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# Unexpected Earnings, Abnormal Accruals, and Changes in CEO Bonuses*

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## ABSTRACT

Prior research has found that the market premium for positive unexpected earnings is greater than the penalty for negative unexpected earnings and that the earnings response coefficients for positive (negative) unexpected earnings are lower (higher) if abnormal accruals are income-increasing. In this study, we investigate whether the relation between changes in CEO bonuses and unexpected earnings (the pay-for-performance sensitivity) varies in a manner consistent with the differential market reactions described above. Based on a sample of US firms during 1993-2004, we find that the pay-for-performance sensitivity is higher when unexpected earnings are positive than when they are negative. For observations with small positive unexpected earnings, the pay-for-performance sensitivity is lower if the abnormal accruals are income-increasing. For observations with negative unexpected earnings, the pay-for-performance sensitivity is higher if the abnormal accruals are income-increasing. Further analysis shows that only the observations from the post-Enron period exhibit differential pay-for-performance sensitivities conditional on the sign of the abnormal accruals. Collectively, our results suggest that compensation committees increase the pay-for-performance sensitivity and discount the performance achieved by using income-increasing abnormal accruals in response to increased scrutiny of executive compensation.

**Keywords:** *Executive compensation, Earnings surprises, Abnormal accruals, Pay-for-performance sensitivity.*

**Data Availability:** *All data are available from public sources.*

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# 1. INTRODUCTION

Prior studies find that analysts are sophisticated financial intermediaries who use firm-specific, market-wide, and their own private information when forecasting earnings (Baldwin 1984; Kross, Ro, and Schroeder 1990; Abarbanell 1991; Lang and Lundholm 1996; Abarbanell and Bushee 1997). Prior studies also find that analysts' earnings forecasts are more accurate than mechanical time-series models in predicting future earnings (Brown and Rozeff 1978; O'Brien 1988; Fried and Givoly 1982; Brown, Griffin, Hagerman and Zmijecwski 1987a, 1987b). Therefore, analysts' forecasts have been used as a proxy for the market's expectations of earnings in the accounting and finance literature. A recent study by Bartov, Givoly and Hayn (2002) provides evidence that firms that meet or beat analysts' earnings forecasts experience a significant amount of market premium, while firms that just miss analysts' earnings forecasts experience severe punishment from the market. Moreover, Bartov et al. (2002) find that firms that meet or beat analysts' earnings forecasts through recognition of income-increasing accruals experience a less but still significant market premium. These findings provide an explanation for managers' strong incentives to meet or beat analysts' earnings forecasts even if the margin is as small as a few cents. Some studies also find that firms meeting or beating analysts' earnings forecasts have much better future performance and higher share values than other firms do (Kasznik and McNichols 2002; Bartov et al. 2002), which suggests that an excess of earnings over the analysts' earnings forecast signals superior future performance.

Since analysts' earnings forecasts have been viewed by investors as an important performance benchmark, it is interesting to know whether they are also used by compensation committees in setting the CEO performance standards. Farrell and Whidbee (2003) find a negative relation between unexpected earnings and CEO turnover, which suggests that compensation committees use analysts' earnings forecasts as performance standards when deciding whether or not to retain the CEO. Matsunaga and Park (2001) find negative effects on CEO cash compensation if the firm misses either the quarterly analyst earnings forecast or the actual earnings number for the same quarter in the prior year, for at least two quarters during the year. However, they do not investigate how the CEOs are rewarded when the firm meets or beats the analyst forecast.

DeFond, Matsunaga, and Park (2003) use the analysts' consensus earnings forecast issued nine months before the fiscal year-end as a proxy for the CEO performance standards set by compensation committees. They find that unexpected earnings are positively associated with changes in CEO cash compensation and

provide incremental explanatory power beyond several other measures of unexpected performance, including changes in earnings, return on equity (ROE), and industry-relative ROE. Their study, however, does not examine whether the change in CEO cash compensation depends on the sign and magnitude of unexpected earnings and how the compensation committees react to the situations when the CEO may have used income-increasing accruals to meet the performance standards.

Our study aims to extend the work by DeFond et al. (2003) and Matsunaga and Park (2001) by further investigating the roles of analysts' earnings forecasts and income-increasing abnormal accruals in setting the cash compensation of CEOs. We use analysts' consensus earnings forecasts as a proxy for the performance standards set by the compensation committees, and we use the term unexpected earnings to refer to the difference between the actual earnings and the performance standards as described above. We first revisit the issue of the asymmetric CEO payoff function by investigating the relation between the changes in CEO bonuses and unexpected earnings separately for positive and negative unexpected earnings. We then investigate whether the above relations are conditional on the sign of the abnormal accruals, especially in situations when the positive unexpected earnings may have been attained by recognizing income-increasing abnormal accruals. We also investigate whether the relation between changes in CEO bonuses and unexpected earnings has changed since the accounting scandals at Enron and several other companies were uncovered.

We find a significantly positive relation between the changes in CEO bonuses and unexpected earnings (the pay-for-performance sensitivity) after controlling for two alternative measures of changes in performance, namely annual stock returns and changes in returns on assets. The sensitivity is stronger for positive than for negative unexpected earnings, which suggests that CEOs are not punished as much as they are rewarded for the same degree of deviation from the performance standards. We also find that for firms with small positive unexpected earnings, the pay-for-performance sensitivity is weaker if the abnormal accruals are income-increasing. In addition, we find that for firms with large negative unexpected earnings, the pay-for-performance sensitivity is stronger (i.e., the CEO is punished more severely) if the abnormal accruals are income-increasing. Further investigation shows that the differential pay-for-performance sensitivity for small positive unexpected earnings and large negative unexpected earnings conditional on the sign of the abnormal accruals are mainly driven by observations from the post-Enron period (i.e., 2001-2004).

Our study makes the following contributions. First, we investigate the changes in CEO bonus and show that the pay-for-performance sensitivity is asymmetric with respect to the sign of unexpected earnings, which complements the prior research that demonstrates an asymmetric payoff function in the level of CEO cash compensation. Second, DeFond et al. (2003) investigate the compensation committees' use of analyst earnings forecasts as performance standards but they do not examine the differential pay-for-performance sensitivity conditional on how the performance standards are met. We extend their work by showing that the pay-for-performance sensitivity of CEO bonuses incorporates the reversing implications of abnormal accruals and the likelihood that the accruals are used by the CEO to meet performance standards. Third, we show evidence that CEO bonuses reflect the reversing implications of abnormal accruals only in the post-Enron period, which is consistent with the suggestion that compensation committees altered their CEO bonus schemes in response to increased public scrutiny on executive compensation.

The next section provides a review of the relevant studies and the development of our hypotheses. Section 3 describes our research design. Section 4 outlines the sample selection criteria and presents the descriptive statistics. The empirical results are discussed in Section 5. The final section summarizes our findings and concludes the paper.

## 2. RELEVANT STUDIES AND DEVELOPMENT OF HYPOTHESES

### 2.1 RELEVANT STUDIES

Numerous studies have documented that accounting earnings play an important role in top executive compensation (e.g., Lambert and Larcker 1987; Sloan 1993; Baber, Kang and Kumar 1998, 1999; Murphy 2001). Early research focuses on the association between executive compensation and aggregated accounting numbers. For example, Sloan (1993) argues that inclusion of earnings-based performance measures in executive compensation contracts helps shield executives from fluctuations in firm value that are beyond their control. Along this line of research, several studies have evaluated the weights that compensation contracts place on the components of earnings. For example, Clinch and Magliolo (1993) find that the components of earnings do not enter the compensation function in the same way. Gaver and Gaver (1998) suggest that compensation committees distinguish among the transactions comprising net income in determining CEO cash compensation. By decomposing income into its

components, Balsam (1998) finds that the explanatory power of the model increases and the coefficient on discretionary accruals is lower than that on non-discretionary accruals, which in turn is lower than that on operating cash flows.

