

# **Learning through a Smokescreen: Earnings Management and CEO Compensation over Tenure**

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## **ABSTRACT**

Career concerns may lead CEOs to distort reported performance (Fudenberg and Tirole (1995)), particularly in the early years of tenure when there is greater uncertainty about the CEO's ability. We investigate whether the presence of reporting distortions affects CEOs' compensation over their tenure. Consistent with the view that career concerns are likely to be stronger in the early years of tenure, we find that earnings management is highest in the early years and decreases monotonically over the CEO's tenure. The results show that compensation is positively associated with earnings management in the early years of a CEO's tenure, but this relationship becomes negative over tenure, indicating that during the period of greatest uncertainty about a CEO's ability, distorting earnings may pay off for some CEOs. Importantly, boards learn about CEOs' ability over time, and do not reward those who continue to distort reported performance. These results are robust to treating tenure and earnings management as endogenous. We also show that the relationship between reporting distortions and compensation varies based on CEO characteristics that capture uncertainty about ability and career concerns: earnings management is more strongly correlated with the compensation of younger CEOs, and those without a fixed term employment contract who may be at higher risk of being fired. These results indicate that boards adjust compensation in response to potential earnings distortions in the early years of a CEO's tenure.

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## 1. Introduction

Career concerns, which arise when a CEO's current performance is linked to future compensation (Gibbons and Murphy (1992)), are likely to be particularly critical during the early years of a CEO's tenure, when the lack of reliable past performance measures makes it difficult for shareholders to discern managerial ability from the quality of the match with the firm.<sup>1</sup> In this environment, boards learn about managers' ability and determine CEO compensation by observing recent performance measures (Harris and Holmstrom (1982), and Holmstrom and Ricart I Costa (1986)). Fudenberg and Tirole (1995) argue that in an environment with "information decay", where recent performance measures are more informative for predicting future performance, managers have an incentive to distort reported earnings to increase their expected tenure. Evidence from "the field" also underscores the importance of the interaction between earnings management and career concerns (Graham et al. (2005)).<sup>2</sup> Theory also suggests that early on in their career, workers are more willing to take costly unobservable actions in order to influence the market's beliefs (Gibbons and Murphy (1992)). In this paper, we investigate how CEO compensation, over the entire tenure, is determined in an environment where shareholders and boards learn about CEO's ability and the quality of the job match, by observing potentially distorted performance measures in the early years of tenure.

Based on the career concerns view, earnings management may act like a smokescreen in the early years of a CEO's tenure, making it difficult for shareholders and boards to infer true managerial ability from reported performance, and in turn may affect CEO compensation. Over the manager's tenure, as more independent information about her decisions becomes available, boards and shareholders should be able to learn (Pan, Wang and Weisbach (2013a)) and discern performance

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<sup>1</sup> Fama (1980), who introduced the idea that career concerns may influence managerial decisions, argued that the discipline imposed by the managerial labor market makes incentive contracts for CEOs redundant. Holmstrom (1982/1999) showed that, while labor market discipline is important, it is not a perfect substitute for incentive contracts.

<sup>2</sup> Based on a survey of managers, Graham et al. (2005) show that more than three-quarters of the surveyed CEOs agree/strongly agree "...a manager's concern about her external reputation helps explain the desire to hit the earnings benchmark."

distortions, and make better inferences about ability. Compensation then should respond to the diminishing uncertainty the board will have about CEO's ability.

A natural question relates to the use of earnings management in the context of the career concerns argument. Existing literature has shown that firms may optimally use earnings management (see, for example, Dye (1988) and Arya et al. (1988)) and shareholders may have incentives not to stop CEOs from engaging in this behavior.<sup>3</sup> While earnings management in the early part of the tenure should have benefits from a career concern point of view, it may not be costless for the CEO to distort performance because of reputational concerns. For example, Hazarika et al. (2012) find that CEOs who *maintain a consistently* high earnings management over their tenure are more likely to be fired by the board, thus paying the ultimate price for distorting reported performance. In other words, there is a trade-off in the use of earnings management and such trade-off varies over tenure: *ceteris paribus* the costs of earnings management in the early part of tenure may be relatively low as the board learns about the new CEO but will increase significantly over time as the CEO becomes more of a "known quantity" and will be fired if high levels are maintained later on during tenure. Hence, the empirical implication is that earnings management is likely to be highest in the early years of a CEO's tenure but will decrease significantly over tenure.<sup>4</sup> Regarding CEO compensation, the empirical implication is that the effect of earnings management on compensation should decay over the CEO's tenure because career concerns are strongest in the earlier years, high ability CEOs will reduce earnings

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<sup>3</sup> When the so-called Revelation Principle does not hold, such as when the contracting space is limited or shareholders' ability to make commitments is restricted, then earnings management may confer some advantages to the firm. Dye (1988) argues that "To assert that shareholders might have a demand for earnings management might seem perverse, since unmanaged earnings are typically considered preferred to managed earnings, *ceteris paribus*. But the assumptions implicit in the *ceteris paribus* qualification are frequently not tenable. For example, to give a manager no incentive to engage in earnings management may necessitate altering his compensation scheme by making it independent of accounting data. Such alterations may change the manager's preferred action choice."

<sup>4</sup> The literature has also shown that CEOs may respond to greater career concerns early in their career, in other ways as well. For example, Chevalier and Ellison (1999) show that the higher termination risk in the early years of a mutual fund manager's career leads young managers to avoid unsystematic risk.

management the most over time, and CEOs who do not reduce earnings management face the risk of being fired.

The learning hypothesis suggesting that compensation will increase with tenure (for the CEO who survive on the job) as more information is revealed about CEO's ability is not the only one that posits a relationship between compensation and tenure. Another theory posits that such a relationship will exist due to accumulation of job-specific human capital (see Becker (1962), Mincer (1974), Parsons (1972), Kuratani (1973), and Hashimoto (1981), among others).<sup>5</sup> Thus to consider the effect of tenure on compensation, in our empirical methodology we disentangle the effect of tenure as a measure of the CEO's firm-specific skills from the effect that earnings management has on compensation.

To investigate how compensation is determined over the tenure of the CEO, given that career concerns may lead CEOs to distort reported performance early in their tenure, we use data on 1,624 CEO turnovers, in 1,023 firms forming part of the S&P 1500 index over the period 1992 to 2009, and follow CEOs over their entire tenure in a firm.<sup>6</sup> We examine the effects of tenure, different measures of earnings management, and the interaction between tenure and earnings management, on CEO compensation and its components, controlling for other firm characteristics that are likely to affect compensation.

Tenure and earnings management are likely to be endogenous to unobservable CEO's ability, quality of the CEO-firm match, and CEO and firm characteristics, which also affect compensation. In particular, since good CEO-firm matches are likely to survive longer than bad matches, CEOs who survive longer may be compensated more because they have located jobs where their productivity is

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<sup>5</sup> The dynamic contracting hypothesis proposed by Edmans, et al. (2009) also indicates that compensation may increase over tenure, as does Bebchuk and Fried's (2004) argument that compensation may increase over the tenure of more entrenched CEOs. However, neither of these theories considers the role of earnings management in determining compensation.

<sup>6</sup> We remove the year of turnover from our analysis since it is well known that incoming CEOs often engage in "big bath" accounting practices in their incoming year (Murphy and Zimmerman (1993)).

high. Earnings management is also a choice variable, and likely to be correlated with unobserved ability, firm, and job match effects. We address these issues in a number of ways. First, we estimate an instrumental variable panel data regression with CEO and firm fixed effects to account for unobservable CEO and firm characteristics. Following Hazarika et al. (2012), we use firm-level special accounting items and volatility of operating earnings as instruments for earnings management. To account for CEO-firm job match effects, we instrument tenure using Altonji and Shakotko's (1987) approach, widely used in the labor economics literature to examine the effect of tenure on wages.<sup>7</sup>

Second, and most importantly, the actual use of earnings management should be the outcome of a trade-off between the costs and benefits of engaging in such behavior. The trade-off should depend on both CEO and firm characteristics related to the learning process. Based on theoretical predictions, we identify CEO and firm characteristics that measure the CEO's incentives and ability to engage in earnings management in the early part of tenure. Specifically, we consider CEOs with fixed term employment contracts, younger CEOs, CEOs who are insiders, the governance characteristics of firms, how powerful is the CEO (i.e. whether she is also appointed as chair of the board), and the precision of the signal on the CEO's ability received by the board. In each case we investigate the relationship between compensation, tenure, and earnings management for these different sub-samples of data.

Consistent with the view that CEOs may use earnings management to signal higher ability when survival is at greatest risk, we first show that earnings management is highest in the early years of a CEO's tenure and decreases monotonically over time. It should be noted that our results on

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<sup>7</sup> Jovanovic (1979) and Johnson (1978) provided the first theoretical work about the importance of job match quality as an explanation for both workers' tenure and their wage growth. Since we do not observe many CEO transitions across multiple firms due to the specificity of the CEO market where there are very few transitions of CEOs across firms, we cannot separately identify an individual effect and a job match effect, and refer to the sum of these as the job match effect.

earnings management are obtained after omitting the year of the turnover, and are not a function of the “big bath” behavior.

Based on this finding, we proceed to investigate whether the CEO’s incentives to manage performance in the early years is anticipated by boards and reflected in the CEO compensation package. The results show that on average, earnings management is positively associated with total compensation in the early years, but this relationship is reversed subsequently. Specifically, the positive association between earnings management and compensation disappears around the fourth year of a CEOs’ tenure, following which we observe a negative relationship between earnings management and total compensation. Note that these results are robust to treating tenure and earnings management as endogenous in an instrumental variable framework, firm-level controls, time, industry, CEO, and firm fixed effects.

The results obtained for the entire sample are largely consistent with Fudenberg and Tirole (1995): uncertainty about CEO’s ability and job-match is high in the early years of tenure, when boards are not able to detect the true extent of earnings management, but such uncertainty decreases over time as the board obtains more independent information and has a longer time to assess the CEO. The results are also consistent with Harris and Holmstrom (1982): as the CEOs survive and more information is produced about them, CEOs should pay a lower (employment) insurance premium because their ability can be more precisely assessed.

If CEOs distort performance to disguise their ability, particularly in the early years of their tenure, it follows that CEOs with high ability, or who are better matched with the firm, should reduce earnings management the most over their tenure. The empirical implication of this argument is that CEOs who decrease earnings management the most should be rewarded by the largest increase in compensation. Our results confirm this prediction: CEOs who decrease earnings management the most with respect to the first year of tenure, experience the largest increase in compensation over their

tenure. This evidence ties well with the results in Hazarika et al. (2012) because we find that the CEOs who survive on the job are those who are found to have reduced earnings management the most and these are, at the same time, rewarded by the largest increase in compensation.

Next, we identify cross-sectional characteristics of CEOs that capture ability and incentives to undertake earnings management, and examine cross-sectional heterogeneity in the dynamics of CEO compensation and earnings management based on these characteristics. First, Fudenberg and Tirole (1995) argue that CEOs may be more likely to distort reported performance if they are not given a long-term employment contract. If a CEO engages in performance management as an insurance device to increase the likelihood of survival then one should not expect such behavior if the CEO's position is covered by a long-term contract. To investigate whether the likelihood of undertaking earnings management varies based on the CEO's employment contract, we hand collect data on the type of contract, if any, given to a CEO at the time of the appointment. These contracts can be of two types: either fixed-term contracts, which specify the minimum number of years of employment (in other words, a long-term contract), or at-will employment contracts, which is a short-term contract. Consistent with Fudenberg and Tirole (1995), we find that CEO's compensation is not sensitive to the level of earnings management and its evolution through time for CEOs with fixed-term contracts. Hence, a long-term contract that mitigates career concerns in the early years of tenure, when they are most critical, appears to reduce the impact of earnings management on compensation.

Second, we examine the difference between insider CEOs, those promoted from within the firm, and outsiders, based on the argument that boards may be better informed about the ability of insider CEOs. However, we note Gibbons and Murphy's (1992) point that prior experience serving at lower levels in the corporation is "unlikely to yield precise information about the individual's potential performance as CEO." Consistent with the latter view, we find no evidence that the earnings management dynamics over the tenure of insiders CEOs are different from those of outsiders. Instead,

we find that what matters for the influence of earnings management on compensation in the case of insiders is whether they are given a fixed-term employment contract or an at-will, or no contract, confirming the importance of such agreements for our research question.

Third, as suggested by Gibbons and Murphy (1992) we should expect that career concerns are more important for younger CEOs (age less than 59 years) compared to those who are close to retirement. Consistent with this hypothesis, we find a significant association between earnings management and compensation over the tenure of younger CEOs.

Fourth, we conjecture that earnings management is likely to play a greater role in determining CEO compensation in firms where the CEO has more power, or boards' monitoring abilities are relatively limited, suggesting an important role for corporate governance. To test this conjecture, we use the G-index (to examine whether the relationship varies based on firm-level governance), and the power position of the CEO (i.e. whether the CEO is also appointed as the Chair of the board). The results suggest that in firms with high G-index, or when a powerful CEO is appointed, compensation is not as responsive to earnings management as in the case when boards have large power vis-à-vis the manager.

Lastly, the principal agent models predict that the link between CEO compensation and firm's performance will be stronger the more precise is the signal the board gets about the CEO's effort. In cases when the underlying firm performance is inherently noisy, the CEO may be more inclined to use earnings management in the early part of tenure as an insurance device against firing. To test this hypothesis, we use the firm-level volatility of stock returns as a measure of the precision of the signal about CEO's effort. Consistent with the prediction from the principal-agent model, we find that the relationship between earnings management and compensation over tenure is found only for high volatile firms, i.e. in firms where the precision of the signal is weak.



