

Accounting losses, CEO Turnover, and Turnover Risk Premium

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ABSTRACT

Although prior studies document a positive relationship between CEO turnover and poor performance, defining ‘poor performance’ remains an empirical challenge. We contend that zero accounting profit serves as an effective break-even point in calibrating CEOs’ performance which is why losses lead to more frequent managerial turnover. Using a non-linear specification around losses, we find a statistically and economically significant relationship between accounting losses and subsequent CEO turnover. A crucial finding is that once we include losses, accounting performance is no longer incrementally important in explaining CEO turnover. We additionally find that the impact of losses on CEO turnover depends on whether other firms in the industry also report losses, and that loss-related turnover leads to more frequent outside CEO appointments. Finally, to the extent that industry-wide losses capture a changing business environment which lowers job security, CEOs demand higher pay when an industry is more prone to losses. Collectively, our results suggest that CEOs bear a higher turnover risk for losses and that a portion of the job risk from losses that is unrelated to ability is priced in the managerial labor market.

Keywords: *Accounting losses; accounting performance; CEO turnover; CEO pay; managerial quality.*

Data Availability: *All data used in the paper are available from publicly available sources noted in the text.*

1. Introduction

Consistent with economic theory suggesting that CEOs are dismissed when performance falls below an acceptable level (e.g, Jenter and Lewellen 2010, Adams and Ferreira 2007, Hirschleifer and Thakor 1994), several studies document a positive relationship between CEO turnover and poor performance. However, defining ‘poor performance’ remains an empirical challenge. Is there a ‘break-even point’ below which performance is deemed unacceptable?¹ We contend that zero accounting profit is likely to serve as an effective break-even point in calibrating CEOs’ performance. Under this view, accounting losses are viewed negatively which leads to more frequent managerial turnover.

The notion that CEOs are penalized for losses has been referenced by researchers. Watts (2003) concludes that “managers have incentives to hide losses to avoid being fired before their tenure is over.” Based on a survey, Graham et al. (2005) find that three-fourths of the survey respondents believe that losses might lead to job losses. An accounting loss indicates that a CEO failed in his/her stewardship role and was unsuccessful in generating any accounting return using the firm’s assets which is expected to trigger questions about the CEO’s competence and ability. Also, losses might act as a heuristic for boards to calibrate managerial competence, which ultimately affects CEO retention decisions (Pinnuck and Lillis 2007; Watts 2003).² Therefore,

¹For instance, prior studies document a positive relationship between CEO turnover and poor performance using accounting and market measures (e.g., Farrell and Whidbee 2003, Engel et al. 2003, DeFond and Park 1999). However, it remains unclear what is poor performance. Some studies contend that CEO turnover is confined to the lowest performance deciles (e.g., Warner et al. 1988), however, such ordinal measurement criterion for poor performance is unable to provide insights into possible ‘break-even’ levels used by boards to reconsider CEO reappointment decisions.

²While reporting a profit often results in routine annual evaluations, a loss is expected to precipitate more critical evaluation of the incumbent CEO as boards members are compelled to learn more about the CEO’s ability and the future prospects of the firm under the current management (Bowen 2008).

losses are more likely to lead to a critical evaluation of the CEO because performance is considered unacceptable which increases the likelihood of a CEO turnover.

Another explanation why accounting losses might be effective in assessing poor performance is linked to accounting conservatism which requires firms to recognize future losses in the current period but not future profits (Basu 1997; Watts 2003; Givoly and Hayn 2000). In the presence of agency problems, accounting losses capture the CEO's actions and competence with less noise because losses include future negative payoffs from past investments, which indicates whether a CEO invested in negative net present value (NPV) projects (Ball and Shivakumar 2005; Watts 2003). Because less noisy measures of performance are more useful in turnover decisions (e.g., Engel et al. 2003; Taylor 2010), we expect losses to dominate the turnover-performance association over profits.

Our study also investigates the impact of market-based performance on CEO turnover decisions. Because prior studies tend to consider prior period stock performance (e.g., Engel et al. 2003; Farrell Whidbee 2003, Brickley et al. 1999; Parrino 1997, Weisbach 1988), they are likely to ignore incrementally valuable information contained in stock returns from the dismissal year, i.e., the period from the beginning of the fiscal year to the dismissal date. We emphasize that stock return performance from the dismissal year is additional performance metric containing valuable new information about managerial competence and is therefore expected to be associated with CEO turnover.

Based on a comprehensive sample of CEO turnovers between 1997 and 2013, we find, as in prior studies, a strong negative relationship between CEO turnover and firm performance using both accounting and stock performance measures. More importantly, when we additionally include an indicator variable *Loss* for firms with negative net income, while controlling for the

other determinants of CEO turnover, we find that the coefficient on *Loss* is positive and highly significant. Additionally, we examine whether the magnitude of the loss plays an added role in CEO turnover decisions by including *Magnitude* (decile ranks of the absolute value of net income to book value equity) and interaction between *Loss* and *Magnitude*. We find that the coefficients on *Loss* and the interaction term are positive and significant. While losses increase the overall probability of a CEO turnover, the likelihood of CEO turnover further increases with the magnitude of the loss.

In sharp contrast to the results from prior studies, we document that the economic magnitude of losses on CEO turnover is large. Holding the other variables constant, some estimates suggest that the odds of a CEO losing a job within a year is 3.7% higher for a firm with losses compared to one with profits which suggests that losses substantially increase the likelihood of the termination of CEO contracts. A crucial finding is that, once we include *Loss*, accounting performance is no longer incrementally important in explaining CEO turnover regardless of how we measure accounting performance (e.g., earnings-to-total assets, industry-adjusted earnings-to-total assets or change in earnings). Thus, losses appear to dominate as a metric for judging managerial competence while small or declining profits do not appear to be useful for CEO retention decisions.

Consistent with our expectation that stock returns from the dismissal year contain valuable new information about managerial performance, we find that the coefficient on returns from the dismissal year is positive and statistically significant. Although, the coefficient on prior period returns is also positive and significant, the coefficient on returns from the dismissal year is almost twice in magnitude than that on prior period returns. Our results suggest that stock returns

from the turnover year contain valuable new information about managerial performance that is incrementally more important than information in stock returns from the prior period.

A more powerful test of the hypothesis that losses lead to a higher likelihood of a CEO turnover is to show that the loss-turnover relationship varies according to economic theory. We develop two related hypotheses on the cross-sectional variation in the loss-turnover relationship. First, boards are expected to hold CEOs accountable for poor performance when losses result from mismanagement or incompetence (i.e., losses are idiosyncratic to the firm), but they are expected to shelter CEOs from losses that are the outcome of industry-wide shocks affecting many firms (Bushman et al. 2010; Gibbons and Murphy 1990; Sloan 1993). We find that the likelihood of a CEO turnover increases subsequent to losses when losses are idiosyncratic or unique to the firm. However, as losses become more symptomatic of the industry, the sensitivity of CEO turnover to losses gets muted.

Second, losses are expected to increase the likelihood that the dismissed CEO is replaced by an outsider. Parrino (1997) claims that outside candidates are more suitable for the top position when boards want changes in the direction of the firm than when they want to maintain status quo because “outside candidates...by virtue of their employment at other firms often have a broader exposure to, and experience with, alternative ways of running a firm” (p. 167). Because losses might reflect a troubled firm (DeAngelo 1988), boards might be more inclined to consider outsiders than insiders when replacing the incumbent CEO for poor performance. We find that turnovers following losses lead to more frequent outside CEO appointments than those following profits.

In our analysis, we control for routine CEO turnovers by including the age of the CEO as an additional control variable in our regressions (DeFond and Park 1999). Although this form of

identification might be effective in isolating forced turnovers, it is a noisy measure. As an added test, we replicate our results using the Eisfeldt and Kuhnen (2013) sample of forced CEO turnovers. Our results indicate that turnover-loss relationship is significant for the forced CEO turnover sample but not when CEO turnovers are related to exogenous shocks or when they cannot be classified.

