Is CEO Compensation Shielded from Overproduction?

Long Chen
Olin School of Business
Washington University in St. Louis
long.chen@wustl.edu

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ABSTRACT: In this study I examine whether compensation committees in manufacturing firms seek to shield CEO compensation from overproduction. I first hypothesize that CEO compensation contracts are optimal in the sense that overproduction has an incremental negative effect on earnings weight in CEO compensation contract. I measure overproduction by using positive change in percent of production added to inventory (PCPAI). Consistent with my hypothesis, PCPAI has significant incremental explanatory power on earnings weight in both CEO total compensation and CEO bonus compensation. In addition, I hypothesize and find that the incremental effect of PCPAI on earnings weight is significantly more negative in CEO total compensation in presence of just meeting or beating analyst earnings expectation or small profit. The results are also robust to adjusting for annual inflation growth and controlling for CEO-specific fixed effects. Overall, these findings suggest that in manufacturing firms, compensation committees perceive the apparent overproduction and at least partially mitigate the effect of overproduction on CEO compensation, and the mitigating effect is more prominent when overproduction is more likely to be opportunistic.

Keywords: *CEO Compensation; compensation committee; opportunistic overproduction; absorption costing.*

Data Availability: *All data used in this study are publicly available.*

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I. INTRODUCTION

Absorption costing, which includes both fixed and variable manufacturing costs as inventoriable costs (as opposed to variable costing, which only includes variable manufacturing costs as inventoriable costs), is the required inventory costing method for external financial reporting in the United States. Managerial accounting texts point out one drawback of absorption costing. It enables a manager to increase operating income in a specific accounting period by increasing production (e.g. Morse and Zimmerman 1997, p386-387; Horngren, Datar and Foster 2005, p302-305; Revsine, Collins, and Johnson 2004, Chapter 9). Prior studies that investigate the consequences of overproduction (Lev and Thiagarajan 1993; Jiambalvo, Norean, and Shevlin 1997; Gupta, Pevzner, and Seethamaraju 2005), however, provide mixed evidence[1] on whether the stock market penalizes the inventory build-up related to possible income manipulation. I analyze whether CEO compensation is sensitive to overproduction.

The executive compensation literature documents that accounting earnings and stock returns are the most common performance measures in CEO compensation contracts (e.g. Murphy 1999) and that the weight attached to earnings is higher than the weight on stock returns (Lambert and Larcker 1987; Sloan 1993) in determining CEO compensation. Therefore, overproduction, which increases earnings in the current period, has the potential to increase CEO contemporaneous compensation. But an unanswered question is whether the transitory, "inflated" earnings from overproduction receive less weight in the determination of CEO compensation.

[1] Lev and Thiagarajan (1993) find a negative association between stock returns and the excess inventory growth over sales growth. Jiambalvo et al. (1997) provide evidence of a significant positive relation between stock returns and change in percent of production added to inventory (CPAI). Gupta et al. (2005), however, finds a substantial reduction in positive valuation impact of CPAI in high relative fixed assets and high overproduction firms.

This study investigates whether the compensation committees in manufacturing firms shield CEO compensation from overproduction by placing a lower weight on earnings in CEO compensation contracts in presence of overproduction. A lower weight suggests that compensation committees perceive overproduction as a bad signal and act to deter it, while the insignificant change of the earnings weight indicates that compensation committees either overlook overproduction, or do not have incentives to discount overproduction[2]. More formally, I hypothesize that the earnings weight in CEO compensation is lower in presence of overproduction. Furthermore, I hypothesize that the overproduction-mitigating effect of CEO compensation is more prominent in situations where managerial opportunism to boost earnings is more likely. Research suggests managers manipulate earnings either to meet or beat benchmarks of analyst forecast (e.g. Matsumoto 2002), zero earnings and last period earnings (e.g. Burgstahler and Dichev 1997), or to avoid the violations of debt covenants which are written in terms of accounting numbers (Jiambalvo et al. 1997). Therefore, I hypothesize opportunistic overproduction is more likely in these four situations.

I test the first hypothesis by regressing changes in CEO compensation on changes in ROA and stock returns interacted with an indicator of high overproduction, controlling for changes in ROA, stock returns and market-to-book ratio. The sample is composed of manufacturing firms with available data over the period of fiscal year 1992-2003. My results indicate a significantly weaker relation between earnings and CEO compensation in the presence of overproduction. Furthermore, by having an indicator of managerial opportunism interact with overproduction-related variables, I find that the incremental effect of overproduction on the earnings weight in determining CEO total compensation is significantly more negative in

[2] I do not have a discussion of and test for the economic factors that may drive either of the two competing alternatives for non-results, which however is an interesting question for future studies.

presence of just meeting or beating analyst forecast or small profit, but no significant results in presence of small earnings increase or high long-term debt. These findings are robust to adjusting for annual inflation growth and controlling for CEO-specific fixed effects. The evidence is consistent with compensation committees recognizing overproduction.

This study makes three contributions to the literature. First, it contributes to the literature of CEO compensation by showing how compensation committees address situations where CEOs are likely to overproduce opportunistically. Second, this study contributes to the literature of corporate governance by providing evidence that CEO compensation contract is an efficient mechanism by compensation committee and the board to work against moral hazard problems, such as opportunistic overproduction. Third, this study connects the literature of overproduction and the literature of earnings management by showing that CEO compensation is adjusted for overproduction in settings where CEOs have greater incentives to manage earnings. Tests in such situations provide more power by reducing noise[3] in overproduction measure and strengthen my argument that CEO compensation is shielded from opportunistic overproduction.