Boards' learning about CEO's ability in the presence of earnings management is the most plausible explanation of the sequence of results found in the paper. Similar to Pan, Wang and Weisbach (2013a) we also find that learning about the CEO takes place, is convex in tenure and faster when there is greater *ex-ante* uncertainty about ability. The evolution of CEO compensation over tenure responds to this learning process.

Our paper makes a contribution to two main strands of the literature. While most of the empirical literature on executive compensation have focused on explaining the cross-sectional variation in compensation across firms and sectors, Gibbons and Murphy (1992) and Cremers and Palia (2011) investigate an under-researched area in executive compensation: how compensation changes over the tenure of the CEO. Another strand of the literature explores the correlation between earnings management and CEO compensation but it does so exclusively in the cross-section and does not consider how this relationship behaves over the tenure of the CEO (see for example Burns and Kedia (2006), Bergstresser and Philippon (2006), Efendi, Srivastava, and Swanson (2007), and Cornett, Marcus, and Tehranian (2008)). Not much is known empirically on, first, how earnings management evolve over CEO's tenure, and, second, its impact on compensation over tenure, as boards internalize the possibility of such behavior for job survivability purposes. We contribute to these strands of literature in various ways. First, we show that earnings management may be used by CEOs as a response to career concerns that are more acute in the early years of tenure. Similar in spirit to the learning process in Pan et al. (2013) and the reputational costs of high earnings management in Hazarika et al. (2012), we show that learning about CEOs' abilities and her match with the firm leads to a monotonically decreasing use of earnings management. Second, and most importantly, we are the first to empirically investigate the dynamics of how compensation is determined over tenure given the CEO's incentives to distort reported performance in the early years of tenure.

We also contribute to the emerging research exploring how the market and boards learn about CEOs' abilities. One way that CEOs may use to influence the learning process is for them to take actions on real firm decisions, such as changing the investment policy to tilt it towards projects with short-term pay-offs. Narayanan (1985) demonstrates that, in the presence of asymmetric information, if the manager has perfect mobility within the labor market, she has incentives to choose projects with short-term pay-offs rather than ones that have higher net present value but produce long-term cash flows. Pan, Yang and Weisbach (2013b) find that CEOs, in the early part of tenure, tend to disinvest in projects embarked on by the previous CEO and then increase investment later on in their tenure. In this paper we investigate the use of earnings management as another channel that CEOs use to influence the learning process and relate this process to how boards set executive compensation.

The remainder of the paper is organized as follows. Section 2 discusses the sample construction and the empirical methodology. Section 3 and 4 describe the results, and, Section 5 concludes.

## **2 Data and Empirical Methodology**

### **2.1 Data**

We obtain data from a variety of sources. We identify all CEO turnovers from the Standard & Poor's ExecuComp database over the period 1992–2010. From these data we exclude interim CEO appointments, i.e. CEOs with tenure of two years including the year of the appointment, and retain CEOs for whom we observe consecutive years from at least the first year of appointment. Following the literature, financial firms (6000-6999) and regulated utilities (4900-4999) are excluded. The final sample includes 1,624 CEO turnovers in 1,023 firms for a total of 7,941 firm-year observations. All variables used in the analysis are described in Appendix A.

We focus on the level of total compensation, and collect the relevant variable (TDC1) recorded by ExecuComp. We use the natural logarithm of total compensation for our compensation specifications.

Firm-level control variables that have been found to influence compensation (such as firm size, return on assets, market-to-book ratio, etc.) are obtained from Compustat, and data on share prices and number of shares outstanding from the Center for Research in Security Prices (CRSP). The institutional ownership data are from Thomson Financial. We have complete information about compensation and earnings management measures for 7,628 firm-year observations. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.<sup>8</sup>

As career concerns are likely to influence CEOs differently, depending on their characteristics, we collect data on (a) whether a CEO has an employment contract with the firm and its type (fixed term vs. at-will), (b) CEO's age at the time of appointment, and (c) whether a CEO is promoted internally (insider) or recruited from outside the firm (outsider).

The Securities Exchange Act of 1934, Regulation S-K, Item 402 requires that firms disclose information about the employment contract terms between the firm and the CEO. Similar to Schwab and Thomas (2005), Gillan et al. (2009), and Xu (2011), we collect information about the existence of an employment contract and its terms (fixed term or at-will) from SEC filings.<sup>9</sup> For each CEO in the sample, we collect information about CEO age at the time of appointment and year of appointment from ExecuComp and, if the data is missing (and to check its correctness), we also search the Factiva and Lexis-Nexis databases. We also obtain data about whether the newly appointed CEO is an insider (defined as a CEO who was an employee of the firm for at least five years before being appointed as

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<sup>8</sup> Results are unchanged if we employ a different winsorization or do not winsorize at all.

<sup>9</sup> In a fixed term contract, the firm's commitment is to pay compensation to the CEO for a specific number of years and should continue to do so if it terminates employment without cause. Under at-will contract, the employment relationship can be terminated by both the employer and the employee for "good cause, for no cause, or even for cause morally wrong, without being thereby guilty of legal wrong" (Payne vs. Western & Atlantic Railroad Co., 81 Tenn. 507, 519-520, 1884 WL 469 (September Term, 1884)).

the CEO), or an outsider from ExecuComp, Factiva, and Lexis-Nexis by reading the press statements and related news issued by the companies in our sample around the date of the CEO appointment.

## 2.2 Measures of Earnings Management

As highlighted in the literature,<sup>10</sup> the degree of accounting transparency of a firm is inversely related to the degree of earnings smoothing and discretion: both measures should capture the extent to which CEOs misstate the firm's true economic performance. Earnings smoothing measures gauge the extent to which management dampens fluctuations in reported earnings relative to true earnings, thus increasing accounting opacity. Another measure of accounting opacity is earnings discretion, namely the latitude that management has in reporting – and thereby misstating – earnings, based on the extent and use of accounting accruals.

We first compute earnings management measures at the firm level, and then disentangle other measures into their “normal” and “abnormal” components, thereby obtaining firm-level measures of excessive earnings management. As shown in the accounting literature (for example Francis et al. (2005)), the informativeness of reported earnings is influenced by various factors, such as environmental uncertainty and industry affiliation, as well as by intentional estimation mistakes arising from insiders' incentives to reduce transparency. In keeping with the maintained hypothesis, we want to capture exclusively management's intentional errors to reduce transparency. For our baseline results, we use the *abnormal* component of earnings smoothing and earnings discretion. We also use a measure of actual firm-level accruals and, in line with the accounting literature, firm-level controls will be used.

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<sup>10</sup>See, for example, Jones (1991), Dechow and Dichev (2002), Dechow et al. (2010), Francis, LaFond, Olsson and Schipper (2005), and Leuz, Nanda and Wysocki (2003).

We use two different measures of accounting transparency. The first earnings management measure is the Performance-adjusted Modified Jones Model which is based on an approach that disentangles normal from abnormal accruals using performance-augmented modified Jones model as in Hazarika, Karpoff and Nahata (2012). Following Bergstresser and Philippon (2006), we use the Fama-French 48 industry-groups and include year dummies in the specification to compute industry-specific estimates that then give us firm-specific normal accruals. Following the literature, we exclude all firm-year observations that do not have sufficient data to estimate any of the measures of earning management and we exclude industry-year observations if there are fewer than ten observations in a Fama-French 48 industry group for any specific year. We then proceed to compute the absolute level of abnormal accruals by subtracting normal accruals from actual accruals. The second measure uses the absolute level of firm-level Operating Accruals calculated using information from the cash-flow statement (Hribar and Collins (2002)). Appendix A explains the details of how we calculate these two measures of accounting transparency.

### **2.3 Sample Description**

Table 1 provides the descriptive statistics of our sample. Panel A shows the number of CEOs in each year of their tenure, Panel B shows the number of CEO turnovers in each calendar year over our sample period together with the CEO characteristics (insiders, young CEOs and CEOs with fixed-term contract), Panel C shows the distribution of the main compensation variable and the two main measures of earnings management and Panel D shows the correlation between tenure, compensation and different earnings management measures.

[Insert Table 1]

From Panel A, we note that out of the 1,624 CEO appointments over our sample period, more than 300 CEOs are not observed any longer in our data at the start of the fourth year and another 300 CEOs drop out in the fourth year. This evidence is important because while the literature so far has focused on the median duration of CEO's tenure we find significant turnovers in the third and fourth years: in fact almost 37% of the CEOs do not complete their fourth year. These descriptive statistics show that significant decisions about the continuation of the CEO on the job are taken precisely in the third and fourth year. It should be noted that, on average, the fixed term contracts' duration is about three years and the end of such contracts seems to be related to the decisions made regarding continuation versus firing or quitting, suggesting we focus our analysis precisely on these years. Only 555 CEOs of the original 1,624 CEOs start the seventh year of their tenure. These terminations may be voluntary or forced turnovers (firings), or retirements.

Panel C shows that, consistent with existing literature, the median (mean) tenure of a CEO is 7 (7.25) years. The average total compensation for the entire sample is \$5.44 million and most of it is driven by the equity component (stocks and stocks options). The salary component accounts for about 12% of the total compensation and bonus contributes to less than 10% of the entire compensation. The average (median) CEO's age at the time of appointment is 52 (51) years, 40% of the CEOs are promoted from inside the firm, and more than 30% of the CEOs start their tenure with an employment contract. The mean and median values of the two earnings management measures are consistent with those found in existing literature. Panel D shows that the total level of compensation is positively correlated with tenure and negatively correlated with our measures of earnings management. Importantly, we find that our measures of earnings management are positively correlated with both special items, and operating earnings volatility, which we will use as instruments for our empirical specification.

## 2.4 Empirical Methodology

Identifying the effect of earnings management, especially the dynamics of earnings management over tenure, on compensation is a difficult task for two reasons. Earnings management may be correlated with unobserved CEO and firm factors or with the quality of the CEO-firm match, that also affect compensation. Similarly, the labor economics literature suggests several theories for why compensation may increase with tenure. The human capital argument discussed by Becker (1975), and Mincer (1974), among others, suggests that additional years on the job imply accumulated job-specific skills, which are rewarded with higher compensation by the current employer. Other explanations for the compensation and tenure relationship rely on uncertainty about the innate ability of the worker, and the quality of the job match. CEO compensation may increase over the tenure of the CEO because good CEO job matches survive, while bad matches do not. We examine whether the dynamics of earnings management over tenure affects compensation using the following specification:

$$Y_{i,j,t} = \beta_1 T_{ijt} + \beta_2 T_{ijt}^2 + \beta_3 EM_{ijt} + \beta_4 T_{ijt} \times EM_{ijt} + \beta_5 T_{ijt}^2 \times EM_{ijt} + \beta_6 X + \varepsilon_{ijt} \quad (1)$$

$$\varepsilon_{ijt} = \alpha_i + \alpha_j + \alpha_{ij} + \eta_{ijt}$$

where  $i$  indexes CEOs,  $j$  indexes firms, and  $t$  indexes the time.  $Y$  is the natural log of TDC1,  $T$  is the number of years CEO  $i$  has been the CEO at firm  $j$ , at time  $t$ , and  $EM$  refers to earnings management.  $X$  includes observable firm characteristics that are likely to affect CEO compensation. The error term  $\varepsilon_{ijt}$  consists of a fixed individual effect  $\alpha_i$ , a fixed firm effect  $\alpha_j$ , a fixed job-match effect  $\alpha_{ij}$ , and a transitory component  $\eta_{ijt}$ . The fixed job match effect reflects variations in compensation across firms that arise due to reasons raised in the job-matching and efficiency wages literature (Altonji and Shakotko, 1987). Both  $EM$  and  $T$  may be correlated with  $\alpha_i, \alpha_j, \alpha_{ij}$ , so ordinary least squares will yield inconsistent estimates. The net effect of the job match component is to introduce an additional upward bias in the OLS estimates of the tenure variable in equation (1).

To control for job match effects in the relationship between tenure and compensation, we adopt an instrumental variable approach and instrument tenure following the methodology used by Altonji and Shakotko (1987).

Let  $\tau_{ij}$  be the set of  $t$  for which we can observe individual  $i$  in firm  $j$ , and  $N_{ij}$  the number of such observations. Altonji and Shakotko (1987) propose an instrumental variable that is the deviation of the tenure variables around their means for each job match spell:

$$\hat{T}_{ijt} \equiv T_{ijt} - \bar{T}_{ijt} \quad (2)$$

where

$$\bar{T}_{ijt} \equiv \frac{1}{N_{ij}} \sum_{t \in \tau_{ij}} T_{ijt}$$

For example, if a CEO has a tenure of 7 years with a given firm,  $\bar{T}_{ijt} = \frac{1}{7}(1 + 2 + 3 + 4 + 5 + 6 + 7) = 4$ . For a CEO with a tenure of 4 years,  $\bar{T}_{ijt} = 2.5$ . The instrumental variable is then constructed as  $T_{ijt} - \bar{T}_{ijt}$  for each year of tenure. We construct the instrumental variable  $T^2$  similarly. The main advantage of this instrumental variable is that it is uncorrelated by construction with the individual, firm and job match effects. However, because we do not observe CEO transitions across firms, i.e. we do not observe a CEO moving to another firm as a CEO, since such events are quite rare, we are not able to distinguish the individual effect  $\alpha_i$  from the job match effect  $\alpha_{ij}$  in equation (1), so we refer to the sum of these two effects as the job match effect. The problem of disentangling time-invariant CEO effects from time-invariant firm effects on compensation, given the very limited mobility of CEOs across firms, was highlighted by Graham, Li and Qiu (2012), who focus on this specific dimension but do not control for the job-match effect which, according to the labor literature, is a crucial dimension of how compensation varies over tenure.



