Incentive Pay Prior to CEO Turnover When Effort Choices Have Lasting Effects

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Abstract

We present a modified principal-agent model to identify a link between the anticipated likelihood of future CEO turnover and the optimal sensitivity of incentive pay to firm performance. The analysis focuses on the optimal sequence of standard one-period incentive contracts when CEO effort choices have lasting effects on firm performance. In such a model, an increase in the anticipated likelihood of turnover reduces the impact of future incentive contracts on current CEO effort, and induces a compensatory increase in the optimal sensitivity of current CEO compensation to current firm performance. We find empirical evidence in support of this prediction for a sample of over 3,000 US firms. Using an executive-specific fixed effects model, we find that among CEOs who depart within two years, the sensitivity of current incentive pay to changes in current firm performance is greater when there is a higher anticipated likelihood of CEO turnover as proxied by departures that reflect a planned succession and departures by CEOs who have reached retirement age. As expected, this increase in the sensitivity of current incentive pay to changes in firm performance is not found if the subsequent turnover is classified as unplanned, and thus not anticipated by the firm.

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I. Introduction

Few issues in economics and finance research receive as much popular attention as top executive compensation. There are both vigorous academic debates regarding the determinants of executive pay and extensive public discussions on its potential reform (Murphy, 1999; Bebchuk & Fried, 2003; Frydman & Jenter, 2010; Murphy, 2013; Edmans & Gabaix, 2016). The design of executive compensation is a complex issue unlikely to be explained by a single theoretical or empirical perspective (Edmans, Gabaix & Jenter, 2017). For instance, the 'shareholder value' view of executive compensation considers compensation contracts that maximize firm value in the context of principal-agent models. In contrast, the 'rent extraction' view suggests that executives maximize their rents by affecting their own compensation (Edmans & Gabaix, 2016; Edmans et al., 2017).[1]

The shareholder value view presumes that executive compensation contracts can address agency problems by aligning the interests of managers with those of shareholders (Jensen and Meckling, 1976). Such contracts use incentive pay as well as equity instruments that link executives' payoffs to shareholder value. In order for the contracts to be an effective incentivizing instrument, there must be a link between the executives' payoffs and their performance (Edmans et al., 2012; Edmans & Gabaix, 2016). Earlier studies found a positive relationship between the level of the executives' current pay and stock returns (Murphy, 1985; Coughlan and Schmidt, 1985). Jensen and Murphy (1990) identified a link between executives' wealth and firm performance, but found that the sensitivity of wealth to performance decreased over time. However, later studies by Hall and Liebman (1998), Chen et al. (2015) as well as Edmans et al. (2017) report that the wealth-to-performance relationship was strengthened as the use of stock options expanded in the 1990s and performance-based equity grew in the 2000s.

Even though much of the literature focuses on stock and option holdings as well as the total compensation of executives, the majority of executives in the US participate in performance bonus plans that link incentive pay to specific accounting targets (Murphy, 1999; 2013). Incentive pay is a component of compensation

[1] Gox and Hemmer (2020) consider a combined approach, one that adopts an optimal contract setting but allows firms to differ on whether the executive compensation practice "reflects arm's length bargaining or rent seeking" (p. 1). Boards that allow for a rent extraction objective are termed "CEO friendly" boards.

packages that is distinct from salary or equity-based compensation and comprises a stable and significant part of the average compensation package. Table 1 indicates that over the 29-year period from 1992 to 2020, the mean proportion of incentive pay for US CEOs represents on average close to 30 percent of total compensation. In contrast, over this period the mean proportion of salary declined by half while the proportion of equity almost doubled. Incentive pay for CEOs is also significant in many European economies comprising up to 40 percent of total compensation (Edmans et al., 2017).

Table 1: US CEO Compensation Components (1992-2020)

Years	Incentive Pay*	Salary Compensation	Equity Compensation
1992-1996	29.6%	43.1%	27.3%
1996-2001	26.2%	32.9%	40.9%
2002-2006	29.8%	30.0%	40.2%
2007-2011	28.7%	30.3%	41.0%
2011-2016	28.8%	24.8%	46.4%
2017-2020	29.0%	22.3%	48.8%
Average	**28.6%**	**30.7%**	**40.6%**

* Incentive pay includes compensation other than salary and equity-based compensation, primarily bonus pay. The figures report means of percentage shares of each compensation component and are based on a sample of 37,641 CEO compensation packages contained in the *ExecuComp* dataset.

Focusing on the CEO's incentives within the shareholder value view of executive compensation calls attention to dynamic phenomena. One of these is the idea that effort expended by a CEO can enhance a firm's performance both currently and in the future relative to competing firms – it has 'lasting effects'. This connection is especially important around the time of CEO turnover. If the CEO remains at the firm, then future compensation based on the firm's future relative performance can provide an additional incentive for the CEO to expend costly effort currently.[2] However, if a CEO's departure is anticipated, then the firm may increase the incentives for a CEO's effort based on the firm's performance in the current period to compensate for the reduction in the incentives for current effort that would otherwise rely on the executive being employed in subsequent periods.

The prediction that compensation incentives strengthen over the tenure of a CEO is proposed by Gibbons and Murphy (1992) who report increasing pay-performance sensitivity consistent with reduced career concerns as the tenure of the CEO at the firm increases. Edmans et al. (2012) point out that as the CEO tenure increases,

[2] Chen, Chittoor, and Vissa (2020) note that one of the two key questions in the executive compensation literature is "to what extent is CEO pay sensitive to realized firm performance." (p. 2)

there are fewer periods left to enjoy lifetime compensation so the increase in utility must become larger to induce effort by the CEO. Mangen (2016) focuses on pay-performance sensitivity changes after economic shocks to the firm and demonstrates that CEO pay becomes more sensitive over time controlling for tenure. The question of how CEO turnover affects the optimal level of incentive pay has not been directly addressed in these studies. Our goal is to complement this literature and examine the changes in incentive pay around the time of CEO turnover both in a theoretical model and empirically.

In Section II of this paper we develop a modified principal-agent model to identify how proximity to a CEO departure can result in an increase in the sensitivity of incentive pay to changes in the firm's performance, but only if the departure is anticipated by the firm. In doing so, we introduce a new parameter that affects the optimal pay-performance incentive structure for a CEO over time, namely the anticipated probability of turnover, under the presumption that the CEO's current effort choice improves the firm's performance not only for the current period but also in the future and that future pay-performance incentive contracts are anticipated.[3] The result is that the optimal one-period contract specifies a larger change in current compensation for a given change in the current firm performance when there is an increase in the anticipated likelihood of turnover.