My study also has several limitations. First, my research design assumes CEO compensation does not affect overproduction. To the extent that overproduction is endogenous to CEO compensation, my results are biased. Further study will address this endogeneity issue by running Simultaneous Equation Model. Second, the accrual manipulation may be a correlated omitted variable from my tests, since the overproduction effect in this study may or may not incremental to accrual effect. Extended tests can be done to check the robustness of my findings. Third, my study focuses on CEO compensation, but does not examine other methods used by the principal (in my research setting, acting through compensation committees) to mitigate

[3] My overproduction measure is noisy to the extent that overproduction may be caused by reasons other than managerial opportunism, such as overestimated customer demand of current or future period and exogenous contemporaneous sales shock, which are not the focus of this study.

managerial opportunism. Such alternative vehicles include CEO turnover and reputation, or formal control systems and budget restrictions (Jensen and Meckling 1976). To the extent that total mitigating effects of all mechanisms (including CEO compensation contract and its substitutes) deter managerial opportunism to overproduce, my tests of CEO compensation contracts lack power or result from factors correlated with errors in measure of overproduction.

The remainder of this paper is organized as follows. In Section II, I present the motivation of this study and develop the hypotheses. In Section III, I describe the data, the sample and the research model. In Section IV, I report my results of empirical tests. In Section V, I check the robustness of my results. And I summarize and discuss my study in Section VI.

II. MOTIVATION AND HYPOTHESES

2.1 CEO Manipulation of Real Activities

Analytical research of principal-agent model (e.g. Holmstron 1979; Banker and Datar 1989) suggests that the efficiency of performance evaluation measure depends on the intensity (where intensity equals the product of sensitivity and precision) of the signal. Thus, an optimal compensation contract will shield the executive compensation from the noise in one signal when more intense signals are present.

In light of this theoretical prediction, empirical accounting research has explored the relation between CEO compensation and manipulation of real activities which can add noise to performance measures, such as accounting procedure changes (Healy et al. 1987), restructuring charges (Dechow et al. 1994; Adut et al. 2003) and R&D spending (Cheng 2004), to address the question whether CEO compensation contracts are efficient. But it remains unknown whether the manipulation of overproduction is penalized or inappropriately rewarded in CEO compensation.

This study extends prior literature by investigating whether and to what extent the compensation committees in manufacturing firms seek to prevent CEO manipulation of overproduction.

2.2 CEO Incentives to Overproduce

In economics, overproduction generally means excess production relative to customer demand. One of its consequences is an unplanned accumulation of inventories. Obviously, overproduction and inventory built-up can be driven not only by managerial opportunism, but also by non-opportunism, such as exogenous contemporaneous sales shock or overestimated customer demand in current or future period. The CEO incentives to overproduce discussed here, however, only refer to managerial opportunism behind overproduction.

Absorption costing and variable costing are the two inventory costing methods in managerial accounting. Absorption costing includes both fixed and variable manufacturing costs as inventoriable costs, while variable costing only includes variable manufacturing costs as inventoriable costs. Although absorption costing is the required inventory costing method for external financial reporting in the United States[4], it enables a manager to increase operating income in a specific accounting period by simply increasing production, even with no customer demand for the additional production (e.g. Morse and Zimmerman 1997, p386-387; Horngren, Datar and Foster 2005, p302-305; Revsine, Collins, and Johnson 2004, Chapter 9). The reason is that overproduction leads to a larger allocation of fixed manufacturing overhead costs to ending inventory under absorption costing than under variable costing, thus the cost of goods sold in

[4] The reasons why GAAP allows absorption costing despite the potential opportunism with it are not the focus of this study. One reason could be that, both fixed and variable manufacturing costs are necessary to produce goods and thus should be inventoried in order to match all manufacturing costs to revenues, regardless of their different behavior patterns.

current period is managed down and the contemporaneous earnings are managed up. This is the managerial opportunism that CEOs can implement in overproduction.

CEOs consider the benefits and costs of overproduction, and only overproduce when the benefits outweigh the costs of such manipulation. First, absorption costing implies that CEOs have incentives to overproduce opportunistically and boost current period earnings for meeting or beating some earnings benchmark (e.g. benchmark of analyst forecast, zero earnings, or last period earnings) or for avoiding violations of debt covenants which are written in terms of accounting numbers (Jiambalvo et al. 1997). Second, a direct personal pecuniary benefit for CEOs is from CEO compensation. Compensation literature provides evidence that CEO compensation contracts place a larger weight on performance measure of current earnings than on stock returns (e.g. Lambert and Larcker 1987; Sloan 1993). Therefore, the higher current earnings may lead to a higher contemporaneous CEO compensation.[5] Third, overproduction manipulation is less easy to be detected by investors than other accounting manipulations and frauds, thus bears a relatively lower litigation risk. Fourth, overproduction bring various benefits of CEOs "empire building"[6], like personal relations with employees and purchase of production inputs from friends, etc. (Jensen and Meckling 1976).

Overproduction also places costs on CEOs. First, overproduction leads to the lower cost of goods sold and inventory build-up in current period, which inevitably lead to a lower ratio of inventory turnover (which equals to cost of goods sold deflated by average inventory), signaling

[5] If CEOs realize that their compensations are shielded from overproduction, then the compensation benefit of overproduction is mitigated. This, however, does not impact other benefits and costs of overproduction discussed in the context.

[6] **"**Empire building" normally refers to a corporate governance problem when management has an incentive to increase firm size through internal growth which may not create value. Overproduction means management has an incentive to produce more than customer demands, which may not be the optimal decision for the firm. Thus, overproduction is to some extent analogous to while different from empire building. I use "empire building" for its analogous meaning.

poor inventory management to investors. Therefore, CEOs who are explicitly evaluated by inventory management measure will bear a large cost of overproduction. Second, if stock market is efficient and investors see through the manipulation of overproduction, the short-term market reaction will be negative. Some prior studies shed lights on this point by providing evidences that stock market seems to react negatively or less positively to inventory build-up related to possible income manipulation (e.g. Lev and Tiagarajan 1993; Gupta et al. 2005)[7]. Third, in the periods after overproduction when inventories are sold out, the absorbed fixed manufacturing costs in inventories will be released, thus driving the cost of goods sold relatively high and earnings relatively low. The future compensation based on the low earnings will be driven down as well.