Finally, we examine whether CEOs demand a risk premium for bearing higher turnover risk that is related to losses. Because CEOs bear substantial cost following job losses, Peters and Wagner (2014) find that higher job risk leads to more CEO pay because of an increase in turnover risk. One problem with estimating pay-turnover relationship is that although losses lead to more frequent CEO turnovers, in equilibrium, higher job risk may not be priced if the underlying causes for higher risk are CEO's incompetence, low ability, or other agency problems. However, if the incidence of industry-wide losses leads to a higher dismissal risk because of a changing business environment and a potential mismatch between the firm and CEO (Eisfeldt and Kuhnen 2013), in equilibrium, industry-wide losses can serve as a powerful instrument to estimate the relation between compensation and turnover risk. Consistent with our expectations, we find that the likelihood of expected turnover is priced in the managerial labor market. Our results suggest that a ten percent increase in the probability of turnover increases CEO compensation by about ten percent.

Our study contributes to the extant literature as follows. First, prior studies provide persuasive evidence that accounting recognition of losses is valuable to lenders and that it has a positive impact on debt contract efficiency. Extending this line of literature, we provide evidence that accounting recognition of losses is also valued by boards to monitor CEOs. Second, prior

studies generally conclude that CEOs manage earnings to avoid losses.³ Our results suggest that protecting jobs might be a key consideration for CEOs managing earnings to avoid losses. Third, prior studies conclude that the stock market reacts to profits, but not losses, because CEOs are expected to exercise the ‘liquidation or abandonment option’ when losses are persistent (Collins et al. 1999; Burgstahler and Dichev 1997; Hayn 1995; Berger and Ofek 1996). Our results suggest that the enhanced threat of a job loss provides incumbent CEOs (who are not fired) with strong incentives to abandon operations when a firm reports a loss.

The rest of the paper is organized as follows. Section 2 develops the hypotheses, Section 3 outlines our research design, Section 4 describes the sample procedure, Section 5 reports the results, Section 6 discusses sensitivity analyses, and Section 7 concludes the paper.

2. Measuring poor performance

Accounting losses as a measure of poor performance

Because board members cannot directly observe the ability of a CEO, they must rely on various performance measures (public signals) and inside information (private signals) to evaluate the performance of a CEO (Taylor 2010). Most turnover-based analytical models assume that the board learns more about the CEO’s ability based on performance and other private information. Whenever a CEO’s ability falls below a threshold which is less than the ability of a replacement manager, the board decides to replace the incumbent manager (Jenter and Kanaan 2011). However, what remains ambiguous is whether there exists some publicly

³The discontinuity in the frequency of firm-years around zero earnings (e.g., Hayn 1995; Burgstahler and Dichev 1997) is widely cited as evidence of earnings management to avoid reporting losses. Similarly, Roychowdhury (2006) provides evidence consistent with the premise that managers manipulate operating (‘real’) activities to avoid reporting losses.

observable threshold performance which triggers close scrutiny of a CEO's actions and decisions. Anecdotal evidence suggests that accounting losses might be such a catalyst.⁴

Reported earnings in the U.S., and those around the world, tend to follow the 'accounting conservatism principle' (e.g., Ball et al. 2000). One interpretation of this principle is that the income statement anticipates all losses (current and future) but not future profits (Basu 1997). Lower of the cost or market for inventories, immediate recognition of future losses on long-term contracts, recognition of future losses for operations designated as discontinued, and asset impairments are some examples of reporting conservatism. In a related study, Watts (2003, p. 213) posits that "managers have incentives to hide losses to avoid being fired before their tenure is over." Admitting to losses might indicate that the CEO invested in negative NPV projects and that the possibility of future profits under the incumbent management might be remote. A key implication of accounting conservatism principle is that losses are more timely and reliable signals of deteriorating managerial performance than small or declining profits. Boards might also view losses as a heuristic for ultimate failure (Pinnuck and Lillis 2007).⁵

Because losses might signal that the firm is in serious difficulties, boards are more likely to re-evaluate the CEO's actions and business strategies following losses to understand the reasons for the losses, and to evaluate the future prospects of the company under the incumbent management (Bowen 2008). Although board members might prefer not to oppose management

⁴In a survey and interview of 400 key executives directly involved in the financial reporting process, Graham et al. (2005) find that 78% of the executives admit to sacrificing long-term growth to report immediate profits rather than a loss because of career concerns. In their survey, three-fourths of the respondents believe that their inability to avoid losses is seen as a "managerial failure" by the executive labor market and by corporate boards.

⁵Some board members might favor CEO turnover for loss firms because of a loss aversion. If a board member is more sensitive to losses than profits because a loss serves as a heuristic for failure (Barberis and Huang 2001; Kahneman and Tversky 1979), he/she might conclude that a loss is sufficient justification of a change.

frequently (Warther 1998), losses might provide dissenting members with the opportunity to step forward and voice their concerns thereby increasing the possibility of a closer scrutiny of the CEO. Also, DeAngelo (1988, 15) reports that dissident shareholders waging a proxy contest “tend to emphasize losses as necessitating a management change.” Therefore, board members might feel the need to re-evaluate the CEO’s ability following losses to placate shareholders (Watts 2003).

In summary, a heightened scrutiny of the CEO following a loss is more likely to lead to managerial turnover because: (1) an in-depth evaluation increases the chances that the board uncovers detrimental information about the CEO’s ability, (2) boards might decide to replace the incumbent CEO when they have doubts about his/her ability to steer the company back to profitability, and (3) boards disagree with the CEO’s vision of moving the company forward in light of the losses. Therefore, our first hypotheses states as follows.

HYPOTHESIS 1: *Accounting losses increase the likelihood of CEO turnover.*

To address concerns about omitted correlated variables problem, and to increase our confidence in the assertion that boards consider losses along with other factors in arriving at CEO retention decisions, we also develop two related hypotheses on the cross-sectional variation in the loss-turnover relationship. Boards are expected to hold CEOs accountable for poor performance when losses result from mismanagement of the firm, lack of leadership or incompetence, or CEO’s inability to take optimal decisions. In contrast, boards are expected to shelter CEOs from losses when poor performance is systematic in nature because of industry- or economy-wide shocks which affect many firms (Bushman et al. 2010; Gibbons and Murphy 1990; Jenter and Kanaan 2011). Therefore, our second hypothesis is as follows.

HYPOTHESIS 2: *The sensitivity of CEO turnover to accounting losses declines as more firms from the same industry report losses.*

The decision to fire a poorly performing CEO benefits shareholders only when the board appoints a more capable successor. CEOs who are appointed from outside the firm are more likely to change pre-existing firm policies that have resulted in losses. Consistent with this perspective, Borokhovich et al. (1996) find that the stock market views the appointment of an outside CEO more favorably than the appointment of an insider, especially when the incumbent CEO is forced to resign. Therefore, accounting losses increase the likelihood that the board might prefer an outside replacement to send a strong signal to investors that the CEO is committed to turning around the firm. Therefore, our third hypothesis is as follows.

HYPOTHESIS 3: *CEO turnover following losses leads to more outside CEO appointments.*

Dismissal year stock returns

Almost all prior studies on CEO turnover, if not all, limit their evaluation of performance to periods prior to the turnover year thereby potentially ignoring valuable information generated during the dismissal year but prior to the dismissal of the CEO (i.e., information contained in stock returns from the dismissal year). Hermalin and Weishbach (1998), among others, contend that stock returns reflect value creation under the incumbent management. Albeit noisy, stock returns from the dismissal year are more timely and hence are more likely to contain the market's updated beliefs about the CEO's ability. Thus, boards might rely on near-term returns, in addition to relying on prior period performance measures, for CEO retention decisions. It is also probable that the information in near-term returns is correlated with the board's private information about the CEO's ability. Therefore, we contend the near-term stock returns are incrementally informative in predicting CEO turnover decisions.

