Does Job Insecurity Discipline CEOs or Induce Opportunism? Evidence Based on Earnings Inflation

March 23, 2021

Abstract

Job security concerns have both disciplinary and opportunistic effects on CEO behavior. This paper studies the dual effects of CEO dismissal risk in the setting of earnings inflation. We find that on average a higher CEO dismissal risk is associated with less earnings inflation, consistent with the disciplinary effect. This effect, however, weakens when CEO dismissal risk further increases. The opportunistic effect may prevail but only when CEO dismissal risk becomes extremely high. Overall, our evidence supports the notion that the threat of forced turnover is an effective corporate governance measure to discipline managerial opportunistic behavior.

JEL Classification: G3, M41
Keywords: Corporate governance, CEO turnover, job security, earnings inflation

1 Introduction

Modern corporations delegate control to professional managers. This structure allows firms to be run by the most capable talent so that more value can be created for shareholders. However, agency problems arise from the separation of ownership and control, in which managers engage in self-serving activities at the expense of shareholders (Jensen and Meckling, 1976). As a result, a set of disciplines have been introduced to address corporate agency issues, of which forced CEO turnover is one mechanism designed to punish managers ex post with the objective of deterring undesirable actions ex ante. Nevertheless, a concern emerges about the side effects of forced CEO turnover. Specifically, the increasing threat of job termination may induce managers to act opportunistically, which harms shareholder interests and hence weakens the disciplinary effect of forced CEO turnover. In this paper, we test the dual effects of CEO dismissal risk, an *ex ante* probability of forced CEO turnover,[1] in the setting of earnings inflation, a particular form of managerial decision that has significant economic relevance and is often suspected to be opportunistic and related to job security pressure.[2] We aim to provide insight and evidence for the debate on the effectiveness of forced CEO turnover as a corporate governance mechanism.

Managerial job- and career-related concerns have significant impacts on corporate financial reporting. A typical conjecture is that the threat to job security motivates a CEO to manipulate earnings. Fudenberg and Tirole (1995) model the action of earnings smoothing as an outcome of poor managerial job security. This argument seems to be supported by the findings of Datta, Iskandar-Datta, and Vivek (2013), who show a higher propensity of earnings management among firms facing fiercer product market competition or operating in more uncertain environments.[3] However, the distortion of earnings information is neither risk nor cost free. Aggressive manipulation of earnings reporting can lead to misconduct and even fraud, subjecting a CEO to severe punishments. In line with this argument, Hazarika, Karpoff, and Nahata (2012) document

[1] We use CEO job security, the threat of CEO dismissal, and CEO dismissal risk interchangeably. All refer to a CEO's ex ante job status.

[2] Earnings underreporting is another form of opportunistic distortion of corporate financial information. However, it is less relevant to the *current* concern of CEO job security. Instead, it is more about a CEO's *future* compensation and job status. In addition, earnings underreporting is more likely to occur when the firm performs better than usual. In such scenarios, job security is less a concern for a CEO. Therefore, in the paper, we mainly study earnings inflation.

[3] Datta, Iskandar-Datta, and Vivek (2013) do not provide direct evidence on the impact of CEO job security on earnings management because product market competition has more implications than the threat to CEO job security.

higher incidences of forced CEO turnover following a higher degree of earnings management. In addition, overreporting earnings increases the difficulty of meeting performance targets in the future (Baber, Kang, and Li, 2011; Barton and Simko, 2002). These ex post consequences hence make it less appealing to inflate earnings to address job security concerns.

We use a parsimonious model to demonstrate the intuition. In this model, the CEO chooses the level of effort and the degree of earnings inflation to maximize self-utility, which is determined by CEO compensation based on the reported firm performance and a loss from the potential dismissal ex post. CEO effort improves firm performance and lowers the probability of ex post dismissal, albeit incurring a disutility for the CEO. Earnings inflation boosts the reported performance, increasing the CEO's compensation and lowering the likelihood of ex post dismissal via deception. However, earnings inflation also creates a discrepancy between the reported performance and the actual performance, subjecting the CEO to a higher risk of ex post dismissal. Therefore, ex post consequences impose a constraint on the action of earnings inflation. There are two opposing effects of the ex ante threat to CEO job security on earnings inflation: On the one hand, it strengthens the constraint and reduces the potential for earnings inflation (i.e., the disciplinary effect); on the other hand, it entices the CEO to opportunistically inflate earnings, in hope of improving his job status with a deceptive performance report (i.e., the opportunistic effect).

We show that overall, the deterioration of CEO job security implies a disciplinary effect. That is, ex ante dismissal risk incentivizes the CEO to exert effort to improve actual firm performance and, at the same time, reduce the degree of earnings inflation. This is because the CEO manipulates earnings up to the limit set by the constraint of ex post consequences, where further overreporting earnings increases the marginal costs more than the marginal benefits. However, this disciplinary effect weakens when CEO dismissal risk further increases. Especially when dismissal risk is imminent, the CEO may engage in a higher degree of earnings inflation in response to the deeply deteriorating job security, since it requires a considerable amount of effort to improve actual firm performance in these scenarios.

Prior literature focuses on the opportunistic effect and attempts to explore managerial opportunism by studying earnings management surrounding CEO turnovers, but empirical evidence is so far mixed. For example, Murphy and Zimmerman (1993) and Pourciau (1993) find little evidence that departing CEOs engage in a greater degree of earnings management, while Guan, Wright, and Leikam (2005) document more aggressive use of discretionary accruals prior to non-routine CEO turnovers.[4] A few issues of these studies may hinder the examination of the dual effects of CEO job security: First, focusing only on CEOs who are ousted ex post causes the issue of sample selectivity and overlooks the plausible *ex ante* disciplinary effect of job security concerns during routine operations. More importantly, the binary simplification of CEO job status (i.e., keeping the job versus dismissed) makes it impossible to study the incremental effects of the potential threat to CEO job security.

We extend this discussion by studying the dual effects (i.e., discipline and opportunism) of CEO dismissal risk on earnings inflation from an ex ante perspective. To our best knowledge, the ex ante disciplinary effect has not been empirically explored. To this end, we construct an ex ante measure of CEO job (in)security based on the estimated dismissal hazard from survival analysis for CEO job duration. This hazard proxies the expected likelihood of forced CEO turnover in the next year, given that the CEO survives as of the current time. Therefore, the greater the hazard, the poorer the CEO job security. This measure has three important advantages. First, it can be estimated for all firm-CEO-years, making our empirical evidence more representative and less subject to the sample selectivity problem. Second, this measure varies in both the cross-sectional and time-series dimensions, enabling us to control for various fixed effects, so our results are more immune to the biases caused by omitted related variables that are invariant in these dimensions. Last but not least, this measure is continuous, which allows us to investigate the incremental effects of CEO dismissal risk.

Using positive discretionary accruals as the primary measure of earnings inflation,[5] we find that on average CEO dismissal risk imposes a disciplinary effect in the decision of financial reporting. That is, earnings inflation is lower when CEO dismissal hazard is higher.

[4] Alternatively, Baginski et al. (2018) examine the impact of career concerns (i.e., a manager's concerns about the impact of current performance on contemporaneous and future compensation) on the extent to which managers delay bad news.

[5] Discretionary accruals are the difference between the reported accounting cash flows and the actual cash-based ones that are at CEO discretion and cannot be explained by normal economic factors. It is commonly used to measure earnings management. The magnitude of discretionary accruals manifests the extent to which the financial information is manipulated, and the sign indicates the direction of manipulation. Therefore, the greater the positive discretionary accruals, the higher the degree of earnings overreporting.

We strengthen the identification using the following approaches. First, we use two instrumental variables in the hazard estimation: CEO dismissals in the firm's industry over the past two years, and change in the state-level non-compete enforceability index. These variables are based on industry trends and changes in regulations, which are unlikely to affect earnings inflation except through their effects on CEO dismissal risk. Second, we adopt alternative measures of CEO dismissal risk, constructed at the industry level, which are less subject to firm-level endogeneity concerns. Third, we explore the effects of CEO job security among subsamples that are partitioned based on various external corporate governance mechanisms. It is expected that the disciplinary effect of CEO dismissal risk should be more pronounced when other external corporate governance mechanisms are weaker. Overall, we find consistent and supporting evidence for the discipline hypothesis.

In addition to manipulating accruals, managers can alter financial performance by distorting real activities (Roychowdhury, 2006). We hence expect a similar effect of CEO job security on real earnings management. Consistent with this conjecture, we find that CEO dismissal hazard is negatively associated with abnormal production costs and positively associated with abnormal discretionary expenditures, both of which suggest a lower degree of earnings inflation through real earnings manipulation.

The second half of the discipline hypothesis posits that deteriorating job security motivates a CEO to improve firm performance. Therefore, we expect to observe better firm performance following a higher CEO dismissal risk. We use three measures of firm performance—Tobin's Q, stock return, and return on assets (ROA) corrected for discretionary accruals and find that CEO dismissal hazard indeed positively predicts firm performance. .

The model also predicts that the disciplinary effect weakens when CEO dismissal risk is significantly high, and the opportunistic effect may even prevail but only in certain extreme scenarios where the risk is imminent. Consistent with this prediction, we find that the disciplinary effect is significantly reduced when CEO dismissal hazard is within the top percentiles or the stock return is within the bottom percentiles among the sample firms.

Finally, our results are immune to various confounding factors, such as (a) different estimation specifications and methods of CEO dismissal risk, (b) alternative methods to construct discretionary accruals, (c) various concerns such as changes around CEO turnovers, reversal of earnings management, analyst forecasts, the Sarbanes-Oxley Act, and CEO overconfidence, and (d) additional controls, including CEO compensation incentives, audit committee independence, other measures of corporate governance, as well as different fixed effects.

Our work complements the literature on forced CEO turnover as an *ex post* discipline. Lehn and Zhao (2006) find a higher incidence of forced CEO turnover following poor acquisition performance. Similarly, Hazarika, Karpoff, and Nahata (2012) find a positive relationship between the degree of earnings management and subsequent CEO dismissals. However, forced CEO turnovers are rare in reality (Huson, Parrino, and Starks, 2001; Kaplan and Minton, 2012). The problem remains: does the ex post discipline lack the teeth or have the concerns been addressed beforehand? We fill the gap by exploring the *ex ante* disciplinary effect of CEO dismissal risk. Our findings suggest that the threat of forced turnover can discipline CEOs through the deterrence of opportunistic managerial behaviors ex ante.

We contribute to the discussion on how CEO turnover affects the quality of financial information. Distinct from the traditional view of opportunism in the extant literature (e.g., Guan, Wright, and Leikam, 2005; Murphy and Zimmerman, 1993; Pourciau, 1993), our findings support the corporate governance view that the threat of job insecurity can discipline CEOs and reduce earnings inflation.

This study also adds to the emerging research about the effects of CEO job security on corporate policies. Cziraki and Xu (2014) find that firms increase investment and leverage when their CEOs are secure. Li and Zhao (2017) find lower acquisition intensity but better acquisition performance when acquiring CEOs face a higher dismissal risk. Liu and Xuan (2014) document similar evidence for merger performance before the renewal of CEO employment contracts.

2 Model and Hypotheses

In this section, we build a simple and stylized model to demonstrate the relation between CEO job security and earnings inflation. Based on the implications of the model, we develop the hypotheses regarding the disciplinary and opportunistic effects of CEO dismissal risk.

A risk-neutral CEO is hired to run the firm. He or she can exert effort to generate actual performance, π_0. For simplicity, we use π_0 to represent the CEO's effort and actual firm performance interchangeably. The CEO is privy to the firm's actual performance, while shareholders instead observe the performance reported by the CEO.

The CEO has flexibility to choose accounting methods in financial reporting and crafts the information quality to serve his or her own objectives. For example, the CEO may have an incentive to overreport performance because CEO compensation and other benefits are closely tied to performances.[6] Let the reported performance be $\pi = \pi_0 + m$, where $m \geqslant 0$ is earnings inflation. The CEO's compensation depends on the reported performance: $S = s_0 + s_1\pi$, where $s_0 \geqslant 0$ is the fixed component of salary, and $s_1 \in (0, 1)$ stands for the pay-performance sensitivity. The CEO suffers a convex disutility, $c_1\pi_0^2/2$, to generate actual performance, where $c_1 > 0$.

Distortion of earnings information is not cost free. First, accelerating the recognition of future cash flows to boost current earnings will increase the difficulty of meeting performance targets in the future (e.g., Baber, Kang, and Li, 2011; Barton and Simko, 2002). Second, aggressive manipulation of earnings can lead to misconduct and even fraud, and the CEO will face severe punishments if such actions are detected and deemed unacceptable by monitoring authorities, such as the board of directors, audit committee, and regulators. In fact, Hazarika, Karpoff, and Nahata (2012) find that a higher degree of earnings management leads to more incidences of forced CEO turnover.

We model the cost of earnings inflation via its impact on the probability of ex post CEO dismissal. Ex ante, the CEO faces a dismissal hazard index h. Ex post, the probability of CEO dismissal is $F(h - a\pi + bm^2/2)$, where $a > 0$ and $b > 0$ are two constant coefficients. We assume that the cumulative distribution function $F(\cdot)$ is continuous, increasing, and twice differentiable. Here, h is not a probability but an increasing transformation of ex ante dismissal hazard: Before the CEO engages in any action to generate firm performance or manipulate the reporting, he or she faces an ex ante dismissal probability $F(h)$. The specification of $F(\cdot)$ encompasses the

[6] Sloan (1996) finds that managers can temporarily boost their firms' stock price by inflating current earnings using aggressive accruals assumptions. Beneish and Vargus (2002) find that abnormally high accruals are associated with insider sales of shares. Moreover, Bergstresser and Philippon (2006) and Cheng and Warfield (2005) document that earnings management is more prevalent in firms where managers' wealth is more closely tied to stock price, most notably via equity compensation.

dynamics of CEO job security and the determining factors of the evolution. The ex post dismissal probability increases when ex ante dismissal hazard becomes higher and when the reported performance is lower. Earnings inflation has two opposing effects on the probability of ex post CEO dismissal: On the one hand, it increases the reported performance, which lowers the ex post CEO dismissal probability; on the other hand, the manipulation increases the difficulty of the firm's future operation and increases the likelihood of fraud or misconduct, which in turn increases the likelihood of CEO dismissal ex post. We assume the latter effect to be convex. That is, it is stronger when earnings are more overreported. Lastly, the CEO faces a substantial loss $c_2 > 0$ if dismissed.[7]

In this model, effort and earnings inflation are substitutes. The CEO chooses the pair (π_0, m) to maximize self-utility, given the benefits and costs of effort and earnings inflation discussed above.[8] Based on the aforementioned assumptions, the CEO's utility is given as:

$$U = s_0 + s_1(\pi_0 + m) - \frac{1}{2}c_1\pi_0^2 - c_2 F\left(h - a\pi + \frac{1}{2}bm^2\right). \tag{1}$$

The CEO's choices of effort and earnings inflation are determined by the first-order conditions:

$$\frac{\partial U}{\partial \pi_0} = s_1 - c_1\pi_0 + ac_2 f = 0, \tag{2a}$$

$$\frac{\partial U}{\partial m} = s_1 + (a - bm)c_2 f = 0, \tag{2b}$$

[7]Using an early sample (1974-1986), Jensen and Murphy (1990) estimate the loss of compensation and wealth for a dismissed CEO to range from hundreds of thousands to millions of dollars. This number ought to be much larger in recent years given the surge in CEO compensation. Eckbo, Thorburn, and Wang (2016) show that the present value of compensation losses for the CEO of a bankrupt company who drops out from the executive labor market can be as high as $7 million (or five times the CEO's pre-departure annual compensation). In addition, a dismissed CEO may lose substantial unexercised stock options (Dahiya and Yermack, 2008). These estimates do not even count reputational damage and the associated losses. Had a CEO not been fired, he could have had ample opportunities to serve as corporate director after retirement (Brickley, Linck, and Coles, 1999).

[8]In reality, the benefits and costs of earnings manipulation vary with the degree of monitoring and discipline. Klein (2002) shows that audit committee independence is related to a lower magnitude of discretionary accruals. Xie, Davidson, and DaDalt (2003) find that the sophistication and financial expertise of board and audit committee members are important in constraining discretionary accruals. They also find that a higher frequency of board and audit committee meetings is associated with less earnings management. Cornett, Marcus, and Tehranian (2008) show that earnings management through discretionary accruals is less when there is more monitoring of managerial discretion from sources such as institutions that own large blocks of shares, institutional representation on the board, and independent outside directors. Here, we focus on a representative model to demonstrate the effects of CEO job security on earnings inflation and discuss the robustness of these effects with respect to various monitoring mechanisms later in the empirical section.

where $f = f(h - a\pi + bm^2/2)$ and $f(\cdot) = F'(\cdot) > 0$. The first-order condition for effort (2a) indicates that an increase in π_0 can boost the compensation (s_1) and reduce the costs of being dismissed by lowering the ex post dismissal probability ($ac_2 f$); however, an increase in π_0 also increases the disutility ($c_1\pi_0$). Therefore, the CEO chooses π_0 so that the marginal benefits equal the marginal costs. Likewise, the CEO weighs the benefits of more compensation and the costs from the heightened ex post dismissal probability when determining earnings inflation.

Two implications can be derived from the first-order condition regarding earnings inflation (i.e., eq. (2b)). First, since s_1, c_2, and f are all positive, the existence of the solution for earnings inflation requires $a - bm < 0$, which means that the degree of earnings inflation is non-zero $m > a/b$. Second, however, earnings inflation is constrained by the threat of ex post dismissal. This is because, above a certain level (i.e., a/b), additional earnings inflation will lead to an increased probability of ex post dismissal (i.e., $-(a - bm)f > 0$), which curtails the degree of earnings inflation. Without the threat of ex post dismissal that balances the benefit from the increased compensation, the CEO will overreport earnings indefinitely.

