PAY PERFORMANCE SENSITIVITY AND EARNINGS RESTATEMENTS?

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Abstract

We examine whether the board of directors adjusts the sensitivity of CEO compensation to earnings following an earnings restatement. Using a sample of 598 restating firms and 2,065 non-restating firms during the period of 1995-2011, we find that firms decrease the sensitivity of cash compensation to accounting earnings after restatements and that this decrease is more pronounced for firms that appoint new CEOs after restatements than those whose CEOs continue to remain in office after restatements. Furthermore, the results suggest that the decrease in the sensitivity of cash compensation to earnings for restating firms with new CEOs is more pronounced for firms with a higher level of institutional ownership. This highlights the monitoring role of institutional investors in the redesign of compensation contracts following restatements. Overall, our results are consistent with the argument that the board adjusts the sensitivity of cash compensation to earnings downwards following restatements to constrain earnings management and recover public confidence in the firm.

Keywords: Compensation, Restatements, Pay Performance Sensitivity, Institutional Ownership

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1. Introduction

The revelations of serious accounting scandals in the United States over the last decade at prominent companies such as Enron, WorldCom, Tyco have revealed major shortcomings in the functioning of an important institution of corporate governance - the board of directors. A competent and knowledgeable board acting as an agent of the shareholders has a fiduciary responsibility to monitor and appropriately formulate the level and form of management compensation contracts (Jensen, 1993). We focus on this primary responsibility of the board in this study and examine its monitoring effectiveness with respect to executive compensation structure in response to the quality of financial reporting by the management. Specifically, we examine whether boards adjust the sensitivity of cash compensation to earnings following an earnings restatement.

One of the most important management motivations for earnings management results from management compensation contracting (Healy and Wahlen 1999). Healy and Palepu (2003) have attributed the failure of Enron, WorldCom and the likes, partly to sub-optimal management compensation contracts, which in turn induce dramatic earnings management. Therefore, examining whether the board of directors optimally responds to the manipulation of earnings-based performance measures by altering the terms of the compensation contract is an important empirical question and throws light on the monitoring effectiveness of the board in fulfilling its fiduciary responsibilities towards the shareholders.

Prior literature has focused on examining the association between the incidence of restatements and equity compensation, especially stock options. For example, Burns and Kedia (2006) and Efendi *et al.* (2007) document a positive association between the likelihood of restatements and the level of executive stock option grants. Cheng and Farber (2008) find that firms reduce the grants of CEO stock options following restatements. However, the literature has largely ignored the effect of restatements on cash compensation and the sensitivity of compensation to performance measures. Cash compensation is a significant component of executive total pay. Core *et al.* (2003) report that for a sample of 2,271 CEOs from ExecuComp over the period of 1993-2000, CEO cash pay on average accounts for about 30% of total pay (including cash pay, long-term incentive plan payouts, stock grants and option grants).[8] Furthermore, given that bonus is the major part of cash compensation and bonus contract is explicitly

[8] In our sample, CEO cash compensation accounts for 27.3% of the total compensation.

written on accounting earnings, examining whether the board adjusts the sensitivity of cash compensation to earnings following an earnings restatement constitutes a natural and an important setting to examine our research question.

Lambert and Larcker (1987) and Sloan (1993) predict that an optimal compensation contract should put lesser weight on relatively noisier performance measures. When earnings are distorted through earnings management, they become noisy in representing true managerial effort. We therefore hypothesize that the board should reduce the sensitivity of cash compensation to earnings following restatements to alleviate the extent of moral hazard.

We identify 598 restating firms and 2,065 non-restating firms during the period of 1995-2011. The empirical analyses are conducted on two samples; one which includes only restating firms and a larger sample that includes both restating and non-restating firms. Using the sample of restating firms enables us to use the firm as its own control and mitigate the possibility of any unobservable firm characteristics confounding the accuracy of our results. On the other hand, the empirical advantage of using a full sample enables us to compare restating firms with non-restating firms in order to better control for the temporal trend in CEO compensation structure during our analysis period (e.g., Murphy 1999; Cheng and Farber 2008). We thus draw our inferences based on both samples.

Consistent with our expectation, the results using both samples show that firms decrease the sensitivity of cash compensation to earnings following restatements. In addition, firms also decrease the sensitivity of cash compensation to stock prices after restatements. This result is consistent with the notion that "garbling" financial information through earnings management also affects stock prices in the short-run (Narayanan 1985; Stein 1989) and thus stock prices for restating firms may also be a noisy proxy for managerial effort. Our results also suggest that the sensitivity of cash compensation to earnings for restating firms is higher in the pre-restatement period than for non-restating firms during the same period, but lower in the post-restatement period relative to non-restating firms. These results are consistent with the argument that extreme levels of sensitivity of cash compensation to earnings are likely to induce an earnings restatement and the board adjusts this sensitivity downwards following the restatement in order to constrain earnings management and recover public confidence in the firm.

To address the possibility that accounting irregularities and errors may affect pay performance sensitivity for restating firms differently, we further classify restatements into accounting irregularities and errors using the procedure proposed by Hennes *et al.* (2008). However, we do not find any evidence that the decrease in pay performance sensitivity following restatements differs between accounting irregularities and errors. This is consistent with prior findings that the board takes disciplinary actions against top executives even for firms with non-fraudulent restatements (e.g., Burks 2011). We next examine whether the decrease in the sensitivity of cash compensation to earnings and stock prices following restatements differs for firms whose CEOs continue to remain in office after restatements and for those who hire new CEOs following restatements. This is an important question because recent empirical evidence has documented that executive pay practices seem to be driven more by the power and influence of the CEO on the board rather than traditional principal-agent theory (Bebchuk and Fried 2006). Since our research focus is on examining board monitoring of compensation, it is insightful to examine whether the adjustment of compensation contract by the board following restatements is affected by the power and influence of the CEO.

We divide restating firms into two groups: firms with extant CEOs (i.e., the current CEO is the same as the CEO involved in the restatement) and firms with new CEOs (i.e., the current CEO is different from the CEO involved in the restatement). The results suggest that firms unambiguously decrease the sensitivity of cash compensation to earnings and stock prices following restatements for new CEOs. Furthermore, the downward adjustment of the sensitivity of cash compensation to earnings is less pronounced for firms retaining CEOs following restatements, consistent with the managerial power theory that extant CEOs may have sufficient power to influence pay performance sensitivity.

Finally, we examine the role of institutional investors in influencing the decision of the board to reduce pay performance sensitivity following restatements. Monitoring by institutional investors is an important governance mechanism for corporate management (e.g., Hartzell and Starks 2003; Chen *et al.* 2007; Gillan and Starks 2007; Aggarwal *et al*. 2011). Because institutional shareholders hold their shares on behalf of individuals or other entities, they have a fiduciary duty to understand how such corporations are managed and how their executives are compensated. We find that the decrease in the sensitivity of cash compensation to earnings following restatements for new CEOs is more pronounced for firms with a higher level of institutional ownership.

As an additional analysis, we compare the effects of restatements on the sensitivity of cash compensation in the pre-SOX period to those in the post-SOX period by partitioning the full sample into two subsamples: the pre-SOX sample and the post-SOX sample. The results based on the post-SOX sample are consistent with those based on the full sample. In contrast, the results based on the pre-SOX sample suggest that firms do not decrease the sensitivity of cash compensation to earnings in the

pre-SOX period. This result is consistent with the explanation that board-level monitoring may be deficient in the pre-SOX period. We also conduct additional analyses to examine the effects of restatements on the sensitivity of equity compensation. We find no significant effects of restatements on the sensitivity of equity compensation to earnings and stock prices.

To summarize, our study makes several important contributions to the literature on executive compensation and corporate governance. First, our study provides evidence consistent with the principle-agent theory (e.g., Lambert and Larcker 1987; Sloan 1993) by documenting a decrease in the sensitivity of cash compensation to noisier earnings after restatements. The literature on restatements (e.g., Burns and Kedia 2006; Cheng and Farber 2008) has largely ignored the effect of restatements on cash compensation, especially the sensitivity of cash compensation to performance measures, although cash compensation constitutes a significant portion of executive pay. Our results complement this literature by highlighting the implications of earnings restatements for cash compensation contracts.

Second, our results suggest that the board of directors appears to perform its monitoring obligations effectively by decreasing the sensitivity of cash compensation to earnings when earnings have been manipulated. This is a comforting finding because skeptics have questioned the role of the board in recent times about its monitoring effectiveness with respect to how executives are being compensated. This study also depicts the significant power and influence wielded by CEOs in deciding the terms of their compensation arrangements (Bebchuk and Fried 2006); consequently additional corporate governance mechanisms may be needed to monitor and control managers, especially in situations when the CEOs involved in restatements continue to remain in office.

Finally, this study also contributes to the literature on the monitoring role of institutional investors (e.g., Hartzell and Starks 2003; Gillan and Starks 2007) by showing that the decrease in the sensitivity of cash compensation to earnings for firms that appoint new CEOs after an earnings restatement is stronger for firms with a higher level of institutional ownership. This result suggests that institutional monitoring can act as a complement in reinforcing the monitoring effectiveness of the board in terms of modifying the compensation contract after an earnings restatement event.

Section 2 discusses the literature most relevant to our study. Section 3 formulates the theory behind our hypotheses. Section 4 discusses the research methodology employed to test the hypotheses. Section 5 discusses sample construction. Section 6 throws light on our empirical findings. Section 7 concludes.

2. Literature review

Our study is broadly related to studies that investigate the association between the structure of compensation contracts and aggressive financial reporting. Below, we briefly review these studies before we develop our primary hypotheses.

Healy and Wahlen (1999) argue that one of the most important motivations for earnings management comes from management compensation contracting. As long as earnings or other benchmarks are used as performance measures in compensation contract, managers will have incentives to manipulate these performance measures in their own interest. Early studies focused on how bonus compensation contract could motivate opportunistic earnings management by managers (Healy 1985; Guidry *et al.* 1999; Gaver *et* al. 1995; Holthausen *et al.* 1995). More recent studies have linked managerial equity compensation to high degree of earnings management. For example, Cheng and Warfield (2005) and Bergstresser and Philippon (2006) find that the magnitude of discretionary accruals is greater and earnings management is more prevalent at firms in which managers' wealth is more closely tied to the value of stock, most notably via stock options. Similarly, Burns and Kedia (2006) show that firms whose CEOs have large stock options are more likely to file earnings restatements.

