The Impact of SOX on Earnings Management Activities around CEO Turnovers

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Abstract

We assess the impact of the Sarbanes-Oxley Act (SOX) on discretionary accruals (DA) and real earnings management (REM) activities around CEO turnovers. Improved corporate governance post-SOX can either deter earnings management (the *deterrence* effect) or pressure CEOs to inflate earnings when facing imminent turnover risks (the *pressure* effect). We find a strong deterrence effect for *new* CEOs, while the pressure effect dominates the deterrence effect for *outgoing* CEOs. Pre-SOX firms with new CEOs manage earnings downward through both DA and REM and the effect is more pronounced in weakly governed firms. Post-SOX both types of earnings baths diminished. By contrast, post-SOX firms engage in more aggressive upward earnings management prior to CEO turnovers and the evidence is stronger prior to performance-induced CEO turnovers. The compulsory compliance with the 2003 NYSE and NASDAQ listing rule on audit committee independence is associated with a reduction in new-CEO REM baths.

JEL classifications: C23, G30, M41.

Keywords: CEO Turnover, SOX, Real Earnings Management, Discretionary Accruals

1. INTRODUCTION

The landmark Sarbanes-Oxley legislation (SOX)[1] introduced sweeping changes in the financial reporting and corporate governance environment. Previous studies find that SOX curbs accruals manipulation in the context of meeting and beating research analysts' forecasts and option granting (Hossain et al. 2011; Koh et al. 2008) and improves reporting quality (Ashbaugh-Skaife et al. 2008; Altamuro and Beatty 2010; Krishnan and Visvanathan 2008). In addition to ongoing capital market and compensation considerations, CEOs have strong and different incentives to manage earnings early and late in their tenure out of career concerns (Ali and Zhang 2015; Pourciau 1993; Dechow and Sloan 1991; Cheng 2004; Kalyta 2009). While earnings quality improved post-SOX overall, SOX may have affected earnings manipulation activities differently for outgoing and incoming CEOs. We find that SOX did not simply deter earnings management activities throughout CEOs' tenure. Instead, the impact of SOX on earnings management activities around CEO turnovers are bi-dimensional, with two opposing forces at work influencing earnings management activities. The first force is the elevated scrutiny that curbs earnings management activities in the post-SOX period (the *deterrence* effect). The second force is an increase in sensitivity of CEO turnover to performance (Kaplan and Minton 2012; Guo and Masulis 2015) in the post-SOX period, which pressures CEOs into more aggressive earnings management activities as a last resort (the *pressure* effect). In the post-SOX period, we find that the deterrence effect is strong and significant for *new* CEOs, while pressure effect dominates the pressure effect for *outgoing* CEOs.

[1] In the paper, SOX refers to the Sarbanes-Oxley Act and its related regulation implemented through the Securities and Exchange Commission (SEC) and stock exchanges. Following a long string of high-profile corporate failures, the US Congress enacted the Sarbanes-Oxley Act in July 2002. The SEC is the government agency charged with implementing most of the provisions of SOX, and the SOX Act required the SEC to design rules to be compliant before specific deadlines.

In the pre-SOX period (January 1, 1993 to July 30, 2002), firms with new CEOs record discretionary accruals (DA) and real earnings management (REM) measures that are significantly lower than their benchmark groups. This evidence for earnings baths in new-CEO firm-quarters disappears in the post-SOX period (July 31, 2002 to December 31, 2013). Pre-SOX, firms with new CEOs manage earnings *downwards* by 0.46 percent and 0.80 percent of total assets through DA and REM in each quarter with p −values of 0.01 and 0.05, respectively.

Not all firms suffered weak governance before the introduction of SOX. We use low levels of institutional ownership (Cremers and Nair 2005; Dittmar and Mahrt-Smith 2007; Gillan and Starks 2000) and high levels of Entrenchment Index (Bebchuk et al. 2008) to proxy for weak corporate governance. We find that the evidence for downward earnings management in firms with new CEOs is more pronounced in weakly governed firms in the pre-SOX period.

Motivated by Jongjaroenkamol and Laux (2017), whose theoretical model predicts that outsider CEOs have more incentives to manage earnings aggressively, we also investigate whether the evidence for new-CEO earnings baths in the pre-SOX period is more pronounced for externally hired new CEOs and find weak evidence consistent with this hypothesis.

While SOX can deter earnings management activities, it also increases the likelihood of CEO turnovers prompted by poor performance (Kaplan and Minton 2012; Guo and Masulis 2015). The threat of losing their jobs can pressure outgoing CEOs to gamble with aggressive upward earnings management activities. As expected, we find that outgoing CEOs significantly manage earnings upward through both DA and REM in the post-SOX period but only weakly so in the pre-SOX period. This finding suggests that post-SOX the pressure effect dominates the deterrence effect for outgoing CEOs. Post-SOX (pre-SOX) outgoing CEOs on average

inflate earnings by 0.38 percent and 0.64 percent (0.15 percent and 0.24 percent) of total assets through DA and REM, respectively, both with p −values of 0.05 (insignificant).

For outgoing CEOs, the pressure effect is likely to be particularly strong when CEOs have to manipulate earnings to make up for earnings shortfalls in order to keep their jobs. In fact, we find that in the post-SOX period evidence for upward earnings management prior to CEO turnovers is strong and highly significant when CEO turnovers are performance-induced. If the CEO-turnover firm underperforms its industry peers in the stock market over the past 12 months in the post-SOX period, DA and REM average 0.45 percent and 0.87 percent *lower* than those recorded by its peer firms, respectively, both with p −values of 0.01. Such evidence for upward earnings management prior to CEO turnovers is weaker if the CEO departure is *not* induced by performance in the post-SOX period.

We use quarterly instead of annual data in order to address the problem of misclassification of a "transition-year" (or a year managed by the outgoing- and incoming-CEOs) as a new-CEO year, as noted by both Pourciau (1993) and Murphy and Zimmerman (1993). In our study, the transition period is only one fiscal quarter and all main analyses exclude these transition quarters. The construction of our quarterly earnings management measures follows Bartov and Cohen (2009), Das et al. (2009), and Jha (2013): we estimated DA and REM measures cross-sectionally by industry-quarter with the modified Jones model (Jones 1991; Dechow et al. 1995) and the Roychowdhury (2006) model, respectively.

Our main results are from panel regressions using all firm-quarter observations with non-missing values in the CRSP/Compustat and Execucomp universe. Sample selection bias is not an issue because our sample is not limited to CEO-change firm-quarter observations. However, an endogeneity problem exists because unobservable variables (for example, the

public's scrutiny of CEOs' performance and actions) affect both earnings management and CEO turnovers. As suggested by Lennox et al. (2011) and Shipman et al. (2017), we use a Heckman (1979) treatment model to address this issue, where the first-stage model predicts CEO turnovers and the second-stage panel regressions include inverse Mills Ratios estimated from the first-stage regressions. The second-stage panel regressions examine whether levels of earnings management measures in firm-quarters managed by outgoing (new) CEOs differ from those in the benchmark group after controlling for variables found to be correlated with measurement errors of earnings management models (Roychowdhury 2006; Dechow et al. 1995) and time and firm fixed effects.

While we show that new (outgoing) CEOs engage in less (more) aggressive earnings management in the post-SOX period, it is necessary to test whether SOX-regulation caused these changes. Following Guo and Masulis (2015), we use the 2003 NYSE and NASDAQ listing rule on audit committee independence as a quasi-experiment to conduct difference-in-differences (DiD) analyses and attribute some of the impact from SOX on REM activities around CEO turnovers to the mandatory adoption of this listing rule. In new-CEO firm-quarters, treatment firms (or, non-compliant firms forced to comply with the new listing rule) record REM averaging 1.39 percent of total assets higher relative to control firms after treatment with a p −value of 0.05.

We summarize our contributions below.

First, we contribute to the literature on SOX and earnings management activities (Bartov and Cohen 2009; Cohen and Zarowin 2010) by investigating how earnings management activities around CEO turnover changed post-SOX. We find that SOX deters earnings baths through both DA and REM in firms managed by new CEOs. We further attribute

this change to the improved corporate governance environment because earnings baths are more pronounced in weakly governed firms pre-SOX. In addition, we uncover an unintended effect from SOX on earnings management activities towards the end of CEOs' tenure – outgoing CEOs significantly inflate earnings on average in the post-SOX but not in the pre-SOX period, corroborating findings in other studies showing that CEOs in the post-SOX environment are under more pressure to deliver financial results (Kaplan and Minton 2012; Guo and Masulis 2015).

Second, we contribute to the literature on the increased awareness of business risks associated with REM in the post-SOX period. While managers are able to substitute REM for DA to meet and beat earnings forecasts in the post-SOX period (Bartov and Cohen 2009; Cohen et al. 2008), we find that post-SOX new CEOs are unable to replace DA with REM in managing earnings downward. Instead, post-SOX new CEOs refrain from using aggressive REM to manage earnings downward. Post-SOX auditors are increasingly aware of risks related to aggressive REM (Kim and Park 2014; Greiner et al. 2017) – REM is associated with auditor resignations and audit fee rises. Consistent with evidence that auditors do care and price REM risks, we find that independent audit committees restrain REM earnings baths. We show that the mandatory adoption of an independent audit committee, as required by the NYSE and NASDAQ listing rule implemented as part of the SOX legislation, significantly reduces levels of REM baths in new-CEO firm-quarters.

Third, we use the quasi-natural experiment opportunity provided by SOX to investigate whether REM earnings baths exist. Although substantial evidence exists for earnings baths through DA in firms managed by new CEOs (Pourciau 1993), the literature has not investigated whether new CEOs manage earnings downward through REM. The crux of the problem is that when new CEOs enter office (CEOs about to lose their jobs), they are likely to implement

changes to business that could result in negative (positive) REM measures that are hard to distinguish from REM baths. The adoption of SOX provides a quasi-natural experiment to investigate whether REM earnings baths exist. One objective of SOX is to improve the quality of financial reporting, but SOX is not designed to hinder CEOs' actions in improving firms' performance. If outgoing or new CEOs restructure the firm's activities to improve performance, then SOX should not influence the level of REM observed in the post-SOX period. Alternatively, if the pre-SOX negative REM measures result from new CEOs' REM baths, we would expect the introduction of SOX to attenuate the level of REM baths detected. We find evidence more consistent with new CEOs' downward earnings management through REM.

2. HYPOTHESES

New CEOs understate earnings because they can blame the losses on their predecessors and benefit from firms' future earnings growth (Choi et al. 2014; Pourciau 1993; Reitenga and Tearney 2003; Ali and Zhang 2015). By contrast, retiring CEOs often cut R&D spending and investments or inflate earnings because they are less likely to benefit from new investments (Cheng 2004; Dechow and Sloan 1991) or because poor performance may trigger job termination (Dechow and Sloan 1991; Murphy and Zimmerman 1993; Cheng 2004; Kalyta 2009; Hazarika et al. 2012).

Many important changes introduced by SOX could deter new (outgoing) CEOs from managing earnings downward (upward) through DA (a deterrence effect). While in the post-SOX period managers increasingly use REM instead of DA to meet and beat research analysts' forecasts (Evans et al. 2015; Bartov and Cohen 2009), aggressive REM activities lead to increased audit business risks and reputation risks for auditors, and so they are likely to be

closely monitored by auditors post-SOX (Greiner et al. 2017; Kim and Park 2014).[2] In addition, strengthened board monitoring could also deter aggressive REM activities because REM can harm the firm over the long run (Cohen and Zarowin 2010; Graham et al. 2005; Kothari et al. 2016). Thus, we hypothesize that SOX can deter CEOs from both DA and REM baths early in their tenure:

H1A. New CEOs engage in more pronounced *downward* earnings management through both DA and REM in the *pre-SOX* period.

Turning to the pressure effect, we motivate this effect by increased CEO-turnover risks and turnover sensitivity to performance in the post-SOX period, as documented by Kaplan and Minton (2012) and Guo and Masulis (2015). Subject to increased pressure, both new and outgoing CEOs could manage earnings management upward more aggressively. For outgoing CEOs, the pressure effect is imminent and more relevant than the deterrence effect. Therefore, we have the following hypothesis:

H1B. Outgoing CEOs engage in more pronounced *upward* earnings management through DA and REM in the *post-SOX* period.