We are interested in knowing how the ex ante job security affects the CEO's choices of effort and earnings inflation. Further derivation based on the first-order conditions implies the following comparative statics:

$$\frac{\partial \pi_0}{\partial h} = \frac{abc_2^2 f f'}{a^2 bc_2^2 f f' + bc_1 c_2 f + c_1 c_2 (a - bm)^2 f'}, \tag{3a}$$

$$\frac{\partial m}{\partial h} = \frac{c_1 c_2 (a - bm) f'}{a^2 bc_2^2 f f' + bc_1 c_2 f + c_1 c_2 (a - bm)^2 f'}, \tag{3b}$$

where $f' = f'(h - a\pi + bm^2/2)$. We can derive a few observations from the above comparative statics. Above all, given the positivity of a, b, c_1, c_2, and f, it is sufficient to show $\partial\pi_0/\partial h > 0$ and $\partial m/\partial h < 0$ when $f' > 0$. The intuition can be obtained from the first-order conditions. At the CEO's optimal choice of (π_0, m), suppose that a shock increases ex ante dismissal hazard. The CEO will adjust the choices of π_0 and m in response to this shock. Based on the first-order condition regarding effort (2a), when $f' > 0$, the CEO can increase the marginal benefits by increasing π_0 (i.e., $ac_2 f' > 0$) to offset the negative impact from increased dismissal hazard on utility. Similarly, based on the first-order condition regarding earnings inflation (2b), when

$f' > 0$, the CEO should avoid further overreporting earnings since the overall effect of m on the ex post dismissal probability is positive (i.e., $bm - a > 0$). Simply speaking, when $f' > 0$, the curtailing effect discussed above is stronger, so the benefits from undertaking additional earnings inflation as a response to increased ex ante dismissal hazard are smaller than the costs resulting from the increased ex post dismissal probability. In this case, the CEO turns to improving actual performance to alleviate job security concerns.

When is f' positive? Note that $f(\cdot)$ is a probability density function. Assume that the distribution is single-modal. Then f' is positive when $x = h - a\pi + bm^2/2$ is below its mode, that is, when the implied ex post dismissal probability is mild. In reality, CEOs are rarely fired, with an observed CEO dismissal rate lower than 5% (Huson, Parrino, and Starks, 2001; Kaplan and Minton, 2012; Taylor, 2010). Therefore, in normal scenarios, the condition for a positive f' holds, so the increase of dismissal hazard (h) encourages the CEO to exert effort (i.e., $\partial\pi_0/\partial h > 0$) and deters earnings inflation (i.e., $\partial m/\partial h < 0$). We call this effect the *disciplinary effect*.

Can $\partial m/\partial h$ be negative? Yes, but it requires f' to be negative and the denominator of the comparative statics, (3a) and (3b), to be positive. In other words, a necessary condition for dismissal hazard to motivate a higher degree of earnings inflation is that the implied ex post dismissal probability is high enough (i.e., x must be above the mode of the distribution). Intuitively, when dismissal hazard is already so high that it requires a considerable amount of effort to turn the situation around, the CEO will have a strong incentive to overreport earnings. We call this effect the *opportunistic effect*. Note that a negative f' does not ensure the prevalence of the opportunistic effect because it also requires a positive denominator in the first-order conditions. Therefore, the disciplinary effect is likely to be the dominant force in most scenarios.

To facilitate understanding of these mechanisms, we solve the model numerically with a plausible calibration of the parameters. Fig. 1(a) shows the CEO's optimal choices of effort and earnings inflation with respect to various levels of CEO dismissal hazard, and Fig. 1(b) shows the corresponding comparative statics (i.e., Eqs. (3a) and (3b)). Consistent with the discussion above, earnings inflation decreases with CEO dismissal hazard (i.e., discipline) in most cases, and this relation reverses (i.e., opportunism) only when CEO dismissal hazard becomes extremely large.[9]

[9] In this calibration, the admissible range of CEO dismissal hazard caps at around one, the right end of the figures' horizontal axis. The upper-bound of the admissible range of hazard in the second calibration discussed subsequently

And, as shown in Fig. 1(b), the implied ex post dismissal probability is extremely high for the latter cases.

The opportunistic effect does not necessarily dominate even when CEO dismissal hazard is very high. We present a second calibration of the model in Fig. 1(c) and Fig. 1(d), where earnings inflation remains negatively related to CEO dismissal hazard over its entire admissible support. The main difference from the previous calibration is that the second features a greater threat of ex post dismissal. Intuitively, when future consequences of earnings manipulation are vital, the disciplinary effect dominates the opportunistic effect in all scenarios. Accordingly, the managerial effort is higher, earnings inflation is lower, and the implied ex post dismissal probability is significantly lower than the respective ones in the first calibration. However, despite the situational prevalence of the opportunistic effect, one feature is common between the two calibrations. That is, the disciplinary effect (i.e., negative $\partial m/\partial h$) weakens when CEO dismissal hazard increases, especially in its high-value range.

Given the above discussion, we expect the disciplinary effect to dominate in the observed data, whereas the opportunistic effect may play an important role in a small group of cases where CEO dismissal hazard is extremely high. We hence can summarize the above discussion in the following testable hypotheses.

Hypothesis 1a. (Discipline Hypothesis) *On average, the threat to job security has a disciplinary effect that motivates a CEO to reduce earnings inflation.*

Hypothesis 1b. (Opportunism Hypothesis) *The disciplinary effect is weakened when CEO dismissal hazard increases. When the threat becomes imminent, the continued increase of dismissal hazard may entice a CEO to increase earnings inflation.*

In reality, both disciplinary and opportunistic motives exist. This paper aims to empirically examine: (a) which effect dominates on average, and (b) under what circumstances either of the two effects plays a prevailing role.

Although the model is set up in a context of earnings reporting (i.e., accrual-based earning inflation), the ideas also apply to real-activity-based manipulation. For example, the CEO

is close to one, too. This similarity is helpful for the comparison of the calibrations.

can distort firm decisions to increase the current performance π by m, which increases his or her compensation and lowers the ex post dismissal probability attributed to the current performance. However, this distortion makes future operation more difficult, lowering long-term performance and increasing future dismissal likelihood. Later, our empirical analysis indeed shows qualitatively similar results for accrual-based and real-activity-based earnings inflation.

3 Data

3.1 Sample Description

Our main sample includes all firms from the Compustat Executive Compensation (ExecuComp) database for the period 1993 to 2011. We identify forced CEO turnovers based on the classification method of Parrino (1997). Specifically, for each record of CEO turnover in the ExecuComp database, we search through Google and Factiva for the reason. A CEO departure is classified as a forced turnover if the indicated reason is described as policy differences with the board, being forced out or fired, and resignation due to weak performance or fraud. In addition, for CEOs younger than the age of sixty, we also classify a turnover as forced if either we do not find the reason as death, poor health, or acceptance of another position, or the CEO is reported to be retiring with no announcement at least six months prior to the departure. Following prior literature, we exclude CEO turnovers associated with bankruptcies, mergers, and spin-offs. In this study, job termination is only triggered by a forced CEO turnover, while voluntary CEO departure is treated as a truncation of the job duration.

In order to estimate CEO dismissal hazard, we further require firms to have stock return information from the Center for Research in Security Prices (CRSP) and board information from the Institutional Shareholder Services (ISS, formerly RiskMetrics). After imposing these restrictions, we end up with a sample of 16,148 firm-year observations.

We merge the sample with Compustat to study earnings inflation. This results in a sample of 13,790 observations, in which 6,227 firm-years have positive discretionary accruals. For extended analysis of earnings inflation based on real earnings management, we require additional Compustat information to calculate abnormal production costs and abnormal discretionary expenses.

This further reduces the sample size to 12,873 firm-year observations.

As for control variables, we retrieve firms' financial information from Compustat, analyst information from the Institutional Brokers' Estimate System (I/B/E/S), and institutional investor information from the Thomson Reuters database. The definitions of the variables are provided in Table A.1 of Appendix A. Summary statistics of the main variables are reported in Table 1, which are comparable to those in prior literature.

3.2 Measure of CEO Job Security

We measure CEO job security using the hazard of forced CEO turnover ("hazard" in short). Since hazard is not observed, we estimate it based on survival analysis of the CEO job duration. To perform the estimation, we assume that CEO job duration follows a distribution that is characterized by a Weibull hazard function:

$$h^t_{t-1}(\tau_{i,t-1}, x_{i,t-1}) = p\tau^{p-1}_{i,t-1} \exp(\delta' x_{i,t-1}), \tag{4}$$

where h^t_{t-1} is hazard, determined by a baseline hazard function $h_0(\tau) = p\tau^{p-1}$ and a set of covariates x; τ is CEO job duration; p is an auxiliary parameter that controls the shape of the baseline hazard; and δ is the coefficients of the covariates. h^t_{t-1} is an appropriate proxy for the likelihood of job termination during year t given that the CEO survives in the position as of year $t-1$. Therefore, we can use it to measure CEO job insecurity at the beginning of year t. The baseline hazard function only depends on job duration τ and represents the natural evolution of hazard over time. We choose the Weibull model because it allows a flexible baseline hazard: $h_0(\tau)$ is increasing in τ when $p > 1$, decreasing when $p < 1$, and constant when $p = 1$. For a robustness check, in Section 5.2, we repeat survival analysis based on various alternative models and estimate hazard accordingly; the implied results are qualitatively similar.

We allow hazard to depend on certain firm and CEO characteristics. The most important determinant of hazard is firm performance. Prior literature finds that CEOs are more likely to be replaced following poor performance (Jenter and Lewellen, 2020). Jenter and Kanaan (2015) find that a CEO who is close to retirement and who owns a large share of the firm's stock is less likely to be fired. We therefore include two dummy variables that indicate whether the CEO is at the retirement age (between 63 and 66 years old) and whether the CEO owns more than 5% of the firm's stock. In addition, forced CEO turnover is affected by internal corporate governance structures. With the same performance, the CEO faces a higher dismissal risk when the evaluation and discipline are more stringent. We hence control for two continuous variables describing board structure (board size and independence) and one dummy variable that indicates whether the CEO is also the chairman of the board (i.e., CEO-chairman duality).

We report the results of survival analysis in Table 2, Panel A. In the baseline specification (column (1)), we use stock return as the proxy for firm performance, which is commonly used in the study of CEO turnovers. Consistent with prior literature, good stock performance significantly reduces CEO dismissal hazard. We also find that CEOs at the retirement age, with more than 5% of the firm's stock, and serving as board chairmen are indeed less likely to be fired. However, board structures do not significantly affect CEO dismissal hazard. One possible reason is that these board attributes may simultaneously impose opposing effects on forced CEO turnover.[10] The estimated Weibull auxiliary parameter, p, is smaller than one, indicating a decreasing pattern of the baseline hazard over CEO job duration. Panel B of Table 2 reports the summary statics of the estimated hazard.[11] Hazard exhibits a strong positive skewness. This is mainly because forced CEO turnovers are rare events in the data.

To address the concern of biases in the estimation of hazard because of mismeasurement of firm performance, we adopt alternative measures of firm performance in survival analysis, as shown in columns (2) and (3) of Table 2. In Section 5.1, we show that our results are robust to performance measures in hazard estimation.

3.3 Measures of Earnings Inflation

Accrual-based accounting, which allows a discrepancy between reported and cash-based financial reporting, has been criticized as being the backdoor of managerial manipulation. Therefore,

[10] Taking board size as an example, on the one hand, a larger board can have more resources and manpower that help oversee the management more closely (e.g., Coles, Daniel, and Naveen, 2008); on the other hand, a larger board may also be subject to the coordination difficulty and suffer the free-rider problem (e.g., Yermack, 1996).

[11] It is important to note that hazard is not a well-defined probability, so it should not be directly assessed based on the normal probability metric, which is bounded by zero and one.

discretionary accruals are often used as a measure of earnings management (Dechow, Ge, and Schrand, 2010; Healy and Wahlen, 1999). The magnitude of discretionary accruals manifests the extent to which earnings information is manipulated, and its sign indicates the direction of earnings management.

Though the reported earnings can be either overreported or underreported, the former is more relevant in the context of CEO job security. Therefore, this paper focuses on earnings inflation and adopts positive discretionary accruals as its primary measure. For convenience, we use the abbreviation "DA" to stand for discretionary accruals hereinafter.

There are a handful of methods to estimate DA (see the review by Dechow, Ge, and Schrand, 2010). Since this paper studies the effects of CEO job security, and firm performance is one important determinant of CEO dismissal hazard, we follow Kothari, Leone, and Wasley (2005) to estimate the performance-adjusted DA as the primary measure of earnings manipulation. In Section 5.3, we show that our results are robust for the modified Jones model (Dechow, Sloan, and Sweeney, 1995), another popular method of DA estimation.

Corporate managers can also manipulate real activities to avoid reporting unfavorable performance without bending accounting rules. For example, Roychowdhury (2006) finds that managers can temporarily boost sales by offering large price discounts and lenient credit terms, lower the average cost of goods sold by overproduction, and improve profit margin by reducing discretionary expenditures such as R&D and advertising expenses. In extended analysis presented in Section 4.3, we measure earnings inflation based on the real-activity manipulation to investigate the effects of CEO job security.

The estimation details of the performance-adjusted DA, the DA based on the modified Jones model, and the measures of the real-activity-based earnings manipulation are provided in Appendix B. Their summary statistics are reported in Table 1.

4 Empirical Analysis

4.1 Effect of CEO Job Security on Earnings Inflation

We begin the examination of the relation between CEO job security and earnings inflation with simple univariate analysis. In Table 3, we show that CEO dismissal hazard is negatively correlated with the subsequent DA and the correlation is statistically significant at the 1% level. It is worth noting that this relation is driven by positive DA: the correlation between hazard and positive DA is negative and statistically significant, while that between hazard and negative DA is small and insignificant. The results hence suggest that on average, the disciplinary effect governs the relation between CEO job security and earnings inflation.

A caveat about univariate analysis is that it ignores the effects of other attributes. In fact, Table 3 shows that DA, positive DA, and negative DA are all highly correlated with other variables, such as firm size, leverage, market-to-book (M/B), ROA, analyst coverage, and others. More importantly, these variables are also correlated with hazard. Therefore, in the absence of control for these covariates, the relation between CEO job security and earnings inflation may be spurious. To address this problem, we estimate the following multivariate regression:

$$EM_{i,t} = \alpha_0 + \alpha_1 h^t_{i,t-1} + \beta' z_{i,t-1} + \alpha_j + \alpha_t + \varepsilon_{i,t}, \tag{5}$$

where $EM_{i,t}$ is earnings manipulation in year t measured by either DA, positive DA, or negative DA; $h^t_{i,t-1}$ is CEO job hazard measured at the beginning of year t (i.e., the end of year $t-1$); and $z_{i,t-1}$ is a vector of covariates including firm and CEO characteristics, such as firm size, firm age, leverage, and M/B. Because profitability affects managerial incentives to alter financial information, we further control for firm performance measures, including ROA, sales growth, and operating cash flow. We also control for a set of variables related to analysts, auditors, and institutional investors, since these disciplines can restrict earnings manipulation. In addition, we control for the variables related to internal disciplines, such as CEO-chairman duality, board size, and board independence. Finally, we control for industry and year fixed effects (α_j and α_t) to mitigate the potential concerns about the omitted related variables that are invariant either in a specific industry or in a specific year.

For all analyses hereinafter, we winsorize the top and bottom one percent of all the continuous variables to control the influence of outliers, and we cluster the standard errors of the regression coefficients at the firm-CEO pair level. Since hazard is estimated, it may introduce sampling noise in the estimated standard errors (and t-statistics) of the coefficients. We thus adopt a bootstrap method to address this issue. Specifically, we randomly draw 200 sets of the coefficients of CEO job survival analysis from their asymptotic distribution and calculate hazard accordingly. Then we run regression (5) with hazard replaced by the simulated ones. The bootstrapped t-statistics are the average of those from the 200 regressions.[12]

We present the baseline results in Table 4. First, we examine the relation between hazard and DA using an ordinary least squares (OLS) regression. The results show that after controlling for a multitude of covariates, hazard exhibits a negative association with DA, and the coefficient is statistically significant (t-statistic $= -3.21$). Next, we run the OLS regression for positive and negative DA, respectively. The coefficient of hazard in the regression of positive DA is negative and statistically significant (t-statistic $= -2.65$). In contrast, the coefficient of hazard in the regression of negative DA is much smaller in magnitude and statistically insignificant (t-statistic $= -1.03$). These results are consistent with the findings of univariate analysis.

The coefficients from the OLS regression may be biased in the subsamples,[13] so we use truncated regression to correct the truncation biases. The results are reported in the last two columns of Table 4. The findings are qualitatively similar to those from the OLS regressions. That is, hazard is negatively associated with positive DA (t-statistic $= -2.83$). To further assess the economic significance, we compute the change in positive DA corresponding to a shift of hazard from its 25th to 75th percentile, holding the covariates at their means in the positive-DA subsample. We find that positive DA decreases by 53% of its magnitude at the sample mean.[14] As for the truncated regression of negative DA, the coefficient of hazard is again statistically and economically

[12] Without the bootstrap adjustment, the results are both qualitatively and quantitatively similar. We choose to present the bootstrapped results for its rigor. The number of random draws in the bootstrap does not make material difference to the results either.

[13] In the positive-DA subsample, $E[\varepsilon_{i,t}|DA_{i,t} > 0, h^t_{i,t-1}, z_{i,t-1}]$ is in general nonzero given $E[\varepsilon_{i,t}|h^t_{i,t-1}, z_{i,t-1}] = 0$. The same applies to the negative-DA subsample.

[14] In the positive-DA subsample, the 25th and 75th percentiles of hazard are 0.0090 and 0.0225, respectively. Given the coefficient of hazard, -1.5549, from the truncated regression of positive DA, the change in positive DA following a shift in hazard from its 25th to 75th percentile is equal to $(0.0225 - 0.0090) \times (-1.5549) = -0.0210$, implying an approximately 53% reduction of DA from its mean in the positive-DA subsample, 0.04.

insignificant (t-statistic $= -0.69$). The overall results suggest a negative relation between hazard and the degree of earnings inflation, consistent with the discipline hypothesis.

These findings also confirm our intuition that earnings inflation is more relevant in the context of job security concerns, and firms underreport performance mainly to build a cushion for the future (i.e., "big bath"), especially when a new CEO assumes the position. Therefore, we will only study earnings inflation in the remainder of this paper.

