises for those reasons will be positively related to returns. Second, firms may time equity grants to precede the release of positive information or time the release of such information to be after equity grants (Yermack, 1997; Lie, 2005). Here a positive correlation between compensation change and returns is driven by timing rather than a review. Third, equity grants provide CEOs with explicit long-term incentives that causally lead to better future performance after the reward (Mehran, 1995; Murphy, 1999; Laffont and Martimort, 2002).

The focus on base salary raises as a reward for long-term performance yields a convenient empirical strategy to separate reviews from other reasons for compensation changes. To identify the outcome of review clauses in our following analysis, we isolate stand-alone raises in salary that do not coincide with raises in equity-based compensation. While positive reviews can result in simultaneous raises in salary and equity-based compensation, other explanations are less plausible for standalone salary raises in absence of raises in equity-based compensation. Renegotiations are likely to include all components of compensation rather than only salary. Timing of positive news after grants is only beneficial for equity-based compensation.

To classify a stand-alone salary increase and thus a positive review outcome, we proceed as follows. First, we take a conservative approach in classifying changes in salary as *raises*: we do so only if the "real" (i.e., inflation-adjusted) salary growth is positive. In other words, we do not consider an upward adjustment that does not exceed the inflation rate to be a raise. We then exclude firm-years with contemporaneous increases in equity compensation. Here, we use the change in *grant values* of restricted stocks plus options (as opposed to realized values) because our objective is to study compensation decisions rather than realized changes in wealth. When calculating changes in such compensation, we also incorporate two observations documented in the literature. First, equity-based compensation is typically granted in multi-year cycles (Hall, 1999), and recipients are not entirely vested until a pre-specified period of time (typically 3 years) has elapsed (Cadman, Campbell, and Klasa, 2016). We therefore assume that, if a CEO receives no equity in years between two grants, then that is an instance of "no change" in equity-based compensation instead of a massive decrease, followed by a similarly massive increase. We then compare the current grant value to the previous grant's value. Second, to ensure that we include only non-trivial changes in equity compensation, we flag only those changes in equity-based compensation that exceed (in absolute value terms) that year's change in salary. Conditioning our predictor to have no simultaneous raises in equity compensation is likely conservative, since we miss some simultaneous raises of equity pay and salary that may, in fact, be related to compensation reviews. Section 6.1 shows that our results are robust to various modifications that relax these restrictions on the salary increase measure.

Panel C of Table 4 summarizes the incidence of our indicator of positive reviews: increases in CEO salary with no contemporaneous change in equity-based pay. These happen in 46% of all firm-years. For comparison's sake, we observe that CEOs receive more salary *and* equity in 12.6%, compared to more salary but *less* equity-based pay in 10.2% of all firm-years.

Table 5 links review requirement clauses to stand-alone salary raises and their disclosed justifications for firm-years under contract. Since not all CEOs sign contracts and not all firms that sign contracts disclose their particulars, we control for the possibility of selection into our contract sample. For this purpose, we use a Heckman (1979) approach and report the inverse Mills ratio for all second-stage regressions (see Appendix 3). We choose a state law characteristic for the identifying restriction: the at-will exception rule of good faith and fair dealing. This rule protects employees with shorter contracts or without contracts. The ensuing popularity of these contracts makes longer explicit contracts less attractive.

In the second stage, we regress indicator variables for subsequent compensation changes on our explanatory variable: contractual clauses requiring periodic review. To ease the comparison, we include only years when there is either a stand-alone salary increase or no change in salary. The dependent variable in columns 1 and 2 of Table 5 is an indicator for a stand-alone salary increase. The presence of review clauses in a CEO's contract corresponds to a 7.5% higher likelihood of salary raises when the only control is year fixed effects. The positive link between review clauses and stand-alone salary increases is robust when we control for CEO tenure group (following the definition in Pan, Wang, and Weisbach (2016)), age, the inverse Mills ratio, and year and industry fixed effects. Our results are also robust to controlling for an indicator variable for salary increases that are based on review factors explicitly written into the contract.

[[INSERT Table 5 about Here]]

Finally, we link contractual review clauses to the compensation narratives and show that firms are less likely to cite objective performance measures for standalone salary raises under such contracts. In column 5, we see that CEOs with review clauses are 5.1% more likely to receive stand-alone salary increases without a stated justification. Column 6 shows that CEOs with review clauses are 8.1% more likely to receive stand-alone salary increases with a justification using subjective explanations. Column 7 indicates that contracts with review clauses are *not* more predictive of stand-alone salary increases justified with objective performance measures. These results are consistent with stand-alone salary raises as rewards for contribution to long-term performance.

3 Returns after Compensation Changes

Compensation reviews provide an opportunity for firms to link compensation to information that is still not perceptible in quantitative measures. The previous results suggest that stand-alone salary raises – our measure of successful reviews– correspond to disclosure about actual CEO performance reviews. But we do not know yet whether such rewards actually link to good future performance, or whether the raises instead are driven by rigged information and captured boards. Ultimately, information about reward-worthy performance should eventually become known to the market and result in better performance after positive reviews. To see if this is true, we now examine the long-run improvement in returns following such increases.

3.1 Portfolio Returns

We examine average returns on portfolios formed using information about compensation changes. We compute excess returns, three- and four-factor alphas (as in Fama and French, 1996; Carhart, 1997) by running time-series regressions of excess portfolio returns on the market (MKT), size (SMB), value (HML), and momentum (UMD) factor returns. Specifically, we form equal-weighted portfolios for each month; each portfolio includes all companies that made the same type of compensation change (e.g., stand-alone salary raises) in the fiscal year that starts within the prior 12 months. The portfolios so constructed are rebalanced monthly. More precisely, salary is set at the beginning of a fiscal year t rather than at the end of a fiscal year t. Salary changes thus reflect information about CEO performance in the fiscal year t-1. Similarly, in the next section where we conduct return forecasting regressions, all the control variables are measured in the year subject to the review, hence one year prior to the fiscal year in which the CEO earns the increased salary.

[[INSERT Table 6 about Here]]

Table 6 reports the average monthly returns to these portfolios and illustrates our main returns result: firms that offer stand-alone salary increases outperform those that do not. This finding holds for excess returns and three- and four-factor alphas. As reported in Panel A, a long–short portfolio spread ("Spread") – that between the portfolio that offers stand-alone salary increases and the one that does not offer increases in either component – is significant and large under all risk adjustment specifications. For example, abnormal returns after three-factor adjustment to the long–short portfolio equals 51 basis points (bps) ($t = 3.75$) half a year after the raises, or 6.12% annually. However, both magnitude and significance decline one year after the raises and disappear 1.5 years after raises.

The disappearance of abnormal returns after 1.5 years indicates that the market takes the disclosed information into account. Figure 2.1 plots the time lag between raises and disclosure in proxy statements. We find that changes are only made public around 1.5 years (mostly 15 and 16 months) after the raise. It implies that replicating this strategy based on official announcements of CEO salary in the following year is not possible without inside information.

[[INSERT Figure 2 about Here]]

To check for robustness, we exclude from the sample the years 2001–2003 during which the

stock market crashed. A crash may render equity grants less attractive (Frydman and Jenter, 2010) and could thus result in such grants being replaced with cash-based pay. As we show in Panel B of Table 6, excluding those years renders the returns more statistically significant and economically substantial than when we use the full sample. For instance, abnormal returns to the long–short portfolio after three-factor adjustment are 56 bps ($t = 4.17$) half a year after raises, or 5 bps higher than in the full sample.

The tests in Panel A and B include all firms for the respective sample periods. To confirm that performance evaluations are related to abnormal returns, in Panel C of Table 6, we sort firms with stand-alone salary increases into two subgroups based on the explanations given for raises: one portfolio consists of firms that offer stand-alone salary increases with subjective explanations, and the other consists of firms that offer salary increases with objective explanations. A long–short portfolio spread ("Spread_subjective explanation") between the portfolio that offers salary raises with subjective explanations and the portfolio with no increases in either component is significant and large under all risk adjustment specifications. Abnormal returns to the long–short portfolio after three-factor adjustment equal 54 bps ($t = 3.60$), which translates to 6.48% annually. Here, too, the significance disappears in 1.5 years after the raises. In contrast, a long–short portfolio spread ("Spread_objective explanation") between the portfolio that offers salary raises with objective explanations and the portfolio with no increase in either component is not significant. This result suggests that compensation changes with subjective explanations may contain information that is not captured by objective performance measures.

Because R&D activities usually have a long horizon, firms with a recent and substantial increase in R&D expenditures should be more actively engaging in performance evaluations. Panel D of Table 6 tests this idea. We double sort firms with positive R&D based on stand-alone salary increases and the ratio of R&D to sales (R&D/sales). We first sort them into four groups by R&D/sales for each industry in each year and further sort each group based on stand-alone salary increases. A long–short portfolio spread ("Spread_R&D/sales high") between the portfolio with stand-alone salary increases in firms with top quartile of R&D/sales and the portfolio with no increases in either component in firms with top quartile R&D/sales has positive abnormal returns after three-factor adjustment of 36 bps ($t = 1.96$) half a year after the raises. In contrast, a long–short portfolio spread ("Spread_R&D/sales low") between the portfolio with stand-alone salary increases in firms with bottom quartile R&D/sales and the portfolio with no increases in either component in firms with bottom quartile R&D/sales is not significant.

Sorting based on terciles yields similar results.

Panel E of Table 6 presents additional characteristics of these portfolios. The portfolio consisting of firms with no change in salary loads positively on value but negatively on momentum, suggesting that stocks in this portfolios are typically value stocks with poor past returns.

In sum, the results from Table 6 demonstrate that salary raises explain a large and significant spread in future abnormal returns.

3.2 Cross-Sectional Regressions

To further isolate the marginal predictive power of compensation changes on future stock returns, we perform return forecasting regressions based on the following equation:

$$\text{RET}_{i,s} = \alpha + \beta * 1(\Delta\text{Salary}_{i,t} > 0) + \gamma * \text{Control} + \varepsilon_{i,s} \tag{1}$$

where the dependent variable is the monthly stock return for firm i in the subsequent period s, and the independent variable of interest is the indicator variable for stand-alone salary increase. Additional control variables include past returns (Jegadeesh, 1990) up to lags of five months. We also control for firm size (Banz, 1981) and book-to-market ratio (Rosenberg, Reid, and Lanstein, 1985; Fama and French, 1992), measured in the year of the review (i.e., one year prior to the fiscal year in which the CEO earns the increased salary). Because residuals may be correlated across firms or across time, we run pooled regressions and estimate standard errors clustered by firm and by year-month (Petersen, 2009). We also conduct Fama and MacBeth (1973) return forecasting regressions. We include in the regression observations with either a stand-alone salary increase or no change in salary.

[[INSERT Table 7 about Here]]

The regression estimates reported in Table 7 confirm our earlier portfolio results: firms that offer stand-alone salary increases outperform those that do not. More specifically, stand-alone salary increases significantly predict stock returns in the year after raises in both one- and two-way clustering and Fama–Macbeth regressions. The coefficients reported in Table 7 imply that a stand-alone salary increase results in, with half a year, a 50-bps increase in stock returns under one-way clustering and two-way clustering, and a 30-bps increase in Fama–Macbeth regressions. The predictability disappears 1.5 years after raises. Therefore, an average percentage increase

of 10.8% for stand-alone salary increases (see Table 4) corresponds to a 30-50 bps increase in future stock returns.

4 Mechanism

The return predictability of stand-alone salary raises, our indicator of positive reviews, can indicate that firms indeed use inside information to reward CEOs for future returns. However, there are other plausible explanations for such return predictability of stand-alone salary raises. First, salary raises themselves may actually cause, rather than reward, positive future performance by giving CEOs incentives to improve future performance (e.g., via the efficiency wages channel (Akerlof, 1982, 1984)). Second, both the salary raises and the subsequent positive returns may be driven by factors outside the firm (e.g., an industry-wide trend to increase compensation in ways that improve outside options for CEOs). While these factors are probable, we offer in this section cross-sectional tests to substantiate our hypothesis that salary raises also constitute rewards for future performance. We show that the return predictability of stand-alone salary raises is greater when discretionary reviews based on inside information prove more useful. In particular, we show that the link between stand-alone salary raises and subsequent positive returns is stronger for firms with a more opaque information environment and for those with better corporate governance. We then zoom in on innovation as one activity for which information is often incorporated into stock returns with a delay.

4.1 Information Asymmetry

Inside information should be more valuable in predicting a CEO's contribution to long-run returns in firms in a more opaque information environment, with noisier objective performance measures, and for CEOs still early in their tenure (Baker, Gibbons, and Murphy, 1994). If the board indeed offers salary raises as pay for future returns, then the return predictability of salary raises should be more pronounced in such settings. In contrast, efficiency wage arguments should also apply in firms with less information asymmetry to investors, and outside options should not vary across information environments.

Following Dierkens (1991), Thomas (2002), and Moeller, Schlingemann, and Stulz (2007), we use quarterly analyst forecast dispersion, idiosyncratic risk based on a four factor-model, bid-ask spread of stock prices, and the length of years since a CEO assumed that role as

measures of information asymmetry (see Appendix 1 for definitions). Specifically, in Panel A of Table 8, columns from 1 to 6, we rank firms based on analyst forecast dispersion, idiosyncratic risk, and annual average stock bid-ask spread above or below the industry median for each year. In columns 7 and 8, we rank firms based on their CEO tenure each year: whether a CEO has served for fewer or more years than his or her median industry peer in that year; we make this adjustment to accommodate industry differences. We then conduct return forecasting regressions for each subsample, as in Table 7.