In order to test this prediction, we must first establish a clear link between incentive pay and firm performance measures (Edmans et al., 2012; Edmans & Gabaix, 2016). Empirical analysis in Section III confirms such a link for firm performance measured by the firm's rate of return on assets. Implied is that even though annual reports on a firm's return on assets are not made public until the start of the following fiscal year, firms can be seen to accurately link current annual compensation to the concurrent annual rate of return on assets. Further, our results show that the effect on compensation of a change in the concurrent return on assets is not observed simply because the current annual rate of return serves as a proxy for the prior year's return on assets.[4]

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[3] In the terminology of Bergemann & Välimäki (2019), our dynamics arise from the assumption that the "set of allocations available change in a nontrivial manner across periods."

[4] In particular, the inclusion of lagged values of ROA neither significantly alters the concurrent correlation nor serves as an important contributor to the variation in current incentive pay. Note that quarterly results on earnings are reported during the year, and these can provide a direct link between compensation and concurrent earnings if incentive compensation agreements are based on quarterly earnings reports. In addition, in certain

A key empirical contribution of this paper described in Section III is the finding that variables indicative of an increase in the likelihood of CEO turnover are associated with higher sensitivity of concurrent incentive compensation to changes in firm performance. Our tests of the theory's predictions rely on the data from a large sample of over 3,000 US firms created from the *ExecuComp* and *CompuStat* data sets. To control for differences in firms and in executives, our empirical analysis adopts a fixed-effect model that identifies specific firm/CEO pairs. Empirical analysis in Section III finds increased sensitivity of concurrent incentive pay to firm performance when CEO turnover is part of a planned succession that proxies for an increase in the anticipated likelihood of impending CEO departure. However, as predicted by the theoretical model, this finding is not observed when CEO turnover can be viewed as unplanned and therefore not anticipated. We also find that incentive pay sensitivity is higher for CEOs who reach retirement age – another indicator of a higher likelihood of departure from the position. These results, supportive of our three hypotheses developed in Section II, shed new light on the importance of incentive pay as part of the optimal executive compensation package. Section IV provides a discussion of these contributions and a conclusion.

II. Principal-Agent Model with Lasting Effects of Effort

To start our analysis, consider the following standard principal-agent model in which the chief executive is hired as an agent to make decisions for the principal of the firm. The model introduces incentives designed to motivate the agent but does so at the cost of exposing the risk-averse agent to uncertain compensation. The analysis follows the linear exponential model (LEN) that "has been widely used for its tractability and ease of exposition" (Corgnet and Hernan-Gonzalez, 2019). In order to generate novel predictions for this model, we explicitly introduce a link between the agent's effort in the current period and firm performance in both the current and future periods. In particular, if we let x_t denote the firm's period return at the end of period t, we assume this return depends not only on the executive's effort in the current period e_t but also on the executive's prior effort choice in the previous period $t-1$, e_{t-1}, such that:

cases bonuses paid after earnings reports are made public can be expensed in the prior year if such bonuses are paid within two and one-half months after the end of the year.

$$x_t \equiv e_t + \theta e_{t-1} + \eta + \varepsilon_t \quad , \tag{1}$$

where the parameter η is a firm-specific ability parameter for the executive and the parameter θ indicates the degree to which the executive's prior effort choices enhance the firm's current performance, with $1 > \theta \geq 0$.[5] The stochastic noise term ε_t has density function $f(\varepsilon)$ and distribution function $F(\varepsilon)$. We assume that ε_t has a mean of zero and finite variance σ^2.

We assume that each period the firm specifies an incentive compensation package that depends only on the firm's return achieved in the current period. Further, we assume that this compensation package takes a simple linear form. Specifically, the firm defines the compensation associated with the firm's performance in period t to take the following form:

$$w_t(x_t) = s_t + \alpha_t x_t \tag{2}$$

In expression (2), the parameter s_t can be considered the salary component of the compensation package and the parameter $\alpha_t \geq 0$ links current compensation to the firm's current performance which, according to (1), depends on the executive's past and current effort levels as well as the executive's ability level. We interpret the parameter α_t as determining the sensitivity of current incentive compensation to changes in the firm's performance. Substituting expression (1) into (2), the executive's expected compensation and its variance in period t are given by, respectively:

$$E(w_t) = s_t + \alpha_t E(x_t) = s_t + \alpha_t (e_t + \theta e_{t-1} + \eta) \qquad \text{and} \qquad Var(w_t) = \alpha^2 \sigma^2 \ .$$

We assume that the executive's period utility function depends directly on the expected compensation and inversely on the variance in compensation and on the executive's effort. In particular, the executive's period expected utility function takes the specific form:

$$u_t(e_t) = s_t + \alpha_t (e_t + \theta e_{t-1} + \eta) - r(\alpha_t^2 \sigma^2) - (\gamma / 2) e_t^2 \tag{3}$$

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[5] The simple additive form of equation (1) follows the form proposed by Holmstrom (1999), among others. A key new term, θe_{t-1}, identifies effects of past effort on current firm performance.

In expression (3), the parameter $r \geq 0$ reflects the degree to which the executive is risk averse and the parameter $\gamma > 0$ affects the executive's cost of effort.

Suppose δ_t denotes the common perception at time t of the probability that the executive employed in period *t* departs the firm at the end of the period, with $1 \geq \delta_t \geq 0$. Let β denote the common discount factor, with $1 > \beta > 0$. Finally, let the executive's alternative value in case the executive departs the firm at the start of the period $t+1$ be given by U_{t+1}^a. Then, the executive's expected present value to employment at the start of period t at effort level e_t is given by (4):

$$\begin{aligned} E_t U_t(e_{t-1}, e_t) = s_t + \alpha_t(e_t + \theta e_{t-1} + \eta) - r(\alpha_t^2 \sigma^2) - (\gamma/2) e_t^2 \\ + \beta\left((1-\delta_t) E_t U_{t+1}(e_t, e_{t+1}) + \delta_t U_{t+1}^a\right) \end{aligned} \tag{4}$$

The expected net return in period *t* for a risk-neutral firm from the employment of the executive is given by the difference between the expected return and the expected compensation cost for the agent: $E_t(x_t) - E_t(w_t)$. Let the firm's expected alternative value if the executive departs the firm at the start of period $t+1$ be given by $V_{t+1}^a(e_t, e_{t+1}^a)$. Then the firm's expected net present value is given by (5):

$$\begin{aligned} E_t V_t(e_{t-1}, e_t) = -s_t + (1-\alpha_t)(e_t + \theta e_{t-1} + \eta) \\ + \beta\left((1-\delta_t) E_t V_{t+1}(e_t, e_{t+1}) + \delta_t V_{t+1}^a(e_t, e_{t+1}^a)\right) \end{aligned} \tag{5}$$

First-best outcome

Consider first the baseline case in which there is no asymmetric information, such that the principal of the firm can directly control the agent's current level of effort. In this case, the firm's choice for the executive's level of effort each period maximizes expression (5) subject only to the executive's per period individual rationality constraint. This constraint assures that the executive obtains expected compensation per period at least equal to the executive's next-best current alternative, denoted by U_t^a. That is, we have:

$$E_t U_t(e_{t-1}, e_t) - U_t^a = 0 \tag{6}$$

Substituting (4) into (6), and letting $E_t U_{t+1}(e_t, e_{t+1}) = U^a_{t+1}$, the individual rationality constraints becomes expression (7).