While prior studies document that compensation is not simply based on the bottom-line earnings, the extent to which compensation is tied to earnings or earnings components is inconclusive. Baber et al. (1998) find that the sensitivity of cash compensation to earnings varies directly with earnings persistence, which is similar to the finding regarding earnings persistence in the capital market context. Bushman, Engel and Smith (2006) show that the pay-earnings relation is associated with the price-earnings relation and that the pay-earnings relation varies over time. Considering the typical feature of upper and lower bounds in earnings-based bonus contracts, Murphy (1999) suggests that the sensitivity of cash compensation to earnings is reduced when earnings are either very high or very low. Using proprietary data that contain details on bonus contracts, Holthausen, Larcker and Sloan (1995) also show that cash compensation is less sensitive to the upside because of the greater likelihood of hitting the upper bound. Along with the finding in Indjejikian and Nanda (2002) that target bonuses are biased so that they are on average easy to achieve, Dechow (2006) argues that CEOs with bad news are more likely to have high pay-for-performance sensitivity than are CEOs with good news.[1]

Regarding the sensitivity between cash compensation and earnings components, Gaver and Gaver (1998) find that the CEO's cash component of a pay package is positively related to the firm's above-the-line earnings but this association is significantly reduced in loss years. They also find that below-the-line transactions that increase income flow through to compensation, but below-the-line losses do not, suggesting that the compensation committees tend to favor the executive.

Agency theory suggests that compensation is positively related to unexpected performance (Holmstrom 1979, 1982). Murphy (2001) also points out that bonuses are usually based on performance measured relative to a performance standard, which typically correspond to "expected performance," and thus the choice of performance standards may also generate important incentives. Consistent with these two studies, prior research has examined the CEO pay-for-performance sensitivity using the prior year's earnings to capture expected performance (Antle and Smith 1986; Sloan 1993; Janakiraman, Lambert and Larcker 1992; Baber et al.

[1] Leone, Wu and Zimmerman (2006) argue that boards of directors exercising discretion to reduce costly ex post settling up in cash compensation paid to the CEO and show that CEO cash compensation is asymmetrically related to stock returns, i.e. more sensitive to negative stock returns than to positive stock returns.

1998, 1999). Some prior research has also used zero as a performance standard to measure unexpected performance. Balsam (1998) finds higher associations between CEO cash compensation and discretionary accruals when positive discretionary accruals allow the firm to reduce or avoid a loss. However, as Balsam does not find this association when positive discretionary accruals are used to meet the prior year's earnings, he concludes that the results are target dependent.

One target that is not examined by Balsam (1998) but has received much attention in recent research on the capital markets is the analysts' consensus earnings forecast. Matsumoto (2002) finds a disproportional number of firms with earnings per share that just meets the analysts' forecasts and provides evidence that firms manage earnings or analysts' expectations to avoid negative earnings surprises. Bartov et al. (2002) and Kasznik and McNichols (2002) show that stock prices are sensitive to meeting analysts' forecasts and the premium from meeting or beating analysts' earnings forecasts is a leading indicator of future performance. DeFond and Park (2001) provide evidence that the market recognizes, though not fully, the reversing nature of abnormal accruals and the market's reactions to meeting or missing analysts' forecasts also depend on the effect of the abnormal accruals on income.

Although prior research has examined the pricing implications of meeting or beating analysts' forecasts, the results do not necessarily generalize to the relation between the CEO's compensation and his ability to beat the analysts' forecasts. Gjesdal (1981) illustrates that the relevance of a performance measure for valuation purposes may not be the same as its relevance for the purpose of inferring managers' contribution to firm value. To address this issue, Matsunaga and Park (2001) provide evidence that missing the analysts' forecasts has a negative effect on CEO bonuses, which suggests that bonus payments provide CEOs with incentives to meet analysts' earnings forecasts. In addition, some studies (Puffer and Weintrop 1991; DeFond and Park 1999; Farrell and Whidbee 2003) show that CEO turnover is associated with missing the analysts' earnings forecasts. Bushman et al. (2006) also show that there is a relation between the stewardship and valuation roles of earnings, i.e., certain indicators of the price-earnings relation are also reflected in the pay-earnings relation.

Prior studies that use analysts' earnings forecasts as the performance standards in determining executive compensation typically use the last forecast issued prior to the earnings announcement date (e.g., Matsunaga and Park 2001). However, if analysts' earnings forecasts incorporate all public information regarding the firm's expected performance, the forecasts issued at the time when the CEO performance

standards are set could incorporate information that is used by the compensation committees and therefore could be regarded as a proxy for CEO performance standards. Consistent with this argument, DeFond et al. (2003) find that changes in CEO cash compensation are related to analyst forecast errors computed as the difference between the actual earnings and the consensus forecast issued nine months before the fiscal year-end. However, one question that remains unexplored by this line of research is whether the relation between changes in CEO compensation and achievement of the performance standards varies depending on how the performance standards are achieved.

## 2.2 DEVELOPMENT OF HYPOTHESES

Prior research has found that the market premium for beating earnings expectations is greater than the penalty for missing earnings expectations (Bartov et al. 2002). However, it is not clear whether the changes in CEO compensation reflect the same type of asymmetric function. In particular, it is not clear whether the CEO's reward for beating the performance standards is greater than the penalty for missing the performance standards. Although Gaver and Gaver (1998) find that CEO cash compensation is positively related to the firm's reported profits but is unrelated to losses, their focus is on the levels of compensation and earnings numbers, which are not compared against any benchmark. Therefore, Gaver and Gaver's (1998) results do not answer the question of whether the relation between the change in CEO cash compensation and the deviation of the actual earnings from the performance standards is conditional on the sign of the deviation.

CEO cash compensation consists of an annual salary and a bonus. In this study, we investigate the changes in CEO bonuses but not salaries for two reasons. First, our focus is on the changes in cash compensation that can be explained by the deviation of the CEO's performance from the performance standards. A CEO's bonus is tied to his/her performance, which is not known until the end of the year. In contrast, the salary usually is determined during the year, therefore a change in the salary over the previous year is unlikely to be affected by the current year's unexpected performance. Second, as described below, we also investigate the effect of abnormal accruals on the relation between the change in CEO cash compensation and unexpected performance. Since the firm's abnormal accruals are not known when the CEO's salary is determined, it is not appropriate to investigate changes in salary in our study.