Earnings management is also likely to be correlated with unobservable CEO and firm factors that also affect compensation. For example, the accounting literature finds evidence consistent with the conjecture that the level of earnings management is decided by the CEO. In our set-up, earnings management may be decided by the CEO for strategic reasons precisely to increase the probability of survival on the job. Consistent with Hazarika et al. (2012), we instrument earnings management by using (i) special items, which is the sum of special items, extraordinary items, and restructuring charges as reported by Compustat; and (ii) operating earnings volatility, computed as the standard deviation of operating earnings (ROA) measured over the five prior years.

The estimation method is an instrumental variable approach, using (a) special items, and (b) operating earnings volatility as instruments for earnings management, and the variables in equation (2) as an instrument for the tenure and tenure squared. When we instrument both the measures of earnings management and tenure, the instrumental variable regressions are estimated with firm-level fixed effects because including a CEO fixed effect tenure and tenure squared would not be identified. As a robustness check, in some specifications we only instrument the measures of earnings management and thus are able to include a CEO fixed effect in the instrumental variable regressions. Finally, we also provide estimates using a panel OLS methodology with firm and CEO fixed effects.

After using the instrumental variable approach on the entire sample, we proceed to use a series of sample splits, carefully chosen based on theoretical predictions, to further investigate the relationship between earnings management and compensation over tenure. As argued before, the actual use of earnings management should be the outcome of a trade-off between the costs and benefits of engaging in such behavior and the trade-off should depend on both CEO and firm characteristics. Based on theoretical predictions, we identify CEO and firm characteristics that measure the CEO's incentives and ability to undertake earnings management. We investigate the

maintained hypothesis in these different sub-samples using both an OLS estimation with CEO fixed effects, industry effects and year dummies and an instrumental variable approach.

### **3. Results**

#### **3.1 Earnings Management and Tenure**

We start our analysis by exploring the behavior of earnings management over the CEOs' tenure. Under our maintained hypothesis of career concerns, we should find that CEOs use more earnings management early on in their tenure and should reduce it over the years as uncertainty diminishes.

We regress each of our measures of earnings management on tenure and include firm-level observable characteristics (Leverage, Market-to-Book Ratio, Firm Size and Past Returns) and use specifications where we either use CEO fixed effects, industry effects and year dummies, or firm fixed effects and year dummies. It should be noted that our objective in these specifications is to explore whether the level of earnings management correlates with tenure and in what way. Thus in these specifications we do not use any instrument for tenure. The results are shown in Table 2 and Figure 1.

[Insert Table 2 and Figures 1 and 2]

The main result in Table 2 is found in the first row: in all specifications, whether we include firm characteristics as controls or not, we find that our measures of earnings management correlate negatively with tenure. As expected, the statistical and economic significance varies across the different specifications but we always find that earnings management is highest in the first years of tenure and then it diminishes monotonically. The coefficient for the variable tenure squared is positive and in many specifications it has either weak or no statistical significance implying that, at best, the

decrease of earnings management over tenure occurs slowly. It should be noted that we remove the first year of the CEO's tenure (year 0) from our analysis and thus these results are not driven by the "big bath" behavior of CEOs as they start their job.

Figure 1 shows graphically the evolution of the Operating Accruals measure of earnings management over the CEOs' tenure together with the fitted values obtained from the regression shown in Column 5 of Table 2. Panel A of Figure 1 shows the linear fit of earnings management over tenure (considering only the impact of tenure) and Panel B shows the quadratic fit (considering the impact of both tenure and tenure squared). Similar results are obtained when using the Performance-Adjusted Modified Jones measure of earnings management.

Given different CEO and firm characteristics, it is likely that the level and evolution of earnings management across tenure differ cross-sectionally. In Figure 2, we explore whether younger CEOs, thus ones for whom uncertainty about ability is very high at the start, may engage in different earnings management compared to older CEOs who, presumably, should be more of a "known quantity" to the board. Figure 2 confirms this conjecture: younger CEOs tend to engage in more earnings management compared to older CEOs, but while the former decrease it over their tenure, older CEOs appear to be increasing it slightly over their tenure.<sup>11</sup>

The results in Table 2 and Figure 1 are consistent with the view that earnings management is higher in the first years of a CEO's tenure and diminishes rapidly in successive years as boards receive unbiased information and reputation costs from high earnings management become significant for CEOs. These results, together with those of Hazarika et al. (2012), suggest that the dynamics of income smoothing modeled by Fudenberg and Tirole (1995) evolve significantly over tenure. The question then becomes: which CEO type should most likely reduce earnings management? Given the

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<sup>11</sup> Existing evidence (Murphy and Zimmerman, 1993, Pourciau, 1993, and Kalyta, 2009) finds that CEOs increase earnings management in the final years of their tenure as a way to influence their compensation in the final year.

reputational concerns it should be CEOs with intrinsically high ability or whose match with the firm is of high quality. For these CEOs, uncertainty is resolved positively over time in the form of positive firm performance and need no smokescreen any longer. This behavior, in turn, implies that the CEOs who decrease significantly their earnings management will be rewarded by the sharpest rise in their total level of compensation (besides being kept on the job). To investigate this, we consider how the *change* in the level of earnings management for each year of the CEO's tenure relative to the level of earnings management in the first year of tenure influences the change in the level of compensation with respect to the first year of tenure.

Specifically, we investigate the correlation between the change in CEO's compensation in year  $t$  from the level of compensation in the first year of tenure with the change in each measure of earnings management measured in a similar way (the change in the level of earnings management in year  $t$  from its value in the first year of tenure). We include CEO-level (or firm-level) fixed effects and cluster standard errors at the CEO-firm level. We show the results graphically in Figure 3.

[Insert Figure 3 and Table 3]

Figure 3 shows that there is a very strong negative correlation between changes in compensation from the first year of tenure and changes in the earnings management measure (using Operating Accruals) from its value in the first year of tenure (and controlling for CEO fixed effects). This means that CEOs who decrease (increase) their earnings management most with respect to their *own level in the first year* of tenure are those who experience the largest increase (decrease) in their level of compensation. Hence, it appears that, on average, CEOs that survive tend to use a much lower level of earnings management compared to their own level of earnings management in the early part of the tenure and any excessive use of earnings management in later years has a negative impact on their compensation.

These results are confirmed more precisely in Table 3 where we investigate how the *change in the equity component* in each year of CEO *i*'s tenure with respect to the first year of her tenure correlates with the *change in her earnings management* in each year with respect to that in the first year. We investigate different parts of the tenure: years 2 and 3 in columns 1 and 4, years 4 and 5 in columns 2 and 5, and years 6 and 7 in columns 3 and 6.

As shown in Panel A of Table 1, a significant number of CEO jobs are terminated in years 4 and 5. For example, out of the initial 1,624 CEOs, 1,305 start their fourth year, and only 1,026 start their fifth year. Although terminations do continue after the fifth year, they do so at a lower rate. These turnover dynamics mean that most of the uncertainty is resolved around the fourth and fifth year and compensation should mostly respond to the change in earnings management around this period. This is precisely what we find in Table 3: the increase in compensation is largest for the CEOs that decrease the earnings management the most in the fourth and fifth year of tenure.

These results suggest that CEOs that show higher true ability through a reduction of earnings management are kept on the job and their compensation is also increased. This evidence is consistent with the results of Hazarika et al. (2012): CEOs who survive on the job are those who reduce earnings management the most and are, at the same time, rewarded by the largest increase in compensation besides being kept on the job.

### **3.2 Executive Compensation and Earnings Management**

Our results so far establish that there is (a) a negative correlation between earnings management and tenure, and (b) a negative correlation between changes in compensation and changes in earnings management with respect to the first year of tenure. These findings suggest that career concerns are particularly critical during the early years of the CEO's tenure because lack of past performance measures makes it harder for shareholders to disentangle random fluctuations in

performance from the CEO's inherent ability and the quality of the match with the firm. Over time, and with more information arriving about the quality of the CEO and his match with the firm, shareholders are able to determine the CEO's true ability and the importance of earnings management diminishes over tenure. So far we have found that CEO compensation broadly correlates with this behavior.

We next investigate the dynamics of executive compensation over a CEOs' tenure at a firm, when shareholders learn about CEO's ability and the quality of the job match with the firm, in the presence of reporting distortions used strategically by CEOs for survival purposes. We do so in a specification that fully considers the endogeneity that may exist in the level and evolution of earnings management and tenure. Existing literature has investigated the cross-sectional relationship between earnings management and compensation, ignoring the relationship over the tenure of the CEO at the firm. Thus, the main variable of interest is the interaction of earnings management with tenure (and tenure squared) on the level of compensation. Under the hypothesis that shareholders' uncertainty about CEO's ability and the quality of match decreases as more information is revealed over time, we should expect that the impact of any performance distortion on compensation decreases over the CEO's tenure. The results are shown in Table 4.

[Insert Table 4]

We start the analysis using panel OLS regression of specification (1) above and including firm, and CEO fixed effects separately, which are reported in the Panel A of Table 4 (columns 1-2 report the results with CEO fixed effects and columns 3-4 report the results with firm fixed effects). In every specification we include firm-level observable characteristics (Market-to-Book Ratio, Firm Size, Firm Size Squared, Stock Returns Volatility, and Past Returns, and Return on Assets, etc.) and include year dummies. We cluster the standard errors at either the CEO-level or the firm-level.

In all specifications we find that the level of earnings management positively correlates with the level of compensation but, as we explain next, the actual magnitude depends crucially on the year of tenure. Most importantly given our research question, the coefficient estimates of the interaction variable between earnings management and tenure is always negative with highly statistical and economically significance across all the measures we use. This evidence is consistent with the view that the impact of performance distortion on compensation becomes smaller over the CEO's tenure. We find unambiguous results on how compensation evolves over tenure whether we use firm or CEO fixed effects. The coefficients of tenure squared are only statistically significant when we use the performance-adjusted modified Jones model but not when using operating accruals. Overall, the coefficients from tenure squared suggest that any decrease of the impact of earnings management over compensation occurs slowly. Putting together the three coefficients we find that the use of earnings management correlates with higher compensation in the first year of tenure and its impact decreases monotonically over time and, starting from the fourth year of tenure, the impact turns negative.

While our panel OLS results support our maintained hypothesis, when controlling for individual CEO effects and firm effects, tenure and earnings management are also likely to be correlated with the job-match effect in the error term, as described in Section 2. We proceed to address these sources of endogeneity in the following way. First, we use a specification that instruments only for earnings management by using (a) special items, and (b) volatility of operating earnings. In this specification, besides industry-level fixed effects we also include CEO fixed effects. We show these results in columns 1 and 2 of Panel B of Table 3. Second, we proceed to instrument *both* earnings management and tenure, where for earnings management we use the same instruments as before and we use the instrument suggested by Altonji and Shakotko (1987) for tenure. In this specification we

use firm-level fixed effects and this allows us to instrument both earnings management and tenure. We show these results in columns 3 and 4 of Panel B of Table 3.

From our IV estimation we find two important results, consistent with what we also found in the OLS specification. First, earnings management has a positive impact on compensation, consistent with the existing literature that has explored the cross-sectional relationship between earnings management and compensation. Second, and most importantly for our research question, the effect of earnings management on compensation *decreases* significantly over tenure. Thus, after controlling for the job-match effect, we find that the negative coefficient of the interaction variable between each earnings management measure and tenure has high economic and statistical significance. For our two measures of earnings management, the coefficient is significant at the 1% confidence level. This result confirms that the impact of earnings management on compensation decays rapidly over tenure. We also find that the coefficient of the interaction between the earnings management measures and tenure squared is positive and statistically significant as well. Broadly speaking, CEOs' compensation does not appear to suffer negatively in the first three years of tenure from high earnings management, but the effect becomes negative after this period.

Panel C of Table 3 shows the estimates from the first stage of the IV specification and the diagnostic tests we carry out. Few important results need to be pointed out. First, we find that our measures of earnings management correlate with special items and volatility of operating earnings, even after using firm-level control variables, firm fixed effects and year dummies. At the same time, tenure is correlated with the tenure IV obtained from the Altonji and Shakotko (1987) methodology. This means that the instruments we use are relevant. Furthermore, the F-test is high and the R-squared are also relatively high implying that our instruments are good instruments.

Putting together these three results on the evolution of the impact of earnings management on compensation, we find that the evidence is consistent with Fudenberg and Tirole (1995): the impact



is largest in the first years of the tenure, precisely when the CEO's concerns about survival are highest, and, second, the impact decays over tenure as more information is produced reducing shareholders' uncertainty about CEO's ability and the quality of the job match.

The results obtained from the OLS and IV specifications are largely consistent in providing evidence with how boards set compensation to respond to CEO's use of earnings management as a tool to address career concerns. However, the magnitude of the impact of earnings management is significantly larger when we use the IV specifications. To be more precise, the impact in the IV specification is much larger than the one found in the OLS specification in years 1-3 of tenure; after the third year, the difference of earnings management's impact in subsequent years is very similar across the two specifications. The larger effect in the first three years of tenure obtained from the IV specifications is very indicative of the econometric concern posed by endogeneity discussed above and which we address through the use of various instruments. These endogeneity concerns, if unaddressed, bias the coefficient estimates towards zero.

Considering the effect of tenure on compensation, we find that the coefficient estimate is positive and statistically significant, implying that compensation rises with tenure, consistent with the labor economics literature. Theory suggests that the effect of tenure over compensation can be due to two forces: first, accumulation of job-specific human capital, and, second, resolution of uncertainty about ability and match. At the very least, one has to disentangle the effect of tenure as a measure of the CEO's firm-specific skills from the effect that earnings management, a la Fudenberg and Tirole (1995), has on compensation via its impact on CEO tenure. Our methodology allows us to reach this objective, and we find evidence consistent with both channels.