HYPOTHESIS 4: *Dismissal year stock return is incrementally as important as stock returns from prior periods in predicting CEO turnover.*

Turnover risk premium related to losses

Prior studies find that CEOs bear substantial costs following job losses—they may remain unemployed for extended periods for time, they might get paid less even when they find a new job, and the new job may involve less compensation than their prior job (Fee and Hadlock 2004). Therefore, CEOs are expected to get paid more when the risk of a job loss is high. Consistent with the notion that pay and dismissal risk are associated in the cross section, Peters and Wagner (2014) find that CEOs with higher job risk are paid more than CEOs who have more job security. Under the assumption that reporting a future accounting loss increases the job risk for a CEO, a key implication of our study is that turnover risk attributable to a potential future loss is likely to be priced by CEOs in the current period.

HYPOTHESIS 5: *CEOs demand higher compensation when the turnover risk attributable to a potential future loss is high.*

Similar to the industry emphasis in Peters and Wagner (2014), we highlight the impact of the incidence of future industry losses on CEO pay for two key reasons. First, one explanation for losses is linked to managerial incompetence, low ability, or other agency problems which increases the likelihood of a CEO turnover. However, in equilibrium, these factors should not play a role in CEOs getting paid more even though a loss leads to more frequent CEO dismissal. Second, assuming that the incidence of industry-wide losses is indicative of a changing business environment, CEOs bear a higher dismissal risk because of a potential mismatch between the firm and CEO, which Eisfeldt and Kuhnen (2013) label as “competitive assignment framework” of CEO turnover. In equilibrium, the incidence of industry losses is expected to lead to higher CEO pay because a CEO would demand a risk premium for bearing the added job risk.

3. **Research design**

Based on the extant literature on CEO turnover (e.g., Bushman et al. 2010; Fich and Shivdasani 2006; Engel et al. 2003; Desai et al. 2006; Farrell and Whidbee 2003; Huson et al.

2001), we test the relationship between CEO turnover and accounting losses using the following logistic regression.

$$\begin{aligned}
 \text{Turnover} = & \beta_0 + \beta_1 \text{Accounting-return} + \beta_2 \text{Loss} + \beta_3 \Delta \text{Accounting-return} + \beta_4 \text{Stock-return}_{\text{interim}} + \\
 & \beta_5 \text{Stock-return} + \beta_6 \text{Stock-volatility} + \beta_7 \text{Earnings-volatility} + \beta_8 \text{Concentration} + \beta_9 \text{Size} + \\
 & \beta_{10} \text{Growth} + \beta_{11} \text{Restructure} + \beta_{12} \text{Restatement} + \beta_{13} \text{Age} + \beta_{14} \text{Retirement} + \beta_{15} \text{Tenure} + \\
 & \beta_{16} \text{Forecast-error} + \text{Industry/Year Fixed effects} + \varepsilon
 \end{aligned} \tag{1}$$

Turnover is an indicator variable that equals 1 when there is a change in the CEO within four quarters subsequent to the fiscal year and 0 otherwise. Prior studies include the following three measures of performance (e.g., Bushman et al. 2010; Fich and Shivdasani 2006; Farrell and Whidbee 2003; DeFond and Park 1999; Murphy and Zimmerman 1993; Weisbach 1988): (1) industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items deflated by total assets at the beginning of the year (*Accounting-return*), (2) difference between current period income before extraordinary items and the corresponding number in the prior year deflated by total assets at the beginning of the year (Δ *Accounting-return*), and (3) the difference between the raw stock returns and the value-weighted CRSP market returns over a twelve-month period ending with the current fiscal year-end (*Stock-return*).

We include two additional performance measures: (1) *Loss* is an indicator variable that equals one when net income is negative for the current year and 0 otherwise, and (2) *Stock-return_{interim}* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns between current fiscal year-end and the CEO turnover date.⁶ The predicted sign of

⁶To ensure that the return measurement period for non-CEO turnover firms mimic that for CEO turnover firms, we use two approaches. First, because the average tenure for the interim period (i.e., the year of the CEO turnover) is 6.3 months, we use 6-month period to compute returns for the non-CEO turnover sample for the interim period. Second, we randomly assign non-turnover firms into various months by mimicking the CEO turnover distribution over the interim period. We then compute returns for the non-CEO turnover firms using these randomly assigned periods. Our results are robust to both methods but we report the results using the former approach.

the coefficient on *Loss* is positive; CEO turnover for firms with losses is expected to be higher than firms with profits. The predicted sign of the coefficient on *Stock-return_{interim}* is negative; CEO turnover is higher when market-adjusted returns are lower for the interim period.

We also include the following performance and control variables. *Stock-volatility* is the standard deviation of *Stock-return* based on prior twenty-four monthly returns. *Earnings-volatility* is the standard deviation of *Accounting-return* over the previous five years. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. *Concentration* is the industry level Herfindahl index. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets. *Restructure* is an indicator variable that equals 1 if special items as a percentage of total assets are less than or equal to -5 percent and 0 otherwise. *Restatement* is an indicator variable equal to 1 when a firm restates its financial statement for the current or prior year and 0 otherwise. *Age* is the age of the CEO in years. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Tenure* is the number of years that the CEO has been in office as of the fiscal year-end.

We include two measures of volatility, one market (*Stock-volatility*) and another accounting (*Earnings-volatility*), because firms with higher volatility are more prone to severe shocks that lead to more frequent CEO turnovers (Bushman et al. 2010; Engel et al. 2003; DeFond and Park 1999). We control for analysts' forecast errors because Farrell and Whidbee (2003) find that firm performance expectations affect CEO turnover. We control for industry concentration because CEO turnover is greater in highly concentrated industries than in less concentrated industries (DeFond and Park 1999). We control for firm size (*Size*) and investment

opportunity (*Growth*) because larger firms and growing firms have a greater demand for high quality CEOs (Smith and Watts 1992). We include indicator variables for restructuring activities (*Restructure*) and financial restatements (*Restatement*) because firms with structural or reporting problems are more likely to be associated with CEO turnovers (Desai et al. 2006; Pourciau 1993). Because not all CEO turnovers are performance related, as in DeFond and Park (1999) and Desai et al. (2006), we include the CEO age (*Age*), an indicator variable for CEOs who are 60 years or older (*Retirement*) and a tenure variable to measure the number of years in office (*Tenure*). Finally, we include fixed effects for years and industry to control for variations in CEO turnover over time and across industries.

4. Data and descriptive statistics

Data and sample selection

Our sample consists of Standard and Poor's (S&P) 1500 firms from Compustat's *ExecuComp* files during the period 1997 to 2013. Included in the *ExecuComp* files are the names of the top executives in the firm, a CEOANN variable indicating which of the executives has the title of a CEO, and the starting date of the CEO. Our CEO turnover indicator variable is constructed from the information contained in *ExecuComp* files. If the name of the executive listed as a firm's CEO for the current year is different from the one listed as the CEO for the prior year, we conclude that there is a change in the CEO, or a new CEO is hired, for the current year. Because we define *Turnover* as one when there is a change in a CEO for the subsequent year, and our sample period ends with 2012, we consider accounting loss from 1997 to 2012.

Ideally, our sample would only consist of involuntary or forced turnovers. However, it is often difficult to categorize CEO turnovers into voluntary and involuntary turnovers by reading press articles (Engel et al. 2003). For instance, prior studies discuss the unreliable nature of the

press articles and how press releases often present involuntary turnovers as retirements (DeFond and Park 1999; Warner et al. 1988). Therefore, as in prior studies we control for voluntary turnovers by including a separate indicator variable for retirement age in our regression analyses (e.g., Engel et al. 2003). However, as additional tests, we examine whether the impact of losses on forced CEO turnover: (1) using the sample of forced turnovers identified in Eisfeldt and Kuhnen (2013), and (2) using CEO age of 60 years to classify turnovers into forced and routine, as in Peters and Wagner (2014).