[[INSERT Table 8 about Here]]

We find that stand-alone salary increases predict 50-bps monthly stock returns one year after raises in the subsample of firms with more divergent analyst forecasts. In the other subsample of firms with less convergent analyst forecasts, stand-alone salary increases, however, do not predict stock returns. Similarly, salary raises offered by firms with greater idiosyncratic risk and higher bid-ask spreads predict stock return increases one year after raises, but not in other subsamples. Stand-alone salary raises offered to CEOs who have served fewer years than their industry peers predict an 80-bps increase in monthly stock returns one year after raises, but not in the other subsample. These findings confirm our hypothesis that the return predictability of inside information should be more pronounced in firms that operate in more opaque environments or if objective performance measures cannot adequately account for CEO performance.

4.2 Corporate Governance

The quality of reviews based on inside information depends on the quality of firm governance and the directors who make the judgments. However, a large literature raises questions on the adequacy of governance by boards (Mace, 1971; Fich and Shivdasani, 2006; Nguyen and Nielsen, 2010). Thus, inside information should be more valuable in predicting long-run returns in firms with better governance, where boards are better in obtaining such information, monitoring and rewarding CEOs, and less subject to performance measure manipulation. In contrast, governance quality is less likely to affect the incentive effect of efficiency wage.

Measurement of governance is always somewhat arbitrary, and empirical evidence on the effects of governance measures is often contradictory, lacks significance, or inadequately accounts for governance quality (e.g., Knyazeva, Knyazeva, and Masulis, 2013; Kang, Kim, and Low,

2016; Houston, Lee, and Shan, 2016). With this note of caution, we follow the literature and examine two board-related characteristics: whether a board has a high number of directors with other engagements ("busy directors" in Fich and Shivdasani, 2006, or "overboarding directors" for practitioners[7]) and whether the board is dominated by independent directors (Nguyen and Nielsen, 2010). In columns 1-4 of Panel B in Table 8, we rank firms based on their percentage of busy directors and their percentage of independent directors on their respective boards above or below industry median for each year. In columns 5-8 of Panel B, using Boardex data, we compute the same measures of the fractions of independent directors and busy directors, but only for compensation committees (Anderson and Bizjak, 2003; Bebchuk and Fried, 2003). We rank firms based on their respective percentage of busy directors and percentage of independent directors on the compensation committee above or below industry median for each year. We then conduct return forecasting regressions for each subsample, as in Table 7.

Columns 1-4 of Panel B shows that stand-alone salary increases are indeed more predictive of future returns for firms with fewer outside engagements and more independent directors. Stand-alone salary raises offered by a more independent board predict a 40-bps increase in monthly stock returns one year after raises. Similarly, stand-alone salary raises offered by a less busy board predict a 50-bps increase in monthly stock returns one year after raises. In addition to the higher return predictability in better governed firms, our results also suggest that board independence does not hamper information flows for compensation reviews based on future returns.

The compensation committee is the vehicle directly responsible for CEO compensation. Consistent with the advisory role that compensation committees serve, the results we find in columns 1-4 also hold for directors on compensation committees, as shown in columns 5-8 of Panel B. Stand-alone salary increases are indeed more predictive of future returns for firms with better-governed compensation committees. For example, stand-alone salary raises offered by a more independent compensation committee predict an 80-bps increase in monthly stock returns one year after raises. Similarly, stand-alone salary raises offered by a less busy compensation committee predict a 90-bps increase in monthly stock returns one year after raises.

[7]More details available at https://www.issgovernance.com/file/policy/uk-ire-overboarding.pdf.

4.3 Innovation

Innovation is one main area in which the literature suggests that objective performance measures incorporate inside information with a delay. Extensive evidence documents that individuals pay less attention to, and place less weight on, information that is harder to process (Song and Schwarz, 2010; Cohen, Malloy, and Ngyuen, 2018). This inattention may be one reason for the market under-reaction to information contained in R&D investment (Chan, Lakonishok, and Sougiannis, 2001; Eberhart, Maxwell, and Siddique, 2004; Cohen, Diether, and Malloy, 2013; Hirshleifer, Hsu, and Li, 2013). If financial measures have not yet absorbed the effect of novel research and product development, then such firm activities should come to fruition after rewards based on evaluation of those activities. In contrast, there is little reason why reaction to omitted factors outside the firm should predict success in innovation.

Table 9 summarizes two outcomes of R&D activities: the number of future product announcements and the abnormal returns to those announcements. Because product announcement data from S&P Capital IQ does not start until year 2002, we use only a subsample of our data. We control for the R&D investment and past returns that may lead to better innovation and return outcomes: the logarithm of total assets, market-to-book ratio, R&D/sales, and annual stock returns, all with a one-year lag. We include firm-year observations with either a stand-alone salary increase or no change in salary.

[[INSERT Table 9 about Here]]

In columns 1 and 2 of Table 9, we regress product announcements, one year and two years after the raises, on compensation changes. We scale the number of product announcements as a fraction of the number of announcements one year before the raises. After we control for both year and firm fixed effects, the number of product announcements compared to the last year increases by 24% one year after an increase in stand-alone salary.

In the event of a positive performance evaluation, we expect that compensation changes predict an improvement in returns to new product announcements. Hence, we calculate, in columns 3 and 4 of Table 9, the average abnormal return changes before and after each product announcement date. Here we use the standard market model approach to estimate abnormal stock returns and define the product announcement date as the event day ($t = 0$). We estimate parameters for the market model over a 90-day period – ending 46 days before the event day – using the equal-weighted CRSP index. We calculate cumulative abnormal returns (CARs) for

an event window that ranges from $t = 5$ to $t = +5$. We then calculate the mean CARs for all product announcement events in each year. Stand-alone salary increases predict returns that increase significantly (by 30-bps) over the +/-5-day window.

These results indicate that stand-alone salary raises are a good predictor of the future success of a firm's research activities. Moreover, firm activities improve in the year after such raises, but we do not find any improvement 2 years after the salary changes, which is consistent with our results with respect to portfolio analysis and return forecasting regressions.

In Figure 2.2, we plot the number of product announcements as a fraction of the total number of announcements in the past year. The x-axis is the number of months between the fiscal year start and the month when the product announcement is made. The number of product announcements one year after the compensation change is higher for firms that offer stand-alone salary raises than that of firms that do not offer such raises, especially around 13 and 15 months after the raises. Consistent with Figure 2.1, such a pattern further confirms that replicating long-short strategy based on official announcements of CEO salary in the following year is not possible, as most of the information is already public when compensation change is finally announced in the proxy statement.

Overall, our results show that positive reviews are followed by positive R&D outcomes. Our findings suggest that firms are aware of delays in information being incorporated into objective measures and reward CEOs based on such information.

4.4 Determinants of Review Clauses

One might argue that salary review clauses may be written into contracts for other reasons than reviewing the CEO for their contribution to future returns. For instance, competitive labor market conditions may require that the board frequently review executive performance and adjust CEO compensation accordingly. Moreover, a powerful CEO could demand more favorable clauses. Therefore, review clauses do not necessarily imply the need for performance evaluations. To explore the possible alternative explanations, we directly investigate the determinants of review clauses. Are firm–CEO pairs for which performance evaluations are more useful also more likely to sign contracts that contain review clauses?

According to Baker, Gibbons, and Murphy (1994), performance evaluations of contributions to long-term performance should be more prevalent in firms with noisier objective performance measures. For example, firms typically face a long delay before early R&D success comes

to fruition in accounting terms; hence, as we have described, compensation reviews based on inside information can be especially useful for firms with substantial R&D investment. Similarly, reviews are also especially useful for firms characterized by greater information asymmetry with respect to investors and/or by more volatile returns, as objective performance measures in these firms are too noisy to capture CEOs' contribution to firm performance.

Compensation reviews for future performance are only one of several possible reasons for preferring contractual flexibility with respect to compensation. An extensive literature studies the various factors affecting compensation, including outside options, the extent of managerial power, and firm's financial constraints. First, compensation may change after renegotiations in response to changes in CEOs' outside options. For example, we find that firms explain in the proxy statement 29% of salary increases as benchmarked to peer CEO compensation in the same industry. We use industry CEO turnover and homogeneity to measure labor market depth (Gillan, Hartzell, and Parrino, 2009). We also use total assets to proxy for firm size, as matching theories (Gabaix and Landier, 2008) predict that larger firms need more able CEOs, and accordingly, must offer higher compensation to attract them. Second, CEOs can influence reviews based on inside information far more easily than they can affect objective performance measures (for example, see Bebchuk and Fried (2006)). We use indicators for busy boards and board independence to assess managerial power. Third, more financially constrained firms have less to spend on salary and so may prefer to offer more equity-based pay. Babenko, Lemmon, and Tserlukevich (2011) posit that financially constrained firms may finance investments using cash inflows from employees exercising their stock options. Similarly, Core and Guay (2001) document that firms with financial constraints use more options for compensation. We use a dummy variable "distress" (Altman, 1968) as a measure for financial constraints. In Table 10, we link these potential determinants to an indicator variable for review clauses as our dependent variable using a Probit specification for years in which we find a disclosed CEO contract.Columns 3 and 4 in Table 10 include industry characteristics; columns 2 and 4 industry fixed effects.

[[INSERT Table 10 about Here]]

Columns 1 and 4 in Table 10 show that a firm with more R&D investment is more likely to have review clauses in its CEO's contract. This finding is consistent with our hypothesis because such firms are the most likely to realize their performance gains (or losses) after some delay. We also find that outside CEOs, about whom boards have less information, are more

likely (by 12%) subject to review requirements; this result is significant across all specifications. In line with these results, columns 1 and 3 in Table 10 reveal that firms with higher levels of idiosyncratic risk are also more likely to offer CEO contracts that include a review requirement. However, review clauses are less likely to be required by distressed firms. This finding could be explained by the asymmetry of adjustments that result from compensation review (i.e., upward adjustments are far more common than downward ones).

Industry characteristics are also significantly related to contract characteristics, although not in all specifications and sometimes not in the expected direction. We find that firms operating in a more homogeneous industry (where outside options are more likely to emerge) are *less* likely to write review requirement clauses into their CEO contracts. In contrast, industries with more outside CEOs in which better outside options are more likely to emerge are *more* likely to incorporate review clauses, although not in all specifications. Finally, we find weak evidence of a negative association between good governance and review clauses.

Collectively, these findings suggest that, when information asymmetry between a firm and investors is higher, firms are more inclined to offer flexible CEO contracts that incorporates compensation reviews for future performance. We also find evidence that review clauses are predicted (albeit much more weakly) by potential outside options.

5 Robustness

In this section, we provide additional tests to show that our results are consistent and robust.

5.1 Alternative Construction for Stand-alone Salary Increases

Salary increases can be identified in many ways. In this section, we show that our results are robust to alternative ways of constructing stand-alone salary increases. In Table 11, we report abnormal returns and t-statistics for the long-short spread portfolio of each test in the first and second row respectively (see the Internet Appendix for the abnormal returns of the underlying portfolios).

[[INSERT Table 11 about Here]]

In Test 1 of Table 11, we define stand-alone salary increases using nominal salary increases instead of real salary increases, as not every firm adjusts salary to incorporate inflation. A

long–short portfolio that invests in firms that offer nominal stand-alone salary increases and takes a short position in firms that do not has significant and large spreads under all risk adjustment specifications. Abnormal returns to the long–short portfolio after three-factor adjustment amount to 50 bps ($t = 3.65$) half a year after the raises, or 6% annually.

In Test 2 of Table 11, when defining stand-alone salary increases, we exclude all changes in equity compensation rather than only changes that exceed the contemporaneous changes in salary. Thus, the set of stand-alone salary increases is reduced based on this stricter definition of "no change in equity pay". A long–short portfolio that invests in firms that offer stand-alone salary increases without any changes in equity value and takes a short position in firms that do not has a significant and large spread under all risk adjustment specifications.

Equity-based compensation is typically granted in multi-year cycles (Hall, 1999), and vests according to a pre-specified schedule (Cadman, Campbell, and Klasa, 2016). Thus, comparing equity values between two consecutive years is less likely to capture the actual decision making of boards in granting equities. In Test 3 of Table 11, we compare equity grant value to the previous year's grant values, rather than the previous grant's value, and define stand-alone salary increases if there is no change in equity value from the previous year. The spread is only significant under three-factor and four-factor adjustment specifications, and the predictability does not persist after a year. While this result suggests that our measure of stand-alone salary increases is robust to more flexible ways of controlling for equity-based pay, it also indicates that comparing equity values between two grants is more likely to capture the actual decision making of boards in granting equities. In unreported tests, we also compare the number of options granted rather than their value to that of the previous grant. The spread of a long–short portfolio that invests in firms that offer stand-alone salary increases without any changes in the number of equity grants and takes a short position in firms that do not offer such raises is not significant under any of the risk adjustment specifications. This result suggests that boards' decisions in making equity grants are likely to be based on value, although they may be offered in the form of fixed numbers (Shue and Townsend, 2017).