$$-s_t = \alpha_t (e_t + \theta e_{t-1} + \eta) - r(\alpha_t^2 \sigma^2) - (\gamma / 2) e_t^2 - U_t^a + \beta U_{t+1}^a \tag{7}$$

Substituting (7) into the firm's objective function (5), we obtain the following expression for the firm's objective function:

$$\begin{aligned} E_t V_t (e_{t-1}, e_t) = {} & e_t + \theta e_{t-1} - r(\alpha_t^2 \sigma^2) - (\gamma / 2) e_t^2 - U_t^a + \beta U_{t+1}^a \\ & + \beta \left[(1 - \delta_t) E_t V_{t+1}(e_t, e_{t+1}) + \delta_t E_t V^a_{t+1}(e_t, e^a_{t+1}) \right] \end{aligned} \tag{8}$$

The firm's optimal "first-best" choice of effort, e_t^{FB}, satisfies the first-order condition in expression (9).

$$e_t^{FB} = \frac{1}{\gamma} \left(1 + \beta(1 - \delta_t)\theta + \beta \delta_t \frac{d E_t V^a_{t+1}(e_t, e^a_{t+1})}{de_t} \right) \tag{9}$$

To simplify, we assume that effort is interchangeable across executives when turnover occurs, such that the marginal impact of an executive's effort in the current period on the firm's return in the following period is independent of whether or not the executive departs the firm. This implies that $dE_t V^a_{t+1}(e_t, e^a_{t+1}) / de_t = \theta$. This assumption simplifies expression (9), resulting in the first-best level of effort each period characterized by the following expression (10).

$$e^{FB} = \frac{1}{\gamma} (1 + \beta\theta) \tag{10}$$

In summary, since the executive is risk averse, the optimal compensation package has the optimal incentive rate α_t equal to zero and an optimal salary that just satisfies the individual rationality constraint (7) at the first-best level of effort. An important feature of this first-best level of effort is the anticipation that an increase in current effort generates returns in both the current and future periods, and both of these gains are taken into account in determining the first-best level of effort.

Second-best outcome with asymmetric information and moral hazard

If the executive's choice of effort is not directly observed or contractible by the firm, then the firm's compensation package will determine the executive's effort choice. In particular, the executive's optimal effort choice can be summarized by the executive's first-order condition to expression (4) given by:

$$\frac{E_t U_t(e_{t-1}, e_t)}{de_t} = \alpha_t - e_t\gamma + \beta(1-\delta_t)\theta\alpha_{t+1} = 0 \tag{11}$$

A key characteristic of the agent's optimal effort choice is the anticipation that an increase in the current effort generates compensation not only in the current period but also in the future period given the executive does not depart from the firm and the wage contract in the next period ties firm performance to compensation – this link is α_{t+1}. We thus have the following expression for the optimal effort choice of the agent:

$$e_t = \frac{1}{\gamma}\left(\alpha_t + \beta(1-\delta_t)\theta\alpha_{t+1}\right) \tag{12}$$

Equation (12) defines the incentive compatibility constraint for our principal-agent setting. Substituting expression (12) into (8), the firm chooses the current period incentive rate α_t to maximize the resulting objective function, one that incorporates both the individual rationality constraint (7) and the incentive compatibility constraint (12). Adopting our earlier simplifying assumption that $dE_t V_{t+1}^a(e_t, e_{t+1}^a)/de_t = \theta$, the resulting first-order condition for α_t is given by:

$$\frac{1}{\gamma} - 2r\alpha_t\sigma^2 - \frac{\gamma}{2}\frac{1}{\gamma^2}\left(2\alpha_t + 2\beta(1-\delta_t)\theta\alpha_{t+1}\right) + \beta(1-\delta_t)\theta\frac{1}{\gamma} + \beta\delta_t\theta\frac{1}{\gamma} = 0 \tag{13}$$

Rearranging, we have the following expression for the optimal incentive rate:

$$\alpha_t^* = \frac{1+\beta\theta}{1+2r\sigma^2} - \frac{\beta\theta(1-\delta_t)\alpha_{t+1}^*}{1+2r\sigma^2} \tag{14}$$

As expected, expression (14) indicates that one can achieve first-best level of effort by applying a 100-percent incentive rate so that $\alpha_t^* = 1$ if the executive is risk-neutral $(r = 0)$ and the executive's current effort does not have an impact on firm performance beyond the current period $(\theta = 0)$. A similar outcome occurs for

a risk-neutral executive if there is no expected turnover $(\delta_t = 0 \ \forall \ t)$ as the optimal incentive rates become $\alpha_t^* = \alpha_{t+1}^* = 1$. In this case, the optimal level of effort is achieved as the executive, by remaining at the firm over time, chooses an effort level that fully accounts for the future impact on compensation of increased current effort.

On the other hand, if the executive is risk-neutral but turnover occurs with probability one in each period $(\delta_t = 1 \ \forall \ t)$ then the optimal incentive rate becomes $\alpha_t^* = \alpha_{t+1}^* = 1 + \beta\theta$. This suggests that the firm must enhance the link between the executive's current effort choice and current firm performance. Increasing the incentive rate is optimal because the executive's turnover eliminates potential gains of higher future compensation from higher effort choices. Finally, note also that in all cases introducing a risk-averse executive into the model reduces the optimal level of the performance incentive α_t. For instance, in the case when turnover occurs with probability one, the optimal incentive rate is: $\alpha_t^* = \alpha_{t+1}^* = (1+\beta\theta)/(1+2r\sigma^2) < (1+\beta\theta)$.

Let us further explore what expression (14) implies regarding the pattern of incentive rates over time under different circumstances. For instance, consider the situation in which the firm and the executive anticipate at the start of period t that turnover will occur only at the end of period $t+1$, such that $\delta_t = 0$ and $\delta_{t+1} = 1$. In this case, through backward induction, condition (14) implies the following dynamics with respect to the optimal choice of the incentive parameter over time:[6]

$$\alpha_{t+1}^* = \frac{1+\beta\theta}{1+2r\sigma^2} \qquad \text{and} \qquad \alpha_t^* = \alpha_{t+1}^* \left(1 - \frac{\beta\theta}{1+2r\sigma^2}\right) < \alpha_{t+1}^* \qquad (15)$$

Given the direct link between the executive's current effort and future firm performance, condition (15) illustrates the emergence of a stronger performance incentive as the time of departure from the firm becomes closer for the executive. More precisely, expression (14) implies the following dynamics for the optimal incentive rate.

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6 We illustrate the change in the incentive rate over only a two-period interval given our assumption that the effects of current effort on future firm performance extend to one period in the future.