We also obtain CEO ownership, age and tenure data from the *ExecuComp* files. The data on earnings and other firm characteristics are obtained from *Compustat* annual files. Stock return data are obtained from *CRSP* files. We obtain analyst earnings forecast data from the *IBES* summary files. We construct one combined sample by merging the CEO, accounting, stock return, and forecast data. To remove the effect of outliers, we winsorize the top or bottom 1 percent of the observations for *Accounting-return*, Δ *Accounting-return*, *Stock-return*, *Earnings-volatility*, *Concentration*, and *Growth*.⁷ This sample selection procedure results in 25,985 firm-year observations over fiscal years 1997 through 2012 with information about CEO turnover included up to 2013. However, when we include analysts' forecasts, the sample size reduces to 24,873.

Descriptive statistics

Table 1 reports the descriptive statistics for the variables included in Equation (1). CEO turnover levels are similar to those typically reported by prior studies; the frequency of CEO turnover is 10.1% over the entire sample period. Losses are fairly common; of all the firm years, 30.6% report negative net income. The mean (median) industry-adjusted return on assets

⁷Our results are not sensitive to other outlier identification methods and they remain qualitatively unchanged when we remove the top and/or bottom 0.5 or 1 percent of observations or even retain all the outliers.

(*Accounting-return*) and changes in income before extraordinary items deflated by total assets (Δ *Accounting-return*) are 4.6% (4.6%) and 1% (0.6%), respectively. The mean (median) cumulative market-adjusted stock returns from the dismissal year (*Stock-return_{interim}*) are 4.2% (1.1%). The mean (median) cumulative market-adjusted stock returns from the prior year (*Stock-return*) are 6.8% (0%). The mean (median) return volatility (*Stock-volatility*) is 0.111 (0.095), whereas the mean (median) earnings volatility (*Earnings-volatility*) is 0.059 (0.033). The Herfindahl index (*Concentration*) has a mean (median) of 0.087 (0.051). The mean fiscal-year end market value of equity (*Market-equity*) is \$6.5 billion, while the median number is smaller (\$1.5 billion). The mean (median) market-to-book ratio (*Growth*) is 1.85 (1.41). 9.6% of firm years report special items less than or equal to -5 percent of total assets and 9.6% of firm years are involved with restatements in the current or prior year. The mean and median values of CEO age are very close at 55 years, whereas the mean (median) CEO tenure (*Tenure*) is 7 (5) years. The mean (median) analysts' earnings forecast errors (*Forecast-error*) are -0.003 (0.001).

Table 2 presents the relative frequency of CEO turnover for firms reporting losses and CEO turnover. The frequency of CEO turnover appears to be constant around 10% over the sample years. It fluctuates between 8.6% in 2002/2008 and 12.2% in 2007. Losses on the other hand have a higher variance. The lowest percentage of losses was 23.5% in 1999 and the highest percentage of losses was 40.2% in 2008. The overall percentage of losses reported by firms during the sample period is 31%.

5. Empirical results

CEO turnover and accounting losses

Table 3 presents the logistic regression results for Equation (1). The dependent variable *Turnover* is an indicator variable that equals 1 when there is a change in the CEO within four

quarters of the fiscal year end and 0 otherwise. Our interest is in the sign and magnitude of the coefficient on *Loss*. In Model (1), we first replicate prior studies by including accounting and stock performance measures but without including *Loss*. Consistent with prior research, we find that accounting and stock performance measures are significantly negatively associated with turnover. The coefficients on *Accounting-return* and *Stock-return* are -1.235 ($z=-4.43$) and -0.516 ($z=-9.41$), respectively. As in prior studies, we find that the economic significance of accounting performance on CEO turnover is small. Holding the values of the other explanatory variables at their mean values, a 10% increase in industry-adjusted return on assets decreases the probability of CEO turnover by 0.14%. The coefficient on Δ *Accounting-return* is negative but insignificant (-0.074, $z=-0.28$).

Consistent with Hypothesis 1, when we additionally include *Loss* in Model (2), we find a positive and statistically significant relationship between CEO turnover and accounting losses. The coefficient on *Loss* is 0.321 ($z=4.24$). The economic magnitude of the coefficient is large. Holding the other variables constant, the odds of a CEO losing his/her job within a year of reporting a loss are about 3.7 percent higher than the odds of CEO turnover following a profit. Another key empirical result is that the coefficient on *Accounting-return* becomes insignificant (-0.593, $z=-1.87$) when we include *Loss* as an additional explanatory variable. The coefficient on Δ *Accounting-return* continues to be insignificant (0.023, $z=0.09$). Consistent with Hypothesis 4, the coefficient on *Stock-return*_{interim} is negative and highly significant (-1.055, $z=-13.46$). While the coefficient on *Stock-return* is also negative and significant (-0.509, $z=-9.19$), the coefficient on *Stock-return*_{interim} is twice that of *Stock-return*. An F-test indicates that the coefficient on *Stock-return*_{interim} is significantly larger than that of *Stock-return* ($\chi^2=32.63$).

We use an indicator variable for losses to examine the relation between accounting losses

and CEO turnover. The underlying assumption that the impact of losses on CEO turnover does not depend on the magnitude of accounting losses may be too restrictive. Therefore, we relax this assumption by examining whether the strength of the relation between losses and turnover varies with the size of losses by adding the magnitude of the loss (*Magnitude*). *Magnitude* represents decile ranks of the absolute value of net income deflated by book value of equity at the beginning of the year.⁸ Model (3) reports the results after including *Loss*×*Magnitude* to estimate how the magnitude of the loss affects the sensitivity of top executive turnover to losses. We find that the coefficient on *Loss* remains positive and significant. The sensitivity of CEO turnover to accounting losses becomes larger as the magnitude of accounting losses increases. The coefficient on *Loss*×*Magnitude* is 0.044 ($z=2.90$).

Finally, Model (4) is an augmented version of Model (3) after additionally including analyst forecast error which reduces our sample size. The results from Model (4) are very similar to those from Model (3). The results of the control variables are generally consistent with our expectations and similar to those reported in prior studies (e.g., Bushman et al. 2010; Desai et al. 2006; Farrell and Whidbee 2003; Engel et al. 2003; Huson et al. 2001; DeFond and Park 1999). The coefficient estimates on *Stock-volatility*, *Size*, *Age*, and *Retirement* are all positive and significant. The results suggest that the likelihood of CEO turnover is higher for firms with higher stock return volatility, bigger firms, when the CEO is older, and when the CEO is close to the retirement age. The coefficient estimates on *Tenure* is negative and significant. The results suggest that the likelihood of CEO turnover is lower for longer tenure. The coefficients on *Earnings-volatility*, *Concentration*, *Growth*, *Restructure*, and *Restatement* are insignificant.

⁸We deflate loss by book value of equity because it indicates the degree of erosion in shareholder equity, which aids the economic interpretation. We use deciles instead of including the continuous variable to minimize the effect of outliers (firms can report extremely large losses). The results are very similar when we interact *Loss* with *Accounting-return*.

Table 3 results are based on all CEO-turnovers which include (1) “forced” turnovers where a CEO is being forced to retire or quit or is being fired from office and (2) other “routine” turnovers that are essentially unrelated to performance. Because losses are expected to lead to forced turnovers, the results from Table 3 are noisy estimates of the likelihood of forced CEO turnovers from losses because our sample also includes routine turnovers. However, identifying the true nature of CEO turnover is often complex because firms almost never announce a turnover as being involuntary (Peters and Wagner 2014). Moreover, using press reports to classify turnovers into forced versus routine turnover groups requires hand collected data which is extremely onerous and time intensive. As in Parrino (1997) and Peters and Wagner (2014), we also use age of the CEO to classify CEO turnovers as forced versus routine. In particular, Table 4 estimates the models from Table 3 with the dependent variable being *Forced (Routine)*, defined as an indicator variable which equals one when a departing CEO is less than or equal to (more than) 60 years.