5.2 Industry-wide Compensation Trends

One might argue that CEO salary changes may simply reflect an industry-wide compensation trend; thus, the subsequent positive returns can be explained by omitted industry factors that positively impact firm returns. We conduct a placebo test to examine this possibility.

In Test 4 of Table 11, we construct a long–short portfolio that invests in firms whose industry peers experienced a stand-alone salary increase on average and takes a short position in firms whose industry peers experienced no increase in salary. We take the mean of changes in each component of compensation for a firm's industry peers (excluding the firm) and categorize stand-alone salary raises for the mean change in industry peers. Salary increases constructed by using a firm's industry peers are not predictive of its future stock returns under any risk adjustments. For example, the spread return after three-factor adjustment are insignificant 6 bps ($t = 0.37$) one year after the raises. Thus, the return predictability of stand-alone salary increases is unlikely to be entirely caused by unobservable industry factors.

5.3 Efficiency wages

A wage above the market equilibrium rate can itself cause employees to work harder, as it increases the cost of dismissal (Akerlof, 1982, 1984). Thus, increases in base salary could have a causal influence on performance via this efficiency wages channel. To find whether the CEO is paid above or below the market equilibrium rate, we follow Gillan, Hartzell, and Parrino (2009) and regress total compensation on firm and CEO characteristics and control for industry and year fixed effects. A negative residual indicates that the CEO is paid below the market wages suggested by the model in Gillan, Hartzell, and Parrino (2009). If return predictability can be fully explained by the incentive effect of efficiency wage, then salary raises offered to a CEO with negative abnormal compensation should not predict future returns.

In Test 5 of Table 11 tests this idea. We double sort stocks based on salary increase and negative abnormal compensation. We first sort them into two groups based on whether the abnormal compensation is negative or positive, and then sort each group based on stand-alone salary increases. A long–short portfolio spread between the portfolio with stand-alone salary increases in firms that offer negative abnormal compensation and the portfolio with no change in salary in firms that offer negative abnormal compensation has positive abnormal returns after three-factor adjustment of 45 bps ($t = 2.55$) half a year after the raises. Thus, the return predictability of stand-alone salary increase is unlikely to be fully driven by the efficiency wage channel.

A long–short portfolio spread between the portfolio with stand-alone salary increases in firms that offer positive abnormal compensation and the portfolio with no change in salary in firms that offer positive abnormal compensation also predicts stock returns of 93 bps ($t = 2.24$) half a

year after the raises. The difference between two spread portfolios could be ascribed to pay for future returns and efficiency wages. Alternative sample splits, comparing total compensation or base salary to the industry average, yield qualitatively similar results.

5.4 Compensation Based on Explicit Performance Measures

While practitioners and actual contracts point to the use of base salary to "pay for future returns," it is theoretically plausible that bonus and equity pay could be used for the same purpose. Given the typically larger size of equity compensation, rewarding future performance with raises in equity compensation could also set greater incentives. In addition, raises in total compensation would keep the ratio between cash and equity compensation constant and thus preserve the status quo in the incentive mix.

In this section, we provide tests to see if compensation measures based on bonus or equity raises can also predict firm performance and activities. In Test 6 of Table 11, we construct a long–short portfolio that invests in firms that increase both salary and equity and takes a short position in firms that do not offer a raise in either component.[8] The spread portfolio has insignificant returns after three-factor adjustment of 24 bps ($t = 1.31$) in half a year after the raises. We also do not find significant spread returns 1 year or 1.5 years after the raises.

Executive bonuses are often calculated as a multiple of base salary (De Angelis and Grinstein, 2015). We therefore identify the actual change in bonus – rather than the "mechanical" change that arises simply from any base salary change – by viewing each bonus strictly as a *multiple* of salary. In unreported results, we find that CEO salary and bonus both increase in 36% of all firm-years. In 30% of all firm-years, salary increases but bonus declines, suggesting that these payment forms are not perfect substitutes.

In Test 7 of Table 11, we construct a long–short portfolio that invests in firms that increase bonus multiples without a contemporaneous increase in equity and takes a short position in firms that do not offer a raise in either component. The spread portfolio has insignificant returns after the raises. For example, the spread portfolio has insignificant returns after three-factor adjustment of 41 bps ($t = 1.48$) half a year after the raises. We also do not find significant spread returns one year or 1.5 years after the raises. As CEO compensation is a package of many compensation components, the efficiency wages argument should also apply to other com-

[8] We tried to construct a portfolio that takes the same long position and a short position in firms that offer an increase in equity but not in salary. However, because fewer than 5% of firms employ that scheme, we are unable to make any statistically meaningful statements about it.

ponents. Thus, the lack of return predictability of increases in bonus and equity compensation casts further doubt on this alternative explanation.

One reason why we are unable to uncover inside information from measures based on bonus multiples and equity-based pay is that adjustments of bonus or equity are subject to either company-wide compensation plans or to rules protecting shareholders from dilution. Therefore, boards are left with little discretion in these matters. In fact, as we documented in Section 2.1, fewer than 5% of CEO contracts discussed explicit discretionary adjustments of bonuses. Consistent with our finding, Guay, Kepler, and Tsui (2016) show that more than 90% of CEO bonus plans include at least one earning-based metric.

6 Conclusion

This paper demonstrates how firms pay CEOs not only to reward past performance, but also future performance. The recent discussion of potential downsides of explicit performance-based compensation has triggered calls to use cash compensation to reward long-term returns. These arguments reflect a long-standing theoretical literature on the benefits of subjective performance reviews when stock prices incorporate performance with a delay. We document for the first time that executive contracts indeed schedule reviews for long-term performance, and that positive reviews are rewarded with increases in base salary. Executives with explicit review provisions are more likely to receive subjectively justified stand-alone salary increases, which implies that compensation changes following reviews are part of the incentive scheme.

We show that positive outcomes of such reviews are followed by positive stock price development. A hypothetical long–short portfolio strategy that invests in firms with stand-alone salary increases and takes a short position in firms without salary increases could earn abnormal returns of 6% annually. Return forecasting regressions also show that stand-alone salary raises predict increases in monthly stock returns. Further, we find an upswing in real firm activities following stand-alone salary increases. Specifically, the number of product-related news announcements increases in firms that give such raises one year after the compensation change; abnormal returns likewise increase around subsequent announcements of product development.

The quality of reviews based on inside information should depend on the quality of governance, and the demand for such reviews should also depend on the informativeness of objective performance measures. Indeed, we find that, for firms with more effective boards or compen-

sation committees, inside information embedded in compensation reviews is more predictive of future returns. Further, compensation changes in firms with more information asymmetry and a new CEO predict higher future returns.

Our paper complements the literature on long-term compensation, a growing literature that focuses on the inside information in the context of corporate governance, as well as the theoretical literature that explores the evaluation of long-term performance. Instead of studying compensation based on explicit performance measures, we provide evidence gathered from CEO contracts whose terms do not exclusively rely on such measures. We show how they play a key role in encouraging long-term innovation decisions. Due to the fast development in information and communication technology in recent years, the cost of acquiring information has greatly declined for shareholders. Our evidence on the existence of inside information suggests that the increased accessibility of such information could encourage more active shareholder engagement, especially in situations in which objective performance measures are not sufficient to align incentives between management and shareholders.

While our methodology of identifying inside information applies to rewards using salary raises, future studies can uncover such information embedded in other components of CEO compensation, such as equity-based pay. It would be worthwhile also to study how boards weigh observable and inside information to determine CEO compensation. Doing so would help us better understand both the pay-performance sensitivity and effectiveness of CEO compensation designs based on inside information.

7 References

Adams, Renée B., and Daniel Ferreira, 2007, A theory of friendly boards, *Journal of Finance* 62, 217–250.

Adams, Renée B, Benjamin E Hermalin, and Michael S Weisbach, 2010, The role of boards of directors in corporate governance: A conceptual framework and survey, *Journal of Economic Literature* 48, 58–107.

Akerlof, George A, 1982, Labor contracts as partial gift exchange, *Quarterly Journal of Economics* 97, 543–569.

Akerlof, George A, 1984, Gift exchange and efficiency-wage theory: four views, *American Economic Review* 74, 79–83.

Altman, Edward I, 1968, Financial ratios, discriminant analysis and the prediction of corporate bankruptcy, *Journal of Finance* 23, 589–609.

Anderson, Ronald C, and John M Bizjak, 2003, An empirical examination of the role of the CEO and the compensation committee in structuring executive pay, *Journal of Banking and Finance* 27, 1323–1348.

Babenko, Ilona, Michael Lemmon, and Yuri Tserlukevich, 2011, Employee stock options and investment, *Journal of Finance* 66, 981–1009.

Baker, George, Robert Gibbons, and Kevin J Murphy, 1994, Subjective performance measures in optimal incentive contracts, *Quarterly Journal of Economics* 109, 1125–1156.

Baker, George P, Michael C Jensen, and Kevin J Murphy, 1988, Compensation and incentives: Practice vs. theory, *Journal of Finance* 43, 593–616.

Banker, Rajiv D, Seok-Young Lee, Gordon S Potter, and Dhinu Srinivasan, 2015, An empirical examination of the impacts from termination of a performance-based incentive plan, https://scholarship.sha.cornell.edu/workingpapers/16/.

Banz, Rolf W, 1981, The relationship between return and market value of common stocks, *Journal of Financial Economics* 9, 3–18.

Bebchuk, Lucian, and Jesse Fried, 2006, *Pay without Performance The Unfulfilled Promise of Executive Compensation* (Harvard University Press).

Bebchuk, Lucian A, and Robert J Jackson Jr, 2005, Executive pensions, Technical report.

Bebchuk, Lucian Arye, and Jesse M Fried, 2003, Executive compensation as an agency problem, *Journal of economic perspectives* 17, 71–92.

Beer, Michael, Mark D Cannon, James N Baron, Patrick R Dailey, Barry Gerhart, Herbert G Heneman III, Thomas Kochan, Gerald E Ledford Jr, and Edwin A Locke, 2004, Promise and peril in implementing pay-for-performance, *Human Resource Management* 43, 3–48.

Bertrand, Marianne, and Sendhil Mullainathan, 1999, Is there a discretion in wage setting? a test using takeover legislation, *RAND Journal of Economics* 30, 535–554.

Bizjak, John M, James A Brickley, and Jeffrey L Coles, 1993, Stock-based incentive compensation and investment behavior, *Journal of Accounting and Economics* 16, 349–372.

Burkart, Mike, Salvatore Miglietta, and Charlotte Ostergaard, 2017, Why do boards exist? governance design in the absence of corporate law, *Swedish House of Finance Research Paper No. 17–8* .

Bushman, Robert M, Raffi J Indjejikian, and Abbie Smith, 1996, CEO compensation: The role of individual performance evaluation, *Journal of Accounting and Economics* 21, 161–193.

Cadman, Brian D, John L Campbell, and Sandy Klasa, 2016, Are ex ante CEO severance pay contracts consistent with efficient contracting?, *Journal of Financial and Quantitative Analysis* 51, 737–769.

Cadman, Brian D, Tjomme O Rusticus, and Jayanthi Sunder, 2013, Stock option grant vesting terms: Economic and financial reporting determinants, *Review of Accounting Studies* 18, 1159–1190.

Carhart, Mark M, 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57–82.

Chan, Louis K C, Josef Lakonishok, and Theodore Sougiannis, 2001, The stock market valuation of research and development expenditures, *Journal of Finance* 56, 2431–2456.

Cohen, L, C Malloy, and Q Ngyuen, 2018, Lazy prices, *SSRN* .

Cohen, Lauren, Karl Diether, and Christopher Malloy, 2013, Misvaluing innovation, *Review of Financial Studies* 26, 635–666.

Core, John E, and Wayne R Guay, 2001, Stock option plans for non-executive employees, *Journal of Financial Economics* 61, 253–287.

Cornelli, Francesca, Zbigniew Kominek, and Alexander Ljungqvist, 2013, Monitoring managers: Does it matter?, *Journal of Finance* 68, 431–481.

Cronqvist, Henrik, and Rüdiger Fahlenbrach, 2013, CEO contract design: How do strong principals do it?, *Journal of Financial Economics* 108, 659–674.

Cyranoski, David, 2014, Chinese science gets mass transformation: teamwork at centre of chinese academy of sciences reform, *Nature* 513, 468–469.

De Angelis, David, and Yaniv Grinstein, 2015, Performance terms in CEO compensation contracts, *Review of Finance* 19, 619–651.

Department for Business, Energy & Industrial Strategy, 2017, Corporate governance reform: The government response to the green paper consultation, `https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640631/corporate-governance-reform-government-response.pdf`.

Department for Business, Innovation & Skills, 2011, The Kay review of UK equity markets and long-term decision making, `https://www.gov.uk/government/consultations/the-kay-review-of-uk-equity-markets-and-long-term-decision-making`.

Dierkens, Nathalie, 1991, Information asymmetry and equity issues, *Journal of Financial and Quantitative Analysis* 26, 181–199.

Eberhart, Allan C, William F Maxwell, and Akhtar R Siddique, 2004, An examination of the longterm abnormal stock returns and operating performance following R&D increases, *Journal of Finance* 59, 623–650.