The result regarding the impact of tenure on compensation may also be consistent with other theories that have been proposed in the executive compensation literature. One potential explanation is the entrenchment hypothesis of Bebchuk and Fried (2004): CEOs who survive in the job may

become more powerful as their tenure is extended and, through their power, entrenched CEOs may set their own compensation. Another potential explanation is the dynamic contracting hypothesis of Edmans, Gabaix, Sadzik and Sannikov (2009) where intertemporal risk sharing generates rewards to CEO's effort to be spread across all future periods. In such a scenario, a higher compensation level will be required as tenure increases, because a risk-averse more-experienced CEO gets less utility from an increase in wealth as she is forced to consume it over fewer periods. However, both the entrenchment hypothesis and the dynamic contracting hypothesis are silent on how earnings management interacts with tenure to produce a time-varying impact on compensation. It is possible that more entrenched CEOs may be more likely to use their power to manage more earnings over tenure. To the extent that this is done, our results suggest that higher levels of distortions in reported income by entrenched managers produce a negative impact on their level of compensation. This is not to say that the entrenchment effect does not influence compensation. However, our results rule out that such effects occur through the management of earnings which existing literature has indicated as a potential tool that entrenched managers can use for strategic reasons (other than survival).

If boards set compensation that responds to the level of uncertainty about CEO's ability one should then ask which component of compensation is used to achieve such objective. Executive compensation is made up of a fixed part, which is the salary component, and a variable part which is made up by the equity component, i.e. the stocks awarded, the restricted stock grants and the value of the options awarded to the CEO. It should be recalled from Panel C of Table 1 that salary accounts for about 12% and bonus less than 10% of total compensation, while the equity component accounts for most of the rest. These magnitudes should give boards a larger scope to use the equity component. We investigate how the different components of compensation respond in Table 5 using the instrumental variable approach described above.

[Insert Table 5]

In columns 1-2 we show the results for the salary component, in columns 3-4 for the bonus component, and in columns 5-6 for the equity component. The results are consistent with our conjecture that boards mostly use the equity component to respond to the resolution of uncertainty about CEO's ability while there is no evidence that either salary (which is a fixed component) or bonus (which accounts for a very small fraction of the CEO's compensation) are used.

Finally, we also test for reverse causality to investigate whether total compensation or the equity component of compensation influence earnings management over the CEO tenure. The cross-sectional evidence in the existing literature (Burns and Kedia (2005), Bergstresser and Philippon (2005), Efendi et al. (2005), Johnson et al. (2005), and Ke (2003)) shows a positive association between stock-based compensation and manipulation of accounting statements. Note that this literature casts the tests within a cross-sectional framework, and does not investigate the time-series behavior of earnings management and compensation over the CEO tenure. We find no evidence that such reverse causality occurs. Results are not shown for sake of brevity.

#### **4. CEO and firm characteristics and the dynamics of compensation**

CEOs' incentives to use earnings management for tenure related reasons may vary cross-sectionally depending on CEO characteristics (younger CEOs may behave differently than older CEOs), firm decisions related to the new CEOs (granting a fixed term job contract or not), and firm characteristics (level of corporate governance and the precision of the signal about CEO's effort). These different characteristics relate to the complexity and difficulty of the boards' learning process. In this section we proceed to analyze how the response of compensation to the presence of earnings management changes in these different scenarios.

The cross-sectional differences are motivated directly by previous theoretical work. Gibbons and Murphy (1992) argue that career concerns are not likely to influence all CEOs in the same way. For example, they suggest that such concerns are strongest for workers further away from their retirement. Fudenberg and Tirole (1995) show that one important condition for CEOs to distort reported performance is that the firm cannot commit to a long-term contract. Indeed, if a CEO engages in performance distortion to increase the likelihood of survivability then one should not expect such behavior (or less likely) to take place if the CEO's position is covered by a long term contract. These considerations suggest that we should investigate more deeply the cross-sectional heterogeneity across CEOs to explore whether and how career concerns shape the influence of tenure and earnings management on the level of compensation.

We start by investigating the condition imposed by Fudenberg and Tirole (1995): the presence of long term contracts given by the firm to the CEO. We collect data on the type of contract, if any, a CEO is given at the time of the appointment. These contracts can be of two types: either a fixed-term employment contract or at-will employment contract. The former is a long-term type of contract while the latter is a short-term contract. We classify CEOs in two groups: first, those whose jobs are protected by a long-term contract and who, according to Fudenberg and Tirole (1995), have lower incentives to engage in earnings management, and, second, those who either have a short-term contract or awarded no contract at all and thus have higher incentives to distort reported performance. About 29% of all CEOs in our sample have a fixed-term employment contract.

[Insert Table 6]

Table 6 reports the results from estimating specification (1) for the two groups of CEOs where in columns 1 to 4 we show the results from the IV specification with firm fixed effects and instrument both earnings management and tenure, and in columns 5 and 6 we show the results from the panel OLS

specification with CEO-level and industry-level fixed effects. The results for the compensation dynamics for CEOs with fixed-term employment contracts are shown in columns 1 and 2 (IV estimation) and 5 (OLS estimation), while the results for the compensation dynamics for CEOs without contracts are shown in columns 3 and 4 (IV estimation) and 6 (OLS estimation).

There is a striking difference between the response of compensation evolution over tenure to the use of earnings management for the two groups of CEOs: the dynamics of earnings management found in the overall sample are found only in the sample made up of the CEOs without a contract or with an at-will employment contract. Overall, we find that CEOs with a fixed-term employment contract use significantly less earnings management, and that their compensation is not sensitive to the level of earnings management and its evolution through time. Thus, consistent with Fudenberg and Tirole (1995) and career concerns, when given a long-term contract, CEOs are not found to use earnings management to distort reported performance, probably because their survival, at least up to the duration of the contract, is more likely than that of CEOs without any contract. Since fixed term contracts have an average duration of about three years, these results explain, at least partially, the difference in the behavior between CEOs with and without a contract: as we discussed above, it is precisely in the first three years of tenure that earnings management is mostly used.

Our results raise the question as to why all firms do not provide a fixed term contract to their newly appointed CEOs, given the evidence in the literature regarding the costs of earnings management. It should be noted, though, that there are costs associated with fixed term contracts, the most important of which is giving up the relative ease with which shareholders can terminate the CEO's employment if she does not perform as expected. Shareholders may value this option especially in the early years when they need to learn about the CEOs' ability and job match with relatively limited information. At the very least these results show that there is an important trade-off

that shareholders face. The actual outcome may depend on time-invariant firm characteristics (like firm culture) or the job match. Our empirical design considers both dimensions.

We also investigate how the earnings management dynamics over tenure may be different between insider CEOs – those who have been promoted from within the firm – and outsider CEOs – those who have been appointed from outside the firm. On one hand, if one were to focus entirely on the CEO’s inherent ability, one should expect that an insider CEO is better known than an outsider CEO, and we should expect that earnings management’s impact on compensation will have very different dynamics compared to that of outsiders. On the other hand, the other important dimension is the CEO-firm match and, as Gibbons and Murphy (1992) argue, being an insider in a non-CEO role may be a very different experience than being a CEO. In other words, the challenges inherent in the job match are such that insiders may not be judged differently than outsiders by shareholders.

We find no evidence that the earnings management dynamics on compensation over the tenure of insider CEOs are different from those of outsiders, consistent with the conjecture of Gibbons and Murphy (1992). Thus, what may matter is not so much the status of insiders versus outsiders, but whether a fixed-term employment contract is given to the CEO or not. Consistent with this conjecture, we proceed to use our employment contract data to explore whether insider CEOs with a fixed term employment contract behave differently from insider CEOs without a fixed term employment contract in Table 7.

[Insert Table 7]

The results shown in Table 7 provide evidence consistent with the view that having an employment contract matters even when an insider is promoted to the role of the CEO: insider CEOs with an employment contract are found to have a much lower propensity to use earnings management early during their tenure compared to insider CEOs appointed without a contract.

As suggested by Gibbons and Murphy (1992), we expect that career concerns are likely to be more important for younger CEOs who are further away from retirement, suggesting that distortions of reported performance are larger in the early years of tenure for young CEOs (compared to old CEOs) and its use rapidly diminishes over tenure.

[Insert Table 8]

We test this hypothesis using specification (1) for the young and old CEO samples and report the estimates in Table 8. Consistent with our hypothesis, we find that younger CEOs show a larger use of earnings management early on in their tenure compared to older CEOs, and the dynamics between earnings management and compensation across tenure is found only for younger CEOs.

We next investigate how the response of compensation to earnings management changes across different corporate governance environments. Firms where the CEO has significant power vis-à-vis the board may respond differently to the use of earnings management compared to firms where boards are more likely to hold the CEO accountable through monitoring. We use the G-index to capture the former type of firms (high G-index firms) and distinguish them from the latter (low G-index firms) and test our conjecture that monitoring by the board matters for the relationship between compensation and earnings management. To deepen the analysis on governance, we also identify CEOs that get additional roles in the firm at the time of their appointment, and specifically look at whether they are also appointed as the Chair of the board or President.

[Insert Tables 9 and 10]

The results in Table 9 confirm the monitoring hypothesis: in firms with high CEO power (i.e. in firms with a high G-index value, shown in columns 1-2 using the IV specification, and column 5 when using the OLS) compensation is not as responsive to the evolution of earnings management as

we observe for firms where boards have large power vis-à-vis the CEO (shown in columns 3-4 using the IV specification, and column 6 when using the OLS). The results in Table 10 point in the same direction: CEOs who are considered as relatively more powerful need to use earnings management less than CEOs who are relatively less powerful. As a consequence, the compensation of the former is less sensitive to earnings management (columns 1-2 using the IV specification, and column 5 using the OLS) compared to the latter group.

Lastly, we also investigate how the precision of the signal about CEO effort influences the link between CEO compensation and earnings management. In cases when the underlying firm performance is inherently noisy, the CEO may be more inclined to use earnings management in the early part of tenure as an insurance device against firing. To test this hypothesis, we use firm-level volatility of stock returns as a measure of the precision of the signal about CEO's effort (Guiso et al. (2005)).

[Insert Table 11]

The results in Table 11 confirm that when learning about the CEO's effort and setting her compensation, the precision of the signal is very important for the board. The link between earnings management and compensation exists mostly for CEOs in firms for which the signal's precision is low (i.e. firms with volatile stock returns, shown in columns 3-4 when using the IV specification and column 6 when using the OLS) which may complicate the learning process about CEO effort and ability.

Overall, the evidence presented in this Section confirms the theoretical prediction that compensation packages awarded by boards vary cross-sectionally and respond to the CEOs' incentives to use earnings management for tenure related reasons. Specifically, the response to the strategic use of earnings management differs depending on CEO characteristics, firm decisions related to the new CEOs (whether, for example, a fixed term contract is awarded or not), and firm characteristics, consistent with theoretical predictions.



## 5. Conclusions

In this paper, we investigate the dynamics of executive compensation over a CEOs' tenure at a firm, when shareholders learn about CEO's ability and the quality of the job match with the firm, in the presence of reporting distortions used strategically by CEOs for survival purposes.

To examine the dynamics of CEO compensation over the tenure of the CEO and in the presence of earnings management, we use data on 1,624 CEO turnovers in 1,023 firms forming part of the S&P 1500 index. We show that earnings management is highest in the early years when there is greatest uncertainty about a CEO's quality, decreasing monotonically over the CEO's tenure. Our results on the dynamics of earnings management are consistent with the career concerns argument that CEOs may use earnings management to show higher ability when survival is at greatest risk.

We then examine the effects of tenure, various measures of earnings management, and the interaction between the tenure and earnings management, on total CEO compensation, controlling for other firm characteristics that are likely to affect compensation and using a methodology that treats tenure and earnings management as endogenous. We find that compensation is positively associated with earnings management in the early years of a CEO's tenure, but this relationship becomes negative over tenure, indicating that during the period of greatest uncertainty about a CEO's ability, distorting earnings may pay off for some CEOs, but boards learn about CEOs' ability over time, and do not reward those who continue to distort reported performance. We also find that the relationship between reporting distortions and compensation varies based on CEO characteristics that capture uncertainty about ability and career concerns.

Boards' learning about CEO's ability in the presence of earnings management is the most plausible explanation of the sequence of results found in the paper. We find that learning about the CEO takes place, is convex in tenure and faster when there is greater *ex-ante* uncertainty about ability. The evolution of CEO compensation over tenure responds to this learning process.