Following the above discussions, we first investigate the relation between changes in CEO bonuses and the performance that is not expected by the compensation committee, conditional on the sign of the unexpected earnings as

defined by DeFond et al. (2003). We formulate the first hypothesis as follows:

**H1: The relation between increases in CEO bonuses and positive unexpected earnings is stronger than that between decreases in CEO bonuses and negative unexpected earnings.**

Prior studies have found that abnormal accruals are less persistent than are normal accruals (e.g., Xie 2001). The findings imply that, *ceteris paribus*, earnings containing income-increasing abnormal accruals are less persistent than those containing income-decreasing abnormal accruals. DeFond and Park (2001) find that (i) when the earnings surprises are positive, the earnings response coefficients are lower if the earnings surprises are accompanied by income-increasing abnormal accruals, and (ii) when the earnings surprises are negative, the earnings response coefficients are higher if the earnings surprises are accompanied by income-increasing abnormal accruals. They interpret the results as consistent with market participants anticipating the reversing implications of abnormal accruals. In light of these results, we are interested in knowing whether compensation committees take into account the reversing implications of abnormal accruals when they determine the CEO's bonus. Specifically, we ask whether the relation between the changes in CEO bonuses and unexpected earnings is conditional on the sign of abnormal accruals. We formulate the related hypotheses as follows:

**H2a: The relation between increases in CEO bonuses and positive unexpected earnings is weaker when abnormal accruals are income-increasing.**

**H2b: The relation between decreases in CEO bonuses and negative unexpected earnings is stronger when abnormal accruals are income-increasing.**

When formulating H2a and H2b, we recognize the reversing implications of abnormal accruals but do not consider the likelihood that the CEO uses abnormal accruals to manage earnings. Prior studies have shown that managers have incentives to avoid negative earnings surprises and one of the tools they use is income-increasing abnormal accruals (e.g., Matsumoto 2002; Burgstahler and Eames 2003). In addition, if the pay-for-performance sensitivity is greater when the unexpected earnings are positive rather than negative (as stated in H1), the asymmetric pay-off function may also provide the CEO with incentives to avoid negative unexpected earnings. Considering those incentives, we are interested in knowing whether the compensation committees determine the pay-for-performance sensitivity of the CEO bonus depending on the likelihood that the CEO achieves the performance standards by using income-increasing abnormal accruals.

To investigate the above question, we need to identify the observations that have positive unexpected earnings but, in absence of earnings management, the unexpected earnings would have been negative. Those observations cannot be identified directly; however, we think that they can be characterized by *small* positive unexpected earnings together with income-increasing abnormal accruals due to the following reasons. First, prior studies have found that a disproportional number of firms report small positive unexpected earnings and have argued that the findings are attributable to earnings management to exceed a threshold (e.g., Degeorge, Patel and Zeckhauser 1999; Matsumoto 2002; Burgstahler and Eames 2003). Second, given the reversing nature of accruals, large positive unexpected earnings are less likely than small positive unexpected earnings to be an outcome of earnings management. It seems unlikely that the CEO would want to recognize income-increasing abnormal accruals when unexpected earnings are already positive, or to recognize large amounts of income-increasing abnormal accruals only to turn the negative unexpected earnings into large positive unexpected earnings. Therefore, we focus on the observations with small positive unexpected earnings and investigate whether the pay-for-performance sensitivity is related to abnormal accruals. The hypothesis is formulated as follows:

**H3a: The relation between increases in CEO bonuses and small positive unexpected earnings is weaker when abnormal accruals are income-increasing.**

In developing H3a, we do not explore the possibility of earnings management when unexpected earnings are negative. Given the reversing nature of abnormal accruals, the CEO may have incentives to engage in income-decreasing earnings management (i.e., the big bath) and save the accounting slack for the future (Healy 1985) if earnings are deemed below the performance standards but there is no dismissal threat or horizon problem. Therefore, we investigate whether compensation committees impose a less severe penalty on large negative unexpected earnings if it is more likely that the CEO's actual performance is not as bad as the earnings amount shows (i.e., abnormal accruals are income-decreasing). In other words, we ask whether the pay-for-performance sensitivity is weaker (stronger) when abnormal accruals are income-decreasing (income-increasing) given that the unexpected earnings are large and negative.[2]

[2] A similar question can be asked when dismissal or a decrease in the bonus is a threat to the CEO since these two events are more likely if unexpected earnings are large and negative (Puffer and Weintrop 1991; Farrell and Whidbee 2003). Provided that the unexpected earnings are large and negative and the CEO is retained, the question to be asked is whether the compensation committee imposes a more (less) severe penalty on the CEO if it is more (less) likely that the CEO has engaged in income-increasing earnings management.

To investigate the above question, we compare the pay-for-performance sensitivity between different signs of abnormal accruals given that unexpected earnings are large and negative. Consistent with our use of firms with income-decreasing abnormal accruals as a benchmark in H3a, we formulate the next hypothesis as follows:

**H3b: The relation between decreases in CEO bonuses and large negative unexpected earnings is stronger when abnormal accruals are income-increasing.**

The publicity surrounding the accounting scandals at Enron, WorldCom, and several other companies has led to changes in the regulatory environments faced by corporate executives and directors. Given the increased scrutiny of executive compensation, it is important to know if the relation between changes in CEO bonuses and unexpected earnings changed since those accounting scandals were uncovered. Recently, Carter, Lynch and Zechman (2005) reported that the positive relation between executive bonuses and normal accruals increases significantly and the positive relation between executive bonuses and abnormal accruals does not change significantly after the introduction of the Sarbanes and Oxley Act. Their study, however, investigated levels of bonuses and earnings that were not compared against any benchmarks. Given our previous hypotheses, we are interested in knowing if our results differ in the pre-Enron and the post-Enron periods. In particular, we want to know whether reporting of income-increasing abnormal accruals weakens the relation between changes in bonuses and positive unexpected earnings (as stated in H2a and H3a) only in the post-Enron period or if this occurs in both periods. The results would help us to understand how the corporate compensation committees have changed the way they link CEO bonuses to performance following the increased scrutiny of executive compensation.

## 3. RESEARCH DESIGN

As mentioned previously, we use the analysts' consensus forecast of one-year-ahead earnings per share issued nine months before the fiscal year-end as a proxy for the CEO performance standards set by the compensation committees, consistent with DeFond et al. (2003). For most firms, this consensus forecast represents the first or second one issued after the announcement date of the previous year's earnings; therefore, the consensus forecast date should be close to the time when the compensation committees set the performance standards. In the empirical analyses, we define unexpected earnings (*UE*) as the actual earnings per share minus the proxy for the performance standards as defined above, scaled by the stock

price at the fiscal year-end. We estimate the following regression to test H1:

$$\Delta BONUS = \beta_0 + \beta_1[UE^+] + \beta_2[UE^-] + \beta_3 RET + \beta_4 \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon, \quad (1)$$

where $\Delta BONUS$ denotes the change in the CEO's bonus over the previous year divided by the CEO's previous year's salary (Matsunaga and Park, 2001),[3] $UE^+$ ($UE^-$) equals $UE$ if $UE$ is positive (negative) and zero otherwise, $RET$ denotes the current year's stock return inclusive of dividends, $\Delta ROA$ denotes the change in the return on assets over the previous year, $YEAR$ is a set of dummy variables for fiscal years, and $INDUSTRY$ is a set of dummy variables for industries (classifications based on Fama and French 1997). Firm and year subscripts are suppressed for simplicity. The amounts of bonus and salary are adjusted to 2000 constant dollars using the consumer price index.

To test H2a and H2b, we add the interaction terms between the unexpected earnings and income-increasing abnormal accruals to Eq. (1) and estimate the following equation:

$$\Delta BONUS = \beta_0 + \beta_1[UE^+] + \beta_2[UE^-] + \beta_3 INAA*[UE^+] + \beta_4 INAA*[UE^-] + \beta_5 INAA + \beta_6 RET + \beta_7 \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon, \quad (2)$$

where $INAA$ is a dummy variable that takes the value one if the firm reports positive (i.e., income-increasing) abnormal accruals and zero otherwise, and other variables are as defined previously. Abnormal accruals ($AA$) equal the regression residuals obtained from estimating the following equation:

$$TA/A = \alpha_0 + \alpha 1(1/A) + \alpha 2(\Delta SALES/A) + \alpha 3(PPE/A) + \varepsilon,. \quad (3)$$

where $TA$ is total accruals (earnings before extraordinary items minus net cash flows from operations), $A$ is the total assets at the end of the previous year, $\Delta SALES$ is the change in net sales over the previous year, and $PPE$ is gross property, plant, and equipment at fiscal year-end. Equation (3) is estimated by industry-year based on all the firms in Compustat with sufficient data.