In regression (1), when *Forced* is the dependent variable, the coefficient on *Loss* is positive and significant at the 1% level (0.387, $z=4.18$). Similarly, the coefficient on *Stock-return_{interim}* is negative and significant at the 1% level (-1.273, $z=-13.03$). In sharp contrast, in regression (2) with *Routine* as the dependent variable, the coefficient on *Loss* is insignificant (0.210, $z=1.62$). We get similar results from regressions (3) and (4) when we additionally include *Forecast-error* as an independent variable.

As an additional validity check, we also use the forced turnover classification of Eisfeldt and Kuhnen (2013) to test our hypothesis. In particular, Eisfeldt and Kuhnen (2013) classify all CEO turnovers into three categories: (1) forced turnovers, (2) exogenous turnovers, and (3) unclassified turnovers. We merge their CEO turnover data, which is compiled from 1992 to

2005, with our CEO turnover data and find 12,174 firm-year overlapping observations. We then use this smaller dataset to examine the impact of losses on CEO turnovers. In untabulated results, we find that the coefficient on *Loss* is positive and significant (0.606, $z=2.18$) only when we use their forced turnover classification as the dependent variable. When we use the exogenous or unclassified categories as dependent variables, *Loss* is insignificant. Thus, our added results are consistent with the expectation that losses impact the likelihood of forced turnovers but not other types of turnovers.

Overall, consistent with Hypothesis 1, our results suggest that CEOs reporting losses are more likely to lose their jobs within a year period compared to CEOs reporting profits. Consistent with Hypothesis 2, we find that stock returns from the dismissal year contain critical information that is highly correlated with CEO turnover.

Key implications

Several valuation studies find that the relation between returns and earnings is weaker for loss firms than for profit firms (Collins et al. 1999; Burgstahler and Dichev 1997; Hayn 1995). The “liquidation/abandonment option” to redeploy existing assets is often used as an explanation for the differential results between firm values and earnings for profit and loss firms. Assuming that CEOs are willing to liquidate a firm or to discontinue a segment when losses are expected to perpetuate, investors perceive losses as being temporary. Therefore, the stock market reaction to losses is muted.

However, in the presence of agency problems, it is unclear whether incumbent CEOs would exercise the liquidation/abandonment option when losses are expected to continue. For example, Ofek (1993) finds that entrenched managers continue operations even when a firm is distressed. Our study helps us better understand why losses are temporary. Because boards play a

proactive role in replacing entrenched CEOs that are unwilling or unable to change their failed business strategies, losses are more likely to be temporary because new CEOs are more likely to reverse the failed strategies of the predecessor CEO.

Idiosyncratic versus systematic losses

A related but important question is whether CEOs are held responsible for reporting losses when other firms in the industry also report losses, i.e., losses are the outcome of systematic negative shocks to the industry. Following Heflin and Hsu (2008), we construct a variable, *Industry-loss*, which measures the proportion of firms reporting losses in each industry for a given year where industry is defined using two-digit Standard Industry Classification (SIC) codes. Our measure is constructed to capture industry-wide shocks. For instance, a negative shock to the industry affecting many firms in that industry is likely to result in a significant number of firms with losses. Therefore, as *Industry-loss* increases, a firm-specific loss is more likely to be the outcome of industry-wide effects (systematic loss). In contrast, a smaller value for *Industry-loss* indicates that a firm-specific loss is more likely to be the result of firm specific factors rather than industry-wide effects (idiosyncratic loss).

Accordingly, in Table 5, we also examine whether *Industry-loss* affects the sensitivity of turnover to losses by estimating an augmented logistic regressions after additionally including *Loss* \times *Industry-loss* and *Industry-loss* along with the other variables. In Model (1), the coefficient on *Loss* is positive and significant (0.898, $z=5.65$) while that on *Loss* \times *Industry-loss* is negative and significant (-1.32, $z=4.00$). Consistent with Hypothesis 2, our results suggest that industry wide losses reduce the impact of firm specific losses on CEO turnover. We get similar results from regression (2) when we additionally include *Forecast-error*.

The results from Table 5 provide direct evidence that boards are discriminating in

holding CEOs responsible for reporting losses. When losses are the outcome of poor managerial performance, i.e., idiosyncratic in nature, the likelihood of CEO turnover is high following losses. However, when losses are more systematic to the industry, boards are less likely to hold CEOs accountable for losses.

Outside replacement and accounting losses

We also examine whether accounting losses increase the likelihood of an outside replacement. Following Pan, Wang, and Weisbach (2013), we define the newly appointed CEO as an outsider if this CEO joins the firm less than two years before being appointed to the CEO position. The sample to examine the impact of losses on outside appointments consists of 1,989 CEO turnover observations. Table 6 presents the regression results on the relationship between accounting losses and the likelihood of outside succession, conditional on CEO turnover. We use a dichotomous dependent variable that equals 0 when the incumbent CEO is replaced with someone from inside the firm. The dependent variable is set to 1 if the replacement CEO is from outside the firm.

We find that the coefficient on *Loss* is positive and significant (0.530, z-stat=3.17) in Model (1). Consistent with Hypothesis 3, our results suggest that accounting losses lead to more frequent appointments of CEOs from outside the firm. In Model (2), we add the additional control variables and find that the coefficient on *Loss* continues to be positive and significant (0.345, z-stat=2.01). Finally, in Model (3), when we additionally include Forecast-error, which reduces the sample size to 1,896, we find similar results.

Turnover risk premium related to losses

We examine the impact of CEO turnover on risk premium using a two-stage estimation procedure. In the first stage, we estimate the probability of turnover using Equation (1). Then we

regress the logarithm of annual compensation on the logarithm of the probability of turnover in the subsequent year and other control variables. We employ the logarithm transformation for the two variables because they are highly skewed containing potentially large observations. Also, the data suggests that a log-linear specification is a better fit. The control variables are *Accounting-return*, *Stock-return*, *Stock-volatility*, *Earnings-volatility*, and *Size*.

One problem associated with this regression is that the probability of turnover is endogenous. There might be some factors that drive both the probability of turnover and the compensation, for example, CEO's incompetence, low ability, or other agency problems. Peters and Wagner (2014) show industry-wide volatility measures can be good instruments in dealing with this endogeneity problem. Based on our analysis of industry-loss on the probability of turnover, industry-loss is correlated with the turnover probability, but does not affect the compensation directly. Hence we can use industry-loss as an instrument. Thus, in addition to the ordinary least square regression (OLS) results, we also report the two-stage least square regression (2SLS) results with industry-loss as the instrument variable.⁹ After we control for the endogeneity of the turnover probability, the relation between the compensation and the turnover probability is significantly positive. Indeed, the magnitude of the coefficient of *Turnover-predict* is larger in the two-stage least square regression than that in the ordinary least square regression. Consistent with Hypothesis 5, our results show that the turnover risk attributable to future losses is an important determinant in CEO compensation. Given the average turnover rate of 10%, a 1% increase in the probability of turnover translates to about 10% change in *Turnover-predict*, which in turn leads to around 1% increase in CEO's annual compensation.

⁹In unreported first-stage results, the industry-loss is significantly correlated with the logarithm of the probability of turnover.

Performance measures may not have as large an impact on CEO compensation for newly appointed CEOs since the firm's past performance is not under the leadership of the new CEOs. To avoid this confounding problem, we exclude all firms with recently hired CEOs by deleting observations when CEO tenure is one and run regressions again. The results are reported in Columns (3) and (4) of Panel B, Table 7. The coefficient of *Turnover-predict* remains positive and significant at 0.102 ($t=6.74$) after using industry-loss as the instrument variable.

6. Sensitivity analysis

CEO turnover and accounting losses for firms with high growth opportunities

For firms in emerging, high-tech, and high-growth industries, current earnings may not serve as an adequate proxy for future earnings potential because of the mismatching of revenues and expenses. Growing firms need to make large investments which are expected to yield future revenues. However, R&D costs are expensed as incurred and growth in tangible/intangible assets leads to depreciation/amortization expenses which could result in more frequent losses for growing firms than non-growing firms (Hayn 1995). If CEOs are penalized for all losses regardless of future growth considerations, they might reduce long-term investments to avoid losses which would be detrimental for the long-run profitability of the firm. Therefore, boards of firms with future growth opportunities are expected to shield CEO from losses.

