

**The relation between executive compensation and earnings management:  
Changes in the post-Sarbanes-Oxley era**

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August 2005

**Abstract**

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We examine the relations between the nondiscretionary and discretionary components of earnings and executive bonus compensation and how these relations change concurrent with the introduction of the Sarbanes-Oxley Act of 2002. Given that its objective is to improve the quality of financial reporting, we hypothesize that a change in the relation between bonus and discretionary earnings would indicate an altered compensation structure that changes the incentives for earnings management behavior. As the CEO and financial officers have primary responsibility for integrity of the financial statements, we examine a sample of these executives from 1996 through 2003. Our results suggest that, before Sarbanes-Oxley, these executives had financial incentives to manage earnings upward and small penalties for managing downward. After, while there is still a premium on income-increasing management, there is a greater reward for nondiscretionary earnings and a larger penalty is imposed on income-decreasing earnings management. In addition, we find that changes in the bonus compensation structure are associated with changes in earnings management behavior, consistent with the lack of reward for earnings management leading to less earnings management. These changes are not associated with improvements in corporate governance, suggesting that firms' may have alternative initiatives that lead to changes in compensation structure.

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Luann Lynch gratefully acknowledges the financial support of the University of Virginia Darden School Foundation. We thank IBES for analyst forecast data. We thank Tim Gray, Chris Ittner, Ephraim Sudit, Pete Wilson, and seminar participants at the 2005 Columbia Accounting Symposium and the 2005 American Accounting Association Annual Meeting for helpful comments. Finally, we thank Lisa Lee for research assistance.

## **1. Introduction**

In the wake of the financial scandals of the early 2000s, increasing attention is being paid to the quality of earnings and the responsibility of corporate executives for those earnings. Among other concurrent reforms, the Sarbanes-Oxley Act of 2002 aimed to improve the integrity of financial reporting by imposing stringent requirements and responsibilities on corporate executives (Sarbanes-Oxley Act of 2002; Donaldson, 2003). Though not specifically noted in Sarbanes-Oxley, incentive-based compensation can be used to influence executives' actions in ways that affect financial reporting (see e.g., Healy, 1985). Thus, a test of whether the overarching objective of Sarbanes-Oxley is being met is to examine whether firms go beyond the Act's specific legal requirements to change incentive compensation for these executives to reduce their financial incentives to manage earnings.

We examine whether rewards for managing earnings are reflected in bonus payments to executives before Sarbanes-Oxley and whether the relation between bonus payments and earnings changes in conjunction with the increased scrutiny of financial reporting that began around the introduction of Sarbanes-Oxley. We also examine whether changes in the rewards for managing earnings are correlated with changes in proxies for earnings management and with changes in corporate governance.

Under Sarbanes-Oxley, principal executives (typically, the CEO) and financial officers (typically, the CFO) have the primary responsibility for the integrity of the financial reports. According to Section 302 of the Act, these executives must certify that the financial statements fairly present the results of operations and are not misleading. The Act also requires that the CEO and the CFO reimburse the company for any bonuses received if the company has to restate its earnings. Thus, the Act places primary responsibility for the integrity of the firm's financial reporting on these executives. Therefore, we examine the relation between bonus compensation and nondiscretionary and discretionary components of earnings for CEOs and CFOs.

We conduct our study using data from ExecuComp for a sample of 8,669 CEO-years and 8,154 CFO-years from 1996 through 2003. Using a modified-Jones model, we partition earnings into its nondiscretionary and discretionary components. We then examine the relation between bonuses and both nondiscretionary and discretionary components of earnings for these executives before and after the introduction of Sarbanes-Oxley.

We find a positive relation between bonus payments and the nondiscretionary proportion of earnings before the introduction of Sarbanes-Oxley, and an increase in this relation after its introduction. Before Sarbanes-Oxley, we find a significantly more positive relation between bonuses and income-increasing discretionary accruals than between bonuses and the nondiscretionary portion of earnings. This premium remains in the post-Sarbanes-Oxley period. Finally, we find a negative relation between bonuses and income-decreasing discretionary accruals in the period before the introduction of Sarbanes-Oxley; this relation becomes more negative after the introduction of Sarbanes-Oxley.

Overall, our results suggest that, before Sarbanes-Oxley, CEOs and CFOs had financial incentives to manage earnings. They received higher bonuses for income-increasing discretionary accruals than for nondiscretionary earnings, and there was only a small penalty for recording income-decreasing discretionary accruals. However, after the introduction of Sarbanes-Oxley, there is greater reliance on nondiscretionary earnings in the bonus contract, and a significantly greater penalty for income-decreasing discretionary accruals appears to be imposed. Our findings are consistent with changes in compensation contracts to lower the incentives to manage earnings concurrent with the increased scrutiny of financial reporting accompanying the Sarbanes-Oxley Act of 2002. These findings are robust to alternative specifications and to an setting of restatements, where financial statements are perceived to lack integrity.

We also examine whether the changes in compensation contracts after Sarbanes-Oxley are associated with changes in earnings management behavior. In particular, we estimate firm-specific changes in bonus-based incentives to manage earnings after the introduction of Sarbanes-

Oxley. We document that firms that changed the bonus contract by lowering incentives to manage earnings have predictable changes in earnings management behavior. These firms are more likely to beat prior year's earnings when the rewards are high, and less likely after the rewards are lowered and penalties increased. They are also less likely to take "big baths" after the penalties are increased. These findings are consistent with changes in incentives to manage earnings resulting in less earnings management behavior after the introduction of Sarbanes-Oxley. We find no evidence linking changes in the compensation contracts to changes in corporate governance, suggesting that while governance improved, it is not the motivation behind the change in compensation. Taken together with the results on our restatement sample, it suggests that it is concerns about earnings quality that are the impetus for the change.

Section 2 provides background and discusses prior research. Section 3 presents the hypotheses. Section 4 discusses sample selection and research design. Section 5 presents the results of the analysis. Section 6 examines changes in earnings management behavior and corporate governance after Sarbanes-Oxley. Finally, Section 7 concludes.

## **2. Background and prior research**

### **2.1 Earnings-based bonus plans**

Executive compensation plans often include the stated objective of firm value maximization and formally tie compensation to a measure of firm value such as earnings. For example, Ittner, Larcker, and Rajan (1997) document earnings per share, net income and operating income as the most common financial measures used in their sample of 317 bonus plans. Murphy (2001) finds that 91% of firms in his sample use accounting measures in their bonus plans.

Academic studies have examined whether the presence of performance-based bonuses in compensation contracts has influenced executives' accounting and accrual decisions. Healy (1985) determines that bonus plans often incorporate both lower and upper bounds on earnings

which lead to differing incentives relative to the position of earnings in the hierarchy. He finds that income-decreasing accruals are more likely when the upper or lower bound is binding, while income-increasing accruals are more likely when neither is binding. Holthausen, Larcker, and Sloan (1995) and Gaver, Gaver, and Austin (1995) find similar results supporting the existence of income-increasing and income-decreasing incentives.<sup>1</sup> The findings of these papers suggest that executives have an incentive to manage earnings to maximize bonus payments.

The incentive to maximize bonus payments by managing earnings will persist if compensation contracts reward efforts to manage earnings. Balsam (1998) examines this relation by studying the impact of discretionary accruals on CEO cash compensation, defined as salary plus bonus. Using a sample of 3,439 firm observations from 1980-1993, he finds a significant positive relation between discretionary accruals and cash compensation, though that relation is significantly smaller than the relation between cash compensation and both nondiscretionary accruals and operating cash flows. Further, this relation differs depending on both the sign and level of accruals as well as firm incentives to increase income related to certain earnings targets. His evidence is consistent with firms' rewarding efforts to manage earnings using income-increasing discretionary accruals.