Regarding the control variables, consistent with the literature (e.g., Ali and Zhang, 2015; Watts and Zimmerman, 1986), the coefficient of firm size is significantly negative for DA and positive DA, and it is significantly positive for negative DA, suggesting that larger firms are subject to greater political costs and thus inflate earnings less. In consonance with the argument that growth firms are more likely to overreport earnings to meet or beat the benchmarks (Frankel, Johnson, and Nelson, 2002), the coefficient on M/B is significantly positive for positive DA. Meanwhile, we find that the coefficient of M/B is also significantly negative for negative DA. In a similar vein, the coefficient of firm age is significantly negative for positive DA but positive for negative DA. Lastly, we find that the coefficient of board independence in the regression of positive DA is negative and statistically significant, suggesting that an independent board helps restrain earnings overreporting.

4.2 Identifying the Disciplinary Effect

The baseline regression shows a negative association between hazard and earnings inflation. However, we cannot rush to interpret it as the disciplinary effect. One potential concern is that some determinants (e.g., firm performance) in the hazard model also simultaneously affect the decision of earnings manipulation. We address this issue by controlling a few measures of firm performance in the baseline regression (as shown in Table 4). In addition, Hazarika, Karpoff, and Nahata (2012) show that earnings management results in more incidences of CEO dismissal. This leads to a second concern—our results may be driven by reverse causality. However, hazard is measured at the beginning of the year. Therefore, this concern is alleviated by proper matching of the timing of hazard and DA. Nevertheless, we implement the following additional tests to strengthen identification.

A. Instrumental Variables

First, we use CEO dismissals in the firm's two-digit SIC industry in the past two years as an instrumental variable (IV). A number of prior studies use industry-level characteristics as instrumental variables (e.g., Coles, Li, and Wang, 2018; Kale, Reis, and Venkateswaran, 2009). These IVs can measure the industry-level shocks that affect corporate decisions in the focal company. For example, the dismissal of a peer CEO may induce the focal company to inspect its CEO for potential issues, thus increasing the likelihood of CEO dismissal. As in the baseline regression, we include industry fixed effects to control for the concern that some common factors in the industry affect hazard and earnings inflation simultaneously through this instrumental variable.[15] We report the results of the first-stage estimation in column (1) of Table A.2 in Appendix C. Indeed, the industry-level CEO dismissal has a positive and statistically significant relation with the focal CEO's dismissal hazard. It is, however, unlikely to have a *direct* impact on the focal firm's earnings inflation after controlling for industry fixed effects. The second-stage results of the truncated regression of positive DA based on the hazard estimated using this instrumental variable are presented in column (1) of Table 5. We find that the coefficient of hazard remains negative and statistically significant (t-statistic $= -2.94$), which is both qualitatively and quantitatively similar to that from the baseline regression in column (4) of Table 4.

A second instrumental variable is the change in the state-level noncompete enforceability index. A noncompete clause is often included in employment contracts, restricting employees from competing with the employer for a specified period after employment termination. These agreements lower the firing costs of employers by alleviating concern about the leakage of business secrets and upfront competition from departing employees. Therefore, noncompete agreements make firms more willing to dismiss an employee. In practice, however, the effect of the noncompete agreements relies on the enforceability within the jurisdiction, which is governed by the state courts. Garmaise (2011) constructs an index to measure the state-level enforceability

[15] A valid instrument has to satisfy the following two conditions (Larcker and Rusticus, 2010; Roberts and Whited, 2013): (a) it is correlated with CEO dismissal hazard (the relevance condition), and (b) it is not directly related to earnings inflation other than through the hypothesized channel conditional on the full set of control variables (the exclusion condition). Including industry fixed effects in the control variables filters the correlation between earnings inflation and the industry-level CEO dismissal intensity since such a correlation is mainly driven by industry-specific characteristics.

of noncompete agreements for the period from 1992 to 2004, and Kini, Williams, and Yin (2018) update the index through 2014 closely following his methodology. An increase (decrease) of the noncompete enforceability strengthens (weakens) the effect of noncompete agreements and hence increases (decreases) dismissal hazard, ceteris paribus. More importantly, the change in noncompete enforceability should be exogenous to corporate policies of individual firms.

We hence use the change in the noncompete enforceability index as an instrumental variable in the estimation of CEO dismissal hazard. The results are reported in column (2) of Table A.2. As expected, it is positively correlated with CEO dismissal hazard and the effect is statistically significant. In addition, the instrumented hazard exhibits a negative and statistically significant correlation with earnings inflation (column (2) of Table 5, t-statistic $= -1.74$), with a magnitude even greater than that in the baseline regression.

B. Alternative Measures of Dismissal Risk

Industry-level measures are less subject to firm-level endogeneity, especially after controlling for industry and year fixed effects. For example, Agrawal and Knoeber (1998) use the mergers and acquisitions intensity of a firm's industry to measure takeover threat. Therefore, we construct alternative measures of a CEO's dismissal risk based on CEO dismissal intensity in the firm's industry. As shown above, industry-level CEO dismissal intensity is positively associated with CEO dismissal hazard in the focal firm. Therefore, it is a suitable proxy.

The first measure is CEO dismissal intensity of the firm's two-digit SIC industry in the previous year, computed as the number of CEO dismissals divided by the total number of CEOs in the industry. As shown in column (1) of Table 6, the coefficient of this proxy is indeed negative and statistically significant (t-statistic $= -1.68$) in the regression of positive DA.

It is possible that the spillover effect of a peer dismissal strengthens with the tenure of the ousted CEO. That is, the dismissal of a senior CEO has greater influence than that of a junior CEO. With the tenure-weighted industry-level intensity of CEO dismissals as a proxy, we find a negative and statistically significant relation (t-statistic $= -1.68$) between CEO dismissal risk and positive DA (see column (2) of Table 6). It is also likely that firms need time to digest the information from a peer dismissal. In columns (3) to (6) of Table 6, we further measure

CEO dismissal risk using the average of the industry-level dismissal intensity for the previous three years, the average of the tenure-weighted industry-level dismissal intensity for the past three years, the inverse-time-weighted average of the industry-level dismissal intensity for the past three years,[16] and the inverse-time-weighted average of the tenure-weighted industry-level intensity for the past three years, respectively. For all these specifications, we consistently find a negative and significant relation between CEO dismissal risk and positive DA.

C. Effect of Dismissal Hazard in Subsamples

Our results so far show that hazard has a negative relation with earnings inflation, suggesting that the discipline hypothesis is prominent. However, in addition to the threat of forced CEO turnover, other corporate governance mechanisms also discourage managers from manipulating earnings. Thus, we conjecture that the main effect documented above would be more pronounced where other governance mechanisms are weaker. To help strengthen the identification, we conduct subsample analysis based on alternative measures of corporate governance. Specifically, we focus on external corporate governance mechanisms, since internal ones (e.g., board structures) are likely to be endogenous to CEO dismissal hazard.

Large firms often draw more attention from the media and are followed by more analysts. Miller (2006) and Blankespoor, Miller, and White (2014) suggest that investors have a low-cost access to information on highly visible firms (usually large firms) because these firms tend to receive broad news coverage. Therefore, we expect that large firms are more subject to external monitoring than small ones. Following this idea, we consider two subsamples of firms whose size is above and below the median value of their industry in the year. We then repeat the baseline regression of positive DA on hazard in each subsample. The results are in Table 7, Panel A. Consistent with our expectation, the coefficient of hazard is negative and statistically significant (t-statistic $= -2.79$) in the subsample of small firms, while it is small and statistically insignificant (t-statistic $= -1.01$) in the subsample of large firms.

The previous research suggests that financial analysts play an external monitoring role. For example, Yu (2008) finds that firms with a high analyst coverage engage less in opportunistic

[16] We assign a higher weight to an incidence that is closer in time and a lower weight to an incidence that is far away because the influence of peer dismissals fades out when time elapses.

earnings management. In Panel B of Table 7, we repeat the baseline regression of positive DA in two subsamples based on the number of financial analysts who follow the firm. We find that the coefficient of hazard is significantly negative (t-statistic $= -2.75$) in the subsample of firms with the least coverage of financial analysts, while the coefficient of hazard in the other subsample is small and statistically insignificant (t-statistic $= -0.58$).

Product market competition can serve as an external governance mechanism that mitigates the incentive misalignment between managers and shareholders. Giroud and Mueller (2010, 2011) find that the superior return for firms with fewer antitakeover provisions documented by Gompers, Ishii, and Metrick (2003) exists only in concentrated industries, suggesting that product market competition can substitute other corporate governance mechanisms in disciplining the manager. To properly characterize product market competition, we use the Herfindahl (1950) and Hirschman (1945) index (HHI) of sales in the text-based network (TNIC) industries (Hoberg and Phillips, 2010, 2016) to measure concentration of industries.[17] We repeat the baseline regression of positive DA for the subsamples of the firms whose TNIC industry's sales HHI is above or below the median sales HHI in the year. The results, shown in Panel C of Table 7, indicate that the coefficient of hazard is negative in both subsamples but is statistically significant (t-statistic $= -2.54$) only in the subsample of firms operating in concentrated industries, where the sales HHI is high. Thus, this finding indicates a disciplinary effect of CEO job security.

The prior studies find that institutional investors play an important role in monitoring managers (e.g., Agrawal and Mandelker, 1990; Brickley, Lease, and Smith Jr., 1988; Demsetz, 1983; Shleifer and Vishny, 1986). Therefore, we expect the effect of CEO dismissal hazard on earnings inflation to be more pronounced in the subsample with lower institutional ownership. The results presented in Panel D of Table 7 confirms this conjecture. That is, the coefficient of hazard is negative and statistically significant (t-statistic $= -2.83$) only in the subsample where institutional ownership is low.

[17] The TNIC industries are classified using the firm pairwise similarity from textual analysis of the firms' 10-K product descriptions. Hoberg and Phillips (2010, 2016) show that the TNIC industry classifications are more accurate than the traditional fixed industry classifications (e.g., SIC) in capturing a firm's competitive environment in the product market.

4.3 Earnings Management Based on Real Activities

Accrual-based earnings manipulation is not the only way in which managers can mislead shareholders. Roychowdhury (2006) document that managers can distort real activities to boost the near-term firm performance at the expense of long-run development. Specifically, firms can temporarily increase sales by offering large price discounts and lenient credit terms, cut average cost of goods sold by engaging in overproduction, and improve profit margin by reducing discretionary expenditures such as R&D and advertising expenses. A natural question is whether CEO job security has a similar disciplinary effect on earnings manipulation based on real activities.

Recent studies suggest that managers use real-activity-based and accrual-based earnings manipulation as substitutes. Graham, Harvey, and Rajgopal (2005) argue that managers prefer real earnings management because it is less likely to be detected or scrutinized by auditors and regulators. Consistent with this argument, Cohen, Dey, and Lys (2008) find that firms have shifted to real earnings management in the post-Sarbanes-Oxley Act (SOX) period because of the higher litigation risk imposed by regulators. Similarly, Cohen and Zarowin (2010) and Zang (2012) show that the choice of method for earnings management depends on the relative costs. Therefore, it is possible that the threat to CEO job security would exaggerate real earnings management because of the substitution effect.

We follow the literature (e.g., Cohen, Dey, and Lys, 2008; Cohen and Zarowin, 2010; Roychowdhury, 2006) to estimate abnormal production costs (Ab PROD) and abnormal discretionary expenses such as advertising, R&D, and SG&A (Ab DISCEXP) as the measures of real earnings management.[18] The construction of these two measures can be found in Appendix B. Firms that engage in real earnings management are likely to have either abnormally high production costs or abnormally low discretionary expenses. Therefore, if CEO job security has a disciplinary effect on real earnings management, then an increase in hazard should lead to a decrease in abnormal production costs and an increase in abnormal discretionary expenses.

We run the baseline regression (5) with *EM* substituted by either of the two measures of

[18] We do not study abnormal cash flows from operations because real activity manipulations have different effects on this item, as discussed by Roychowdhury (2006). Specifically, price discounts and overproduction decrease cash flows from operations, but cutting discretionary expenses increases them. The net effect is thus ambiguous. For the same reason, Zang (2012) also only examines abnormal production costs and abnormal discretionary expenses.

the aforementioned real earnings manipulations. Table 8 presents the estimation results, with column (1) for abnormal production costs and column (2) for abnormal discretionary expenses. Consistent with the discipline hypothesis, we find that the coefficient of hazard is significantly negative (t-statistic $= -2.09$) in the regression of abnormal production costs and significantly positive (t-statistic $= 1.82$) in the regression of abnormal discretionary expenses.

4.4 Understanding the Disciplinary Effect

The discipline hypothesis posits that a CEO exerts greater effort to improve firm performance rather than inflating earnings in response to deteriorating job security. Therefore, we expect better firm performance following a higher CEO dismissal hazard. We run the following regression to test this prediction:

$$PFM_{i,t} = \alpha_0 + \alpha_1 h_{i,t-1}^t + \alpha_2 PFM_{i,t-1} + \beta' w_{i,t-1} + \alpha_i + \alpha_t + \varepsilon_{i,t}, \tag{6}$$

where $PFM_{i,t}$ is a measure of firm performance, $w_{i,t-1}$ is a vector of firm and CEO characteristics that are related to firm performance, and α_i and α_t are firm and year fixed effects. Because performance measures tend to exhibit a strong serial correlation in annual frequency and firm performance affects CEO dismissal hazard, we include lagged firm performance as a control variable and use the Arellano and Bond (1991) approach to perform the linear dynamic panel-data regression.

We first consider the Tobin's Q of firm assets, which is the ratio between market value and book value of the firm's total assets. We use Tobin's Q as the primary measure of firm performance because it is stock market based and hence less subject to managerial manipulation. The results are in column (1) of Table 9. Consistent with the discipline hypothesis, we find that the coefficient of hazard is positive and statistically significant (t-statistic $= 12.38$).

In column (2) of Table 9, we use the annual stock return as a performance measure. Similarly, stock return is market based and less affected by managerial manipulation. In addition, stock return manifests the rate of change of the firm's market capitalization, which indicates the improvement of firm performance. We again find a positive and statistically significant coefficient

(t-statistic $= 5.13$) for hazard.

Firm performance is also often measured by accounting-based metrics, such as return on assets (ROA), albeit likely contaminated by earnings manipulation. Nevertheless, it is worth examining whether the relation between CEO job security and firm performance remains robust with respect to accounting performance measures. In column (3) of Table 9, we introduce corrected ROA as a performance measure, subtracting DA from raw ROA that is presumably "managed." Again, we find a positive and statistically significant coefficient (t-statistic $= 4.43$) for hazard.

4.5 Testing the Opportunism

So far, our empirical evidence strongly supports the discipline hypothesis. However, we cannot completely rule out the opportunistic motives. In fact, Guan, Wright, and Leikam (2005) find that CEOs who depart for non-routine reasons engage in more income-inflating earnings management in the year prior to the departure. Liu and Xuan (2014) document higher discretionary accruals for CEOs with fixed-term contracts around contract renewal years. Their evidence suggests that CEOs may behave opportunistically by undertaking earnings inflation when they face an immediate threat of job termination. In this section, we explore the opportunistic effect and separate it from the disciplinary effect.

Hypothesis 1b posits that the disciplinary effect weakens when CEO dismissal hazard is significantly high, and the opportunistic effect may even prevail if the threat becomes imminent. To test this hypothesis, we augment the baseline regression (5) with an interaction term between hazard and a dummy variable that indicates whether hazard is within the top P percent among the firms in the year, where we allow P to be respectively 50, 40, 30, 20, and 10 to demonstrate different degrees of the opportunistic effect when CEO job security varies. In the presence of the interaction term, the coefficient of hazard represents the average effect of CEO dismissal risk, and the coefficient of the interaction term shows the incremental effect when the threat of job termination is high. We expect the coefficient of hazard to remain negative, in line with the dominant disciplinary effect, but the coefficient of the interaction term to be positive, especially when P is low (i.e., when dismissal risk is high).

The results are presented in Table 10, Panel A. Consistent with our conjecture, the coefficient of hazard indeed remains negative and statistically significant after including the interaction term, suggesting the prevalence of the disciplinary effect. More importantly, the coefficient of the interaction term is mostly positive. This implies that, when CEO job security is poor, the continued increase in hazard weakens the disciplinary effect, indicating the opportunistic effect. The opportunistic effect becomes even stronger and statistically significant (t-statistic $= 2.18$) in the last column, where dismissal risk is significantly high (top 10 percent). This result is largely consistent with the findings of Guan, Wright, and Leikam (2005) and Liu and Xuan (2014), since their samples likely comprise CEOs whose dismissal hazard is among the top quantiles of the population.

Poor firm performance is the most important reason for forced CEO turnover. When firm performance deteriorates, the likelihood of CEO dismissal is high, and meanwhile, opportunistic earnings inflation becomes more likely. Thus, we augment the baseline regression (5) with an interaction term between hazard and a dummy variable that indicates whether the firm's stock return is within the bottom P percent among the firms in the year. We allow P to take the respective values of 10, 20, 30, 40, and 50 to show differences in the opportunistic effect when firm performance varies. We expect the coefficient of hazard to be negative but the coefficient of the interaction term to be positive, especially when P is small (i.e., when stock return is low).

The results reported in Panel B of Table 10 are consistent with our conjecture. While hazard has a negative effect on earnings inflation, this effect is weakened when stock return declines. The coefficient of the interaction term (i.e., the opportunistic effect) is positive, and especially in the first two columns where stock return is deeply inferior, it is large in magnitude and statistically significant.

In sum, our evidence suggests that both discipline and opportunism can be valid. However, the disciplinary effect is universal and dominant, while the opportunistic effect is local and is prominent only when a CEO faces a severe and immediate dismissal risk.

5 Robustness

In this section, we show that our results are robust to alternative performance measures, alternative methods for the estimation of CEO dismissal hazard, alternative measure of earnings inflation, the inclusion of additional control variables that may affect earnings inflation, and others.

5.1 Alternative Performance Measures

In the baseline analysis, CEO dismissal hazard is estimated using stock return to measure firm performance in survival analysis. One concern is that mismeasurement of firm performance can bias hazard estimation, which in turn leads to biases in the study of earnings inflation. To address this concern, we use alternative measures of firm performance in the estimation of hazard and find that our results are robust to the choices of performance measures.