Not all firms are poorly governed pre-SOX. Because effective board oversight and strong governance mechanisms deter myopic earnings manipulation behaviors (Bushee 1998; Hossain et al. 2011; Qiang et al. 2016), we expect to find stronger evidence for earnings baths

[2] Kim and Park (2014) summarize their conversations with current and former auditors in BIG4 and show that auditors are concerned about clients' abnormal and aggressive operating decisions and their impacts on business risks of the client as well as the auditor. In addition, the AU section 329.23 of PCAOB 2002 requires auditors to engage in analytical review procedures to evaluate significant unexpected differences in financial statement items which may indicate an increased audit risk. The analytical review could reveal certain REM activities.

early in CEOs' tenure in weakly governed firms pre-SOX. Specifically, we test the hypothesis below to investigate whether strong governance deters earnings baths early in CEOs' tenure.

H2A. Earnings baths through DA and REM early in CEOs' tenure are more pronounced in weakly governed firms pre-SOX.

Post-SOX, outgoing CEOs in strongly governed firms could face more pressure to deliver financial results, thus managing earnings upward more aggressively relative to outgoing CEOs in weakly governed firms. For example, outgoing CEOs in firms with fewer anti-takeover protection mechanisms (or with low levels of entrenchment index – E-Index) could potentially face more pressure in managing earnings upward compared with outgoing CEOs in firms with a high E-Index in the post-SOX period. However, we consider the balance of power from two opposing effects and put forward the hypothesis below:

H2B. In the post-SOX period, upward earnings management through DA and REM prior to CEO turnovers can occur in either weakly or strongly governed firms depending on whether the pressure effect dominates the deterrence effect.

Firms often hire outsider CEOs to make transformational changes and give them a larger performance bonus (Parrino 1997; Zajac 1990; Farrell and Whidbee 2003). As a result, outsider CEOs have stronger incentives to manipulate earnings than insider CEOs (Jongjaroenkamol and Laux 2017). Thus, we expect to see more aggressive downward earnings management after firms hired outsiders as new CEOs relative to when CEOs are insiders:

H3A. Externally hired new CEOs engage in more pronounced earnings baths pre-SOX.

We assume that the pressure effect is stronger when firms underperform their industry peers in the post-SOX period. Following Jenter and Lewellen (2017), we drop the distinction

between forced and voluntary CEO turnovers and categorize CEO turnovers into performance-induced and non-performance-induced CEO turnovers. Specifically, we posit the following:

H3B. Post-SOX outgoing CEOs engage in more pronounced upward earnings management when firms underperform their peers relative to when firms outperform their peers.

Next, in order to identify the mechanism through which SOX influenced earnings management activities around CEO turnovers, we follow Guo and Masulis (2015) and use the 2003 NYSE and NASDAQ listing rule for fully independent audit committees as a quasi-natural experiment to examine the causal relation between audit committee structure and earnings manipulation around CEO turnovers. We expect that changes in board structure made to meet the independent audit committee requirement curb earnings baths early in CEOs' tenure. By contrast, upward earnings management in firms prior to CEO turnovers could either decrease in response to the scrutiny from independent audit committees (Klein 2002; Carcello et al. 2006) or become strongly associated with CEO-turnover events (Hazarika et al. 2012). Hence, we have the following hypothesis:

H4. The listing rule on audit committee independence affects the levels of earnings management through DA and REM around CEO turnovers in non-compliant firms.

3. DATA AND METHODOLOGY

We obtain dates of CEO appointments and departures from Execucomp over the 1993–2013 period so that we have one decade before and one decade after SOX. We exclude firms in the financial, insurance, real estate, utilities, and public administration industries. In this sample period, the Execucomp and CRSP/Compustat merged file record 3,015 CEO-turnover events. Table 1 reports CEO-turnover events by time and industry. On average, 10.7 percent of firms experience a change in CEO (see Panel A in Table 1), implying an average CEO tenure

of approximately 9.3 years.[3] The agriculture, forestry, and fishing industry has the lowest CEO-turnover ratio of 5.9 percent (Panel B of Table 1). The competitive retail industry exhibits the highest CEO-turnover rate of 11.3 percent, implying an average CEO tenure of 8.8 years.[4]

[Insert Table 1 about here.]

We use different cutoff dates for DA and REM when assigning CEO-turnover time-event indicators to firm-quarters in the CRSP/Compustat merged file (Figure 1). The cutoff dates for DA and REM are the earnings announcement date and the balance sheet date, respectively, corresponding to the last day when each type of earnings management can take place.[5] The first (last) four consecutive fiscal quarters managed by a new CEO are new (outgoing) CEO quarters (NEW and OUT). We require a minimum tenure of four consecutive fiscal quarters for a CEO to be included in our analyses. Firm-quarters that are neither OUT nor NEW are established-CEO firm-quarters (*Established*) or the benchmark groups in our study.

[Insert Figure 1 about here.]

We use all available firm-quarters from combining the Execucomp database and the CRSP/Compustat Merged Database from 1993 to 2013 to estimate the normal levels of discretionary accruals, production costs, and discretionary expenditure by running cross-sectional regressions for each two-digit SIC-quarter group.

[3] As a point of comparison, Bushman et al. (2010) use Execucomp, which covers S&P 1000 large companies, and the average CEO tenure of turnover firms is approximately 10 years.

[4] We validate the starting date and the ending date of a CEO's tenure recorded in Execucomp with information from Audit Analytics, Capital IQ, and Factiva news search when the date of "becameceo" or the date of "leftofc" in Execucomp is missing or outside of the period during which the executive was recorded as a CEO in the Execucomp database.

[5] This fine-grained alignment is necessary. In fact, we show later in the paper that DA baths can take place as early as in-transition quarters. Internet Appendix AI.1 describes the matching procedure in more detail.

The normal level of accruals are estimated from a modified Jones model (Jones 1991; Dechow et al. 1995), with quarterly data as in Das et al. (2009), Bartov and Cohen (2009) and Jha (2013). Proxies for REM use models in Roychowdhury (2006) and are constructed on quarterly data, as in Bartov and Cohen (2009). Our proxies for the extent of REM include abnormal cash flow from operations (R_CFO), abnormal production costs (R_PROD), abnormal discretionary expenditure (R_DISX), and the real earnings management index (REM, or the sum of R_CEO, R_DISX, and R_PROD).

Our study constructs proxies for earnings management measures such that a positive number suggests upward earnings management and a negative number suggests the opposite.[6] Appendix A summarizes the variables used in this study.

Institutional ownership and corporate governance data are from Thomson Reuter's 13F database and Institutional Shareholder Services (ISS) governance database, respectively. We follow Bebchuk et al. (2008) to compile the E-Index.

The main analyses in this study use 56,567 firm-quarter observations with non-missing values for all three earnings management measures and control variables.

Table 2 reports descriptive statistics for the main variables.

[Insert Table 2 about here.]

Panel A of Table 2 reports summary statistics of important variables. The market value of firm-quarter observations average 7.2 billion USD with a median of 1.5 billion USD. The percentage of institutional ownership (IO%) averages about 74 percent and the E-Index

[6] Both R_CFO and R_DISX are (−100) times the difference between the actual measure and the corresponding normal level. Internet Appendix IA.2 includes a more detailed description of the earnings management models used in this study as well as a summary of estimation results.

averages about 2.30. Panel B of Table 2 summarizes the earnings management and control variables used in the main regressions. The means of these earnings management variables do not equal zero because they have been winsorized at 1 percent on both tails. At the 25th and the 75th percentiles, the quarterly DAs are −1.40 percent and 1.73 percent of total assets, respectively, with a standard deviation of 3.34. The levels and standard deviations of quarterly DAs are comparable to prior studies using quarterly discretionary accruals, as in Bartov and Cohen (2009) and Collins et al. (2017). $Size_{t-1}$, MB_{t-1}, and ROA_t are standardized[7] by industry-quarter to be consistent with the construction earnings management measures.

[Insert Table 3 about here.]

Table 3 reports the pairwise correlation coefficients between key variables. Firms tend to use accruals and real activities to manage earnings in the same direction in a given quarter, as shown by the correlation coefficient of 0.32 (p −value of 0.05) between REM and DA. Control variables are not highly correlated, with correlation coefficients ranging from −0.06 between $SIZE(t-1)$ and $HIGHE(t)$ to 0.37 between $MB(t-1)$ and $SIZE(t-1)$. $ROA(t)$, $SIZE(t-1)$, and $MB(t-1)$ are significantly correlated with DA and REM measures, emphasizing the need to control for performance when measuring the extent of earnings management.

We also correlate REM measures with proxies for legitimate business activates including levels of R&D (R&D/Revenue[8]) and capital expenditure (Capex/Total Assets). R_DISX positively correlates with R&D/Revenue, as expected. Interestingly, Capex correlates

[7] The control variables are standardized by subtracting the industry-quarter mean and then dividing by the industry-quarter standard deviation.

[8] We standardize R&D/Revenue by industry-quarter and multiply by −1 so that a positive number suggests upward earnings management.

with R_CFO and R_PROD at -0.13 and -0.08, respectively, with $p-$values of 0.01, suggesting that earnings-decreasing REM activities are associated with increases in Capex in our dataset.

4. EARNINGS MANAGEMENT AROUND CEO TURNOVERS IN PRE- AND POST-SOX PERIODS

In order to examine how measures of earnings management evolve around CEO-turnover events, we plot the mean of each earnings management variable pre-SOX and post-SOX, for the period beginning four quarters before and ending four quarters after a CEO-change event (Figure 2). All five charts for the pre-SOX period (solid lines) exhibit a common U-shaped pattern despite some volatility in the transition quarter. In contrast, four charts for the REM measures post-SOX are almost flat.

[Insert Figure 2 about here.]

We compare the means of earnings management variables during the pre- and post-SOX periods for firm-quarters with outgoing (new) CEOs (Table 4). The mean of DA in the post-SOX period for outgoing CEOs is 0.06, or 0.05 higher than that in the pre-SOX period, but the difference is insignificant. Turing to new CEOs, the pattern is consistent with decreased downward earnings management activities (before controlling for other factors) by new CEOs in the post-SOX period. For example, DA during firm-quarters managed by new CEOs averages -0.19 in the pre-SOX period, and this mean increases to -0.04 in the post-SOX period. We observe similar patterns in REM variables.

[Insert Table 4 about here.]

Interestingly, earnings management measures and line items used to capture business activities do not move in the same direction from the pre-SOX period to the post-SOX period, suggesting that the evidence for diminishing new CEOs' earnings baths is *unlikely* to be spurious. For example, while R_DISX increases by 0.08 post-SOX (POST-PRE) for new CEOs, R&D/Revenue decreases by 0.01. Capex expenditure in firms managed by new CEOs averages -0.11 below those in their industry peers in the pre-SOX period, and the cut in Capex shrinks to -0.05 in the post-SOX period.[9]

In order to test the difference in earnings management levels between firms with new CEOs and those with established CEOs in the pre-SOX and post-SOX periods (H1A and H1B), we use all firm-quarter observations with non-missing values to run panel regressions specified in equation (1). [10]

$$Y = \propto_0 + \propto_1 OUT \times PRE + \propto_2 OUT \times POST + \propto_3 NEW \times PRE + \propto_4 NEW \times POST + \propto_5 Lambda\_out + \propto_6 Lambda\_new + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon, \quad (1)$$

where Y, the dependent variable, is one of the earnings management measures (see Appendix A for more details). NEW (OUT) takes the value of one for the first (last) four new-CEO firm-quarters, and zero otherwise. PRE ($POST$) equals to one for firm quarters in the pre-SOX (post-SOX) period and zero otherwise. Our model does not suffer from a sample selection bias because we use all firm-quarter observations with non-missing values and the benchmark group

[9] Capex/Total assets negatively correlates with all REM measures in Table 3.