As in prior studies, we use the market-to-book ratio (*Growth*) to measure future growth opportunities. Similar to *Magnitude*, we include decile ranks of *Growth* to minimize the effect of outliers. Our untabulated results indicate that the sensitivity of CEO turnover to losses becomes smaller for firms with higher growth opportunities. When we include all the control variables, the coefficient on *Loss* remains positive and significant (0.570, $z\text{-stat}=3.12$). In contrast, the coefficient on the interaction between *Loss* and *Growth* is negative and significant (-0.047, $z\text{-$

stat=4.53). Our results suggest that boards of growing firms shield their CEOs from losses to encourage long-term investments.

Endogeneity

A potential concern with our prior results is that accounting losses are likely to be endogenously determined (Klein and Marquardt 2006; Joos and Plesko 2005). There are two sources of endogeneity in our study. First, there might be a simultaneity problem; losses might lead to CEO turnover, but CEO turnover might lead newly appointed CEOs to take a “big bath” and report a loss. We avoid the simultaneity problem by examining CEO turnover subsequent to the year following losses. Second, random shocks might affect the occurrence of losses which might also affect CEO turnover decisions.

We address the second type of an endogeneity problem using a two-stage least squares (2SLS) estimation procedure to obtain consistent and efficient estimates for losses. Specifically, drawing on prior studies, we model losses in the first stage and then, in the second stage, we regress CEO turnover on the probability of a firm reporting a loss obtained from the first stage regression. After controlling for the endogeneity of accounting losses, our results confirm the earlier findings on the positive relationship between CEO turnover and losses. Our results once again confirm that the likelihood of CEO turnover is higher for firms reporting accounting losses even after controlling for issues related to endogeneity.

7. Conclusions

Several studies examine the importance of earnings and stock returns as measures of firm performance on CEO turnover considerations (e.g., Weisbach 1988; Murphy and Zimmerman 1993; Goyal and Park 2002; Bushman et al. 2010; Jenter and Kanaan 2011). We suggest that accounting losses reflect managerial effort and quality that are not fully captured in the

traditional measures of firm performance. In this paper, we investigate whether accounting losses provide incremental information that can be used to assess CEO retention/dismissal decision. Specifically, we examine how accounting losses affect subsequent top executive turnover in relation to the other measures of performance.

Based on a comprehensive sample of CEO turnover between 1997 and 2013, we find that compared to profit firms, the likelihood of CEO turnover is significantly higher for loss firms. More importantly, when we include losses, accounting performance measures (earnings levels, earnings changes, or industry-adjusted earnings) are no longer incrementally significant in explaining CEO turnover. Our results suggest that only losses result in a higher likelihood of a subsequent CEO turnover and variations in profit levels do not impact CEO turnover decisions. We also replicate our results using forced turnover samples.

We provide cross-sectional variation in the loss-turnover relationship that is consistent with economic theory. We find that: (1) the magnitude of the loss affects CEO turnover, (2) the impact of firm-specific losses on CEO turnover is significant when losses tend to be confined to the firm but is muted when losses are more systematic to the industry, (3) CEO turnover following losses leads to more outside CEO appointments, and (4) the sensitivity of CEO turnover to losses is affected by growth opportunities.

We also provide evidence that the risk of turnover leads to higher CEO pay. Because CEOs have less control over industry shocks which might lead to industry-wide losses and in turn increase their dismissal rate, CEOs demand more pay when they are exposed to job risk because of industry-wide losses. Finally, although our emphasis is on accounting performance, we also add to the prior literature by showing that stock return from the dismissal year contains

valuable new information about CEO's ability and competence which is incremental to prior period stock performance.

Our results suggest that boards view losses as an additional indicator of management failure and are more likely to penalize CEOs that report losses. Additionally, prior studies often presume that effective managers exercise the liquidation/abandonment option when losses are expected to persist. Our results suggest that board actions that threaten higher turnover following losses increase CEO focus on the liquidation/abandonment option. Finally, our results also provide one explanation why firms manage earnings to avoid reporting losses.

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TABLE 1
Descriptive Statistics

	Mean	First quartile	Median	Third quartile	Standard deviation
<i>Turnover</i>	0.101	0.000	0.000	0.000	0.301
<i>Accounting-return</i>	0.046	0.012	0.046	0.093	0.104
<i>Loss</i>	0.306	0.000	0.000	1.000	0.461
Δ <i>Accounting-return</i>	0.010	-0.011	0.006	0.028	0.092
<i>Stock-return</i> _{interim}	0.042	-0.130	0.011	0.167	0.304
<i>Stock-return</i>	0.068	-0.216	0.000	0.244	0.483
<i>Stock-volatility</i>	0.111	0.068	0.095	0.135	0.063
<i>Earnings-volatility</i>	0.059	0.015	0.033	0.070	0.078
<i>Concentration</i>	0.087	0.035	0.051	0.105	0.087
<i>Size</i>	7.428	6.345	7.319	8.459	1.642
<i>Growth</i>	1.856	1.086	1.413	2.088	1.292
<i>Restructure</i>	0.096	0.000	0.000	0.000	0.294
<i>Restatement</i>	0.096	0.000	0.000	0.000	0.294
<i>Age</i>	55.362	50.000	55.000	60.000	7.362
<i>Retirement</i>	0.231	0.000	0.000	0.000	0.421
<i>Tenure</i>	7.356	2.000	5.000	10.000	7.428
<i>Forecast-error</i>	-0.003	-0.001	0.001	0.007	0.069

Turnover is an indicator variable that equals 1 when there is a change in the CEO within four quarters subsequent to fiscal year-end and 0 otherwise. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Loss* is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. Δ *Accounting-return* is the difference between current period income before extraordinary items and the corresponding number in the prior year deflated by total assets at the beginning of the year. *Stock-return*_{interim} is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over a six-month period subsequent to the current fiscal year-end (between current fiscal year-end and the CEO turnover date) for non CEO-turnover (CEO-turnover) firms. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Concentration* is the industry level (2 digit SIC level) Herfindahl index as of the current fiscal year. *Size* is the logarithm of the current fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets as of the current fiscal year-end. *Restructure* is an indicator variable that equals 1 if special items as a percentage of total assets are less than or equal to -5 percent and 0 otherwise. *Restatement* is an indicator variable equal to 1 when a firm restates its financial statement for the current or prior fiscal year and 0 otherwise. *Age* is the age of the CEO in years (for the outgoing CEO in turnover firms) as of the fiscal-year end. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Tenure* is the number of years that the CEO has been in office as of the fiscal year-end. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. Descriptive statistics are based on a sample with 25,985 firm-year observations between 1997 and 2012 for all the variables other than *Forecast-error* which has 24,873 observations.

TABLE 2
Frequency of Losses and CEO Turnover

	<i>Loss</i>	<i>Turnover</i>
1997	0.236	0.098
1998	0.266	0.101
1999	0.235	0.115
2000	0.269	0.095
2001	0.372	0.093
2002	0.396	0.086
2003	0.324	0.092
2004	0.259	0.116
2005	0.269	0.089
2006	0.271	0.094
2007	0.310	0.122
2008	0.402	0.086
2009	0.381	0.088
2010	0.281	0.107
2011	0.284	0.111
2012	0.310	0.112
	0.306	0.101

Loss is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. *Turnover* is an indicator variable that equals 1 when there is a change in the CEO within four quarters subsequent to the current fiscal year-end and 0 otherwise.