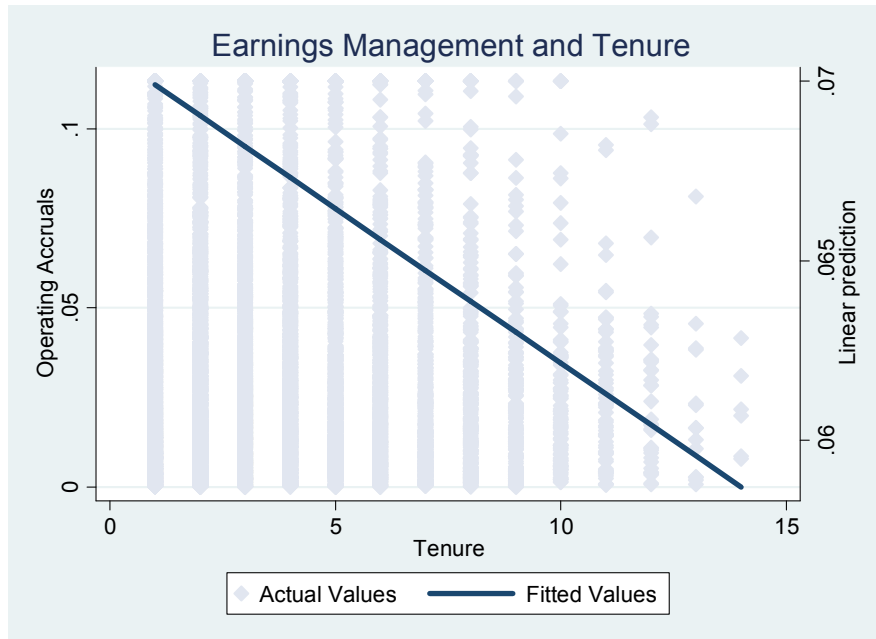
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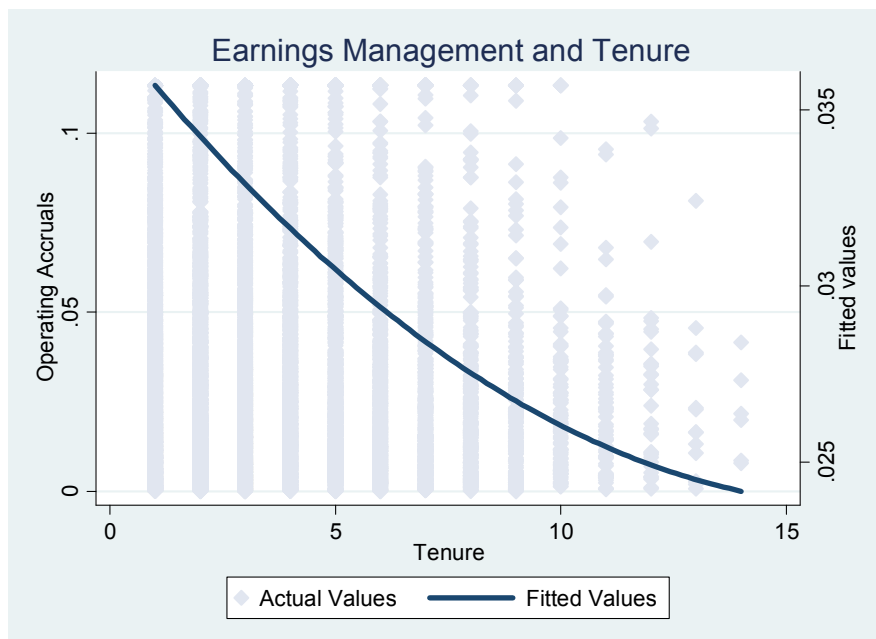
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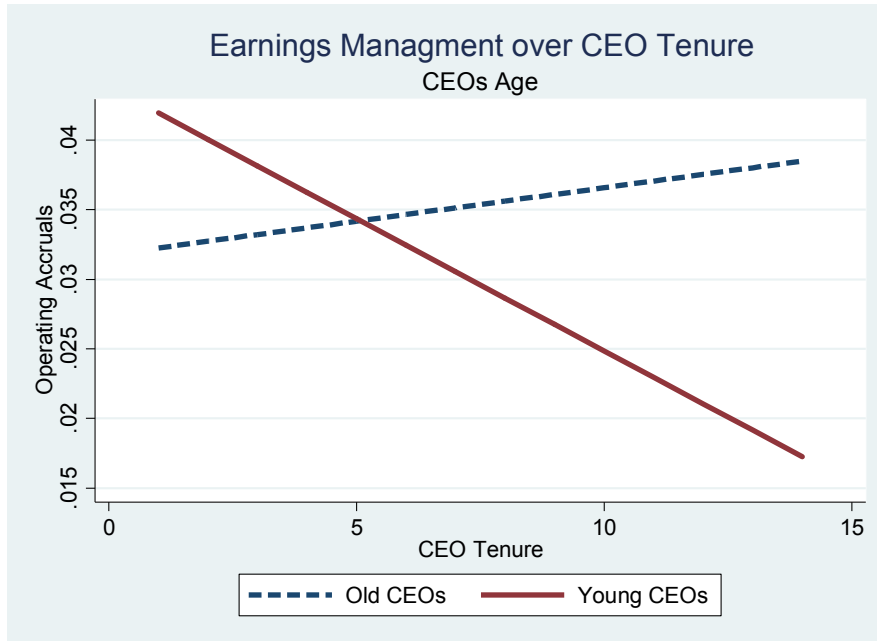
**Panel A: Linear Fit**



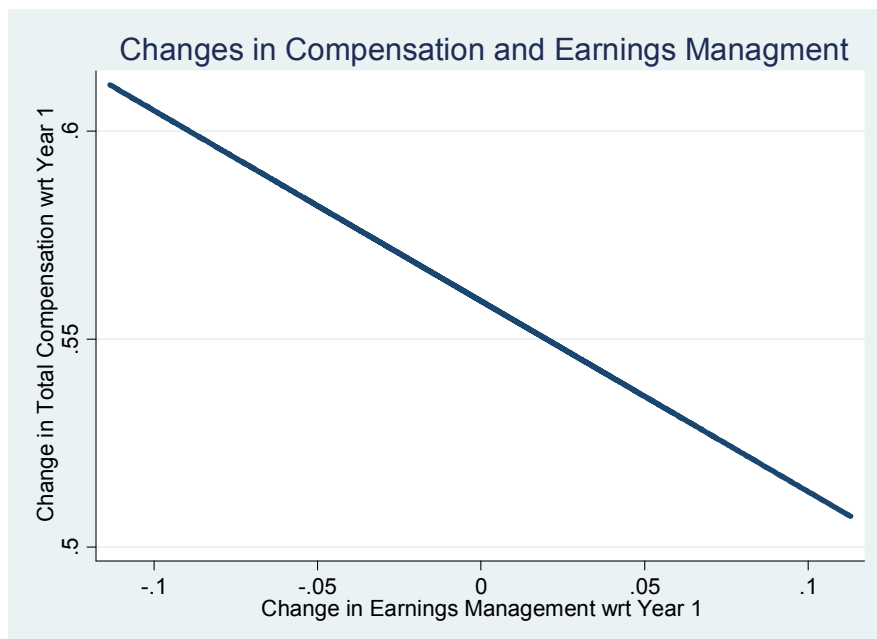
**Panel B: Quadratic Fit**



**Figure 1.** The figure shows the evolution of earnings management (Operating Accruals) over the CEOs' tenure. Fitted values are obtained from a Panel OLS regression that includes CEO fixed effects and clusters standard errors at the CEO-firm level.



**Figure 2.** This Figure plots the relationship between changes in compensation and changes in earnings management over the CEO’s tenure for young CEOs (Young CEOs) and old CEOs (Old CEOs). Fitted values are obtained from a Panel OLS regression that includes CEO fixed effects and clusters standard errors at the CEO-firm level.



**Figure 3.** This Figure plots the relationship between changes in compensation and changes in earnings management over the CEO’s tenure. For each year of the CEO’s tenure, we calculate the difference between the CEO’s Total Compensation (Operating Accruals) and her Total Compensation (Operating Accruals) during the first year of her appointment. The line plots the curve resulting from the prediction of a panel OLS regression of changes in Total Compensation on changes in Operating Accruals. The regression includes CEO fixed effects and clusters standard errors at the CEO-firm level.

## Appendix - Variable Definitions

<b>Panel A. CEO Level Variable</b>	
Tenure	The tenure of the CEO in years.
Total Compensation	The natural logarithm of the CEO total compensation. We use TDC1 in ExecuComp. Prior to December 2006, TDC1 was Salary + Bonus + Other Annual + LTIP Payouts + Restricted Stock Grants + Value of Options Granted+ All Other. After December 2006, TDC1 was Salary + Bonus+ Non-Equity Incentive Plan Compensation + Grant-Date Fair Value of Stock Awards + Value of Options Granted + Other Compensation.
Salary	The natural logarithm of the salary component of the CEO's compensation as directly reported by ExecuComp.
Equity Component 1	The natural logarithm of the equity component of the CEO's compensation. Before 2006, we obtain the equity component of the CEO's compensation adding together Stock Awards, Restricted Stock Grants and the Value of Options Granted. After December 2006, Equity Component 1 is calculated adding together Stock Awards, Grant-Date Fair Value of Option Awards and Value of Options Granted.
Equity Component 2	The natural logarithm of the equity component of the CEO's compensation. Before 2006, Equity Component 2 is calculated as difference between the CEO's total compensation (TDC1) and Salary, Bonus, Other Annual, LTIP Payouts and All Other. After December 2006, Equity Component 2 is calculated as difference between the CEO's total compensation (TDC1) and Salary, Bonus, Non-Equity Incentive Plan Compensation and Other Compensation.
Bonus	The natural logarithm of the bonus component of the CEO's compensation as directly reported by ExecuComp.
Other Components of Compensation	The natural logarithm of the other components of the CEO's compensation. Before 2006, to obtain the other components of a CEO's compensation we add together Other Annual, LTIP Payouts and All Other. After December 2006, we obtain the other components of a CEO's compensation adding together Non-Equity Incentive Plan Compensation and Other Compensation.
CEO Age	The CEOs age at the appointment.
Young CEO Dummy	A dummy variable that is equal to 1 if the CEO has less than 59 years, and zero otherwise.
CEO Contract Dummy	A dummy variable that is one if the CEO has an explicit employment agreement, and zero otherwise.
Insider CEO Dummy	A dummy variable that is one if the CEO has spent at least 5 years in the firm before being appointed, and zero otherwise.
<b>Panel B. Measures of Discretionary Accruals</b>	
Operating Accruals	<p>Absolute operating accruals over lagged assets as in Hribar and Collins (2002). Total accruals for firm <math>j</math> in year <math>t</math> are measured as:</p> $ACC_{j,t} = -(CHGAR_{j,t} + CHGINV_{j,t} + CHGAP_{j,t} + CHGTAX_{j,t} + CHGOTH_{j,t} + DEP_{j,t}) / Assets_{j,t-1}$ <p>where <math>CHGAR_{j,t}</math> is the decrease (increase) in accounts receivable (Compustat data item 302); <math>CHGINV_{j,t}</math> is the decrease (increase) in inventory (Compustat data item 303); <math>CHGAP_{j,t}</math> is the increase (decrease) in accounts payable (Compustat data item 304); <math>CHGTAX_{j,t}</math> is the increase (decrease) in taxes payable (Compustat data item 305); <math>CHGOTH_{j,t}</math> is the net change in other current assets (Compustat data item 307); and <math>DEP_{j,t}</math> is depreciation expense (Compustat data item 125). Closely following Hribar and Collins (2002), we take all of these variables from the operating section of the statement of cash flows and, hence, they are not affected by non-operating changes in these accounts.</p>
Performance-augmented Modified Jones Model	<p>Absolute discretionary accruals calculated using the performance-adjusted modified Jones model as in Hazarika, Karpoff and Nahata (2012), p. 48, including year dummy variables as in Bergstresser and Philippon (2006). Total accruals for firm <math>j</math> in year <math>t</math> are measured as: <math>TA_{j,t} = (\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t}) / Assets_{j,t-1}</math>, where <math>\Delta CA_{j,t}</math> = firm <math>j</math>'s change in current assets (Compustat #4) from year <math>t-1</math> to year <math>t</math>, <math>\Delta CL_{j,t}</math> = firm <math>j</math>'s change in current liabilities (Compustat data item 5) from year <math>t-1</math> to year <math>t</math>, <math>\Delta Cash_{j,t}</math> = firm <math>j</math>'s change in cash (Compustat data item 1) from year <math>t-1</math> to year <math>t</math>, <math>\Delta STDEBT_{j,t}</math> = firm <math>j</math>'s change in debt in current liabilities (Compustat data item 34) from year <math>t-1</math> to year <math>t</math>, <math>DEPN_{j,t}</math> = firm <math>j</math>'s depreciation and amortization expense (Compustat data item 14) in year <math>t</math> and <math>Assets_{j,t-1}</math> = firm <math>j</math>'s book value of assets (Compustat data item 6) in year <math>t-1</math>. We estimate the following regression, which is estimated for each of the 48 Fama-French (1997) industry groups in each calendar year <math>t</math>.</p>

$$TA_{j,t} = \phi_{0j} + \phi_{1j} \left( \frac{1}{Assets_{j,t-1}} \right) + \phi_{2j} (\Delta Rev_{j,t} - \Delta AR_{j,t}) + \phi_{3j} PPE_{j,t} + \phi_{4j} ROA_{j,t-1} + \sum_{year=y} \gamma_y + u_{j,t}$$

$\Delta Rev_{j,t}$  = firm  $j$ 's change in revenues (Compustat data item 12), divided by  $Assets_{j,t-1}$  (Compustat data item 6);  $\Delta AR_{j,t}$  = firm  $j$ 's change in account receivables (Compustat data item 2), divided by  $Assets_{j,t-1}$ ;  $PPE_{j,t}$  = firm  $j$ 's gross value of property, plant and equipment (Compustat data item 7) divided by  $Assets_{j,t-1}$ ;  $ROA_{j,t-1}$  = firm  $j$ 's operating income before depreciation (Compustat data item 13) on assets in year  $t-1$ . We use the Fama-French 48 industry-groups to compute industry-specific parameter estimates that then give us firm-specific normal accruals. We exclude all firm-year observations that do not have sufficient data to estimate any of the measures of earnings management and when there are fewer than ten observations in a Fama-French 48 industry group for any specific year. In the analyses we use the absolute value of the difference between total accruals and the estimated value of total accruals calculated using the coefficients obtained by the regression above.

Special items		Sum of special items, extraordinary items, and restructuring charges normalized by total assets in year $t-1$ .
Operating Earnings Volatility		Standard deviation in the firm's ROA over the prior five years including the current fiscal year.