As Holthausen et al. (1995) point out, and Balsam (1998) acknowledges, however, bonus contracts have undergone a shift from primarily bonus-pool-type plans to more budget-based plans under which bonuses depend on the amount to which performance meets predetermined targets. Our study examines the relation between bonuses and both the nondiscretionary portion of earnings and discretionary accruals in a more contemporaneous sample within which budget-based bonus plans are more common.

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<sup>1</sup> The results of both studies were consistent with those of Healy (1985) with the exception that the income-decreasing results were only supported with respect to the upper bound, not the lower. In both studies, this was attributed primarily to a mechanical relation induced by Healy's methodology.

## 2.2 The Sarbanes-Oxley Act of 2002

The primary objective of the Sarbanes-Oxley Act of 2002 was to “improve the accuracy and reliability of corporate disclosures made pursuant to the securities laws.” (Sarbanes-Oxley Act of 2002). Under Sarbanes-Oxley, the CEO and the CFO have the primary responsibility for the integrity of the financial reports. According to Section 302 of the Act, principal executives (typically, the CEO) and financial officers (typically, the CFO) must certify that the financial statements fairly present the results of operations and are not misleading. Further, the Act requires that these executives reimburse the company for any bonuses received should the company have to prepare an accounting restatement. In addition, by August 2002, the NYSE had filed a proposed rule change with the SEC to implement significant changes in listing standards. The changes were aimed at ensuring “independence of directors...and to strengthen corporate governance practices of listed companies”. Shortly after that in October 2002, the NASDAQ followed suit with a similar proposal sent to the SEC to strengthen “board independence and committee independence” (SEC Release No. 34-48745). Combined, these reforms may alter the business climate and may create a change in the compensation contracts with respect to bonus payments.

Several articles have examined the impact of Sarbanes-Oxley on various legal issues and market responses. But, few have examined the impact on compensation or earnings management behavior. Jain and Rezaee (2004) use three measures of accounting conservatism to examine the impact of Sarbanes-Oxley on financial reporting. Their evidence does not support the claim that Sarbanes-Oxley induced more conservative reporting. On the other hand, Cohen, Dey and Lys (2004a) find evidence of a decrease in earnings management after the introduction of Sarbanes-Oxley. Specifically, using principal-component analysis to derive a measure of earnings management, they detect an increasing trend in earnings management behavior in the period before Sarbanes-Oxley, concentrated primarily in poorly performing industries, and a reversal in this trend in the post-Sarbanes-Oxley period. They find a significant association between

compensation from options and earnings management levels in the pre-period and a decline in this association after Sarbanes-Oxley came into effect.

Cohen, Dey and Lys (2004b) find that the ratio of incentive compensation (bonus and options) to fixed compensation (salary), which is increasing in the pre-Sarbanes-Oxley period, reverses and declines in the post-Sarbanes-Oxley period. The authors interpret this finding as evidence that executives are receiving additional insurance in the form of more fixed compensation to offset the increase in executive liability induced by Sarbanes-Oxley. However, an alternative explanation is that stock option use has declined in this same time period in anticipation of the likely expensing of stock option grants in the financial statements (Carter, Lynch and Tuna, 2005).

Our study complements this emerging body of research. We examine *directly* the degree to which earnings management efforts are rewarded in bonus payments, rather than assuming such a relation exists. We also consider whether that relation has changed in the period following the introduction of Sarbanes-Oxley. We examine the effects of bonus contracts on earnings management by studying whether changes in the relation between bonuses and earnings management are associated with changes in earnings management. Finally, we examine whether changes in bonus contracts are motivated by improvements in corporate governance.

### **3. Hypotheses**

In this study, we examine the effect of earnings management on bonus compensation of the CEO and CFO and whether that effect changes after the Sarbanes-Oxley Act of 2002.<sup>2</sup> To this end, we investigate the relation between bonuses and both unmanaged earnings and managed

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<sup>2</sup> We consider bonus compensation, and not also stock option compensation, as our proxy for incentive-based compensation for several reasons. First, as mentioned earlier, bonus contracts frequently tie payments explicitly to earnings. There is not similar evidence on such a relation between options and earnings. Further, academic research has documented that stock option grants are a function of other factors unrelated to earnings such as tax and financial reporting costs, retention, and increasing the convexity of compensation contracts (see Core, Guay, and Larcker (2003) for a discussion). Finally, the concurrent event of the likely expensing of stock options creates confounding effects on the changes in stock option compensation that are difficult to disentangle.

earnings, before and after the law's enactment. Our proxy for unmanaged earnings is an estimate of nondiscretionary earnings and for managed earnings, an estimate of discretionary accruals.

### 3.1 Relation between bonuses and nondiscretionary earnings

We expect a positive relation between bonuses and the nondiscretionary portion of earnings (i.e. earnings that result from firm operations and not from the result of accounting decisions or assumptions made by management). Since a primary objective of Sarbanes-Oxley is to ensure the integrity of the financial statements, but not to change the normal operations of the firm, we expect no change in the relation between bonuses and the nondiscretionary portion of earnings after introduction of Sarbanes-Oxley.

### 3.2 Relation between bonuses and discretionary accruals

DeGeorge, Patel and Zeckhauser (1999) provide a model predicting how executives strategically influence reported earnings and, examining discontinuities in the distribution of observed earnings, provide evidence of earnings management around particular targets.

As shown in Balsam (1998), compensation contracts appear to reward earnings management, although income-increasing discretionary accruals have a lower coefficient than nondiscretionary earnings. In our more contemporaneous sample period, if firms continue to reward earnings management, then we also expect a positive coefficient on income-increasing discretionary accruals. In addition, if firms "reward" income-decreasing discretionary accruals (i.e. do not penalize for income-decreasing discretionary accruals) then we expect no correlation between bonus payments and these accruals.<sup>3</sup>

These predictions assume that the compensation committee can disentangle managed earnings from unmanaged earnings and award bonuses accordingly. However, it may be that

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<sup>3</sup> If firms go beyond not penalizing for income-decreasing accruals and, in fact, increase bonuses for those accruals, then there will be a positive relation between bonuses and the absolute value of income-decreasing accruals.

reported accounting earnings is the measure that drives bonuses and that the compensation committee cannot or does not segregate managed and unmanaged earnings. If so, we would expect a positive correlation with discretionary accruals. That is, we should detect a positive correlation with income-increasing discretionary accruals and a negative correlation with the absolute value of income-decreasing discretionary accruals, of equal magnitude.

With the increased scrutiny of financial reporting that has accompanied Sarbanes-Oxley, firms may want to reduce discretionary accruals reported in the financial statements.<sup>4</sup> Thus, firms may change compensation plans for executives to reduce financial incentives to manage earnings by altering the relation between bonus payments and discretionary accruals. Accordingly, we test whether the relation between bonus payments and discretionary accruals changes after the introduction of Sarbanes-Oxley. If increased scrutiny in the post- Sarbanes-Oxley era leads to firms changing compensation contracts for executives to reduce incentives to manage earnings, we expect no relation after Sarbanes-Oxley (or a smaller relation after than before Sarbanes-Oxley) between bonuses and income-increasing discretionary accruals. Furthermore, if after Sarbanes-Oxley, firms penalize executives for managing earnings downward, we expect a negative relation after Sarbanes-Oxley (or more negative relation after than before Sarbanes-Oxley) between bonuses and the absolute value of income-decreasing discretionary accruals.