To test H3a and H3b, we separate positive and negative unexpected earnings each into two categories based on the median and estimate the following equation:

[3] Our conclusions in this paper are unaffected when the changes in the CEO's bonus are divided by the previous year's salary and bonus.

$$\begin{aligned}\Delta BONUS = {} & \beta_0 + \beta_1[UE^{Large+}] + \beta_2[UE^{Small+}] + \beta_3[UE^{Small-}] + \beta_4[UE^{Large-}] \\ & + \beta_5 INAA*[UE^{Large+}] + \beta_6 INAA*[UE^{Small+}] + \beta_7 INAA*[UE^{Small-}] \\ & + \beta_8 INAA*[UE^{Large-}] + \beta_9 INAA + \beta_{10} RET + \beta_{11}\Delta ROA + \delta \cdot YEAR \\ & + \phi \cdot INDUSTRY + \varepsilon \end{aligned} \quad (4)$$

where $UE^{Large+}$ ($UE^{Small+}$) equals *UE* if *UE* is positive and above (below) the median of positive *UE* and zero otherwise, $UE^{Small-}$ ($UE^{Large-}$) equals *UE* if *UE* is negative and above (below) the median of negative *UE* and zero otherwise, and all other variables are as defined previously. In other words, $UE^{Large+}$ ($UE^{Small+}$) denotes large (small) positive unexpected earnings and $UE^{Small-}$ ($UE^{Large-}$) denotes small (large) negative unexpected earnings.

# 4. SAMPLE AND DATA

## 4.1 SAMPLE SELECTION

Our sample consists of all firm-years during 1993-2004 with sufficient data from the following sources: ExecuComp for the compensation and stock return data, Compustat for the accounting data, and I/B/E/S for the analyst earnings forecast data. The sample period starts from 1993 because the data in ExecuComp start from 1992 and lagged compensation data are required to compute the changes in bonuses. We delete the observations that are either in the year of a CEO change or in the year after. This is because our measure of changes in bonuses requires data on a full year's bonus for the same CEO for two consecutive years. We also delete the observations with changes in bonuses, unexpected earnings, annual stock returns, or change in ROA at the top or bottom one percentile. The final sample consists of 8,475 observations from 1,861 distinct firms.

## 4.2 DESCRIPTIVE STATISTICS

Table 1 shows the characteristics of our sample by portfolio ranking of *UE*, where portfolio 1 (10) consists of observations with the most negative (positive) values of *UE*. The mean (median) of $\Delta BONUS$ increases from -0.217 (-0.034) in portfolio 1 of *UE* to 0.499 (0.329) in portfolio 10 of *UE*, consistent with the positive relation reported in DeFond, Park, and Matsunaga (2003). Table 1 also reveals a positive relation between *UE* and firm performance, i.e., annual stock returns (*RET*) and returns on assets ($\Delta ROA$). Untabulated results show that the Pearson correlation coefficients between $\Delta BONUS$, *UE*, *RET*, and $\Delta ROA$ range between 0.229 and 0.331 and all of those coefficients are statistically significant (p-value < 0.001).

**TABLE 1 Means and Medians of Variables by Portfolio Ranking of Unexpected Earnings (Medians shown in brackets)**

| Portfolio ranking of *UE* | *UE* | $\Delta$*BONUS* | *RET* | $\Delta$*ROA* | *AA* |
|---|---|---|---|---|---|
| 1 (Most negative) | -0.102<br>[-0.075] | -0.217<br>[-0.034] | -0.155<br>[-0.204] | -0.045<br>[-0.030] | -0.016<br>[-0.013] |
| 2 | -0.032<br>[-0.031] | -0.130<br>[-0.035] | 0.045<br>[-0.012] | -0.014<br>[-0.011] | 0.001<br>[-0.001] |
| 3 | -0.015<br>[-0.015] | -0.092<br>[-0.001] | 0.117<br>[0.039] | -0.011<br>[-0.007] | -0.002<br>[-0.003] |
| 4 | -0.007<br>[-0.007] | -0.025<br>[0.000] | 0.148<br>[0.075] | -0.003<br>[-0.003] | 0.004<br>[0.003] |
| 5 | -0.002<br>[-0.001] | 0.111<br>[0.036] | 0.156<br>[0.129] | -0.000<br>[0.000] | 0.003<br>[0.001] |
| 6 | 0.001<br>[0.001] | 0.155<br>[0.088] | 0.237<br>[0.212] | 0.003<br>[0.002] | -0.001<br>[0.000] |
| 7 | 0.002<br>[0.002] | 0.288<br>[0.147] | 0.263<br>[0.228] | 0.007<br>[0.005] | -0.000<br>[-0.004] |
| 8 | 0.004<br>[0.004] | 0.323<br>[0.202] | 0.283<br>[0.212] | 0.010<br>[0.007] | -0.004<br>[-0.005] |
| 9 | 0.008<br>[0.008] | 0.399<br>[0.256] | 0.342<br>[0.286] | 0.014<br>[0.012] | -0.010<br>[-0.010] |
| 10 (Most positive) | 0.024<br>[0.020] | 0.499<br>[0.329] | 0.342<br>[0.279] | 0.030<br>[0.022] | -0.009<br>[-0.007] |

a.Variable definitions:

*UE* =Unexpected earnings, computed as the actual earnings per share minus the median consensus forecast per share issued nine months prior to the fiscal year-end (both from I/B/E/S), then divided by the share price as of the fiscal year-end

$\Delta$*BONUS* =Change in the CEO's bonus over the previous year deflated by the prior-year salary, all adjusted to 2000 constant dollars using the consumer price index

*RET* =Annual stock return inclusive of dividend distributions

$\Delta$*ROA* =Annual change in the rate of return on assets

*AA* =Abnormal accruals, measured as the residuals obtained from the regression of the following equation: $TA/A = \alpha_0 + \alpha_1(1/A) + \alpha_2(\Delta SALES/A) + \alpha_3(PPE/A) + \varepsilon$, where *TA* is total accruals (earnings before extraordinary items minus net cash flows from operations), *A* is the total assets at the end of the previous year, $\Delta$*SALES* is the change in net sales over the previous year, and *PPE* is he gross property, plant, and equipment at year end

b.The sample consists of 8,475 firm-year observations during 1993-2004, after deleting observations with top and bottom one percentile of the variables. Observations with negative *UE* are assigned to equal-size portfolios 1 to 5 based on *UE*, with portfolio 1 (5) consisting of the most (least) negative *UE*. Similarly, observations with positive *UE* are assigned to equal-sized portfolios 6 to 10 based on *UE*, with portfolio 6 (10) consisting of the least (most) positive *UE*. The number of observations in portfolios 1 to 5 ranges between 1,037 and 1,040, The number of observations in portfolios 6 to 10 ranges between 624 and 628.