Edmans, Alex, Vivian W Fang, and Allen Huang, 2017, The long-term consequences of short-term incentives, *European Corporate Governance Institute (ECGI) - Finance Working Paper No. 527/2017* .

Fama, Eugene F, and Kenneth R French, 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

Fama, Eugene F, and Kenneth R French, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55–84.

Fama, Eugene F, and James D MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607–636.

Fich, Eliezer M, and Anil Shivdasani, 2006, Are busy boards effective monitors?, *Journal of Finance* 61, 689–724.

Frydman, Carola, and Dirk Jenter, 2010, CEO compensation, *Annual Review of Financial Economics* 2, 75–102.

Fuchs, William, 2015, Subjective evaluations: Discretionary bonuses and feedback credibility, *American Economic Journal: Microeconomics* 7, 99–108.

Gabaix, Xavier, and Augustin Landier, 2008, Why has CEO pay increased so much?, *Quarterly Journal of Economics* 123, 49–100.

Garmaise, Mark J, 2009, Ties that truly bind: Noncompetition agreements, executive compensation, and firm investment, *Journal of Law, Economics, and Organization* 27, 376–425.

Gibbs, Michael, Kenneth A Merchant, Wim A Van der Stede, and Mark E Vargus, 2004, Determinants and effects of subjectivity in incentives, *Accounting Review* 79, 409–436.

Gillan, Stuart L, Jay C Hartzell, and Robert Parrino, 2009, Explicit versus implicit contracts: Evidence from CEO employment agreements, *Journal of Finance* 64, 1629–1655.

Gompers, Paul, Joy Ishii, and Andrew Metrick, 2003, Corporate governance and equity prices, *Quarterly Journal of Economics* 118, 107–156.

Gopalan, Radhakrishnan, Sheng Huang, and Johan Maharjan, 2016, The role of deferred pay in retaining managerial talent, *SSRN* .

Gopalan, Radhakrishnan, Todd Milbourn, Fenghua Song, and Anjan V Thakor, 2014, Duration of executive compensation, *Journal of Finance* 69, 2777–2817.

Guay, W, John D Kepler, and David Tsui, 2016, Do CEO bonus plans serve a purpose?, Working paper.

Hall, Brian J, 1999, The design of multiyear stock option plans, *Journal of Applied Corporate Finance* 12, 97–106.

Hall, Brian J, and Jeffrey B Liebman, 1998, Are CEOs really paid like bureaucrats?, *Quarterly Journal of Economics* 113, 653–691.

Hall, Brian J, and Kevin J Murphy, 2002, Stock options for undiversified executives, *Journal of Accounting and Economics* 33, 3–42.

Hallock, Kevin F, and Paul Oyer, 1999, The timeliness of performance information in determining executive compensation, *Journal of Corporate Finance* 5, 303–321.

Hayes, Rachel M, and Scott Schaefer, 2000, Implicit contracts and the explanatory power of top executive compensation for future performance, *RAND Journal of Economics* 31, 273–293.

Heckman, James J, 1979, Sample selection bias as a specification error, *Econometrica* 47, 153–161.

Hirshleifer, David, Po-Hsuan Hsu, and Dongmei Li, 2013, Innovative efficiency and stock returns, *Journal of Financial Economics* 107, 632–654.

Hölmstrom, Bengt, 1979, Moral hazard and observability, *Bell Journal of Economics* 10, 74–91.

Houston, Joel F, Jongsub Lee, and Hongyu Shan, 2016, In search of board independence: Former employees, shades of gray and director classifications revisited, *SSRN* .

Ittner, Christopher D, David F Larcker, and Madhav V Rajan, 1997, The choice of performance measures in annual bonus contracts, *Accounting Review* 72, 231–255.

Jegadeesh, Narasimhan, 1990, Evidence of predictable behavior of security returns, *Journal of Finance* 45, 881–898.

Jensen, Michael C, and Kevin J Murphy, 1990, Performance pay and top-management incentives, *Journal of Political Economy* 98, 225–264.

Jochem, Torsten, Tomislav Ladika, and Zacharias Sautner, 2018, The retention effects of unvested equity: evidence from accelerated option vesting, *Review of Financial Studies, Forthcoming* .

Kahl, Matthias, Jun Liu, and Francis A Longstaff, 2003, Paper millionaires: how valuable is stock to a stockholder who is restricted from selling it?, *Journal of Financial Economics* 67, 385–410.

Kang, Jun-Koo, Jungmin Kim, and Angie Low, 2016, Rookie directors, *SSRN* .

Kaplan, Steven N, and Per Strömberg, 2003, Financial contracting theory meets the real world: An empirical analysis of venture capital contracts, *Review of Economic Studies* 70, 281–315.

Knyazeva, Anzhela, Diana Knyazeva, and Ronald W Masulis, 2013, The supply of corporate directors and board independence, *Review of Financial Studies* 26, 1561–1605.

Ladika, Tomislav, and Zacharias Sautner, 2017, Managerial short-termism and investment: Evidence from accelerated option vesting, *SSRN* .

Laffont, Jean-Jacques, and David Martimort, 2002, *The Theory of Incentives: The Principal-Agent Model* (Princeton University Press).

Lie, Erik, 2005, On the timing of CEO stock option awards, *Management Science* 51, 802–812.

Lund, Andrew C W, 2006, What Was the Question-The NYSE and Nasdaq's Curious Listing Standards Requiring Shareholder Approval of Equity-Compensation Plans, *Connecticut Law Review* 39, 119–158.

Mace, Myles L, 1971, *Directors: Myth and reality* (Boston: Harvard Business School Press.).

Malenko, Nadya, 2013, Communication and decision-making in corporate boards, *Review of Financial Studies* 27, 1486–1532.

Mehran, Hamid, 1995, Executive compensation structure, ownership, and firm performance, *Journal of Financial Economics* 38, 163–184.

Meulbroek, Lisa K, 2001, The efficiency of equity-linked compensation: Understanding the full cost of awarding executive stock options, *Financial management* 30, 5–30.

Moeller, Sara B, Frederik P Schlingemann, and René M Stulz, 2007, How do diversity of opinion and information asymmetry affect acquirer returns?, *Review of Financial Studies* 20, 2047–2078.

Muhl, Charles J, 2001, The employment-at-will doctrine: three major exceptions, *Monthly Labor Review* 124, 3–11.

Murphy, Kevin, and Paul Oyer, 2003, Discretion in executive incentive contracts: theory and evidence, `https://pdfs.semanticscholar.org/321f/4c88a1a178266dc947a4c77bdcfff23adbc6.pdf`.

Murphy, Kevin J, 1999, Executive compensation, in *Handbook of Labor Economics*, volume 3, chapter 38, 2485–2563 (Elsevier).

Murphy, Kevin J, 2000, Performance standards in incentive contracts, *Journal of Accounting and Economics* 30, 245–278.

Nguyen, Bang Dang, and Kasper Meisner Nielsen, 2010, The value of independent directors: evidence from sudden deaths, *Journal of Financial Economics* 98, 550–567.

Pan, Yihui, Tracy Yue Wang, and Michael S Weisbach, 2016, CEO investment cycles, *Review of Financial Studies* 29, 2955–2999.

Parrino, Robert, 1997, CEO turnover and outside succession a cross-sectional analysis, *Journal of Financial Economics* 46, 165–197.

Petersen, Mitchell A, 2009, Estimating standard errors in finance panel data sets: Comparing approaches, *Review of Financial Studies* 22, 435–480.

Prendergast, Canice, 2002, Uncertainty and incentives, *Journal of Labor Economics* 20, 115–137.

Prendergast, Canice, and Robert H Topel, 1996, Favoritism in organizations, *Journal of Political Economy* 104, 958–978.

Rauh, Joshua, Irina Stefanescu, and Stephen Zeldes, 2013, Cost shifting and the freezing of corporate pension plans .

Rosenberg, Barr, Kenneth Reid, and Ronald Lanstein, 1985, Persuasive evidence of market inefficiency, *Journal of Portfolio Management* 11, 9–16.

Schwab, Stewart J, and Randall S Thomas, 2005, An empirical analysis of CEO employment contracts: What do CEOs bargain for?, *Washington and Lee Law Review* 63, 231–270.

Schwartz-Ziv, Miriam, and Michael S Weisbach, 2013, What do boards really do? Evidence from minutes of board meetings, *Journal of Financial Economics* 108, 349–366.

Shilon, Nitzan, 2018, Replacing executive equity compensation: The case for cash for long-term performance, working paper.

Shue, Kelly, and Richard R. Townsend, 2017, Growth through rigidity: an explanation for the rise in ceo pay, *Journal of Financial Economics* 123, 1 – 21.

Song, Hyunjin, and Norbert Schwarz, 2010, If it's easy to read, it's easy to do, pretty, good, and true, *the psychologist* 23, 108–111.

Stefanescu, Irina, Yupeng Wang, Kangzhen Xie, and Jun Yang, 2018, Pay me now (and later): pension benefit manipulation before plan freezes and executive retirement, *Journal of Financial Economics* 127, 152 – 173.

Taylor, Lucian A, 2010, Why are CEOs rarely fired? Evidence from structural estimation, *Journal of Finance* 65, 2051–2087.

Taylor, Lucian A, 2013, CEO wage dynamics: estimates from a learning model, *Journal of Financial Economics* 108, 79–98.

Thomas, Shawn, 2002, Firm diversification and asymmetric information: evidence from analysts' forecasts and earnings announcements, *Journal of Financial Economics* 64, 373–396.

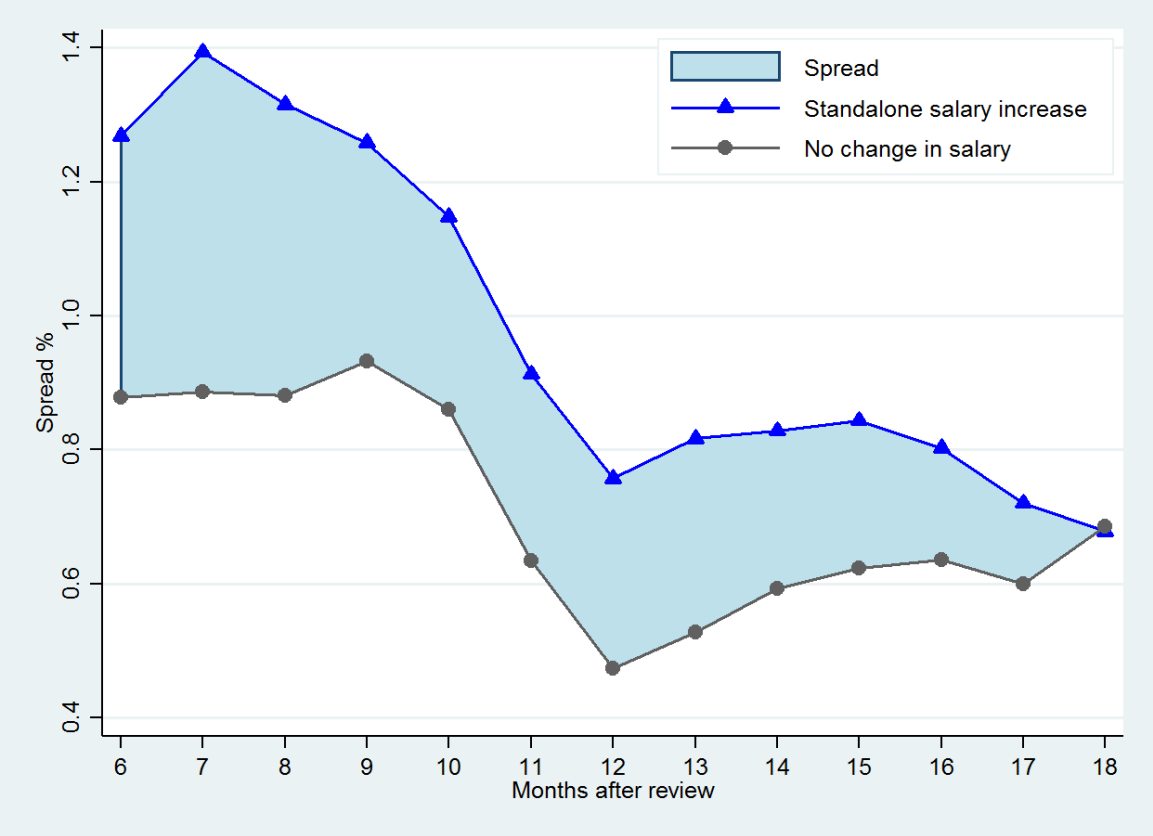
Walsh, David J, and Joshua L Schwarz, 1996, State common law wrongful discharge doctrines: update, refinement, and rationales, *American Business Law Journal* 33, 645–690.

Wurgler, Jeffrey, and Ekaterina Zhuravskaya, 2002, Does arbitrage flatten demand curves for stocks?, *Journal of Business* 75, 583–608.

Yermack, David, 1997, Good timing: CEO stock option awards and company news announcements, *Journal of Finance* 52, 449–476.

Yermack, David, 2006, Golden handshakes: separation pay for retired and dismissed CEOs, *Journal of Accounting and Economics* 41, 237–256.