#### **4. Sample selection and research design**

##### **4.1 Data sources and sample selection**

Executive compensation data are obtained from ExecuComp for 1996 through 2003.<sup>5</sup> We eliminate partial year (new or exiting) executives, as compensation in those years may be affected by hiring bonuses or retirement/severance/exit payments. We label an executive as a

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<sup>4</sup> It should be noted that the academic evidence as to whether firms actually decrease discretionary accruals after Sarbanes-Oxley is mixed (Jain and Rezaee (2004) and Cohen, Dey, and Lys (2004a)).

<sup>5</sup> We begin our study in 1996 despite full compensation data being available from 1993. Starting in 1996 allows us to have a more balanced panel pre- and post-Sarbanes-Oxley, with sufficient years to estimate firm-specific changes in the compensation contracts, and map into availability of governance data.

CEO if the ExecuComp CEOANN field is labeled “CEO”. We label an executive as a firm’s financial executive if the executive’s title on ExecuComp (contained in the title field) indicates the executive has financial responsibility, such as chief financial officer, vice president finance, treasurer, or chief accounting officer.<sup>6</sup> Consistent with Gore, Matsunaga, and Yeung (2004), we eliminate observations in the financial services and utilities industries (SIC codes 4900-4999, 6000-6999). Keeping only firms with observations in both the pre (1996-2001) and post (2002-2003) Sarbanes-Oxley periods, the final sample contains 8,669 CEO-year observations and 8,154 CFO-year observations across the 8-year period.

We obtain governance data from the Directors database of the Investor Responsibility Research Center (IRRC). This database contains director information for approximately 1,800 companies from proxy statements dated 1996 to 2003. We match proxy statements to their fiscal year (i.e., 2001 proxy data for a December fiscal year end firm applies to the 2000 fiscal year). As a result, the majority of this data applies to fiscal years 1995 to 2002.

## 4.2 Research methodology

We examine the relation between bonuses and both the nondiscretionary portion of earnings and discretionary accruals, allowing for different coefficients on income-increasing discretionary accruals and income-decreasing discretionary accruals. We examine these relations before and after the introduction of Sarbanes-Oxley.

Specifically, we use a Tobit model to estimate the following regression of bonuses<sup>7</sup> on nondiscretionary earnings, income-increasing discretionary accruals, income-decreasing

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<sup>6</sup> To identify such executives, we first identify all executives with a title containing the strings “CFO”, “fin”, “trea”, “accou”, “acct”, “chief fi”, or “contr”. We then manually review the titles for potential misclassification of a non-financial executive as a financial executive as the title could contain the search string but not be related to a financial executive. We also perform a manual search of other executives, on a test basis, for misclassifications.

<sup>7</sup> We utilize bonus realizations rather than thresholds obtained directly from compensation contracts as Merchant and Manzoni (1989) found them to be highly correlated.

discretionary accruals, and control variables.<sup>8</sup> All variables are scaled by beginning-of-period total assets (Compustat Data Item #6).

$$\begin{aligned} \text{BONUS}_{ijt} = & \alpha_0 + \alpha_1 \text{POST}_t + \alpha_2 \text{EGS}_{jt} + \alpha_3 \text{EGS}_{jt} \times \text{POST}_t \\ & + \alpha_4 \text{INCACCR}_{jt} + \alpha_5 \text{INCACCR}_{jt} \times \text{POST}_t \\ & + \alpha_6 \text{DECACCR}_{jt} + \alpha_7 \text{DECACCR}_{jt} \times \text{POST}_t + \alpha_8 \text{BTM}_{jt} + \varepsilon_{ijt} \end{aligned} \quad (1)$$

where:

BONUS <sub>ijt</sub>	=	bonus (ExecuComp variable BONUS) for executive i of firm j in year t
POST <sub>t</sub>	=	1 if year t is 2002 through 2003, 0 otherwise <sup>9</sup>
EGS <sub>jt</sub>	=	net income before extraordinary items (Compustat Data Item #18) minus discretionary accruals for firm j in year t, where discretionary accruals are estimated using a modified-Jones model as described in section 4.2.1
INCACCR <sub>jt</sub>	=	discretionary accruals for firm j in year t if discretionary accruals > 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model as described in section 4.2.1
DECACCR <sub>jt</sub>	=	absolute value of discretionary accruals for firm j in year t if discretionary accruals < 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model as described in section 4.2.1
BTM <sub>jt</sub>	=	book value of equity / market value of equity for firm j at the end of fiscal year t

We include the book-to-market ratio to control for growth opportunities and scale by beginning-of-period total assets to control for firm size effects on compensation (Smith and Watts, 1992). We estimate significance using Huber/White standard errors to adjust for any potential heteroskedasticity and serial correlation in the data.

#### 4.2.1 Calculating the nondiscretionary portion of earnings and discretionary accruals

We calculate the nondiscretionary portion of earnings and discretionary accruals as follows. We calculate discretionary accruals from a cross-sectional version of the modified-Jones model (Subramanyam, 1996; Bartov, Gul and Tsui, 2000; Dechow, Sloan and Sweeney, 1995;

<sup>8</sup> To mitigate the influence of outlying observations, we winsorize values of BONUS, EGS, and BTM less than (greater than) the 1<sup>st</sup> (99<sup>th</sup>) percentile and values of INCACCR and DECACCR greater than the 99<sup>th</sup> percentile.

<sup>9</sup> 2002 may be considered, in-full or in-part, a transitional year for the changes surrounding Sarbanes-Oxley. If this is an accurate interpretation, it will bias against our finding a change in the post-period.

Guay, Kothari and Watts, 1996).<sup>10</sup> Following Kasznik (1999), we include cash flow from operations in the model.

Specifically, using all firms on Compustat with total assets greater than \$1 million, we estimate the following model for each 2-digit SIC code for each year 1996 through 2003.<sup>11</sup> All variables are scaled by beginning-of-period total assets (Compustat Data Item #6).

$$TACC_j = \beta_1 + \beta_2 \text{ADJREV}_j + \beta_3 \text{PPE}_j + \beta_4 \text{OCF}_j + \varepsilon_j \quad (2)$$

where:

- $TACC_j$  = total accruals, calculated as income before extraordinary items from the statement of cash flows (Compustat Data Item #123) minus cash flow from operations (Compustat Data Item #308) adjusted for extraordinary items and discontinued operations (Compustat Data Item #124) for firm  $j$
- $ADJREV_j$  = change in revenues (Compustat Data Item # 12) from the prior year adjusted for the change in accounts receivables (Compustat Data Item #302) from the prior year for firm  $j$
- $PPE_j$  = gross property, plant and equipment (Compustat Data Item #7) for firm  $j$
- $OCF_j$  = change in cash flow from operations (Compustat Data Item #308) from the prior year for firm  $j$

For each firm-year observation, we calculate nondiscretionary accruals using the industry- and year-specific coefficients from the above model. Then, we calculate discretionary accruals as total accruals less nondiscretionary accruals. We calculate the nondiscretionary portion of earnings (EGS) as the difference between income before extraordinary items (Compustat Data Item #18) and our estimate of discretionary accruals. Finally, we separate discretionary accruals into income-increasing (INCACCR) and income-decreasing (DECACCR) discretionary accruals.

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<sup>10</sup> Subramanyam (1996) finds that the cross-sectional Jones models are generally better specified than their time-series counterparts. Similarly, Bartov, Gul and Tsui (2000) report that the cross-sectional version of the modified-Jones model is able to consistently detect earnings management. This model has been shown to provide a reasonable measure of discretionary accruals by Dechow, Sloan and Sweeney (1995) and Guay, Kothari and Watts (1996), although the measurement is imperfect. We do not use the performance matched discretionary accruals as in Kothari, Leone and Wasley (2005) as that model is well-specified only when the researcher desires to calibrate accruals of a treatment group relative to a control group. In our specification, we expect all firms to be behaving similarly in any given year.