[10] Equation (1) facilitates easier interpretation of results than its commonly used alternative. In equation (1), the level of earnings baths in new CEO firm-quarters relative to the firm-quarters managed by established CEOs in the pre-SOX (post-SOX) period is the slope estimate on $NEW \times PRE$ ($NEW \times POST$). Instead of using $NEW \times PRE$ and $NEW \times POST$, one can include NEW and $NEW \times POST$ in the model – perhaps a more common approach. Then, the slope estimate on NEW is the level of earnings management in new CEO firm-quarters *pre-SOX*. The slope estimate on $NEW \times POST$ is the change in new-CEO earnings management measures from the pre-SOX to the post-SOX period. In order to obtain the level of earnings management in new CEO firm-quarters *post-SOX*, one needs to sum the slope estimate on NEW and that on $NEW \times POST$. Equation (1) and this alternative regression specification render identical estimates for the levels of earnings management in firm-quarters managed by new (outgoing) CEOs pre-SOX and post-SOX, but it is easier to interpret the results in Equation (1). Mian and Sankaraguruswamy (2012) use a specification similar to our equation (1).

consists of firm quarters managed by established CEOs. Nevertheless, endogeneity concerns exist because some omitted and *unobservable* factors can affect both earnings management measures and CEO turnovers simultaneously. For example, the regulatory environment may have changed the nature of CEO turnovers, as well as affecting earnings management activities. As suggested by Lennox et al. (2011) and Shipman et al. (2017), we use Heckman (1979) treatment models to address endogeneity arising from "unobservables". Specifically, we predict the likelihood of CEO departure and CEO appointment with logit regressions using models following Hazarika et al. (2012) and Faleye et al. (2011)[11] and include the inverse Mills Ratios ($Lambda\_out$ and $Lambda\_new$) in panel regressions. Other control variables ($\boldsymbol{Control}$) include market capitalization ($Size_{t-1}$), market-to-book ratio (MB_{t-1}), and firm performance (ROA_t) (following Roychowdhury 2006 and Zang 2011). All regressions include year-quarter and firm fixed effects ($\boldsymbol{YQ}$ and $\boldsymbol{Firm}$) to capture differences across time and firms. t-tests use standard errors clustered by firm (Gow et al. 2010; Petersen 2009). [12]

Estimates of main interest are α_2 and α_3 on $OUT \times POST$ and $NEW \times PRE$, respectively – sizes of these coefficients suggest levels of earnings management in firm-quarters managed by (outgoing) new CEOs (post-) pre-SOX relative to established CEOs. A negative estimate on α_3 supports H1A and a positive estimate on α_2 supports H1B.

[Insert Table 5 about here.]

[11] Estimation results of CEO turnover prediction are included in Internet Appendix IA.3. Pseudo R-squareds in our prediction models are close to the 6 percent on Table 2 of Faleye et al. (2011). Inverse Mills Ratios from the first-stage prediction models are not highly correlated with other explanatory variables in the model because the variance inflation factors for inverse Mills Ratios are all below 10.

[12] We cluster the standard errors by firm because our panel data have a few thousand firms but fewer than 100 quarters, in line with the guidance by Petersen (2009). Standard errors clustered by firm are almost identical to standard errors clustered by firm and quarter in our study.

Evidence for downward earnings management in new-CEO firm-quarters is strong in the pre-SOX period but disappears in the post-SOX period. In Panel A of Table 5, for all six earnings management measures the estimates for slope coefficients on $NEW \times PRE$ are negative, two with p-values of 0.01, one with a p-value of 0.05, and one with a p-value of 0.10. The extent of earnings baths ranges between 0.06 percent and 0.80 percent of total assets in the pre-SOX period, but we find no evidence for earnings baths in new-CEO quarters in the post-SOX period on average. Thus, the results in Panel A of Table 5 lend support to H1A, where we posit that new CEO earnings baths are more pronounced pre-SOX.

By contrast, in outgoing-CEO firm-quarters evidence for upward earnings management is strong in the post-SOX period but less significant in the pre-SOX period. Five out of six slope coefficients on $OUT \times POST$ are positive. In the post-SOX period, firms with outgoing CEOs on average manage earnings upward through DA, R_DISX, and R_CFO by 0.38 percent, 0.20 percent, and 0.38 percent of total assets and significant with p −values of 0.05, 0.10, and 0.01, respectively. Pre-SOX outgoing CEOs only significantly manage earnings upward through R_CFO by 0.27 percent of total assets and significant with a p −value of 0.05. Hence, the results in Panel A of Table 5 also lend support to H1B, where we hypothesize upward earnings management by outgoing CEOs are more pronounced post-SOX.

A time trend in earnings management or extreme observations may be driving our results. We address these concerns in three ways. First, all earnings management measures used in this study are winsorised at 1 percent on each tail to mitigate the impact from extreme values. Second, we estimate the slope coefficients on NEW and OUT for each of the two-year sub-periods between 1994 and 2014 and plot the coefficient estimates in Figure 3. DA and REM in outgoing-CEO firm-quarters are positive in four out of five sub-periods in the post-SOX periods and do not seem to be extremely high in any single period. Similarly, DA and REM in

new-CEO firm-quarters are invariably negative in all four pre-SOX sub-periods and do not appear to be concentrated in any single period. Lastly, in Section 7 we use changes in NYSE and NASDAQ listing rules between 2002 and 2004 as a quasi-natural experiment and a DiD analysis, where we explicitly control for temporal changes and cross-sectional differences.

5. CORPORATE GOVERNANCE AND EARNINGS MANAGEMENT AROUND CEO TURNOVERS

The adoption of SOX raised the standards for corporate governance, but not all firms had to make adjustments to meet the higher standards. Thus, we expect that SOX strongly curbed new CEOs' earnings baths in weakly governed firms.

First, we use institutional ownership to proxy for the strength of corporate governance and run regressions specified in equation (2) below. Regressions specified in equation (2) split the four firm-quarter groups around CEO turnovers in the pre- and post-SOX periods ($OUT \times PRE$, $OUT \times POST$, $NEW \times PRE$, $NEW \times POST$) in equation (1) into a group with high levels of institutional ownership firms ($HIGHIO$) and a group with low levels of institutional ownership ($LOWIO$):

$$\begin{aligned} Y = {} & \beta_0 + \beta_1 OUT \times PRE \times HIGHIO + \beta_2 OUT \times PRE \times LOWIO \\ & + \beta_3 OUT \times POST \times HIGHIO + \beta_4 OUT \times POST \times LOWIO \\ & + \beta_5 NEW \times PRE \times HIGHIO + \beta_6 NEW \times PRE \times LOWIO \\ & + \beta_8 NEW \times POST \times HIGHIO + \beta_8 NEW \times POST \times LOWIO \\ & + \beta_9 Lambda\_out + \beta_{10} Lambda\_new \\ & + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon \end{aligned} \quad (2)$$

Results in Panel B of Table 5 suggest that the evidence for new-CEO earnings baths is stronger and more significant among firms with low levels of institutional ownership in the pre-SOX period. The sizes of new-CEO earnings baths for these firms with low levels of institutional ownership in the pre-SOX period average 0.55 percent and 0.97 percent of total assets through

DA and REM and significant with p −values of 0.01 and 0.05, respectively. The evidence for CEO earnings baths in firms with *high* institutional ownership levels in the pre-SOX period is slightly weaker – the sizes of earnings baths through DA and REM for this group of companies pre-SOX are 0.38 percent and 0.67 percent of total assets and significant with p −values of 0.05 and 0.10, respectively ($NEW \times PRE \times HIGHIO$). These results support H2A, where we hypothesize that earnings baths are more pronounced in weakly governed firms in the pre-SOX period.

Next, in order to capture a different aspect of corporate governance we use the E-Index to proxy for the strength of governance. Following the prior literature (Bebchuk et al. 2011; Peters and Wagner 2014; Guo and Masulis 2015), we regard firms with an E-Index above two to have a weak governance mechanism, where CEOs are more likely to be entrenched. The E-Index (Bebchuk et al. 2008) summarizes constitutional and anti-takeover provisions that constrain the shareholders and corporate control market from disciplining CEOs. Consistent with Guo et al. (2015), who show that this external mechanism and other governance mechanisms serve as substitutes, $HIGHIO$ and $HIGHE$ are only weakly correlated with each other at 0.05 (Table 3) – suggesting that institutional monitoring and this external governance mechanism capture different aspects of governance. The regressions are specified in the equation below:

$$\begin{aligned} Y = {} & \gamma_0 + \gamma_1 OUT \times PRE \times LOWE + \gamma_2 OUT \times PRE \times HIGHE \\ & + \gamma_3 OUT \times POST \times LOWE + \gamma_4 OUT \times POST \times HIGHE \\ & + \gamma_5 NEW \times PRE \times LOWE + \gamma_6 NEW \times PRE \times HIGHE \\ & + \gamma_8 NEW \times POST \times LOWE + \gamma_8 NEW \times POST \times HIGHE \\ & + \gamma_9 Lambda\_out + \gamma_{10} Lambda\_new \\ & + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon \end{aligned} \quad (3)$$

Similar to Equation (2), the regressions specified in equation (3) split the new- and outgoing-CEO firm-quarter groups pre-SOX and post-SOX in equation (1) into low- and high-E-Index

groups (LOWE and HIGHE). Panel C of Table 5 presents the regression results. New-CEO earnings baths appear to concentrate in the group of weakly governed firms (with high E-Indices) in the pre-SOX period. Coefficient estimates for $NEW \times PRE \times HIGHE$ are -0.60 to -0.98 for DA and REM and significant with p −values of 0.01 and 0.05, respectively. In contrast, firms with a low E-Index in the pre-SOX period only record marginally significantly negative levels of DA and R_DISX of -0.32 and -0.30 with p −values of 0.01 for both. Overall, the evidence for new-CEO earnings baths is more pronounced in the group of firms with a high E-Index (where CEOs are highly entrenched) but weak in firms with a low E-Index in the pre-SOX period, thus lending support to H2A.

Turning to upward earnings management by outgoing CEOs, we find that in the post-SOX period firms tend to record significantly positive earnings management measures prior to CEO turnovers, regardless of levels of institutional ownership. In Panel B of Table 5, estimates on $OUT \times POST \times HIGHIO$ and those on $OUT \times POST \times LOWIO$ are of similar sizes and predominantly positive, with the difference being economically insignificant (0.03 percent and 0.01 percent of total assets for DA and REM, respectively). Similarly, results in Panel C of Table 5 suggest that regardless of the strength of corporate governance (or HIGHE or LOWE) outgoing CEOs on average record similar levels of earnings management measures in the post-SOX period. These findings suggest that the pressure effect dominates the deterrence effect for outgoing CEOs in the post-SOX period, regardless of the strength of corporate governance as proxied for by levels of institutional ownership and the E-Index (providing evidence related to H2B).

6. INSIDER/OUTSIDER NEW CEOS AND PERFORMANCE-INDUCED CEO TURNOVERS

This section tests H3A and H3B. H3A states that externally hired *new* CEOs record more negative DA and REM measures in the pre-SOX period, while H3B posits that the pressure effect is stronger for *outgoing* CEOs in the post-SOX period if their departures are performance-induced.

A *new* CEO appointed less than one year after joining the firm is an externally hired new CEO (EXT), otherwise he or she is promoted internally (INT). We follow Jenter and Lewellen (2017) to use 12-month stock returns scaled by return volatility to assess the company's performance in order to classify whether the departure of a CEO is performance-induced. If the volatility scaled return is below its industry median in the past 12 months, we classify the CEO departure as performance-induced ($POOR$), otherwise the departure is non-performance-induced ($GOOD$). We run regressions specified in equation (4) to test H3A and H3B:

$$\begin{aligned} Y = {} & \delta_0 + \delta_1 OUT \times PRE \times POOR + \delta_2 OUT \times PRE \times GOOD \\ & + \delta_3 OUT \times POST \times POOR + \delta_4 OUT \times POST \times GOOD \\ & + \delta_5 NEW \times PRE \times EXT + \delta_6 NEW \times PRE \times INT \\ & + \delta_8 NEW \times POST \times EXT + \delta_8 NEW \times POST \times INT \\ & + \delta_9 Lambda\_out + \delta_{10} Lambda\_new \\ & + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon \end{aligned} \quad (4)$$

Regressions specified in equation (4) split the two outgoing-CEO firm-quarters groups pre-SOX and post-SOX ($OUT \times PRE$, $OUT \times POST$) in equation (1) into performance-induced CEO-turnover firms ($POOR$) and non-performance-induced CEO-turnover firms ($GOOD$). Two *new* CEO firm-quarter groups pre-SOX and post-SOX ($NEW \times PRE$, $NEW \times POST$) in equation (1) are split into externally hired new CEOs (EXT) and internally promoted new CEOs (INT) in equation (4). Panel D in Table 5 reports regression results. To support H3A, we expect to see the estimates of (δ_5) on $NEW \times PRE \times EXT$ to be more negative than the estimates of (δ_6) on $NEW \times PRE \times INT$ and this is what we find. Externally hired new CEOs record DA,

R_DISX, and R_CFO that are lower than those in firm-quarters managed by established CEOs by 0.60 percent, 0.58 percent and 0.44 percent of total assets with p −values of 0.05, 0.05, and 0.10, respectively. In contrast, DA and R_DISX in firm-quarters managed by internally appointed new CEOs average lower than that in firm-quarters managed by established CEOs by only 0.30 percent and 0.41 percent of total assets with p −values of 0.10 and 0.05, respectively, and the R_CFO is not significantly lower in firm-quarters managed by internally appointed new CEOs. While the differences in sizes of earnings baths between internally promoted and externally hired new CEOs all have expected sign, their differences are not statistically significant. Thus, these results lend weak support to H3A, where we anticipate more aggressive earnings baths if new CEOs are hired externally in the pre-SOX period.