Figure 1: Long-short spread portfolio



Spread	0.39%	0.51%	0.43%	0.33%	0.29%	0.28%	0.28%	0.29%	0.24%	0.22%	0.17%	0.12%	-0.01%
t-stat	2.53	3.83	3.16	2.3	2.06	1.97	1.75	2	1.64	1.55	1.14	0.8	-0.05

Note: This figure plots monthly long-short portfolio returns from 6 months to 18 months following compensation changes. Each month, we construct a long–short portfolio that invests in firms that offer stand-alone salary increases without contemporaneous changes in equity-based pay and takes a short position in firms that do not offer such raises using CEO compensation changes at the beginning of the each fiscal year. We compute excess returns for these long and short portfolios. More details of portfolio construction are provided in Section 4. The panel below the figure presents spreads of long-short portfolios and t-statistics. Standard errors are computed after Newey-West adjustment with three lags.

Figure 2: Timing of proxy filings and product announcements

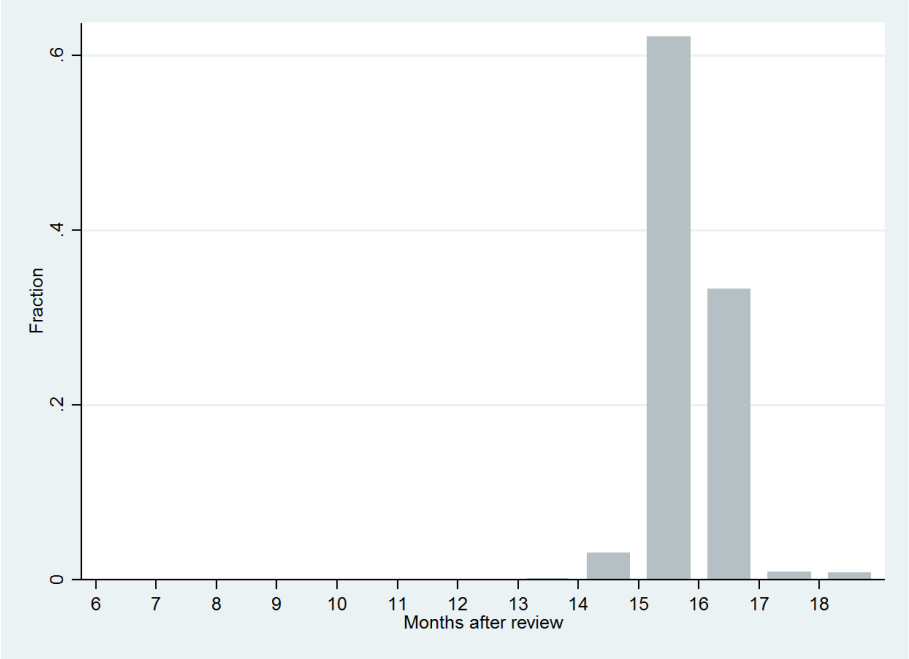


Figure 2.1: Proxy filings

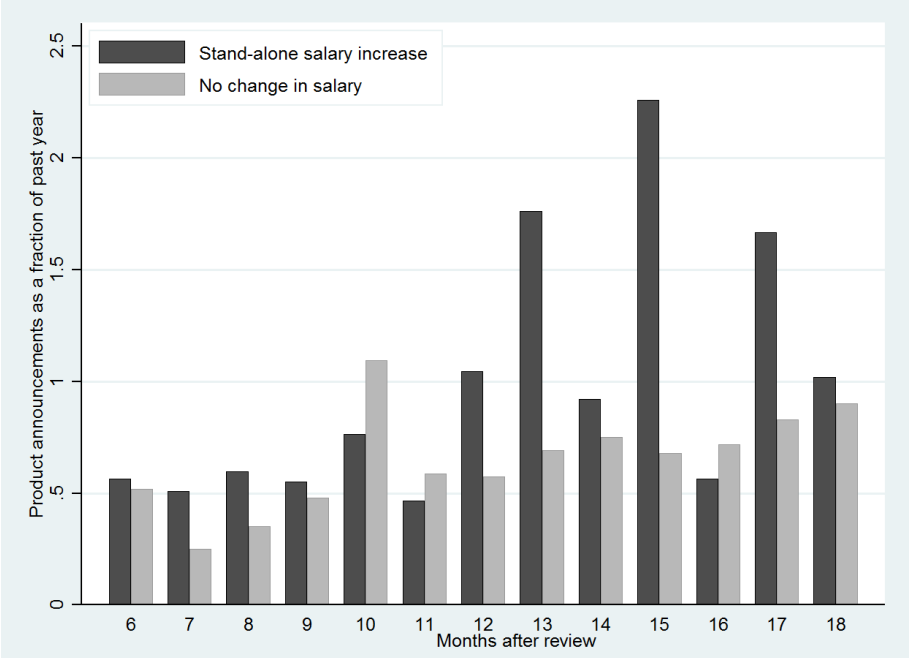


Figure 2.2: Product announcements

Note: The first figure plots the distribution of time lags between compensation change (salary) and disclosure in the proxy statements. Time lags are calculated as the number of months between the fiscal year start and the month when the proxy statement of that fiscal year is disclosed. The second figure plots the number of product announcements as a fraction of past year total announcements for firms that offer stand-alone salary raises and for firms that do not. Time lags are calculated as the number of months between the fiscal year start and the month when the product announcement of that fiscal year is made.

Table 1: **Summary statistics**

Variable	N	Mean	Median	STD	Min	Max
Firm characteristics						
Total assets (in $ millions)	5,121	23,901.01	7,059.60	39,722.50	57.33	153,412.60
Total sales (in $ millions)	5,121	10,353.05	5,081.50	12,577.00	15.66	46,089.78
ROA	5,097	0.08	0.07	0.06	-0.62	0.17
Idiosyncratic risk	5,117	0.30	0.26	0.15	0.06	1.27
Analyst forecast dispersion	5,121	0.12	0.05	0.27	0.00	3.32
R&D/sales	5,121	0.04	0.00	0.26	0.00	16.44
Leverage (net)	5,121	0.33	0.36	0.24	-0.37	0.88
Distress	5,096	0.30	0.00	0.46	0.00	1.00
Depre.&Amort.%	5,032	0.04	0.03	0.03	0.00	0.78
Gindex	5,121	9.51	9.44	1.59	3.00	15.00
Stock return monthly	58,849	0.01	0.01	0.11	-0.45	0.35
Product announcements	2,989	3.42	0.00	15.67	0.00	295.00
CEO characteristics						
Outside CEO	5,121	0.14	0.00	0.34	0.00	1.00
Tenure CEO	5,121	7.84	6.00	6.46	2.00	45.00
Age CEO	5,121	55.80	56.00	6.84	36.00	74.00
Chairman CEO	5,121	0.74	1.00	0.44	0.00	1.00
Independent directors (% of board)	5,121	0.67	0.66	0.16	0.00	1.00
Busy board	5,121	0.29	0.00	0.39	0.00	1.00
Independent directors						
(% of compensation committee)	3,723	0.67	0.70	0.19	0.00	1.00
Busy compensation committee	3,725	0.29	0.00	0.45	0.00	1.00
Labor market characteristics						
Industry homogeneity	5,117	0.06	0.05	0.02	0.04	0.14
Industry CEO turnover	5,121	0.12	0.11	0.07	0	0.75
Industry outside CEOs%	5,121	0.58	0.58	0.07	0.17	0.86

Note: This table presents summary statistics for our sample, excluding the first and last years of each CEO's tenure, for S&P 500 companies between 1994 and 2008. Columns 1, 2, 3, 4, 5, and 6 show the number of observations, mean, median, standard deviation (STD), and minimum and maximum values in the sample, respectively, for each variable. Industry classifications are based on the first two digits of the SIC code.

Table 2: **Contract clauses**

Clauses	Number	% of Total
(1)	(2)	(3)
Panel A: Review clauses		
Review requirement	355	54.70%
Review frequency:	327	50.39%
Regular (Annually,15 Months and 18 Months)	256	39.45%
Irregular	64	9.86%
As often as other officers	7	1.08%
Not specified	28	4.31%
Panel B: Review factors explicitly expressed in contracts		
Performance of the company and the CEO	56	8.63%
Comparable executives in the firm and industry	23	3.54%
Market conditions	3	0.46%
Financial condition of the firm	3	0.46%
Cost of living	7	1.08%
Panel C: Compensation components with explicit discretion		
Salary	490	75.50%
Bonus	32	4.93%
Equity grants	87	13.41%

Note: This table presents the summary statistics for contract clauses. The sample contains S&P 500 companies between 1994 and 2008. Specific contract clauses are listed in column 1, the number of contracts containing such clauses are shown in column 2, and column 3 presents the incidence of such clauses. Panels A and B list clauses regarding review requirement, review frequency and contract-mandated factors that should be considered in reviews. Panel C presents compensation components that boards have the discretion to adjust based on CEO performance.

Table 3: **Performance-related justifications for compensation changes**

Panel A: Justifications for compensation changes				
Justifications for changes	N	% of Total		
	(1)	(2)		
Objective performance	322	7.41%		
General performance	1,735	39.90%		
Soft measures of performance	731	16.81%		
Leadership	421	9.68%		
Strategy	298	6.85%		
Organizational development	40	0.92%		
Expansion	37	0.85%		
Restructure	3	0.07%		
Subjective	130	2.99%		
No justifications given	1,446	33.26%		
Panel B: Review clauses				
Review requirement	No	Yes		
Variable	Mean	Mean	t-stat of difference	
	(1)	(2)	(3)	
No justifications given	0.315	0.453	-6.375	***
Soft measures or no justifications given	0.519	0.616	-4.227	***
Objective performance	0.077	0.050	2.293	**
General performance	0.412	0.305	4.785	***
Panel C: Annual review clauses				
Annual review	No	Yes		
No justifications given	0.318	0.464	-6.081	***
Soft measures or no justifications given	0.520	0.628	-4.229	***
Objective performance	0.077	0.047	2.263	**
General performance	0.409	0.309	4.001	***

Note: Panel A presents the summary statistics for the justifications for compensation changes stated in the proxy statement. The sample contains S&P 500 companies between 1994 and 2008. The number of observations that contain those keywords is shown in column 1, and the percentage of such changes is provided in column 2. We present the frequency of salary increases based on justifications with and without review requirement clauses in columns 1 and 2 of Panel B and with and without annual review clauses in columns 1 and 2 of Panel C. We then compare the differences in the frequencies and present t-statistics in column 3 of Panels B and C.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 4: **Salary changes**

Panel A: Changes in salary			
	(1)	(2)	(3)
Change in salary	**-**	**0**	+
Salary (thousands)	646.04	721.14	712.96
Bonus (thousands)	553.06	793.24	648.94
Equity-based compensation (thousands)	4,082.80	4,677.45	3,850.01
Change in salary	-13.3%	-2.6%	9.5%
Frequency in % of all years	5.2%	25.4%	69.4%
Panel B: Change in equity			
Change in equity-based pay	**-**	**0**	+
Salary (thousands)	731.54	691.71	774.85
Bonus (thousands)	653.45	669.67	747.17
Equity-based compensation (thousands)	3593.15	3708.68	5862.58
Change in equity-based compensation	-24.9%	0.0%	23.5%
Frequency % of all years	13%	71%	16%
Panel C: Total effect of salary changes as a percentage of total annual compensation			
Salary change	(1) Low case	(2) Base case	(3) High case
Actual	19.77%	41.97%	142.04%
Sample Mean	40.01%	83.47%	254.31%
Sample Median	36.31%	75.76%	230.82%
Sample Std	37.83%	78.93%	240.48%

Note: This table presents summary statistics of CEO compensation. The sample consists of S&P 500 companies between 1994 and 2008. Panel A (B) presents the frequency of increases and decreases in CEO salary (equity compensation), the magnitude of compensation components in firm-years of these changes, and the percentage change. We classify a raise if real (i.e., inflation adjusted) salary growth is positive; the salary cut classification is based on nominal growth. If a CEO receives no equity in the years between two grants, we classify these years as no change in equity-based compensation. We then compare the current grant value to the previous grant's value. We classify equity-based compensation only as change if it exceeds (in absolute value terms) that year's change in salary. Bonus multiple is bonus divided by the salary. Panel C reports the present value of implied effects (salary, bonus, and pensions) of the actual salary change (row1), a salary change of the sample mean (median, standard deviation) in percentage salary growth as a fraction of the current total compensation (TDC1). The low case assumes retirement next year, the base case at the average tenure of all CEOs that leave office in the focal year (or next year, if the current tenure is larger), the high case at an age of 65 (or next year, if the CEO is over 65). The impact on bonus is calculated as salary change times the sample-minimum bonus multiple for a given CEO-firm pair (low), the sample-median (base) or the sample-maximum (high case). The impact on pensions is the sum of salary and bonus change times benefit factor times years in service. The discount rate of 5.5%, benefit factor of 0.02, and the annuity factor are from Stefanescu, Wang, Xie, and Yang (2018) which takes mortality rates into account.