2.3 Adjustments to CEO Compensation

CEOs take actions to overproduce opportunistically when benefits outweigh costs. However, in the framework of principal-agent model, CEOs actions are not isolated, but formally contracted. Since some empirical evidence indicates that stock market seems to *ex post* realize and discount the adverse effect of overproduction on earnings to some extent (Lev and Tiagarajan 1993; Gupta et al. 2005), compensation committees may also perceive and deter overproduction by *ex ante* setting a lower association between contemporaneous earnings and CEO compensation. In addition, survey evidences from the United States, Scandinavia and Asia show that, approximately 20%- 55% of companies use variable costing in their internal accounting system including performance evaluation (Horngren et al. 2005, p305), supporting my prediction that compensation committees perceive the drawback of absorption costing and adjust CEO compensation to mitigate the opportunism under absorption costing.

[7] More precisely, as discussed in the introduction, the evidences in extant literature as to whether market reacts positively or negatively to overproduction are mixed. This study does not take a position in this debate, and has no prediction for the incremental effect of overproduction on the weight of stock returns.

Another motivation of adjustments to CEO compensation is from inventors' desire to penalize inefficient inventory management. In case of increased production, absorption costing leads to larger inventoriable costs than variable costing. Therefore, in absorption-costing reporting, high inventory turnover is more difficult to achieve and thus is more desired by investors. Actually, the adjustments to deter opportunistic overproduction and the adjustments to reward efficient inventory management are both implied by absorption costing and consistent with each other in this study.

A related question is whether compensation committees also adjust CEO compensation by changing the weight of stock returns. I will expect to see a higher association between stock returns and CEO compensation to penalize overproduction only if two conditions hold. One is that stock market apparently negatively reacts to overproduction, the other is that compensation committees view stock returns as a precise signal of CEO actions. However, since neither condition holds firmly, I do not expect to see compensation committees adjust CEO compensation by increasing the weight on stock returns in presence of overproduction.

Predicting that compensation committees perceive and deter the effect of overproduction on earnings, I have the following hypothesis:

H_1: *Ceteris paribus*, overproduction has an incremental negative effect on earnings weight in CEO compensation.

To sharpen my measure of opportunistic overproduction, I address situations in which CEO incentives to boost earnings are larger. Matsumoto (2002) and Burgstahler and Dichev (1997) suggest that managers manipulate earnings up to meet benchmarks of analyst forecast, zero earnings, and last period earnings. Jiambalvo et al. (1997) also indicates that firms close to

debt covenant violations manipulate earnings to avoid the violations. Therefore, the related hypotheses about opportunistic overproduction are as following:

$H_{2(a)}$: *Ceteris paribus*, the incremental effect of overproduction on earnings weight in CEO compensation is more negative for firms with small meeting-or-beating analyst expectation.

$H_{2(b)}$: *Ceteris paribus*, the incremental effect of overproduction on earnings weight in CEO compensation is more negative for firms with small profit.

$H_{2(c)}$: *Ceteris paribus*, the incremental effect of overproduction on earnings weight in CEO compensation is more negative for firms with small earnings increase.

$H_{2(d)}$: *Ceteris paribus*, the incremental effect of overproduction on earnings weight in CEO compensation is more negative for firms with high long-term debt.

III. RESEARCH METHOD

3.1 Sample Selection

I obtain the initial sample of 8,862 firm-CEO-years from the EXECUCOMP database from fiscal year 1993 through 2004. First, consistent with Sloan (1993) and Core et al. (2003), I require that the CEO serves for a full year in the current year and a full year in the year before, which yields a much smaller sample of 2,845 firm-CEO-year observations from 1993- 2004. The sample period starts from year 1993 because compensation data is not available in EXECUCOMP until year 1992 and I require prior year compensation data to compute the change in compensation. Then, I eliminate 886 observations due to missing CEO option portfolio data (including data of both current year and prior year required to calculate option values), 95 observations due to missing CRSP data, and 10 observations due to missing COMPUSTAT data

on earnings, inventory, etc. Last, I delete all observations in year 2004, because after imposing all the sample selection requirements above, only 9 qualified observations[8] remain in year 2004 sample, which can not serve as a justified sample size for a year. The final sample consists of 1,845 firm-CEO-year observations from fiscal year 1993- 2003.[9] Panel A in TABLE 1 shows the detailed steps of sample selection, and Panel B displays the sample distribution by fiscal year.

3.2 Measurement of the Main Variables

CEO Compensation

Consistent with prior studies (e.g. Core et al. 2003; Cheng 2004), this study focuses on CEO annual compensation, which is directly influenced by compensation committees in boards of directors. Following Core et al. (2003), I use three different measures of CEO annual compensation: bonus, total pay, and total compensation. *Total pay* is defined as the sum of salary, bonus, long-term incentive plan payouts, the value of restricted stock grants, the value of options granted during the year, and any other annual pay. The value of options granted is estimated using a modified version of the Black and Scholes (1973) model following Core et al. (2003).

Total compensation is defined as the sum of CEO total pay and the change in the value of CEO's equity portfolio (including both stock holdings and option holdings) during the year. Following Core et al. (2003), I estimate the change in CEO's stock (option) holdings as the number of stock shares (options) held by the CEO at year beginning, multiplied by an estimate of the change in stock price including dividends (the change in average option price) during the

[8] Among the 712 firm-CEO-year observations in the original sample of year 2004, 630 observations are deleted due to missing "became CEO" or "leaving office" dates, and 39 observations are deleted for not fulfilling the requirement of serving as CEO for one full year in the current year and one full year in the year prior.
[9] I also test the hypothesis with the sample including the 9 observations in year 2004, and my results are qualitatively the same.

year. This method is equivalent to assuming that all grants of restricted stocks and options occur at year-end and all the CEO's trades and option exercises are settled at year-end.