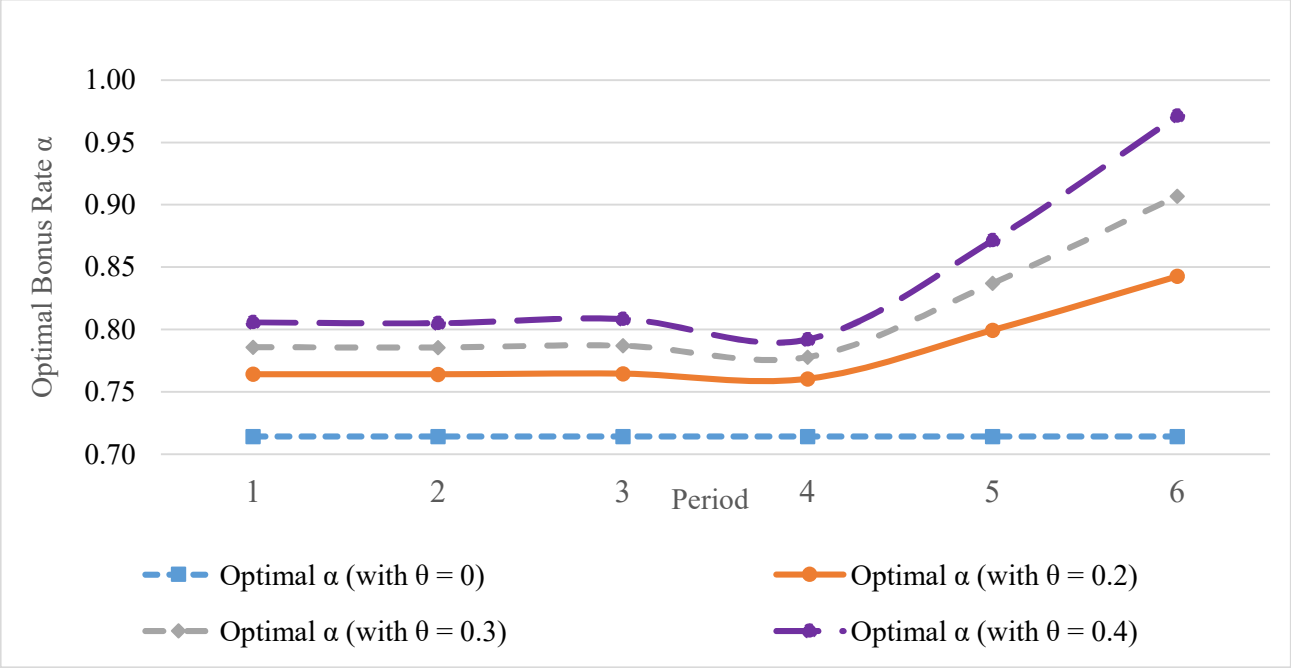
$$\frac{d\alpha_t^*}{d\delta_t} = \frac{\beta\theta}{1+2r\sigma^2}\alpha_{t+1}^* - \frac{\beta\theta(1-\delta_t)}{1+2r\sigma^2}d\alpha_{t+1}^* \qquad (16)$$

The first term in condition (16) indicates that an increase in the likelihood of the executive's turnover at the end of the period has the direct effect of increasing the current period's optimal incentive rate. However, if the following period's incentive rate is higher $(d\alpha_{t+1}^* > 0)$, say due to an increase in δ_{t+1}, this has an offsetting second-order effect of reducing the optimal incentive rate in the earlier period.

In order to illustrate such dynamics, consider a case in which there is a constant likelihood of an executive's departure from the firm $\overline{\delta} < 1$ up to the start of period $N-2$. At that time, assume that the firm's succession plan results in an increasing likelihood of CEO departure over the next two periods. Furthermore, assume that if the CEO does not depart in period $N-1$, then the likelihood of departure rises to $\delta_N = 1$ in period *N* such that: $1 = \delta_N > \delta_{N-1} > \delta_{N-2} = \delta_{N-3} = \delta_{N-4} = \delta_{N-5} = \overline{\delta} \geq 0$. Figure 1 presents the changes in the optimal performance incentive rate that accompany such a rise in the probability of executive turnover associated with planned succession. For this illustration, we assume the following parameter values: $\beta = 0.9$, $r = 0.2$, $\sigma^2 = 1$, and a six-period horizon, with $\delta_N = 1$ and $\delta_{N-1} = 0.6$ in the final two periods and $\delta_{N-2} = \delta_{N-3} = \delta_{N-4} = \delta_{N-5} = \overline{\delta} = 0.2$.

The predicted changes in the optimal incentive rate over time depicted in Figure 1 are demonstrated for four different magnitudes in terms of the impact of current effort on future firm performance indicated by the parameter θ. Figure 1 highlights the key feature of our analysis, namely that when current effort enhances future firm performance, an anticipated increase in the likelihood of turnover reduces the extent to which future incentive contracts encourage current effort, resulting in a gain to providing more powerful incentives based on current output. The result is a rising optimal incentive rate over time in response to an increased probability that the CEO departs the position.

Figure 1: Optimal Incentive Rate for Different Levels of Impact of Effort on Future Firm Performance



Hypotheses

The above characterization of the optimal compensation contract for the executive suggests several specific predictions regarding the link between optimal incentive compensation and current firm performance in terms of the incentive rate α. One prediction has to do with the age of the CEO. We presume that when a CEO reaches retirement age, the likelihood that the CEO will soon depart from the firm is higher, other things equal. The theoretical model suggests that such an increase in the likelihood of a CEO departure will affect the optimal compensation package and specifically the sensitivity of performance incentive pay. This provides the following Hypothesis 1.

Hypothesis 1: Given the higher anticipated likelihood of CEO departure when the CEO is of retirement age, we expect an increase in the sensitivity of incentive pay to a change in firm performance for CEOs who reach retirement age.

A second hypothesis arises from the classification of CEO departures into categories according to the degree to which the departure is anticipated to occur shortly. Suppose there are two such categories. The first group includes planned CEO successions that we define as normal retirements as well as changes in the duties of the CEO such that the CEO remains at the firm in a senior capacity. We consider this first type of departures to be

anticipated by the firm in the years just prior to the CEO departure. The second group is CEO departures that are less likely to have been anticipated. This group includes resignations, early retirements, firings and departures due to illness. We consider this second group of departures to be unplanned CEO successions. A key difference between the two groups is the likelihood that the departure is anticipated by the firm. In terms of the theoretical model, the former group has a higher parameter δ. This leads to Hypothesis 2.

Hypothesis 2: Given the higher anticipated likelihood of an impending CEO departure for planned successions, we expect an increase in the sensitivity of incentive pay to a change in firm performance for executives close to a planned succession departure.