Table 5: **Stand-alone salary increases**

Panel A: Frequency and magnitudes			
Change in salary		+	
Change in equity-based pay	**-**	**0**	+
Salary (thousands)	713.68	699.61	766.99
Bonus (thousands)	677.39	665.56	655.67
Equity-based compensation (thousands)	3,170.69	4,009.93	5,405.40
Change in salary	6.7%	10.8%	6.5%
Change in equity-based compensation	-25.8%	0.0%	23.7%
% of all years	10.2%	46%	13.2%

Panel B: Stand-alone salary increases and explanations					
Dependent variable	Stand-alone salary increase		Stand-alone salary increase with		
			No explanation	Subjective explanation	Objective explanation
	(1)	(2)	(3)	(4)	(5)
Review requirement	0.075**	0.067*	0.051**	0.081***	0.001
	(0.038)	(0.039)	(0.021)	(0.027)	(0.022)
Review factor		0.021	0.039	0.037	0.033
		(0.045)	(0.081)	(0.055)	(0.202)
Mills		0.062	0.021	0.009	-0.037
		(0.057)	(0.041)	(0.053)	(0.040)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Tenure group, age group, and Industry fixed effects	No	Yes	Yes	Yes	Yes
N	954	954	937	937	937

Note: Panel A presents the frequency of increases and decreases in equity compensation for firm-years with real increases in salary, the magnitude of compensation components, and the percentage change. If a CEO receives no equity in the years between two grants, we classify these years as no change in equity-based compensation. We then compare the current grant value to the previous grant's value. We classify equity-based compensation only as change if it exceeds (in absolute value terms) that year's change in salary. Panel B presents the marginal effects from probit regressions, with heteroskedasticity robust standard errors (in parentheses). The dependent variable is an indicator of stand-alone salary raises, which is interacted with "no justifications" in column 3, either no justifications provided or based on subjective justifications in column 4, and objective justifications only in column 5. CEO age groups are: under 45, 46-50, 51-55, 56 -60, and above 60. Tenure groups are: 2 years or less, 3-5 years, and more than 5 years. Industry fixed effects are based on the first two digits of the SIC code.

*** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

Table 6: **Calendar-time portfolio returns**

Returns	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Stand-alone salary increases									
Stand-alone salary increase	1.27%	0.73%	0.81%	0.76%	0.48%	0.55%	0.68%	0.57%	0.59%
No change in salary	0.88%	0.22%	0.39%	0.47%	0.11%	0.28%	0.69%	0.57%	0.60%
Spread	**0.39%**	**0.51%**	**0.42%**	**0.28%**	**0.36%**	**0.27%**	-0.01%	0.00%	-0.01%
T-stat	2.53	3.75	3.10	1.75	2.46	1.91	-0.05	0.00	-0.07
Panel B: Stand-alone salary increases – excluding 2001-2003									
Stand-alone salary increase	1.44%	0.60%	0.70%	0.72%	0.37%	0.48%	0.60%	0.51%	0.51%
No change in salary	1.02%	0.04%	0.16%	0.38%	-0.06%	0.10%	0.50%	0.40%	0.41%
Spread	**0.42%**	**0.56%**	**0.54%**	**0.33%**	**0.43%**	**0.37%**	0.10%	0.11%	0.10%
T-stat	2.77	4.17	4.01	1.81	2.64	2.25	0.58	0.69	0.60
Panel C: Stand-alone salary increases: justifications									
Spread_subjective explanation	**0.41%**	**0.54%**	**0.43%**	0.24%	**0.32%**	0.27%	-0.10%	-0.11%	-0.11%
T-stat	2.45	3.60	2.95	1.29	1.86	1.59	-0.66	-0.75	-0.73
Spread_objective explanation	0.20%	0.42%	0.33%	0.28%	**0.57%**	0.46%	-0.46%	-0.50%	-0.53%
T-stat	0.54	1.20	0.95	0.76	1.69	1.35	-1.03	-1.12	-1.20

Returns	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel D: Stand-alone salary increases: R&D/sales									
Stand-alone salary increase*top quartile R&D/sales	1.34%	0.73%	0.79%	0.84%	0.56%	0.63%	0.72%	0.61%	0.62%
No change in salary*top quartile R&D/sales	1.03%	0.37%	0.46%	0.55%	0.20%	0.35%	0.54%	0.40%	0.45%
Spread_top quartile R&D/sales	**0.32%**	**0.36%**	**0.33%**	0.29%	**0.37%**	0.28%	0.19%	0.21%	0.18%
T-stat	1.74	1.96	1.81	1.29	1.90	1.44	0.87	1.06	0.92
Stand-alone salary increase*bottom quartile R&D/sales	1.41%	0.75%	0.87%	1.18%	0.59%	0.67%	0.65%	0.52%	0.51%
No change in salary*bottom quartile R&D/sales	1.04%	0.59%	0.79%	0.59%	-0.04%	0.27%	0.88%	0.74%	0.86%
Spread_bottom quartile R&D/sales	0.37%	0.15%	0.08%	0.59%	0.63%	0.40%	-0.23%	-0.22%	-0.34%
T-stat	0.81	0.34	0.18	1.17	1.29	0.82	-0.37	-0.39	-0.63
Panel E: Four factor loadings, Year 1 after salary change									
	MKT	T-stat	SMB	T-stat	HML	T-stat	UMD	T-stat	
Stand-alone salary increase	0.71	14.95	-0.03	-0.51	0.04	0.60	-0.04	-1.14	
No change in salary	0.76	12.96	-0.10	-1.42	0.19	2.49	-0.08	-1.74	
Spread	-0.07	-1.96	0.12	2.83	-0.14	-2.84	0.03	1.02	

Note: This table shows calendar-time equally weighted monthly returns and t-statistics for portfolios sorted by changes in compensation. We form portfolios for each month; each portfolio includes all companies that made the same type of compensation change and of which the fiscal year starts within the prior 12 months. These portfolios so constructed are rebalanced monthly. In Panel A, we sort stocks into two portfolios, one consisting of firms with stand-alone salary increases and the other consisting of firms with no such increases. Panel B reports subsample analysis excluding years 2001 to 2003. In Panel C, we further sort firms with stand-alone salary increases based on the justifications for salary changes listed, namely, subjective and objective justifications. In Panel D, we double sort firms with positive R&D based on stand-alone salary increases and R&D/sales. We rank firms with positive R&D by their R&D/sales into four groups for each industry and for each year. Industry classifications are based on the first two digits of the SIC code. We compute excess returns, three- and four-factor alphas (as in Fama and French, 1996; Carhart, 1997) by running time-series regressions of excess portfolio returns on the market (MKT), size (SMB), value (HML), and momentum (UMD) factor returns. Panel E reports the factor loadings based on the four-factor model for portfolios in Panel A and their t-statistics. Standard errors are computed after Newey-West adjustment with three lags. The spreads of long-short portfolio returns are indicated in bold if they are positive and significant at the 10% level.

Table 7: **Stock return regressions**

Dependent variable	Monthly stock return 0.5 year after salary change			Monthly stock return 1 year after salary change			Monthly stock return 1.5 years after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Stand-alone salary increase	0.005***	0.005***	0.003**	0.005***	0.005***	0.003**	0.003	0.003	0.001
	(0.002)	(0.001)	(0.019)	(0.002)	(0.002)	(0.019)	(0.002)	(0.002)	(0.018)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	No	No	Yes	No	No	Yes	No	No
Two way cluster	No	Yes	No	No	Yes	No	No	Yes	No
Fama-Macbeth	No	No	Yes	No	No	Yes	No	No	Yes
R-squared	0.002	0.002	180	0.001	0.001	180	0.001	0.001	180
N	34,648	34,648	34,648	34,652	34,652	34,652	34,639	34,639	34,639

Note: This table reports the coefficients and standard errors (in parentheses) of forecasting regressions of monthly stock returns on compensation changes. We include observations with either a stand-alone salary increase or no change in salary. The dependent variables in columns 1, 2, and 3 are the monthly stock returns 0.5 year after compensation changes; in columns 4, 5, and 6, they are the monthly stock returns 1 year after compensation changes; in columns 7, 8 and 9, they are the monthly stock return 1.5 years after compensation changes. The independent variable is the dummy variable indicating stand-alone salary increases. Control variables include one-, two-, three-, four- ,and five-month lagged returns, the logarithm of asset size and market-to-book ratio, both with one-year lag. We estimate pooled regression in columns 1, 2, 4, 5, 7, and 8. Standard errors are clustered by firm in columns 1, 4, and 7 and by firm and year-month in columns 2, 5, and 8. Fama and MacBeth (1973) regressions are estimated in columns 3, 6, and 9.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 8: **Stock return regressions: heterogeneity**

Dependent Variable	Monthly stock return 1 year after salary change							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Information heterogeneity								
Sample	Low analyst forecast dispersion	High analyst forecast dispersion	Low idiosyncratic risk	High idiosyncratic risk	Low bid-ask spread	High bid-ask spread	Early CEO tenure	Late CEO tenure
Stand-alone salary increase	0.001	0.005**	0.002	0.005**	0.001	0.006**	0.008**	0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
Adjusted R-squared	0.0069	0.0073	0.0047	0.0077	0.0049	0.0080	0.0065	0.0059
N	18,546	16,119	17,747	16,918	17,465	17,200	12,055	22,610
Panel B: Board and compensation committee characteristics								
Sample	Low board independent directors%	High board independent directors%	Low board busy directors%	High board busy directors%	Low CC independent directors%	High CC independent directors%	Low CC busy directors%	High CC busy directors%
Stand-alone salary increase	0.003	0.004*	0.005**	0.002	0.003	0.008***	0.009***	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.003)	(0.003)	(0.005)
Adjusted R-squared	0.0064	0.0092	0.0065	0.0068	0.0093	0.0040	0.0050	0.0106
N	13,761	20,904	21,921	12,744	2,249	9,634	7,678	4,205

Note: This table reports the coefficients and standard errors (in parentheses) of forecasting regressions of monthly stock returns on compensation changes. We include observations with either a stand-alone salary increase or no change in salary. The dependent variable is monthly stock returns 1 year after compensation changes. In columns 1-6 of Panel A, we rank firms based on analyst forecast dispersion, idiosyncratic risk, and stock bid-ask spread above or below industry median for each year. In columns 7 and 8 of Panel A, we rank firms based on their CEO tenure each year: whether the CEO serves for fewer or more years than his or her median industry peer in that year. In Panel B, we rank firms based on the percentage of busy directors, and the percentage of independent directors in the board above or below industry median each year in columns 1-4, and rank firms based on percentage of busy directors, and percentage of independent directors in the compensation committee above or below industry median each year in columns 5-8. We have fewer observations for compensation committees in Panel B, because Boardex data that we use to construct compensation committee measures starts from 2000. Industry classifications are based on the first two digits of the SIC code. In all regressions, we include control variables of one-, two-, three-, four-, and five-month lagged returns, the logarithm of asset size and market-to-book ratio, both with one-year lag. Standard errors are clustered by firm and year-month.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 9: **Firm activity**

Dependent Variables	Product announcement		CARs (-5, +5)	
	After 1 year	After 2 years	After 1 year	After 2 years
	(1)	(2)	(3)	(4)
Stand-alone salary increase	0.240*	0.077	0.003**	-0.001
	(0.143)	(0.223)	(0.001)	(0.002)
Control	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.433	0.430	0.114	0.177
N	1,448	855	1,175	685

Note: This table reports the coefficients of OLS regressions of product development on compensation changes. Standard errors (in parentheses) are heteroskedasticity robust. The sample contains S&P 500 companies between 2002 and 2008. We include firm-year observations with either a stand-alone salary increase or no change in salary. The dependent variables in columns 1 and 2 are numbers of product announcements 1 year and 2 years after compensation changes, divided by the number of product announcements one year before compensation changes. The dependent variable in columns 3 and 4 is the average 11-day abnormal returns around the product announcement date 1 and 2 years after compensation changes. We use a standard market model approach to estimate abnormal stock returns and then take the mean of all product announcement events each year. The market model parameters are estimated over a 90-day period ending 46 days before the event day using the equal-weighted CRSP index. Control variables include the logarithm of asset size, market-to-book ratio, R&D/sales, and annual stock returns, all with one-year lag.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 10: **Determinants of contract clauses**

Dependent variable		Review requirement			
		(1)	(2)	(3)	(4)
Information asymmetry	R&D/sales	1.095***	0.456**	1.068***	0.438**
		(0.253)	(0.200)	(0.253)	(0.196)
	Outside CEO	0.121***	0.118***	0.120***	0.115***
		(0.029)	(0.033)	(0.029)	(0.033)
	Idiosyncratic risk	0.169*	0.109	0.237**	0.081
		(0.093)	(0.113)	(0.095)	(0.114)
	Depr. &amort.%	-0.162	0.947*	0.037	0.945*
		(0.368)	(0.496)	(0.372)	(0.495)
	Distress	-0.097***	-0.099**	-0.119***	-0.105**
		(0.033)	(0.040)	(0.034)	(0.041)
Industry	Industry homogeneity			-1.015**	2.878
				(0.487)	(2.103)
	Industry outside CEO			0.890***	0.216
				(0.187)	(0.449)
Governance	Busy board	0.027	0.071*	0.022	0.075*
		(0.034)	(0.039)	(0.034)	(0.039)
	Independent directors%	0.131	0.146	0.082	0.143
		(0.084)	(0.099)	(0.084)	(0.099)
Controls	Net leverage	0.192*	0.055	0.180*	0.066
		(0.109)	(0.099)	(0.105)	(0.102)
	Log assets	0.009	-0.000	0.005	0.000
		(0.011)	(0.014)	(0.011)	(0.014)
	Tenure group	Yes	Yes	Yes	Yes
	Age group	Yes	Yes	Yes	Yes
	Year fixed effects	Yes	Yes	Yes	Yes
	Industry fixed effects	No	Yes	No	Yes
	N	1,876	1,693	1,875	1,693