Clearly, the difference between *Total Compensation* and *Total Pay* is the change in the value of CEO's equity portfolio. Due to the measuring difficulties, *Total Compensation* is not widely used as a proxy for CEO compensation in extant compensation literature. However, since the compensation addressed in agency theory is the total pecuniary benefits that provide incentives to CEOs, I argue that the change in the value of equity portfolio provides large incentives to CEOs thus should be included in CEO total compensation.

I do not use cash pay (the summary of salary and bonus) as one of the proxies for CEO compensation although some prior studies (e.g. Dechow et al. 1994; Adut et al. 2003) do so. My reason is that, since a comparatively large component of cash pay is salary, which is normally set fixed at the beginning of the period, cash pay provides few incentives to CEOs.

An alternative measure of dependent variable in this study may be the compensation of operation executives, who directly control and manage production. However, since the compensation data of non-CEO executives is not explicitly identified, and in addition, it may not be directly influenced by compensation committees, I do not use the compensation of operation executives as the dependent variable in my model. Actually, since CEOs make final decisions on production, their incentives are aligned with those of operation executives. Therefore, CEOs can be penalized for any managerial opportunism in overproduction, and CEO compensation is a justified measure of the compensation mechanism which has mitigating effect on opportunistic overproduction in the firm.

Opportunistic Overproduction

As discussed in Section II, opportunistic overproduction is driven by the different ways of treating fixed manufacturing cost between absorption costing and variable costing. Therefore, the increased earnings by manipulating overproduction can be accurately calculated by taking the difference between the two numbers of inventory cost in the two inventory costing systems. However, since variable costing is not required for external financial reporting and may be used at most for internal decision making or not used at all in some firms, it is very hard to get the variable-costing inventory data to calculate overproduction explicitly. But analyzing the difference between absorption-costing earnings and variable-costing earnings provides insights of measuring overproduction alternatively.

In APPRENDIX 1, I derive an expression of the difference between change in absorption-costing earnings and change in variable-costing earnings in terms of fixed manufacturing overhead cost, change in absorption-costing inventory and cost of goods sold, following Jiambalvo et al. (1997). As Equation 12 and 13 show, if fixed manufacturing overhead cost is constant,

$$\Delta NI_{abs_t} - \Delta NI_{\text{var}_t} = FMO * CPAI_t \tag{12}$$

$$where \quad CPAI_t = \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}} - \frac{\Delta Inv_{abs_{t-1}}}{COGS_{abs_{t-1}} + \Delta Inv_{abs_{t-1}}} \tag{13}$$

Therefore, *CPAI* (Change in percent of Production Added to Inventory) can be used to measure overproduction, which induces the upward absorption-costing earnings. *FMO* represents fixed manufacturing overhead costs; ΔInv_t represents annual absorption-costing inventory change of a firm between year *t* and *t-1*, both calculated with total inventory value (COMPUSTAT data3); *COGS* is absorption-costing cost of goods sold (COMPUSTAT data41). Based on *CPAI*, I use a dummy variable *PCPAI* (Positive Change in percent of Production Added to Inventory), where

$PCPAI_{i,t}$ equals 1 if $CPAI_{i,t}$ is positive and 0 otherwise, as a proxy for high overproduction, since positive CPAI has a larger possibility of unjustified inventory build-up than non-positive CPAI[10].

The constancy of fixed manufacturing overhead cost (FMO) is an important assumption underlying the derivation of CPAI. If this assumption does not hold, the change of FMO over time should also be considered. However, measuring FMO is a big problem for outsiders, since fixed manufacturing costs are not publicly reported and either can it be easily proxied by other public financial statement data.

Fixed assets may be one potential correlated variable with FMO, but I do not think it is justified to use fixed assets to proxy for FMO or use growth of fixed assets to proxy for growth of FMO. On one hand, FMO includes periodical depreciation on plant equipment, plant-leasing costs, and costs of administration assisting manufacturing (e.g. plant manager's salary). Obviously, plant manager's salary and financial leasing costs have no direct relations with fixed assets values, though depreciation and operational leasing costs are correlated with fixed assets. On the other hand, fixed assets also include fixed non-manufacturing costs, which have nothing to do with fixed manufacturing overhead costs. Therefore, using fixed assets to proxy for FMO is noisy. In addition, since FMO is less likely to be manipulated to manage earnings up and the objective of constructing CPAI in this study is to capture opportunistic overproduction, the omission of FMO from the expression of CPAI is justified. Correspondingly, I do not expect to see the incremental effect of overproduction on earnings weight will be different for firms with different fixed asset intensity.

3.3 Empirical Specification

[10] I do not study the negative $CPAI_{i,t}$ separately since my research question is overproduction rather than underproduction. Another interesting research question will be whether and why CEOs underproduce.

Model 1: Overproduction

To examine whether compensation committees shield CEO compensation from overproduction, I focus on the incremental effect of high-overproduction measure on the association between a change in CEO compensation and a change in earnings performance. This is consistent with agency theory that suggests an association between a change in compensation and unexpected components of the performance measures (Lambert and Larcker 1987). The first empirical model in my study is specified as below:

$$\Delta < DV >_{i,t} = \beta_0 + \beta_1 \Delta ROA_{i,t} + \beta_2 RET_{i,t} + \beta_3 PCPAI_{i,t} + \beta_4 PCPAI_{i,t} * \Delta ROA_{i,t} + \beta_5 PCPAI_{i,t} * RET_{i,t} + \beta_6 MB_{i,t} + \varepsilon_{i,t} \quad (1)$$

where, for each firm-CEO pair i[11] and year t, DV is one of the three compensation variables, *log(Bonus)*, *log(Total_Pay)* and *log(Total_Compensation)*. Consistent with prior research, I use a change specification (i.e. $\Delta < DV >_{i,t} = < DV >_{i,t} - < DV >_{i,t-1}$) to control for unidentified correlated omitted variables, and take a natural logarithmic transformation to control for the skewness in CEO compensation. Consistent with Murphy (1999) survey results and prior empirical studies, I use *ΔROA* and *RET* as proxies for performance measures in CEO compensation contracts. *ΔROA* is the change in ROA, where *ROA*[12] is measured as earnings before extraordinary items (COMPUSTAT data18) deflated by the average of total assets (COMPUSTAT data6). *RET* is the annual buy-and-hold stock return starting 3 months after the beginning of a fiscal year and ending 3 months after the year ends (with delisting return adjusted). *MB* is a variable to control for firm growth opportunity, which is measured as the ratio of market

[11] Considering a firm may have different CEOs over time and a CEO may also pursue career in different firms, the index *i* here is neither for firm nor for CEO only, but for firm-CEO pair, i.e. the change in compensation is calculated only for the same CEO in the same firm. This specification then controls for CEO-specific fixed effects to some extent.