The relation between *UE* and abnormal accruals (*AA*) is not monotonic, however. On average, *AA* is higher if the magnitude of *UE* is smaller, and *AA* is the lowest (i.e., most negative) in portfolios 1, 9, and 10, which have the most extreme values of *UE*. These results are consistent with Healy (1985) who shows that firms with extremely good performance use income-decreasing accruals to smooth earnings and firms with very poor performance use income-decreasing accruals to take "a big bath."

# 5. EMPIRICAL RESULTS

## 5.1 UNIVERIATE TESTS OF CHANGES IN BONUSES AND THE SIGN OF ABNORMAL ACCRUALS

Table 2 shows the statistics of $\Delta BONUS$ by the signs of unexpected earnings and abnormal accruals and the results from tests of if $\Delta BONUS$ differs between firms with different signs of abnormal accruals for a given sign of *UE*. For the group of firms with positive unexpected earnings, the mean (median) change in bonuses as a percentage of the prior year's salary for CEOs of the firms with income-increasing abnormal accruals equals 27.8% (14.8%), which is significantly lower than the mean (median) of 36.2% (20.6%) for CEOs of the firms with income-decreasing abnormal accruals. These results suggest that, on average, CEOs of firms with positive unexpected earnings are rewarded less if the abnormal accruals are income-increasing rather than income-decreasing.

For the group of firms falling short of our proxy for the performance standards, the mean (median) change in bonuses as a percentage of the prior year's salary for CEOs of the firms with income-increasing abnormal accruals equals -9.3% (-0.%), which is significantly lower than the mean (median) of -4.9% (0.0%) for CEOs of the firms with income-decreasing abnormal accruals. These results suggest that CEOs of firms with negative unexpected earnings are punished more if abnormal accruals are income-increasing rather than income-decreasing. Collectively, the results in Table 2 suggest that compensation committees recognize the reversing implications of abnormal accruals when rewarding/punishing executives based on unexpected performance.

## 5.2 THE RELATION BETWEEN CHANGES IN BONUSES AND UNEXPECTED EARNINGS

Table 3, Panel A, shows the results from regressions of the changes in bonuses on positive and negative unexpected earnings and the control variables (see Eq. (1)). We compute the t-statistics based on robust standard errors adjusted for clustering

**TABLE 2 Means and Medians of Changes in CEO Bonuses – Sample Partitioned by Signs of Unexpected Earnings and Abnormal Accruals**

| | | Unexpected Earnings (*UE*) | |
|---|---|---|---|
| Abnormal Accruals (*AA*) | | *UE* > 0 | *UE* < 0 |
| | | Changes in CEO Bonus | Changes in CEO Bonus |
| *AA* > 0 | Mean | 0.278 | -0.093 |
| (Income-Increasing) | Std. Dev. | 0.593 | 0.640 |
| | Q1 | 0.000 | -0.382 |
| | Median | 0.148 | -0.003 |
| | Q3 | 0.479 | 0.148 |
| | N | 1,484 | 2,510 |
| *AA* < 0 | Mean | 0.362 | -0.049 |
| (Income-Decreasing) | Std. Dev. | 0.659 | 0.624 |
| | Q1 | 0.000 | -0.314 |
| | Median | 0.206 | 0.000 |
| | Q3 | 0.628 | 0.180 |
| | N | 1,798 | 2,683 |
| Mean test: *t*-statistic | | -2.50 | -3.83 |
| (*p*-value) | | (0.012) | (0.000) |
| Median test: *Z*-statistic | | -2.30 | -3.99 |
| (*p*-value) | | (0.011) | (0.000) |

a.Variable definitions:

*UE* =Unexpected earnings, computed as the actual earnings per share minus the median consensus forecast per share issued nine months prior to the fiscal year-end (both from I/B/E/S), then divided by the share price as of the fiscal year-end;

*AA* =Abnormal accruals, measured as the residuals obtained from the regression of the following equation: $TA/A = \alpha_0 + \alpha_1(1/A) + \alpha_2(\Delta SALES/A) + \alpha_3(PPE/A) + \varepsilon$, where *TA* is total accruals (earnings before extraordinary items minus net cash flows from operations), *A* is the total assets at the end of the previous year, Δ*SALES* is the change in net sales over the previous year, and *PPE* is he gross property, plant, and equipment at year end.

b.Changes in CEO bonuses are deflated by the prior-year salary. All amounts for bonuses and salaries are adjusted to 2000 constant dollars using the consumer price index. The mean test is a t-test for the hypothesis that the mean changes in bonus for the positive *AA* group and for the negative *AA* group are equal. The median test is a Wilcoxon rank sum test for the hypothesis that the median changes in bonus for the positive *AA* group and for the negative *AA* group are equal. *p*-values are based on a two-tailed test.

by firm (Rogers 1993). In other words, we treat the regression residuals as independent across firms but not necessarily independent within a firm. Thus, the standard errors are adjusted for the correlations of the regression residuals within the same firm.

The coefficients on positive unexpected earnings ($UE^+$) and negative unexpected earnings ($UE^-$) are both significantly positive (*t*-statistic = 10.04 and 5.11, respectively), suggesting a positive pay-for-performance sensitivity. Note that $UE^-$ is coded as a negative value if *UE* is negative and zero otherwise, so that a positive coefficient on $UE^-$ suggests a decrease in bonuses. The coefficient on $UE^+$ is significantly greater than that on $UE^-$ (*t*-statistic = 9.01), consistent with H1 and

suggesting an asymmetric pay-for-performance sensitivity with respect to the sign of unexpected earnings. These results also are consistent with Gaver and Gaver (1998) who find that CEOs are more likely to be rewarded for good performance than to be penalized for poor performance. The coefficients on annual stock returns and changes in ROA are both significantly positive, suggesting that the changes in CEO bonuses are also related to alternative measures of unexpected performance.

We further separate $UE^{+}$ and $UE^{-}$ each in Eq. (1) into two categories based on the median and present the regression results in Table 3, Panel B. Recall that $UE^{Large+}$ ($UE^{Small+}$) denotes large (small) positive unexpected earnings and $UE^{Large-}$ ($UE^{Small-}$) denotes large (small) negative unexpected earnings. The results show significantly positive coefficients on all four categories of unexpected earnings. The coefficient on $UE^{Large+}$ ($UE^{Small+}$) is significantly greater than that on $UE^{Large-}$ ($UE^{Small-}$), again consistent with asymmetric pay-for-performance sensitivity with respect to the sign of unexpected earnings. For both positive and negative unexpected earnings, the coefficient on large unexpected earnings is significantly lower than that on small unexpected earnings, which suggests that CEO bonuses are less sensitive to unexpected earnings when the magnitude of the unexpected earnings is larger. When we separate positive and negative unexpected earnings each into five categories based on the quintile rankings, the results (not tabulated) also show larger coefficients for unexpected earnings that have smaller magnitude. Therefore, our results from examining different magnitudes of unexpected earnings separately are consistent with Murphy (1999) who finds that the sensitivity of cash compensation to earnings is reduced when earnings are either very high or very low, because of the upper and lower bounds in the bonus contracts.