Jenter and Kanaan (2015) show that forced CEO turnover is not only driven by the firm's own performance but also affected by industry performance. In column (2) of Table 2, we follow their method to decompose stock return into two components: the industry-induced stock return (the component of stock return predicted by the industry's average stock return) and the idiosyncratic stock return (i.e., the residual of the prediction regression). We then use these two stock-return components as the measures of firm performance in CEO job survival analysis. The results are in column (2) of Table 2. Indeed, both the industry-induced stock return and the idiosyncratic stock return are negatively associated with hazard. In Panel B of Table 2, we show that the distribution of hazard based on this specification is qualitatively and quantitatively similar to that based on the baseline model. More importantly, when we use this alternative hazard in the regression of positive DA, its coefficient remains negative and statistically significant (t-statistic $= -2.28$), as shown in column (1) of Table 11.

Fee et al. (2018) challenge the robustness of the relation between the industry-induced stock return and forced CEO turnover. They claim that the results of Jenter and Kanaan (2015) are sensitive to the choice of data timing. Some other studies suggest using accounting measures (e.g., Engel, Haye, and Wang, 2003; Weisbach, 1988). Therefore, in column (3) of Table 2, we use stock return and ROA as performance measures and find that they are both negatively and significantly associated with hazard. The hazard estimated based on this specification also exhibits a similar distribution as the baseline (Panel B of Table 2), and its coefficient remains negative and statistically significant (t-statistic $= -1.68$) in the regression of positive DA (column (2) of Table 11).

5.2 Alternative Methods of Hazard Estimation

Another source of bias in the estimation of hazard is the choice of the model. In the baseline study, we estimate hazard based on survival analysis using the Weibull model. Below we show that our results are robust to various alternative methods of hazard estimation.

We first use the Gompertz model, another widely used model in survival analysis, in place of the Weibull model. Specifically, we assume a Gompertz hazard function: $h_{t-1}^{t}(\tau_{i,t-1}, x_{i,t-1}) = \exp(\gamma\tau_{i,t-1})\exp(\delta_0 + \delta' x_{i,t-1})$, where γ is an auxiliary parameter that controls the shape of the baseline hazard. The results of hazard estimation based on the Gompertz model are in column (1) of Table A.3, which are very similar to the baseline results. In the regression of positive DA (column (3) of Table 11), we continue to find a negative and statistically significant coefficient for the Gompertz hazard (t-statistic $= -2.77$).

Although parametric hazard models (such as Weibull and Gompertz) are flexible, they still depend on the assumptions of certain functional forms. Misspecification of the functional form may cause biases in the estimation. To address this concern, we follow Cox (1972) to assume a semiparametric model that leaves the baseline hazard unspecified: $h_{t-1}^{t}(\tau_{i,t-1}, x_{i,t-1}) = h_0(\tau_{i,t-1})\exp(\delta' x_{i,t-1})$, where $h_0(\tau)$ is a nonparametric baseline hazard function. The results of the Cox hazard estimation (column (2) of Table A.3) are similar to those of the baseline model. Because of the semiparametric functional form, we can only estimate the hazard ratio (i.e., relative hazard) that excludes the baseline hazard. However, since we control for CEO tenure in the regression of positive DA, the effect of the missing baseline hazard can be largely absorbed. In column (4) of Table 11, we use the estimated hazard ratio to proxy for CEO dismissal risk and find that the coefficient of the Cox hazard ratio is negative and statistically significant (t-statistic $= -3.02$) in the regression of positive DA, consistent with the baseline results. Since the baseline hazard is a function of CEO tenure only, this finding (i.e., similar results for the hazard ratio that does not include the baseline hazard) also alleviates the concern that the relation between hazard and earnings inflation may be driven by the fact that earnings manipulation varies with CEO tenure (Ali and Zhang, 2015).

One advantage of survival analysis is that it considers the evolution and path dependence of dismissal hazard over time, while other simpler methods (such as the Probit model and the linear probability model) treat the probability of job termination in different years indifferently. However, these simpler methods allow more flexible econometric specifications, such as fixed effects.[19] To check the robustness of our results, we also consider the probit and linear probability (OLS) models in the estimation of CEO dismissal risk (columns (3) and (4) of Table A.3). Using the estimated probability to proxy for CEO dismissal risk, we again find a negative and statistically significant coefficient in the regression of positive DA (column (5) and (6) of Table 11). To partly address the potential problem of neglecting hazard evolution over time, we control for CEO tenure in the probit and linear probability models (column (5) and (6) of Table A.3). The regressions of positive DA based on the probabilities estimated from these models exhibit very similar results (see columns (7) and (8) of Table 11).

Finally, forced CEO turnovers are rare in the data. Estimating the tails of the distribution of CEO dismissals using regular methods, like the ones we use, can lead to inaccurate estimates (King and Zeng, 2001). In fact, as shown in Panel B of Table A.3, the highest dismissal probability computed in the regular methods is not high enough,[20] which may cause some doubt about the credibility of the threat. To address this concern, we estimate the Probit model with a bias-reduced technique (i.e., the BRGLM algorithm designed by Staub (2017)). As shown in column (7) of Table A.3, the estimated probability based on this model has a very similar mean, 25th, 50th, and 75th percentiles, but its upper bound can reach about 0.8. More importantly, in the regression of positive DA, the coefficient of CEO dismissal risk estimated based on the bias-reduced probit model is negative and statistically significant (t-statistic $= -1.91$), consistent with

[19]Hazard regressions allow for certain heterogeneity in the coefficients (strata). However, the estimation may run into numerical difficulties (such as non-convergence) when the number of strata increases substantially. It is thus numerically infeasible to introduce the industry or firm strata in hazard regressions.

[20]The linear probability models do not guarantee an estimate of the dismissal probability within $(0, 1)$. We manually truncate the upper bound at one.

the baseline results. This also suggests that our findings are not driven by extreme values of CEO dismissal risk.

5.3 Alternative Measure of Earnings Inflation

Our primary measure of earnings manipulation is based on discretionary accruals that are model dependent. This leads to a concern about the robustness of our evidence with respect to the measure of earnings inflation. We hence adopt the modified Jones model (Dechow, Sloan, and Sweeney, 1995), a widely used method of constructing DA, to construct discretionary accruals.

Table 12 repeats the regressions in Table 4, whereas discretionary accruals are computed using the modified Jones model. The results are qualitatively very similar; only the coefficient of hazard becomes larger in magnitude and statistically more significant, especially for positive DA. The difference may be due to the fact that DA based on the modified Jones model is not adjusted for firm performance, but hazard is affected by firm performance. We also examine the opportunistic effect based on this measure of earnings inflation and find consistent results (see Table A.4 in Appendix D).

5.4 Other Concerns and Additional Controls

In this section, we provide evidence for the robustness of our results with respect to various concerns and additional control variables, including changes around CEO turnovers, reversal of earnings management, analyst forecast, the Sarbanes-Oxley Act, CEO overconfidence, compensation incentives, audit committee independence, other corporate governance measures, and controls for different fixed effects.

A. Changes Around CEO Turnovers

One may argue that our results can be driven by CEO turnovers. That is, following a high dismissal hazard, if the incumbent CEO departs, the new CEO may reduce the degree of earnings overreporting and even undertake income-deflating manipulation (i.e., “big bath"). This leads to a negative correlation between hazard and the subsequent positive DA. We deal with this concern by excluding the firm-year observations in which CEO turnover occurs. Column (1) of

Table 13 reports the results of the positive DA regression after excluding CEO turnover events. The coefficient of hazard remains negative and statistically significant (t-statistic $= -2.56$), and its magnitude is similar to that in the baseline regression. Therefore, our results are not driven by CEO turnovers.

B. Reversal of Earnings Management

Another bias may arise from the reversal of earnings management. Barton and Simko (2002) and Baber, Kang, and Li (2011) show that earnings management in prior periods may constrain the firm's ability to achieve earnings targets in the future. Meanwhile, Hazarika, Karpoff, and Nahata (2012) document a positive relation between earnings management and subsequent CEO dismissals. Therefore, the negative coefficient of hazard in the regression of positive DA may be due to the reversal of earnings management. To address this concern, we include two controls of past earnings management in the regression of positive DA. In column (2) of Table 13, we control for DA from the previous year; and in column (3), we include a dummy variable that equals one if DA is higher in the previous year and zero otherwise. We indeed find that the coefficients of these two additional controls are both negative and statistically significant, suggesting a reversal of earnings management. However, after controlling for the reversal of earnings management, the coefficients of hazard remain negative and statistically significant, with t-statistics of -2.74 and -2.82, respectively. Our results thus cannot be explained by the reversal of earnings management.

C. Analyst Forecast

A firm has stronger incentive to overreport earnings when it fails to meet analyst forecast, and this failure has an adverse effect on CEO job security. Thus, it may create a spurious correlation between hazard and positive DA if we do not control for whether the firm meets analyst forecast of earnings. However, this effect, if it exists, should only bias against our findings. Nonetheless, in column (4) of Table 13, we include a dummy variable that equals one if the firm meets analyst forecast of earnings and zero otherwise. The coefficient of this dummy variable is negative and statistically significant (t-statistic $= -1.65$), indicating that firms inflate earnings less if they already meet analyst forecast. More importantly, the coefficient of hazard remains negative, similar in magnitude to that in the baseline regression, and statistically significant (t-statistic $= -2.86$). Therefore, our results are robust to the issue of analyst forecast.

D. Sarbanes-Oxley Act

Cohen, Dey, and Lys (2008) show that accrual-based earnings management increased steadily until the passage of the Sarbanes-Oxley Act (SOX) in 2002 and then declined afterwards. Since our sample spans the pre- and post-SOX periods, one may be curious about how our results are affected by this legislation change. We augment the baseline regression by adding a dummy variable that equals one if the year is after 2001 and zero otherwise. Consistent with the findings of Cohen, Dey, and Lys (2008), we also find a negative coefficient for the SOX dummy (column (5) of Table 13), indicating that accrual-based earnings inflation indeed declines after the SOX. However, the coefficient of hazard is still negative and statistically significant (t-statistic $= -2.80$). Therefore, our results are not a SOX effect.

E. CEO Overconfidence

The turnover hazard perceived by a CEO may be different from that estimated by the econometrian. For example, an overconfident CEO may underestimate his own turnover hazard, and meanwhile the same CEO can undertake more earnings management (e.g., Hsieh, Bedard, and Johnstone, 2014). We use the Malmendier and Tate (2005) option-based measure for CEO overconfidence, following the construction method of Humphery-Jenner et al. (2016). In column (6) of Table 13, we control for both the measure of CEO overconfidence and its interaction with hazard to address potential biases due to this concern. We find that CEO overconfidence indeed has a positive relation with earnings overreporting. However, the coefficient of the interaction term is negative and statistically insignificant, suggesting that overconfidence does not cause a CEO to increase earnings inflation when job security weakens. More importantly, after controlling for CEO overconfidence, hazard continues to have a negative and statistically significant effect on earnings inflation (t-statistic $= -1.95$).

In untabulated tests, we also repeat the baseline regression with CEO and firm-CEO fixed effects to further address the concern of the CEO's subjective perception of dismissal risk. The results are similar to those from the baseline regression. Therefore, our results are not driven by the effect of CEO overconfidence or the subjective hazard perception.

F. Compensation Incentives

A CEO whose compensation is more sensitive to firm performance may have a stronger incentive to overreport earnings (Bergstresser and Philippon, 2006). In column (7) of Table 13, we control for CEO pay-performance sensitivity (delta) and CEO wealth sensitivity to stock volatility (vega), computed following the method of Coles, Daniel, and Naveen (2006). We find that a CEO with a higher delta tends to engage in more earnings inflation, and the coefficient of hazard remains negative and statistically significant (t-statistic $= -2.86$) in the regression of positive DA.

G. Audit Committee Independence

In the baseline regression, we include board independence as a control variable. However, one may argue that the audit committee matters more for the release of financial information. We thus control for audit committee independence (i.e., the proportion of independent members on the audit committee) in column (8) of Table 13, but we do not find a significant effect for it. However, after controlling for audit committee independence, the coefficient of hazard is still negative and statistically significant (t-statistic $= -2.76$) in the regression of positive DA.

H. Other Governance Measures

One may argue that other corporate governance mechanisms, such as the market of corporate control, could also have an impact on the firm's earnings manipulation decision. In columns (9) and (10) of Table 13, we control for the governance index (i.e., G-index of Gompers, Ishii, and Metrick, 2003) and the entrenchment index (i.e., E-index of Bebchuk, Cohen, and Ferrell, 2009), respectively. We do not find a significant effect for these indices. However, the coefficients of hazard remain significantly negative in the regression of positive DA, with t-statistics of -2.07 and -2.08, respectively.

I. Other Fixed Effects

We include industry and year fixed effects in the baseline regression to control for the effects of omitted determinants of earnings manipulation that are invariant in specific industries or in specific years. One potential concern is that some common factors may be both industry- and time-specific, and some may be firm-specific. In column (11) of Table 13, we include industry-by-year fixed effects, and in column (12) of the table, we control for firm fixed effects. With these alternative fixed effects, hazard continues to have a negative and statistically significant relation with earnings inflation (with t-statistics of -2.58 and -3.09, respectively). Therefore, our results are robust to alternative specifications of fixed effects.

In summary, our finding that hazard has a negative relation with earnings inflation is robust, supporting the prevalence of the disciplinary effect of CEO job security.

6 Conclusion

Forced CEO turnover is an important corporate governance mechanism, which imposes fierce penalty ex post to deter undesirable managerial actions ex ante. However, ousted CEOs incur significant losses, leading to the worry about side effects of the threat of CEO dismissal: when a CEO senses that the dismissal risk increases, he or she may undertake opportunistic behaviors such as manipulating financial reporting to defer or alleviate the threat. Such opportunism will undermine the effectiveness of forced CEO turnover as a corporate governance measure.

In this paper, we address this debate by empirically examining the relation between CEO job security and earnings inflation. Specifically, we test two plausible hypotheses: the discipline hypothesis, which predicts a lower degree of earnings inflation following an increase of CEO dismissal risk, and the opportunism hypothesis, which predicts a weakened disciplinary effect when dismissal hazard becomes significantly high. Using positive discretionary accruals as the primary measure of earnings inflation, we show that the disciplinary effect is prevalent, on average. We also find that the opportunistic effect emerges but only when managers face an immediate threat of job termination. Our results hence mitigate the concern about managerial opportunism implied by job insecurity and lend strong support to the notion that the threat of forced turnover can serve as an effective corporate governance mechanism to discipline managerial opportunistic behavior.

References

Agrawal, Anup and Charles R. Knoeber. 1998. "Managerial Compensation and the Threat of Takeover." *Journal of Financial Economics* 47 (2):219–239.

Agrawal, Anup and Gershon N. Mandelker. 1990. "Large Shareholders and the Monitoring of Managers: The Case of Antitakeover Charter Amendments." *Journal of Financial and Quantitative Analysis* 25 (2):143–161.

Ali, Ashiq and Weining Zhang. 2015. "CEO Tenure and Earnings Management." *Journal of Accounting and Economics* 59 (1):60–79.

Arellano, Manuel and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58 (2):277–297.

Baber, William R., Sok-Hyon Kang, and Ying Li. 2011. "Modeling Discretionary Accrual Reversal and the Balance Sheet as an Earnings Management Constraint." *The Accounting Review* 86 (4):1189–1212.

Baginski, Stephen P., John L. Campbell, Lisa A. Hinson, and David S. Koo. 2018. "Do Career Concerns Affect the Delay of Bad News Disclosure?" *The Accounting Review* 2 (93):61–95.

Barton, Jan and Paul J. Simko. 2002. "The Balance Sheet as an Earnings Management Constraint." *The Accounting Review* 77 (Supplement):1–27.

Bebchuk, Lucian, Alma Cohen, and Allen Ferrell. 2009. "What Matters in Corporate Governance?" *Review of Financial Studies* 22 (2):783–827.

Beneish, Messod D. and Mark E. Vargus. 2002. "Insider Trading, Earnings Quality, and Accrual Mispricing." *The Accounting Review* 77 (4):755–791.

Bergstresser, Daniel and Thomas Philippon. 2006. "CEO Incentives and Earnings Management." *Journal of Financial Economics* 80 (3):511–529.

Blankespoor, Elizabeth, Gregory S. Miller, and Hal D. White. 2014. "The Role of Dissemination in Market Liquidity: Evidence from Firms' Use of Twitter." *The Accounting Review* 89 (1):79–112.

Brickley, James A., Ronald C. Lease, and Clifford W. Smith Jr. 1988. "Ownership Structure and Voting on Antitakeover Amendments." *Journal of Financial Economics* 20 (January-March):267–291.

Brickley, James A., James S. Linck, and Jeffery L. Coles. 1999. "What Happens to CEOs after They Retire? New Evidence on Career Concerns, Horizon Problems, and CEO Incentives." *Journal of Financial Economics* 52 (3):341–377.

Cheng, Qiang and Terry D. Warfield. 2005. "Equity Incentives and Earnings Management." *The Accounting Review* 80 (2):411–476.

Cohen, Daniel A., Aiyesha Dey, and Thomas Z. Lys. 2008. "Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods." *The Accounting Review* 83 (3):757–787.

Cohen, Daniel A. and Paul Zarowin. 2010. "Accrual-Based and Real Earnings Management Activities around Seasoned Equity Offerings." *Journal of Accounting and Economics* 50 (1):2–19.

Coles, Jeffery L., Naveen D. Daniel, and Lalitha Naveen. 2008. "Boards: Does One Size Fit All?" *Journal of Financial Economics* 87 (2):329–356.

Coles, Jeffery L., Zhichuan Li, and Yan Wang. 2018. "Industry Tournament Incentives." *Review of Financial Studies* 31 (4):1418–1459.

Coles, Jeffrey L., Naveen D. Daniel, and Lalitha Naveen. 2006. "Managerial Incentives and Risk-Taking." *Journal of Financial Economics* 79 (2):431–468.

Cornett, Marcia Millon, Alan J. Marcus, and Hassan Tehranian. 2008. "Corporate Governance and Pay-for-Performance: The Impact of Earnings Management." *Journal of Financial Economics* 87 (2):357–373.