The literature has found that managers' opportunistic behaviors can be limited by well-designed corporate governance arrangements. More specifically, prior studies find that earnings management and restatements are less likely for firms with more independent board or audit committee (Beasley 1996; Dechow *et al.* 1996; Klein 2002), higher managerial ownership (Warfield *et al.* 1995), more audit efforts (Lobo and Zhao 2013), shorter audit tenure (Stanley and DeZoort 2007), and more compensation for audit committee members (Archambeault *et al.* 2008).

Another stream of literature focuses on the consequences of restatements, and finds that restatements result in lower firm growth (Albring *et al.* 2013), a higher likelihood of auditor resignation (Huang and Scholz 2012), an increase in the cost of capital (e.g., Hribar and Jenkins 2004; Baber *et al*. 2013), an increase in information risk (Kravet and Shevlin 2010), a decrease in firm value (Palmrose *et al*. 2004), a decrease in the information content of earnings (Wilson 2008), and a higher reliance on debt financing instead of equity financing (Chen *et al.* 2013). Some studies have also focused on the effectiveness of corporate governance arrangements to take corrective actions following an earnings restatement. For example, earlier studies find that accounting restatements (Desai *et al*. 2006) and earnings management (Hazarika *et al.* 2012) increase the likelihood of subsequent CEO turnover and director turnover (Srinvasan 2005). In contrast, Burks (2011) finds that for firms with no fraudulent restatements, boards are more likely to terminate CFOs or rely on bonus penalty in the post-SOX period to discipline top executives in response to

restatement events.

Given the wealth of evidence on the economic consequences of earnings restatements and the effectiveness of the board in terminating the CEO, CFO or directors, surprisingly little evidence exists on whether the board of directors alters the terms of compensation contracts in response to opportunistic earnings management. Our study attempts to fill this important void in the literature by examining the change in the design of compensation contracts, especially pay performance sensitivity, following earnings restatements.

3. Hypothesis development

A variety of reasons have been advanced in the literature to explain the popularity of earnings in executive compensation contracts. The theoretical underpinnings for doing so are enshrined in the seminal work of Holstrom (1979). He showed that any informative signal, even if noisy, provides additional information about the agent's efforts and actions. Therefore, earnings-based performance measures, such as the return on assets, supplement stock prices by revealing more information about the agent's actions than do stock prices alone. Furthermore, accounting earnings may reflect factors that are within the executive's control, while market-wide fluctuation in stock prices may reflect market factors that are beyond management control (Gibbons and Murphy 1990). Consistent with these arguments, researchers have found that accounting earnings have significant incremental explanatory power for cash compensation above and beyond stock prices.

The board of directors' responsibility to determine optimal executive compensation contracts also involves choosing appropriate weights on performance measures in these contracts. Our study is closely linked to the literature on the sensitivity of cash compensation to performance measures. The theoretical and empirical insights from research in this area are that the sensitivity of cash compensation to a performance measure, such as accounting earnings, is increasing in the precision of this performance measure (Banker and Datar 1989; Lambert and Larcker 1987; Bushman and Indjejikian 1993; and Sloan 1993).

Baber *et al* (1998) demonstrate that the sensitivity of cash compensation to earnings varies positively with earnings persistence. Since earnings persistence is a desirable attribute of earnings in that it reflects the ability of the earnings number to predict future earnings and cash flows, the implicit conclusion seems to point to an effective monitoring role of the board of directors in mitigating CEOs' excessive focus on current earnings. More recent studies find that higher credibility of financial information is related to higher pay performance sensitivity (Bushman *et al*. 2006; and Banker *et al*. 2009).

Extensive anecdotal evidence suggests that earnings restatements have a detrimental effect on the credibility of financial information following restatements.[9] Furthermore, the precision of earnings as an indicator of managerial effort is also likely to decline when financial statements are misrepresented, as is often evidenced when an earnings restatement event takes place. Several studies provide empirical evidence consistent with a decline in the quality of financial information after a restatement. For example, Cheng *et al.* (2014) document a long-term adverse impact of restatements on external financing activities and the information content of earnings. Taken together, the above discussion suggests a decrease in the credibility and quality of accounting earnings following earnings restatements, which in turn should lead to a decrease in the sensitivity of cash compensation to earnings.

In addition, managers involved in restatements may have indulged in financial misrepresentation in order to derive higher earnings-based bonuses (e.g., Healy and Wahlen 1999), suggesting an excessive sensitivity of cash compensation to earnings and a need to alter the terms on which existing bonus compensation contracts are structured. Therefore, if the board of directors truly acts in the interests of the shareholders to reduce the potential for future opportunistic earnings management, it should reduce the sensitivity of cash compensation to earnings following an earnings restatement. Our first hypothesis therefore is stated in the alternative form as:

H1: The board of directors is likely to adjust the sensitivity of cash compensation to earnings downwards following an earnings restatement.

We also expand the above research question to settings where the CEO of the firm may or may not continue to remain in office following restatements. The managerial power hypothesis developed by Bebchuk and Fried (2006) argues that observed executive pay practices cannot be explained by a model in which shareholders contract optimally with managers. Rather, they argue that a more accurate characterization of the CEO pay process is one in which the CEO effectively sets his own pay, subject to some constraints by the market. This is in sharp contrast to the predictions for the structure of executive compensation contracts using the principal-agent approach, in which management receives an optimal incentive contract given the underlying contracting problem.

Prior studies (e.g., Desai *et al*. 2006) suggest that earnings restatements lead to management turnover, suggesting that the board of directors imposes a significant penalty on managers violating GAAP. When a CEO continues to remain in office after an earnings restatement, it suggests that the CEO may have strong power and influence within the firm and on its policies, such as the design of compensation contracts. Several studies provide evidence consistent with the argument that CEOs' involvement and power in firms with earnings restatements jeopardize the strength of corporate governance, such as the effectiveness of boards and audit committees. For example, Carcello et al. (2011) finds that the negative association between auditor committee independence (or expertise) and the likelihood of restatements is

[9] For example, the U.S. Government Accounting Office (GAO 2002) suggests that financial statement restatements have raised questions about the credibility of accounting practices, the quality of financial disclosure, and oversight in the U.S.

less pronounced for firms with CEOs involved in the selection of board members, suggesting that CEO involvement in the director selection process reduces auditor committee effectiveness. Carver (2014) finds that both the influence and the involvement of the CEO in the nominating process positively affect the retention of audit committee members following restatements.

Therefore, we argue that the decline in the sensitivity of cash compensation to earnings following a restatement is likely to be less pronounced for firms that retain the CEO after the restatement. In other words, extant CEOs by virtue of their continued employment within the firm following an earnings restatement are those that may have a significant power and influence in determining the terms of their compensation contracts, and thus are more likely to be shielded from the downward adjustment of the sensitivity of cash compensation to earnings following restatements. Hence we present our second hypothesis in the alternative form as follows:

H2: The downward adjustment of the sensitivity of cash compensation to earnings following an earnings restatement is likely to be lower for firms that retain the CEO after the restatement event compared to those that do not retain the CEO.

In our final hypothesis, we focus on restating firms with new CEOs and explore the role that institutional ownership can play in influencing the board's decision to adjust the sensitivity of cash compensation to earnings downwards following an earnings restatement. Prior research argues that relative to individual investors, institutional investors are more likely to effectively monitor agents and reduce agency costs because of their relatively higher stakes and lower coordination and communication costs (Hill and Snell 1989; Thomsen and Pedersen 2000). The literature generally provides evidence consistent with the monitoring and governance role of institutional investors. For example, prior research finds that firms with a higher level of institutional ownership are more likely to terminate poorly performing CEOs (Aggarwal *et al*. 2011), report more conservative earnings (Ramalingegowda and Yu 2012), reduce the use of discretionary accruals (Cornett *et al.* 2008), issue more frequent and more accurate earnings forecasts (Ajinkya *et al.* 2005; Karamanou and Vafeas 2005). More closely related to this study, Hartzell and Starks (2003) find that institutional investors do influence executive compensation structures directly through their monitoring and indirectly through their preferences and trading.

We expect that institutional monitoring can help reduce the sensitivity of cash compensation to earnings for restating firms with new CEOs. In other words, we expect the downward sensitivity adjustment regarding accounting earnings for restating firms with new CEOs (as stated in H2) to be supplemented by institutional monitoring, resulting in an even steeper drop in the sensitivity of cash compensation to earnings for firms with a higher level of institutional ownership. Our final hypothesis is formulated in the alternative form as:

H3: The downward adjustment of the sensitivity of cash compensation to accounting earnings for restating firms with new CEOs after restatements is likely to be more pronounced for firms that have a higher level of institutional ownership.

4. Research methodology

We conduct our empirical analyses based on both the sample of restating firms and the full sample including restating and non-restating firms. Using the sample of restating firms enables us to compare the same set of firms before and after restatements, and thus mitigates the effects of potential confounding factors such as unobservable firm characteristics related to CEO compensation. The advantage of using the full sample is that we can compare restating firms with non-restating firms to control for the temporal trend in CEO compensation structure during our analysis period (Murphy 1998; Cheng and Farber 2008). We thus draw our inferences based on both samples.

We use the following basic changes model to examine the effect of restatements on the sensitivity of cash compensation to earnings and stock prices for both the restating sample and the full sample.

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ \quad (1)$$

Consistent with prior literature (e.g., Gibbons and Murphy 1990; Sloan 1993), ΔLNTCC is the change in natural logarithm of CEO annual cash compensation, where cash compensation is defined as total salary plus bonus.[10] POST is a dummy variable equal to zero for non-restating firms or for restating firms in the pre-restatement period, and one for restating firms in the post-restatement period. ΔROA is the change in the return on assets at the end of each fiscal year.[11] RET is the raw stock return for each fiscal year. Following prior studies (Leone *et al.* 2006; Shaw and Zhang 2010), we include SALE and SALESQ to control for nonlinear size effects. Fixed firm and year effects are also included but not reported.

Model (1) does not differentiate restating firms in the pre-restatement period from non-restating firms. However, pay performance sensitivity may differ between restating firms in the pre-restatement period and non-restating firms. To address this possibility, we add a dummy variable indicating restating vs. non-restating firms (RESTATE) and its interactions with performance measures into model

[10] Several studies (e.g., Baber *et al.* 1996) use the change in cash compensation scaled by base salaries in the prior year as the dependent variable. Our main results remain unchanged, if this alternative dependent variable is used.

[11] As a robustness check, we also use the return on equity instead of return on assets as an alternative accounting performance measure. The results are qualitatively similar to those reported in Tables 4-6.