[12] Un-tabulated results show that, the empirical results remain qualitatively unchanged when I replace ROA by ROE (earnings before extraordinary items deflated by the average of book-value equity).

value of equity (COMPUSTAT data25* data199) to book-value of equity (COMPUSTAT data60). Other variables are as defined in Section 3.2.

My focus of interest is β_4. Negative and significant value of β_4 will support the hypothesis of incremental negative effect of overproduction. As discussed in Section 2.3, I do not have a sign prediction for β_5. I do not have a predicted sign for β_3 either, since the general effect of overproduction on CEO compensation is not clear thus compensation committees are not expected to take overproduction as an individual measure in CEO compensation. In addition, consistent with prior research, β_1, β_2 and β_6 are predicted to be positive.

Model 2: Opportunistic Overproduction

To test hypotheses 2(a) through 2(d) and examine whether the incremental effect of overproduction on the earnings weight in CEO compensation is more negative in situations of higher managerial opportunism, I introduce a dummy variable for high opportunism (proxied by just meeting or beating analyst earnings expectation, small profit, small earnings increase, and high long-term debt, separately), which also interacts with both overproduction variables and the interaction terms of overproduction and performance measures. Thus the second empirical model in my study is as following:

$$\begin{aligned}\Delta < DV >_{i,t} &= \beta_0 + \beta_1 \Delta ROA_{i,t} + \beta_2 RET_{i,t} + \beta_3 PCPAI_{i,t} \\ &+ \beta_4 PCPAI_{i,t} * \Delta ROA_{i,t} + \beta_5 PCPAI_{i,t} * RET_{i,t} + \beta_6 < OPP >_{i,t} + \beta_7 < OPP >_{i,t} * PCPAI_{i,t} \\ &+ \beta_8 < OPP >_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t} + \beta_9 < OPP >_{i,t} * PCPAI_{i,t} * RET_{i,t} + \beta_{10} MB_{i,t} \qquad (2)\end{aligned}$$

where all variables are defined as before except <*OPP*>, which is one of the four dummies of high managerial opportunism: *SMBE*, *SPROF*, *SCROA*, and *HLTD* (defined as below).

The first three dummies are based on the different benchmarks of earnings expectation. The first benchmark is analyst forecast. Following Bartov et. al (2002) and Matsumoto (2002), I

define $SUPR_{i,t}$ (earnings surprise) as the difference between actual EPS and the latest analyst forecast of EPS for firm *i* at year *t*, both EPS data obtained from IBES. Then following Koh et al. (2005), I define $SMBE_{i,t}$ (small meeting-or-beating analyst expectation) as a dummy equal to 1 if $SUPR_{i,t}$ falls in the range of [0, 1] cent per share and 0 otherwise. The second and third benchmarks are suggested by Burgstahler and Dichev (1997), which documents that managers manage earnings to avoid losses (benchmark of zero earnings) or earnings decrease (benchmark of last period earnings). Following Cheng (2004), I define $PROF_{i,t}$ as firm *i*'s pre-tax income (COMPUSTAT data170) of year *t* deflated by market value of equity (defined as before) at year *t-1*, and $SPROF_{i,t}$ (small profit) as a dummy equal to 1 if $PROF_{i,t}$ is in the range of [0, 1] cent and 0 otherwise. Also, based on the finding of Burgstahler and Dichev (1997) that the earnings change distribution exhibits an irregular spike around 0% to 2%, I define $SCROA_{i,t}$ (small change in ROA) as a dummy equal to 1 if change in ROA (defined as before) is between 0% and 2%[13] and 0 otherwise. Last, following Jiambalvo et. al (1997), I define the fourth dummy $HLTD_{i,t}$ (high long-term debt) as 1 if the firm *i*'s long-term debt (COMPUSTAT data9/ COMPUSTAT data6) is in the top 10% of long-term debt for all the same SIC firms in year *t*, and 0 otherwise.

The coefficient of my interest in Model 2 is β_8. If compensation committees perceive and deter opportunism in overproduction, which is proxied by each of the four opportunism dummies, the incremental effect of overproduction on earnings weight will be more negative in presence of such opportunism proxy. Alternatively, the significant and negative value of β_8 with respect to each of the four opportunism proxies will support the corresponding sub-hypothesis in Hypothesis 2. Due to the same reason for no prediction on the incremental effect of overproduction on *RET* in Model 1, I also have no sign prediction for the coefficient β_9. More

[13] I also change the threshold of 2% to 0.1%, 0.5% and 1%, and the qualitative results remain unchanged.

formally, I predict no incremental effect on the weight of stock returns, either of overproduction alone or of overproduction coexisting with managerial opportunism.

IV. EMPIRICAL RESULTS

4.1 Descriptive Statistics

TABLE 2 summarizes the descriptive statistics of the sample. In Panel A, the mean value of *Salary* ($0.68 millions) is higher than the mean value of *Bonus* ($0.63 million) while the standard deviation of *Salary* ($0.33 million) is far less than that of *Bonus* ($0.79 million). This indicates that more than half of cash pay (summary of salary and bonus) comes from salary, which provides few incentives to CEOs. This consists with my claim of not using cash pay as one of the proxies for CEO compensation in my study. In addition, *Other Pay*, most of which are stock option grants and restricted stocks grants, equals about 66% of CEO total pay, making total pay a justified proxy for CEO compensation. However, *Total Pay* is still small in magnitude when the change in the value of equity holdings (which is almost four times as large as total pay) is considered. Therefore, *Total Compensation*, which consists of all incentives provided to CEO through CEO compensation contract, serves as a best proxy for CEO compensation. In addition, consistent with findings in Cheng (2003), the means of all compensation variables are higher than the corresponding medians, indicating the positive skewness in the data and justifying the use of the logarithmic transformation of CEO compensation measures.