For unplanned CEO departures, Jenter and Kanaan (2015), among others, identify a reduction in firm performance as a contributing factor. In our model, such a reduction in firm performance can arise from a decrease in the CEO's ability (a lower value of parameter η) or an increase in the CEO's cost of effort (a higher γ). However, it is important to note that while the CEOs who experience an unplanned departure may have lower productivity reflecting such parameter changes, neither of these changes alters the optimal level of sensitivity of incentive compensation to changes in firm performance – the optimal incentive rate (α). We thus have the following Hypothesis 3.

Hypothesis 3: We expect no change in the sensitivity of incentive pay to a change in firm performance for executives close to an unplanned departure.

III. Data and Empirical Analysis

In order to test whether changes in the anticipated likelihood of CEO departure will result in increased sensitivity of concurrent incentive pay to a measure of firm performance, as suggested by the hypotheses above, we turn to Standard and Poor's *ExecuComp* annual dataset of executive compensation for the period from 1992 through 2020. We merge the *ExecuComp* data with the *CompuStat* dataset to obtain financial information for each firm. The merged dataset contains 3,879 firms and a total of 56,255 firm-year observations.[7]

[7] Our approach to dataset construction is similar to empirical studies that use the combination of *ExecuComp* and *CompuStat* data, such as Barron et al. (2011), Jenter & Kanaan (2015), Chulkov & Barron (2019).

As our empirical analysis focuses on CEOs, we start by identifying the CEO at each firm in the data set. We then exclude firm observations when the CEO at the start of the fiscal year is not well-defined - these exclusions involve co-CEOs and cases when the same CEO was shared across different firms. We also exclude firm-year combinations that involve a restructuring of the firm including spinoff, buyout, merger, or bankruptcy as well as firm-year combinations that were missing key financial variables. Finally, we exclude as outliers twelve "speculative" firms which appear in the dataset for at least 10 years but had at most only one year with a positive return on assets. The result is a data set of 3,819 distinct firms with 53,693 distinct firm-year combinations.

In order to identify each case of CEO turnover in our data set based on the changes in the CEO listed at a firm from year to year, we introduce unique firm identification numbers to distinguish distinct contiguous time periods. This means that when there is a break in data availability for a particular firm, we create two separate firm identification numbers and treat each contiguous set of records as a separate case. As the result, the 3,819 unique firms represent 4,097 distinct contiguous-period firm-level instances in the dataset. Our empirical tests focus on the pattern of compensation over time for each CEO excluding the first and last year the individual is a CEO at a firm. To assure a sufficient spell length in order to examine changes in the nature of CEO compensation packages associated with turnover at a particular firm, we restrict our dataset to firm observations that reflect at least six contiguous years. This reduces the sample of firms to 3,101 distinct firms with 50,539 distinct firm-year combinations. It reduces the sample of distinct contiguous-period firm-level instances to 3,186 with 50,539 total firm-year combinations. Below we discuss firms in terms of these contiguous-period instances.

For this sample, when a change in the CEO occurs at a particular firm, we identify the departing year of this CEO. For executives who become a CEO within the data set, we also identify the year they became CEO and the current tenure as CEO in each year. If a CEO occupied the position when the firm enters the sample, we use the information in the *ExecuComp* data set to compute the total length of the CEO's tenure.

Table 2: Summary Statistics for Data Sample

	Mean	Standard Deviation	Min	Max	N
Incentive compensation	$1,718	3,359.176	$0	$166,000	37,641
Salary compensation	$926	493.155	$0	$10,149	37,641
Equity-based compensation	$3,642	11,480.65	$0	$1,030,000	37,641
Net Income (After EI and DO)	$476	2,222	-$118,000	$81,417	37,641
Return on assets (ROA)	0.039	0.134	-5.779	11	37,641
No CEO departure within two years, CEO not retirement age	0.732	0.443	0	1	37,641
No CEO departure within two years, CEO retirement age	0.077	0.266	0	1	37,641
Planned CEO departure within two years, CEO not retirement age	0.031	0.174	0	1	37,641
Planned CEO departure within two years, CEO retirement age	0.027	0.161	0	1	37,641
Unplanned CEO departure within two years, CEO not retirement age	0.128	0.334	0	1	37,641
Unplanned CEO departure within two years, CEO retirement age	0.005	0.068	0	1	37,641
Total assets of the firm	$18,606	111,000	$4	$3,780,000	37,641
CEO tenure at firm	8.729	7.326	2	61	37,641
Fiscal Year	2006	7.76	1992	2019	37,641

Notes: Compensation variables are reported in terms of thousands of 2018 dollars. Assets are in millions of 2018 dollars. Net income (after Extraordinary Items and Discontinued Operations) is in millions of 2018 dollars. The return on assets (ROA) is net income divided by total firm assets. The CEO tenure is the number of years the CEO has been CEO at the firm during the current spell as CEO. Planned successions are CEO departures that reflect normal retirements or a change in duties at the firm. Unplanned successions are CEO departures within two years by resignation, early retirement (at age less than 65), firing, or illness. The variable CEO retirement age equals one if CEO age is greater than or equal to 65.

We exclude from our analysis turnover observations that involve interim CEOs – typically such individuals have a tenure as CEO of less than two years. We drop cases reflecting the last year the firm is in the database because we cannot identify whether the CEO leaves the firm at that point time. We also drop cases reflecting the departure year of the CEO as compensation for that year may reflect only partial employment for the year and/or may include severance payments. Similarly, we drop cases that involve the executive's first-year as CEO at the firm as compensation in the first year can reflect a hiring bonus and similar payments. Finally, we drop six cases when a negative compensation component has been recorded. This reduces the final sample size to

3,180 contiguous-period firms and 37,641 firm-year observations spanning the years from 1992 to 2019. Table 2 provides summary statistics for our sample.

Our empirical analysis uses six dummy variables to test for the differences in pay sensitivity based on changes in the anticipated likelihood of CEO turnover, as predicted by the hypotheses. These dummy variables reflect the various CEO departure types. Specifically, they indicate whether the CEO is of retirement age, whether the CEO departs the position within the next two years, and if such a future departure occurs, whether the departure can be classified as planned or unplanned. Table 3 summarizes these variables further and displays the number of observations in each of the resulting six categories.

Table 3: CEO Turnover by Type

CEO Departure Type	CEO not of Retirement Age*		CEO of Retirement Age*	
No CEO departure within two years	27,568	73.2%	2,893	7.7%
Planned CEO departure within two years	1,182	3.1%	1004	2.7%
Unplanned CEO departure within two years	4,822	12.8%	172	0.5%

* CEO retirement age is greater than or equal to 65. Percentages reflect fraction of the total number of observations (37,641) in each group.