(1). The updated Model (1) is presented below:

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET \quad (2)$$

RESTATE equals one for restating firms, and zero for non-restating firms. In model (2), β_2 captures the sensitivity of cash compensation to earnings for non-restating firms, while $\beta_2+\beta_9$ and $\beta_2+\beta_4+\beta_9$ measure the sensitivity of cash compensation to earnings for restating firms in the pre- and post-restatement periods, respectively. Similarly, β_3 captures the sensitivity of cash compensation to stock prices for non-restating firms, while $\beta_3+\beta_{10}$ and $\beta_3+\beta_5+\beta_{10}$ measure the sensitivity of cash compensation to stock prices for restating firms in the pre- and post- restatement periods, respectively. A negative coefficient on POST*ROA in models (1) and (2) would be consistent with hypothesis 1 that firms decrease the sensitivity of cash compensation to earnings after restatements.

Hennes *et al.* (2008) indicate the importance of distinguishing accounting irregularities from errors in research on accounting restatements. To address the possibility that accounting irregularities and errors may have different impacts on pay performance sensitivity for restating firms, we first classify restatements into accounting irregularities and errors using the procedure proposed by Hennes *et al.* (2008). Specifically, restatements are treated as irregularities if the firm explicitly uses variants of "fraud" or "irregularity" to describe the restatement, or if there is a related SEC or Department of Justice (DOJ) investigation or an independent investigation into the misstatement. Restatements not meeting any of these criteria are treated as errors. We then add a dummy variable indicating accounting irregularities vs. errors (IRRE) and its interactions with performance measures into models (1) and (2). Specifically, the following models are used to examine whether irregularities can provide incremental explanatory power for the change in pay performance sensitivity following restatements.

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 IRRE + \beta_9 IRRE * \Delta ROA + \beta_{10} IRRE * RET \quad (3)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET + \beta_{11} IRRE + \beta_{12} IRRE * \Delta ROA + \beta_{13} IRRE * RET \quad (4)$$

IRRE equals one for restating firms in the post-restatement period with restatements classified as irregularities (i.e., IRRE = 1 if RESTATE = 1 and restatements are classified as irregularities), and zero otherwise. β_4 and β_5 measure the effects of restatements classified as errors on the sensitivity of cash compensation to earnings and stock prices, respectively, while β_{12} and β_{13} measure the *incremental* effects of restatements classified as irregularities on the sensitivity of cash compensation to earnings and stock prices, respectively.

Hypothesis 2 suggests that the decrease in the sensitivity of cash compensation to earnings following restatements should be lower for firms retaining their CEOs after restatements. To examine whether restatements affect pay performance sensitivity for extant and new CEOs differently, we add a dummy variable indicating whether restating firms retain their CEOs after restatements as well as its interaction with ΔROA and RET into models (1) and (2). The modified models are stated below:

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 EXCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 POST * \Delta ROA + \beta_6 POST * RET + \beta_7 EXCEO * \Delta ROA + \beta_8 EXCEO * RET + \beta_9 SALE + \beta_{10} SALESQ \quad (5)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 EXCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 POST * \Delta ROA + \beta_6 POST * RET + \beta_7 EXCEO * \Delta ROA + \beta_8 EXCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} RESTATE + \beta_{12} RESTATE * \Delta ROA + \beta_{13} RESTATE * RET \quad (6)$$

EXCEO is a dummy variable equal to one for restating firms in the post-restatement period with extant CEOs (i.e., EXCEO = 1 if POST = 1 and the CEO involved in the restatement remains in position), and zero otherwise. In models (5) and (6), β_5 and β_6 measure the effects of restatements on the sensitivity of cash compensation to earnings and stock prices, respectively, for restating firms with new CEOs, while $\beta_5 + \beta_7$ and $\beta_6 + \beta_8$ measure the effects of restatements on the sensitivity of cash compensation to earnings and stock prices, respectively, for restating firms with extant CEOs. Hypothesis 2 suggests that β_5 should be negative and β_7 should be positive.

Hypothesis 3 suggests that the decrease in the sensitivity of cash compensation to earnings for restating firms with new CEOs should be more

pronounced for firms with a higher level of institutional ownership. We use the following models to examine the effects of institutional ownership and other corporate governance variables on the changes in pay performance sensitivity following restatements for firms with new CEOs.

$$\begin{aligned}\Delta LNTCC = {} & \beta_0 + \beta_1 EXCEO + \beta_2 NEWCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 EXCEO * \Delta ROA + \beta_6 EXCEO * RET \\ & + \beta_7 NEWCEO * \Delta ROA + \beta_8 NEWCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} INST \\ & + \beta_{12} INST * \Delta ROA + \beta_{13} INST * RET + \beta_{14} INST * NEWCEO * \Delta ROA + \beta_{15} INST * NEWCEO * RET \\ & + \beta_{16} CEOOWN + \beta_{17} CEOOWN * \Delta ROA + \beta_{18} CEOOWN * RET + \beta_{19} CEOOWN * NEWCEO * \Delta ROA \\ & + \beta_{20} CEOOWN * NEWCEO * RET + \beta_{21} DIRPER + \beta_{22} DIRPER * \Delta ROA + \beta_{23} DIRPER * RET \\ & + \beta_{24} DIRPER * NEWCEO * \Delta ROA + \beta_{25} DIRPER * NEWCEO * RET + \beta_{26} DIROWN \\ & + \beta_{27} DIROWN * \Delta ROA + \beta_{28} DIROWN * RET + \beta_{29} DIROWN * NEWCEO * \Delta ROA \\ & + \beta_{30} DIROWN * NEWCEO * RET \end{aligned} \quad (7)$$

$$\begin{aligned}\Delta LNTCC = {} & \beta_0 + \beta_1 EXCEO + \beta_2 NEWCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 EXCEO * \Delta ROA + \beta_6 EXCEO * RET \\ & + \beta_7 NEWCEO * \Delta ROA + \beta_8 NEWCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} INST \\ & + \beta_{12} INST * \Delta ROA + \beta_{13} INST * RET + \beta_{14} INST * NEWCEO * \Delta ROA + \beta_{15} INST * NEWCEO * RET \\ & + \beta_{16} CEOOWN + \beta_{17} CEOOWN * \Delta ROA + \beta_{18} CEOOWN * RET + \beta_{19} CEOOWN * NEWCEO * \Delta ROA \\ & + \beta_{20} CEOOWN * NEWCEO * RET + \beta_{21} DIRPER + \beta_{22} DIRPER * \Delta ROA + \beta_{23} DIRPER * RET \\ & + \beta_{24} DIRPER * NEWCEO * \Delta ROA + \beta_{25} DIRPER * NEWCEO * RET + \beta_{26} DIROWN \\ & + \beta_{27} DIROWN * \Delta ROA + \beta_{28} DIROWN * RET + \beta_{29} DIROWN * NEWCEO * \Delta ROA \\ & + \beta_{30} DIROWN * NEWCEO * RET + \beta_{31} RESTATE + \beta_{32} RESTATE * \Delta ROA + \beta_{33} RESTATE * RET \end{aligned} \quad (8)$$

NEWCEO is a dummy variable equal to one for restating firms in the post-restatement period with new CEOs (i.e., NEWCEO = 1 if POST = 1 and the current CEO is different from the one involved in the restatement), and zero otherwise. INST is institutional ownership. Three additional corporate governance variables are also considered: CEOOWN, DIRPER, and DIROWN. CEOOWN is the ownership of the CEO, calculated as the number of shares held by the CEO divided by the number of shares outstanding. DIRPER is the percentage of independent directors, calculated as the number of independent directors divided by the total number of directors in the board. DIROWN is the ownership of independent directors, calculated as the total number of shares held by independent directors divided by the number of shares outstanding.

The coefficient on INST*NEWCEO*ΔROA (β_{14}) in models (7) and (8) captures the incremental effect of institutional ownership on the decrease in the sensitivity of cash compensation to earnings after restatements for firms with new CEOs. Hypothesis 3 suggests that β_{14} should be negative.

5. Sample selection and descriptive statistics

We start with all the firms with available changes in annual CEO cash compensation in Compustat Executive Compensation during the period of 1995 to 2011. Financial variables and stock prices are obtained from Compustat and CSRP, respectively. We get restatement data from GAO databases (GAO 2003, 2006), which contain 2,706 earnings restatements for 2,159 firms in the period of 1997 to 2006. CEO ownership, institutional ownership, and the percentage and the ownership of independent directors are then obtained from Compustat Executive Compensation, Thomson Reuters Institutional Holdings, and RiskMetrics Directors, respectively. After merging various databases, we eliminate observations with missing data to calculate all the necessary variables. Finally, to alleviate the effect of outliers, we delete the top and bottom 1% distribution of the variables used in the regression analyses. The full sample includes 17,073 firm-year observations for 598 restating firms and 2,065 non-restating firms.

Panel A of Table 1 shows the descriptive statistics for the full sample. The mean of total equity compensation (mean of TEC = 3.55 million dollars) is much larger than the mean of total cash compensation (mean of TCC= 1.33 million dollars), consistent with the fact that stock option and restricted stock have been the major incentive instruments for CEO compensation since 1990s. The means and the medians of ΔLNTCC and ΔLNTEC are positive, suggesting an annual increase in CEO cash and equity compensation for the majority of the sample firms. Furthermore, the sample firms appear to be heavily owned by institutional investors (mean and median of INST = 0.639 and 0.699, respectively). In contrast, both CEOs and independent directors only hold a small percentage of outstanding shares (means of CEOOWN and DIROWN = 0.02 and 0.008, respectively).

Panel B of Table 1 presents descriptive statistics of the main variables separately for restating and non-restating firms. Columns I and II compare descriptive statistics for restating firms before and after restatements. Relative to the pre-restatement period, restating firms in the post-restatement period experience a significant decrease in total cash

compensation (TCC: difference = -197.1 and p-value = 0.000) and a significant decrease in the annual change in cash compensation (ΔLNTCC: difference = -0.071 and p-value = 0.000), but a significant increase in the change in the return on assets (ΔROA: difference = 0.006 and p-value = 0.001). The results are consistent with hypothesis 1 that the sensitivity of cash compensation to earnings decreases following restatements. In contrast, stock returns and the change in equity compensation in the post-restatement period are not significantly different from those in the pre-restatement period.

Furthermore, restating firms also exhibit a significant decrease in CEO ownership (CEOOWN: difference = -0.007 and p-value = 0.000), but a significant increase in institutional ownership (INST: difference = 0.239 and p-value = 0.000), the percentage and the ownership of independent directors (DIRPER: difference = 0.145 and p-value = 0.000; DIROWN: difference = 0.001 and p-value = 0.078), suggesting an improvement of corporate governance following restatements for restating firms.