<sup>11</sup> Estimating total accruals by SIC code and year allows any accounting rule changes affecting accruals across all firms in an industry to be captured in non-discretionary accruals.

## 5. Results

### 5.1 Descriptive statistics related to CEO and CFO compensation

Table 1 provides descriptive statistics related to CEO and CFO compensation over the study period. The proportion of compensation from salary decreases over the study period, ranging from a high of 40% of total compensation in 1996, to a low of 34% in 1999-2002. The proportion of compensation from bonuses remains relatively stable throughout the study period, ranging between 16% and 20% of total compensation, with the exception of 2001 when bonuses account for only 13% of total compensation. However, bonus as a percentage of salary grows from 72% in 1996 to a peak of 81% in 2000, though it dropped back to 63% in 2001 only to rebound to 78% by 2003. While lower than in 1999 and 2000, bonus as a percentage of salary is higher after Sarbanes-Oxley than in the 1996 and 1998. Finally, the proportion of compensation accounted for by options increases substantially through 2001 (from 29% in 1996 to a high of 43% in 2001) and then decreases considerably by 2003 to 33%, possibly as a result of concerns about a requirement to expense stock options (see Carter et al., 2005).

### 5.2 Descriptive statistics related to dependent and independent variables

Table 2 presents descriptive statistics related to the dependent and independent variables for our sample in the pre and post Sarbanes-Oxley era. Average bonus payments in the pre-period (\$361,300) are lower than in the post-period (\$447,700) and the median increased from \$151,700 to \$200,000. Our sample firms have nondiscretionary earnings (income before extraordinary items excluding discretionary accruals) representing 5% of assets, on average. While income-increasing discretionary accruals decreased from an average of 4% of assets in the pre-period to 2% in the post-period, negative discretionary accruals (absolute value) increased from 3% to 5% of assets, on average. Finally, sample firms have total assets averaging \$3.5 billion (\$5.0 billion) and an average book-to-market ratio of 0.48 (0.56) in the pre (post) period.

### 5.3 Multivariate analysis

#### 5.3.1 Before Sarbanes-Oxley

Using a Tobit model, we estimate the regression in equation (1) of BONUS on our independent variables of interest (EGS, INCACCR, DECACCR), control variables, an indicator variable to identify years after the introduction of Sarbanes-Oxley (POST), and interactions of the indicator variable with the intercept and our primary independent variables (EGS, INCACCR, and DECACCR). Table 3 provides results of estimating that regression.

As expected, there is a positive relation between bonuses and the nondiscretionary portion of earnings ( $p < 0.01$ ), consistent with bonus contracts that incorporate the incentive to increase earnings. In addition, there is a positive relation between bonuses and income-increasing discretionary accruals ( $p < 0.01$ ). Interestingly, the relation between bonuses and income-increasing discretionary accruals is more positive than the relation between bonuses and the nondiscretionary portion of earnings (a  $\chi^2$  test of the difference in the coefficients on EGS and INCACCR is significant at  $p < 0.01$ ). This contrasts with prior research related to CEO compensation in the late 1980s and early 1990s (Balsam 1998), which suggested that income-increasing discretionary accruals were rewarded less than nondiscretionary earnings. It is jointly consistent with incentives in bonus contracts rewarding earnings more heavily as earnings approach a predetermined earnings target and with executives managing earnings upward in an effort to reach that target.

There is a marginally negative relation between bonuses and income-decreasing discretionary accruals, though significant only at  $p < 0.10$ , using a one-tailed test, suggesting a small penalty for income-decreasing accruals. However, the penalty for recording income-decreasing discretionary accruals is significantly smaller than the reward provided for non-

discretionary earnings or income-decreasing accruals (a  $\chi^2$  test of the difference in the coefficients on EGS and INCACCR vs. absolute value (DECACCR) is significant at  $p < 0.01$ ).

### 5.3.2 After Sarbanes-Oxley

After Sarbanes-Oxley, there is a significant increase in the positive relation between bonuses and the nondiscretionary portion of earnings suggesting greater reliance on nondiscretionary earnings. There remains a positive relation between bonuses and income-increasing discretionary accruals after Sarbanes-Oxley and that relation is no different than in the pre-period. In the post-period, the premium on the income-increasing discretionary accruals relative to the reward in bonus for the nondiscretionary portion of earnings remains marginally significant (a  $\chi^2$  test of the difference in the coefficients on EGS + EGS x POST and INCACCR + INCACCR x POST is significant at  $p < 0.11$ ).

While there is only a small penalty for income-decreasing discretionary accruals in the period before Sarbanes-Oxley, there is a significantly larger penalty for managing earnings downward in the period after Sarbanes-Oxley. Specifically, on average, there is a significant negative relation between bonuses and the absolute value of income-decreasing discretionary accruals (DECACCR + DECACCRxPOST negative and significant at  $p < 0.01$ ); the greater the absolute value of income-decreasing discretionary accruals, the lower the bonus. This is consistent with firms altering bonus contracts after Sarbanes-Oxley to reduce the incentive for executives to record income-decreasing accruals. Despite this penalty, though, CEOs and CFOs are penalized less for recording income-decreasing discretionary accruals than they are rewarded for nondiscretionary earnings (a  $\chi^2$  test of the difference in the coefficients on EGS + EGSxPOST and the absolute value of the coefficients on DECACCR + DECACCRxPOST is significant at  $p < 0.01$ ) or income-increasing discretionary accruals (a  $\chi^2$  test of the difference in the coefficients on INCACCR + INCACCRxPOST and the absolute value of the coefficients on

DECACCR + DECACCRxPOST is significant at  $p < 0.01$ ).<sup>12</sup> These findings are consistent with firms rewarding earnings management, possibly when such earnings management allows the firm to meet some predetermined target.<sup>13</sup>

#### 5.4 Robustness tests

##### *Robustness to alternate setting of restatements*

We hypothesize that firms alter their compensation structure in response to problems with the integrity of financial reporting by changing the relation between bonus payments and discretionary earnings. Our results during the Sarbanes-Oxley era support this claim. If our results are driven by a response to the lack of quality in financial reporting, we would expect to see a similar outcome in other settings such as financial restatements where such weaknesses are discovered. To test this, we obtain from the Government Accountability Office a list of 919 restatements involving “accounting irregularities resulting in material misstatements of financial results” (GAO-03-138) during the period between January 1997 and June 2002. Of these, 185 are for companies included in ExecuComp<sup>14</sup>.

We estimate the same regression as regression (1); however, we now define the indicator variable as whether a firm-year observation is before a restatement (if the firm restates). Similar

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<sup>12</sup> Coefficients on a continuous variable interacted with an indicator variable may not be interpretable as evidence supporting a hypothesis because the relation between the two states may actually vary over the continuum of observations. To examine whether our findings are subject to this issue, we form deciles of the earnings variables (EGS, INCACCR and DECACCR) and plot the relation between BONUS and the earnings variables in both the pre- and post- Sarbanes-Oxley eras. We find (plots not reported) that the relation between BONUS and EGS is generally the same across deciles of EGS for both the pre- and post-Sarbanes-Oxley periods, consistent with the multivariate results. The relation between BONUS and INCACCR in the post-period is generally lower in the pre-period, consistent with multivariate results that there is less of a reward for income-increasing accruals in the post-period. Finally, in all but four deciles, the relation between BONUS and DECACCR is equal or lower in the post-period, also consistent with the multivariate results that there is lower reward for income-decreasing accruals post-Sarbanes-Oxley.