Now, we move to evidence related to the pressure effect in the post-SOX period for outgoing CEOs prior to (non-)performance-induced CEO turnovers (H3B). As shown by the estimates for δ_3 in Panel D of Table 5, in the post-SOX period prior to performance-induced CEO turnovers, firms on average manage earnings upward through both DA and REM by 0.45 percent and 0.87 percent of total assets with p −values of 0.01. In contrast, the pressure effect is only marginally significant for outgoing CEOs prior to non-performance-induced CEO turnovers: these outgoing CEOs on average manage earnings upward by 0.30 percent and 0.46 percent of total assets with p −values of 0.10. The differences in levels of upward earnings management between performance-induced and non-performance-induced CEO turnovers ($\delta_3 - \delta_4$) are significant with p −values of 0.10. These results are consistent with H3B, where we expect to see a stronger pressure effect before performance-induced CEO turnovers in the post-SOX period.

7. THE INDEPENDENT AUDIT COMMITTEE RULE

Although results so far suggest that levels of earnings management around CEO turnovers changed after the enactment of the SOX, the observed changes could result from a general trend of heightened public scrutiny of governance over public listed firms in the United States instead of resulting from the enactment of SOX-related regulations. The US Congress passed the SOX Act in July 2002 with many details of SOX implemented through the SEC and stock exchange rules. NYSE and NASDAQ issued new exchange listing rules aimed at strengthening the internal governance of listed firms in 2003, with a deadline of compliance in 2004. The provisions of the new listing rules require that the board of a listed company have a majority of independent directors and fully independent nominating, compensation, and audit committees. Because a large number of firms were compliant before the proposal of these new listing rules in 2003 with the remainder forced to adopt independent boards and committees, this attractive quasi-experiment opportunity allows us to conduct DiD analyses. DiD analyses can isolate the effects from specific SOX requirements (or, changes in board and committee structure) from general improvements in governance.

We focus on the forced adoption of an independent audit committee as the *treatment* in our DiD analyses because the audit committee plays an important role in monitoring the integrity of the financial statements, the effectiveness of the company's internal control and risk management systems, and the effectiveness of the company's internal and external audit functions (KPMG Audit Committee Handbook).[13, 14]

Treatment firms are firms with non-independent audit committees in the year of CEO turnover between 1998 and 2001, or prior to the passage of SOX. Control firms were compliant

[13] https://assets.kpmg.com/content/dam/kpmg/be/pdf/Markets/aci-handbook.pdf

[14] We do not find that compulsory changes in board independence, nomination committee, and compensation committee have any significant effect on earnings management around CEO changes using DiD analyses. Results are not reported but available on request.

with the independence audit committee requirement in the year of each CEO turnover prior to 2002. A treatment (control) firm retains its treatment (control) status throughout the sample period to isolate the time-trend effect. The sample period starts from 1998 because director independence and committee information is sparse prior to 1998. Following Guo and Masulis (2015), we exclude the transition period between 2002 and 2004 during which non-compliant firms are allowed to make changes to their board and committee structure. The multivariate DiD regressions use the following equation[15]:

$$\begin{aligned} Y = {} & \omega_0 + \omega_1 OUT + \omega_2 OUT \times T + \omega_3 OUT \times P + \omega_4 OUT \times P \times T \\ & + \omega_5 NEW + \omega_6 NEW \times T + \omega_7 NEW \times P + \omega_8 NEW \times P \times T \\ & + \boldsymbol{\vartheta Control} + \boldsymbol{\mu YQ} + \boldsymbol{\pi Firm} + \boldsymbol{\tau}, \end{aligned} \quad (5)$$

where Y is one of the DA and REM measures. T indicates treatment firms, or firms with non-independent audit committees in the year of CEO turnover between 1998 and 2001. P is the indicator variable for the post-treatment period. $\boldsymbol{Control}$ is a vector of control variables, including $SIZE(t-1)$, $MB(t-1)$, ROA(t), $EINDEX(t)$, and $IO\%(t-1)$. Estimates for ω_2 capture the difference in levels of earnings management between treatment and control firms throughout the sample period. Estimates for ω_3 capture the general time difference in levels of earnings management for all firms before and after the treatment. The treatment effects, also our main interests, are captured by ω_4 (ω_8), which indicate the effect from adopting the rule on audit committee independence on levels of earnings management prior to CEO turnovers (new CEOs' earnings baths). A positive (positive) estimate for ω_4 (ω_8) indicates an increase (decrease) in upward (downward) earnings management by outgoing (new) CEOs as a response to the treatment.

[15] This equation does not include P (the indicator variable for the post-treatment period) as a separate explanatory variable because it perfectly correlates with the time fixed-effects.

[Insert Table 6 about here.]

Panel A of Table 6 reports the univariate DiD results for firms with outgoing (new) CEOs (OUT and NEW). We obtain the difference in means of earnings management measures pre- and post-treatment in the control firms ($Diff1$), that in the treatment firms ($Diff2$), and the difference-in-differences ($Diff2 - Diff1$). Outgoing CEOs in the post-treatment period record increased levels of REM measures after adjusting for the time difference and cross-sectional differences. $Diff2 - Diff1$'s are 2.37, 0.36, 0.27, and 0.78 for REM, R_DISX, R_CFO, and R_RPOD with p −values of 0.01 for all. Similarly, the univariate DiD analyses show that new CEOs in the post-treatment period do not manage earnings downward as aggressively as in the pre-treatment period.

Panel B in Table 6 reports results from the multivariate DiD analyses. The rule on audit committee independence does not have a strong effect on upward earnings management in firms with outgoing CEOs. All six slope estimates on $OUT \times P \times T$ are positive, but only for R_PROD is the estimate significant with a p −value of 0.10. Consistent with our findings from the Heckman treatment models earlier, the mandatory adoption of an independent audit committee causes decreases in earnings baths. For REM measures, all five estimates on $NEW \times P \times T$ are positive and those for REM and R_PROD are 1.39 and 0.80, respectively, with p −values of 0.05, suggesting that the adoption of an independent audit committee curbs new CEOs' REM baths (thus lending support to H4).

However, the treatment effect on new CEOs' earnings baths through DA is insignificant because DA baths reduced in all firms post-SOX. In control firms, the sizes of new CEOs' DA baths reduced post-SOX by 0.15 percent of total assets (refer to the estimate for the slope

coefficient on $NEW \times P$ in explaining DA), but the additional treatment effect is only 0.08 percent (refer to the slope estimate for $NEW \times P \times T$ in explaining DA).

For our control group to be a valid counterfactual, control and treatment firms need to share parallel trends had the treatment not taken place. While the parallel-trend assumption is ultimately untestable, we use two approaches to check whether the choice of control group is valid. First, we interact a time-trend variable (t) with the treatment groups prior to SOX ($OUT \times T$ and $NEW \times T$) and re-run the regressions specified in equation (5) above. Any significant estimate for the slope coefficients on $OUT \times T \times t$ and $NEW \times T \times t$ suggests that the time trend in the treatment group and that in the control group significantly differ prior to the treatment. We find that the coefficient estimates on the time-trend variables are invariably insignificant, thus supporting the parallel-trends assumption. Second, we run a placebo test in which we move the SOX effective date to January 1, 2000 and assume a pre-SOX period between 1998 and 1999 and a post-SOX period between 2000 and 2001. Unlike in the actual DiD tests, we do not find any significant treatment effect in the Placebo test (Panel C of Table 6).

8. Conclusion

Earnings management could be heightened around a CEO turnover, but the direction and magnitude of forces to manipulate earnings differ between outgoing and incoming CEOs. For example, poorly performing outgoing CEOs may have greater incentives to inflate earnings to save their jobs and we label this the pressure effect. In contrast, if left unconstrained, incoming CEOs might favor earnings baths so that future positive earnings surprises become more likely. Good corporate governance and regulation is one way to deter such earnings management, which we describe as the deterrence effect.

Increasing the governance threshold, SOX may change this calculus drastically in the post-SOX environment, particularly for weakly governed firms. The increased focus on governance post-SOX may also increase the pressure on CEOs whose tenure is under threat and increase the likelihood of them inflating earnings. While SOX may deter new CEOs from taking earnings baths, the pressure to report positive earnings early in their tenure may be less dominant. We find the deterrence effect of SOX dominates the pressure effect for new CEOs. SOX has deterred the use of downward DA and REM for firms with new CEOs. The "big bath" behavior attributed to new CEOs prior to the passage of SOX disappears post-SOX, and we do not find REM substituting for DA as a strategy of aggressive downward earnings management early in CEOs' tenure in the post-SOX period. We conclude that good governance is associated with an improvement in the quality of earnings reported by new CEOs in the first year of their tenure. In contrast, CEOs in a post-SOX environment seem to succumb to the increased pressure to deliver financial performance – outgoing CEOs are more likely to use income-increasing DA and REM post-SOX, which should be of regulatory concern.

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Figure 1 Financial result cutoff dates for accrual-based and real earnings management

This figure illustrates financial result cutoff dates along a time line. The cutoff date represents the last date at which earnings management could take place. For accrual-based earnings management, the cutoff date is the earnings announcement date. For measures of real earnings management, the cutoff date is the balance sheet date. Refer to Appendix A for variable definitions.

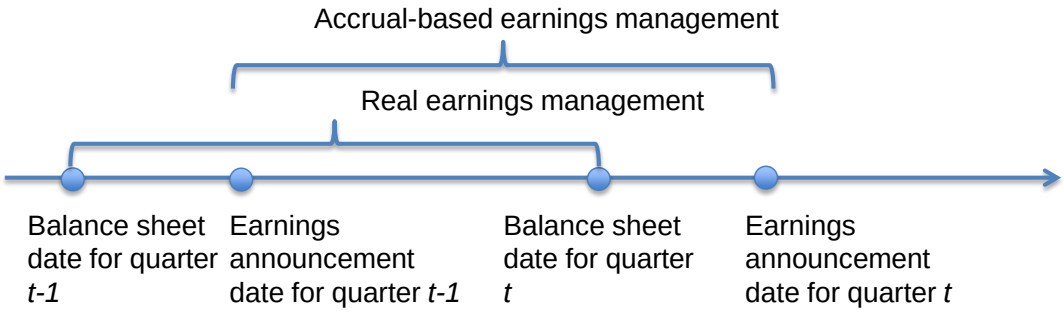
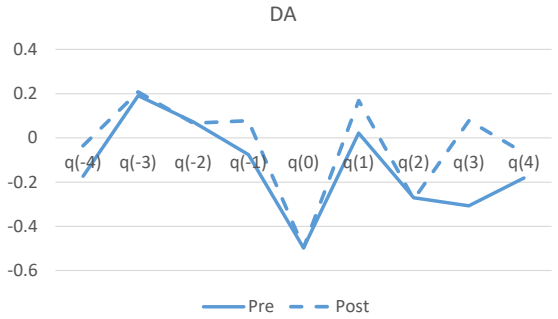


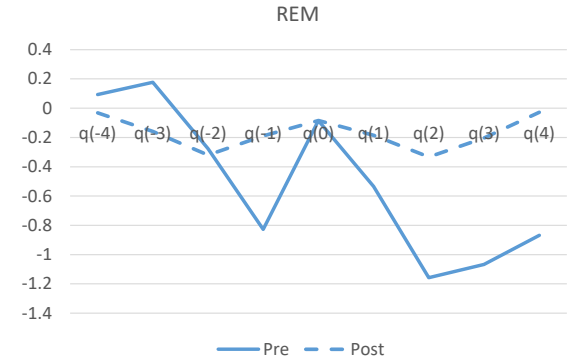
Figure 2 Levels of earnings management around CEO turnovers

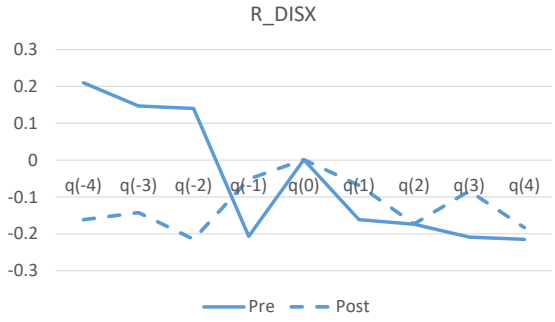
This figure plots the means of earnings management measures around CEO turnovers pre-SOX (Pre) and post-SOX (Post). q(0) is the transition quarter in which the CEO turnover takes place. Refer to Appendix A for variables definitions.