The comparison of the variables between restating firms in the post-restatement period and non-restating firms is similar to that between the pre- and the post- restatement periods for restating firms, except that the return on assets and the ownership of independent directors for restating firms in the post-restatement period are lower than those for non-restating firms (ROA: difference = -0.006 and p-value = 0.002; DIROWN: difference = -0.001 and p-value = 0.011).

Table 1. Descriptive Statistics of Main Variables
Panel A: Descriptive statistics for the full sample

	Mean	Std. Dev.	Q1	Median	Q3
TCC($ in 000's)	1,329.9	1,686.0	629.0	949.4	1,450.0
TEC($ in 000's)	3,551.5	9,747.8	427.3	1,507.5	4,113.4
ROA	0.059	0.087	0.018	0.052	0.096
ΔLNTCC	0.033	0.326	-0.033	0.041	0.166
ΔLNTEC	0.109	2.413	-0.306	0.081	0.544
ΔROA	-0.004	0.060	-0.019	0.000	0.016
RET	0.061	0.380	-0.194	0.034	0.263
RESTATE	0.120	0.325	0.000	0.000	0.000
IRRE	0.029	0.168	0.000	0.000	0.000
EXCEO	0.039	0.193	0.000	0.000	0.000
NEWCEO	0.081	0.274	0.000	0.000	0.000
INST	0.639	0.273	0.516	0.699	0.839
CEOOWN	0.020	0.045	0.001	0.003	0.013
DIRPER	0.706	0.165	0.600	0.750	0.833
DIROWN	0.008	0.018	0.000	0.002	0.007
SALE($ in 000's)	5,731.2	17,185.3	573.4	1,448.0	4,279.0

The full sample includes 17,073 observations with 2,663 unique firms.

TCC is CEO annual cash compensation in thousands of dollars, defined as total salary plus bonus.

ΔLNTCC is the change in natural logarithm of TCC from t-1 to t.

TEC is CEO annual equity compensation in thousands of dollars, calculated as the value of stock options granted plus the value of restricted stocks granted. ΔLNTEC is the change in natural logarithm of TEC from year t-1 to year t.

ROA is the return on total assets, calculated as the income before extraordinary items divided by total assets at the end of the fiscal year. ΔROA is the change in ROA from year t-1 to year t. RET is the raw stock return for the fiscal year. SALE is sales revenue.

RESTATE is a dummy variable equal to zero for non-restating firms or for restating firms in the pre-restatement period, and one for restating firms in the post-restatement period.

IRRE is a dummy variable equal to one for restating firms in the post-restatement period with restatements classified as irregularities (i.e., IRRE = 1 if RESTATE = 1 and the restatement is classified as irregularities), and zero otherwise.

EXCEO is a dummy variable equal to one for restating firms in the post-restatement period with the same CEO as the CEO involved in the restatement (i.e., EXCEO = 1 if RESTATE = 1 and the current CEO is the same as the CEO involved in the restatement), and zero otherwise. NEWCEO is a dummy variable equal to one for restating firms in the post-restatement period with a CEO different from the CEO involved in the restatement (i.e., NEWCEO = 1 if RESTATE = 1 and the current CEO is different from the CEO involved in the restatement), and zero otherwise.

INST is institutional ownership. CEOOWN is the ownership by the CEO, calculated as the number of shares held by the CEO divided by the number of shares outstanding. DIRPER is the percentage of independent directors in the board. DIROWN is the ownership by independent directors, calculated as the total number of shares held by independent directors divided by the number of shares outstanding.

Table 1 (Continued)

Panel B: Comparison of Descriptive Statistics between Restating and Non-Restating Firms

	Restating firms						Non-restating firms (3) (Obs.=12,854)			Test of differences			
	(1) Before Restatement (Obs.=2,166)			(2) After Restatement (Obs.=2,053)						(2)-(1)		(2)-(3)	
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Diff.	p-value	Diff.	p-value
TCC ($ in 000's)	1,453.2	1,582.4	1,010.8	1,256.1	1,287.0	969.4	1,321.0	1,756.7	934.6	-197.1	0.000	-64.9	0.045
TEC ($ in 000's)	3,463.0	17,000.6	993.3	4,794.6	5,708.8	3,080.5	3,367.7	8,487.1	1,444.7	1,331.6	0.001	1,426.9	0.000
ROA	0.056	0.082	0.049	0.055	0.074	0.046	0.060	0.090	0.054	-0.001	0.550	-0.006	0.002
ΔLNTCC	0.059	0.341	0.074	-0.011	0.335	0.024	0.036	0.321	0.042	-0.071	0.000	-0.047	0.000
ΔLNTEC	0.115	3.493	0.102	0.120	1.651	0.068	0.107	2.294	0.081	0.005	0.953	0.013	0.751
ΔROA	-0.006	0.061	-0.001	0.000	0.062	0.002	-0.004	0.060	0.000	0.006	0.001	0.004	0.009
RET	0.053	0.394	0.020	0.063	0.384	0.044	0.062	0.377	0.035	0.010	0.402	0.001	0.882
INST	0.520	0.301	0.596	0.759	0.222	0.810	0.640	0.267	0.693	0.239	0.000	0.119	0.000
CEOOWN	0.020	0.044	0.003	0.013	0.034	0.003	0.021	0.046	0.004	-0.007	0.000	-0.008	0.000
DIRPER	0.647	0.179	0.667	0.792	0.118	0.818	0.702	0.164	0.727	0.145	0.000	0.090	0.000
DIROWN	0.006	0.015	0.002	0.007	0.017	0.002	0.008	0.018	0.002	0.001	0.078	-0.001	0.011
SALE ($ in 000's)	5,533.6	11,723.3	1,450.0	8,202.3	17,563.2	2,155.6	5,369.8	17,854.1	1,337.1	2,668.8	0.000	2,832.6	0.000

All the variables are as defined in Panel A of Table 1.

Panel A of Table 2 presents the distribution of restating firms by initial restating year. Columns I and II show the yearly distribution of restatements classified by restatement type (i.e., irregularities vs. errors), while columns III and IV show the yearly distribution of restatements classified by the status of CEO turnover following restatements. The number of restating firms tends to increase during the period of 1997-2005 with the most restating firms in 2005 (154 firms). There is a dramatic decrease in the number of restating firms in 2006 (39 firms) relative to 2005. Untabulated results indicate that restating firms with irregularities (errors) accounts for 25.9% (74.1%) of all restating firms, and that restating firms without (with) CEO turnover following restatements account for 40.5% (59.5%) of all restating firms.

Panel B of Table 2 presents the industry distribution of restating and non-restating firms based on industry classifications specified in Barth et al. (1998). Columns I and II (columns III and IV) report the number and the proportion of restating (non-restating) firms in each industry as a percentage of the total number of restating (non-restating) firms. Column V reports the ratio of the number of restating firms to the total number of firms for each industry. The sample of restating firms (598 firms) tends to concentrate in the industries of durable manufacturers (17.89%), computers (13.71%), and retail (19.57%). The sample of non-restating firms (2,065 firms) tends to concentrate in the industries of durable manufacturers (20.63%), computers (13.08%), and financial institutions (15.45%). Furthermore, column V suggests that compared to the other industries, the retail industry is more likely to have restatements with the number of restating firms (117 firms) accounting for 40.48% of all the firms in the industry.

Table 2. Yearly and Industry Distribution of Sample Firms

Panel A: Distribution of Restating firms by Initial Restating Year

Restating Year	Classified by Restatement Type		Classified by CEO Turnover		Total	Percentage (No. of Firms in Each Year/Total No. of Firms)
	No. of Restating Firms with Irregularities I	No. of Restating Firms with Errors II	No. of Restating Firms without CEO Turnover III	No. of Restating Firms with CEO Turnover IV		
1997	8	5	4	9	13	2.17%
1998	10	5	7	8	15	2.51%
1999	9	27	12	24	36	6.02%
2000	11	28	7	32	39	6.52%
2001	12	63	28	47	75	12.54%
2002	30	42	15	57	72	12.04%
2003	22	53	35	40	75	12.54%
2004	23	57	39	41	80	13.38%
2005	23	131	73	81	154	25.75%
2006	7	32	22	17	39	6.52%
Total	155	443	242	356	598	100.00%

Panel B: Industry Distribution of Restating vs. Non-Restating Firms

Industry	No. of Restating Firms - I	Percent II	No. of Non-Restating Firms III	Percent IV	No. of Restating Firms/ No. of Firms in Each Industry - V
1. Mining and construction	10	1.67%	47	2.28%	17.54%
2. Food	15	2.51%	56	2.71%	21.13%
3. Textiles, printing, and Publishing	28	4.68%	105	5.08%	21.05%
4. Chemicals	12	2.01%	64	3.10%	15.79%
5. Pharmaceuticals	15	2.51%	79	3.83%	15.96%
6. Extractive industries	24	4.01%	91	4.41%	20.87%
7. Durable manufacturers	107	17.89%	426	20.63%	20.08%
8. Computers	82	13.71%	270	13.08%	23.30%
9. Transportation	26	4.35%	105	5.08%	19.85%
10. Utilities	36	6.02%	104	5.04%	25.71%
11. Retail	117	19.57%	172	8.33%	40.48%
12. Financial institutions	63	10.54%	319	15.45%	16.49%
13. Insurance and Real Estate	14	2.34%	70	3.39%	16.67%
14. Services	47	7.86%	152	7.36%	23.62%
15. Other	2	0.33%	5	0.24%	28.57%
Total	598	100.00%	2,065	100.00%	

Table 3 reports the correlations of the main variables. The Pearson (Spearman) correlations are shown above (below) the diagonal. P-values for each correlation coefficient are reported in the parentheses. Consistent with prior literature (e.g., Gibbons and Murphy 1990), ΔROA is positively correlated with ΔLNTCC (Pearson correlation = 0.19) and ΔLNTEC (Pearson correlation = 0.04). Similarly, RET is also positively correlated with ΔLNTCC (Pearson correlation = 0.18) and ΔLNTEC (Pearson correlation = 0.03). Furthermore, ΔLNTCC is negatively correlated with RESATE (Pearson correlation = -0.05), EXCEO (Pearson correlation = -0.03), and NEWCEO (Pearson correlation = -0.04), suggesting a decrease in the change in CEO cash compensation following restatements. In addition, RESTATE is correlated with INST, CEOOWN, DIRPER, and DIROWN, indicating the importance of considering these corporate governance variables in the empirical analyses.