Panel B in TABLE 2 contains descriptive statistics of the three measures of CEO compensation. *Δlog(Total_Pay)* has the lowest standard deviation while *Δlog(Bonus)* has the highest one, indicating that the measure of change in total pay reflects fluctuations in incentives provided to CEO to a lesser extent than the other two measures of compensation. Thus, I expect

to see weaker findings for change in total pay than for the other two compensation measures, and later regression results consist with this prediction.

In Panel C of TABLE 2, the overproduction measure *CPAI* has a mean of -0.00, median of 0.00, and standard deviation of 0.10, which indicates that half of the firm-year observations in the sample have an inventory build-up (*CPAI >=0*). *SURP* (earnings surprise) is slightly negatively skewed with a mean of 0.00 and median of 0.01, which suggests that half of the observations beat analyst expectations by more than 1 cent. Similarly, *PROF* and *ΔROA* are also negatively skewed. *PROF* has a mean of 0.06 and median of 0.08, and *ΔROA* has a mean -0.01 and median of -0.00. The last opportunism measure, *LTD*, however, is slightly positively skewed, showing a different distribution pattern from those of the other three signals.

4.2 Spearman and Pearson Correlations

TABLE 3 presents Spearman and Pearson correlations among the main variables in my models. Both *ΔROA* and *RET* are significantly and positively related with each of the three compensation variables (all significant at 0.001, except the Pearson correlation between *ΔROA* and *Δlog(Total_Comp)*, which is significant at 0.10). *PCPAI* is significantly and positively associated with *Δlog(Bonus)* and *Δlog(Total_Pay)*, while not significantly with *Δlog(Total_Comp)*. In addition, *PCPAI* is significantly and positively associated with *ΔROA* (p<=0.001) and *RET* (p<=0.01).

As to the opportunism dummies, *HLTD* is not significantly associated with all the other variables except *SPROF*, while each of the other three dummies, *SMBE*, *SPROF* and *SCROA*, exhibits significant associations with both performance measures and *PCPAI*, except the Pearson association between *SPROF* and *ΔROA*. Interestingly, the associations of performance measures

with *SPROF* are significant and negative, while those with *SMBE* or *SCROA* are significant and positive. In addition, *SCROA* significantly and positively associates with all the compensation measures, while associations for *SMBE* (positive) and *SPROF* (negative) are only significant in CEO bonus compensation. Plus, the control variable *MB*, as a proxy for firm growth, is significantly and positively associated with each CEO compensation measure as predicted. These results provide some preliminary though limited evidences as to whether compensation committees deter opportunistic overproduction. I expect to find more evidences in multivariate regression analyses.

4.3 Incremental Effect of Overproduction on Earnings Weight

TABLE 4 reports the OLS estimation of Model 1 using CEO bonus, CEO total pay, and CEO total compensation as the proxy for CEO compensation respectively. The coefficient on *ΔROA* is significant and positive in CEO bonus, but not significant in CEO total pay or CEO total compensation; the coefficient on *RET* is significant and positive in all regressions. Consistent with the correlation matrix, *PCPAI* generally has a significant and positive effect on CEO bonus, but no significant effect on the other two compensation measures. *MB* shows a significant and positive effect on CEO total pay and total compensation.

The coefficient on the interaction term of overproduction measure and earnings measure is the focus of my interest. In both CEO bonus compensation and CEO total compensation, *PCPAI* shows a significant and negative incremental effect on the weight of *ΔROA*, but no significant result in CEO total pay. This seems to be consistent with the lowest standard deviation of *Δlog(Total_Pay)*. In addition, *PCPAI* only shows a significant (at 0.10) and positive incremental effect on the weight of *RET* in CEO total compensation, but not significant at any

conventional level in the other two compensation measures. This finding may be induced by the positive mechanical relation between stock returns and CEO total compensation, the largest portion of which is the change in equity portfolios. The generally insignificant findings about stock returns then suggest that the weight on stock returns is not increased by compensation committees in presence of overproduction. Overall, the results in TABLE 4 support the Hypothesis 1 that, compensation committees mitigate overproduction, as proxied by *PCPAI*, in both CEO bonus and CEO total compensation contracts by setting a negative relation between earnings measure and CEO compensation in presence of overproduction.

4.4 Analysis of Just Meeting or Beating Analyst Expectation Situation

TABLE 5 through TABLE 8 report the analyses results of the incremental explanatory power of overproduction on the weight of earnings in situations of potential managerial opportunism. The coefficients on *<OPP>*PCPAI*ΔROA* are the focus of interest, where *<OPP>* proxies for different situations of potential opportunism in overproduction.

TABLE 5 shows the analysis in the situation of small meeting-or-beating analyst expectation. The coefficient on *SMBE*PCPAI*ΔROA* is negative (= -5.47) and significant (p=0.03) in CEO total compensation while not significant in either CEO bonus or CEO total pay, and the coefficient on *SMBE*PCPAI*RET* is not significant at conventional levels. These findings support Hypothesis 2(a) by showing a significantly larger mitigating effect of CEO total compensation on overproduction when overproduction coexists with small meeting-or-beating analyst expectation.

4.5 Analysis of Small Profit Situation

TABLE 6 shows the analysis in the situation of small profit. The results show that, the coefficient on *SPROF*PCPAI*ΔROA* is negative (= -18.28) and significant (p=0.01) in CEO total compensation while not significant in the other two compensation measures, and the coefficient on *SPROF*PCPAI*RET* is not significant at conventional levels. These findings, similar to those in TABLE 5, support hypothesis 2(b) by showing the mitigating effect of CEO total compensation on overproduction is significantly more negative when overproduction is accompanied by small profit.