<sup>13</sup> Because CFOs have authority and day-to-day responsibility over the financial reporting of the firm, it is possible that the compensation structure creates differing incentives to manage earnings between CEOs and CFOs. In untabulated results, we examine the change in the relation between bonus and earnings (non-discretionary income and income-increasing and income-decreasing accruals) after Sarbanes-Oxley between these two groups and find no evidence that it is different.

<sup>14</sup> If a firm had multiple restatements, we retained only the first.

to before, we require our restatement firms to have data in both the pre and post periods. As shown in Table 4, our findings in this alternative setting are consistent with our earlier results. After the restatement, firms reward both non-discretionary earnings and income-increasing accruals (coefficients on EGS and INCACCR are significantly positive at  $p < 0.01$ ), though the reward on income increasing-accruals is no different than the reward for non-discretionary earnings (a  $\chi^2$  test of the difference in the coefficients on EGS and INCACCR is not significant). In addition, firms penalize income-decreasing accruals (coefficient on DECACCR is significantly negative at  $p < 0.05$ ). Thus, for non-restatement firms and for restatement firms after the restatement event, the compensation contract provides very limited rewards for earning management. However, prior to the restatement, restatement firms have a significantly larger reward for income-increasing accruals (coefficient on INCACCR x PRE significantly positive at  $p < 0.01$ ) and significantly less of a penalty for income-decreasing accruals (coefficient on DECACCR x PRE significantly negative at  $p < 0.05$ ). These findings suggest that restatement firms had compensation contracts that encouraged (or did not discourage) income-increasing or income-decreasing accruals relative to non-restatement firms prior to announcing the restatements. They provide further support for our hypothesis that firms changed their compensation contracts in response to a lack of quality in financial statements.

#### *Other robustness tests*

First, it is possible that firms consider total cash compensation, not only bonus compensation, in structuring relations between compensation and reported earnings. We substitute salary + bonus as our dependent variable and find (in untabulated results) that firms reward non-discretionary earnings, income-increasing discretionary accruals and income-decreasing discretionary accruals before Sarbanes-Oxley and firms reduce rewards for income-decreasing accruals after Sarbanes-Oxley.

Second, if firms are structuring compensation contracts away from rewarding earnings management, we might expect that bonuses will have a stronger relation with less discretionary performance measures such as cash flows. We replace our proxies for non-discretionary and discretionary earnings with Cash Flows from Operations (CFO) (Compustat Data Item #308), allowing the coefficient to change in the post-Sarbanes-Oxley period (CFOxPOST). In untabulated results, the coefficient on CFOxPOST is positive and significant ( $p < 0.05$ ), suggesting that firms place greater reliance on nondiscretionary earnings in an attempt to provide lower rewards for earnings management.

Finally, it is possible that our measure of discretionary earnings is affected by accounting standard changes that occurred around the same time as Sarbanes-Oxley. In particular, the Financial Accounting Standards Board (FASB) made effective standards related to goodwill and asset writedowns. These items are included in Special Items (Compustat Data Item #17). To examine whether increased writedowns are driving the findings on income-decreasing accruals, we re-estimate discretionary accruals excluding special items.<sup>15</sup> Then, we estimate Model (1) using a measure of non-discretionary earnings that excludes both discretionary accruals and special items, measures of income-increasing and income-decreasing discretionary accruals excluding special items, and income-increasing and income-decreasing special items. Our findings (untabulated) are consistent with our findings in Table 3 and, of particular interest, there remains a greater punishment for income-decreasing accruals in the post-Sarbanes-Oxley period. Interestingly, positive (negative) special items are rewarded (punished) pre-Sarbanes-Oxley with no changes in the post-Sarbanes-Oxley period.

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<sup>15</sup> Marquardt and Wiedman (2004) find a strong correlation between estimates of discretionary accruals from the modified Jones Model and estimates of unexpected special items. Since special items are nonrecurring by nature, their value in expectation is zero.

## 6. Changes in earnings management and corporate governance after Sarbanes-Oxley

### 6.1 Changes in earnings management

Results in the prior section suggest that bonus contracts in the post-Sarbanes-Oxley era provide executives less incentive to manage earnings than in the period before Sarbanes-Oxley. In addition, Cohen, Dey and Lys (2004a) find that earnings management decreased after the implementation of Sarbanes-Oxley, although their study does not tie this decrease directly to a change in compensation contracts. In this section, we examine whether there is a change in earnings management behavior that is associated with the changes in the rewards for managing earnings after Sarbanes-Oxley (as documented in Section 5). A finding in favor of this hypothesis would be consistent with the change in bonus contracts resulting in less earnings management after Sarbanes-Oxley.

We examine whether executives in firms with higher incentives to manage earnings do manage earnings more before Sarbanes-Oxley and whether those firms engage in less earnings management after Sarbanes-Oxley. Our proxy for the incentive to manage earnings is based on firm-specific changes in bonus contracts rewarding discretionary accruals. Specifically, for each firm, we estimate the following:

$$\text{BONUS}_{ijt} = \alpha_0 + \alpha_1 \text{POST}_t + \alpha_2 \text{ABSACCR}_{jt} + \alpha_3 \text{ABSACCR}_{jt} \times \text{POST}_t + \alpha_4 \text{EGS}_{jt} + \alpha_5 \text{BTM}_{jt} + \varepsilon_{ijt} \quad (3)$$

where:

- $\text{BONUS}_{ijt}$  = bonus (ExecuComp variable BONUS) for executive  $i$  of firm  $j$  in year  $t$
- $\text{POST}_t$  = 1 if year  $t$  is 2002 through 2003, 0 otherwise<sup>16</sup>
- $\text{ABSACCR}_{jt}$  = absolute value of discretionary accruals for firm  $j$  in year  $t$ , where discretionary accruals are estimated using a modified-Jones model as described in section 4.2.1
- $\text{EGS}_{jt}$  = net income before extraordinary items (Compustat Data Item #18) minus discretionary accruals for firm  $j$  in year  $t$ , where discretionary accruals are estimated using a modified-Jones model as described in section 4.2.1
- $\text{BTM}_{jt}$  = book value of equity / market value of equity for firm  $j$  at the end of fiscal year  $t$

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<sup>16</sup> 2002 may be considered, in-full or in-part, a transitional year for the changes surrounding Sarbanes-Oxley. If this is an accurate interpretation, it will bias against our finding a change in the post-period.

We estimate firms-specific measures of the change in compensation contract by regressing bonus on the absolute value of total discretionary accruals in model (3). We do not distinguish between income-increasing and income-decreasing accruals to enable us to estimate a firm-specific measure of the change in the contract with our limited sample size. We include EGS to control for the effects of nondiscretionary earnings on bonuses. We identify firms as having changed incentives in the bonus contracts to manage earnings when the coefficient on ABSACCR is zero or positive and the coefficient on ABSACCR\*POST is negative. We are able to obtain estimates for 1,002 firms, of which 320 are classified as having lowered incentives to manage earnings in the post-Sarbanes-Oxley era.