### Panel C. Firm-Level Control Variables

Firm Size		The natural logarithm of a firm's market capitalization calculated as the company's shares outstanding (in million) multiplied by market price as of the end of the month of December.
Firm Size Squared		The squared value of Firm Size.
Leverage		The book value of debt divided by the book value of total assets.
Market-to-Book		The market value of equity at the end of the year divided by the book value of common equity.
Past Stock Returns		The firm's stock returns, computed as the average stock market return over the previous 12 months.
Return on Assets		The net income in year $t$ divided by total assets in year $t-1$ .
Stock Return Volatility		The firm's stock returns volatility, computed as the standard deviation of the stock returns over the previous 12 months.
Stock Turnover		The average of the previous 12 months stock turnover.
G-index		The firm governance index as calculated by Gompers, Ishii and Matrix (2003).
G-index Appointment	Dummy at	A dummy variable equal to one if in the year the CEO was appointed the G-index was above the median in the sample and zero otherwise.



**Table 1**  
**Descriptive Statistics**

This table describes the main characteristics of the CEOs and firms in the sample. For the period 1992–2010, we obtain information from ExecuComp, Factiva, Lexis-Nexis, Compustat and CRSP. Panel A describes the number of CEOs-firm observations. Panel B describes the frequency of CEO turnovers. Panel C shows descriptive statistics for CEO level characteristics, discretionary earnings management measures and firm level characteristics. Panel D provides the time-average of the cross-sectional pairwise correlation coefficients between the CEOs' tenure, total pay and the earnings management measures for the entire sample. We report the significance level of correlation coefficients using the Bonferroni adjustment. In Panel D, \* indicates significance at 10% or less. All variables shown are described in the Appendix and are winsorized at the 1% level.

Panel A – Sample Description				
Year from Appointment	Number of CEOs	No Missing Compensation	No Missing Compensation & Measures of EM	
1	1,624	1,579	1,530	
2	1,624	1,616	1,571	
3	1,305	1,300	1,267	
4	1,026	1,018	990	
5	745	743	719	
6	555	552	535	
7	398	397	382	
8	274	274	264	
9	168	167	160	
10	101	101	95	
11	66	65	62	
12	35	35	33	
13	14	14	14	
14	6	6	6	
Number of Observations	7,941	7,867	7,628	

Panel B – Frequency of CEO Turnovers				
First Year of Appointment (Year of Appointment =1)	Number of CEOs	Insiders	Young CEOs	CEOs with Contract
1992	1	0	0	0
1993	63	27	49	7
1994	36	10	27	6
1995	56	27	35	9
1996	88	38	68	20
1997	91	29	75	29
1998	88	30	68	27
1999	97	32	73	27
2000	112	48	98	41
2001	129	55	112	49
2002	140	50	115	54
2003	94	44	79	34
2004	104	38	88	39
2005	90	33	78	33
2006	123	52	98	56
2007	104	44	89	33
2008	114	46	94	49
Total Number of Observations	1,530	603	1,246	513

Panel C – Descriptive Statistics						
	N	Mean	SD	P05	Median	P95
<b>CEO Level Variables</b>						
Tenure	7,867	7.25	2.89	3.00	7.00	13.00
Total Compensation (in Million of \$)	7,867	5.44	10.49	0.54	3.12	16.63
Salary (in Million of \$)	7,867	0.67	0.44	0.00	0.65	1.36
Bonus (in Million of \$)	7,867	0.54	1.19	0.00	0.14	2.24
Equity Component 1 (in Million of \$)	7,867	2.64	9.21	0.00	0.87	9.80
Equity Component 2 (in Million of \$)	7,867	3.72	9.78	0.00	1.64	12.93
Other Components of Compensation (in Million of \$)	7,867	0.51	2.04	0.00	0.04	2.36
CEO Age at Appointment	7,867	51.37	6.25	41.00	52.00	61.00
Young CEO Dummy	7,867	0.67	0.47	0.00	1.00	1.00
CEO Contract Dummy	7,867	0.29	0.46	0.00	0.00	1.00
Proportion of Insider CEOs	7,867	0.40	0.49	0.00	0.00	1.00
<b>Measures of Discretionary Accruals</b>						
Operating Accruals	7,860	0.04	0.06	0.00	0.02	0.11
Perf.-Aug. Modified Jones Model	7,628	0.05	0.06	0.00	0.03	0.13
Special Items	7,698	-0.02	0.10	-0.10	0.00	0.01
Operating Earnings Volatility	7,517	0.06	0.08	0.01	0.04	0.19
<b>Firm Characteristics</b>						
Return on Assets	7,616	0.042	0.150	-0.157	0.056	0.187
Leverage	7,597	0.232	0.197	0.000	0.214	0.539
Market-to-Book	7,350	2.769	22.051	0.365	2.089	7.982
Firm Size (in Billions of \$)	6,891	3.880	6.390	0.104	1.400	17.100
Stock Turnover	7,390	0.17%	0.14%	0.04%	0.13%	0.46%
Stock Returns Volatility	7,228	11.26%	5.91%	4.44%	9.78%	23.54%
Past Stock Returns	7,228	0.87%	3.75%	-5.17%	0.91%	6.94%
G-index	4,417	9.53	2.69	5.00	10.00	14.00

Panel D – Correlation Matrix											
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Tenure	1									
(2)	Total Compensation	0.0814*	1								
(3)	Operating Accruals	-0.0722*	-0.0463*	1							
(4)	Perf.-Aug. Modified Jones Model	-0.0598*	-0.0228	0.4998*	1						
(5)	Total Accruals from Cash-flow Statement	-0.0319	-0.0146	0.4097*	0.3563*	1					
(6)	Perf.-Aug. Modified Jones Model without Year Dummies	-0.0584*	-0.0407*	0.3851*	0.6269*	0.4645*	1				
(7)	Classic Jones Model	-0.0584*	-0.0389*	0.3714*	0.6334*	0.4607*	0.8857*	1			
(8)	Total Accrual from Balance Sheet	-0.0556*	-0.0361*	0.4196*	0.7059*	0.5646*	0.8157*	0.8114*	1		
(9)	Special items	0.0112	-0.0019	0.1054*	0.1374*	-0.2272*	0.1215*	0.1137*	0.0932*	1	
(10)	Operating Earnings Volatility	-0.0153	-0.0233	0.347*	0.2794*	0.2079*	0.2463*	0.2368*	0.2571*	0.6182*	1

**Table 2 -- Earnings Management and Tenure**

This Table reports panel regressions with CEO and firm fixed effects for the relationship between earnings management and CEO's tenure. The dependent variables are different proxies of earnings management: We use Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns from (1) to (4) and Operating Accruals calculated using the firm's cash-flow statement in columns from (5) to (8). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Perf.-Aug. Modified Jones Model				Operating Accruals			
Tenure	-0.0057*** (0.010)	-0.0057* (0.079)	-0.0023** (0.025)	-0.0024** (0.026)	-0.0043*** (0.003)	-0.0058*** (0.000)	-0.0013* (0.056)	-0.0011 (0.138)
Tenure Squared	0.0002* (0.079)	0.0001 (0.154)	0.0002** (0.032)	0.0002** (0.041)	0.0001 (0.245)	0.0000 (0.898)	0.0001 (0.205)	0.0001 (0.416)
Firm Size		0.0027 (0.394)		0.0013 (0.630)		0.0027 (0.376)		0.0006 (0.786)
Market-to-Book Ratio		-0.0001 (0.358)		-0.0000 (0.504)		-0.0001** (0.022)		-0.0001** (0.025)
Past Returns		0.0146 (0.753)		0.0161 (0.715)		0.0957*** (0.006)		0.0990*** (0.002)
Leverage		0.0053 (0.837)		0.0072 (0.508)		0.0098 (0.424)		0.0077 (0.299)
CEO Fixed Effects	YES	YES	NO	NO	YES	YES	NO	NO
Firm Fixed Effects	NO	NO	YES	YES	NO	NO	YES	YES
Industry Dummies	YES	YES	NO	NO	YES	YES	NO	NO
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,908	6,887	7,908	6,887	8,139	7,075	8,139	7,075
Adj. R-squared	0.00559	0.00730	0.00961	0.00988	0.00609	0.0141	0.00859	0.0138
Number of CEOs/Firms	1,573	1,463	998	941	1,608	1,492	1,021	961

**Table 3****Changes in the Equity Component of the CEO's Compensation and Earnings Management over Tenure**

This Table reports OLS regressions with industry effects for the relationship between the change in the equity component of the CEO's compensation and the change in earnings management over the CEO's tenure. Columns from (1) to (3) show results for the equity part of the CEO's compensation calculated as Equity Component 1 (Change in Equity Component 1). Before 2006, we obtain Equity Component 1 adding together Stock Awards, Restricted Stock Grants and the Value of Options Granted. After December 2006, Equity Component 1 is calculated adding together Stock Awards, Grant-Date Fair Value of Option Awards and Value of Options Granted. Columns from (4) to (6) show results using an alternative definition of the equity part of the CEO's compensation: Equity Component 2 (Change in Equity Component 2). Before 2006, Equity Component 2 is calculated as difference between the CEO's total compensation (TDC1) and Salary, Bonus, Other Annual, LTIP Payouts and All Other. After December 2006, Equity Component 2 is calculated as difference between the CEO's total compensation (TDC1) and Salary, Bonus, Non-Equity Incentive Plan Compensation and Other Compensation. As a proxy of earnings management we use Operating Accruals calculated using the firm's cash-flow statement. The variable of earnings management is unsigned. For each period of two years of the CEO's tenure, we calculate the average value of the equity compensation and earnings management over that period and subtract from it the value of the respective variable in the first year of tenure. For instance, to obtain the dependent variable for the years two and three in the CEO's tenure, we first calculate the average value of Equity Component 1 (2) over these two years and then subtract from its average the value that Equity Component 1 (2) had in year one. The same procedure is used to calculate the change in Operating Accruals over the years two and three in the CEO's tenure. The control variables are calculated as averages over each of the two years periods considered in the analysis. All regressions exclude the year in which the CEO was appointed. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Change in Equity Component 1			Change in Equity Component 2		
Years of Tenure	2-3	4-5	6-7	2-3	4-5	6-7
Change in Operating Accruals	2.0160 (0.232)	-6.0914** (0.024)	1.3982 (0.701)	2.3482 (0.224)	-5.9217** (0.032)	0.2512 (0.946)
Firm Size	2.3233** (0.041)	3.5751** (0.010)	4.8362* (0.055)	2.8112** (0.012)	2.6251* (0.060)	7.0284*** (0.001)
Firm Size Squared	-0.0534** (0.046)	-0.0804** (0.013)	-0.1081* (0.068)	-0.0638** (0.015)	-0.0567* (0.082)	-0.1574*** (0.001)
Market-to-Book Ratio t-1	-0.0042 (0.490)	0.0367 (0.232)	-0.0111 (0.159)	0.0053 (0.128)	0.0409 (0.241)	-0.0017 (0.791)
Past Returns	2.4540 (0.484)	-3.9194 (0.428)	-7.9353 (0.378)	5.1249 (0.137)	-9.0784* (0.084)	-14.4090 (0.186)
Past Returns t-1	2.4994 (0.539)	8.9290 (0.129)	19.3130** (0.046)	0.8030 (0.843)	8.1857 (0.183)	28.6132*** (0.007)
Return on Assets	2.1070 (0.149)	2.1056* (0.062)	-0.8571 (0.802)	2.4419 (0.103)	2.2723** (0.047)	-2.5985 (0.549)
Return on Assets t-1	-1.2763 (0.322)	-1.7314 (0.289)	3.2837 (0.478)	-1.6496 (0.187)	-2.0616 (0.328)	2.0846 (0.691)
Stock Returns Volatility	2.3658 (0.236)	5.3645* (0.057)	9.7854** (0.014)	1.4217 (0.491)	4.5454 (0.127)	9.3169** (0.031)
Observations	1,177	677	361	1,135	652	348
R-squared	0.049	0.102	0.196	0.059	0.110	0.210

**Table 4 -- CEO Compensation, Earnings Management and Tenure**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure. Panel A reports panel regressions with CEO fixed effects in columns (1) and (2), panel regressions with firm fixed effects in columns (3) and (4). Panel B reports instrumental variables regressions. In columns (1) and (2), we only instrument the measure of earnings management and assume tenure is exogenous, in columns (3) and (4) we instrument both the measure of earnings management and tenure. Panel C reports the first stage of the instrumental variables regressions in column (3) and (4) of Panel B. In Panel A and Panel B, the dependent variable is the logarithm of total compensation (Total Compensation). Both Panel A and Panel B show results using two different measures of earnings management as dependent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1) and (3) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). Panel C shows the first stage results for Performance-adjusted Modified Jones Model in column (1), Operating Accruals in column (4), Performance-adjusted Modified Jones Model times tenure in column (2), Operating Accruals times tenure in column (5), Performance-adjusted Modified Jones Model times tenure squared in column (3), Operating Accruals times tenure squared in column (6), tenure in column (7) and tenure squared in column (8). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instruments for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. In Panel A, errors are standard errors are White-corrected for heteroscedasticity. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