TABLE 3
CEO Turnover and Losses

	Dependent variable: <i>Turnover</i>			
	(1)	(2)	(3)	(4)
<u>Performance measures</u>				
<i>Accounting-return</i>	-1.235 (-4.43)***	-0.593 (-1.87)	-0.290 (-0.86)	-0.352 (-0.99)
<i>Loss</i>		0.321 (4.24)***	0.195 (2.21)**	0.217 (2.38)**
<i>Loss x Magnitude</i>			0.044 (2.90)***	0.037 (2.33)**
Δ <i>Accounting-return</i>	-0.074 (-0.28)	0.023 (0.09)	0.053 (0.20)	0.209 (0.73)
<i>Stock-return</i> _{interim}		-1.055 (-13.46)***	-1.049 (-13.43)***	-1.064 (-13.01)***
<i>Stock-return</i>	-0.516 (-9.41)***	-0.509 (-9.19)***	-0.480 (-8.56)***	-0.486 (-8.38)***
<u>Control variables</u>				
<i>Stock-volatility</i>	2.739 (5.84)***	2.373 (4.97)***	2.104 (4.32)***	2.123 (4.17)***
<i>Earnings-volatility</i>	-0.095 (-0.28)	-0.122 (-0.35)	-0.137 (-0.39)	0.006 (0.02)
<i>Concentration</i>	-0.686 (-1.11)	-0.670 (-1.07)	-0.677 (-1.08)	-0.579 (-0.90)
<i>Size</i>	0.074 (4.74)***	0.067 (4.26)***	0.073 (4.60)***	0.082 (4.87)***
<i>Growth</i>	0.029 (1.32)	0.012 (0.54)	0.008 (0.35)	0.009 (0.37)
<i>Restructure</i>	0.117 (1.57)	0.086 (1.13)	0.045 (0.57)	0.053 (0.65)
<i>Restatement</i>	0.044 (0.62)	0.022 (0.31)	0.021 (0.29)	0.019 (0.25)
<i>Age</i>	0.042 (9.15)***	0.043 (9.22)***	0.042 (9.14)***	0.045 (9.43)***
<i>Retirement</i>	0.604 (8.89)***	0.613 (8.96)***	0.615 (8.99)***	0.600 (8.56)***
<i>Tenure</i>	-0.019 (-6.22)***	-0.019 (-6.25)***	-0.019 (-6.15)***	-0.017 (-5.53)***
<i>Forecast-error</i>				-0.398 (-1.44)
<u>Fixed effects</u>				
<i>Industry / Year</i>	Yes	Yes	Yes	Yes
Observations	25,985	25,985	25,985	24,873
Pseudo R ²	5.1%	6.4%	6.5%	6.6%

The dependent variable *Turnover* is an indicator variable that equals 1 when there is a change in the CEO within four quarters subsequent to a fiscal year-end and 0 otherwise. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Loss* is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. *Magnitude* is the decile rank of the absolute value of net income deflated by the book value of equity. Δ *Accounting-return* is the difference between current period income before extraordinary items and the corresponding number in the prior year deflated by total assets at the beginning of the current year. *Stock-return*_{interim} is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over a six-month period subsequent to the current fiscal year-end (between current fiscal year-end and the CEO turnover date) for non CEO-turnover (CEO-turnover) firms. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Concentration* is the industry level Herfindahl index (2 digit SIC level) as of the current fiscal year. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets as of the current fiscal year-end. *Restructure* is an indicator variable that equals 1 if special items as a percentage of total assets are less than or equal to -5 percent and 0 otherwise. *Restatement* is an indicator variable equal to 1 when a firm restates its financial statement for the current or prior fiscal year and 0 otherwise. *Age* is the age of the CEO in years (for the outgoing CEO in turnover firms) as of the fiscal-year end. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Tenure* is the number of years that the CEO has been in office as of the fiscal year-end. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. We report the estimated coefficients from a logistic regression and the corresponding z-statistics in parenthesis.

*** (**) denote statistical significance at the 1 (5) percent level for a two-tailed test.

TABLE 4
Forced versus Routine CEO Turnover and Losses

	CEO Departure Type			
	Reference Category: <i>No Turnover</i>			
	<i>Forced</i>	<i>Routine</i>	<i>Forced</i>	<i>Routine</i>
Performance measures				
<i>Accounting-return</i>	-0.408 (-1.07)	-1.069 (-1.87)	-0.414 (-1.02)	-1.164 (-1.94)
<i>Loss</i>	0.387 (4.18)***	0.210 (1.62)	0.374 (3.88)***	0.226 (1.67)
Δ <i>Accounting-return</i>	-0.029 (-0.09)	0.383 (0.76)	0.166 (0.50)	0.508 (0.96)
<i>Stock-return</i> _{interim}	-1.273 (-13.03)***	-0.535 (-4.06)***	-1.288 (-12.59)***	-0.549 (-3.98)***
<i>Stock-return</i>	-0.698 (-9.78)***	-0.202 (-2.28)**	-0.701 (-9.44)***	-0.190 (-2.09)**
Control variables				
<i>Stock-volatility</i>	3.167 (5.62)***	-0.169 (-0.19)	3.215 (5.44)***	-0.331 (-0.36)
<i>Earnings-volatility</i>	-0.272 (-0.68)	-0.571 (-0.84)	-0.074 (-0.18)	-0.701 (-0.98)
<i>Concentration</i>	-1.238 (-1.41)	0.027 (0.03)	-1.236 (-1.37)	0.137 (0.14)
<i>Size</i>	0.066 (3.34)***	0.119 (4.63)***	0.086 (4.09)***	0.116 (4.26)***
<i>Growth</i>	0.010 (0.36)	0.027 (0.72)	0.007 (0.24)	0.030 (0.78)
<i>Restructure</i>	0.024 (0.25)	0.156 (1.22)	0.027 (0.27)	0.165 (1.26)
<i>Restatement</i>	0.010 (0.12)	-0.006 (-0.05)	0.019 (0.21)	-0.025 (-0.20)
<i>Age</i>	-0.020 (-4.68)***	0.228 (35.97)***	-0.018 (-3.99)***	0.234 (35.29)***
<i>Tenure</i>	-0.023 (-4.73)***	-0.047 (-10.66)***	-0.020 (-4.06)***	-0.046 (-10.06)***
<i>Forecast-error</i>			-0.792 (-2.46)**	0.162 (0.32)
Fixed effects				
<i>Industry / Year</i>	Yes	Yes	Yes	Yes
Observations	24,898	24,341	23,834	23,315
Pseudo R ²	6.5%	24.1%	6.3%	24.5%

The dependent variable *Forced* (*Routine*) equals one when a departing CEO is less or equal to (more than) 60 years. The reference category is no turnover years. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Loss* is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. Δ *Accounting-return* is the difference between current period income before extraordinary items and the corresponding number in the prior year deflated by total assets at the beginning of the current year. *Stock-return*_{interim} is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over a six-month period subsequent to the current fiscal year-end (between current fiscal year-end and the CEO turnover date) for non CEO-turnover (CEO-turnover) firms. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Concentration* is the industry level Herfindahl index (2 digit SIC level) as of the current fiscal year. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets as of the current fiscal year-end. *Restructure* is an indicator variable that equals 1 if special items as a percentage of total assets are less than or equal to -5 percent and 0 otherwise. *Restatement* is an indicator variable equal to 1 when a firm restates its financial statement for the current or prior fiscal year and 0 otherwise. *Age* is the age of the CEO in years (for the outgoing CEO in turnover firms) as of the fiscal-year end. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Tenure* is the number of years that the CEO has been in office as of the fiscal year-end. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. We report the estimated coefficients from a logistic regression and the corresponding *z*-statistics in parenthesis.