Cox, David. R. 1972. "Regression Models and Life Tables." *Journal of the Royal Statistical Society. Series B (Methodological)* 34 (2):187–220.

Cziraki, Peter and Moqi Xu. 2014. "CEO Job Security and Volatility." Working paper, University of Toronto and London School of Economics.

Dahiya, Sandeep and David Yermack. 2008. "You Can't Take It with You: Sunset Provisions for Equity Compensation when Managers Retire, Resign, or Die." *Journal of Corporate Finance* 14 (5):499–511.

Datta, Sudip, Mai Iskandar-Datta, and Singh Vivek. 2013. "Product Market Power, Industry Structure, and Corporate Earnings Management." *Journal of Banking & Finance* 37 (8):3273–3285.

Dechow, Patricia M., Weili Ge, and Catherine Schrand. 2010. "Understanding Earnings Quality: A Review of the Proxies, Their Determinants and Their Consequences." *Journal of Accounting and Economics* 50 (2-3):344–401.

Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. 1995. "Detecting Earnings Management." *The Accounting Review* 70 (2):193–225.

Demsetz, Harold. 1983. "The Structure of Ownership and the Theory of the Firm." *Journal of Law & Economics* 26 (2):375–390. Corporations and Private Property: A Conference Sponsored by the Hoover Institution.

Eckbo, B Espen, Karin S. Thorburn, and Wei Wang. 2016. "How Costly Is Corporate Bankruptcy for the CEO?" *Journal of Financial Economics* 121 (1):210–229.

Engel, Ellen, Rachel M. Haye, and Xie Wang. 2003. "CEO Turnover and Properties of Accounting Information." *Journal of Accounting and Economics* 36 (1-3):197–226.

Fee, C. Edward, Charles J. Hadlock, Jing Huang, and Joshua R. Pierce. 2018. "Robust Models of CEO Turnover: New Evidence on Relative Performance Evaluation." *Review of Corporate Finance Studies* 7 (1):70–100.

Frankel, Richard M., Marilyn F. Johnson, and Karen K Nelson. 2002. "The Relation between Auditors' Fees for Nonaudit Services and Earnings Management." *The Accounting Review* 77:71–105. Supplement: Quality of Earnings Conference.

Fudenberg, Drew and Jean Tirole. 1995. "A Theory of Income and Dividend Smoothing Based on Incumbency Rents." *Journal of Political Economy* 103 (1):75–93.

Garmaise, Mark J. 2011. "Ties that Truly Bind: Noncompetition Agreements, Executive Compensation, and Firm Investment." *Journal of Law, Economics, and Organization* 27 (2):376–425.

Giroud, Xavier and Holger M. Mueller. 2010. "Does Corporate Governance Matter in Competitive Industries?" *Journal of Financial Economics* 95 (3):312–331.

———. 2011. "Corporate Governance, Product Market Competition, and Equity Prices." *Journal of Finance* 66 (2):563–600.

Gompers, Paul, Joy Ishii, and Andrew Metrick. 2003. "Corporate Governance and Equity Prices." *Quarterly Journal of Economics* 118 (1):107–156.

Graham, John R., Campbell R. Harvey, and Shiva Rajgopal. 2005. "The Economic Implications of Corporate Financial Reporting." *Journal of Accounting and Economics* 40 (1-3):3–73.

Guan, Liming, Charlotte J. Wright, and Shannon L. Leikam. 2005. "Earnings Management and Forced CEO Dismissal." *Advances in Accounting* 21:61–81.

Hazarika, Sonali, Jonathan M. Karpoff, and Rajarishi Nahata. 2012. "Internal Corporate Governance, CEO Turnover, and Earnings Management." *Journal of Financial Economics* 104 (1):44–69.

Healy, Paul M. and James M. Wahlen. 1999. "A Review of the Earnings Management Literature and Its Implications for Standard Setting." *Accounting Horizons* 13 (4):365–383.

Herfindahl, Orris C. 1950. *Concentration in the U.S. Steel Industry*. Dissertation, Columbia University.

Hirschman, Albert O. 1945. *National Power and the Structure of Foreign Trade*. Berkeley and Los Angeles, CA: University of California Press.

Hoberg, Gerard and Gordon M. Phillips. 2010. "Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis." *Review of Financial Studies* 23 (10):3773–3811.

———. 2016. "Text-Based Network Industries and Endogenous Product Differentiation." *Journal of Political Economy* 124 (5):1423–1465.

Hsieh, Tien-Shin, Jean C. Bedard, and Karla M. Johnstone. 2014. "CEO Overconfidence and Earnings Management During Shifting Regulatory Regimes." *Journal of Business Finance & Accounting* 41 (9):1243–1268.

Humphery-Jenner, Mark, Ling Lei Lisic, Vikram Nanda, and Sabatino Dino Silveri. 2016. "Executive Overconfidence and Compensation Structure." *Journal of Financial Economics* 119 (3):533–558.

Huson, Mark R., Robert Parrino, and Laura T. Starks. 2001. "Internal Monitoring Mechanisms and CEO Turnover: A Long-Term Perspective." *Journal of Finance* 56 (6):2265–2297.

Jensen, Michael C. and William H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3 (4):305–360.

Jensen, Michael C. and Kevin J. Murphy. 1990. "Performance Pay and Top-Management Incentives." *Journal of Political Economy* 98 (2):225–264.

Jenter, Dirk and Fadi Kanaan. 2015. "CEO Turnover and Relative Performance Evaluation." *Journal of Finance* 70 (5):2155–2183.

Jenter, Dirk and Katharina Lewellen. 2020. "Performance-Induced CEO Turnover." *Review of Financial Studies* forthcoming.

Kale, Jayant R., Ebru Reis, and Anand Venkateswaran. 2009. "Rank-Order Tournaments and Incentive Alignment: The Effect on Firm Performance." *Journal of Finance* 64 (3):1479–1512.

Kaplan, Steven N. and Bernadette A. Minton. 2012. "How Has CEO Turnover Changed." *International Review of Finance* 12 (1):57–87.

King, Gary and Langche Zeng. 2001. "Logistic Regression in Rare Events Data." *Political Analysis* 9 (2):137–163.

Kini, Omesh, Ryan Williams, and David Yin. 2018. "Restrictions on CEO Mobility, Performance-Turnover Sensitivity, and Compensation: Evidence from Non-Compete Agreements." Working paper, Georgia State University and University of Arizona.

Klein, April. 2002. "Audit Committee, Board of Director Characteristics, and Earnings Management." *Journal of Accounting and Economics* 33 (3):375–400.

Kothari, S.P., Andrew J. Leone, and Charles E. Wasley. 2005. "Performance Matched Discretionary Accrual Measures." *Journal of Accounting and Economics* 39 (1):163–197.

Larcker, David F. and Tjomme O. Rusticus. 2010. "On the Use of Instrumental Variables in Accounting Research." *Journal of Accounting and Economics* 49 (3):186–205.

Lehn, Kenneth M. and Mengxin Zhao. 2006. "CEO Turnover after Acquisitions: Are Bad Bidders Fired?" *Journal of Finance* 61 (4):1759–1811.

Li, Di and Haibei Zhao. 2017. "Does Job Security Concern Acquiring Managers?" Working paper, Peking University and Lehigh University.

Liu, Ping and Yuhai Xuan. 2014. "The Contract Year Phenomenon in the Corner Office: An Analysis of Firm Behavior During CEO Contract Renewals." Working paper, University of Illinois-Urbana-Champaign.

Malmendier, Ulrike and Geoffrey Tate. 2005. "CEO Overconfidence and Corporate Investment." *Journal of Finance* 60 (6):2661–2700.

Miller, Gregory S. 2006. "The Press as a Watchdog for Accounting Fraud." *Journal of Accounting Research* 44 (5):1001–1033.

Murphy, Kevin J. and Jerold L. Zimmerman. 1993. "Financial Performance surrounding CEO Turnover." *Journal of Accounting and Economics* 16 (1-3):273–315.

Parrino, Robert. 1997. "CEO Turnover and Outside Succession: A Cross-Sectional Analysis." *Journal of Financial Economics* 46 (2):165–197.

Pourciau, Susan. 1993. "Earnings Management and Nonroutine Executive Changes." *Journal of Accounting and Economics* 16 (1-3):317–336.

Roberts, Michael R. and Toni M. Whited. 2013. *Endogeneity in Empirical Corporate Finance*, *Handbook of the Economics of Finance*, vol. 2, chap. 7. Elsevier, 493–572.

Roychowdhury, Sugata. 2006. "Earnings Management through Real Activities Manipulation." *Journal of Accounting and Economics* 42 (3):335–370.

Shleifer, Andrei and Robert W. Vishny. 1986. "Large Shareholders and Corporate Control." *Journal of Political Economy* 94 (3):461–488.

Sloan, Richard G. 1996. "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?" *The Accounting Review* 71 (3):289–315.

Staub, Kevin. 2017. "BRGLM: Stata Module to Perform Bias-Eeduced Estimation of Binary Response Models." Working paper, University of Melbourne.

Taylor, Lucian A. 2010. "Why Are CEOs Rarely Fired? Evidence from Structural Estimation." *Journal of Finance* 65 (6):2051–2087.

Watts, Ross L. and Jerold L. Zimmerman. 1986. *Positive Accounting Theory*. Prentice-Hall, 1st ed. ed.

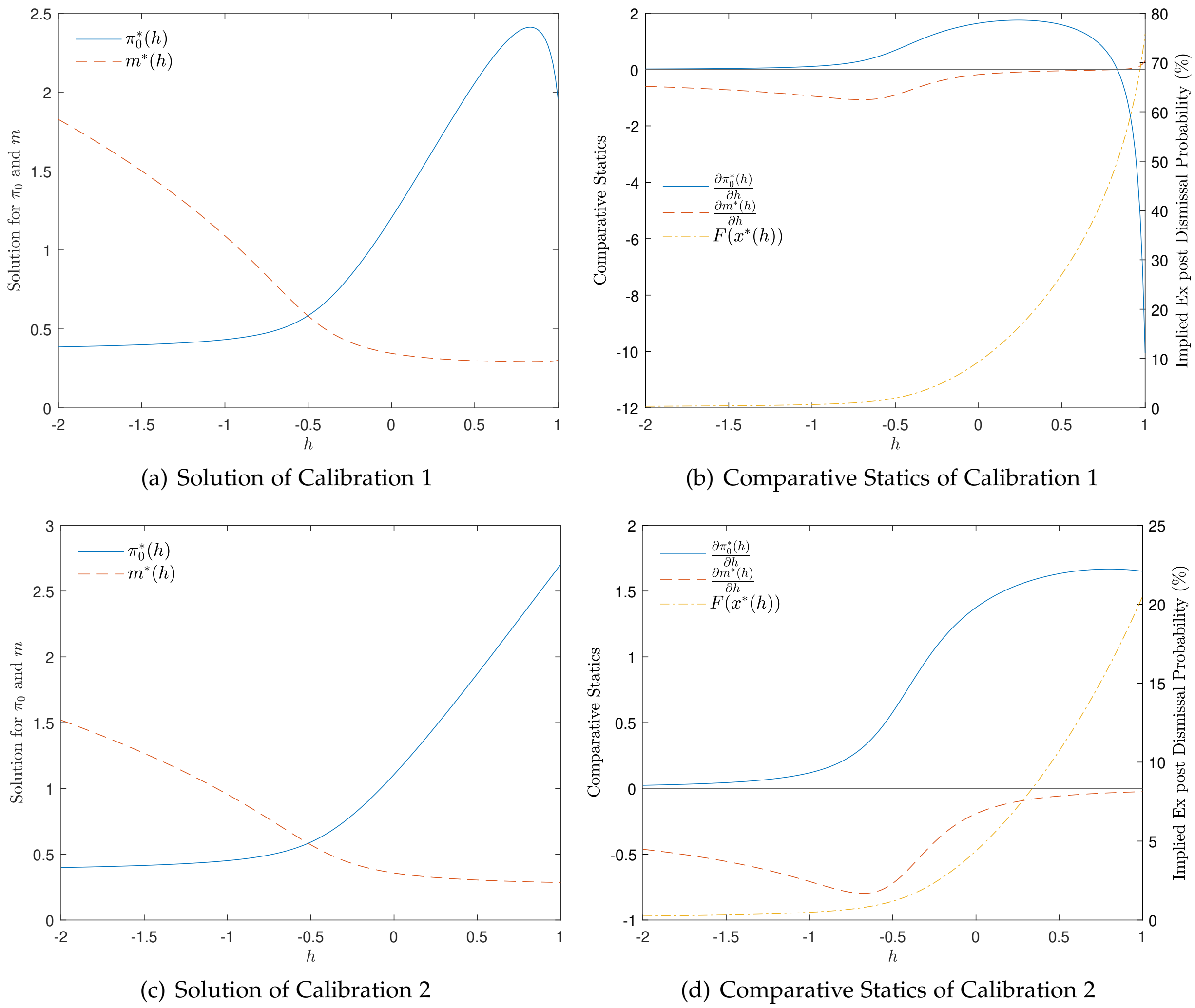
Weisbach, Michael S. 1988. "Outside Directors and CEO Turnover." *Journal of Financial Economics* 20 (January-March):431–460.

Xie, Biao, Wallace N. Davidson, and Peter J. DaDalt. 2003. "Earnings Management and Corporate Governance: The Role of the Board and the Audit Committee." *Journal of Corporate Finance* 9 (3):295–316.

Yermack, David. 1996. "Higher Market Valuation of Companies with A Small Board of Directors." *Journal of Financial Economics* 40 (2):185–211.

Yu, Fang (Frank). 2008. "Analyst Coverage and Earnings Management." *Journal of Financial Economics* 88 (2):245–271.

Zang, Amy Y. 2012. "Evidence on the Trade-Off between Real Activities Manipulation and Accrual-Based Earnings Management." *The Accounting Review* 87 (2):675–703.



(a) Solution of Calibration 1

(b) Comparative Statics of Calibration 1

(c) Solution of Calibration 2

(d) Comparative Statics of Calibration 2

Figure 1: Model Mechanisms

This figure demonstrates the model's mechanisms. In Panels (a) and (b), the model is calibrated with $s_1 = 0.01$, $c_1 = 0.03$, $c_2 = 0.25$, $a = 0.25$, and $b = 1.0$, and $F(\cdot)$ is the cumulative distribution function of the normal distribution $\mathcal{N}(0.2, 0.4^2)$. In Panels (c) and (d), the model is calibrated with $a = 0.4$ and $b = 1.6$, and the other parameters and distributional assumptions remain the same. Panels (a) and (c) show the CEO's optimal choices of effort (π_0) and earnings inflation (m) with respect to various levels of the CEO dismissal hazard (h) for the two calibrations respectively. Panels (b) and (d) show the comparatives statics and the implied ex post CEO dismissal likelihood (i.e., $F(x^*(h))$), where the left vertical axis marks the comparative statics and the right axis marks the implied ex post CEO dismissal probability in percentage.

Table 1: Summary Statistics

The table reports summary statistics. DA is discretionary accruals, Positive DA and Negative DA are positive and negative values of discretionary accruals, respectively, either based on the performance-adjusted model (Kothari, Leone, and Wasley, 2005) or the modified Jones model (Dechow, Sloan, and Sweeney, 1995), Ab PROD and Ab DISCEXP are respectively abnormal production costs and abnormal discretionary expenses (Roychowdhury, 2006), Size is the logarithm of book value of total assets, Leverage is long-term debt plus debt in current liabilities divided by book value of total assets, M/B is market value of assets divided by book value of total assets, ROA is net income divided by book value of total assets, Sales growth is change in sales divided by lagged sales, Operating cash flow is operating cash flows divided by book value of total assets, Firm age is the number of years since the firm was listed on a stock exchange, Analyst number is the number of analysts following the firm, Auditor tenure is the number of years since the current auditor works for the firm, Big 4 auditors is a dummy variable that indicates that the auditor is one of the four largest auditing firms. CEO tenure is the number of years since the CEO assumes the position. CEO ownership is the percentage of shares outstanding held by the CEO. Institutional ownership is the sum of all institutional investors' ownership. CEO duality is a dummy variable that indicates whether the CEO is also the chairman of the board. Board size is the number of directors on the board. Board independence is the proportion of independent directors on the board.

Variable	*N*	Mean	Std. Dev.	25%	Median	75%
Accrual-Based Earnings Manipulation						
Performance-Adjusted DA						
DA	13,790	−0.01	0.06	−0.04	−0.01	0.02
Positive DA	6,227	0.04	0.04	0.01	0.03	0.05
Negative DA	7,563	−0.05	0.04	−0.06	−0.03	−0.02
DA from the Modified Jones Model						
DA	13,790	0.00	0.06	−0.03	0.00	0.03
Positive DA	7,354	0.04	0.04	0.01	0.03	0.06
Negative DA	6,436	−0.04	0.04	−0.06	−0.03	−0.01
Real Earnings Manipulation						
Ab PROD	12,873	−0.06	0.19	−0.17	−0.06	0.04
Ab DISCEXP	12,873	0.00	0.22	−0.11	0.01	0.10
Firm and CEO Characteristics						
Size	13,790	7.62	1.46	6.56	7.47	8.56
Leverage	13,790	0.21	0.17	0.06	0.21	0.33
M/B	13,790	2.07	1.40	1.21	1.61	2.37
ROA	13,790	0.11	0.09	0.06	0.10	0.15
Sales growth	13,790	0.10	0.24	−0.02	0.06	0.17
Operating cash flow	13,790	0.13	0.09	0.07	0.12	0.17
Firm age	13,790	27.00	16.86	12.00	22.00	42.00
Analyst number	13,790	10.70	7.40	5.00	9.00	15.00
Auditor tenure	13,790	14.27	9.27	6.00	12.00	23.00
Big 4 auditors	13,790	0.96	0.20	1.00	1.00	1.00
CEO tenure	13,790	8.44	7.16	3.00	6.00	11.00
CEO ownership (%)	13,790	1.56	0.20	0.02	0.20	0.81
Institutional ownership	13,790	0.67	0.25	0.57	0.74	0.86
CEO duality	13,790	0.55	0.50	0.00	1.00	1.00
Board size	13,790	9.14	2.35	7.00	9.00	11.00
Board independence	13,790	0.70	0.17	0.60	0.73	0.83

Table 2: Forced CEO Turnover and Dismissal Hazard

The table reports the estimation of CEO dismissal hazard. We assume that CEO job duration follows a distribution that is characterized by a Weibull hazard function: $h^t_{t-1}(\tau_{i,t-1}, x_{i,t-1}) = p\tau^{p-1}_{i,t-1} \exp(\delta' x_{i,t-1})$, where p is an auxiliary parameter that controls the shape of baseline hazard, τ is CEO job duration, x is a vector of firm and CEO characteristics, and δ is a vector of the coefficients of x. Panel A presents the results of CEO job survival analysis. Panel B reports summary statistics of estimated CEO dismissal hazard. In column (1), firm performance is proxied by stock return. In column (2), firm performance is proxied by the industry-induced stock return and the idiosyncratic stock return following Jenter and Kanaan (2015). In column (3), firm performance is proxied by both stock return and return on assets (ROA). Retirement age is a dummy variable that is equal to one if the CEO is between 63 and 66 years old and zero otherwise, Ownership $\geqslant$ 5% is a dummy variable that is equal to one if the CEO owns at least 5% of the shares outstanding and zero otherwise, CEO duality is a dummy variable that is equal to one if the CEO is also the chairman of the board and zero otherwise, Board size is the number of directors on the board, and Board independence is the proportion of independent directors on the board. Standard errors are clustered at the firm-CEO pair level. t-statistics are presented in parentheses. The superscripts ***, **, and * indicate the statistical significance at 0.01, 0.05, and 0.10, respectively.