We use three proxies for whether firms have engaged in earnings management: (1) whether firms meet or just beat analysts' quarterly earnings forecasts, (2) whether earnings this quarter are greater than earnings of the same quarter last year, and (3) whether the analyst forecast error reflects a possible "big bath". Our proxies assume firms are using income-increasing and income-decreasing accruals to meet a target or take income-decreasing accruals when a target is not likely to be met. Prior research documents that firms construct bonus compensation contracts utilizing targets (Murphy, 2001). Targets may include meeting analyst forecasts or beating prior year's earnings (Degeorge, et al. 1999). We classify a firm as having met or just beat analyst forecasts if it has a forecast error (actual – mean forecast) at quarter  $t$  between zero and one cent per share, inclusive. We classify a firm as beating prior year's earnings if earnings in quarter  $t$ , year  $k$  is greater than earnings in quarter  $t$ , year  $k-1$ . We classify a firm as possibly taking a "big bath" if the analyst forecast error is less than  $-\$0.05$ . We obtain analyst forecasts and actual earnings from IBES.

We examine whether the likelihood of engaging in earnings management declines in the post-Sarbanes-Oxley era for firms with declines in the rewards for earnings management by estimating the following regression. In our analysis, we draw on prior literature (Lang and

Lundholm, 1996) to identify control variables that capture non-earnings management reasons for achieving targets such as meeting or beating an analyst forecast.<sup>17</sup>

$$EM_{jt} = \alpha_0 + \alpha_1 POST_t + \alpha_2 HI\_CHG_j + \alpha_3 HI\_CHG_j \times POST_t + \alpha_4 CORR\_EPS_{jt} + \alpha_5 ROE\_STD_{jt} + \alpha_6 MVE_{jt} + \alpha_7 EPS\_SURPRISE_{jt} + \varepsilon_{jt} \quad (4)$$

Where:

EM (Dependent Variable):

- MEET<sub>jt</sub> = 1 if forecast error for firm j at quarter t is between 0.00 and 0.01 per share inclusive, 0 otherwise
- PY<sub>jt</sub> = 1 if earnings for firm j at quarter t year k is greater than earnings at quarter t year k-1, 0 otherwise
- BATH<sub>jt</sub> = forecast error for firm j at quarter t if forecast error is less than \$-0.05, 0 otherwise

Independent Variables:

- POST<sub>t</sub> = 1 if quarter t is in 2002 through 2003, 0 otherwise
- HI\_CHG<sub>j</sub> = 1 if firm j has non-negative coefficient on ABSACCR and negative coefficient on ABSACCR\*POST in firm-specific estimate of model (3); 0 otherwise
- CORR\_EPS<sub>jt</sub> = correlation between annual returns (cumulative monthly returns from CRSP) and earnings (annual data item #58) over the preceding ten years for firm j at quarter t
- ROE\_STD<sub>jt</sub> = standard deviation of return on equity (annual data item #172 / annual data item #60) over the preceding ten years for firm j at quarter t
- MVE<sub>jt</sub> = market value of equity (quarterly item #14 \* quarterly item #61) for firm j at the beginning of quarter t
- EPS\_SURPRISE<sub>jt</sub> = absolute value of the difference between current and prior year quarterly earnings per share (quarterly data item #19), divided by beginning of quarter price (quarterly data item #14), for firm j at quarter t

If bonus contracts in the pre-Sarbanes-Oxley period provide executives incentives to manage earnings to meet targets and executives responded to those incentives, we expect a

<sup>17</sup> To mitigate the influence of outlying observations, we winsorize values of CORR\_EPS, ROE\_STD, MVE, and EPS\_SURPRISE less than (greater than) the 1<sup>st</sup> (99<sup>th</sup>) percentile.

positive coefficient on HI\_CHG. If those incentives are lowered and executives respond to the lower incentives, we expect a negative coefficient on HI\_CHG x POST.

Table 5 reports our results of this analysis. Looking at firms' abilities to meet or just beat analyst forecasts, we find little evidence of an increased frequency before Sarbanes-Oxley or a decrease in frequency after Sarbanes-Oxley. However, in untabulated results, we estimate model (3) using only income-increasing (income-decreasing) accruals rather than the absolute value of total accruals to identify firms lowering the incentives to take income-increasing (income-decreasing) accruals. We find firms that lower incentives to take income-increasing accruals are more likely to meet or beat analysts' forecasts before Sarbanes-Oxley (coefficient on HI\_CHG is positive and significant at  $p < 0.05$ ) and less likely in the post period (a  $\chi^2$  test of POST + HI\_CHG x POST is negative and significant at  $p < 0.01$ ). In firms that lower the incentive to take income-decreasing accruals, we find a negative, but not significant, relation on the likelihood of meeting or beating analysts' forecasts before Sarbanes-Oxley and a negative, but not significant relation, in the post-period. Therefore, there appears to be evidence supporting a decrease in earnings management behavior for the firms that lower the rewards for income-increasing accruals but no evidence with respect the firms with changes in the rewards for income-decreasing; the opposing relations between earnings management and changes in rewards for income-increasing and income-decreasing accruals appear to generate the lack of overall results.

Using the ability to meet earnings of the prior year's quarter as a proxy for earnings management, we find firms with the largest overall change in the rewarding of discretionary accruals were more likely to meet prior year earnings in the pre-period (coefficient on HI\_CHG positive and significant p-value  $< 0.10$ , using a one-tailed test ). Alternatively, in the post-period, these firms are significantly less likely to meet prior year's earnings level than firms that do not lower the incentives to take discretionary accruals (coefficient on HI\_CHG x POST is significantly negative at p-value  $< 0.01$ ). These results are consistent with the lowering of rewards for discretionary accruals leading to less earnings management behavior.

Using our third proxy for earnings management, “big bath” behavior, we find that firms with the highest changes in the rewards for discretionary accruals have similar “big bath” behavior relative to firms that do not change the rewards before the introduction of Sarbanes-Oxley. While there is a general increase in “big bath” behavior after Sarbanes-Oxley, the increase is significantly less for firms that lower the incentives to take discretionary accruals than the increase for other firms (coefficient on HI\_CHG x POST is negative and significant at p-value < 0.10) indicating that the contract changes may have had a mitigating effect for those firms.

Overall, these results suggest that firms with the greater bonus-based incentives to manage earnings are more likely to manage earnings prior to Sarbanes-Oxley. Further, these firms with greater evidence of changes in the reward for discretionary accruals around the Sarbanes-Oxley period are also generally more likely to show declines in the earnings management behavior, often declines much larger than that for the firms without contract changes. These findings suggest that decreasing the reward for discretionary accruals results in less earnings management.

## 6.2 Changes in corporate governance

To further substantiate the findings in Section 5, we examine whether changes in measures of corporate governance are correlated with changes in incentives to use income-increasing or income-decreasing accruals in the post-Sarbanes-Oxley period. Concurrent changes in governance would suggest that changes in the bonus contracts did not result from an overall tenor of improved earnings quality, but rather from a specific mechanism, namely a change in governance. We examine changes in the proportion of directors that are independent on both the overall board (measured as the number of independent directors scaled by the total number of directors on the board) and on the compensation committee (measured as the number of independent directors on the compensation committee scaled by the total number of directors on the compensation committee). We examine both groups because, while the compensation

committee is charged with determining management compensation, such important decisions may be discussed at the board level as well.

Table 6 reports changes in these two governance measures. While the proportion of independent directors increases for firms that lowered the incentives for earnings management in the bonus contracts, it also increases for firms that did not change the incentives for earnings management. That there is no difference in changes in these corporate governance measures between these two groups confirms that there was an overall improvement in governance from the political climate (i.e. NYSE or NASD regulations and Sarbanes-Oxley). It also suggests that changes in the compensation contracts for executives in some firms was not due to a mechanism such as changes in the composition of the board or the compensation committee but rather resulted from some other initiative in these firms.