Note: This table presents the marginal effects of firm and industry characteristics from probit regressions. Standard errors (in parentheses) are heteroskedasticity robust. The sample consists of S&P 500 companies with CEO contracts between 1994 and 2008. The dependent variable is review requirement, which is equal to 1 if the contract contains a review requirement clause and zero otherwise. Columns 3 and 4 include industry characteristics as control variables. CEO age groups are: under 45, 46-50, 51-55, 56 -60, and above 60. Tenure groups are: 2 years or less, 3-5 years, and more than 5 years. Industry fixed effects are based on the first two digits of the SIC code.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Table 11: **Alternative construction of stand-alone salary increases and placebo tests**

Returns	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Without inflation adjustment	**0.39%** 2.49	**0.50%** 3.65	**0.40%** 3.01	**0.28%** 1.75	**0.36%** 2.40	**0.29%** 1.99	0.04% 0.28	0.05% 0.34	0.03% 0.24
2. Excluding all changes in equity compensation	**0.39%** 2.46	**0.50%** 3.65	**0.41%** 3.02	**0.33%** 2.07	**0.42%** 2.89	**0.36%** 2.50	0.08% 0.54	0.08% 0.56	0.07% 0.47
3. Change in equity compared to previous year's value	0.25% 1.29	**0.45%** 2.48	**0.32%** 1.70	0.07% 0.34	0.26% 1.46	0.19% 1.06	-0.13% -0.59	-0.11% -0.50	-0.11% -0.55
4. Industry stand-alone salary increase	0.13% 0.80	0.21% 1.31	0.15% 0.91	0.03% 0.80	0.06% 0.37	0.04% 0.25	0.09% 0.54	0.05% 0.30	0.04% 0.27
5. Negative bnormal compensation	**0.39%** 2.17	**0.45%** 2.55	**0.32%** 1.86	0.33% 1.48	**0.43%** 2.11	0.24% 1.26	-0.30% -1.33	-0.30% -1.34	-0.33% -1.54
Positive bnormal compensation	**0.76%** 1.79	**0.93%** 2.24	**0.84%** 2.02	0.78% 1.28	0.74% 1.23	0.73% 1.21	0.08% 0.17	0.14% 0.30	0.08% 0.17
6. Overall compensation increase	0.20% 0.93	0.24% 1.31	0.09% 0.48	-0.03% -0.12	0.06% 0.28	-0.08% -0.35	-0.22% -1.04	-0.14% -0.7	-0.16% -0.83
7. Stand-alone bonus multiple increase	0.42% 1.50	0.41% 1.48	0.33% 1.11	0.06% 0.23	0.17% 0.59	0.09% 0.30	0.31% 1.17	0.38% 1.46	0.37% 1.39

Note: This table shows calendar-time equally weighted monthly returns and t-statistics for spread portfolios sorted by changes in compensation in the first and second rows of each test. In test 1, we define stand-alone salary increases using nominal salary increases instead of real salary increases. In test 2, we define stand-alone salary increases excluding all changes in equity compensation instead of excluding only changes in equity value that exceed the contemporaneous change in salary. In test 3, we define stand-alone salary increases by comparing equity grant value to the previous year's grant value, rather than the previous grant's value. In test 4, we sort stocks into two portfolios, one consisting of firms whose industry peers experienced a stand-alone salary increase on average and the other consisting of firms whose industry peers experienced no changes in salary on average. In test 5, we first calculate abnormal compensation, as in Gillan, Hartzell, and Parrino (2009), by regressing total compensation on firm and CEO characteristics and controlling for industry and year fixed effects. We then double sort stocks based on salary increase and negative abnormal compensation. Industry classifications are based on the first two digits of the SIC code. In test 6, we sort stocks into two portfolios, one consisting of firms with compensation increases in salary and equity and the other consisting of firms with no changes in salary. In test 7, we sort stocks into two portfolios, one consisting of firms with stand-alone bonus multiple increases (bonus is scaled by salary) and the other consisting of firms with no changes in bonus multiples. The formation of spread portfolio follows Table 6 for these alternative constructions of compensation changes. We compute excess returns, three- and four-factor alphas (as in Fama and French, 1996; Carhart, 1997) by running time-series regressions of excess portfolio returns on the market (MKT), size (SMB), value (HML), and momentum (UMD) factor returns. Standard errors are computed after Newey-West adjustment with three lags. The spreads of long-short portfolio returns are indicated in bold if they are positive and significant at the 10% level.

Appendix 1. Variable Definitions

Variables	Definitions
Age group	Dummy variables for CEO age groups of < 45, ≥ 45 and < 50, ≥ 50 and < 55, ≥ 55 and < 60, and ≥ 60
Analyst forecast dispersion	We first compute the standard deviation of quarterly EPS estimates scaled by the actual value per analyst and firm and compute the average across analysts for each firm
At-will exception	Dummy variable equal to 1 if the contract is governed by the law of a state with a good faith and fair dealing at-will exception, and 0 otherwise
Bid-ask spread	The absolute value of ask price minus bid price
Busyboard	Dummy variable equal to 1 if the fraction of busy directors who are in more than 2 outside public boards over the number of independent directors is greater than 0.5, and 0 otherwise
CEO age	CEO age in years
CEO tenure	Number of years the CEO has been in office
Chairman CEO	Dummy variable equal to 1 if a CEO also serves as a chairman of the board, and 0 otherwise
Contract	Dummy variable equal to 1 if we observe an employment agreement between the firm and the CEO, and 0 otherwise
Depr.&Amort.%	Depreciation and amortization as percentage of assets
Distress	Distress indicator based on Altman (1968)
Garmaise	Index of Garmaise (2009)
G-Index	Index of Gompers, Ishii, and Metrick (2003)
Idiosyncratic risk	Based on Wurgler and Zhuravskaya (2002): we regress daily firm excess return on a four factor-model and measure the volatility of residuals
Independent directors (% of board)	Percentage of independent directors on the board based on Fich and Shivdasani (2006)
Independent directors%_high	Dummy variable equal to 1 if the percentage of independent directors exceeds the industry median based on the two-digit SIC classification, and 0 otherwise

Industry CEO turnover	Industry turnover ratio of CEOs based on the first two digits of SIC
Industry homogeneity	Correlation between common monthly stock returns within two-digit SIC industries as in Parrino (1997)
Industry outside CEOs%	Industry ratio of outside CEOs based on the first two digits of SIC (see definition of outside CEO below)
Leverage (net)	Debt minus cash, divided by total assets
Total assets	Book assets (in $ millions)
Outside CEO	Dummy variable equal to 1 if the CEO is hired from outside firms or works in the firm for less than a year before becoming a CEO, and 0 otherwise
Product announcement	Number of product announcements per year
R&D /sales	R&D expenditure over total sales
Renewal	Dummy variable equal to 1 if a CEO was in office at the time of the contract start, and 0 otherwise
ROA	Earnings before interest & tax (EBIT) over total assets
Tenure group	Three dummies for a CEO who has worked in the same firm for at most 2 years, 3-5 years, and more than 5 years
Stock return (monthly)	One month holding period return

Appendix 2. Excerpt of a CEO Employment Contract

EMPLOYMENT AGREEMENT BETWEEN KENNETH W. FREEMAN & QUEST DIAGNOSTICS INCORPORATED

This EMPLOYMENT AGREEMENT (the "Agreement") is entered into as of the date of execution (the "Effective Date"), between QUEST DIAGNOSTICS INCORPORATED (the "Company"), a Delaware corporation having its principal place of business at One Malcolm Avenue, Teterboro, NJ 07608, and KENNETH W. FREEMAN (the "Executive"). [. . .]

1. EMPLOYMENT. The Company shall continue to employ the Executive in a full-time capacity in the position set forth in this paragraph, and the Executive shall continue to accept such employment upon the terms and conditions set forth herein. Such employment shall be in the capacity of Chief Executive Officer of the Company, and as a Director and Chairman of the Board of Directors of the Company (the "Board") reporting directly to the Board. The Company shall nominate the Executive as a Director of the Company and shall use its best efforts to have the Executive elected and re-elected to the Board for the duration of the "Employment Term" (as hereinafter defined). [. . .]

5. CASH COMPENSATION. Executive shall be compensated for services rendered during the Employment Term as follows:

   (a) BASE SALARY. Executive shall be compensated at an annual base salary of no less than $750,000 (the base salary, at the rate in effect from time to time, is hereinafter referred to as the "Base Salary"). The Company's Board of Directors shall review and may, if appropriate, at its discretion, increase this annual Base Salary during the Employment Term. Base Salary shall be reviewed annually and be adjusted to reflect (among other factors) increases generally granted to other senior executives of the Company and CEO performance consistent with Company pay practices. The Base Salary shall be payable in equal bi-weekly installments.

   (b) ANNUAL BONUS. In addition to the Base Salary provided for in Section 5 (a) above, the Company will provide annual bonus awards to Executive under its Management Incentive Plan (MIP) in accordance with the plan and any financial performance targets thereunder. During the Employment Term, Executive's target incentive op-

portunity under the Company's MIP will be no less than 140% of Base Salary as in effect at the time such target incentive opportunity is established. [. . .]

6. EQUITY AWARD. Executive may be awarded additional compensation (such as stock options, shares of incentive stock, or shares of restricted stock) pursuant to the present or any future incentive compensation or long-term compensation program established for the senior officers of the Company (collectively the "Incentive Compensation Programs"), in an appropriate manner for the position occupied by Executive and his performance therein relative to other Company senior executives and consistent with Company pay practices. [. . .]

IN WITNESS WHEREOF, the Company has caused this Agreement to be executed on its own behalf and has caused its corporate seal to be affixed, and the Executive has executed this Agreement on his own behalf intending to be legally bound, as of the date first written above.

Appendix 3. Selection

To control for the selection bias arising from this non-random exclusion, we follow the approach of Heckman (1979) and use the choice regression described below to compute the Mills ratio. We choose a state law characteristic for the identifying restriction: the at-will exception rule of good faith and fair dealing (henceforth the "exception rule"). This state-wide rule prohibits terminations made in bad faith or motivated by malice.[9] This rule protects employees with shorter contracts or without contracts, which makes such forms of employment more attractive. The ensuing popularity of these contracts could potentially make longer explict contracts less attractive.

The direct judicial consequences of the rule to CEOs are likely to be limited, however, since they are protected by individual contracts. We obtain the listing of these so-called at-will exceptions from Walsh and Schwarz (1996) and Muhl (2001). In most states, the rules were adopted between 1960 and 1980, following debates that were driven by political sentiments of that time as well as the particularities of isolated precedent cases.

To ensure that geographical effects are due to at-will exceptions and not to other legal differences across states, we control for other geographical indexes, such as the anti-takeover index of Bertrand and Mullainathan (1999) and the anti-competition enforceability index of Garmaise (2009). All regressions contain industry and year fixed effects to control for exogenous shocks to the labor market.

We run Probit regressions of contract disclosure and results are reported in Table A.1. Because we study contract disclosure, not compensation changes, in this regression, we include all firm-year observations, i.e., including the first and last years of a CEO's tenure. We use the Mills ratio to control for the possibility of selection into our contract sample in Table 5, because not all CEOs sign contracts, and not all firms that sign contracts disclose their particulars.

[9]There are two other exceptions that are less relevant for us. Under the public policy exception, dismissal is not allowed if it violates the state's public policy or a statute. Under the implied contract exception, an employee can dispute his/her dismissal if he/she can prove the existence of an implicit contract.

Table A 1: **At-will exceptions**

Code	State	At-will exceptions			Garmaise	Anti-takeover
		Public policy	Implied contract	Good faith and fair dealing		
AL	Alabama	0	1	1	5	0
AK	Alaska	1	1	1	3	0
AZ	Arizona	1	1	1	3	1
AR	Arkansas	1	1	0	5	0
CA	California	1	1	1	0	0
CO	Colorado	1	1	0	2	0
CT	Connecticut	1	1	0	3	1
DC	District of Columbia	1	1	0	6	0
DE	Delaware	1	0	1	7	1
FL	Florida	0	0	0	9	0
GA	Georgia	0	0	0	5	1
HI	Hawaii	1	1	0	3	0
ID	Idaho	1	1	1	6	1
IL	Illinois	1	1	0	5	1
IN	Indiana	1	0	0	5	1
IA	Iowa	1	1	0	6	0
KS	Kansas	1	1	0	6	1
KY	Kentucky	0	1	0	6	1
LA	Louisiana	0	0	0	4	0
ME	Maine	0	1	0	4	1
MD	Maryland	1	1	0	5	1
MA	Massachusetts	1	0	1	6	1
MI	Michigan	1	1	0	5	1
MN	Minnesota	1	1	0	5	1
MS	Mississippi	1	1	0	4	0
MO	Missouri	1	0	0	7	1
MT	Montana	1	0	1	2	0
NE	Nebraska	0	1	0	4	1
NV	Nevada	1	1	1	5	0
NH	New Hampshire	1	1	0	2	0
NJ	New Jersey	1	1	0	4	1
NM	New Mexico	1	1	0	2	0
NY	New York	0	1	0	3	1
NC	North Carolina	1	0	0	4	0
ND	North Dakota	1	1	0	0	0
OH	Ohio	1	1	0	5	1
OK	Oklahoma	1	1	0	1	0
OR	Oregon	1	1	0	6	0
PA	Pennsylvania	1	0	0	6	1
RI	Rhode Island	0	0	0	3	1
SC	South Carolina	1	1	0	5	1
SD	South Dakota	1	1	0	5	1
TN	Tennessee	1	1	0	7	1
TX	Texas	0	0	0	3	0
UT	Utah	1	1	1	6	0
VT	Vermont	1	1	0	5	0
VA	Virginia	1	0	0	3	1
WA	Washington	1	1	0	5	1
WV	West Virginia	1	1	0	2	0
WI	Wisconsin	1	1	0	3	1
WY	Wyoming	1	1	1	4	1

Note: This table presents at-will exceptions, anti-takeover regulations, the Garmaise (2009) index, and the number of patents issued between 1977 and 2004 by each state.