Panel A: Hazard Estimation			
	(1) Weibull 1	(2) Weibull 2	(3) Weibull 3
Stock return	−1.2546***		−1.1923***
	(−6.50)		(−6.05)
Industry induced stock return		−0.5056**	
		(−2.06)	
Idiosyncratic stock return		−1.7353***	
		(−6.80)	
ROA			−1.0132**
			(−2.07)
Retirement age	−1.0821**	−1.0694**	−1.0756**
	(−2.16)	(−2.13)	(−2.14)
Ownership $\geqslant$ 5%	−2.8854***	−2.8879***	−2.8682***
	(−2.87)	(−2.87)	(−2.86)
CEO duality	−0.3567***	−0.3446***	−0.3482***
	(−2.80)	(−2.70)	(−2.73)
Board size	0.0185	0.0176	0.0223
	(0.83)	(0.78)	(1.02)
Board independence	−0.0092	0.0028	−0.0181
	(−0.02)	(0.01)	(−0.05)
Constant	−2.9122***	−3.0662***	−2.8477***
	(−6.52)	(−6.75)	(−6.41)
ln(p)	−0.3862***	−0.3929***	−0.3918***
	(−3.61)	(−3.65)	(−3.65)
Observations	16,148	16,148	16,061
Panel B: Summary Statistics of Hazard			
Mean	0.0167	0.0167	0.0167
Std. dev.	0.0113	0.0121	0.0118
25th percentile	0.0090	0.0082	0.0089
50th percentile	0.0152	0.0149	0.0151
75th percentile	0.0225	0.0227	0.0223
Max	0.1009	0.1308	0.1462

Table 3: Univariate Analysis—Pearson Correlation

The table presents the Pearson correlation among main variables. Hazard is estimated CEO dismissal hazard (see Section 3.2 for details), DA is performance-adjusted discretionary accruals, Positive DA (PDA) and Negative DA (NDA) are positive and negative values of performance-adjusted discretionary accruals, respectively, Ab PROD (ABP) and Ab DISCEXP (ABD) are respectively abnormal production costs and abnormal discretionary expenses (Roychowdhury, 2006), Size is the logarithm of book value of total assets, Leverage is long-term debt plus debt in current liabilities divided by book value of total assets, M/B is market value of assets dividend by book value of total assets, ROA is net income divided by book value of total assets, Sale growth is change in sales divided by lagged sales, Operating cash flow is operating cash flows divided by book value of total assets, Firm age is the number of years since the firm was listed on a stock exchange, Analyst number is the number of analysts following the firm, Auditor tenure is the number of years since the current auditor works for the firm, Big 4 auditor is a dummy variable that indicates that the auditor is one of the four largest auditing firms, CEO tenure is the number of year since the CEO takes the position, Institutional ownership is the share of stock held by institutional investors, CEO duality is a dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise, Board size is the number of directors on the board, and Board independence is the proportion of independent directors on the board. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	Hazard	DA	PDA	NDA	ABP	ABD
Hazard	1.00					
DA	−0.03***	1.00				
Positive DA	−0.06***	1.00***	1.00			
Negative DA	0.01	1.00***	.	1.00		
Ab PROD	0.06***	0.15***	0.09***	0.11***	1.00	
Ab DISCEXP	−0.03***	−0.07***	0.03**	−0.12***	−0.74***	1.00
Size	0.06***	0.01	−0.20***	0.17***	0.08***	−0.14***
Leverage	0.08***	0.04***	−0.11***	0.11***	0.10***	−0.10***
M/B	−0.22***	−0.06***	0.13***	−0.14***	−0.36***	0.25***
ROA	−0.16	0.00	0.03***	0.01	−0.27***	−0.05***
Sales growth	−0.14***	0.01	0.09***	−0.09***	−0.05***	0.08***
Operating cash flow	−0.16***	−0.07***	0.03**	−0.06***	−0.30***	0.06***
ln(Firm age)	0.06***	0.03***	−0.16***	0.17***	0.11***	−0.15***
ln(Analyst number)	−0.02***	−0.02**	−0.08***	0.04***	−0.11***	0.04***
ln(Auditor tenure)	0.04***	−0.01	−0.05***	0.06***	0.02**	−0.06***
Big 4 auditors	0.07***	−0.01	−0.03**	0.02	0.02***	−0.02**
ln(CEO tenure)	−0.49***	0.02***	0.05***	0.00	−0.01	0.03***
Institutional ownership	−0.02	0.01*	−0.02*	0.05***	−0.01	0.00
CEO duality	−0.35***	0.03***	−0.02	0.04***	0.00	−0.03***
Board size	0.11***	0.01	−0.13***	0.15***	0.06***	−0.10***
Board independence	0.08***	−0.02**	−0.12***	0.07***	0.01	−0.02***

Table 4: CEO Job Security and Accrual-Based Earnings Manipulation

The table presents the results of multivariate analysis on the effect of CEO job security on accrual-based earnings manipulation. Columns (1) to (3) are based on the ordinary least squares (OLS) regression, and columns (4) and (5) are based on the truncated regression. In column (1), the analysis is carried in the whole sample. In columns (2) and (4), the analysis is carried out for the subsample of positive performance-adjusted discretionary accruals. In columns (3) and (5), the analysis is conducted for the subsample of negative performance-adjusted discretionary accruals. The definitions of the regressors can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. *t*-statistics presented in parentheses are computed using a bootstrap method as the average of *t*-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	OLS			Truncated Regression	
	(1) DA	(2) Positive DA	(3) Negative DA	(4) Positive DA	(5) Negative DA
Hazard	−0.2097***	−0.1563***	−0.0626	−1.5549***	−0.2049
	(−3.21)	(−2.65)	(−1.03)	(−2.83)	(−0.69)
Size	−0.0018**	−0.0038***	0.0019**	−0.0432***	0.0148***
	(−2.43)	(−5.46)	(2.45)	(−5.49)	(3.39)
Leverage	0.0016	−0.0051	0.0069*	−0.0750**	0.0598**
	(0.39)	(−1.44)	(1.70)	(−2.35)	(2.57)
M/B	−0.0016***	0.0015**	−0.0020***	0.0036*	−0.0033**
	(−2.84)	(2.27)	(−2.87)	(1.65)	(−2.43)
ROA	0.0652***	−0.0070	0.0491***	−0.0091	0.1442***
	(5.16)	(−0.58)	(4.85)	(−0.13)	(3.79)
Sale growth	0.0021	0.0008	−0.0051*	0.0075	−0.0134
	(1.10)	(0.72)	(−1.94)	(1.29)	(−1.64)
Operating CF	−0.0754***	−0.0138	−0.0345***	−0.0871	−0.1168***
	(−6.10)	(−1.44)	(−3.16)	(−1.34)	(−2.75)
ln(Firm age)	0.0021*	−0.0026**	0.0030***	−0.0273**	0.0252***
	(1.69)	(−2.29)	(2.65)	(−2.37)	(3.73)
ln(Ananlyst number)	0.0008	−0.0001	0.0004	0.0097	−0.0023
	(0.61)	(−0.06)	(0.29)	(0.88)	(−0.35)
ln(Auditor tenure)	−0.0006	0.0001	−0.0001	0.0027	−0.0037
	(−0.66)	(0.13)	(−0.07)	(0.34)	(−0.72)
Big 4 auditors	−0.0004	0.0022	−0.0001	0.0129	0.0088
	(−0.10)	(0.77)	(−0.02)	(0.58)	(0.53)
Institutional ownership	0.0013	−0.0012	0.0037	0.0060	0.0187
	(0.45)	(−0.51)	(1.43)	(0.26)	(1.24)
ln(CEO tenure)	0.0001	−0.0006	0.0009	−0.0031	0.0047
	(−0.02)	(−0.68)	(0.88)	(−0.37)	(0.85)
CEO duality	−0.0009	0.0001	−0.0017	−0.0029	−0.0033
	(−0.6)	(0.09)	(−1.23)	(−0.24)	(−0.40)
Board size	0.0004	0.0002	0.0009***	0.0013	0.0049**
	(1.15)	(0.59)	(3.01)	(0.44)	(2.50)
Board independence	−0.0139***	−0.0101***	−0.0063	−0.0814***	−0.0325
	(−3.20)	(−2.68)	(−1.47)	(−2.61)	(−1.43)
Constant	−0.0274***	0.0748***	−0.0839***	0.1129***	0.2907***
	(−2.76)	(8.09)	(−6.22)	(15.28)	(6.47)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.031	0.088	0.102		
Observations	13,790	6,227	7,563	6,227	7,563

Table 5: The Effect of Dismissal Hazard—An Instrumental-Variable Approach

The table presents the effect of CEO dismissal hazard on accrual-based earnings inflation, where hazard is estimated based on an instrumental-variable (IV) approach. The dependent variable is positive performance-adjusted discretionary accruals (positive DA). The regressions are conducted based on the truncated specification (i.e., column (4) of Table 4) using the subsample of positive DA. In column (1), the IV is CEO dismissals of the firm's two-digit SIC industry over the past two years (Ind. Dismissal), and in column (2) the IV is the change in the non-compete enforceability index of the state where the firm's headquarter is located (Change in NCI). The instrumented hazard estimation is reported in Table A.2. The definition of the regressors can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. t-statistics presented in parentheses are computed using a bootstrap method as the average of t-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1) Ind. Dismissal	(2) Change in NCI
Hazard	−1.4459***	−1.2572*
	(−2.94)	(−1.74)
Size	−0.0429***	−0.0410***
	(−5.50)	(−5.19)
Leverage	−0.0809**	−0.0804**
	(−2.52)	(−2.47)
M/B	0.0036*	0.0038*
	(1.68)	(1.69)
ROA	−0.0139	0.0045
	(−0.19)	(0.06)
Sale growth	0.0085	0.0079
	(1.44)	(1.35)
Operating CF	−0.0876	−0.0856
	(−1.36)	(−1.28)
ln(Firm age)	−0.0278**	−0.0307***
	(−2.43)	(−2.62)
ln(Ananlyst number)	0.0104	0.0048
	(0.95)	(0.44)
ln(Auditor tenure)	0.0028	0.0019
	(0.34)	(0.23)
Big 4 auditors	0.0117	0.0154
	(0.54)	(0.69)
Institutional ownership	0.0057	0.0043
	(0.25)	(0.18)
ln(CEO tenure)	−0.0031	−0.0028
	(−0.38)	(−0.31)
CEO duality	−0.0026	−0.0012
	(−0.22)	(−0.09)
Board size	0.0015	0.0012
	(0.51)	(0.40)
Board independence	−0.0791**	−0.0801**
	(−2.56)	(−2.47)
Constant	0.1529***	0.1485***
	(2.87)	(2.61)
Observations	6,227	6,132
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes

Table 6: The Effect of CEO Dismissal Risk—Tests Based on Industry-Level Measures

The table presents the effect of CEO dismissal risk (Risk) on accrual-based earnings inflation, where Risk is proxied by alternative industry-level measures. The dependent variable is positive performance-adjusted discretionary accruals (positive DA). All regressions are conducted based on the truncated specification (i.e., column (4) of Table 4) using the subsample of positive DA. In column (1), Risk is proxied by the industry-level CEO dismissal intensity (i.e., the number of CEO dismissals divided by the number of CEOs in the industry) in the previous year. In column (2), Risk is proxied by the weighted industry-level CEO dismissal intensity in the previous year, where the weight is CEO tenure. In column (3), Risk is proxied by the average industry-level CEO dismissal intensity over the previous three years. In column (4), Risk is proxied by the three-year average of the tenure-weighted industry-level CEO dismissal intensity. In column (5), Risk is proxied by the inverse-time-weighted average of industry-level CEO dismissal intensity over the previous three years. In column (6), Risk is proxied by the inverse-time-weighted average of tenure-weighted average industry-level CEO dismissal intensity over the previous three years. The definition of the regressors can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. *t*-statistics are presented in parentheses. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1) Ind. Dismissal Intensity	(2) Tenure-Weighted Ind. Intensity	(3) Three-Year Avg. Ind. Dismissal Intensity	(4) Three-Year Avg. Tenure-Weighted. Ind. Dismissal Intensity	(5) Three-Year Time-Weighted Avg. Ind. Dismissal Intensity	(6) Three-Year Time- & Tenure-Weighted Avg. Ind. Dismissal Intensity
Risk	−0.6069*	−0.7153*	−0.9238*	−1.7664**	−0.9144*	−1.5638**
	(−1.68)	(−1.68)	(−1.65)	(−2.26)	(−1.74)	(−2.27)
Size	−0.0667***	−0.0665***	−0.0666***	−0.0661***	−0.0666***	−0.0661***
	(−4.23)	(−4.21)	(−4.24)	(−4.24)	(−4.24)	(−4.23)
Leverage	−0.1280**	−0.1270**	−0.1274**	−0.1261**	−0.1278**	−0.1265**
	(−2.33)	(−2.31)	(−2.32)	(−2.31)	(−2.33)	(−2.32)
M/B	0.0132	0.0134	0.0135	0.0138	0.0133	0.0136
	(1.16)	(1.18)	(1.19)	(1.22)	(1.17)	(1.20)
ROA	−0.0011	−0.0001	−0.0030	−0.0002	−0.0020	0.0003
	(−0.01)	(−0.00)	(−0.03)	(−0.00)	(−0.02)	(0.00)
Sale growth	0.0106	0.0108	0.0105	0.0108	0.0104	0.0108
	(1.28)	(1.30)	(1.27)	(1.31)	(1.26)	(1.31)
Operating CF	−0.1120	−0.1104	−0.1125	−0.1156	−0.1127	−0.1137
	(−1.05)	(−1.04)	(−1.06)	(−1.09)	(−1.06)	(−1.08)
ln(Firm age)	−0.0487**	−0.0487**	−0.0488**	−0.0485**	−0.0489**	−0.0488**
	(−2.36)	(−2.35)	(−2.37)	(−2.37)	(−2.37)	(−2.38)
ln(Ananlyst number)	0.0127	0.0122	0.0127	0.0121	0.0128	0.0121
	(0.69)	(0.66)	(0.69)	(0.66)	(0.70)	(0.66)
ln(Auditor tenure)	0.0057	0.0056	0.0056	0.0052	0.0056	0.0053
	(0.44)	(0.43)	(0.43)	(0.40)	(0.43)	(0.41)
Big 4 auditors	0.0213	0.0205	0.0211	0.0203	0.0211	0.0203
	(0.62)	(0.60)	(0.62)	(0.60)	(0.62)	(0.60)
Institutional ownership	0.0080	0.0074	0.0077	0.0070	0.0079	0.0071
	(0.21)	(0.20)	(0.21)	(0.19)	(0.21)	(0.19)
ln(CEO tenure)	0.0104	0.0104	0.0103	0.0094	0.0103	0.0096
	(0.88)	(0.87)	(0.87)	(0.79)	(0.87)	(0.81)
CEO duality	0.0112	0.0113	0.0110	0.0104	0.0108	0.0104
	(0.62)	(0.62)	(0.61)	(0.58)	(0.60)	(0.58)
Board size	0.0009	0.0009	0.0009	0.0010	0.0009	0.0010
	(0.19)	(0.19)	(0.19)	(0.22)	(0.20)	(0.22)
Board independence	−0.1264**	−0.1280**	−0.1254**	−0.1263**	−0.1255**	−0.1271**
	(−2.43)	(−2.45)	(−2.42)	(−2.45)	(−2.42)	(−2.46)
Constant	0.1427*	0.1391*	0.1476*	0.1509*	0.1482*	0.1490*
	(1.70)	(1.66)	(1.76)	(1.80)	(1.77)	(1.78)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,227	6,227	6,227	6,227	6,227	6,227

Table 7: CEO Job Security and Earnings Inflation—Subsample Analysis

The table presents the effect of CEO job security on accrual-based earnings inflation when firms face different levels of discipline from other corporate governance mechanisms. The dependent variable is positive performance-adjusted discretionary accruals, and all results are based on the truncated regression. In Panel A, the subsamples are partitioned based on firm size; in Panel B, the subsamples are partitioned based on the number of analysts who follow the firm; in Panel C, the subsamples are based on product market competition which is measured by the Herfindahl (1950) and Hirschman (1945) index (HHI) of sales for the text-based network industries (TNIC), where the TNIC industry classification is designed by Hoberg and Phillips (2010, 2016); and in Panel D, the subsamples are partitioned based on the institutional ownership in the firm. In all panels, the subsample cutoff point is the median of the variable on which the analysis is based and is industry-year specific. In all analyses, the control variables (including industry and year fixed effects) of the baseline regression (column (4) of Table 4) are included, and their definitions can be found in Table A.1. For brevity, the control variables are omitted from the table. Standard errors are clustered at the firm-CEO pair level. t-statistics presented in parentheses are computed using a bootstrap method as the average of t-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	Panel A: Firm Size		Panel B: Number of Analysts	
	Bottom Half	Top Half	Bottom Half	Top Half
Hazard	-2.1988^{***}	-0.6598	-2.2326^{***}	-0.3590
	(-2.79)	(-1.01)	(-2.75)	(-0.58)
Observations	3,129	3,098	3,093	3,128
	Panel C: TNIC Sales HHI		**Panel D: Inst. Ownership**	
	Bottom Half	Top Half	Bottom Half	Top Half
Hazard	-0.9261	-1.9665^{**}	-2.1855^{***}	-0.6843
	(-1.34)	(-2.54)	(-2.83)	(-1.05)
Observations	3,113	3,103	3,076	3,151
	Regression Control Variables			
Control variables	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes

Table 8: CEO Job Security and Real Earnings Manipulation

The table presents the effects of CEO job security on real-activity-based earnings manipulation. In column (1), the dependent variable is abnormal production costs (Ab PROD); and in column (2), the dependent variable is abnormal discretionary expenses (Ab DISCEXP). The definitions of the independent variables can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. *t*-statistics presented in parentheses are computed using a bootstrap method as the average of *t*-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1) Ab PROD	(2) Ab DISCEXP
Hazard	−0.5218**	0.5335*
	(−2.09)	(1.82)
Size	0.0168***	−0.0282***
	(3.68)	(−5.21)
Leverage	0.0012	−0.0845**
	(0.05)	(−2.34)
M/B	−0.0185***	0.0304***
	(−5.83)	(6.28)
ROA	−0.2204***	−0.5672***
	(−4.54)	(−9.52)
Sale growth	0.0241**	0.0048
	(2.26)	(0.77)
Operating CF	−0.2827***	0.1347***
	(−6.99)	(3.10)
ln(Firm age)	0.0101	−0.0234***
	(1.31)	(−2.61)
ln(Ananlyst number)	−0.0242***	0.0451***
	(−3.03)	(4.86)
ln(Auditor tenure)	−0.0060	0.0048
	(−1.07)	(0.75)
Big 4 auditors	0.0210	−0.0178
	(1.42)	(−0.98)
Institutional ownership	−0.0034	0.0159
	(−0.14)	(0.61)
ln(CEO tenure)	−0.0021	0.0097
	(−0.38)	(1.58)
CEO duality	−0.0051	−0.0039
	(−0.70)	(−0.46)
Board size	−0.0002	0.0002
	(−0.09)	(0.08)
Board independence	−0.0412	0.0552*
	(−1.55)	(1.84)
Constant	−0.0597	0.1081
	(−0.96)	(1.50)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
R-squared	0.162	0.168
Observations	12,873	12,873

Table 9: CEO Job Security and Subsequent Firm Performance

The table presents the effects of CEO job security on subsequent firm performance. In column (1), firm performance is measured by the Tobin's Q of firm assets; in column (2), firm performance is measured by annual stock return; and in column (3) firm performance is measured by corrected return on assets (ROA), where ROA is adjusted for discretionary accruals. Lagged dep. var. is the value of the dependent variable in the previous year, R&D is research and development expenditures divided by book value of assets, and Stock volatility is annual volatility of stock return. The definition of the other variables can be found in Table A.1. We use the Arellano and Bond (1991) approach for the linear dynamic panel-data estimation. Standard errors are clustered at the firm-CEO pair level. t-statistics presented in parentheses are computed using a bootstrap method as the average of t-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1) Tobin's Q	(2) Stock Return	(3) Corrected ROA
Hazard	16.7636***	2.9391***	0.4688***
	(12.38)	(5.13)	(4.43)
Lagged dep. Var	0.4903***	−0.1378***	0.2788***
	(13.21)	(−9.29)	(8.65)
Size	−0.2442***	−0.2528***	−0.0760***
	(−3.44)	(−8.09)	(−8.82)
Leverage	0.6938***	0.2616***	0.0029
	(4.02)	(3.56)	(0.18)
Sale growth	−0.0249	−0.0716***	0.0021
	(−0.53)	(−3.36)	(0.45)
Operating CF	0.4756***	−0.7516***	−0.4379***
	(2.76)	(−9.17)	(−12.49)
ln(Firm age)	−0.8148***	0.2284***	0.0243
	(−5.81)	(2.98)	(1.43)
R&D	−1.6319	−0.7576***	−0.1290*
	(−1.60)	(−3.44)	(−1.79)
Stock Volatility	−1.0770***	0.5082***	−0.0294***
	(−13.56)	(13.59)	(−3.68)
Institutional ownership	1.1598***	−0.9264***	0.0211
	(7.94)	(−10.92)	(1.29)
ln(CEO tenure)	0.1348***	0.0772***	−0.0050
	(2.79)	(3.17)	(−0.96)
CEO duality	0.1337***	−0.0048	−0.0005
	(4.79)	(−0.33)	(−0.17)
Board size	−0.0159**	0.0018	0.0010
	(−2.18)	(0.42)	(0.85)
Board independence	−0.0385	−0.1444**	0.0192
	(−0.33)	(−2.26)	(1.42)
Constant	4.4715***	1.7349***	0.6132***
	(8.38)	(7.62)	(11.45)
Firm dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Observations	12,022	11,712	10,383

Table 10: CEO Job Security and Earnings Inflation—Opportunistic Motives

The table presents the effects of CEO job security on accrual-based earnings inflation when CEO dismissal risk is high and when firm performance is poor. The dependent variable is positive performance-adjusted discretionary accruals, and the results are based on the truncated regression. In Panel A, Top 50%, Top 40%, Top 30%, Top 20%, and Top 10% are the dummy variables that indicate CEO dismissal hazard is among the top 50%, 40%, 30%, 20%, and 10% in the year, respectively. In Panel B, Bottom 10%, Bottom 20%, Bottom 30%, Bottom 40%, and Bottom 50% are dummy variables that indicate the firm's stock return is among the bottom 10%, 20%, 30%, 40%, and 50% in the year, respectively. The control variables are the same as in Table 4 and are omitted for brevity. Standard errors are clustered at the firm-CEO pair level. t-statistics presented in parentheses are computed using a bootstrap method as the average of t-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	Panel A: Based on Hazard				
	(1)	(2)	(3)	(4)	(5)
Hazard	−1.5016	−2.0957**	−2.1802**	−2.2007***	−2.4734***
	(−1.26)	(−2.02)	(−2.38)	(−2.71)	(−3.37)
Hazard×Top 50%	−0.0222				
	(−0.05)				
Hazard×Top 40%		0.4981			
		(0.63)			
Hazard×Top 30%			0.5947		
			(0.90)		
Hazard×Top 20%				0.6797	
				(1.16)	
Hazard×Top 10%					1.2199**
					(2.18)
	Panel B: Based on Stock Return				
	(1)	(2)	(3)	(4)	(5)
Hazard	−2.1316***	−2.2419***	−1.9018**	−2.0649***	−2.1664**
	(−3.48)	(−3.19)	(−2.51)	(−2.63)	(−2.45)
Hazard×Bottom 10%	1.3578**				
	(2.28)				
Hazard×Bottom 20%		0.9176*			
		(1.72)			
Hazard×Bottom 30%			0.3627		
			(0.69)		
Hazard×Bottom 40%				0.5102	
				(0.96)	
Hazard×Bottom 50%					0.5608
					(0.92)
	Regression Control Variables				
Control variables	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Observations	6,227	6,227	6,227	6,227	6,227

Table 11: Robustness—Alternative Estimation Methods for CEO Dismissal Hazard or Probability

The table shows robustness of the effect of CEO job security on earnings inflation with respect to alternative estimation methods for CEO dismissal hazard or probability. The dependent variable is positive performance-adjusted discretionary accruals, and the results are based on the truncated regression. In columns (1) and (2), hazard is estimated based on a Weibull model in the specifications of columns (2) and (3) in Table 2, respectively. In column (3), the hazard is estimated based on a Gompertz model. In column (4), hazard is estimated based on the Cox model (Cox, 1972). In column (5), the CEO dismissal probability is estimated based on a Probit model. In column (6), the CEO dismissal probability is estimated based on a linear probability model. In column (7), the CEO dismissal probability is estimated based on a Probit model with control of CEO tenure. In column (8), the CEO dismissal probability is estimated based on a linear probability model with control of CEO tenure. In column (9), the CEO dismissal probability is estimated based on a Probit model with the bias-reduced algorithm to address the potential rare-event bias (King and Zeng, 2001). Hazard and probability used in columns (3) to (9) are based on the specifications of columns (2) to (8) of Table A.3 in Appendix C, respectively. The definitions of the control variables can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. *t*-statistics presented in parentheses are computed using a bootstrap method as the average of *t*-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis or dismissal probability estimation. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1) Weibull 2	(2) Weibull 3	(3) Gompertz	(4) Cox	(5) Probit	(6) OLS	(7) Probit with CEO Tenure	(8) OLS with CEO Tenure	(9) Rare-Event Probit
Hazard	−1.0829**	−1.0082*	−1.4927***	−0.0390***					
	(−2.28)	(−1.68)	(−2.77)	(−3.02)					
Probability					−0.6267*	−0.9659**	−0.5563*	−0.9787**	−0.3939*
					(−1.70)	(−2.57)	(−1.72)	(−2.51)	(−1.91)
Size	−0.0433***	−0.0438***	−0.0433***	−0.0429***	−0.0416***	−0.0426***	−0.0319***	−0.0426***	−0.0326***
	(−5.48)	(−5.47)	(−5.50)	(−5.47)	(−5.09)	(−5.48)	(−5.66)	(−5.48)	(−6.00)
Leverage	−0.0748**	−0.0768**	−0.0750**	−0.0739**	−0.0675**	−0.0778**	−0.0499**	−0.0784**	−0.0580**
	(−2.34)	(−2.38)	(−2.35)	(−2.33)	(−2.09)	(−2.44)	(−2.07)	(−2.45)	(−2.43)
M/B	0.0039*	0.0041*	0.0036*	0.0035	0.0041*	0.0035	0.0031	0.0035	0.0030*
	(1.77)	(1.84)	(1.66)	(1.64)	(1.67)	(1.63)	(1.61)	(1.62)	(1.78)
ROA	−0.0050	−0.0410	−0.0088	−0.0111	−0.0113	0.0045	−0.0179	0.0046	−0.0090
	(−0.07)	(−0.54)	(−0.12)	(−0.15)	(−0.15)	(0.06)	(−0.31)	(0.06)	(−0.17)
Sale growth	0.0070	0.0083	0.0077	0.0072	0.0067	0.0064	0.0066	0.0064	0.0071
	(1.20)	(1.37)	(1.32)	(1.24)	(1.15)	(1.13)	(1.46)	(1.13)	(1.59)
Operating CF	−0.0867	−0.0820	−0.0868	−0.0871	−0.0718	−0.0920	−0.0470	−0.0917	−0.0564
	(−1.33)	(−1.23)	(−1.33)	(−1.34)	(−1.02)	(−1.43)	(−0.92)	(−1.43)	(−1.18)
ln(Firm age)	−0.0274**	−0.0273**	−0.0273**	−0.0274**	−0.0332***	−0.0290**	−0.0235***	−0.0293**	−0.0203**
	(−2.37)	(−2.36)	(−2.37)	(−2.39)	(−2.73)	(−2.54)	(−2.68)	(−2.56)	(−2.40)
ln(Ananlyst number)	0.0092	0.0098	0.0098	0.0098	0.0092	0.0105	0.0063	0.0104	0.0054
	(0.84)	(0.89)	(0.89)	(0.90)	(0.80)	(0.96)	(0.81)	(0.95)	(0.72)
ln(Auditor tenure)	0.0027	0.0025	0.0028	0.0027	0.0037	0.0031	0.0047	0.0032	0.0036
	(0.33)	(0.31)	(0.34)	(0.33)	(0.43)	(0.39)	(0.72)	(0.40)	(0.58)
Big 4 auditors	0.0127	0.0124	0.0128	0.0138	0.0063	0.0123	0.0081	0.0119	0.0125
	(0.57)	(0.56)	(0.58)	(0.62)	(0.26)	(0.56)	(0.42)	(0.54)	(0.70)
Institutional ownership	0.0062	0.0067	0.0060	0.0060	0.0054	0.0069	0.0051	0.0067	0.0065
	(0.27)	(0.28)	(0.26)	(0.26)	(0.23)	(0.30)	(0.28)	(0.29)	(0.37)
ln(CEO tenure)	0.0001	0.0006	−0.0056	0.0036	0.0085	0.0040	0.0037	−0.0046	0.0017
	(0.01)	(0.08)	(−0.64)	(0.47)	(1.10)	(0.54)	(0.57)	(−0.54)	(0.27)
CEO duality	0.0004	0.0009	−0.0017	−0.0020	−0.0020	−0.0045	−0.0008	−0.0012	0.0016
	(0.04)	(0.08)	(−0.14)	(−0.17)	(−0.16)	(−0.37)	(−0.09)	(−0.10)	(0.19)
Board size	0.0012	0.0013	0.0013	0.0012	0.0016	0.0019	0.0019	0.0017	0.0018
	(0.42)	(0.44)	(0.43)	(0.42)	(0.53)	(0.64)	(0.83)	(0.59)	(0.83)
Board independence	−0.0820***	−0.0835***	−0.0838***	−0.0824***	−0.0851**	−0.0669**	−0.0682***	−0.0733**	−0.0605***
	(−2.62)	(−2.66)	(−2.69)	(−2.66)	(−2.52)	(−2.10)	(−2.76)	(−2.34)	(−2.58)
Constant	0.1431***	0.1441***	0.1616***	0.1429***	0.1235**	0.1153**	0.1001**	0.1411***	0.0941**
	(2.65)	(2.62)	(2.93)	(2.71)	(2.32)	(2.26)	(2.41)	(2.70)	(2.36)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,227	6,227	6,227	6,230	5,732	6,230	5,732	6,230	6,314

Table 12: Robustness—Earnings Inflation Based on the Modified Jones Model

The table presents the results of multivariate analysis on the effect of CEO job security on accrual-based earnings manipulation, where discretionary accruals are estimated based on the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Columns (1) to (3) are based on the ordinary least squares (OLS) regression, and columns (4) and (5) are based on the truncated regression. In column (1), the analysis is performed in the whole sample. In columns (2) and (4), the analysis is carried out for the subsample of positive discretionary accruals. In columns (3) and (5), the analysis is conducted for the subsample of negative discretionary accruals. The definitions of the regressors can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. *t*-statistics presented in parentheses are computed using a bootstrap method as the average of *t*-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	OLS			Truncated Regression	
	(1) DA	(2) Positive DA	(3) Negative DA	(4) Positive DA	(5) Negative DA
Hazard	−0.3443***	−0.2570***	−0.0524	−2.9817***	−0.2084
	(−4.86)	(−4.14)	(−0.75)	(−3.02)	(−0.21)
Size	−0.0020**	−0.0042***	0.0015*	−0.0558***	0.0492**
	(−2.48)	(−5.70)	(1.76)	(−4.05)	(2.39)
Leverage	−0.0017	−0.0051	0.0058	−0.1118**	0.2133**
	(−0.38)	(−1.40)	(1.14)	(−2.35)	(2.06)
M/B	−0.0020**	0.0012*	−0.0043***	0.0029	−0.0134***
	(−2.43)	(1.76)	(−5.49)	(1.33)	(−3.93)
ROA	0.1219***	0.0156	0.0785***	0.1882	0.5969***
	(8.26)	(1.14)	(6.21)	(1.61)	(3.59)
Sale growth	−0.0014	0.0023	−0.0031	0.0230	−0.0083
	(−0.68)	(1.09)	(−1.09)	(1.39)	(−0.56)
Operating CF	−0.0677***	−0.0186*	−0.0228	−0.1632*	−0.2569
	(−4.73)	(−1.67)	(−1.52)	(−1.70)	(−1.51)
ln(Firm age)	0.0027**	−0.0027**	0.0037***	−0.0417**	0.1227***
	(2.09)	(−2.21)	(2.64)	(−2.29)	(2.59)
ln(Ananlyst number)	0.0011	0.0003	0.0014	0.0158	−0.0035
	(0.79)	(0.22)	(0.96)	(1.11)	(−0.14)
ln(Auditor tenure)	−0.0003	0.0001	0.0001	0.0056	−0.0205
	(−0.30)	(0.15)	(0.08)	(0.55)	(−0.85)
Big 4 auditors	0.0009	0.0038	0.0008	0.0262	0.0523
	(0.23)	(1.30)	(0.23)	(0.96)	(0.81)
Institutional ownership	0.0034	0.0012	0.0052*	0.0421	0.0911
	(1.15)	(0.52)	(1.66)	(1.39)	(1.46)
ln(CEO tenure)	−0.0008	−0.0010	0.0013	−0.0063	0.0165
	(−0.73)	(−1.10)	(1.09)	(−0.58)	(0.73)
CEO duality	−0.0016	−0.0006	−0.0027*	−0.0157	−0.0211
	(−1.01)	(−0.40)	(−1.66)	(−0.96)	(−0.64)
Board size	0.0004	0.0001	0.0012***	−0.0002	0.0229**
	(1.12)	(0.35)	(3.2)	(−0.04)	(2.20)
Board independence	−0.0146***	−0.0084**	−0.0080	−0.0896**	−0.1307
	(−3.00)	(−1.97)	(−1.47)	(−2.11)	(−1.25)
Constant	−0.0280***	0.0895***	−0.0869***	0.1307*	−1.1720***
	(−3.26)	(9.80)	(−8.39)	(1.81)	(−2.93)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.043	0.098	0.130		
Observations	13,790	7,354	6,436	7,354	6,436