The classification of CEO turnover instances associated with planned and unplanned successions was obtained following the guidelines provided by Parrino (1997) as well as Barron et al. (2011). We examined news articles related to cases of CEO turnover identified in the data to verify the timing of such turnover and to identify the type for the CEO turnover in our sample. In the planned succession category are CEOs who retired at the age of 65 or higher and CEOs who took a different senior position within the firm in a change of duties. Those that change duties typically move to the board of directors and maintain their connection with the firm. In the unplanned succession category are CEOs who resigned, took early retirement, were fired, or left due to illness or death. We use a two-year window before the actual departure of the CEO to create our variables for departure types.

In order to test our hypotheses empirically, we also must establish relevant measures for annual incentive compensation and for firm performance in order to identify pay-performance sensitivity. Following Mangen (2016), we consider cash compensation and further focus on its incentive component, which we define as compensation that is neither salary- nor equity-based. As shown in Table 1, this incentive component of

compensation, which primarily includes bonus payments, accounts for close to 30-percent of an average CEO's total compensation. While we focus on incentive pay, we estimate all empirical models also for salary and equity compensation to allow for comparisons of the results between different compensation types. For our measure of the firm's performance, we use the firm's annual rate of return on assets (ROA) defined as the firm's earnings divided by total assets.[8]

Table 4 examines the association between each of the three different components of CEO compensation (incentive pay, salary, and equity-based compensation) and firm performance in our sample. In Table 4, the dependent variables reflect the log of compensation in the form of incentive pay (model 1), salary (model 2), or equity-based compensation (model 3).[9] Our empirical analysis utilizes executive-level fixed effects that allow us to abstract from the differences across executives that could be correlated with both the independent variables of compensation as well as our dependent variables (Chamberlain, 1980). The estimates reported in Table 4 reflect fixed-effects specifications for each firm-CEO pair, such that the coefficients can be interpreted as changes that appear over the CEO's tenure relative to the mean compensation for each firm-CEO pair. Two compensation components – incentive and equity-based – are positively related to firm performance, with the significance at the 1% level. However, by far the larger coefficient and the higher level of significance is observed in the relationship between firm performance and the incentive pay component of compensation. Model (4) introduces a potential effect for lagged values of ROA on incentive pay and confirms that the key pay/performance link is between the concurrent incentive pay and the firm's ROA. The models in Table 4 also include control variables that can affect the level of compensation such as changes in firm size and CEO tenure, and both these control variables demonstrate a significant direct relationship to the size of all forms of compensation. The results also indicate that various forms of CEO compensation are lower when the CEOs

[8] Jenter and Kanaan (2015) advocate using a relative measure for firm performance. All our results are robust to using such a relative measure of ROA, a measure that equals a firm's annual rate of return minus the average rate of return of other firms in the same industry in the same year, with this average calculated excluding the firm's own rate of return.

[9] Specifically, the dependent variables in Table 4 equal the log of one plus the value of the various types of compensation to account for zero values for some types of compensation.

reach retirement age. This is not surprising given that the alternative employment opportunities are reduced for such CEOs.

Table 4: CEO Compensation, Age, Turnover, and Firm Performance: CEO Fixed-Effects Model

	(1) Dependent Variable: Incentive Pay	(2) Dependent Variable: Salary Compensation	(3) Dependent Variable: Equity Compensation	(4) Dependent Variable: Incentive Pay, Lagged ROA included
Return on assets (ROA)	**1.766****	0.0405*	0.325**	2.351**
	(31.70)	(2.00)	(2.68)	(34.90)
Lagged return on assets (ROA)				0.293**
				(5.02)
No CEO departure within two years, CEO retirement age	-0.134**	-0.0365**	-0.0632	-0.127**
	(-3.55)	(-2.66)	(-0.77)	(-3.52)
Planned CEO departure within two years, CEO not retirement age	0.0515	0.0183	0.0115	0.0626
	(1.16)	(1.13)	(0.12)	(1.44)
Planned CEO departure within two years, CEO retirement age	-0.161**	-0.0399*	-0.327**	-0.154**
	(-3.21)	(-2.19)	(-3.01)	(-3.22)
Unplanned CEO departure within two years, CEO not retirement age	-0.177**	0.0334**	0.0292	-0.146**
	(-7.12)	(3.70)	(0.54)	(-6.06)
Unplanned CEO departure within two years, CEO retirement age	-0.149	-0.119**	-0.774**	-0.252*
	(-1.36)	(-2.98)	(-3.25)	(-2.35)
Log of book value of total firm assets	0.248**	0.102**	0.785**	0.438**
	(13.85)	(15.64)	(20.19)	(50.18)
CEO tenure at firm	0.0626**	0.0178**	0.0803**	0.00645**
	(12.41)	(9.67)	(7.32)	(3.13)
Five 5-year time interval dummy variables	Included	Included	Included	Included
CEO-level fixed effects	Included	Included	Included	Included
Observations	37,641	37,641	37,641	31,200

t statistics in parentheses (* p < .05, ** p < .01)

Notes: Five 5-year time interval dummy variables reflect five of the six time periods cited in Table 1. ROA is defined as net income divided by total assets. Planned successions are normal retirements or a change in duties with the CEO remaining at the firm. Unplanned successions include resignations, early retirement at age less than 65, firing, or illness. CEO retirement age is greater than or equal to 65. Dependent variables are in log form. The smaller sample in model (4) is due to missing values for the lagged ROA variable. Estimating all models on this smaller sample generates very similar results with or without the lagged ROA variable.

In order to test the two hypotheses regarding the sensitivity of compensation to changes in firm performance based on CEO age and type of departure, we interact the firm's ROA performance variable with five dummy variables that indicate various CEO turnover types. The sixth, excluded, category is cases when the CEO is not of retirement age and does not depart within two years. These results are reported in Table 5.

Table 5: Sensitivity of Compensation to Firm Performance by Turnover Type: CEO Fixed-Effects Model

	(1) Dependent Variable: Incentive Compensation	(2) Dependent Variable: Salary Compensation	(3) Dependent Variable: Equity Compensation
Return on assets (ROA)	**1.730****	0.0554**	0.398**
	(30.13)	(2.59)	(3.23)
ROA interacted with no CEO departure within two years, CEO retirement age	**1.281****	-0.0647	-0.134
	(5.14)	(-0.70)	(-0.25)
ROA interacted with planned CEO departure within two years, CEO not retirement age	**2.238****	0.0018	0.796
	(4.95)	(0.01)	(0.83)
ROA interacted with planned CEO departure within two years, CEO retirement age	**2.665****	-0.137	1.617
	(6.01)	(-0.82)	(1.71)
ROA interacted with unplanned CEO departure within two years, CEO not retirement age	0.285	0.0015	0.106
	(1.92)	(0.03)	(0.34)
ROA interacted with unplanned CEO departure within two years, CEO retirement age	-0.439	0.142	-2.149
	(-0.75)	(0.65)	(-1.72)
Log of book value of total firm assets	0.430**	0.145**	0.597**
	(54.11)	(36.18)	(39.99)
CEO tenure at firm	0.00887**	0.00986**	-0.0171**
	(4.68)	(10.58)	(-4.70)
Five dummy variables indicating types of CEO departure	Included	Included	Included
Five 5-year time interval dummy variables	Included	Included	Included
CEO-level fixed effects	Included	Included	Included
Observations	37,641	37,641	37,641

t statistics in parentheses, * p < .05, ** p < .01

Notes: Dummy variables indicating types of CEO departure are included but not reported. The results with these dummy variables appear in the Appendix to this paper. Five 5-year time interval dummy variables are also included in all specifications but not reported. Planned successions are normal retirements or a change in duties with the CEO remaining at the firm. Unplanned successions reflect resignation, early retirement at age less than 65, firing, or illness. The retirement age is greater than or equal to 65. Dependent variables are in log form.