Table A 2: **First stage**

	Dependent variable	Contract
Geography	At-will exceptions	0.035
		(0.0545)
	Garmaise	-0.018*
		(0.0102)
Disclosure quality	Restatements	0.056
		(0.0937)
	Assets	-0.008
		(0.0155)
Governance	Renewal	-1.430***
		(0.0467)
	Gindex	0.033***
		(0.0121)
Risk	Analyst forecast dispersion	0.03
		(0.058)
	Industry homogeneity	-0.73
		(1.99)
Control variables	Tenure group	Yes
	Age group	Yes
	Year fixed effects	Yes
	Industry fixed effects	Yes
	N	7,804

Note: This table presents the marginal effects from a probit regression. The dependent variable is a dummy that equals 1 if the CEO has a disclosed contract. We include all firm-year observations. Standard errors (in parentheses) are heteroskedasticity robust. Data for the sample of S&P 500 companies are from 1994 to 2008. The dependent variable is an indicator equal to 1 if the CEO has a disclosed contract and zero otherwise.

*** Significant at the 1% level.
** Significant at the 5% level.
* Significant at the 10% level.

Internet Appendix

IA.1. Review Clauses in Contracts

Many compensation contracts require reviews. Appendix 2 provides an example of such contract clauses. In the example, the CEO's base salary shall be reviewed for increases by the board without any specific performance target given. We use these (and related) keywords to search for review clauses, including "subject to the review of the board," "at the discretion of the board," "to be reviewed/determined by the board," and so forth. Such clauses explicitly indicate that compensation levels are subject to future reviews. Panel A of Table 3 provides an overview of the frequency of review clauses and their content. More than half (54.7%) of the contracts require future reviews. In addition, most contracts specify the review frequency (usually each year). For CEOs with such clauses, reviews are mandatory.

Some clauses indicate the factors on which a review is based. However, such factor clauses exist in only 9% of our sample contracts; see Panel B of Table 3 for an overview. Examples of review factors include a firm's financial condition and firm performance. The absence of such clauses in most contracts indicates that adjustments to a CEO's base pay are usually based on a subjective assessment of the executive's contribution.

Most subjective review clauses directly link positive reviews to increases in base salary. More than 75.5% of contracts explicitly prescribe possible salary adjustments, as compared with 4.93% and 13.41% that prescribe bonus and equity adjustments respectively (see Panel C of Table 3). Mr. Freeman's contract in Appendix 3 is a typical example. It calls for reviews of the CEO only when discussing salary; in contrast, any adjustments to bonus or equity are subject to company-wide compensation policies that leave little discretion to the board.

Discussions with industry practitioners confirm the popularity of salary raises as a reward for long-term performance not yet visible in stock prices. While long-term performance targets and vesting periods can reduce the focus to current performance, the time horizon for such compensation incentives is typically three years (Cadman, Rusticus, and Sunder, 2013) and not much longer than five years, consistent with prohibitive costs of such long explicit horizons to risk-averse CEOs. Shareholders concerned about more long-term performance and sustainability of firms often advocate decoupling more compensation from stock-price based measures and towards subjective reviews and salary increases. The 2017 UK Government's green paper on governance reform (Department for Business, Energy & Industrial Strategy, 2017) provides an

overview of this discussion.

The focus on salary is also consistent with institutional factors. Equity compensation is subject to rules designed to protect shareholders from dilution. Both the New York Stock Exchange (NYSE) and Nasdaq (Lund, 2006) require shareholder approval of all equity-based compensation plans. Therefore, firms must convince shareholders before adjusting a CEO's equity-based compensation, a process that involves releasing information to justify the raise. Firms may choose to award salary raises instead precisely to avoid releasing such information early, especially when it is related to the progress of R&D projects. Because salary is rarely cut and bonuses and pensions are usually calculated in multiples of the salary, salary raises are one way for a board to give its CEO a sizable increase in total compensation without invoking institutional constraints.

IA.2. Reasons for Salary Increases

Using the narrative provided in the proxy statements to justify compensation raises, we further document that boards offer such raises to reward subjective performance. In order to study the stated reasons for salary raises, we categorize the narratives for such raises into three types: due to good *subjective* performance, *objective* performance, and/or *general* performance.[1] Panel A of Table 4 gives summary statistics for these reasons and lists the keywords we use to signify different types.

First, certain salary increases are the direct result of good objective financial performance, as reflected by net income, ROA, and so forth. However, raises based on specified financial performance account for only 7.41% of increased compensation instances. Many more changes in compensation – almost 40% of them – are rewards for general, nonspecified financial performance.

Second, boards of directors may reward CEOs for more subjective criteria, in line with our evidence from the contractual clauses for subjective reviews. Nearly 16.8% of salary increases are described as a reward for subjectively evaluated performance: leadership, strategic planning, accomplishing an expansion or restructuring, and so forth. These narratives do not link compensation increases to tangible financial performance as direct outcomes of those activities.

No reason is given (in proxy statements) for nearly a third of salary increases. Such raises

[1]There are also reasons for compensation changes that are *not* based on performance. In the sample, 29% of changes result from a board's benchmarking of CEO compensation to other executives who work in the same industry. Further increases followed contract renewals or adjustments for inflation.

may simply reflect a board's arbitrarily increasing CEO pay. In that case, there should be no systematic differences between firms that increase CEO salary with or without reasons. We must bear in mind, however, that boards are not obliged to offer a specific reason if the (publicly available) ex ante contract already requires periodic subjective reviews. That reticence can be beneficial if a firm – say, for competitive reasons – prefers not to disclose its motivation for increasing CEO compensation until a more advantageous time. If this motive explains why no reasons are stated for salary increases, then we should expect to observe systematic differences between firms that do and do not give reasons for increasing CEO pay.

As discussed in Section 3, Panel B and Panel C of Table 3 provide evidence that salary increases are unlikely to reflect an arbitrary board decision, even when no specific reasons are given for the raise. Otherwise, we would observe similar frequencies of stand-alone salary increases for CEOs with and without review clauses.

Table IA 1: **Alternative constructions of stand-alone salary increases and placebo tests**

Compensation changes	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Stand-alone salary increases: without inflation adjustment									
Overall compensation increase	1.19%	0.69%	0.79%	0.77%	0.47%	0.56%	0.69%	0.59%	0.61%
No change in salary	0.80%	0.20%	0.39%	0.49%	0.11%	0.27%	0.65%	0.54%	0.58%
Spread	**0.39%**	**0.50%**	**0.40%**	**0.28%**	**0.36%**	**0.29%**	0.04%	0.05%	0.03%
T-stat	2.49	3.65	3.01	1.75	2.40	1.99	0.28	0.34	0.24
Panel B: Stand-alone salary increases: excluding all changes in equity compensation									
Overall compensation increase	1.18%	0.70%	0.80%	0.83%	0.54%	0.62%	0.72%	0.62%	0.65%
No change in salary	0.80%	0.20%	0.39%	0.49%	0.11%	0.27%	0.65%	0.54%	0.58%
Spread	**0.39%**	**0.50%**	**0.41%**	**0.33%**	**0.42%**	**0.36%**	0.08%	0.08%	0.07%
T-stat	2.46	3.65	3.02	2.07	2.89	2.50	0.54	0.56	0.47
Panel C: Stand-alone salary increases: change in equity compared to previous year's value									
Overall compensation increase	1.04%	0.65%	0.71%	0.56%	0.38%	0.46%	0.52%	0.44%	0.47%
No change in salary	0.80%	0.20%	0.39%	0.49%	0.11%	0.27%	0.65%	0.54%	0.58%
Spread	0.25%	**0.45%**	**0.32%**	0.07%	0.26%	0.19%	-0.13%	-0.11%	-0.11%
T-stat	1.29	2.48	1.70	0.34	1.46	1.06	-0.59	-0.50	-0.55

Compensation changes	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel D: Industry salary increase									
Industry stand-alone salary increase	1.07%	0.45%	0.57%	0.55%	0.21%	0.38%	0.75%	0.59%	0.62%
No change in industry salary	0.94%	0.24%	0.43%	0.52%	0.15%	0.33%	0.66%	0.54%	0.58%
Spread	0.13%	0.21%	0.15%	0.03%	0.06%	0.04%	0.09%	0.05%	0.04%
T-stat	0.80	1.31	0.91	0.80	0.37	0.25	0.54	0.30	0.27
Panel E: Efficiency wage: abnormal compensation									
Stand-alone salary increase*neg_abn_comp	1.20%	0.54%	0.66%	0.71%	0.37%	0.46%	0.60%	0.45%	0.48%
No change in salary*neg_abn_comp	0.81%	0.09%	0.35%	0.39%	-0.06%	0.22%	0.90%	0.75%	0.81%
Spread_neg_abn_comp	**0.39%**	**0.45%**	**0.32%**	0.33%	**0.43%**	0.24%	-0.30%	-0.30%	-0.33%
T-stat	2.17	2.55	1.86	1.48	2.11	1.26	-1.33	-1.34	-1.54
Stand-alone salary increase*pos_abn_comp	1.94%	1.32%	1.35%	1.26%	0.99%	1.11%	0.64%	0.52%	0.47%
No change in salary*pos_abn_comp	1.17%	0.39%	0.52%	0.48%	0.25%	0.39%	0.56%	0.38%	0.39%
Spread_pos_abn_comp	**0.76%**	**0.93%**	**0.84%**	0.78%	0.74%	0.73%	0.08%	0.14%	0.08%
T-stat	1.79	2.24	2.02	1.28	1.23	1.21	0.17	0.30	0.17
Panel F: Overall compensation increase in both salary and equity									
Overall compensation increase	1.08%	0.46%	0.48%	0.44%	0.18%	0.20%	0.46%	0.43%	0.44%
No change in salary	0.88%	0.22%	0.39%	0.47%	0.11%	0.28%	0.69%	0.57%	0.60%
Spread	0.20%	0.24%	0.09%	-0.03%	0.06%	-0.08%	-0.22%	-0.14%	-0.16%
T-stat	0.93	1.31	0.48	-0.12	0.28	-0.35	-1.04	-0.7	-0.83

Compensation changes	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha	Excess returns	3-factor alpha	4-factor alpha
	Year 0.5 after salary change			Year 1 after salary change			Year 1.5 after salary change		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel G: Stand-alone bonus multiple increase									
Stand-alone bonus multiple increase	0.74%	0.58%	0.59%	0.81%	0.59%	0.62%	0.79%	0.67%	0.69%
No change in bonus	0.32%	0.17%	0.26%	0.75%	0.42%	0.53%	0.47%	0.28%	0.32%
Spread	0.42%	0.41%	0.33%	0.06%	0.17%	0.09%	0.31%	0.38%	0.37%
T-stat	1.50	1.48	1.11	0.23	0.59	0.30	1.17	1.46	1.39

Note: This table shows calendar-time equally weighted monthly returns and t-statistics for portfolios sorted by changes in compensation. We form portfolios for each month; each portfolio includes all companies that made the same type of compensation change and of which the fiscal year starts within the prior 12 months. In Panel A, we define stand-alone salary increases using nominal salary increases instead of real salary increases. In Panel B, we define stand-alone salary increases excluding all changes in equity compensation instead of excluding only changes in equity value that exceed the contemporaneous change in salary. In Panel C, we define stand-alone salary increases by comparing equity grant value to the previous year's grant value, rather than the previous grant's value. In Panel D, we sort stocks into two portfolios, one consisting of firms whose industry peers experienced a stand-alone salary increase on average and the other consisting of firms whose industry peers experienced no changes in salary on average. In Panel E, we double sort stocks based on salary increase and whether the change in salary in above industry average or not. Industry classifications are based on the first two digits of the SIC code. In Panel F, we sort stocks into two portfolios, one consisting of firms with compensation increases in salary and equity and the other consisting of firms with no changes in salary. In Panel G, we sort stocks into two portfolios, one consisting of firms with stand-alone bonus multiple increases (bonus is scaled by salary) and the other consisting of firms with no changes in bonus multiples. We compute excess returns, three- and four-factor alphas (as in Fama and French, 1996; Carhart, 1997) by running time-series regressions of excess portfolio returns on the market (MKT), size (SMB), value (HML), and momentum (UMD) factor returns. Standard errors are computed after Newey-West adjustment with three lags. The spreads of long-short portfolio returns are indicated in bold if they are positive and significant at the 10% level.