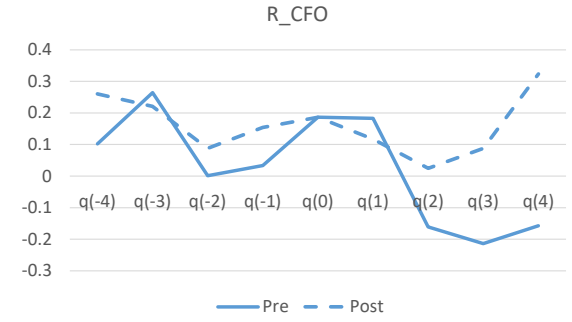
A. Discretional accruals



B. Real earnings management measures







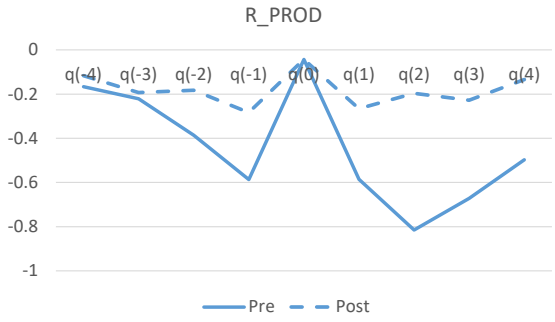


Figure 3. Earnings management in new-CEO quarters in different sub-periods

The graphs below present levels of earnings management activities in firms with outgoing CEOs (OUT) and those with new CEOs (NEW) for each of the two-year sub-periods between 1994 and 2013. Bars depict coefficient estimates for the slope coefficients on $\boldsymbol{OUT \times SUBPERIOD}$ (for outgoing CEOs) and those on $\boldsymbol{NEW \times SUBPERIOD}$ (for new CEOs).

$$Y = \alpha_0 + \boldsymbol{\alpha_1} OUT \times \boldsymbol{SUBPERIOD} + \boldsymbol{\alpha_2} NEW \times \boldsymbol{SUBPERIOD} + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon,$$

where Y is either DA or REM and $\boldsymbol{SUBPERIOD}$ is a vector of 10 indicator variables that take the value of one for firm-quarter observations that fall in a specific sub-period.

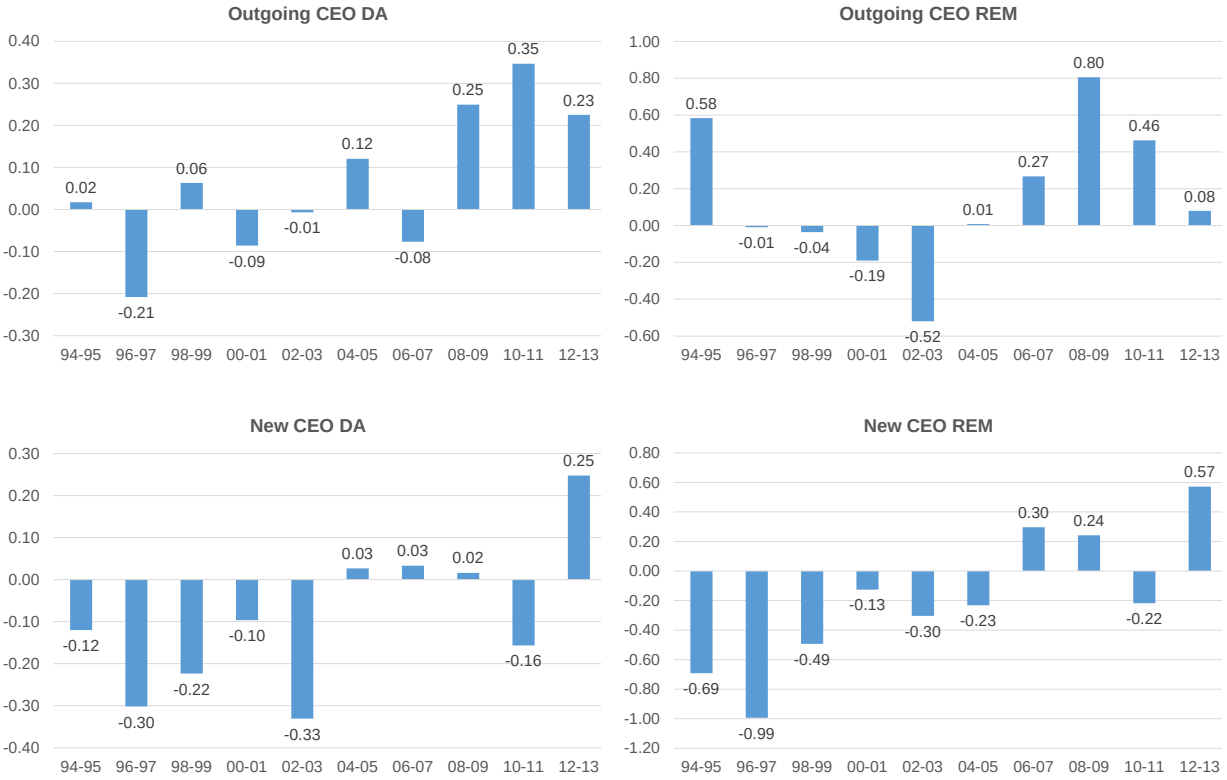


Table 1 CEO turnover events

Panels in this table summarize CEO-turnover events by year, quarter, and industry. We collect CEO-turnover data from Execucomp from 1993 to 2013. CEO turnovers in finance and regulated industries are excluded because CEOs in these industries have different incentives.

Panel A CEO-turnover events by year and by quarter

This panel summarizes CEO-turnover events by year.

Calendar year	CEO-turnover events	As % of unique firm observations in a year
1993	90	7.4%
1994	118	9.3%
1995	136	10.1%
1996	124	8.4%
1997	147	9.7%
1998	143	9.4%
1999	170	11.7%
2000	194	14.0%
2001	183	13.2%
2002	129	9.3%
2003	139	9.9%
2004	150	10.9%
2005	168	13.0%
2006	163	11.7%
2007	150	10.1%
2008	167	11.6%
2009	132	9.4%
2010	110	8.0%
2011	143	10.7%
2012	125	9.5%
2013	134	10.6%
		As % of total
Q1	928	30.8%
Q2	658	21.8%
Q3	783	26.0%
Q4	646	21.4%
Total (average)	3,015	10.7%

Panel B CEO-turnover events by industry

This panel summarizes CEO turnover events by industry group as defined by the 11 two-digit SIC industry groups.

Industry	SIC head	CEO turnover events	As % of unique firm-year observations in an industry
Agriculture, Forestry, Fishing	01-09	6	5.9%
Mining	10-14	144	9.2%
Construction	15-17	45	9.5%
Manufacturing	20-39	1,699	10.5%
Transportation	40-43	41	8.6%
Public utilities	44-49	NA	NA
Wholesale trade	50-51	121	10.1%
Retail trade	52-59	362	11.3%
Finance, insurance, real estate	60-69	NA	NA
Services	70-89	577	10.1%
Public administration	91-99	20	11.0%
Total (average)		3,015	9.6%

Table 2 Descriptive statistics

The table summarizes the observations for all firm-quarters used in our main analyses from 1993 to 2013. Refer to Appendix A for variable definitions.

Panel A Summary statistics of firm-quarter observations

	(1)	(2)	(3)	(4)	(5)	(6)
	N	Mean	Median	SD	25th Pctile	75th Pctile
Market Value ($ mn)	56,567	7,167	1,482	23,169	590	4,376
SIZE (log of market value)	56,567	7.46	7.30	1.54	6.38	8.38
Market-to-book	56,567	3.91	2.42	34.98	1.61	3.78
Total Assets ($ mn)	56,567	4,879	1,280	12,778	532	3,675
Sales ($mn, Quarterly)	56,567	1,275	337	3,909	139	963
Total Accruals ($mn, Quarterly)	56,567	-67	-12	400	-53	2
Discretionary Expenses ($mn, Quarterly)	56,567	293	77	891	32	210
CFO ($mn, Quarterly)	56,567	149	29	531	7	102
Production Expenses ($mn, Quarterly)	56,567	843	196	2,958	70	590
IO%	56,567	74	77	20	62	90
EINDEX	56,567	2.30	2.00	1.28	1.00	3.00
R&D ($mn, Quarterly)	56,567	43	0	182	0	16
Capex ($mn, Quarterly)	56,567	64	13	216	4	42

Panel B Key variables

This panel presents summary statistics of important variables. All variables are winsorized at 1% on both tails. Appendix A includes variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)
	N	Mean	Median	SD	25th Pctile	75th Pctile
Earnings management variables						
DA	56,567	0.07	0.19	3.35	-1.40	1.73
REM	56,567	-0.46	0.04	9.38	-5.54	5.02
R_DISX	56,567	-0.04	0.37	4.16	-2.09	2.43
R_CFO	56,567	-0.08	-0.07	3.19	-1.80	1.62
R_PROD	56,567	-0.33	-0.23	4.60	-2.82	2.18
Firm characteristics						
SIZE	56,567	0.21	0.13	0.93	-0.47	0.83
MB	56,567	-0.03	-0.21	0.81	-0.48	0.13
ROA	56,567	0.06	0.10	0.76	-0.23	0.41
HIGHIO	56,567	0.54	1.00	0.50	0.00	1.00
HIGHE	56,567	0.44	0.00	0.50	0.00	1.00
Line items						
R&D/Revenue	51,020	0.04	0.20	0.79	0.05	0.38
Capex/Total Assets	56,567	-0.01	-0.22	0.84	-0.56	0.31

Table 3 Correlation matrix

This table reports correlation coefficients between earnings management variables and their control variables. Asterisks ***, **, and * next to correlation coefficients indicate significance levels of 1%, 5%, and 10%, respectively. Refer to Appendix A for variable definitions.

	DA (t)	REM (t)	R_DISX (t)	R_CFO (t)	R_PROD (t)	SIZE (t-1)	MB (t-1)	ROA (t)	HIGHIO (t)	HIGHE (t)	R&D /Revenue(t)
REM(t)	0.32***										
R_DISX(t)	0.07***	0.79***									
R_CFO(t)	0.64***	0.56***	0.06***								
R_PROD(t)	0.12***	0.92***	0.67***	0.38***							
SIZE(t-1)	0.02***	-0.14***	-0.06***	-0.14***	-0.14***						
MB(t-1)	0.03***	-0.25***	-0.18***	-0.16***	-0.25***	0.37***					
ROA(t)	0.24***	-0.25***	-0.04***	-0.31***	-0.26***	0.26***	0.35***				
HIGHIO(t)	0.01***	0.00	0.01	-0.02***	0.00	0.03***	0.01***	0.01***			
HIGHE(t)	0.01	0.03***	0.02***	0.04***	0.02***	-0.06***	-0.06***	-0.05***	0.05***		
R&D/Revenue(t)	0.09***	0.22***	0.34***	0.01***	0.12***	0.00	-0.07***	0.11***	0.00	0.06***	
Capex/Total Assets(t)	-0.05***	-0.10***	-0.05***	-0.13***	-0.08***	0.05***	0.14***	0.14***	0.01*	0.01***	0.01

Table 4 Earnings management around CEO turnovers – univariate analysis

This table compares the means of earnings management measures and line items for OUT and NEW in the pre-SOX period and the post-SOX period. Asterisks ***, **, and * next to coefficient estimates indicate significance levels of 1%, 5%, and 10%, respectively, for the difference in means test with unequal variance.

	DA	REM	R_DISX	R_CFO	R_PROD	R&D /Revenue	Capex /Total Assets
Outgoing CEOs							
PRE	0.01	-0.17	0.08	0.11	-0.33	0.03	0.00
POST	0.06	-0.18	-0.14	0.17	-0.19	0.04	-0.01
POST-PRE	0.05	-0.01	-0.22*	0.06	0.14	0.00	-0.01
New CEOs							
PRE	-0.19	-0.93	-0.21	-0.09	-0.65	0.05	-0.11
POST	-0.04	-0.18	-0.12	0.13	-0.20	0.04	-0.06
POST-PRE	0.15	0.74***	0.08	0.22**	0.45***	-0.01	0.05**

Table 5 Earnings management around CEO turnovers – multivariate analysis

This table reports levels of earnings management in firm-quarters managed by outgoing CEOs (OUT) and in those managed by new CEOs (NEW) by regressing an earnings-management measure (Y) on OUT, NEW, inverse Mills Ratios ($Lambda\_out$ and $Lambda\_new$) control variables ($\boldsymbol{Control}$), year-quarter fixed effects ($\boldsymbol{YQ}$), and firm fixed effects ($\boldsymbol{Firm}$). $\boldsymbol{Control}$ is a vector of variables including firm characteristics (MB_{t-1}, $SIZE_{t-1}$ and ROA_t) which are shown to be correlated with the measurement error in earnings management levels. Estimates for coefficients on fixed effect are omitted.