### 5.3 THE RELATION BETWEEN CHANGES IN BONUSES AND UNEXPECTED EARNINGS CONDITIONAL ON THE SIGN OF ABNORMAL ACCRUALS

In Table 4, Panel A, we present the regression results for Eq. (2) in which the independent variables include $UE^{+}$, $UE^{-}$, the interaction effects between a dummy variable representing income-increasing abnormal accruals (*INAA*) and $UE^{+}$ as well as $UE^{-}$, and the control variables. The coefficients on $UE^{+}$ and $UE^{-}$ are both significantly positive and they are significantly different from each other, suggesting that there is an asymmetric pay-for-performance sensitivity with respect to the sign of unexpected earnings when abnormal accruals are income-decreasing (i.e., *INAA* = 0). The coefficient on $INAA*UE^{+}$ is not significantly different from zero, suggesting that when unexpected earnings are positive, there is no difference in the increases in CEO bonuses between the firms with different signs of abnormal accruals. This result does not support H2a. The coefficient on $INAA*UE^{-}$ is

significantly positive (*t*-statistic = 1.95), suggesting that when unexpected earnings are negative, the CEO is punished more if the abnormal accruals are income-increasing. This result is consistent with H2b.

To test H3a and H3b, we estimate Eq. (4), in which $UE^{+}$ and $UE^{-}$ each is separated into two categories based on the median (as defined previously). The results are presented in Table 4, Panel B. For the observations with income-decreasing abnormal accruals (i.e., *INAA* = 0), the results are similar to those shown in Table 3, Panel B. Thus, they are not discussed here. The coefficient on $INAA*UE^{Small+}$ equals -31.64 (*t*-statistic = -2.05) , which reveals that for firms with small positive unexpected earnings, the relation between the increases in CEO bonus and unexpected earnings is significantly weaker if the unexpected earnings are accompanied by income-increasing abnormal accruals. This result supports H3a and suggests that compensation committees reduce the reward to the CEO when it is more likely that income-increasing abnormal accruals are used to beat the performance standards. The coefficient on $INAA*UE^{Large-}$ is significantly positive (*t*-statistic = 2.30), suggesting that for firms with large negative unexpected earnings, the punishment to the CEO is more severe if the unexpected earnings are accompanied by income-increasing abnormal accruals. This result is consistent with H3b. The coefficients on the remaining two interaction effects are not significantly different from zero.

Table 4, Panel C, shows the regression results when we further consider the magnitude of the income-increasing abnormal accruals. Specifically, we use two dummy variables, $INAA^{Large}$ and $INAA^{Small}$, to indicate large and small income-increasing abnormal accruals, respectively. $INAA^{Large}$ ($INAA^{Small}$) equals one if the magnitude of the income-increasing abnormal accruals is above (below) the median and zero otherwise. The results reveal a significantly negative coefficient on $[INAA^{Large}]*[UE^{Small+}]$ (*t*-statistic = -3.08) but not on $[INAA^{Small}]*[UE^{Small+}]$. These results provide further evidence in support of H3a since among the CEOs who beat the performance standards by a small margin, those who report *large* income-increasing abnormal accruals are more likely than the others to have used abnormal accruals to attain the small positive unexpected earnings. Panel C also shows that when unexpected earnings are negative, the CEOs are punished more if abnormal accruals are income-increasing regardless of the magnitude of the abnormal accruals.

The inferences we draw based on the results in Table 4 are unaffected when we separate positive and negative unexpected earnings each into five categories based on the quintile rankings (results not tabulated).

**TABLE 3 Results from Regressions of Changes in CEO Bonuses on Unexpected Earnings, Annual Stock Returns, Change in ROA, and Dummy Variables for Year and Industry**

*Panel A:* $\Delta BONUS = \beta_0 + \beta_1 UE^{+} + \beta_2 UE^{-} + \beta_3 RET + \beta_4 \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon$

*Panel B:* $\Delta BONUS = \beta_0 + \beta_1 UE^{Large+} + \beta_2 UE^{Small+} + \beta_3 UE^{Small-} + \beta_4 UE^{Large-} + \beta_5 RET + \beta_6 \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon$

| | Predicted | Panel A | | Panel B | |
|---|---|---|---|---|---|
| Variable | sign | Coefficient | t-statistic | Coefficient | t-statistic |
| $UE^{+}$ | + | 12.110 | 10.04*** | | |
| $UE^{Large+}$ | + | | | 11.154 | 9.13*** |
| $UE^{Small+}$ | + | | | 64.371 | 7.70*** |
| $UE^{-}$ | + | 0.979 | 5.11*** | | |
| $UE^{Small-}$ | + | | | 12.768 | 6.40*** |
| $UE^{Large-}$ | + | | | 0.994 | 5.03*** |
| *RET* | + | 0.351 | 17.51*** | 0.344 | 17.29*** |
| $\Delta ROA$ | + | 1.466 | 9.04*** | 1.431 | 8.88*** |
| Adj. $R^2$ | | 0.153 | | 0.162 | |
| N | | 8,475 | | 8,475 | |
| Test: | | | | | |
| $UE^{+} - UE^{-}$ | + | 11.131 | 9.01*** | | |
| $UE^{Large+} - UE^{Large-}$ | + | | | 10.159 | 8.04*** |
| $UE^{Small+} - UE^{Small-}$ | + | | | 51.603 | 5.62*** |

a.Variable definitions:

$\Delta BONUS$ =Change in the CEO's bonus over the previous year deflated by the prior-year salary, all adjusted to 2000 constant dollars using the consumer price index;

*UE* =Unexpected earnings, computed as the actual earnings per share minus the median consensus forecast of earnings per share issued nine months prior to the fiscal year-end (both from I/B/E/S), then divided by the share price at fiscal year-end;

$UE^{+}$ =*UE* if *UE* is positive, and 0 otherwise;

$UE^{-}$ =*UE* if *UE* is negative, and 0 otherwise;

$UE^{Large+}$ =*UE* if *UE* is greater than the median of positive *UE*, and 0 otherwise;

$UE^{Small+}$ =*UE* if *UE* is positive and lower than the median of positive *UE*, and 0 otherwise;

$UE^{Small-}$ =*UE* if *UE* is negative and greater than the median of negative *UE*, and 0 otherwise;

$UE^{Large-}$ =*UE* if *UE* is negative and lower than the median of negative *UE*, and 0 otherwise;

*RET* =Annual stock return inclusive of dividend distributions;

$\Delta ROA$ =Annual change in the rate of return on assets.

b.The sample consists of 8,475 firm-year observations during 1993-2004. The coefficients on the intercept term and the dummy variables for year and industry are not presented. The *t*-statistics are computed based on robust standard errors adjusted for clustering by firm. *** corresponds to 1% significance level based on a two-tailed test.

## 5.4 ANALYSIS OF THE PRE-ENRON PERIOD VS. THE POST-ENRON PERIOD

To investigate if the relations between changes in CEO bonuses and unexpected earnings conditional on the sign of unexpected earnings and the sign/magnitude of abnormal accruals change in the post-Enron period, we replicate the regression in Table 4, Panel C, separately for two periods (1993 to 2000 and 2001 to 2004). The regression results are presented in Table 5. The coefficients on unexpected earnings (except $UE^{Large-}$) nearly double during 2001-2004, suggesting large increases in the pay-for-performance sensitivity in the post-Enron period for firms with income-decreasing abnormal accruals. The coefficient on $[INAA^{Large}]*[UE^{Small+}]$ is significantly negative only in the post-Enron period (*t*-statistic = -2.49), suggesting

**TABLE 4 Results from Regressions of Changes in CEO Bonuses on Unexpected Earnings, Interaction Effects between Unexpected Earnings and Dummy Variables for Income-Increasing Abnormal Accruals, Annual Stock Returns, Change in ROA, and Dummy Variables for Year, Industry, and Income-Increasing Abnormal Accruals**