The contrasting findings between CEO total compensation and the other two compensation measures in the first two opportunistic situations may be caused by the fact that, the measure of CEO total compensation captures more incentives provided to CEO thus serves as a better proxy for CEO compensation than the other two measures. In addition, finding no incremental effect of overproduction on earnings weight in CEO bonus and total pay may simply be a function of earnings not being in the relevant range for an earnings-based bonus to kick in.

4.6 Analysis of Small Earnings Increase Situation

TABLE 7 reports the analysis results in the situation of small earnings increase. Inconsistent with Hypothesis 2(c), the coefficient on *SCROA*PCPAI*ΔROA* is not significant at conventional levels in any of the CEO compensation measures, and the coefficient on *SCROA*PCPAI*RET* is not significant either. These findings suggest that compensation committees do not seem to recognize small earnings increase as a signal of opportunism in overproduction, although they seem to perceive and deter opportunism in situations of small meeting-or-beating analyst expectation and small profit in CEO total compensation. One reason for this inconsistency may be that, the benchmark of last period earnings (i.e. benchmark of zero

earnings change) is not so commonly used in evaluating earnings as the benchmark of analyst expectation or benchmark of zero earnings. Correspondingly, compensation committees may not use this benchmark widely in evaluating earnings.

4.7 Analysis of High Long-Term Debt Situation

In TABLE 7, I report the results in the situation of high long-term debt. The coefficient on *SLTD*PCPAI*ΔROA* is not significant at conventional levels in any measure of CEO compensation, and the coefficient on *SLTD*PCPAI*RET* is also insignificant except the one in CEO total pay. In general, these findings do not support hypothesis 2(d) but indicate that, compensation committees do not seem to perceive CEO incentives to avoid the violations of debt covenants by managing earnings. The underlying reason may either be that CEOs rarely manage earnings only for the purpose of avoiding debt covenant violations, or be that CEOs are less likely to manage earnings for avoiding debt covenant violations than for other purposes, such as meeting-or-beating analyst expectation or gaining some profit.

V. ROBUSTNESS CHECK

5.1 Adjust for Annual Inflation Growth

Adut et al. (2003) provides evidence that after controlling for the annual inflation growth in CEO cash compensation, the mitigating effect of CEO cash compensation on the potential adverse restructuring charges diminishes significantly. The different results after controlling for annual inflation rate suggest a potentially correlated omitted variable from my research models.

Then, by obtaining CPIs (Consumer Price Index) for calendar year 1993-2004[14] from the website of Bureau of Labor Statistics and using them as deflators, I adjust all compensation data to year 1993-base and re-do my empirical tests. The unreported results show that the significant values of corresponding coefficients in TABLE 4, 5 and 6 are qualitatively unchanged after adjusting for the annual inflation growth in CEO compensation. Therefore, my findings in Section IV are robust to adjusting for annual inflation growth.

5.2 Control for CEO-Specific Fixed Effects

Another potential specification problem with the models may be not controlling for CEO-specific fixed effects. I then re-do the main tests in TABLE 4, 5 and 6 by controlling for CEO-specific fixed effects in CEO total compensation (since the main findings exist in CEO total compensation). As TABLE 9 reports, the incremental effect of overproduction on earnings weight in CEO total compensation contract is still significantly more negative in presence of managerial opportunism, proxied by small meeting-or-beating analyst expectation or small profit. But the incremental effect of overproduction on earnings weight is no longer significant at conventional levels. Therefore, Hypothesis 2(a) and 2(b) are still supported after controlling for CEO-specific fixed effects, while Hypothesis 1 is not supported at conventional levels. Overall, the results that compensation committees mitigate potential opportunistic overproduction in presence of small meeting-or-beating analyst expectation or small profit, are robust to controlling for CEO-specific fixed effects.

[14] CPI is based on calendar years and my data are based on fiscal years. I match CPI with the calendar year of CPI equal to the calendar year in which the fiscal year end of the observation falls. This then leads to the possibility that observations of fiscal year 2003 are matched with CPI of calendar year 2004.

VI. CONCLUSIONS AND DISCUSSIONS

Absorption costing, as a required inventory costing method for external financial reporting, implies that CEOs have incentives to overproduce opportunistically to boost accounting earnings by allocating more fixed manufacturing costs to the accumulated inventories. Prior studies provide mixed evidence on whether stock market penalizes and discounts such opportunism. This study, from the perspective of CEO compensation, provides evidence that CEO total compensation contracts are optimal in mitigating the adverse effect of opportunism in overproduction, with opportunism proxied by just meeting or beating analyst expectation or small profit. In addition, these results are robust to adjusting for annual inflation growth and controlling for CEO-specific fixed effects.

This study makes three contributions to the literature. First, it contributes to the literature of CEO compensation by showing how compensation committees address situations where CEOs are likely to overproduce opportunistically. Second, it contributes to the literature of corporate governance by providing evidence that CEO compensation contract is an efficient mechanism by compensation committee and the board to work against moral hazard problems, such as opportunistic overproduction. Third, this study connects the literature of overproduction and the literature of earnings management by showing that CEO compensation is adjusted for overproduction in settings where CEOs have greater incentives to manage earnings.

This study also has several limitations. First, my research design assumes CEO compensation does not affect overproduction. To the extent that overproduction is endogenous to CEO compensation, my results are biased. My further study will address this endogeneity issue by running Simultaneous Equation Model. Second, the accrual manipulation may be a correlated omitted variable from my tests, since the overproduction effect in this study may or may not

incremental to accrual effect. Extended tests can be done to check the robustness of my findings. Third, my study focuses on CEO compensation but does not examine other methods used by the principal to mitigate managerial opportunism, such as CEO turnover and reputation, or formal control systems and budget restrictions. To the extent that the total mitigating effects of all mechanisms deter managerial opportunism to overproduce, my tests of CEO compensation contracts lack power or result from factors correlated with errors in overproduction measure. Further studies on overproduction may examine whether CEO turnover and reputation cost are effective in adjusting for opportunistic overproduction.