In order to obtain a clear effect of CEO turnovers, our analysis excludes ambiguous firm-quarters, or firm-quarters that can be both new-CEO quarters and outgoing-CEO quarters as a result of short CEO tenure. Asterisks ***, **, and * next to a coefficient estimate indicate significance levels of 1%, 5%, and 10%, respectively. Two-tailed p-values are calculated using standard errors clustered by firm. The full sample includes all firm-quarters with non-missing values from 1993 to 2013.

Panel A Established, New, and Outgoing CEOs in the pre-SOX and post-SOX periods (H1A, H1B)

Regressions in this panel are specified in the equation below.

$$Y = \propto_0 + \propto_1 OUT \times PRE + \propto_2 OUT \times POST + \propto_3 NEW \times PRE + \propto_4 NEW \times POST + \propto_5 Lambda\_out + \propto_6 Lambda\_new + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon$$

		DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	α0	1.61***	0.15	0.27	0.43	-0.46	-0.04
OUT * PRE	α1	0.15	0.24	0.08	0.27**	-0.10	-0.07
OUT * POST	α2	0.38**	0.64**	0.20*	0.38***	0.05	-0.08
NEW * PRE	α3	-0.46***	-0.80**	-0.40***	-0.29*	-0.18	-0.06
NEW * POST	α4	-0.25	-0.10	-0.14	-0.15	0.14	0.13
Lambda_out	α5	-0.13*	-0.24*	-0.06	-0.15***	-0.01	0.00
Lambda_new	α6	0.12	0.09	0.15**	0.05	-0.08	-0.12
MB		-0.02	-1.67***	0.04	-0.86***	-0.87***	-0.73***
SIZE		-0.09	0.84***	0.89***	-0.27***	0.26*	0.12
ROA		1.43***	-1.67***	0.04	-0.86***	-0.87***	-0.73***
Adj R-sqr		10.6	66.2	77.9	21.6	61.9	64.0
N		52,175	52,175	52,175	52,175	52,175	33,191

Panel B Established, New, and Outgoing CEOs in firms with high and low levels of institutional shareholding in the pre-SOX and post-SOX periods (H2A and H2B)

This panel presents regression results where we further split the new- and outgoing-CEO firm-quarter groups pre-SOX and post-SOX in Panel A into high institutional ownership firms ($HIGHIO$) and low institutional ownership firms ($LOWIO$). Regressions in this panel are specified in the equation below.

$$
\begin{aligned}
Y = {} & \beta_0 + \beta_1 OUT \times PRE \times HIGHIO + \beta_2 OUT \times PRE \times LOWIO \\
& + \beta_3 OUT \times POST \times HIGHIO + \beta_4 OUT \times POST \times LOWIO \\
& + \beta_5 NEW \times PRE \times HIGHIO + \beta_6 NEW \times PRE \times LOWIO \\
& + \beta_8 NEW \times POST \times HIGHIO + \beta_8 NEW \times POST \times LOWIO \\
& + \beta_9 Lambda\_out + \beta_{10} Lambda\_new \\
& + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon
\end{aligned}
$$

		DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	β_0	1.60***	0.14	0.26	0.43	-0.46	-0.04
OUT * PRE * HIGHIO	β_1	0.22	0.18	0.07	0.27*	-0.16	-0.12
OUT * PRE * LOWIO	β_2	0.06	0.33	0.10	0.27*	-0.02	0.00
OUT * POST * HIGHIO	β_3	0.36**	0.64**	0.16	0.38***	0.09	-0.07
OUT * POST * LOWIO	β_4	0.39**	0.65**	0.24**	0.40***	0.01	-0.09
NEW * PRE * HIGHIO	β_5	-0.38**	-0.67*	-0.29**	-0.28*	-0.15	-0.09
NEW * PRE * LOWIO	β_6	-0.55***	-0.97**	-0.54***	-0.31*	-0.23	-0.03
NEW * POST * HIGHIO	β_7	-0.18	-0.14	-0.16	-0.15	0.11	0.10
NEW * POST * LOWIO	β_8	-0.32*	-0.07	-0.13	-0.16	0.16	0.17
Lambda_out	β_9	-0.13	-0.24*	-0.06	-0.15**	-0.01	0.00
Lambda_new	β_{10}	0.12	0.09	0.15**	0.05	-0.08	-0.12
MB		-0.02	-0.88***	-0.47***	-0.03	-0.38***	-0.39***
SIZE		-0.09	0.84***	0.89***	-0.27***	0.26*	0.12
ROA		1.43***	-1.67***	0.04	-0.86***	-0.87***	-0.73***
Adj R-sqr		10.6	66.2	77.9	21.6	61.9	64.0
N		52,175	52,175	52,175	52,175	52,175	33,191

Panel C Established, New, and Outgoing CEOs in firms with high and low E-Index in the pre-SOX and post-SOX periods (H2A and H2B)

This panel presents regression results where we further split the new- and outgoing-CEO firm-quarter groups pre-SOX and post-SOX in Panel A into high E-index firms ($HIGHE$) and low E-Index firms ($LOWE$). Regressions in this panel are specified in the equation below.

$$Y = \gamma_0 + \gamma_1 OUT \times PRE \times LOWE + \gamma_2 OUT \times PRE \times HIGHE + \gamma_3 OUT \times POST \times LOWE + \gamma_4 OUT \times POST \times HIGHE + \gamma_5 NEW \times PRE \times LOWE + \gamma_6 NEW \times PRE \times HIGHE + \gamma_8 NEW \times POST \times LOWE + \gamma_8 NEW \times POST \times HIGHE + \gamma_9 Lambda\_out + \gamma_{10} Lambda\_new + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon$$

		DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	γ0	1.62***	0.15	0.27	0.44	-0.46	-0.04
OUT * PRE * LOWE	γ1	0.19	0.38	0.13	0.31**	-0.03	0.10
OUT * PRE * HIGHE	γ2	0.11	0.10	0.04	0.23*	-0.17	-0.23
OUT * POST * LOWE	γ3	0.40**	0.66**	0.22*	0.42***	0.03	-0.14
OUT * POST * HIGHE	γ4	0.34**	0.61**	0.17	0.34***	0.07	-0.02
NEW * PRE * LOWE	γ5	-0.32*	-0.63	-0.30*	-0.22	-0.20	-0.15
NEW * PRE * HIGHE	γ6	-0.60***	-0.98**	-0.50***	-0.37**	-0.17	0.00
NEW * POST * LOWE	γ7	-0.14	0.03	-0.10	-0.07	0.14	0.21
NEW * POST * HIGHE	γ8	-0.36**	-0.23	-0.17	-0.24	0.13	0.05
Lambda_out	γ9	-0.13*	-0.23*	-0.06	-0.15**	-0.01	0.00
Lambda_new	γ10	0.12	0.09	0.14**	0.05	-0.08	-0.12
MB		-0.02	-0.88***	-0.47***	-0.03	-0.38***	-0.39***
SIZE		-0.09	0.84***	0.89***	-0.27***	0.26*	0.12
ROA		1.43***	-1.67***	0.04	-0.86***	-0.87***	-0.73***
Adj R-sqr		10.6	66.2	77.9	21.6	61.9	64.0
N		52,175	52,175	52,175	52,175	52,175	33,191

Panel D Performance-induced CEO turnovers (POOR/GOOD) and external/internal (EXT/INT) new CEOs (H3A and H3B)

This panel presents regression results where we further split the outgoing-CEO firm-quarter pre-SOX and post-SOX in Panel A into performance-induced CEO turnovers ($POOR$) and non-performance-induced CEO turnovers ($GOOD$) and split the new-CEO firm-quarters pre-SOX and post-SOX in Panel A into externally hired new CEOs (EXT) and internally promoted new CEOs (INT). Regressions in this panel are specified in the equation below.

$$
\begin{aligned}
Y = {} & \delta_0 + \delta_1 OUT \times PRE \times POOR + \delta_2 OUT \times PRE \times GOOD \\
& + \delta_3 OUT \times POST \times POOR + \delta_4 OUT \times POST \times GOOD \\
& + \delta NEW \times PRE \times EXT + \delta_6 NEW \times PRE \times INT \\
& + \delta_8 NEW \times POST \times EXT + \delta_8 NEW \times POST \times INT \\
& + \delta_9 Lambda\_out + \delta_{10} Lambda\_new \\
& + \boldsymbol{\theta Control} + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Firm} + \varepsilon
\end{aligned}
$$

		DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	δ0	1.63***	0.18	0.30	0.44	-0.45	-0.03
OUT * PRE * POOR	δ1	0.21	0.38	0.14	0.34**	-0.11	0.02
OUT * PRE * GOOD	δ2	0.10	0.18	0.05	0.22	-0.03	-0.15
OUT * POST * POOR	δ3	0.45***	0.87***	0.26**	0.51***	0.11	-0.02
OUT * POST * GOOD	δ4	0.30*	0.46*	0.16	0.25**	0.01	-0.15
NEW * PRE * EXT	δ5	-0.60**	-1.17*	-0.58**	-0.44*	-0.30	0.00
NEW * PRE * INT	δ6	-0.31*	-0.90**	-0.41**	-0.29	-0.29	-0.09
NEW * POST * EXT	δ7	-0.40	-0.28	-0.24	-0.42*	0.29	0.37
NEW * POST * INT	δ8	-0.02	-0.09	-0.13	-0.12	0.07	0.20
Lambda_out	δ9	-0.14*	-0.26**	-0.07	-0.17***	-0.02	-0.01
Lambda_new	δ10	0.08	0.20	0.17**	0.08	-0.01	-0.11
MB		-0.03	-0.89***	-0.47***	-0.04	-0.39***	-0.40***
SIZE		-0.07	0.90***	0.91***	-0.26***	0.28**	0.17
ROA		1.42***	-1.70***	0.03	-0.87***	-0.89***	-0.74***
Adj R-sqr		10.4	66.4	78.0	21.8	62.1	64.1
N		50,775	50,775	50,775	50,775	50,775	32,329

Table 6 New exchange rule on audit committee independence and earnings management around CEO turnovers (H4)

This table presents the effect of new exchange listing rules on levels of earnings management surrounding CEO turnovers. Treatment firms were noncompliant with the independent audit committee rule in the year of a CEO turnover prior to 31 December 2001. A firm is classified as a control firm if it was compliant at the time of all CEO turnover events prior to 31 December 2001. Firms without CEO turnover events prior to 31 December 2001 are neither treatment nor control firms and thus are excluded from this analysis. Pre-treatment period is between 1998 and 2001. Post-treatment period is between 2005 and 2013.

Panel A Univariate difference-in-differences analyses

This panel reports difference in the means of earnings management measures in treatment and control firms in the pre- and post-SOX periods. $\boldsymbol{Diff1}$ ($\boldsymbol{Diff2}$) is equal to the change in the level of earnings management measure from pre- to post-treatment periods in control (treatment) firms. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level for tests of differences in means with unequal variance.

		N	DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
OUT								
	Control							
	Pre	585	-0.09	-0.31	-0.11	0.26	-0.42	-0.48
	Post	455	0.06	-0.71	-0.36	0.07	-0.42	-0.36
	Diff1		*0.15*	*-0.40*	*-0.25*	*-0.19*	*0.00*	*0.11*
	Treatment							
	Pre	378	0.12	-1.10	-0.14	0.03	-0.96	-0.06
	Post	315	0.17	-0.14	-0.03	0.11	-0.18	-0.16
	Diff2		*0.05*	*0.97*	*0.11*	*0.08*	*0.78***	*-0.10*
	Diff2-Diff1		*-0.11*	*1.37****	*0.36****	*0.27****	*0.78****	*-0.21****
NEW								
	Control							
	Pre	715	-0.17	-0.37	-0.15	0.10	-0.35	-0.30
	Post	444	-0.06	-1.32	-0.68	0.12	-0.75	-0.63
	Diff1		*0.11*	*-0.95**	*-0.53***	*0.02*	*-0.40*	*-0.33*
	Treatment							
	Pre	469	-0.27	-2.09	-0.54	-0.33	-1.28	-0.95
	Post	306	-0.18	-0.26	-0.05	0.02	-0.24	-0.33
	Diff2		*0.09****	*1.83**	*0.49*	*0.35****	*1.04*	*0.62*
	Diff2-Diff1		*-0.02*	*2.78****	*1.02****	*0.33****	*1.44****	*0.94****

Panel B Multi-variate differences-in-differences analyses

The panel presents results from regressions specified in the equation below.

$$Y = \omega_0 + \omega_1 OUT + \omega_2 OUT \times T + \omega_3 OUT \times P + \omega_4 OUT \times P \times T$$
$$+\omega_5 NEW + \omega_6 NEW \times T + \omega_7 NEW \times P + \omega_8 NEW \times POST \times T$$
$$+\boldsymbol{\vartheta Control} + \boldsymbol{\tau},$$

where Y is one of the measures of accrual-based earnings management and of real earnings management. T and P are the treatment and post-treatment period indicators for the rule of audit committee independence. Asterisks ***, **, and * next to a coefficient estimate indicate significance levels of 1%, 5%, and 10%, respectively. Two-tailed p-values are calculated using standard errors clustered by firm.

	DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	-0.22	-0.70	-0.25	0.01	-0.59*	0.01
OUT	-0.18	0.09	0.13	0.03	-0.05	-0.21
OUT * T	0.16	-0.93	-0.51*	0.14	-0.54	0.12
OUT * P	0.04	0.22	0.16	-0.09	0.10	0.07
OUT * T * P	0.20	1.35	0.50	0.05	0.81*	0.22
NEW	-0.31*	-0.25	0.04	-0.15	-0.18	-0.35*
NEW * T	-0.02	-1.12*	-0.45*	-0.14	-0.61**	-0.08
NEW * P	0.15	0.09	0.17	-0.06	0.02	0.07
NEW * T * P	0.08	1.39**	0.44	0.27	0.80**	0.54
MB	-0.02	-0.75***	-0.52***	0.03	-0.28***	-0.17
SIZE	-0.18	0.37	0.80***	-0.31**	-0.06	-0.46*
ROA	1.28***	-1.80***	0.06	-0.97***	-0.92***	-0.74***
Adj R-sqr	9.4	65.7	77.6	23.3	63.4	67.2
N	12,290	12,493	12,493	12,493	12,493	8,163

Panel C Placebo test

The panel presents results from running regressions identical to those in Panel B. The pre-treatment period runs between 1998 and 1999 and the post-treatment period is between 2000 and 2001. Asterisks ***, **, and * next to a coefficient estimate indicate significance levels of 1%, 5%, and 10%, respectively. Two-tailed ***p***-values are calculated using standard errors clustered by firm.

	DA	REM	R_DISX	R_CFO	R_PROD	R_PROD_M
Const	-0.02	-0.82	-0.63*	0.51	-0.81*	0.45
OUT	0.12	0.32	0.09	0.27	0.04	-0.13
OUT * T	-0.07	-0.44	-0.17	0.03	-0.35	0.27
OUT * P	-0.58	-1.08	-0.28	-0.44	-0.40	-0.21
OUT * T * P	0.66	1.01	0.37	0.32	0.32	0.01
NEW	-0.33	-0.24	-0.04	-0.13	-0.02	-0.29
NEW * T	0.43	-0.09	-0.24	0.01	-0.21	0.34
NEW * P	0.17	-0.47	-0.13	0.01	-0.45	-0.09
NEW * T * P	-0.65	-0.07	0.36	-0.14	0.05	-0.27
MB	-0.02	-0.65*	-0.41***	0.00	-0.29*	0.07
SIZE	0.29	1.67***	1.14***	-0.03	0.75**	0.28
ROA	1.62***	-1.33***	0.16**	-0.81***	-0.74***	-0.61***
Adj R-sqr	12.8	69.8	83.1	24.9	66.3	70.0
N	4,720	4,767	4,767	4,767	4,767	3,075

Appendix A Variable definitions

Variable	Definition (Compustat code)
A	Total assets at the end of each fiscal quarter (atq).
Accruals	Total accruals calculated as net income before extraordinary items minus CFO.
AGE	The age of CEO.
ANALYST	Number of sell-side research analysts that are actively following a company before a quarterly earnings announcement. We require that the latest earnings forecast is not stale, or has been updated or confirmed to be valid within 30 days prior to the earnings announcement date.
AR	Account receivables at the end of each fiscal quarter (rectq).
Capex/Total Assets	Capex (capxq) scaled by total assets (atq), standardized by industry-quarter.
CFO	Quarterly cash flow from operations. Quarterly cash flow from operations in the first fiscal quarter equals to the year-to-date operating cash flow (oancfy). CFOs in the second, third, and fourth fiscal quarter equal to accumulated year-to-date cash flow from operations ended in this quarter minus that ended in the previous quarter.
CEOSHR	CEO ownership as a percentage of total number of shares outstanding.
DA	Discretionary accruals estimated by industry-quarter using the modified Jones Model as defined in Internet Appendix IA.2. The residual is multiplied by 100 so that one unit is one percentage point of total assets.
DISX	Discretionary expenditures, the dependent variable in the regressions specified in equation (4). DISX the sum of R&D and SG&A expenditures (xsgaq).
DISX_Y1	Accumulated DISX over the first fiscal quarters of a CEO's tenure.
DUALITY	An indicator variable taking the value of one if CEO is also the chairperson and zero otherwise.
EINDEX	Entrenchment Index (Bebchuk et. al 2008).
EXT	An indicator variable taking the value of one if the new CEO is hired externally, or has joined the firm for no more than one year when becoming a CEO, and zero otherwise.
GOOD	An indicator variable taking the value of one if the firm's past 12-month stock returns/volatility of stock returns over the past 12 months is above the industry mean and zero otherwise.
HIGHE	An indicator variable that takes the value of one when the firms' E-Index is above 2 and zero otherwise.
HIGHIO	An indicator variable that takes the value of one when the firm's percentage of shares owned by institutional shareholders (IO%) is above the median of all firms' institutional shareholding percentages for the same quarter.
INT	An indicator variable that equals to 1 minus EXT.
IO%	Institutional ownership as a percentage of total number of shares outstanding.
Lambda_new	The inverse Mills Ratio from the first-stage Heckman treatment model specified in IA.2.
Lambda_out	The inverse Mills Ratio from the first-stage Heckman treatment model specified in IA.2.
LEV	Total liabilities as a percentage of total assets at the end of each quarter, standardized by industry-quarter.
MB	Market value of equity (prcc × cshoq) to book equity value of a firm (ceqq), standardized by industry-quarter.

Variable	Definition (Compustat code)
NEW	NEW equals to 1 if the financial cutoff date is within four quarters from the beginning of CEO tenure, and 0 otherwise. The financial cutoff date for DA is the earnings announcement and for REM, R_PROD and R_DISX is the balance sheet date.
OUT	OUT equals to 1 if the financial cutoff date is within four quarters prior to the end of CEO tenure, and 0 otherwise. The financial cutoff date for DA is the earnings announcement and for REM, R_PROD and R_DISX is the balance sheet date.
P	The post-treatment indicator variable that equals to one for years between 2005 and 2013 and zero for years between 1998 and 2001. The pre-treatment period starts in 1998 because audit committee data from ISS are sparsely populated before 1998. Following Guo et al. (2015), we exclude the transition period during which the SOX was enacted and the NYSE and NASDAQ gave listed firms a deadline of January 15, 2005 to comply with rule on independent audit committee.
PPE	Gross book value of property, plant, and equipment (ppegtq). We fit a linear growth model to fill in the missing quarterly PPE observations.
PRE	An indicator variable that takes the value of 1 if the balance sheet date is before July 30, 2002 and 0 otherwise.
POOR	An indicator variable that equals to one minus GOOD.
POST	An indicator variable that takes the value of 1 if the balance sheet date is on or after July 30, 2002 and 0 otherwise.
PROD	Production costs, the dependent variable in the regressions specified as question (3). $Prod_t$ is the sum of the cost of goods sold in quarter t (cogsq) and the change in inventory (invtq) from $t-1$ to t.
R&D	Research and development expenditures in the second, third and fourth fiscal quarter is the difference between year-to-date R&D ended in each quarter (xrdy) and that ended in the previous quarter; quarterly R&D in the first fiscal quarter equals to the year-to-date R&D. Following Cohen and Zarowin (2010), we replace missing R&D with zero if SG&A is non-missing.
R&D/Revenue	R&D scaled by total revenue and multiplied by minus 1 ($-$ xrdq/revtq), standardized by industry-quarter. The ratio is multiplied by minus one to be consistent with the earnings management measures where a negative number suggests downward earnings management.
R_CFO	Abnormal cash flows measure the level of earnings management through accelerating or delaying sales, over- or under-production or delaying or accelerating expenses as in Roychowdhury (2006). It is estimated cross-sectionally by industry-quarter. R_CFO is the residual from regression specified in equation (5) multiplied by -100. One unit is one percentage point of total assets. A higher R_CFO indicates a larger cut in discretionary expenditures to increase earnings.
R_DISX	Abnormal discretionary expenses measure the level of earnings management through accelerating or delaying discretionary expenses, as in Roychowdhury (2006). It is estimated cross-sectionally by industry-quarter. R_DISX is the residual from regression specified in equation (4) multiplied by -100. One unit is one percentage point of total assets. A higher R_DISX indicates a larger cut in discretionary expenditures to increase earnings.
R_PROD	Abnormal production costs measure the level of earnings management through overproduction, as in Roychowdhury (2006). It is estimated cross-sectionally by industry-quarter. R_PROD is the residual from the regression specified in equation (3) multiplied by

Variable	Definition (Compustat code)
	100. One unit is one percentage point of total assets. A higher residual indicates a larger amount of inventory overproduction and a greater increase in reported earnings through reducing the cost of goods sold.
REM	Real earnings management index equal to the sum of R_DISX, R_CFO and R_PROD.
RET12M	Stock return over the past 12 months.
RET12MIND	Value-weighted industry portfolio return over the past 12 months. An industry contains firms that share the same first two-digit SIC code.
ROA	Return on assets niq(t)/atq(t-1), standardized by industry-quarter.
ROA1YR	Accumulated net income over the past four fiscal quarters (q-3, q-2, q-1, and q) scaled by total assets in the last fiscal quarter (q-1).
S	Quarterly sales (revtq).
SALESGRTH1YR	Annual percentage changes in four-quarter sales (q-3, q-2, q-1, and q over q-7, q-6, q-5, and q-4).
SIZE	Logarithm of market value of a firm, standardized by industry-quarter, by deducting the industry-quarter mean and then dividing by the industry-quarter standard deviation.
T	The treatment indicator variable that takes the value of one if the firm was noncompliant with the independent audit committee rule in the year of a CEO turnover prior to December 31, 2001. The variable takes the value of zero if a firm was compliant at the time of all CEO turnover events prior to December 31, 2001. Firms without CEO turnover events prior to December 31, 2001 are neither treatment nor control firms and thus are excluded from this analysis.
VOL12M	Volatility of stock returns over the past 12 months.

Internet Appendices

IA.1 Matching CEO appointment and departure dates to CRSP/Compustat quarterly file.

We match the starting date of CEO tenure to a firm-quarter in CRSP/Compustat on the relevant cutoff date in order to identify the transition new-CEO quarter. For DA, the cutoff date is the earnings announcement date. For REM, the cutoff date is the balance sheet date. Transition quarters are partially managed by new CEOs and partially managed by outgoing CEOs. Our main analyses exclude transition quarters.

For DA measures, a fiscal quarter is assigned to be the transition quarter for CEO appointment (q0_apt_da) if CEOs start their jobs before (or on the day of) the earnings announcement of q0 quarterly results and after the announcement of the result in the previous quarter. The fiscal quarter immediately following q0_apt_da is assigned to be q1_apt_da. The first four full fiscal quarters managed by a new CEO (q1_ to q4_apt_da) are new-CEO firm quarters (NEW_da).

Similarly, we match the leaving date of a CEO to a firm-quarter in CRSP/Compustat on the relevant cutoff date in order to identify the transition outgoing-CEO quarter. For DA measures, a fiscal quarter is assigned to be a transition quarter for departing CEOs q0_dpt_da if CEOs depart before the earnings announcement date of fiscal quarter q0 and after the earnings announcement of results in the previous fiscal quarter. The fiscal quarter immediately preceding q0_dpt_da is q1_dpt_da. The last four full fiscal quarters managed by an outgoing CEO (q1_ to q4_dpt_da) are outgoing-CEO firm-quarters (OUT_da).

For REM, we repeat the above procedures except that the cutoff dates are balance sheet dates.