*Panel A*: $\Delta BONUS = \beta_0 + \beta_1[UE^+] + \beta_2[UE^-] + \beta_3 INAA*[UE^+] + \beta_4 INAA*[UE^-] + \beta_5 INAA + \beta_6 RET + \beta_7 \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon$

*Panel B*: $\Delta BONUS = \beta_0 + \beta_1[UE^{Large+}] + \beta_2[UE^{Small+}] + \beta_3[UE^{Small-}] + \beta_4[UE^{Large-}] + \beta_5 INAA*[UE^{Large+}] + \beta_6 INAA*[UE^{Small+}] + \beta_7 INAA*[UE^{Small-}] + \beta_8 INAA*[UE^{Large-}] + \beta_9 INAA + \beta_{10} RET + \beta_{11} \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon$

*Panel C*: $\Delta BONUS = \beta_0 + \beta_1[UE^{Large+}] + \beta_2[UE^{Small+}] + \beta_3[UE^{Small-}] + \beta_4[UE^{Large-}] + \beta_5[INAA^{Large}]*[UE^{Large+}] + \beta_6[INAA^{Small}]*[UE^{Large+}] + \beta_7[INAA^{Large}]*[UE^{Small+}] + \beta_8[INAA^{Small}]*[UE^{Small+}] + \beta_9[INAA^{Large}]*[UE^{Small-}] + \beta_{10}[INAA^{Small}]*[UE^{Small-}] + \beta_{11}[INAA^{Large}]*[UE^{Large-}] + \beta_{12}[INAA^{Small}]*[UE^{Large-}] + \beta_{13}[INAA^{Large}] + \beta_{14}[INAA^{Small}] + \beta_{15} RET + \beta_{16} \Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon$

| | Predicted | Panel A | | Panel B | | Panel C | |
|---|---|---|---|---|---|---|---|
| Variable | sign | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| $UE^+$ | + | 10.987 | 7.08*** | | | | |
| $UE^-$ | + | 0.691 | 2.69*** | | | | |
| $UE^{Large+}$ | + | | | 10.382 | 6.61*** | 10.392 | 6.62*** |
| $UE^{Small+}$ | + | | | 78.340 | 6.30*** | 78.313 | 6.30*** |
| $UE^{Small-}$ | + | | | 11.382 | 4.26*** | 11.354 | 4.25*** |
| $UE^{Large-}$ | + | | | 0.623 | 2.35** | 0.616 | 2.32** |
| $INAA*UE^+$ | – | 2.126 | 0.93 | | | | |
| $INAA*UE^-$ | + | 0.770 | 1.95* | | | | |
| $INAA*UE^{Large+}$ | – | | | 1.419 | 0.62 | | |
| $INAA*UE^{Small+}$ | – | | | -31.640 | -2.05** | | |
| $INAA*UE^{Small-}$ | + | | | 2.893 | 0.73 | | |
| $INAA*UE^{Large-}$ | + | | | 0.948 | 2.30** | | |
| $INAA^{Large}*UE^{Large+}$ | – | | | | | 0.124 | 0.04 |
| $INAA^{Small}*UE^{Large+}$ | – | | | | | 3.100 | 1.14 |
| $INAA^{Large}*UE^{Small+}$ | – | | | | | -59.477 | -3.08*** |
| $INAA^{Small}*UE^{Small+}$ | – | | | | | -5.733 | -0.33 |
| $INAA^{Large}*UE^{Small-}$ | + | | | | | 10.460 | 2.13** |
| $INAA^{Small}*UE^{Small-}$ | + | | | | | -4.379 | -0.88 |
| $INAA^{Large}*UE^{Large-}$ | + | | | | | 1.109 | 2.45** |
| $INAA^{Small}*UE^{Large-}$ | + | | | | | 0.826 | 1.55 |
| $INAA$ | ? | -0.052 | -3.22*** | -0.029 | -1.42 | | |
| $INAA^{Large}$ | ? | | | | | 0.007 | 0.26 |
| $INAA^{Small}$ | ? | | | | | -0.066 | -2.64*** |
| $RET$ | + | 0.345 | 17.13*** | 0.339 | 16.91*** | 0.341 | 16.95*** |
| $\Delta ROA$ | + | 1.548 | 9.47*** | 1.514 | 9.32*** | 1.518 | 9.34*** |
| Adj. $R^2$ | | 0.155 | | 0.165 | | 0.166 | |
| N | | 8,475 | | 8,475 | | 8,475 | |

**TABLE 4 (Continued)**

a.Variable definitions:

$\Delta BONUS$ =Change in the CEO's bonus over the previous year deflated by the prior-year salary, all adjusted to 2000 constant dollars using the consumer price index;

$UE$ =Unexpected earnings, computed as the actual earnings per share minus the median consensus forecast of earnings per share issued nine months prior to the fiscal year-end (both from I/B/E/S), then divided by the share price at fiscal year-end;

$UE^{Large+}$ =$UE$ if $UE$ is greater than the median of positive $UE$, and 0 otherwise;

$UE^{Small+}$ =$UE$ if $UE$ is positive and lower than the median of positive $UE$, and 0 otherwise;

$UE^{Small-}$ =$UE$ if $UE$ is negative and greater than the median of negative $UE$, and 0 otherwise;

$UE^{Large-}$ =$UE$ if $UE$ is negative and lower than the median of negative $UE$, and 0 otherwise;

$INAA$ =1 if abnormal accruals are income-increasing ($AA > 0$, see Table 1 for definition), and 0 otherwise ;

$INAA^{Large}$ =1 if $AA$ is above the median of positive $AA$, and 0 otherwise;

$INAA^{Small}$ =1 if $AA$ is positive and below the median of positive $AA$, and 0 otherwise;

$RET$ =Annual stock return inclusive of dividend distributions;

$\Delta ROA$ =Annual change in the rate of return on assets.

b.The sample consists of 8,475 firm-year observations during 1993-2004. The coefficients on the intercept term and the dummy variables for year and industry are not presented. The $t$-statistics are computed based on robust standard errors adjusted for clustering by firm. $^{*}$, $^{**}$, and $^{***}$ correspond to 10%, 5%, and 1% significance levels, respectively, based on a two-tailed test.

that when unexpected earnings are small and positive, the CEOs who report large income-increasing abnormal accruals are rewarded less than are other CEOs only during the post-Enron period. Table 5 also shows that the coefficient on $[INAA^{Large}]*[UE^{Large-}]$ is significantly positive only in the post-Enron period ($t$-statistic = 1.96). Overall, the results in Table 5 are consistent with compensation committees increasing the pay-for-performance sensitivity and discounting the CEO's performance achieved by using income-increasing abnormal accruals in response to increased scrutiny of executive compensation.

### 5.5 OTHER TESTS

Our primary analyses are based on abnormal accruals that are estimated using the Jones model. A recent study by Kothari, Leone and Wasley (2005) find that performance-matched abnormal accrual measures enhance the reliability of the inferences from earnings management research. Therefore, we replicate all the regressions using abnormal accruals that are estimated based on the Jones model with a control for lagged returns on assets (i.e., including lagged returns on assets in Eq. (3)). The results (not shown) based on the performance-adjusted abnormal accruals are similar to those reported in the paper.