## **7. Conclusion**

This study examines the relation between bonus payments and discretionary and nondiscretionary components of earnings. We examine this relation before and after the introduction of Sarbanes-Oxley to consider whether the increased scrutiny of financial reporting that began around the introduction of Sarbanes-Oxley had an effect on executive compensation structures that potentially rewarded earnings management. In our research design, we consider compensation for CEOs and CFOs because both are specifically identified in the Sarbanes-Oxley Act as having primary responsibility for financial reporting.

Using a sample of 8,669 CEO-years and 8,154 CFO-years from 1996 to 2003, we find that bonus payments are positively correlated with nondiscretionary earnings and that this relation increases after the introduction of Sarbanes-Oxley. Despite this greater reliance on nondiscretionary earnings, the premium we find on income-increasing discretionary accruals before the introduction of Sarbanes-Oxley remains in the later period. Finally, we find that there is a negative relation between bonus payments and income-decreasing discretionary accruals

before Sarbanes-Oxley that becomes significantly more negative in the post-period. These findings are robust to alternative specifications and to an alternative setting of restatements where financial statements are perceived to lack integrity.

Examining whether the changes in compensation contracts are associated with changes in earnings management behavior, we find that firms that reduce the incentives for income-increasing or income-decreasing accruals are more likely to beat prior year's earnings when the rewards are high, and less likely after the rewards are lowered and penalties increased. They are also less likely to take "big baths" after the penalties were increased. These findings are consistent with a change in incentives to manage earnings resulting in less earnings management behavior. We find no evidence that changes in the compensation contracts are associated with improvements in corporate governance. This suggests that, while governance improved, it is not the motivation behind the change in bonus structures. Combined with our results using an alternative setting of restatements, it suggests that overall concerns about earnings quality may have lead these firms to change their compensation contracts.

Taken together, our findings suggest that executive compensation contracts changed concurrent with the increased scrutiny of financial reporting around the introduction of Sarbanes-Oxley and these changes are associated with changes in earnings management behavior. Before Sarbanes-Oxley, CEOs and CFOs have greater financial incentives to manage earnings – they receive higher bonus payments for income-increasing discretionary accruals than for nondiscretionary earnings, and they had limited penalties for recording income-decreasing discretionary accruals. After the introduction of Sarbanes-Oxley, greater reliance on non-discretionary earnings for bonuses occurs, and significantly greater penalties for income-decreasing accruals appear to be imposed. That these changes are associated with changes in earnings management behavior reinforces the importance of understanding the incentives created by executive compensation contracts.

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**Table 1**  
**Descriptive annual statistics related to compensation for 8,669 CEOs and 8,154 CFOs from 1996 – 2003**  
**(mean values reported)**

	1996	1997	1998	1999	2000	2001	2002	2003
# observations	1,548	1,728	1,950	2,231	2,378	2,392	2,388	2,208
Total Comp. (000's)	2,095.2	2,490.8	3,158.7	3,359.2	4,481.7	4,147.6	3,159.7	2,927.6
Salary (%)	40%	37%	36%	34%	34%	34%	34%	36%
Bonus (%)	19%	20%	17%	17%	17%	13%	16%	17%
Restricted Stk (%)	3%	3%	4%	3%	4%	4%	5%	7%
Options (%)	29%	32%	36%	38%	40%	43%	38%	33%
LTIP (%)	3%	3%	2%	2%	2%	1%	2%	2%
Other (%)	1%	1%	1%	1%	1%	1%	1%	1%
Bonus (% of cash comp)	33%	36%	33%	34%	34%	28%	32%	34%
Bonus (a) (% of salary)	72%	78%	73%	80%	81%	63%	74%	78%

(a) For this calculation, 121 observations where the executive is paid a \$1 salary are eliminated.

All compensation data are obtained from ExecuComp. Percentages, unless otherwise indicated, are based on the respective compensation component scaled by total compensation, where total compensation is ExecuComp variable TDC1, salary is ExecuComp variable SALARY, bonus is ExecuComp variable BONUS, restricted stock is ExecuComp variable RSTKGRNT, options is ExecuComp variable BLK\_VALU, LTIP is ExecuComp variable LTIP, and other is ExecuComp variable OTHANN.

**Table 2**  
**Descriptive pre- and post-Sarbanes-Oxley statistics for 8,669 CEOs and 8,154 CFO-years from 1996 – 2003**

**Panel A: Pre-Sarbanes-Oxley (12,227 observations)**

	<b>Mean</b>	<b>Median</b>
BONUS	\$361.3	\$151.7
EGS	0.05	0.05
INCACCR	0.04	0.00
DECACCR	0.03	0.00
ASSETS	\$3,463.5	\$770.0
BOOK-TO-MARKET	0.48	0.38

**Panel B: Post-Sarbanes-Oxley (4,596 observations)**

	<b>Mean</b>	<b>Difference from pre-period (p-value)</b>	<b>Median</b>	<b>Difference from pre-period (p-value)</b>
BONUS	\$447.7	0.00	\$200.0	0.00
EGS	0.05	0.01	0.05	0.51
INCACCR	0.02	0.00	0.00	0.00
DECACCR	0.05	0.00	0.01	0.00
ASSETS	\$5,037.6	0.00	\$965.7	0.00
BOOK-TO-MARKET	0.56	0.00	0.48	0.00

Variable definitions

BONUS	=	bonus (ExecuComp variable BONUS) in 000's
EGS	=	net income before extraordinary items (Compustat Data Item #18) less discretionary accruals, scaled by beginning of period assets, where discretionary accruals are estimated using a modified-Jones model
INCACCR	=	discretionary accruals if discretionary accruals > 0, scaled by beginning of period assets, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
DECACCR	=	absolute value of discretionary accruals if discretionary accruals < 0, scaled by beginning of period assets, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
ASSETS	=	total assets (in 000,000's)
BOOK-TO-MKT	=	book value of equity / market value of equity

**Table 3**

**Tobit regression of executive bonus compensation in 1996 through 2003 on nondiscretionary net income, income-increasing and income-decreasing discretionary accruals and other variables, for 8,669 CEO-years and 8,154 CFO-years in the pre- and post-Sarbanes-Oxley periods**

$$\text{BONUS}_{ijt} = \alpha_0 + \alpha_1 \text{POST}_t + \alpha_2 \text{EGS}_{jt} + \alpha_3 \text{EGS}_{jt} \times \text{POST}_t + \alpha_4 \text{INCACCR}_{jt} + \alpha_5 \text{INCACCR}_{jt} \times \text{POST}_t + \alpha_6 \text{DECACCR}_{jt} + \alpha_7 \text{DECACCR}_{jt} \times \text{POST}_t + \alpha_8 \text{BTM}_{jt} + \varepsilon_{ijt} \quad (1)$$

Variable	Coefficient	z-statistic	
Intercept	0.03174	7.96	***
POST	0.02168	2.11	**
EGS	0.00226	15.82	***
EGS x POST	0.00034	1.81	*
INCACCR	0.00330	17.73	***
INCACCR x POST	0.00001	0.01	
DECACCR	-0.00030	-1.39	#
DECACCR x POST	-0.00078	-2.47	***
BTM	-0.01454	-2.40	**
N	16,823		

Estimated using Tobit; z-statistics calculated using Huber/White standard errors.