Panel A: OLS Regressions

	(1)	(2)	(3)	(4)
Perf.-Aug. Modified Jones Model	1.623*** (0.004)		1.898*** (0.001)	
Perf.-Aug. Modified Jones Model *Tenure	-0.620** (0.010)		-0.730*** (0.003)	
Perf.-Aug. Modified Jones Model *Tenure Squared	0.048** (0.036)		0.058** (0.012)	
Operating Accruals		1.915** (0.014)		1.544** (0.039)
Operating Accruals* Tenure		-0.766** (0.018)		-0.603* (0.064)
Operating Accruals* Tenure Squared		0.047 (0.122)		0.033 (0.290)
Tenure	-0.067* (0.076)	-0.069* (0.067)	0.036** (0.034)	0.026* (0.099)
Tenure Squared	-0.002 (0.286)	-0.001 (0.347)	-0.002 (0.147)	-0.001 (0.454)
Firm Size	0.564 (0.511)	0.478 (0.559)	0.430 (0.455)	0.353 (0.523)
Firm Size Squared	-0.005 (0.817)	-0.003 (0.897)	-0.002 (0.909)	0.000 (0.980)
Market-to-Book Ratio t-1	0.001* (0.066)	0.001 (0.103)	0.001** (0.013)	0.001** (0.025)
Past Returns	-1.363** (0.031)	-1.382** (0.024)	-1.450*** (0.010)	-1.477*** (0.007)
Past Returns t-1	0.703 (0.156)	0.694 (0.142)	0.630 (0.178)	0.661 (0.141)
Return on Assets	0.488*** (0.000)	0.466*** (0.000)	0.454*** (0.000)	0.433*** (0.000)
Return on Assets t-1	-0.078 (0.512)	-0.067 (0.598)	0.072 (0.478)	0.072 (0.486)
Stock Returns Volatility	0.708** (0.031)	0.743** (0.021)	0.727** (0.017)	0.742** (0.014)
CEO Fixed Effects	YES	YES	NO	NO
Firm Fixed Effects	NO	NO	YES	YES
Industry Dummies	YES	YES	NO	NO
Year Dummies	YES	YES	YES	YES
Cluster	CEO	CEO	Firm	Firm
Observations	6,410	6,588	6,410	6,588
Adj. R-squared	0.158	0.164	0.237	0.239
Number of CEOs/Firms	1,443	1,472	937	957

Panel B: Second Stage of IV Regressions

	(1)	(2)	(3)	(4)
Perf.-Aug. Modified Jones Model	18.253*** (0.001)		36.120*** (0.010)	
Perf.-Aug. Modified Jones Model *Tenure	-7.155*** (0.003)		-15.865** (0.014)	
Perf.-Aug. Modified Jones Model *Tenure Squared	0.705*** (0.007)		1.771** (0.018)	
Operating Accruals		19.309*** (0.002)		41.839*** (0.002)
Operating Accruals* Tenure		-8.511*** (0.002)		-19.063*** (0.003)
Operating Accruals* Tenure Squared		0.848*** (0.003)		1.963*** (0.003)
Tenure	0.244* (0.064)	0.202* (0.086)	0.689** (0.014)	0.585*** (0.003)
Tenure Squared	-0.030*** (0.008)	-0.025*** (0.004)	-0.076** (0.018)	-0.058*** (0.004)
Firm Size	1.031*** (0.000)	0.855*** (0.001)	1.128*** (0.002)	1.015*** (0.001)
Firm Size Squared	-0.017** (0.012)	-0.013** (0.033)	-0.018** (0.036)	-0.017** (0.026)
Market-to-Book Ratio t-1	0.001** (0.024)	0.001 (0.139)	0.002** (0.025)	0.001 (0.165)
Past Returns	-1.714*** (0.000)	-1.394*** (0.000)	-2.543*** (0.000)	-2.231*** (0.000)
Past Returns t-1	0.188 (0.649)	0.339 (0.356)	-0.850 (0.282)	-0.468 (0.416)
Return on Assets	0.649*** (0.000)	0.456*** (0.000)	0.892*** (0.000)	0.430*** (0.003)
Return on Assets t-1	0.234* (0.085)	0.463*** (0.004)	0.375* (0.068)	0.717*** (0.005)
Stock Returns Volatility	0.526* (0.062)	0.453* (0.094)	0.121 (0.779)	0.026 (0.945)
CEO Fixed Effects	YES	YES	NO	NO
Firm Fixed Effects	NO	NO	YES	YES
Industry Dummies	YES	YES	NO	NO
Year Dummies	YES	YES	YES	YES
Only Earnings Management is Instrumented	YES	YES	NO	NO
Observations	6,163	6,324	6,163	6,324
Number of CEOs/Firms	1,403	1,430	922	941

Panel C: IV Regressions First Stage and Tests

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Perf.-Aug. Modified Jones Model	Perf.-Aug. Modified Jones Model* Tenure	Perf.-Aug. Modified Jones Model* Tenure Squared	Operating Accruals	Operating Accruals*Tenure	Operating Accruals*Tenure Squared	Tenure	Tenure Squared
Operating Volatility	3.187*** (0.000)	13.492*** (0.000)	61.559*** (0.000)	6.526*** (0.000)	23.438*** (0.000)	94.767*** (0.000)	-2.312 (0.742)	-8.592 (0.895)
Operating Volatility*Tenure IV	6.918*** (0.000)	20.216*** (0.000)	41.664** (0.038)	16.704*** (0.000)	47.434*** (0.000)	106.230*** (0.000)	16.315 (0.110)	129.026 (0.172)
Operating Volatility*Tenure Squared IV	-0.765*** (0.000)	-1.856*** (0.000)	-1.063 (0.712)	-1.971*** (0.000)	-5.048*** (0.000)	-7.340*** (0.003)	-2.680* (0.068)	-21.105 (0.120)
Special Items	-0.053*** (0.000)	-0.183*** (0.005)	-1.033** (0.024)	-0.103*** (0.000)	-0.398*** (0.000)	-2.077*** (0.000)	0.221 (0.343)	1.078 (0.617)
Special Items*Tenure IV	-0.007 (0.732)	-0.287*** (0.001)	-2.061*** (0.001)	-0.040** (0.026)	-0.410*** (0.000)	-3.116*** (0.000)	-0.031 (0.918)	0.832 (0.769)
Special Items*Tenure Squared IV	0.001 (0.501)	0.022** (0.013)	0.138** (0.026)	0.004* (0.055)	0.030*** (0.000)	0.214*** (0.000)	-0.027 (0.392)	-0.317 (0.278)
Tenure IV	-0.001 (0.394)	0.046*** (0.000)	0.035 (0.206)	-0.003*** (0.001)	0.031*** (0.000)	0.057** (0.015)	1.069*** (0.000)	0.624*** (0.000)
Tenure Squared IV	0.000 (0.184)	0.000 (0.967)	0.041*** (0.000)	0.000*** (0.003)	-0.000 (0.695)	0.024*** (0.000)	0.001 (0.675)	1.005*** (0.000)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	6,208	6,208	6,208	6,370	6,370	6,370	6,370	6,370
Number of Firms	923	923	923	942	942	942	942	942
<b>First Stage Tests:</b>								
R-squared of OLS Regressions including only Instruments								
R-squared	0.157	0.193	0.212	0.080	0.175	0.237	0.651	0.645
Adj. R-squared	0.156	0.192	0.211	0.0790	0.174	0.236	0.651	0.645
F-test of Excluded Instruments								
F-test	27.71	136.06	246.14	169.13	180.03	187.62	4745.25	6173.34
P-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Overidentification Test -- Earnings Management Instruments								
Sargan-Hansen Statistic	3.844			4.447				
P-value	0.2788			0.2171				



**Table 5 – CEO Salary and Equity Compensation and Earnings Management over Tenure**

This Table reports instrumental variables regressions for the relationship between the different components of the CEO's compensation and earnings management over the CEO's tenure. Columns (1) and (2) show results for the salary part of the CEO's total compensation (Salary). Columns (3) and (4) report results using the bonus part of the CEO's total compensation (Bonus). Columns (5) and (6) show results for the equity part of the CEO's compensation (Equity Component 1). Before 2006, we obtain Equity Component 1 adding together Stock Awards, Restricted Stock Grants and the Value of Options Granted. After December 2006, Equity Component 1 is calculated adding together Stock Awards, Grant-Date Fair Value of Option Awards and Value of Options Granted. The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), and (5) and Operating Accruals calculated using the firm's cash-flow statement in columns (2), (4), and (6). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns, and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Salary		Bonus		Equity Component 1	
Perf.-Adj. Modified Jones Model	-7.416 (0.631)		60.093 (0.117)		71.946* (0.074)	
Perf.-Adj. Modified Jones Model *Tenure	3.114 (0.660)		-26.853 (0.126)		-32.026* (0.083)	
Perf.-Adj. Modified Jones Model *Tenure Squared	-0.406 (0.620)		3.405* (0.094)		3.532* (0.099)	
Operating Accruals		-11.848 (0.480)		35.858 (0.306)		88.748** (0.035)
Operating Accruals* Tenure		5.373 (0.490)		-16.690 (0.304)		-40.593** (0.038)
Operating Accruals* Tenure Squared		-0.587 (0.470)		1.984 (0.243)		4.162** (0.042)
Tenure	-0.020 (0.950)	-0.044 (0.854)	1.415* (0.081)	1.263** (0.038)	1.415* (0.081)	1.263** (0.038)
Tenure Squared	0.017 (0.640)	0.016 (0.500)	-0.155* (0.096)	-0.124** (0.041)	-0.155* (0.096)	-0.124** (0.041)
Firm Size	0.694* (0.091)	0.711* (0.068)	4.380*** (0.000)	4.088*** (0.000)	4.380*** (0.000)	4.088*** (0.000)
Market-to-Book Ratio t-1	-0.001 (0.573)	-0.000 (0.764)	0.000 (0.844)	-0.002 (0.323)	0.000 (0.844)	-0.002 (0.323)
Past Returns t-1	0.114 (0.900)	0.055 (0.941)	-4.045* (0.088)	-3.718** (0.047)	-6.804*** (0.002)	-6.492*** (0.000)
Return on Assets t-1	-0.230 (0.323)	-0.336 (0.276)	1.020* (0.092)	1.768** (0.023)	1.286* (0.050)	0.425 (0.370)
Stock Returns Volatility	-0.301 (0.530)	-0.098 (0.842)	0.623 (0.618)	0.793 (0.521)	0.623 (0.618)	0.793 (0.521)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	NO	NO
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Industry Dummies	NO	NO	NO	NO	NO	NO
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors Cluster	NO	NO	NO	NO	NO	NO
Observations	6,208	6,373	6,208	6,373	6,197	6,362
Number of Firms	923	942	923	942	921	940

**Table 6 – CEO Compensation and Earnings Management over Tenure by CEO's Contracts Type**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for CEOs with an explicit employment agreement (CEOs with Contracts) and CEOs that have been appointed without a contract (CEOs without Contracts). The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	CEOs with Contracts		CEOs without Contracts		CEOs with Contracts	CEOs without Contracts
Perf.-Aug. Modified Jones Model	0.921		31.705***		0.716	2.101***
	(0.920)		(0.005)		(0.417)	(0.003)
Perf.-Aug. Modified Jones Model *Tenure	0.122		-12.903**		-0.212	-0.787***
	(0.978)		(0.011)		(0.600)	(0.009)
Perf.-Aug. Modified Jones Model *Tenure Squared	-0.060		1.237**		0.015	0.059**
	(0.907)		(0.017)		(0.748)	(0.035)
Operating Accruals		30.213		41.502**		
		(0.171)		(0.046)		
Operating Accruals* Tenure		-14.506		-16.162*		
		(0.182)		(0.061)		
Operating Accruals* Tenure Squared		1.616		1.444*		
		(0.194)		(0.070)		
Tenure	-0.002	0.516	0.546**	0.502*	-0.115***	0.103***
	(0.991)	(0.183)	(0.012)	(0.059)	(0.000)	(0.000)
Tenure Squared	0.003	-0.055	-0.052**	-0.043*	-0.001	-0.002
	(0.890)	(0.199)	(0.018)	(0.068)	(0.777)	(0.348)
Firm Size	0.685	0.565	0.746**	1.280***	0.682	0.537
	(0.120)	(0.251)	(0.041)	(0.005)	(0.358)	(0.667)
Market-to-Book Ratio t-1	0.001	0.000	0.002*	0.000	0.001	0.001***
	(0.158)	(0.778)	(0.069)	(0.877)	(0.332)	(0.002)
Past Returns t-1	1.162*	0.057	-0.604	-0.542	1.465**	0.269
	(0.089)	(0.956)	(0.333)	(0.425)	(0.029)	(0.695)
Return on Assets t-1	0.181	0.622*	0.255	0.742**	0.139	-0.175
	(0.307)	(0.093)	(0.242)	(0.050)	(0.412)	(0.226)
Stock Returns Volatility	1.111*	0.917	0.588	-0.284	0.892	0.709**
	(0.073)	(0.132)	(0.113)	(0.573)	(0.202)	(0.038)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors	NO	NO	NO	NO	YES	YES
Cluster	NO	NO	NO	NO	CEO	CEO
Observations	1,853	1,875	4,310	4,449	1,922	4,488
Adj. R-squared					0.165	0.167
Number of CEOs/Firms	394	397	697	718	492	960