Prior research shows that outside directors lack the economic incentives to prevent excessive compensation (Baker, Jensen and Murphy 1988) and boards of directors serve at the discretion of the CEO (Shivdasani and Yermack 1999). Thus, the results in our study may differ between the CEOs who serve as the board chair and those who do not. We investigate but find no evidence that, for firms with similar levels of unexpected earnings, the association between reporting income-increasing abnormal accruals and the pay-for-performance sensitivity

**TABLE 5 Results from Regressions of Changes in CEO Bonuses on Unexpected Earnings, Interaction Effects between Unexpected Earnings and Dummy Variables for Income-Increasing Abnormal Accruals, Annual Stock Returns, Change in ROA, and Dummy Variables for Year, Industry, and Income-Increasing Abnormal Accruals – Years 1993-2000 vs. Years 2001-2004**

$$\begin{aligned}\Delta BONUS = {} & \beta_0 + \beta_1[UE^{Large+}] + \beta_2[UE^{Small+}] + \beta_3[UE^{Small-}] + \beta_4[UE^{Large-}] \\ & + \beta_5[INAA^{Large}]*[UE^{Large+}] + \beta_6[INAA^{Small}]*[UE^{Large+}] + \beta_7[INAA^{Large}]*[UE^{Small+}] \\ & + \beta_8[INAA^{Small}]*[UE^{Small+}] + \beta_9[INAA^{Large}]*[UE^{Small-}] + \beta_{10}[INAA^{Small}]*[UE^{Small-}] \\ & + \beta_{11}[INAA^{Large}]*[UE^{Large-}] + \beta_{12}[INAA^{Small}]*[UE^{Large-}] + \beta_{13}[INAA^{Large}] \\ & + \beta_{14}[INAA^{Small}] + \beta_{15}RET + \beta_{16}\Delta ROA + \delta \cdot YEAR + \phi \cdot INDUSTRY + \varepsilon\end{aligned}$$

| | Predicted | Years 1993-2000 | | Years 2001-2004 | |
|---|---|---|---|---|---|
| Variable | sign | Coefficient | t-statistic | Coefficient | t-statistic |
| $UE^{Large+}$ | + | 7.518 | 4.16*** | 14.971 | 5.24*** |
| $UE^{Small+}$ | + | 57.416 | 3.29*** | 104.971 | 5.89*** |
| $UE^{Small-}$ | + | 7.392 | 2.22** | 15.933 | 3.67*** |
| $UE^{Large-}$ | + | 0.558 | 1.97** | 0.676 | 1.38 |
| $INAA^{Large}*UE^{Large+}$ | – | 6.799 | 1.83* | -7.698 | -1.81* |
| $INAA^{Small}*UE^{Large+}$ | – | 8.489 | 2.31** | -4.123 | -1.06 |
| $INAA^{Large}*UE^{Small+}$ | – | -39.017 | -1.55 | -81.025 | -2.49** |
| $INAA^{Small}*UE^{Small+}$ | – | -2.680 | -0.13 | 5.389 | 0.17 |
| $INAA^{Large}*UE^{Small-}$ | + | 12.603 | 2.03** | 8.939 | 1.12 |
| $INAA^{Small}*UE^{Small-}$ | + | -5.231 | -0.84 | -2.441 | -0.29 |
| $INAA^{Large}*UE^{Large-}$ | + | 0.613 | 1.25 | 1.790 | 1.96** |
| $INAA^{Small}*UE^{Large-}$ | + | 0.649 | 1.26 | 1.122 | 1.02 |
| $INAA^{Large}$ | ? | -0.001 | -0.03 | 0.007 | 0.16 |
| $INAA^{Small}$ | ? | -0.075 | -2.44** | -0.058 | -1.31 |
| *RET* | + | 0.366 | 14.99*** | 0.300 | 8.64*** |
| $\Delta ROA$ | + | 1.430 | 6.51*** | 1.639 | 6.82*** |
| Adj. $R^2$ | | 0.174 | | 0.172 | |
| N | | 4,987 | | 3,488 | |

a.Variable definitions:

$\Delta BONUS$ =Change in the CEO's bonus over the previous year deflated by the prior-year salary, all adjusted to 2000 constant dollars using the consumer price index;

*UE* =Unexpected earnings, computed as the actual earnings per share minus the median consensus forecast of earnings per share issued nine months prior to the fiscal year-end (both from I/B/E/S), then divided by the share price at fiscal year-end;

$UE^{Large+}$ =*UE* if *UE* is greater than the median of positive *UE*, and 0 otherwise;

$UE^{Small+}$ =*UE* if *UE* is positive and lower than the median of positive *UE*, and 0 otherwise;

$UE^{Small-}$ =*UE* if *UE* is negative and greater than the median of negative *UE*, and 0 otherwise;

$UE^{Large-}$ =*UE* if *UE* is negative and lower than the median of negative *UE*, and 0 otherwise;

*INAA* =1 if abnormal accruals are income-increasing (*AA* > 0, see Table 1 for definition), and 0 otherwise ;

$INAA^{Large}$ =1 if *AA* is above the median of positive *AA*, and 0 otherwise;

$INAA^{Small}$ =1 if *AA* is positive and below the median of positive *AA*, and 0 otherwise;

*RET* =Annual stock return inclusive of dividend distributions;

$\Delta ROA$ =Annual change in the rate of return on assets.

b.The full sample consists of 8,475 firm-year observations during 1993-2004. The coefficients on the intercept term and the dummy variables for year and industry are not presented. The *t*-statistics are computed based on robust standard errors adjusted for clustering by firm. *, **, and *** correspond to 10%, 5%, and 1% significance levels, respectively, based on a two-tailed test.

depends on whether or not the CEO is the chair of the board.

When considering the reversing nature of abnormal accruals, one might expect that, as the CEO approaches retirement, reporting income-increasing abnormal accruals would lead to a larger decrease (increase) in the pay-for-performance sensitivity with respect to positive (negative) unexpected earnings. We do not find such results when we classify CEOs aged 63 or more as approaching retirement and having a short horizon. However, we notice that for quite a few observations, the CEO was more than 65 years old but did not retire as of the end of our sample period. Since it is not clear when these CEOs will actually approach retirement, our results for the short-horizon CEOs may be subject to measurement errors.

## 6. SUMMARY AND CONCLUSIONS

In this study, we extend the prior research on the relation between the changes in CEO compensation and unexpected earnings by examining the asymmetric pay-for-performance sensitivity with respect to the sign of unexpected earnings and the role of income-increasing abnormal accruals in setting the CEO bonus. Consistent with DeFond et al. (2003), we use the analysts' consensus earnings forecast issued soon after the prior year's earnings announcement date as a proxy for the performance standards set by the compensation committee, and we measure unexpected earnings as the difference between the actual earnings and this proxy for performance standards. We find that the relation between increases in CEO bonuses and positive unexpected earnings is stronger than that between decreases in CEO bonuses and negative unexpected earnings, which is consistent with the asymmetric CEO payoff function documented in prior studies (e.g., Gaver and Gaver 1998). Our results also show that CEO bonuses are less sensitive to unexpected earnings when the magnitude of unexpected earnings is larger, consistent with Murphy (1999) who finds that the pay-for-performance sensitivity is reduced when earnings approach the upper and lower bounds in the bonus contracts.

Regarding the roles of abnormal accruals in setting the CEO's bonus, we find that for firms with small positive unexpected earnings, the CEOs are rewarded less if abnormal accruals are income-increasing. For firms with negative unexpected earnings, the CEOs are punished more severely if abnormal accruals are income-increasing. These results suggest that compensation committees are able to incorporate the reversing implications of abnormal accruals into CEO bonus schemes. Nevertheless, these results are mainly driven by observations from the post-Enron period, consistent with compensation committees altering CEO bonus schemes in response to the increased scrutiny on executive compensation.

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