Table 13: Robustness—Additional Control Variables

The table shows robustness of the effect of CEO job security on earnings inflation with respect to the exclusion of CEO turnover events and to the inclusion of various control variables. The dependent variable is positive performance-adjusted discretionary accruals, and the results are based on the truncated regression. In column (1), we exclude the firm-year observations with occurrence of CEO turnovers; in column (2), we control for discretionary accruals in the previous year; in column (3), we control for a dummy variable that indicates whether discretionary accruals in the previous year are greater; in column (4), we control for a dummy variable that indicates whether earnings meet analyst forecast; in column (5), we control for the SOX dummy that equals one if the year is after 2001 and zero otherwise; in column (6), we control for CEO overconfidence and its interaction with hazard, where CEO overconfidence is based on the Malmendier and Tate (2005) option-based measure, constructed following the method of Humphery-Jenner et al. (2016); in column (7), we control for CEO pay-performance sensitivity (delta) and CEO wealth sensitivity to stock volatility (vega), computed following the method of Coles, Daniel, and Naveen (2006); in column (8), we control for the proportion of independent members on the audit committee; in column (9), we control for the governance index (G-index), constructed following Gompers, Ishii, and Metrick (2003); in column (10), we control for the entrenchment index (E-index), constructed following Bebchuk, Cohen, and Ferrell (2009); in column (11), we control for industry-by-year fixed effects; and in column (12), we control for firm fixed effects. In all analyses, the control variables (including industry and year fixed effects) of the baseline regression (column (4) of Table 4) are included but omitted from the table for brevity. The definitions of the control variables can be found in Table A.1. Standard errors are clustered at the firm-CEO pair level. t-statistics presented in parentheses are computed using a bootstrap method as the average of t-statistics from 200 regressions in which hazard is calculated based on the coefficients randomly drawn from their asymptotic distribution in CEO job survival analysis. The superscripts ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Hazard	-1.4919^{**}	-1.4208^{***}	-0.9410^{***}	-1.5411^{***}	-1.5217^{***}	-1.3828^{*}	-1.6468^{***}	-1.5999^{***}	-1.1667^{**}	-1.1683^{**}	-1.5031^{***}	-1.9459^{***}
	(−2.56)	(−2.74)	(−2.82)	(−2.86)	(−2.80)	(−1.95)	(−2.86)	(−2.76)	(−2.07)	(−2.08)	(−2.58)	(−3.09)
Lagged DA		-0.2139^{**}										
		(−2.41)										
Dummy ($DA_{t-1} > DA_t$)			-0.1958^{***}									
			(−10.90)									
Meet forecast				-0.0164^{*}								
				(−1.65)								
Sox dummy (Year $\geqslant$ 2002)					-0.1392^{*}							
					(−1.86)							
CEO overconfidence						0.0410^{**}						
						(2.27)						
Hazard×CEO overconfidence						−0.7531						
						(−0.90)						
Delta							0.0004^{***}					
							(2.92)					
Vega							−0.0219					
							(−0.87)					
Audit comm. Ind.								0.0158				
								(0.46)				
G-index									0.0015			
									(0.69)			
E-index										0.0042		
										(0.96)		
Constant	0.1083^{*}	0.1440^{***}	0.1514^{***}	0.1497^{***}	0.1572^{***}	0.1439^{**}	0.1383^{**}	0.1600^{***}	0.0857	0.0869	0.2421^{***}	−0.0131
	(1.88)	(2.72)	(4.26)	(2.79)	(2.89)	(2.58)	(2.37)	(2.78)	(1.49)	(1.52)	(4.51)	(−0.23)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Industry-year dummies											Yes	
Firm dummies												Yes
Observations	5,140	6,211	6,211	6,098	6,221	6,137	5,900	5,554	5,411	5,411	6,227	6,227

Appendix

A Variable Definition

All continuous variables are winsorized at 1% and 99%. All dollar values are in millions and are adjusted by the Consumer Price Index to the year 2011 dollars.

Table A.1: : Definitions of Important Variables Used in the Analysis

Variable	Source	Detailed Explanation
A: Earnings Management Measures		
Ab DISCEXP	Compustat	Abnormal discretionary expenses calculated as the difference between actual discretionary expenses and estimated values from the corresponding industry-year regression in Roychowdhury (2006).
Ab PROD	Compustat	Abnormal production costs calculated as the difference between actual production costs and estimated values from the corresponding industry-year regression in Roychowdhury (2006).
DA	Compustat	Discretionary accruals: The difference between total accruals and the estimated values calculated as in Kothari, Leone, and Wasley (2005) or Dechow, Sloan, and Sweeney (1995).
Positive DA	Compustat	Positive discretionary accruals.
Negative DA	Compustat	Negative discretionary accruals.
B: Firm Characteristics		
Analyst number	I/B/E/S	The number of analysts following the firm.
Analyst tenure	I/B/E/S	The number of years since the current auditor works with the firm.
Audit comm. ind.	ISS	The percentage of independent members on the audit committee.
Big 4 auditors	Compustat	A dummy variable that equals one if the company is audited by a big-four auditor and zero otherwise.
Board independence	ISS	The percentage of independent directors on the board.
Board size	ISS	The number of directors on the board.
Discretionary expenses	Compustat	The sum of R&D (data 46), advertising (data 45), and selling, general and administrative (SG&A) expenses (data 189) divided by book value of total assets (data 6). Advertising and R&D are set to zero if they are missing as long as SG&A is available.
Firm age	CRSP	Th number of years since the firm was listed on a stock exchange.
Idiosyncratic return	CRSP	The residual value of the regression of firm stock return on the two-digit Standard Industrial Classification (SIC) industry return (Jenter and Kanaan, 2015).
Industry-induced return	CRSP	The predicted value of the regression of firm stock return on the two-digit SIC industry return (Jenter and Kanaan, 2015).
Industry dismissals	ExecuComp	The number of forced CEO turnover events in peer firms of the same two-digit SIC industry in the past two years.
Institutional ownership	Thomson Reuters	The sum of all institutional investors' ownership in the firm
Leverage	Compustat	Long-term debt (data 9) plus debt in current liabilities (data 34) divided by book value of total assets (data 6).
M/B (Q)	Compustat	Market value of assets (data 6 + data 199×data 25 − data 60 − data 74) divided by book value of total assets (data 6).

Continued on next page

Table A.1 Continued

Variable	Source	Detailed Explanation
Operating CF	Compustat	Cash flow from operations (data 308) divided by book value of total assets (data 6).
Production costs	Compustat	Cost of goods sold (data 44) plus change in inventory (Δdata 3) divided by book value of total assets (data 6).
R&D	Compustat	Research and development expenditures (data 46) divided by book value of total assets.
ROA	Compustat	Net income divided (data 172) by book value of total assets (data 6).
Sales growth	Compustat	Annual percentage change in sales (data 12).
Size	Compustat	The natural logarithm of book value of total assets (data 6).
Stock return	CRSP	Annual stock return.
Stock volatility	CRSP	Volatility of annual stock return.
Total accruals	Compustat	Income before extraordinary items (data 18) minus cash flow from operations (data 308) divided by book value of total assets (data 6).
C: CEO Characteristics		
CEO duality	ISS	A dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise.
CEO ownership	ExecuComp	The shares held by the CEO divided by the number of shares outstanding.
CEO tenure	ExecuComp	The number of years since the CEO assumes the position.
Ownership $\geqslant$ 5%	ExecuComp	A dummy variable that equals one if the CEO owns at least 5% of the shares outstanding and zero otherwise.
Retirement age	ExecuComp	A dummy variable that equals one if the CEO is between 63 and 66 years old and zero otherwise.

B Estimation of Earnings Manipulation Measures

The primary measure of earnings manipulation is performance-adjusted DA Kothari, Leone, and Wasley (2005). The model is given below:

$$\frac{TA_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 \frac{1}{Total\ Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Total\ Assets_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{Total\ Assets_{i,t-1}} + \beta_4 ROA_{i,t} + \varepsilon_{i,t},$$

where we define total accruals (TA) as change in non-cash current assets minus change in current liabilities excluding current portion of long-term debt, minus depreciation and amortization; $\Delta Sales$ is change in sales net of change in accounts receivable; PPE is net property, plant and equipment; and ROA is return on assets. Here, we use lagged assets as the deflator to mitigate the issue of heteroscedasticity in residuals. We estimate the above model in each two-digit Standard Industrial Classification (SIC) industry-year group and use the residuals of these regressions as the measure of DA.

An alternative measure of earnings management is based on the modified Jones model (Dechow, Sloan, and Sweeney, 1995), which is the same as the estimation of performance-adjusted DA except that the model omits ROA as a determining factor of non-discretionary accruals:

$$\frac{TA_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 \frac{1}{Total\ Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Total\ Assets_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{Total\ Assets_{i,t-1}} + \varepsilon_{i,t}.$$

Similarly, we estimate the modified Jones model in each two-digit SIC industry-year group and use the regression residuals as the alternative measure of DA.

We consider two types of real earnings management that are manifested respectively in abnormal levels of production costs and discretionary expenses, and we follow Roychowdhury (2006) to construct the measures as follows.

Production costs (PROD) are defined as the sum of cost of goods sold and change in inventory during the year. Abnormal production costs (Ab PROD) is actual production costs minus *normal* production costs calculated using the estimated coefficients from the following regression for each two-digit SIC industry-year group:

$$\frac{PROD_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 \frac{1}{Total\ Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Total\ Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{Total\ Assets_{i,t-1}} + \beta_4 \frac{\Delta Sales_{i,t-1}}{Total\ Assets_{i,t-1}} + \varepsilon_{i,t}.$$

Discretionary expenses (DISCEXP) are defined as the sum of R&D expenses, advertising expenses, and selling, general and administrative expenses (SG&A). R&D expenses and advertising expenses are set to zero if they are missing as long as SG&A is available. Abnormal discretionary expenses (Ab DISCEXP) is actual discretionary expenses minus *normal* discretionary expenses calculated using the estimated coefficients from the following regression for each two-digit SIC industry-year group:

$$\frac{DISCEXP_{i,t}}{Total\ Assets_{i,t-1}} = \beta_1 \frac{1}{Total\ Assets_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{Total\ Assets_{i,t-1}} + \varepsilon_{i,t}.$$

C Results for Alternative Hazard Estimation

Table A.2: Instrumented Hazard Estimation

The table reports the estimation of CEO dismissal hazard based on an instrumental-variable approach. Panel A reports the estimation results. Penal B reports summary statistics of estimated CEO dismissal hazard. Column (1) repeats the baseline CEO job survival analysis (column (1) of Table 2) based on a Weibull model using Ind. dismissal (CEO dismissals of the firm's two-digit SIC industry over the past two years) as an instrumental variable; column (2) repeats the baseline CEO job survival analysis based on a Weibull model using Change in NCI (change in the non-compete enforceability index of the firm's headquarter state) as an instrumental variable. Standard errors are clustered at the firm-CEO pair level. t-statistics are presented in parentheses. The superscripts ***, **, and * indicate the statistical significance at 0.01, 0.05, and 0.10, respectively.

Panel A: Instrumented Hazard Estimation		
	(1) Weibull 1	(2) Weibull 1
Stock return	-1.2226^{***}	-1.2226^{***}
	(-6.43)	(-6.30)
Retirement age	-1.0667^{**}	-1.0515^{**}
	(-2.13)	(-2.10)
Ownership $\geqslant$ 5%	-2.8746^{***}	-2.8557^{***}
	(-2.86)	(-2.84)
CEO duality	-0.3555^{***}	-0.3421^{***}
	(-2.80)	(-2.64)
Board size	0.0380^{*}	0.0166
	(1.74)	(0.73)
Board independence	-0.0631	0.0962
	(-0.17)	(0.25)
Ind. dismissal	0.0845^{***}	
	(4.20)	
Change in NCI		0.5519^{***}
		(4.35)
Constant	-3.3135^{***}	-2.9879^{***}
	(-7.38)	(-6.55)
$\ln(p)$	-0.3654^{***}	-0.3801^{***}
	(-3.52)	(-3.56)
Observations	16,148	15,876
Panel B: Summary Statistics of Hazard		
Mean	0.0166	0.0166
Std. dev.	0.0117	0.0119
25th percentile	0.0086	0.0089
50th percentile	0.0147	0.0152
75th percentile	0.0222	0.0223
Max	0.1362	0.4057

Table A.3: Alternative Methods of Hazard Estimation

The table reports the estimation of CEO dismissal hazard or probability using alternative methods. Panel A reports the estimation results. Penal B reports summary statistics of estimated CEO dismissal hazard or probability. Column (1) assumes a Gompertz hazard: $h^t_{t-1}(\tau_{i,t-1}, x_{i,t-1}) = \exp(\gamma\tau_{i,t-1})\exp(\delta_0 + \delta' x_{i,t-1})$, where γ is an auxiliary parameter that controls the shape of baseline hazard, τ is CEO job duration, x is a vector of firm and CEO characteristics, δ_0 is a constant coefficient, and δ is a vector of the coefficients of x; column (2) assumes a semiparametric hazard following Cox (1972): $h^t_{t-1}(\tau_{i,t-1}, x_{i,t-1}) = h_0(\tau_{i,t-1})\exp(\delta' x_{i,t-1})$, where $h_0(\tau)$ is a nonparametric baseline hazard function; column (3) estimates the CEO dismissal probability using a Probit model; column (4) estimates the CEO dismissal probability using a linear probability model; column (5) estimate the CEO dismissal probability using a Probit model that controls for CEO tenure; column (6) estimates the CEO dismissal probability using a linear probability model that controls for CEO tenure; and column (7) estimates the CEO dismissal probability using a Probit model with the bias-reduced technique (i.e., the BRGLM algorithm designed by Staub, 2017) to address the potential rare-event bias (King and Zeng, 2001). In columns (3) to (7), we control for industry fixed effects. We do not report summary statistics of the estimated hazard for the Cox model because its baseline hazard is unspecified. Standard errors are clustered at the firm-CEO pair level. t-statistics are presented in parentheses. The superscripts ***, **, and * indicate the statistical significance at 0.01, 0.05, and 0.10, respectively.

Panel A: Dismissal Hazard (Probability) Estimation							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Gompertz	Cox	Probit	OLS	Probit with CEO Tenure	OLS with CEO Tenure	Rare-Event Probit
Stock return	−1.2585***	−1.2430***	−0.5981***	−0.0193***	−0.6019***	−0.0194***	−0.5793***
	(−6.52)	(−6.50)	(−6.61)	(−7.65)	(−6.59)	(−7.69)	(−6.72)
Retirement age	−1.0297**	−0.9920**	−0.4763**	−0.0110***	−0.3842**	−0.0080***	−0.3351**
	(−2.05)	(−1.98)	(−2.54)	(−3.89)	(−2.03)	(−2.85)	(−2.19)
Ownership ⩾ 5%	−2.7380***	−2.6422***	−1.1046***	−0.0146***	−0.9738***	−0.0092***	−0.7903***
	(−2.72)	(−2.62)	(−3.73)	(−7.61)	(−3.26)	(−4.76)	(−5.43)
CEO duality	−0.3348***	−0.2779**	−0.2523***	−0.0105***	−0.1848***	−0.0073***	−0.1784***
	(−2.63)	(−2.18)	(−4.47)	(−4.20)	(−3.15)	(−2.84)	(−3.31)
Board size	0.0176	0.0146	0.0338***	0.0011**	0.0313***	0.0009*	0.0303***
	(0.79)	(0.65)	(3.11)	(2.25)	(2.79)	(1.90)	(2.90)
Board independence	−0.1235	−0.1190	0.4804***	0.0174**	0.3865**	0.0124	0.3694**
	(−0.33)	(−0.32)	(2.68)	(2.33)	(2.17)	(1.64)	(2.28)
ln(CEO tenure)					−0.2487***	−0.0095***	−0.2399***
					(−6.01)	(−5.73)	(−6.38)
Constant	−3.3501***		−2.4531***	−0.0178***	−1.8878***	0.0103	0.3557*
	(−9.40)		(−7.00)	(−2.63)	(−5.09)	(1.22)	(1.73)
γ	−0.0602***						
	(−4.77)						
Industry dummies			Yes	Yes	Yes	Yes	Yes
Year dummies			Yes	Yes	Yes	Yes	Yes
Observations	16,148	16,148	15,030	16,148	15,030	16,148	16,148
Panel B: Summary Statistics of Hazard (Probability)							
Mean	0.0168	.	0.0186	0.0174	0.0186	0.0174	0.0196
Std. dev.	0.0120	.	0.0203	0.0188	0.0219	0.0197	0.0234
25th percentile	0.0081	.	0.0045	0.0061	0.0037	0.0053	0.0043
50th percentile	0.0151	.	0.0123	0.0174	0.0112	0.0172	0.0120
75th percentile	0.0232	.	0.0257	0.0287	0.0255	0.0295	0.0268
Max	0.0990	.	0.2093	1.0000	0.2402	1.0000	0.7957

D Exploration of Opportunistic Motives Based on the Modified Jones Model

Table A.4: Opportunistic Motives—A Study Based on the Modified Jones Model

The table presents the effects of CEO job security on accrual-based earnings inflation when CEO dismissal risk is high and when firm performance is poor. All settings are the same as Table 10 except that the dependent variable is positive discretionary accruals estimated based on the modified Jones model (Dechow, Sloan, and Sweeney, 1995).

	Panel A: Based on Hazard				
	(1)	(2)	(3)	(4)	(5)
Hazard	−3.8103**	−4.4172***	−4.6351***	−4.1626***	−4.0396***
	(−2.15)	(−2.64)	(−2.93)	(−2.96)	(−3.20)
Hazard×Top 50%	0.7649				
	(0.61)				
Hazard×Top 40%		1.3164			
		(1.24)			
Hazard×Top 30%			1.5921		
			(1.65)		
Hazard×Top20 %				1.2915	
				(1.56)	
Hazard×Top 10%					1.5439**
					(1.97)
	Panel B: Based on Stock Return				
	(1)	(2)	(3)	(4)	(5)
Hazard	−3.6754***	−4.1244***	−3.4079***	−2.8599**	−3.1386**
	(−3.26)	(−3.22)	(−2.76)	(−2.35)	(−2.36)
Hazard×Bottom 10%	1.8290**			−0.1188	
	(2.13)			(−0.17)	
Hazard×Bottom 20%		1.6029**			
		(2.05)			
Hazard×Bottom 30%			0.4708		
			(0.67)		
Hazard×Bottom 40%				−0.1188	
				(−0.17)	
Hazard×Bottom 50%					0.1384
					(0.18)
	Regression Control Variables				
Control variables	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Observations	7,354	7,354	7,354	7,354	7,354