6. Empirical Results

6.1 Main results

Table 4 reports the effects of restatements on the sensitivity of cash compensation to earnings and stock prices. Columns I and II present the results for the sample of restating firms based on models (1) and (3), respectively. As expected, the change in cash compensation (ΔLNTCC) is positively associated with both the change in return on assets (ΔROA) and stock returns (RET) at the 0.01 level. Consistent with hypothesis 1, the coefficient on POST*ΔROA is negative at the 0.01 level (coefficient = -0.949 and -0.969 in Columns I and II, respectively), suggesting that firms decrease the sensitivity of cash compensation to earnings following restatements.

Interestingly, the coefficient on POST*RET is also significantly negative (coefficient = -0.107 and -0.132 in Columns I and II, respectively), suggesting that firms also decrease the sensitivity of cash compensation to stock prices after restatements. This is consistent with the notion that when earnings are manipulated, stock prices that incorporate accounting information also tend to deviate from fundamental values (Stein 1989; Narayanan 1985). Consequently, boards are likely to put a lower weight on stock prices in periods after earnings restatements. In the absence of reliable accounting or market-based measures of performance, boards may put higher weights on non-financial performance measures, such as product quality, customer satisfaction, and market share, in the cash compensation contracts (Banker et al. 2000).

Furthermore, the coefficients on IRRE* ΔROA and IRRE* RET are not significant, indicating that the decrease in pay performance sensitivity following restatements does not differ significantly between accounting errors and irregularities. The results are consistent with prior findings that systematic and intentional earnings management exists prior to restatements for both non-fraudulent and fraudulent restatements (Ettredge *et al.* 2010) and that the board takes disciplinary actions against top executives even for firms with non-fraudulent restatements (e.g., Burks 2011).

Columns III to VI present the results for the full sample based on models (1) through (4), respectively. The results are consistent with those for the restating sample. In all the four columns, the coefficients on both POST*ΔROA and POST*RET are negative at the 0.01 level, suggesting a decrease in pay performance sensitivity after a restatement. More importantly, the coefficients on both RESTATE*ΔROA (coefficient = 0.442 and 0.443 in Columns IV and VI, respectively) and RESTATE*RET (coefficient = 0.050 and 0.049 in Columns IV and VI, respectively) are positive at the 0.01 level, indicating that the sensitivity of cash compensation to earnings and stock prices for restating firms in the pre-restatement period is significantly higher than that for non-restating firms. The results support the argument that excessive pay performance sensitivity may lead to earnings restatements and financial frauds (e.g., Healy and Palepu 2003).

Table 5 examines whether the impacts of restatements on the sensitivity of cash compensation to earnings and stock prices differ between extant and new CEOs. Columns I and II present the results based on the sample of restating firms and the full sample, respectively. The coefficient on POST*ΔROA (coefficient = -1.164 and -1.194 in columns I and II, respectively) is negative and the coefficient on EXCEO* ΔROA (coefficient = 0.773 and 0.697 in columns I and II, respectively) is positive at the 0.01 level, suggesting that firms decrease the sensitivity of cash compensation to earnings for new CEOs after restatements and that the downward adjustment of this sensitivity is muted for restating firms with extant CEOs. The results are consistent with hypothesis 2 that extant CEOs may have the ability and power to influence the design of cash compensation contracts and to retain a relatively high level of sensitivity of cash compensation to earnings even after restatements.

Furthermore, the coefficient on POST*RET (coefficient = -0.132 and -0.111 in columns I and II, respectively) is negative at the 0.01 level, suggesting that firms also decrease the sensitivity of cash compensation to stock prices for new CEOs after restatements. In addition, we find mixed evidence on whether restatements have differential impacts on the sensitivity of cash compensation to stock prices between extant and new CEOs. In particular, the coefficient on EXCEO*RET is not significant in column I, but is significantly positive (coefficient = 0.062) at the 0.10 level in column II.

Table 3. Pearson and Spearman correlations

	ΔLNTCC	ΔLNTEC	ΔROA	RET	RESTATE	EXCEO	NEWCEO	INST	CEOOWN	DIRPER	DIROWN	SALE
ΔLNTCC		-0.01	0.19	0.18	-0.05	-0.03	-0.04	-0.04	0.00	-0.06	-0.01	-0.01
		(0.05)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.95)	(0.00)	(0.27)	(0.19)
ΔLNTEC	0.03		0.04	0.03	0.00	-0.00	0.00	0.00	0.01	0.00	-0.01	-0.00
	(0.00)		(0.00)	(0.00)	(0.83)	(0.71)	(0.61)	(0.79)	(0.22)	(0.87)	(0.34)	(0.60)
ΔROA	0.25	0.11		0.26	0.02	0.02	0.01	0.03	-0.01	0.03	-0.02	0.01
	(0.00)	(0.00)		(0.00)	(0.00)	(0.02)	(0.06)	(0.00)	(0.23)	(0.00)	(0.01)	(0.13)
RET	0.19	0.08	0.29		0.00	-0.00	0.00	0.05	0.01	0.01	-0.01	-0.02
	(0.00)	(0.00)	(0.00)		(0.77)	(0.76)	(0.58)	(0.00)	(0.30)	(0.26)	(0.14)	(0.05)
RESTATE	-0.06	-0.01	0.03	0.00		0.54	0.81	0.16	-0.06	0.19	-0.01	0.05
	(0.00)	(0.37)	(0.00)	(0.59)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)
EXCEO	-0.03	-0.00	0.02	-0.00	0.54		-0.06	0.08	0.01	0.08	0.01	0.02
	(0.00)	(0.54)	(0.02)	(0.62)	(0.00)		(0.00)	(0.00)	(0.42)	(0.00)	(0.07)	(0.00)
NEWCEO	-0.05	-0.01	0.02	0.01	0.81	-0.06		0.14	-0.07	0.17	-0.03	0.05
	(0.00)	(0.52)	(0.00)	(0.32)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
INST	-0.05	0.00	0.04	0.05	0.19	0.08	0.17		-0.10	0.25	-0.02	-0.05
	(0.00)	(0.77)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.02)	(0.00)
CEOOWN	-0.04	0.00	-0.02	-0.02	-0.04	0.04	-0.08	-0.00		-0.29	0.04	-0.09
	(0.00)	(0.71)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.59)		(0.00)	(0.00)	(0.00)
DIRPER	-0.06	0.00	0.03	0.02	0.21	0.08	0.19	0.26	-0.24		0.04	0.10
	(0.00)	(0.54)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)
DIROWN	-0.03	-0.04	-0.06	-0.07	0.02	0.05	-0.02	0.14	0.21	0.06		-0.08
	(0.00)	(0.00)	(0.00)	(0.00)	(0.05)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)		(0.00)
SALE	0.00	0.01	0.04	0.02	0.11	0.05	0.09	0.01	-0.34	0.21	-0.34	
	(0.87)	(0.06)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.41)	(0.00)	(0.00)	(0.00)	

Table 3 reports the correlations of the main variables. The Pearson (Spearman) correlations are shown above (below) the diagonal. P-values for each correlation coefficient are reported in the parentheses. All the variables are as defined in Panel A of Table 1.

Table 4. The Effect of Restatements on the Sensitivity of Cash Compensation

	The Sample of Restating Firms				The Full Sample							
	I		II		III		IV		V		VI	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
POST	0.051	(2.08)**	0.054	(2.16)**	0.001	(0.10)	0.000	(-0.02)	0.006	(0.47)	0.006	(0.42)
ΔROA	1.284	(11.63)***	1.282	(11.57)***	0.936	(22.40)***	0.865	(19.08)***	0.935	(22.39)***	0.865	(19.10)***
RET	0.189	(10.82)***	0.191	(10.92)***	0.140	(20.37)***	0.133	(17.76)***	0.141	(20.54)***	0.133	(17.78)***
POST* ΔROA	-0.949	(-5.96)***	-0.969	(-5.64)***	-0.616	(-5.29)***	-0.973	(-6.47)***	-0.674	(-5.14)***	-1.032	(-6.35)***
POST* RET	-0.107	(-3.96)***	-0.132	(-4.55)***	-0.048	(-2.50)**	-0.093	(-3.83)***	-0.062	(-2.87)***	-0.105	(-4.01)***
SALE	0.000	(0.25)	0.000	(1.17)	0.000	(-1.45)	0.000	(-1.38)	0.000	(-1.43)	0.000	(-1.37)
SALESQ	0.000	(-0.78)	0.000	(-2.12)**	0.000	(0.79)	0.000	(0.72)	0.000	(0.78)	0.000	(0.72)
RESTATE							0.228	(1.57)			0.219	(1.51)
RESTATE* ΔROA							0.442	(3.86)***			0.443	(3.87)***
RESTATE* RET							0.050	(2.85)***			0.049	(2.76)***
IRRE			-0.021	(-0.80)					-0.025	(-1.01)	-0.024	(-0.97)
IRRE** ΔROA			0.329	(1.24)					0.201	(0.78)	0.201	(0.78)
IRRE*RET			0.061	(1.40)					0.047	(1.12)	0.048	(1.16)
Fixed firm and year effects	Yes		Yes		Yes		Yes		Yes		Yes	
Adjusted R^2	0.196		0.196		0.189		0.192		0.190		0.192	
No. of Obs.	4,219		4,219		17,073		17,073		17,073		17,073	

Table 4 reports the effects of restatements on the sensitivity of cash compensation to earnings and stock prices.
Columns I and II of Panel A present the results for the sample of restating firms based on models (1) and (3), respectively. Columns III to VI present the results for the full sample based on models (1) through (4), respectively.

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ \quad (1)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET \quad (2)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 IRRE + \beta_9 IRRE * \Delta ROA + \beta_{10} IRRE * RET \quad (3)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET + \beta_{11} IRRE + \beta_{12} IRRE * \Delta ROA + \beta_{13} IRRE * RET \quad (4)$$

All the variables are as defined in Panel A of Table 1. The intercept, and fixed firm and year effects are included in the regressions, but are not reported. *, **, and *** denote significance of coefficients at the 10%, 5% and 1% levels respectively, using a two tailed test.