The evidence in Table 5 supports hypothesis 1 in that for CEOs with no departures within two years, being of retirement age significantly increases the sensitivity of incentive pay to firm performance. The coefficient on the ROA variable indicates that for cases where there is no CEO departure within two years, if the CEO is not of retirement age then a 1 percentage point increase in the ROA increases the incentive pay component of total compensation by 1.73%. However, for CEOs with no departure within two years but of retirement age, the same 1 percentage point increase in the ROA increases incentive pay by 3.01% based on the estimated coefficient values, and this difference is statistically significant.[10]

[10] This figure reflects the sum of two coefficients, specifically 3.01 = 1.730 + 1.281. Additional comparisons cited below are similarly obtained by summing the appropriate coefficients.

The evidence in Table 5 also supports hypothesis 2. Among non-retirement-age CEOs who experience a departure within two years, the sensitivity of incentive pay to firm performance is more than twice as high when the departure is part of a planned succession compared to an unplanned departure. This reflects the fact that a 1 percentage point increase in the ROA increases incentive compensation by 3.97% and 2.02%, respectively, for these two groups.[11] Among retirement-age CEOs who experience a departure within two years, the sensitivity of incentive pay to firm performance is approximately four times higher when the departure is part of a planned succession versus an unplanned departure. This reflects the fact that a 1 percentage point increase in the ROA increases incentive compensation by 4.40% and 1.29%, respectively, for these two groups.[12]

Finally, the evidence in Table 5 supports hypothesis 3. Among CEO's who are associated with unplanned departures, whether of retirement age or not, there is no statistically significant difference in the coefficient on the ROA variable interacted with these groups of CEOs around the time of their departure from the firm.[13]

IV. Discussion and Conclusion

Our theoretical and empirical analysis presents several contributions. First of all, we develop a principal-agent model that identifies how the optimal incentive pay structure for a CEO is affected by anticipated turnover. A key modification of this analysis is the condition that the CEO's current effort choice affects the firm's performance not only currently, but also in the future. A key prediction of the model is that when future turnover is anticipated, such as in the years prior to the CEO departing in a planned succession, the optimal incentive pay contract exhibits a higher degree of pay-performance sensitivity. This result rests on the assumptions that current CEO effort affects future firm performance – has lasting effects – and that the firm has limited ability to enforce incentive compensation contracts after a CEO leaves the firm.

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[11] These figures reflect the following coefficient summations: 3.97 = 1.730 + 2.238 and 2.02 = 1.730 + 0.285

[12] These figures reflect the following coefficient summations: 4.40 = 1.730 + 2.665 and 1.29 = 1.730 - 0.439

[13] Estimating Table 5's model for the dependent variable of total executive compensation also demonstrates increased sensitivity for the categories linked to CEOs of retirement age and those leaving in planned succession with the significance at the 10 percent level while other categories yield no significant coefficients. This relationship is driven by the incentive pay component of compensation as seen in Table 5.

We should note that our theoretical analysis abstracts from several principal-agent model features that can arise in a dynamic setting. For instance, we do not assume asymmetric information regarding the agent's type.[14] If such asymmetric information were to exist, then new information on the agent's type could potentially be revealed to the principal over time. This introduces an incentive for the principal to alter the optimal reward structure over time in order to identify type, and in turn can induce a forward-looking agent to alter effort to avoid more demanding incentive structures.[15] By focusing instead on a known agent type, we essentially characterize the optimal contract in terms of a sequence of short-term contracts.

Our analysis also abstracts from potential short-termism, a situation in which a current action increases current returns at the expense of future returns (Stein, 1988).[16] Adopting the approach of Holmstrom and Milgrom (1991), one could interpret short-termism as indicative of two tasks, one that enhances current output and one that increase future output. If the two tasks are substitutes, then incentives that increase effort devoted to current output would increase the cost of performing the other task that enhances future output. The result is that increased incentives based on current output would reduce future output, other things equal. In our model, the opposite is predicted in that incentives that increase effort today also lead to higher future output, other things equal.

A second contribution of our analysis is to provide novel empirical tests of the theory's prediction. Empirical results demonstrate that a key component of CEO compensation, namely incentive pay, is strongly and positively related to firm performance for a fixed-effects specification that also controls for the size of the firm's assets and CEO tenure. This confirms the general findings of extant studies (Jensen and Murphy, 1990; Gibbons & Murphy, 1992; Chen et al., 2015; Mangen, 2016). We further find that it is only when the CEO is of retirement age or there is a planned succession, and thus there exists an anticipated increase in the likelihood the

[14] Bergemann and Välimäki (2019) consider "the distinguishing feature of dynamic mechanism design" to be that "types of some agents ... change in a nontrivial manner across periods."
[15] This is known as the "ratchet effect". This term in the context of a principal-agent model was introduced, among others, by Freixas, Guesnerie, and Tirole (1985).
[16] Applications of short-termism to executive compensation are discussed, for instance, by Edmans et al. (2012) and Edmans & Gabaix (2016).

CEO departs from the firm, there is increased sensitivity of current CEO incentive compensation to current firm performance. These results highlight the role of incentive pay in the overall executive compensation package.

Our focus on incentive pay differentiates this study from the extensive literature on executive compensation that studies wealth-to-performance sensitivity (Jensen & Murphy, 1990; Frydman & Saks, 2010; Edmans et al., 2017). On the scale of a manager's entire career, the extent of equity compensation dwarfs all other compensation types (Hall & Liebman, 1998; Frydman & Saks, 2010). However, we are interested in the incentives around the time of a CEO's departure from the firm. The shortened time horizon as well as the existence of sunset provisions and vesting restrictions that make option and equity compensation's value to the executive heavily discounted close to the departure from the firm (Dahiya and Yermack, 2008) leads us to focus on the pay-to-performance sensitivity (Murphy, 1985; Gibbons and Murphy, 1992).