Matched firm-quarters are transition quarters (q0) unless the CEO departs on the last day of a fiscal quarter or the CEO starts on the first day of a fiscal quarter. When CEOs start on the first day of a fiscal quarter or on the day immediately following a previous earnings announcement, this quarter is the first full fiscal quarter of a CEO's tenure (or, q1_apt_re or q1_apt_da). Likewise, when CEOs leave on the last day of a fiscal quarter or on the earnings announcement day, this quarter is identified as q1_dpt_re or q1_dpt_da. Neither of the cases above has transition quarters.

As a result of CEO tenure shorter than four fiscal quarters, some quarters are *ambiguous* because they are both NEW and OUT. Transition quarters (q0) are also ambiguous because they are partially managed by outgoing CEOs and partially by new CEOs. All analyses in our paper exclude these *ambiguous* firm-quarters. Thus, effectively we require that a CEO has been at the helm for a minimum of four consecutive fiscal quarters for a firm to be included in our analyses. Quarter 0 is the transition (or ambiguous) quarter during which both outgoing CEOs and new CEOs potentially exercise influence. Established-CEO firm-quarters (Established) are those firm-quarters that are not new-CEO firm-quarters, outgoing-CEO firm-quarters, or ambiguous firm-quarters.

IA.2 Estimation of normal level of accruals, normal level of production costs, and normal level of discretionary expenditures

We estimate cross-sectional models for each two-digit SIC group quarterly. The universe includes all the US firms that issued common equity (share code 10 or 11) with quarterly financial data in the merged CRSP/Compustat file and CEO information in the Execucomp data base between 1992 and 2015. Finance and regulated industries are excluded from the estimate (SIC code 4400 – 4999 and 6000 – 6999). The models below are applied to quarterly data, as in Bartov and Cohen (2009).

Accrual-based earnings management

We use the modified Jones model (Jones, 1991) as described in Dechow, Sloan, and Sweeney (1995) to estimate the normal level of accruals. We run cross-sectional regressions for each two-digit SIC-quarter group using the equation specified below:

$$\frac{\boldsymbol{Accruals_{i,t}}}{\boldsymbol{A_{i,t-1}}} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\frac{\boldsymbol{1}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\alpha_2}\frac{\boldsymbol{\Delta S_{i,t}}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\alpha_3}\frac{\boldsymbol{PPE_{i,t}}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\varepsilon_{i,t}}\ , \quad (1)$$

Coefficient estimates from (1) are used to estimate the normal levels of accruals as below:

$$Norm\_accruals_{i,t} = \hat{\alpha}_0 + \hat{\alpha}_1\frac{1}{A_{i,t-1}} + \hat{\alpha}_2\frac{\Delta S_{i,t}-\Delta AR_{i,t}}{A_{i,t-1}} + \hat{\alpha}_3\frac{PPE_{i,t}}{A_{i,t-1}}, \quad (2)$$

All variables are defined in Appendix A. Discretionary accruals ($DA_{i,t}$) is the difference between accruals and the fitted normal accruals multiplied by 100, so that one unit is 1% of total assets.

Real earnings management

We follow Roychowdhury (2006) to construct measures to estimate levels of real earnings management. We discuss each of these two components of real earnings management in more detail below.

(1) **Delaying discretionary expenditure:** Discretionary expenditures include R&D, advertising, and selling, general, and administrative (SG&A) expenditure. Temporarily reducing discretionary expenditures can inflate earnings in the current period; similarly, front-loading discretionary expenditure can temporarily decrease earnings in the current period. We estimate the normal level of discretionary expenditure from operations using the following equation:

$$\frac{\boldsymbol{DISX_{i,t}}}{\boldsymbol{A_{i,t-1}}} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\frac{\boldsymbol{1}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\alpha_2}\frac{\boldsymbol{S_{i,t}}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\varepsilon_{i,t}}\ , \quad (3)$$

where $DISX_{it}$ is discretionary expenditure in quarter *t*, which includes R&D and SG&A.[1] Abnormal discretionary expenditure ($R\_DISX_{i,t}$) is the regression residual from (4), multiplied by -100 for ease of interpretation. Thus, lower abnormal discretionary expenditure (as defined) corresponds to downward earnings management through an abnormal increase in discretionary expenditure.

(2) Sales manipulation: Managers can attempt to increase sales temporarily during a period by offering price discounts or more lenient credit terms. Both sales manipulation strategies can lure customers to advance purchases from the next fiscal period to the current fiscal period, but the net impact on the cash flow per sale is negative. If managers overproduce to manipulate earnings upward, the net impact

[1] Similar to Bartov and Cohen (2009), we focus on SG&A and R&D when measuring quarterly discretionary because Compustat does not provide quarterly advertising expenditure. Appendix A provides a detailed description of all the variables used.

on cash flow is negative. However, delaying discretionary expenditure reduces the cash flow. Thus, the aggregate impact on cash flows from upward earnings management using sales manipulation, overproduction, and delaying discretionary expenses can be both negative and positive.

We estimate the normal level of cash flow from operations with the equation below:

$$\frac{\boldsymbol{CFO_{i,t}}}{\boldsymbol{A_{i,t-1}}} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\frac{\boldsymbol{1}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\alpha_2}\frac{\boldsymbol{S_{i,t}}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\alpha_3}\frac{\boldsymbol{\Delta S_{i,t}}}{\boldsymbol{A_{i,t-1}}} + \boldsymbol{\varepsilon_{i,t}}, \quad (4)$$

where $CFO_{i,t}$ is cash flow from operations (oancfq) less extraordinary and discretionary operational cash flow (xidocq). Abnormal cash flow ($R\_CFO_{i,t}$) is the regression residual from (5), multiplied by -100 for convenient interpretation and presentation where negative abnormal cash flow suggests possible downward earnings management.

(3) **Overproduction:** Overproduction results in fixed overheads being allocated to a larger number of units and hence has the effect of reducing the cost of goods sold on a per unit basis. The lower cost of goods sold translates into increased earnings in the period in which overproduction takes place. However, inventory capacity is limited and this upward earnings management will eventually reverse, as running down excess inventory leads to a period of underproduction. Conversely, a firm can also under-produce to lower earnings in the current period. We estimate the normal level of production cost from operations using the following equation:

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1\frac{1}{A_{i,t-1}} + \alpha_2\frac{S_{i,t}}{A_{i,t-1}} + \alpha_3\frac{\Delta S_{i,t}}{A_{i,t-1}} + \alpha_4\frac{\Delta S_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}\ , \quad (5)$$

where $PROD_{i,t}$ is the sum of the cost of goods sold in quarter t and the change in inventory from quarter $t-1$ to t. The abnormal levels of production costs ($R\_PROD_{i,t}$) are the regression residuals from estimating equation (3) (i.e., the difference between $\frac{Prod_{i,t}}{A_{i,t-1}}$ and fitted level of production costs) multiplied by 100. Low levels of abnormal production costs indicate that a firm manipulates earnings downwards through underproduction and temporarily reduction in sales from stricter sales terms.

The real earnings management index ($REM_{i,t}$) is the sum of abnormal production costs ($R\_PROD_{i,t}$), abnormal discretionary expenditure ($R\_DISX_{i,t}$), and abnormal cash flow ($R\_CFO_{i,t}$).

The table below reports the estimation results. Reported coefficients are the average of coefficient estimates across all industry-quarter regressions. ***p***-values are against the null that the average of coefficient estimates is insignificant. ***p***-values at 10% or better levels are shown in bold font.

$Accruals_{it}/A_{it-1}$

	avg. estimates	$p-$value
Intercept	**-0.0069**	**<0.001**
$1/A_{it-1}$	-0.0010	0.99
$\Delta S_{it}/A_{it-1}$	**0.0442**	**<0.001**
PPE_{it}/A_{it-1}	**-0.0121**	**<0.001**
Avg. $\bar{R}^2$	11.9	
Avg. # of obs	48.1	
# of industry quarters	2,127	

$DISX_{it}/A_{it-1}$

	avg. estimates	$p-$value
Intercept	**0.0365**	**<0.001**
$1/A_{it-1}$	**5.3404**	**<0.001**
S_{it-1}/A_{it-1}	**0.1037**	**<0.001**
Avg. $\bar{R}^2$	25.1	
Avg. # of obs	47.5	
# of industry quarters	1,994	

CFO_{it}/A_{it-1}

	avg. estimates	$p-$value
Intercept	**0. 0129**	**<0.001**
$1/A_{it-1}$	**-0.9836**	**<0.001**
S_{it}/A_{it-1}	**0.0497**	**<0.001**
$\Delta S_{it}/A_{it-1}$	**0.0474**	**<0.001**
Avg. $\bar{R}^2$	17.5	
Avg. # of obs	48.4	
# of industry quarters	2,017	

$PROD_{it}/A_{it-1}$

	avg. estimates	$p-$value
Intercept	**-0.0410**	**<0.001**
$1/A_{it-1}$	**-2.7105**	**<0.001**
S_{it}/A_{it-1}	**0.8183**	**<0.001**
$\Delta S_{it}/A_{it-1}$	**-0.1493**	**<0.001**
$\Delta S_{it-1}/A_{it-1}$	**-0.0995**	**<0.001**
Avg. $\bar{R}^2$	48.1	
Avg. # of obs	80.7	
# of industry quarters	128,153	

Summary statistics of earnings management proxies

	N	Mean	Median	SD	25th Pctile	75th Pctile
Raw						
DA	100,860	0.03	0.18	4.68	-1.51	1.82
REM	87,834	-0.32	0.24	10.55	-5.54	5.43
R_DISX	94,625	0.00	0.45	5.00	-2.07	2.64
R_CFO	97,720	0.00	0.00	3.79	-1.83	1.78
R_PROD	98,162	0.00	0.01	5.39	-2.68	2.59
Winsorized (at 1%)						
DA	100,860	0.07	0.18	3.60	-1.51	1.82
REM	87,834	-0.29	0.24	9.81	-5.54	5.43
R_DISX	94,625	0.05	0.45	4.46	-2.07	2.64
R_CFO	97,720	0.00	0.00	3.42	-1.83	1.78
R_PROD	98,162	-0.02	0.01	4.90	-2.68	2.59

IA.3 Predicting CEO turnovers

This table presents estimations for logit models in predicting CEO turnovers using regressions specified in the equations below:

$$OUT(t) = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} DUALITY(t\text{-}4) + \boldsymbol{\beta_2} CEOSHR(t\text{-}4) + \boldsymbol{\beta_3} AGE(t\text{-}4) + \boldsymbol{\beta_4} VOL12M(t\text{-}4) + \boldsymbol{\beta_5} RET12M(t\text{-}4) + \boldsymbol{\beta_6} RET12MIND(t\text{-}4) + \boldsymbol{\beta_7} SALEWGRWTH1YR(t\text{-}4) + \boldsymbol{\beta_8} ROA1YR(t\text{-}4) + \boldsymbol{\beta_9} MB(t\text{-}4) + \boldsymbol{\beta_{10}} SIZE(t\text{-}4) + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Industry} + \boldsymbol{\mu_t}$$

$$NEW(t) = \boldsymbol{\theta_0} + \boldsymbol{\theta_1} DUALITY(t\text{-}4) + \boldsymbol{\theta_2} CEOSHR(t\text{-}4) + \boldsymbol{\theta_3} AGE(t\text{-}4) + \boldsymbol{\theta_4} VOL12M(t\text{-}4) + \boldsymbol{\theta_5} RET12M(t\text{-}4) + \boldsymbol{\theta_6} RET12MIND(t\text{-}4) + \boldsymbol{\theta_7} SALEWGRWTH1YR(t\text{-}4) + \boldsymbol{\theta_8} ROA1YR(t\text{-}4) + \boldsymbol{\theta_9} MB(t\text{-}4) + \boldsymbol{\theta_{10}} SIZE(t\text{-}4) + \boldsymbol{\iota YQ} + \boldsymbol{\kappa Industry} + \boldsymbol{\mu_t}$$

Asterisks ***, **, and * next to the difference indicate significance levels of 1%, 5%, and 10%, respectively, based on one-trailed *p*-values. The full sample includes all firm-quarters with non-missing values from 1993 to 2013. Refer to Appendix A for variables definitions.

	NEW	OUT
DUALITY	-0.29***	-0.28***
CEOSHR	-0.16***	-0.09***
AGE	0.02***	0.03***
VOL12M	0.05***	0.05***
RET12M	-0.11***	-0.06***
INDRET12M	0.01	0.08**
SALESGRTH1YR	-0.10***	-0.02**
ROA1YR	-0.09***	-0.04***
SIZE	0.06***	0.09***
MB	0.01	-0.01
Pseudo R-sqr (%)	5.31	4.95
N	52,175	52,175