Table 5. Impact of Restatement on the Sensitivity of Cash Compensation across Extant and New CEOs

	Sample of Restating Firms		Full Sample	
	I		II	
	Coeff.	t-stat	Coeff.	t-stat
POST	0.043	(1.52)	-0.007	(-0.47)
EXCEO	0.009	(0.44)	0.012	(0.64)
ΔROA	1.283	(11.66)***	0.865	(19.11)***
RET	0.188	(10.81)***	0.133	(17.77)***
POST* ΔROA	-1.164	(-6.55)***	-1.194	(-7.07)***
POST*RET	-0.132	(-4.33)***	-0.111	(-4.03)***
EXCEO* ΔROA	0.773	(3.25)***	0.697	(3.05)***
EXCEO*RET	0.059	(1.54)	0.062	(1.68)*
SALE	0.000	(1.23)	0.000	(-1.36)
SALESQ	0.000	(-2.11)**	0.000	(0.70)
RESTATE			0.245	(1.69)*
RESTATE* ΔROA			0.444	(3.88)***
RESTATE* RET			0.049	(2.76)***
Fixed firm and year effects	Yes		Yes	
Adjusted R^2	0.202		0.193	
No. of Obs.	4,219		17,073	

Table 5 examines whether the impacts of restatements on the sensitivity of cash compensation to earnings and stock prices differ between extant and new CEOs. Columns I and II present the results for the sample of restating firms and the full sample based on models (5) and (6), respectively.

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 EXCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 POST * \Delta ROA + \beta_6 POST * RET + \beta_7 EXCEO * \Delta ROA + \beta_8 EXCEO * RET + \beta_9 SALE + \beta_{10} SALESQ \quad (5)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 EXCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 POST * \Delta ROA + \beta_6 POST * RET + \beta_7 EXCEO * \Delta ROA + \beta_8 EXCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} RESTATE + \beta_{12} RESTATE * \Delta ROA + \beta_{13} RESTATE * RET \quad (6)$$

All the variables are as defined in Panel A of Table 1. Columns I and II present the results based on the full sample and the sample of restating firms, respectively. The intercept, and fixed firm and year effects are included in the regressions, but are not reported. *, **, and *** denote significance of coefficients at the 10%, 5% and 1% levels respectively, using a two tailed test.

Table 6 reports the moderating role of institutional ownership in the downward adjustment of the sensitivity of cash compensation to earnings for new CEOs after restatements. Columns I and II present the results based on the sample of restating firms and the full sample, respectively. Consistent with hypothesis 3, the coefficient on INST*NEWCEO*ΔROA (coefficient = -2.081 and t-stat = -2.99 in column I; coefficient = -1.426 and t-stat = -2.35 in column II) is significantly negative, suggesting that the decrease in the sensitivity of cash compensation to earnings for new CEOs after restatements is more pronounced for firms with a higher level of institutional ownership. In contrast, the coefficient on INST*NEWCEO*RET is not significant in both columns, suggesting that institutional ownership does not affect the adjustment of the sensitivity of cash compensation to stock prices after restatements.

In addition, CEO ownership (CEOOWN), the percentage of independent directors (DIRPER), and the ownership of independent directors (DIROWN) appear not to affect the adjustment of pay performance sensitivity after restatements. Overall, the results reported in Table 6 highlight the important governance and monitoring role of institutional ownership in the downward adjustment of the sensitivity of cash compensation to earnings following restatements.

Table 6. The Moderating Role of Corporate Governance in the Association between Pay Performance Sensitivity and Earnings Restatements for the full sample

	Sample of Restating Firms		Full Sample	
	I		II	
	Coeff.	t-stat	Coeff.	t-stat
EXCEO	0.045	(1.80)*	0.006	(0.41)
NEWCEO	0.042	(1.47)	-0.006	(-0.44)
ΔROA	1.022	(2.46)**	1.445	(7.43)***
RET	0.182	(2.83)***	0.262	(8.61)***
EXCEO* ΔROA	-0.492	(-2.00)**	-0.356	(-1.63)
EXCEO*RET	-0.075	(-1.85)*	-0.019	(-0.53)
NEWCEO* ΔROA	-0.639	(-0.53)	-1.267	(-1.15)
NEWCEO*RET	0.185	(1.00)	0.061	(0.36)
SALE	0.000	(1.39)	0.000	(-1.19)
SALESQ	0.000	(-2.29)**	0.000	(0.66)
INST	0.043	(1.27)	0.034	(1.94)*
INST* ΔROA	0.638	(1.95)*	-0.006	(-0.04)
INST*RET	-0.060	(-1.17)	-0.140	(-5.79)***
INST*NEWCEO*ΔROA	-2.081	(-2.99)***	-1.426	(-2.35)**
INST*NEWCEO*RET	-0.003	(-0.02)	0.080	(0.71)
CEOOWN *NEWCEO*ΔROA	-0.036	(-0.01)	-1.267	(-0.2)
CEOOWN *NEWCEO*RET	0.353	(0.40)	-0.089	(-0.11)
DIRPER *NEWCEO*ΔROA	1.094	(0.76)	1.605	(1.25)
DIRPER *NEWCEO*RET	-0.405	(-1.80)*	-0.231	(-1.15)
DIROWN*NEWCEO*ΔROA	12.027	(1.01)	7.986	(0.77)
DIROWN*NEWCEO*RET	-2.028	(-1.41)	-1.969	(-1.71)*
RESTATE			0.255	(1.74)*
RESTATE* ΔROA			0.397	(3.38)***
RESTATE* RET			0.029	(1.63)
Other corporate governance variables and their interactions with ΔROA and RET	Yes		Yes	
Fixed firm and year effects	Yes		Yes	
Adjusted R^2	0.201		0.195	
No. of Obs.	4,219		17,073	

Table 6 reports the moderating role of institutional ownership in the downward adjustment of the sensitivity of cash compensation to earnings for new CEOs after restatements. Columns I and II present the results for the sample of restating firms and the full sample based on models (7) and (8), respectively.

$$\begin{aligned}\Delta LNTCC = {} & \beta_0 + \beta_1 EXCEO + \beta_2 NEWCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 EXCEO * \Delta ROA + \beta_6 EXCEO * RET \\ & + \beta_7 NEWCEO * \Delta ROA + \beta_8 NEWCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} INST \\ & + \beta_{12} INST * \Delta ROA + \beta_{13} INST * RET + \beta_{14} INST * NEWCEO * \Delta ROA + \beta_{15} INST * NEWCEO * RET \\ & + \beta_{16} CEOOWN + \beta_{17} CEOOWN * \Delta ROA + \beta_{18} CEOOWN * RET + \beta_{19} CEOOWN * NEWCEO * \Delta ROA \\ & + \beta_{20} CEOOWN * NEWCEO * RET + \beta_{21} DIRPER + \beta_{22} DIRPER * \Delta ROA + \beta_{23} DIRPER * RET \\ & + \beta_{24} DIRPER * NEWCEO * \Delta ROA + \beta_{25} DIRPER * NEWCEO * RET + \beta_{26} DIROWN \\ & + \beta_{27} DIROWN * \Delta ROA + \beta_{28} DIROWN * RET + \beta_{29} DIROWN * NEWCEO * \Delta ROA \\ & + \beta_{30} DIROWN * NEWCEO * RET \end{aligned} \quad (7)$$

$$\begin{aligned}\Delta LNTCC = {} & \beta_0 + \beta_1 EXCEO + \beta_2 NEWCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 EXCEO * \Delta ROA + \beta_6 EXCEO * RET \\ & + \beta_7 NEWCEO * \Delta ROA + \beta_8 NEWCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} INST \\ & + \beta_{12} INST * \Delta ROA + \beta_{13} INST * RET + \beta_{14} INST * NEWCEO * \Delta ROA + \beta_{15} INST * NEWCEO * RET \\ & + \beta_{16} CEOOWN + \beta_{17} CEOOWN * \Delta ROA + \beta_{18} CEOOWN * RET + \beta_{19} CEOOWN * NEWCEO * \Delta ROA \\ & + \beta_{20} CEOOWN * NEWCEO * RET + \beta_{21} DIRPER + \beta_{22} DIRPER * \Delta ROA + \beta_{23} DIRPER * RET \\ & + \beta_{24} DIRPER * NEWCEO * \Delta ROA + \beta_{25} DIRPER * NEWCEO * RET + \beta_{26} DIROWN \\ & + \beta_{27} DIROWN * \Delta ROA + \beta_{28} DIROWN * RET + \beta_{29} DIROWN * NEWCEO * \Delta ROA \\ & + \beta_{30} DIROWN * NEWCEO * RET + \beta_{31} RESTATE + \beta_{32} RESTATE * \Delta ROA + \beta_{33} RESTATE * RET \end{aligned} \quad (8)$$

All the variables are as defined in Panel A of Table 1. Columns I and II present the results based on the full sample and the sample of restating firms, respectively. The intercept, and fixed firm and year effects are included in the regressions, but are not reported. *, **, and *** denote significance of coefficients at the 10%, 5% and 1% levels respectively, using a two tailed test.

6.1. Additional Analysis

In this section, we first examine whether the SOX may affect the downward adjustment of the sensitivity of cash compensation to earnings and stock prices. Prior studies suggest an increase in the strength of corporate governance after the SOX. We thus expect that the downward adjustment of the sensitivity of cash compensation to earnings should be stronger in the post-SOX period compared to the pre-SOX period. The full sample is partitioned into two subsamples: the pre-SOX sample including all the firm-year observations from 1995 to 2001 and the post-SOX sample covering the period of 2002-2011. We then repeat our analyses for the two subsamples.

Table 7 compares the effects of restatements on the sensitivity of cash compensation to earnings and stock prices in the pre-SOX period to those in the post-SOX period. Columns I and II report the results in the pre-SOX period based on models (2) and (4), respectively. The coefficient on POST*ΔROA is not significant in both columns I and II, suggesting that firms do not decrease the sensitivity of cash compensation to earnings after restatements in the pre-SOX period. Interestingly, the coefficient on POST*RET is positive, suggesting that firms increase the sensitivity of cash compensation to stock prices after restatements in the pre-SOX period. One possible explanation for this result is that the board may increase the weight on stock prices in cash compensation to constrain managers' myopic focus on earnings in the pre-SOX period.

Columns III, IV, and V report the results in the post-SOX period based on models (2), (4), and (6), respectively. Consistent with the results in Tables 4 and 5, the coefficient on POST*ΔROA is negative in all the three columns and the coefficient on EXCEO*ΔROA is positive in Column V, suggesting that firms decrease the sensitivity of cash compensation to accounting earnings after restatements and this decrease is less pronounced for firms with extant CEOs. In other words, the introduction of SOX seems to have had a positive impact on board monitoring of executive compensation practices. Untabulated results also indicate that the downward adjustment of the sensitivity of cash compensation to earnings is also larger for firms with a higher level of institutional investors. Taken together, the results reported in Table 7 are consistent with the deficiency in corporate governance in the pre-SOX period and suggest that the results documented in Tables 4-6 are driven by the post-SOX period.