\*, \*\*, \*\*\* Significant at 10%, 5%, 1% level, respectively, using a 2-tailed test

# Significant at 10% level, using a 1-tailed test

Variable definitions (all variables are scaled by lagged total assets)

- BONUS<sub>ijt</sub> = bonus (ExecuComp variable BONUS) (in 000,000's) for executive i of firm j in year t
- POST<sub>t</sub> = 1 if year t is 2002 through 2003, 0 otherwise
- EGS<sub>jt</sub> = net income before extraordinary items (Compustat Data Item #18) less discretionary accruals for firm j in year t, where discretionary accruals are estimated using a modified-Jones model
- INCACCR<sub>jt</sub> = discretionary accruals for firm j in year t if discretionary accruals > 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
- DECACCR<sub>jt</sub> = absolute value of discretionary accruals for firm j in year t if discretionary accruals < 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
- BTM<sub>jt</sub> = book value of equity / market value of equity for firm j at the end of fiscal year t

**Table 4**  
**Tobit regression of executive bonus compensation in 1992 through 2003 on nondiscretionary net income, income-increasing and income-decreasing discretionary accruals and other variables, for 26,629 firm observations before and after restatement events**

$$\text{BONUS}_{ijt} = \alpha_0 + \alpha_1 \text{PRE}_t + \alpha_2 \text{EGS}_{jt} + \alpha_3 \text{EGS}_{jt} \times \text{PRE}_{jt} + \alpha_4 \text{INCACCR}_{jt} + \alpha_5 \text{INCACCR}_{jt} \times \text{PRE}_t + \alpha_6 \text{DECACCR}_{jt} + \alpha_7 \text{DECACCR}_{jt} \times \text{PRE}_t + \alpha_8 \text{BTM}_{jt} + \varepsilon_{ijt}$$

Variable	Coefficient	z-statistic	
Intercept	0.05037	4.87	***
PRE	-0.03133	-2.92	***
EGS	0.00187	6.21	***
EGS x PRE	0.00044	1.32	#
INCACCR	0.00156	4.04	***
INCACCR x PRE	0.00196	4.56	***
DECACCR	-0.00101	-2.42	**
DECACCR x PRE	0.00085	1.87	*
BTM	0.00207	0.44	
N	26,629		

Estimated using Tobit; z-statistics calculated using Huber/White standard errors.

\*, \*\*, \*\*\* Significant at 10%, 5%, 1% level, respectively, using a 2-tailed test

# Significant at 10% level, using a 1-tailed test

Variable definitions (all variables are scaled by lagged total assets)

- BONUS<sub>ijt</sub> = bonus (ExecuComp variable BONUS) (in 000,000's) for executive i of firm j in year t
- PRE<sub>t</sub> = 1 if year t is before a restatement event, 0 otherwise
- EGS<sub>jt</sub> = net income before extraordinary items (Compustat Data Item #18) less discretionary accruals for firm j in year t, where discretionary accruals are estimated using a modified-Jones model
- INCACCR<sub>jt</sub> = discretionary accruals for firm j in year t if discretionary accruals > 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
- DECACCR<sub>jt</sub> = absolute value of discretionary accruals for firm j in year t if discretionary accruals < 0, 0 otherwise, where discretionary accruals are estimated using a modified-Jones model
- BTM<sub>jt</sub> = book value of equity / market value of equity for firm j at the end of fiscal year t

**Table 5**  
**Regression of earnings management in 1996 through 2003 on change in reward for earnings management group and other variables, in the pre- and post-Sarbanes-Oxley periods**

$$EM_{jt} = \alpha_0 + \alpha_1 POST_t + \alpha_2 HI\_CHG_j + \alpha_3 HI\_CHG_j \times POST_t + \alpha_4 CORR\_EPS_{jt} + \alpha_5 ROE\_STD_{jt} + \alpha_6 MVE_{jt} + \alpha_7 EPS\_SURPRISE_{jt} + \varepsilon_{jt} \quad (4)$$

Variable	Analyst Forecast			Prior Year Earnings			Big Bath		
	Coefficient	z-statistic		Coefficient	z-statistic		Coefficient	z-statistic	
Intercept	-0.68582	-25.54	***	0.09391	3.81	***	0.56412	38.53	***
POST	-0.11571	-2.74	***	0.41466	10.55	***	0.08019	5.46	***
HI_CHG	0.00334	0.08		0.04945	1.30	#	0.01293	0.94	
HI_CHG x POST	0.01552	0.61		-0.32625	-4.73	***	-0.04646	-1.83	*
CORR_EPS	-0.13367	-2.94	***	0.15051	3.55	***	-0.00362	-0.23	
ROE_STD	-0.02434	-0.67		0.03744	1.17		0.01459	1.27	
MVE	0.00001	11.33	***	-0.00000	-0.94		0.00000	6.64	***
EPS_SURPRISE	-9.23081	-11.99	***	-1.37945	-2.93	***	-2.46436	-18.19	***
N	20,422			20,422			20,422		
Pseudo R2	0.02			0.00			0.04		

Estimated using

Logit

Logit

Tobit

\*, \*\*, \*\*\* Significant at 10%, 5%, 1% level, respectively, using a 2-tailed test

# Significant at 10% level, estimated using a 1-tailed test

**Table 5 (continued)**  
**Regression of earnings management in 1996 through 2003 on change in reward for earnings management group and other variables, in the pre- and post-Sarbanes-Oxley periods**

Variable definitions

Where:

EM (Dependent Variable):

MEET <sub>jt</sub>	= 1 if forecast error for firm j at quarter t is between 0.00 and 0.01 per share inclusive, 0 otherwise
PY <sub>jt</sub>	= 1 if earnings for firm j at quarter t year k is greater than earnings at quarter t year k-1, 0 otherwise
BATH <sub>jt</sub>	= forecast error firm j at quarter t if forecast error is less than \$-0.05, 0 otherwise

Independent Variables:

POST <sub>t</sub>	= 1 if quarter t is in 2002 through 2003, 0 otherwise
HI_CHG <sub>j</sub>	= 1 if firm j has non-negative coefficient on ABSACCR and negative coefficient on ABSACCR*POST in firm-specific estimate of model (3); 0 otherwise
CORR_EPS <sub>jt</sub>	= correlation between annual returns (cumulative monthly returns from CRSP) and earnings (annual data item #58) over the preceding ten years for firm j at quarter t
ROE_STD <sub>jt</sub>	= standard deviation of return on equity (annual data item #172 / annual data item #60) over the preceding ten years for firm j at quarter t
MVE <sub>jt</sub>	= market value of equity (quarterly item #14 * quarterly item #61) for firm j at the beginning of quarter t
EPS_SURPRISE <sub>jt</sub>	= absolute value of the difference between current and prior year quarterly earnings per share (quarterly data item #19), divided by beginning of quarter price (quarterly data item #14), for firm j at quarter t

**Table 6**  
**Tests of changes in governance before and after Sarbanes-Oxley periods (1996 – 2003 is only data availability) on firms with changes in reward for earnings management**

Panel A: Based on ABSACCR coefficient change for high change firms				
	Pre-SOX	Post-SOX	p-value	n
Percent independent directors	60.5% (62.4%)	65.6% (66.9%)	0.00 (0.00)	236
Percent independent directors on compensation committee	87.8% (100.0%)	90.0% (100.0%)	0.04 (0.07)	232
Panel B: Based on ABSACCR coefficient change for non-high change firms				
	Pre-SOX	Post-SOX	p-value	n
Percent independent directors	61.4% (63.3%)	66.7% (68.5%)	0.00 (0.00)	529
Percent independent directors on compensation committee	88.7% (100.0%)	91.2% (100.0%)	0.00 (0.00)	519
Panel C: Based on ABSACCR coefficient change for high change firms relative to non-high change firms				
	High Change	Not High Change	p-value	
Difference post vs. pre SOX percent independent directors before	5.1% (4.3%)	5.3% (4.4%)	0.84 (0.55)	
Difference post vs. pre SOX percent independent directors on compensation committee	2.2% (0.0%)	2.5% (0.0%)	0.80 (0.47)	