*** (**) denote statistical significance at the 1 (5) percent level for a two-tailed test.

TABLE 5
CEO Turnover and Industry-wide Losses

	Dependent variable: <i>Turnover</i>	
	(1)	(2)
<u>Performance measures</u>		
<i>Accounting-return</i>	-0.793 (-2.46)**	-0.829 (-2.42)**
<i>Loss</i>	0.898 (5.65)***	0.894 (5.40)***
<i>Industry-loss</i>	-0.021 (-0.06)	-0.001 (-0.00)
<i>Loss x Industry-loss</i>	-1.320 (-4.00)***	-1.319 (-3.82)***
Δ <i>Accounting-return</i>	0.033 (0.12)	0.196 (0.68)
<i>Stock-return</i> _{interim}	-1.058 (-13.50)***	-1.071 (-13.06)***
<i>Stock-return</i>	-0.517 (-9.33)***	-0.518 (-9.04)***
<u>Control variables</u>		
<i>Stock-volatility</i>	2.421 (5.07)***	2.406 (4.81)***
<i>Earnings-volatility</i>	-0.102 (-0.29)	0.043 (0.12)
<i>Concentration</i>	-0.649 (-1.04)	-0.553 (-0.86)
<i>Size</i>	0.070 (4.45)***	0.080 (4.83)***
<i>Growth</i>	0.018 (0.80)	0.019 (0.84)
<i>Restructure</i>	0.073 (0.96)	0.074 (0.93)
<i>Restatement</i>	0.012 (0.17)	0.010 (0.14)
<i>Age</i>	0.043 (9.21)***	0.046 (9.47)***
<i>Retirement</i>	0.613 (8.96)***	0.599 (8.53)***
<i>Tenure</i>	-0.019 (-6.13)***	-0.017 (-5.50)***
<i>Forecast-error</i>		-0.434 (-1.57)
<u>Fixed effects</u>		
<i>Industry</i>	Yes	Yes
<i>Year</i>	Yes	Yes
Observations	25,985	24,873
Pseudo R ²	6.5%	6.7%

The dependent variable *Turnover* is an indicator variable that equals 1 when there is a change in the CEO within four quarters subsequent to a fiscal year-end and 0 otherwise. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Loss* is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. *Industry-loss* is the proportion of firms reporting losses in each industry for a given year when industry is defined using SIC 2-digit codes. Δ *Accounting-return* is the difference between current period income before extraordinary items and the corresponding number in the prior year deflated by total assets at the beginning of the current year. *Stock-return*_{interim} is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over a six-month period subsequent to the current fiscal year-end (between current fiscal year-end and the CEO turnover date) for non CEO-turnover (CEO-turnover) firms. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Concentration* is the industry level Herfindahl index (2 digit SIC level) as of the current fiscal year. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets as of the current fiscal year-end. *Restructure* is an indicator variable that equals 1 if special items as a percentage of total assets are less than or equal to -5 percent and 0 otherwise. *Restatement* is an indicator variable equal to 1 when a firm restates its financial statement for the current or prior fiscal year and 0 otherwise. *Age* is the age of the CEO in years (for the outgoing CEO in turnover firms) as of the fiscal-year end. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Tenure* is the number of years that the CEO has been in office as of the fiscal year-end. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. We report the estimated coefficients from a logistic regression and the corresponding *z*-statistics in parenthesis.

*** (**) denote statistical significance at the 1 (5) percent level for a two-tailed test.

TABLE 6
CEO Turnover, Outsider versus Insider Successor CEOs, and Losses

	Outside CEO Replacement		
	Reference Category: Company Insider		
	(1)	(2)	(3)
<u>Performance measures</u>			
<i>Accounting-return</i>	-1.096 (-1.80)	-0.207 (-0.31)	0.425 (0.61)
<i>Loss</i>	0.530 (3.17)***	0.345 (2.01)**	0.450 (2.53)**
<i>Stock-return</i>	-0.378 (-3.32)***	-0.321 (-2.71)***	-0.305 (-2.46)**
<i>Stock-volatility</i>		1.632 (1.48)	1.593 (1.39)
<u>Control variables</u>			
<i>Earnings-volatility</i>		0.752 (0.96)	0.910 (1.13)
<i>Size</i>		-0.184 (-4.83)***	-0.181 (-4.48)***
<i>Growth</i>		0.005 (0.09)	-0.031 (-0.57)
<i>Concentration</i>		4.211 (2.57)**	3.494 (2.08)**
<i>Retirement</i>		-0.269 (-2.49)**	-0.296 (-2.65)***
<i>Forecast-error</i>			0.213 (0.36)
<u>Fixed effects</u>			
<i>Industry / Year</i>	Yes	Yes	Yes
Observations	1,989	1,989	1,896
Pseudo R ²	6.7%	8.9%	8.8%

The dependent variable *Outsider* is an indicator variable that equals 1 when the successor CEO is hired from outside the company. The analysis is limited to CEO turnovers. The reference category refers to replacements by company outsiders from inside the industry. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Loss* is an indicator variable with a value of 1 when net income is negative for the current fiscal year and 0 otherwise. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. *Growth* is the sum of the market value of equity and the book value of debt scaled by the book value of total assets as of the current fiscal year-end. *Concentration* is the industry level Herfindahl index (2 digit SIC level) as of the current fiscal year. *Retirement* is an indicator variable equal to 1 when the CEO is over the age of 60 years and 0 otherwise. *Forecast-error* is the difference between reported annual EPS and the mean forecast EPS deflated by stock price at the beginning of the year. We report the estimated coefficients from a logistic regression and the corresponding *z*-statistics in parenthesis.

*** (***) denote statistical significance at the 1 (5) percent level for a two-tailed test.

TABLE 7
CEO Compensation, Turnover Probability, and Losses

Panel A: Summary Statistics					
	Mean	First quartile	Median	Third quartile	Standard Deviation
<i>CEO-Compensation</i>	7.964	7.247	7.988	8.714	1.153
<i>Turnover-predict</i>	-6.835	-7.726	-6.966	-6.066	1.201

Panel B: CEO Compensation Regressions				
	<i>Full Sample</i>		<i>Excluding First-Year CEOs</i>	
	OLS	2SLS	OLS	2SLS
<i>Accounting-return</i>	-0.367 (-6.14)***	-0.305 (-4.98)***	-0.327 (-5.29)***	-0.271 (-4.30)***
<i>Turnover-predict</i>	0.027 (5.53)***	0.103 (6.93)***	0.029 (5.72)***	0.102 (6.74)***
<i>Stock-return</i>	-0.062 (-4.84)***	-0.022 (-1.45)	-0.060 (-4.50)***	-0.020 (-1.31)
<i>Stock-volatility</i>	0.999 (7.86)***	0.826 (6.28)***	0.884 (6.74)***	0.718 (5.29)***
<i>Earnings-volatility</i>	0.176 (2.08)**	0.375 (4.05)***	0.077 (0.88)	0.271 (2.84)***
<i>Size</i>	0.444 (112.52)***	0.440 (109.51)***	0.442 (108.55)***	0.438 (105.55)***
<i>Intercept</i>	4.949 (91.75)***	5.478 (48.88)***	4.990 (89.85)***	5.508 (47.71)***
<u>Fixed effects</u>				
<i>Year</i>	Yes	Yes	Yes	Yes
Observations	25,869	25,869	23,862	23,862
Adjusted R ²	37.8%	37.2%	38.4%	37.9%

CEO-Compensation is the logarithm of the CEO's total annual compensation for the current fiscal year. *Turnover-predict* is the logarithm of the probability of turnover computed from Model (2) of Table 5. *Accounting-return* is industry-adjusted return on assets measured as the difference between the firm-specific and the industry-median income before extraordinary items for the current fiscal year deflated by total assets at the beginning of the year. *Stock-return* is the difference between the raw buy-and-hold returns and the value-weighted CRSP market returns over the twelve-month period ending with the current fiscal year-end. *Stock-volatility* (*Earnings-volatility*) is the standard deviation of buy-and-hold returns less value-weighted CRSP market returns (industry-adjusted return on assets) based on prior twenty-four monthly (five year) data ending with the current fiscal year-end. *Size* is the logarithmic transformation of the fiscal year-end market value of equity. In two stage least square (2SLS) estimates, we use *Industry-loss*, the proportion of firms reporting losses in each 2-digit SIC code industry for a given year, as the instrument. We report the estimated coefficients from the regression and the corresponding *t*-statistics in parenthesis.

*** (**) denote statistical significance at the 1 (5) percent level for a two-tailed test.