**Table 7****CEO Compensation and Earnings Management over Tenure by CEO's Contracts Type, for CEOs appointed within the Firm**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for insider CEOs with an explicit employment agreement (Insider CEOs with Contracts) and insider CEOs that have been appointed without a contract (Insider CEOs without Contracts). An insider CEO is a CEO that has spent at least 5 years in the firm before being appointed. The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	Insiders with Contracts		Insiders without Contracts		Insiders with Contracts	Insiders without Contracts
Perf.-Aug. Modified Jones Model	23.100 (0.495)		29.192*** (0.001)		0.480 (0.778)	2.145** (0.046)
Perf.-Aug. Modified Jones Model *Tenure	-17.720 (0.492)		-11.735*** (0.004)		-0.351 (0.727)	-1.124*** (0.005)
Perf.-Aug. Modified Jones Model *Tenure Squared	2.576 (0.544)		1.042** (0.011)		-0.034 (0.733)	0.093*** (0.005)
Operating Accruals		-11.778 (0.527)		47.894* (0.087)		
Operating Accruals* Tenure		1.897 (0.804)		-18.897 (0.105)		
Operating Accruals* Tenure Squared		0.147 (0.815)		1.635 (0.121)		
Tenure	0.714 (0.460)	0.006 (0.981)	0.541*** (0.006)	0.569 (0.108)	0.089 (0.111)	0.133*** (0.000)
Tenure Squared	-0.097 (0.537)	-0.007 (0.777)	-0.051** (0.010)	-0.050 (0.109)	0.001 (0.892)	-0.004* (0.072)
Firm Size	0.323 (0.799)	-0.309 (0.715)	0.196 (0.712)	0.612 (0.352)	0.231 (0.713)	-0.499 (0.418)
Market-to-Book Ratio t-1	0.000 (0.949)	0.000 (0.951)	0.001 (0.188)	-0.000 (0.924)	0.000 (0.908)	0.001*** (0.001)
Past Returns t-1	0.899 (0.644)	0.480 (0.671)	0.390 (0.611)	0.198 (0.857)	0.612 (0.430)	1.505** (0.014)
Return on Assets t-1	-0.482 (0.713)	0.101 (0.807)	0.331 (0.256)	0.859* (0.100)	0.153 (0.730)	-0.159 (0.345)
Stock Returns Volatility	0.971 (0.696)	2.731** (0.011)	0.650 (0.237)	-0.165 (0.782)	1.853** (0.038)	0.333 (0.466)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors	NO	NO	NO	NO	YES	YES
Cluster	NO	NO	NO	NO	CEO	CEO
Observations	536	536	1,993	2,041	549	2,042
Adj. R-squared					0.291	0.212
Number of CEOs/Firms	124	124	379	388	131	442

**Table 8 – CEO Compensation and Earnings Management over Tenure by CEO's age**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for young CEOs (Young CEOs) and old CEOs (Old CEOs). A CEO is defined as young if she is no older than 59 years and old if she is more than 59 years old. The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	Old CEOs		Young CEOs		Old CEOs	Young CEOs
Perf.-Adj. Modified Jones Model	8.957 (0.231)		31.517 (0.102)		1.841* (0.091)	1.508** (0.036)
Perf.-Adj. Modified Jones Model *Tenure	-3.767 (0.295)		-14.456* (0.073)		-0.646 (0.139)	-0.565* (0.074)
Perf.-Adj. Modified Jones Model *Tenure Squared	0.391 (0.311)		1.522* (0.052)		0.059 (0.142)	0.042 (0.156)
Operating Accruals		28.994 (0.202)		24.679** (0.023)		
Operating Accruals* Tenure		-12.684 (0.268)		-12.072** (0.011)		
Operating Accruals* Tenure Squared		1.359 (0.305)		1.468*** (0.006)		
Tenure	0.064 (0.535)	0.438 (0.308)	0.473* (0.078)	0.570** (0.011)	-0.093*** (0.002)	-0.040 (0.351)
Tenure Squared	-0.007 (0.489)	-0.047 (0.341)	-0.047* (0.059)	-0.069*** (0.006)	0.001 (0.673)	-0.002 (0.320)
Firm Size	0.116 (0.748)	0.589 (0.336)	1.263*** (0.003)	1.021** (0.012)	-0.374 (0.437)	1.081 (0.395)
Market-to-Book Ratio t-1	0.001 (0.359)	0.001 (0.584)	0.001* (0.089)	0.002*** (0.006)	0.002 (0.159)	0.001 (0.102)
Past Returns t-1	0.840* (0.089)	0.260 (0.779)	-0.690 (0.477)	-0.761 (0.348)	0.143 (0.816)	0.872 (0.205)
Return on Assets t-1	0.414** (0.031)	0.260 (0.281)	0.561 (0.141)	0.298 (0.157)	-0.216 (0.246)	0.016 (0.914)
Stock Returns Volatility	0.246 (0.552)	-0.622 (0.523)	0.306 (0.532)	0.754* (0.081)	0.033 (0.947)	0.790* (0.067)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors	NO	NO	NO	NO	YES	YES
Cluster	NO	NO	NO	NO	CEO	CEO
Observations	2,063	2,011	4,261	4,152	2,093	4,317
Adj. R-squared					0.213	0.142
Number of CEOs/Firms	565	553	861	840	718	1,174

**Table 9 -- CEO Compensation, Earnings Management, Tenure and Firms' Corporate Governance**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for firms with different corporate governance at the time when the CEO was appointed. A firm has High G-index at Appointment if its G-index the year the CEO was appointed is above the median in the sample. A firm with a G-index below the median in the sample in the year when the CEO was appointed is defined as a firm with Low G-index at Appointment. The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	High G-Index At Appointment		Low G-Index At Appointment		High G-Index At Appointment	Low G-Index At Appointment
Perf.-Adj. Modified Jones Model	8.851 (0.332)		31.836** (0.023)		2.655 (0.116)	1.305** (0.031)
Perf.-Adj. Modified Jones Model *Tenure	-5.340 (0.205)		-13.428** (0.032)		-1.258 (0.113)	-0.459* (0.077)
Perf.-Adj. Modified Jones Model *Tenure Squared	0.603 (0.163)		1.444** (0.040)		0.105 (0.221)	0.035 (0.151)
Operating Accruals		22.812 (0.252)		37.628*** (0.006)		
Operating Accruals* Tenure		-9.398 (0.257)		-16.917*** (0.007)		
Operating Accruals* Tenure Squared		1.059 (0.375)		1.718*** (0.008)		
Tenure	0.284* (0.099)	0.338 (0.144)	0.570** (0.039)	0.511** (0.010)	0.165*** (0.000)	-0.086** (0.042)
Tenure Squared	-0.030* (0.096)	-0.035 (0.262)	-0.062** (0.045)	-0.050** (0.011)	-0.010*** (0.007)	0.000 (0.948)
Firm Size	-0.204 (0.687)	0.035 (0.958)	1.061*** (0.004)	0.936*** (0.005)	-0.404 (0.400)	0.754 (0.461)
Market-to-Book Ratio t-1	0.001 (0.516)	0.001 (0.624)	0.002** (0.044)	0.001 (0.239)	0.001 (0.473)	0.001 (0.113)
Past Returns t-1	1.123* (0.078)	0.562 (0.602)	-1.110 (0.221)	-0.596 (0.339)	1.298* (0.097)	0.581 (0.304)
Return on Assets t-1	-0.047 (0.879)	-0.147 (0.698)	0.483** (0.045)	0.846*** (0.005)	0.011 (0.977)	-0.069 (0.574)
Stock Returns Volatility	0.750 (0.152)	0.347 (0.737)	0.310 (0.467)	0.206 (0.607)	0.343 (0.566)	0.709* (0.059)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors Cluster	NO	NO	NO	NO	YES	YES
	NO	NO	NO	NO	CEO	CEO
Observations	1,377	1,447	4,786	4,877	1,401	5,009
Adj. R-squared					0.233	0.154
Number of CEOs/Firms	256	267	801	813	331	1,118

**Table 10 – CEO Compensation, Earnings Management, Tenure – CEOs and Chair of the Board/President**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for CEOs that also hold other appointments within the firm. Columns (1), (2) and (5) report results for firms in which the CEO is also the Chair of the Board of Directors or the President. Columns (3), (4) and (6) show results for firms in which the CEO is neither the Chair of the Board of Directors nor the President. The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	CEOs and Chair of the Board/President		Other CEOs		CEOs and Chair of the Board/President	Other CEOs
Perf.-Adj. Modified Jones Model	7.542 (0.234)		18.594** (0.039)		-0.001 (0.999)	1.841*** (0.009)
Perf.-Adj. Modified Jones Model *Tenure	-4.888 (0.113)		-7.917* (0.075)		-0.151 (0.735)	-0.641** (0.050)
Perf.-Adj. Modified Jones Model *Tenure Squared	0.531 (0.103)		0.868 (0.114)		0.012 (0.764)	0.050 (0.168)
Operating Accruals		8.020 (0.197)		48.339*** (0.010)		
Operating Accruals* Tenure		-4.770 (0.122)		-22.609** (0.012)		
Operating Accruals* Tenure Squared		0.510 (0.101)		2.412** (0.016)		
Tenure	0.251* (0.094)	0.151* (0.090)	0.310* (0.085)	0.708** (0.013)	0.085*** (0.006)	-0.066*** (0.002)
Tenure Squared	-0.025 (0.136)	-0.013 (0.148)	-0.033 (0.119)	-0.073** (0.016)	0.001 (0.830)	-0.001 (0.636)
Firm Size	-0.223 (0.617)	-0.206 (0.656)	1.498*** (0.000)	1.754*** (0.000)	-0.780 (0.266)	0.924 (0.399)
Market-to-Book Ratio t-1	0.001* (0.078)	0.001* (0.063)	0.001 (0.196)	0.001 (0.575)	0.001 (0.333)	0.001** (0.024)
Past Returns t-1	1.067 (0.146)	1.134** (0.043)	-0.132 (0.797)	-0.864 (0.267)	0.857 (0.166)	0.308 (0.628)
Return on Assets t-1	0.012 (0.963)	0.050 (0.833)	0.247* (0.076)	0.839*** (0.005)	0.020 (0.918)	0.001 (0.997)
Stock Returns Volatility	1.321*** (0.008)	1.391*** (0.002)	0.065 (0.864)	-0.213 (0.669)	1.201** (0.019)	0.664 (0.116)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors Cluster	NO	NO	NO	NO	YES	YES
	NO	NO	NO	NO	CEO	CEO
Observations	1,502	1,568	4,661	4,756	1,550	4,860
Adj. R-squared					0.286	0.134
Number of CEOs/Firms	360	370	860	878	462	1,292



**Table 11 – CEO Compensation, Earnings Management, Tenure and Industry Volatility**

This Table reports multivariate analyses for the relationship between CEO compensation and earnings management over the CEO's tenure for firms with different stock returns volatility. A firm is classified as a High (Low) Volatility Firm if its Stock Returns Volatility, computed as the standard deviation of the stock returns over the previous 12 months, is the top (bottom) tercile of its industry's distribution. The table reports instrumental variables regressions in columns from (1) to (4) and panel regressions with CEO fixed effects in columns (5) and (6). In each regression, the dependent variable is the logarithm of total compensation (Total Compensation). The table shows results using two different measures of earnings management as independent variables: (a) Performance-adjusted Modified Jones Model calculated including year dummies in the model in columns (1), (3), (5) and (6) and Operating Accruals calculated using the firm's cash-flow statement in columns (2) and (4). As instruments for earnings management, we use both Special items (which is the sum of special items, extraordinary items and restructuring charges) and Operating Earnings Volatility (Hazarika et al (2012)). As instrument for tenure and tenure squared we use the deviation of the tenure and tenure squared variables around their means for each job match spell (Altonji and Shakotko (1987)). All the variables of earnings management are unsigned. All regressions exclude the year in which the CEO was appointed. All regressions include also the following control variables: Firm Size Squared, Past Returns and Return on Asset. Variable definitions are found in the Appendix. Variables are winsorized at the 1% level. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. \* indicates significance at 1% (\*\*\*), 5% (\*\*), 10% (\*).

	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables Regressions				Panel OLS Regressions with CEO Fixed Effects	
	Low Volatility Firms		High Volatility Firms		Low Volatility Firms	High Volatility Firms
Perf.-Adj. Modified Jones Model	2.804 (0.518)		30.212* (0.069)		0.611 (0.622)	3.086*** (0.001)
Perf.-Adj. Modified Jones Model *Tenure	1.132 (0.675)		-14.167* (0.086)		-0.006 (0.992)	-1.411*** (0.000)
Perf.-Adj. Modified Jones Model *Tenure Squared	-0.378 (0.362)		1.568 (0.109)		-0.019 (0.715)	0.128*** (0.001)
Operating Accruals		-8.278 (0.600)		27.997** (0.034)		
Operating Accruals* Tenure		1.082 (0.866)		-13.091** (0.038)		
Operating Accruals* Tenure Squared		-0.334 (0.543)		1.367** (0.042)		
Tenure	-0.020 (0.834)	-0.016 (0.917)	0.877* (0.088)	0.494** (0.033)	-0.133*** (0.000)	0.180*** (0.000)
Tenure Squared	0.013 (0.335)	0.010 (0.475)	-0.095 (0.115)	-0.047** (0.043)	0.001 (0.728)	-0.007** (0.022)
Firm Size	1.457* (0.091)	1.278* (0.093)	0.835 (0.143)	0.742 (0.122)	0.363 (0.644)	0.061 (0.937)
Market-to-Book Ratio t-1	0.001 (0.462)	0.001 (0.365)	-0.000 (0.976)	-0.001 (0.667)	-0.000 (0.869)	-0.000 (0.830)
Past Returns t-1	2.705*** (0.001)	2.725*** (0.003)	-0.969 (0.397)	-0.784 (0.353)	3.125*** (0.000)	0.683 (0.203)
Return on Assets t-1	0.273 (0.536)	0.381 (0.328)	0.075 (0.737)	0.313 (0.193)	0.241 (0.375)	-0.287** (0.017)
Stock Returns Volatility	1.841 (0.138)	2.410 (0.124)	0.597 (0.360)	0.386 (0.470)	1.079 (0.310)	0.588 (0.284)
Other Control Variables	YES	YES	YES	YES	YES	YES
CEO Fixed Effects	NO	NO	NO	NO	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	NO	NO
Industry Dummies	NO	NO	NO	NO	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Robust Standard Errors Cluster	NO	NO	NO	NO	YES	YES
	NO	NO	NO	NO	CEO	CEO
Observations	1,998	2,068	2,112	2,147	2,050	2,237
Adj. R-squared					0.337	0.200
Number of CEOs/Firms	637	655	745	759	832	1,037