Incentive pay linked to accounting measures is commonly used both in the US and in other developed economies and comprises a remarkably stable share of total compensation packages. There have been numerous changes in the pattern of executive compensation in the US over the years. As reported in Table 1, the mean share of salary declined from 43 percent in 1992 to 22 percent in 2017. Equity-based compensation including stock and options rose over this period at a rate that more than offset the decline in the salary component. However, noteworthy for our study is that incentive pay has remained relatively stable and, on average, has represented a significant part of total compensation – close to 30 percent. Our research illustrates the strong link between this stable component of total compensation and firm performance measures, as well as variations in the sensitivity of such payments that can be linked to optimal contracting theory.

Incentive compensation is popular not only in the US, but also in other major economies. In the period between 2002 and 2009, bonuses constituted 40 percent of CEO compensation in Germany, 20 percent in Belgium, 19 percent in the Netherlands, and 18 percent in France (Edmans et al., 2017). The non-equity incentive pay as percentage of compensation in major UK firms rose from 12.6 in 2000 to 20.6 percent in 2006, as well as from 18 to 28.2 percent for banks (Gregg, Jewell & Tonks, 2012). The use of incentive pay exhibits features predicted by agency theory and influences CEOs' investment and reporting decisions (Healy, 1985; Lambert & Larcker, 1987; Bennett et al., 2017). Guay, Kepler and Tsui (2019) demonstrate that incentive plans can also play a key role in providing collective top management team incentives. Unlike equity incentives

accumulated over an executive's entire career, incentive pay provides a clear and direct link between pay and performance which may help explain its enduring prevalence (Murphy, 2013).

Finance and accounting literature documents evidence of earnings management at the time of CEO turnover which may contribute to endogeneity concerns in the pay-to-performance relationship. However, many such findings are specific to incoming CEOs rather than ones leaving the firm. The incoming CEOs have the incentive to underreport earnings to show greater gains in future years (Murphy and Zimmerman, 1993; Pourciau, 1993; Davidson et al., 2004). In contrast, outgoing CEOs may be affected by the horizon problem as the controls and incentive structures of the firm lose some of their effectiveness when the CEO departure from the firm is imminent. However, despite these theoretical predictions for outgoing executives, empirical evidence on the impact of the horizon problem on discretionary accounting choices is inconclusive (Wells, 2002). Pourciau (1993) reports, contrary to expectations, that departing executives record accruals that decrease earnings during their final year at the firm. Using a sample of Australian firms, Wells (2002) finds little evidence of income-increasing earnings management prior to CEO departures. Davidson et al. (2007) report that firms with CEOs at retirement age have larger discretionary accruals in the year prior to turnover, but their test on the likelihood of larger discretionary accruals for firms with profit-based incentive pay did not produce robust results. Kalyta (2009) shows that only CEOs who have pension plans tied to firm performance are more likely to engage in earnings management before turnover. Kalyta (2009) concludes that: "in general, existing empirical literature suggests that managers make accounting choices to increase their compensation but does not provide conclusive evidence that the likelihood and/or the magnitude of earnings management are greater in years immediately prior to managerial retirement. However, some managers have stronger incentives to manage earnings in their final pre-retirement years than others due to the nature of their retirement plans." (p.1556) Note, of course, that such discussions regarding management's manipulation of earnings starts with the presumption that it optimal to link management compensation to a firm's return on earnings; it is this link that we focus on in this paper that provides the incentive for the potential manipulation of earnings reports by management.

Our findings supplement other models that discuss the sensitivity of a CEO's income to firm performance. For instance, Gibbons and Murphy (1992) discuss career concerns that weaken as a CEO approaches retirement.

As the result, financial incentives must be strengthened to keep the CEO motivated. Edmans et al. (2012) suggest that as the CEO approaches retirement, there are fewer periods left to enjoy lifetime utility from compensation and as the result the increase in reward must become larger to induce the same level of effort. This also results in higher current period compensation closer to retirement. Adding to these findings, our study links higher pay-performance sensitivity for incentive pay not only to CEOs reaching retirement age, but also to CEOs departing from the firm in a planned succession.

Executive compensation is a rich and profound topic. Our theoretical model extends the understanding of how CEO effort choices that affect the firm not only currently, but also in the future, influence the optimal compensation package. Our empirical analysis confirms the theoretical predictions that incentive pay becomes more sensitive to concurrent firm performance before CEO departures, but only for a planned succession or when the CEOs reach retirement age. These results help understand and inform optimal executive compensation policies over time.

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Appendix

Table 5A: Sensitivity of Compensation to Firm Performance by Turnover Type: CEO Fixed-Effects Model: Reporting Coefficients on Turnover Type Variables

	(1) Dependent Variable: Incentive Compensation	(2) Dependent Variable: Salary Compensation	(3) Dependent Variable: Equity Compensation
Return on assets (ROA)	**1.730****	0.0554**	0.398**
	(30.13)	(2.59)	(3.23)
ROA interacted with no CEO departure within two years, CEO retirement age	**1.281****	-0.0647	-0.134
	(5.14)	(-0.70)	(-0.25)
ROA interacted with planned CEO departure within two years, CEO not retirement age	**2.238****	0.0018	0.796
	(4.95)	(0.01)	(0.83)
ROA interacted with planned CEO departure within two years, CEO retirement age	**2.665****	-0.137	1.617
	(6.01)	(-0.82)	(1.71)
ROA interacted with unplanned CEO departure within two years, CEO not retirement age	0.285	0.0015	0.106
	(1.92)	(0.03)	(0.34)
ROA interacted with unplanned CEO departure within two years, CEO retirement age	-0.439	0.142	-2.149
	(-0.75)	(0.65)	(-1.72)
Log of book value of total firm assets	0.430**	0.145**	0.597**
	(54.11)	(36.18)	(39.99)
No CEO departure within two years,	-0.181**	-0.0340*	-0.369**
CEO retirement age	(-5.03)	(-2.47)	(-4.88)
Planned CEO departure within two years,	-0.0760	0.0257	-0.121
CEO not retirement age	(-1.59)	(1.39)	(-1.20)
Planned CEO departure within two years,	-0.263**	-0.0317	-0.634**
CEO retirement age	(-5.29)	(-1.66)	(-6.04)
Unplanned CEO departure within two years,	-0.169**	0.0447**	0.0464
CEO not retirement age	(-7.57)	(5.13)	(0.99)
Unplanned CEO departure within two years,	-0.184	-0.110**	-1.089**
CEO retirement age	(-1.77)	(-2.81)	(-4.93)
CEO tenure at firm	0.00887**	0.00986**	-0.0171**
	(4.68)	(10.58)	(-4.70)
Five 5-year time interval dummy variables	Included	Included	Included
CEO-level fixed effects	Included	Included	Included
Observations	37,641	37,641	37,641

t statistics in parentheses, * p < .05, ** p < .01

Notes: Planned successions are normal retirements or a change in duties with the CEO remaining at the firm. Unplanned successions reflect resignation, early retirement at age less than 65, firing, or illness. The retirement age is greater than or equal to 65. Dependent variables are in log form.