We next examine whether restating firms decrease the sensitivity of *equity* compensation to earnings and stock prices following restatements for the full sample (The results based on the sample of restating firms are similar to those reported in Tables 7 and 8.). We begin with a model similar to model (2) to examine the effects of restatements on the sensitivity of equity compensation to earnings and stock prices.

$$\begin{aligned}\Delta LNTEC = {} & \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET \\ & + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET\end{aligned} \quad (9)$$

We then add IRRE, IRRE*ΔROA, and IRRE*RET as additional explanatory variables into model (9) to investigate whether irregularities can provide incremental explanatory power for the change in the sensitivity of equity compensation following restatements.

$$\begin{aligned}\Delta LNTEC = {} & \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET \\ & + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET \\ & + \beta_{11} IRRE + \beta_{12} IRRE * \Delta ROA + \beta_{13} IRRE * RET\end{aligned} \quad (10)$$

Table 8 reports the results based on models (9) and (10). In contrast to the results regarding the sensitivity of CEO cash compensation, the coefficients on POST*ΔROA and POST*RET are not significant in both columns, suggesting that restatements do not affect the sensitivity of equity compensation to earnings and stock prices. In addition, the coefficients on RESTATE*ΔROA and RESTATE*RET are not significant, indicating no difference in the sensitivity of equity compensation between restating firms in the pre-restatement period and non-restating firms. The coefficients on IRRE*ΔROA and IRRE*RET in column II are also not significant, suggesting that the board does not adjust the sensitivity of equity compensation even after restatements classified as irregularities.

Table 7. The Effects of Restatements on the Sensitivity of Cash Compensation in the Pre- vs. Post- SOX period for the Full Sample

	Pre-SOX Period				Post-SOX Period					
	I		II		III		IV		V	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
POST	0.050	(0.84)	0.088	(1.42)	0.039	(1.94)*	0.050	(2.31)**	0.036	(1.46)
EXCEO									0.005	(0.20)
ΔROA	0.076	(18.12)***	1.377	(18.14)***	0.539	(9.11)***	0.539	(9.10)***	0.539	(9.11)***
RET	0.011	(13.84)***	0.159	(13.88)***	0.100	(9.56)***	0.100	(9.58)***	0.099	(9.53)***
POST* ΔROA	0.463	(0.19)	0.607	(1.08)	-1.062	(-3.39)***	-1.035	(-3.22)***	-1.180	(-3.67)***
POST* RET	0.107	(4.15)***	0.563	(3.63)***	-0.241	(-5.47)***	-0.243	(-5.37)***	-0.258	(-5.58)***
EXCEO * ΔROA									0.593	(2.39)**
EXCEO * RET									0.052	(1.36)
SALE	0.000	(2.14)**	0.000	(2.32)**	0.000	(-0.88)	0.000	(-0.87)	0.000	(-0.9)
SALESQ	0.000	(-0.89)	0.000	(-1.03)	0.000	(0.83)	0.000	(0.83)	0.000	(0.85)
RESTATE	0.173	(1.08)	0.186	(1.08)	0.346	(1.25)	0.341	(1.20)	0.394	(1.41)
RESTATE* ΔROA	0.143	(0.44)	0.066	(0.46)	0.733	(2.46)**	0.655	(2.18)**	0.690	(2.31)**
RESTATE* RET	0.022	(-0.56)	-0.013	(-0.59)	0.206	(5.03)***	0.208	(5.06)***	0.204	(4.98)***
IRRE			-0.124	(-1.14)			-0.060	(-1.23)		
IRRE** ΔROA			-1.610	(-1.67)*			0.273	(0.99)		
IRRE*RET			-0.213	(-1.00)			0.013	(0.29)		
Fixed firm and year effects	Yes		Yes		Yes		Yes		Yes	
Adjusted R^2	0.196		0.197		0.216		0.215		0.216	
No. of Obs.	6,816		6,816		10,257		10,257		10,257	

Table 7 compares the effects of restatements on the sensitivity of cash compensation to earnings and stock prices in the pre-SOX period to those in the post-SOX period. Columns I and II report the results in the pre-SOX period based on models (2) and (4), respectively. Columns III, IV, and V report the results in the post-SOX period based on models (2), (4), and (6), respectively.

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET \quad (2)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET + \beta_{11} IRRE + \beta_{12} IRRE * \Delta ROA + \beta_{13} IRRE * RET \quad (4)$$

$$\Delta LNTCC = \beta_0 + \beta_1 POST + \beta_2 EXCEO + \beta_3 \Delta ROA + \beta_4 RET + \beta_5 POST * \Delta ROA + \beta_6 POST * RET + \beta_7 EXCEO * \Delta ROA + \beta_8 EXCEO * RET + \beta_9 SALE + \beta_{10} SALESQ + \beta_{11} RESTATE + \beta_{12} RESTATE * \Delta ROA + \beta_{13} RESTATE * RET \quad (6)$$

All the variables are as defined in Panel A of Table 1. Columns I and II present the results based on the full sample and the sample of restating firms, respectively. The intercept, and fixed firm and year effects are included in the regressions, but are not reported. *, **, and *** denote significance of coefficients at the 10%, 5% and 1% levels respectively, using a two tailed test.

Table 8. The Effect of Restatements on the Sensitivity of Equity Compensation for the full sample

	Dependent Var.: Change in Equity Compensation			
	I		II	
	Coeff.	t-stat	Coeff.	t-stat
POST	-0.013	(-0.20)	-0.007	(-0.09)
ΔROA	1.623	(6.36)***	1.624	(6.36)***
RET	0.134	(3.17)***	0.133	(3.15)***
POST* ΔROA	0.050	(0.06)	0.782	(0.85)
POST* RET	0.038	(0.28)	0.050	(0.34)
SALE	0.000	(-0.99)	0.000	(-1.01)
SALESQ	0.000	(0.50)	0.000	(0.51)
RESTATE	-1.391	(-1.28)	-1.201	(-1.10)
RESTATE* ΔROA	-0.766	(-1.18)	-0.876	(-1.34)
RESTATE* RET	0.087	(0.86)	0.077	(0.76)
IRRE			-0.041	(-0.30)
IRRE** ΔROA			-2.338	(-1.61)
IRRE*RET			-0.013	(-0.06)
Fixed firms and year effects	Yes		Yes	
Adjusted R^2	0.118		0.118	
No. of Obs.	16,567		16,567	

Table 8 reports the effects of restatements on the sensitivity of equity compensation to earnings and stock prices for the full sample based on models (9) and (10).
Column I reports results based on the following model.

$$\Delta LNTEC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET \quad (9)$$

$$\Delta LNTEC = \beta_0 + \beta_1 POST + \beta_2 \Delta ROA + \beta_3 RET + \beta_4 POST * \Delta ROA + \beta_5 POST * RET + \beta_6 SALE + \beta_7 SALESQ + \beta_8 RESTATE + \beta_9 RESTATE * \Delta ROA + \beta_{10} RESTATE * RET + \beta_{11} IRRE + \beta_{12} IRRE * \Delta ROA + \beta_{13} IRRE * RET \quad (10)$$

All the variables are as defined in Panel A of Table 1. The intercept, and fixed firm and year effects are included in the regressions, but are not reported. *, **, and *** denote significance of coefficients at the 10%, 5% and 1% levels respectively, using a two tailed test.

Conclusion

Recent accounting scandals in the last decade or so have raised questions about the board of directors monitoring effectiveness with respect to the actions of the management and their compensation contracts. We attempt to study this issue; specifically we examine whether the board of directors adjusts the sensitivity of CEO compensation to performance measures following an earnings restatement. Using a sample of 598 restating firms and 2,065 non-restating firms during the period of 1995-2011, we find that firms decrease the sensitivity of cash compensation to accounting earnings after restatements. This is an important piece of evidence in the corporate governance literature, because it provides comfort to the notion of the board serving as an important monitoring institution when it comes to formulating optimal management compensation contracts. It shows that when the integrity of performance measures is manipulated, the board responds by putting a lesser weight on that performance measure in the compensation contract.

To obtain deeper insights into this result, we also explore whether these results are moderated by other factors. We find that the decrease in sensitivity of cash compensation to earnings is more pronounced for firms who hire new CEOs after restatements than

those who continue to remain in the firm after the restatement. This result shows that while boards have retained their monitoring obligations, its independence seems to have been weakened by the power and influence that a CEO may have over the board. Furthermore, we also find that this decrease in the sensitivity of cash compensation to earnings after a restatement is more pronounced for firms with a higher level of institutional ownership. The results suggest that institutional monitoring acts as a complement to the board-level monitoring in formulating optimal management compensation contracts. Overall, these results are consistent with the argument that the board performing its monitoring obligations efficiently by optimally adjusting the sensitivity of cash compensation to earnings downwards following restatements in order to constrain earnings management and recover public confidence in the firm among shareholders and investors.

The scope of this study is limited in that it considers a single dimension of earnings management, i.e. the violation of GAAP as manifested in an earnings restatement. Future research may focus more closely on earnings management that exists within GAAP rules (e.g., abnormal accruals, loss avoidance, or real earnings management) and examine whether the board proactively adjusts compensation contracts in response to abnormal accruals or other signals of earnings management. Furthermore, it would be also interesting to examine actual compensation contracts and investigate what specific performance metrics are involved and how the weight on each metric is modified by the board while adjusting the pay performance sensitivity to constrain earnings management.

References

1. Ajinkya, B., & Bhojraj, S., & Sengupta, P. (2005). The association between outside directors, institutional investors and the properties of management earnings forecasts. *Journal Of Accounting Research, 43*(3), 343-376.
2. Albring, S., & Huang, S. X., & Pereira, R., & Xu, X. (2013). The effects of accounting restatements on firm growth. *Journal of Accounting and Public Policy, 32*(5), 357–376.
3. Aggarwal, R., & Erel, I., & Ferreira, M., & Matos, P. (2011). Does governance travel around the world? Eidence from institutional investors. *Journal Of Financial Economics, 100*(1), 154-181.
4. Archambeault, D., & Dezoort, F., & Hermanson, D. (2008). Audit committee incentive compensation and accounting restatements. *Contemporary Accounting Research/Recherche Comptable Contemporaine, 25*(4), 965-992.
5. Baber, W., & Gore, A., & Rich, K., & Zhang, J. (2013). Accounting restatements, governance and municipal debt financing. *Journal Of Accounting And Economics, 56*(2-3), 212-227.
6. Baber, W., & Janakiraman, S., & Kang, S. (1996). Investment opportunities and the structure of executive compensation. *Journal Of Accounting And Economics, 21*(3), 297-318.
7. Baber, W., & Kang, S., & Kumar, K. (1998). Accounting earnings and executive compensation: The role of earnings persistence. *Journal of Accounting and Economics*, 25, 169-193.
8. Banker, R., & Datar, S. (1989). Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research, 27*(1), 21-39.
9. Banker, R., & Huang, R., & Natarajan, R. (2009). Incentive contracting and value relevance of earnings and cash flows. *Journal of Accounting Research, 47*(3), 647-678.
10. Banker, R., Potter, G., & Srinivasan, D. (2000). An empirical investigation of an incentive plan that includes nonfinancial performance measures. *The Accounting Review, 75*(1), 65-92.
11. Barth, M. E., & Beaver, W. H., & Landsman, W. R. (1998). Relative valuation roles of equity book value and net income as a function of financial health. *Journal of Accounting and Economics*, 25, 1-34.
12. Beasley, M. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. *Accounting Review, 71*(4), 443-465.
13. Bebchuk, L. A., & Fried, J. M. (2006). *Pay without performance: The unfulfilled promise of executive compensation*. Harvard University Press.
14. Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal Of Financial Economics, 80*(3), 511-529.
15. Burks, J. (2011). Are investors confused by restatements after Sarbanes-Oxley? *The Accounting Review, 86*(2), 507-539.
16. Bushman, R., & Engel, E., & Smith, A. (2006). An analysis of the relation between the stewardship and valuation roles of earnings. *Journal Of Accounting Research, 44*(1), 53-83.
17. Bushman, R., & Indjejikian, R. (1993). Stewardship value of 'distorted' accounting disclosures. *Accounting Review, 68*(4), 765-782.
18. Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal Of Financial Economics, 79*(1), 35-67.
19. Carcello, J. V., & Neal, T. L., & Palmrose, Z. V., & Scholz, S. (2011). CEO involvement in selecting board members, audit committee effectiveness, and restatements. *Contemporary Accounting Research, 28*(2), 396-430.
20. Carver, B. (2014). The retention of directors on the audit committee following an accounting restatement. *Journal of Accounting and Public Policy, 33*(1), 51-68.
21. Core, J., & Guay, W., & Larcker, D. (2003). Executive equity compensation and incentives: A survey. *Federal Reserve Bank Of New York Economic Policy Review, 9*(1), 27-50.
22. Chen, X., & Harford, J., & Li, K. (2007). Monitoring: Which institutions matter?. *Journal Of Financial Economics, 86*(2), 279-305.
23. Chen, X., & Cheng, Q., & Lo, A. (2013). Accounting restatements and external financing choices. *Contemporary Accounting Research/Recherche Comptable Contemporaine, 30*(2), 750-779.

24. Cheng, Q., & Farber, D. (2008). Earnings restatements, changes in CEO compensation, and firm performance. *Accounting Review, 83*(5), 1217-1250.
25. Cheng, Q., & Warfield, T. D. (2005). Equity incentives and earnings management. *The Accounting Review*, *80*(2), 441-476.
26. Cheng, X., & Gao, L., & Lawrence, J. E., & Smith, D. B. (2014). SEC division of corporation finance monitoring and CEO power. *AUDITING: A Journal of Practice & Theory, 33*(1), 29-56.
27. Cornett, M., & Marcus, A., & Tehranian, H. (2008). Corporate governance and pay-for-performance: The impact of earnings management. *Journal Of Financial Economics, 87*(2), 357-373.
28. Dechow, P., & Hutton, A., & Sloan, R. (1996). Economic consequences of accounting for stock-based compensation. *Journal Of Accounting Research, 34*(3), 1-20.
29. Desai, H., & Hogan, C., & Wilkins, M. (2006). The reputational penalty for aggressive accounting: Earnings restatements and management turnover. *Accounting Review, 81*(1), 83-112.
30. Efendi, J., & Srivastava, A., & Swanson, E. P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal Of Financial Economics*, *85*(3), 667-708.
31. Ettredge, M., & Scholz, S., & Smith, K., & Sun, L. (2010). How do restatements begin? Evidence of earnings management preceding restated financial reports. *Journal Of Business Finance And Accounting, 37*(3-4), 332-355.
32. Gaver, J. J., & Gaver, K. M., & Austin, J. R. (1995). Additional evidence on bonus plans and income management. *Journal Of Accounting And Economics, 19*(1), 3-28.
33. Gibbons, R., & Murphy, K. J. (1990). Relative performance evaluation for chief executive officers. *Industrial and Labor Relations Review, 43*(3), 30s-51s.
34. Gillan, S. L., & Starks, L.T. (2007). The evolution of shareholder activism in the United States. *Journal of Applied Corporate Finance, 19*(1), 55-73.
35. Guidry, F., & Leone, A. J., & Rock, S. (1999). Earnings-based bonus plans and earnings management by business-unit managers. *Journal Of Accounting And Economics, 26*(1-3), 113-142.
36. Hartzell, J., & Starks, L. (2003). Institutional investors and executive compensation. *Journal Of Finance, 58*(6), 2351-2374.
37. Hazarika, S., & Karpoff, J., & Nahata, R. (2012). Internal corporate governance, CEO turnover, and earnings management. *Journal Of Financial Economics, 104*(1), 44-69.
38. Healy, P. (1985). The effect of bonus schemes on accounting policies. *Journal of Accounting and Economics, 7*(1), 85–107.
39. Healy, P., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons, 13*(4), 365-383.
40. Healy, P. M., & Palepu, K. G. (2003). The fall of Enron. *Journal of Economic Perspectives, 17*(2), 3-26.
41. Hennes, K., & Leone, A., & Miller, B. (2008). The importance of distinguishing errors from irregularities in restatement research: The case of restatements and CEO/CFO turnover. *Accounting Review, 83*(6), 1487-1519.
42. Hill, C. W., & Snell, S. A. (1989). Effects of ownership structure and control on corporate productivity. *The Academy of Management Journal, 32*(1), 25-46.
43. Holstrom, B. (1979). Moral hazard and observability. *The Bell Journal of Economics, 10*(1), 74-91.
44. Holthausen, R., & Larcker, D., & Sloan, R. (1995). Annual bonus schemes and the manipulation of earnings. *Journal Of Accounting And Economics, 19*(1), 29-74.
45. Hribar, P., & Jenkins, N. (2004). The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review Of Accounting Studies, 9*(2-3), 337-356.
46. Huang, Y., & Scholz, S. (2012). Evidence on the association between financial restatements and auditor resignations. *Accounting Horizons, 26*(3), 439-464.
47. Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal Of Finance, 48*(3), 831-880.
48. Karamanou, I., & Vafeas, N. (2005). The association between corporate boards, audit committees, and management earnings forecasts: An empirical analysis. *Journal Of Accounting Research, 43*(3), 453-486.
49. Klein, A. (2002). Audit committee, board of director characteristics, and earnings management. *Journal Of Accounting And Economics, 33*(3), 375-400.
50. Kravet, T., & Shevlin, T. (2010). Accounting restatements and information risk. *Review Of Accounting Studies, 15*(2), 264-294.
51. Lambert, R., & Larcker, D. (1987). An analysis of the use of accounting and market
52. measures of performance in executive compensation contracts. *Journal of Accounting Research, 25*, 85-125.
53. Leone, A., & Wu, J., & Zimmerman, J. (2006). Asymmetric sensitivity of CEO cash compensation to stock returns. *Journal Of Accounting And Economics, 42*(1-2), 167-192.
54. Lobo, G., & Zhao, Y. (2013). Relation between audit effort and financial report misstatements: Evidence from quarterly and annual restatements. *Accounting Review, 88*(4), 1385-1412.
55. Murphy, K. J. (1999). Executive compensation. In Handbook of Labor Economics, edited by O. Ashenfleter, and D. Card. Amsterdam, The Netherlands: North Holland.
56. Narayanan, M. P. (1985). Managerial incentives for short-term results. *Journal Of Finance, 40*(5), 1469-1484.
57. Palmrose, Z., & Richardson, V., & Scholz, S. (2004). Determinants of market reactions to restatement announcements. *Journal Of Accounting And Economics, 37*(1), 59-89.
58. Ramalingegowda, S., & Yu, Y. (2012). Institutional ownership and conservatism. *Journal Of Accounting and Economics, 53*(1-2), 98-114.
59. Shaw, K., & Zhang, M. (2010). Is CEO cash compensation punished for poor firm performance?. *Accounting Review, 85*(3), 1065-1093.
60. Sloan, R. (1993). Accounting earnings and top executive compensation. *Journal of Accounting and Economics, 16*(1), 55-100.

61. Srinivasan, S. (2005). Consequences of financial reporting failure for outside directors: Evidence from accounting restatements. *Journal of Accounting Research*, *43*(2), 291–334.
62. Stanley, J. D., & DeZoort, F. T. (2007). Audit firm tenure and financial restatements: An analysis of industry specialization and fee effects. *Journal of Accounting & Public Policy*, *26*(2), 131-159.
63. Stein, J. C. (1989). Efficient capital markets, inefficient firms: A model of myopic corporate behavior. *Quarterly Journal Of Economics*, *104*(4), 655-669.
64. Thomsen, S., & Pedersen, T. (2000). Ownership structure and economic performance in the largest European companies. *Strategic Management Journal*, *21*(6), 689-705.
65. U.S. General Accountability Office (GAO). (2002). Financial Statement Restatements: Trends, Market Impacts, Regulatory Responses, and Remaining Challenges. GAO-03-138. Washington, D.C.: General Accounting Office.
66. U.S. General Accounting Office (GAO). (2003). Financial Statement Restatement Database. GAO-03-395R. Washington, D.C.: General Accounting Office.
67. U.S. General Accountability Office (GAO). (2006). Financial Restatement Database. GAO-06-1053R. Washington, D.C.: General Accounting Office.
68. Warfield, T., & Wild, J., Wild, K. (1995). Managerial ownership, accounting choices, and informativeness of earnings. *Journal Of Accounting And Economics*, *20*(1), 61-91.
69. Wilson, W. (2008). An empirical analysis of the decline in the information content of earnings following restatements. *Accounting Review*, *83*(2), 519-548.