APPENDIX 1: Deriving the expression of Change in the Percent of Production Added to Inventory (Following Jiambalvo, Noreen, and Shevlin, 1997)

Implied by Absorption Costing, the incremental information content of the component of unexpected earnings due to producing a quantity greater than the quantity needed to meet current period demand, is equal to the difference between the change in earnings computed under variable costing and the change in earnings computed under absorption costing. These two earnings numbers can be calculated as:

$$NI_{abs_t} = REV_t - COGS_{abs_t} - NME_t \quad (1)$$

$$NI_{\text{var}_t} = REV_t - COGS_{\text{var}_t} - FMO_t - NME_t \quad (2)$$

where:

NI_{abst} = net income computed under absorption costing;
NI_{vart} = net income computed under variable costing;
REV_t = revenue;
$COGS_{abst}$ = cost of goods sold computed under absorption costing;
COG_{vast} = cost of goods sold computed under variable costing;
NME_t = non-manufacturing expense;
FMO_t = Fixed manufacturing overhead.

Also, cost of goods sold can be computed as following:

$$COGS_{abs_t} = (VM_t + \frac{FMO_t}{QP_t}) * QS_t \quad (3)$$

$$COGS_{\text{var}_t} = VM_t * QS_t \quad (4)$$

where:

VM_t = variable manufacturing costs per unit;
QS_t = quantity sold;
QP_t = quantity produced.

Taking the difference between (1) and (2) and substituting (3) and (4) leads to below equation:

$$NI_{abs_t} - NI_{\text{var}_t} = FMO_t * \frac{QP_t - QS_t}{QP_t} \quad (5)$$

This is the component of absorption-costing earnings that is subject to manipulation by engaging in excess production. Since FMO is much less exposed to manipulation and relatively constant

over time, the focus of the study is the second term of the right-hand-side, $\frac{QP_t - QS_t}{QP_t}$, which is the units in inventory to the units produced during the period *t*.

Let ΔInv_{abs_t} be the dollar change in inventories during the period under absorption costing. Then,

$$\Delta Inv_{abs_t} = [VM_t + \frac{FMO_t}{QP_t}] * (QP_t - QS_t) \quad (6)$$

Dividing both sides by (3) yields,

$$\frac{\Delta Inv_{abs_t}}{COGS_{abs_t}} = \frac{QP_t - QS_t}{QS_t} \quad (7)$$

$$\Rightarrow \frac{QP_t - QS_t}{QP_t} = \frac{\frac{\Delta Inv_{abs_t}}{COGS_{abs_t}}}{1 + \frac{\Delta Inv_{abs_t}}{COGS_{abs_t}}} = \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}} \quad (8)$$

Substituting (8) into (5),

$$NI_{abs_t} - NI_{\text{var}_t} = FMO_t * \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}} \quad (9)$$

Furthermore, the change in absorption-costing net income can be restated in terms of variable-costing net income as below:

$$NI_{abs_t} - NI_{abs_{t-1}} = (NI_{\text{var}_t} + FMO_t * \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}}) - (NI_{\text{var}_{t-1}} + FMO_{t-1} * \frac{\Delta Inv_{abs_{t-1}}}{COGS_{abs_{t-1}} + \Delta Inv_{abs_{t-1}}}) \quad (10)$$

$$\Rightarrow \Delta NI_{abs_t} - \Delta NI_{\text{var}_t} = FMO_t * \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}} - FMO_{t-1} * \frac{\Delta Inv_{abs_{t-1}}}{COGS_{abs_{t-1}} + \Delta Inv_{abs_{t-1}}} \quad (11)$$

If $FMO_t = FMO_t = FMO$, this reduces to:

$$\Delta NI_{abs_t} - \Delta NI_{\text{var}_t} = FMO * CPAI_t \quad (12)$$

$$where \quad CPAI_t = \frac{\Delta Inv_{abs_t}}{COGS_{abs_t} + \Delta Inv_{abs_t}} - \frac{\Delta Inv_{abs_{t-1}}}{COGS_{abs_{t-1}} + \Delta Inv_{abs_{t-1}}} \quad (13)$$

Since all the terms on the right-hand-side of equation (13) are observable, CPAI on the left-hand-side can be measured.

REFERENCES

Adut, D., W. Cready, and T. Lopez. 2003. Restructuring charges and CEO cash compensation: a reexamination. *The Accounting Review* 78 (1):169-192.

Baber, W., S. Kang, and K. Kumar. 1999. The explanatory power of earnings levels vs. earnings changes in the context of executive compensation. *The Accounting Review* 74 (4): 459-472.

Banker, R., and S. Datar. 1989. Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research* 27 (1): 21-39.

Bartov, E., D. Givoly, and C. Hayn. 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33 (2): 173-204.

Boschen, J., A. Dura, L. Gordon, and K. Smith. 2003. Accounting and stock price performance in dynamic CEO compensation arrangements. *The Accounting Review* 78 (1): 143-168.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24 (1): 99-126.

Cheng, S. 2004. R&D expenditures and CEO compensation. *The Accounting Review* 79 (2): 305-328.

Core, J., W. Guay, and R. Verrecchia. 2003. Price versus non-price performance measures in optimal CEO compensation contracts. *The Accounting Review* 78 (4): 957-981.

Dechow, P., M. Huson, and R. Sloan. 1994. The effect of restructuring charges on executives' cash compensation. *The Accounting Review* 69 (1): 138-156.

Dikolli, S., S. Kulp, and K. Sedatole. 2006. Transient Institutional Ownership and CEO Contracting. *Working Paper.*

Gibbons, R., and K. Murphy. 1992. Optimal incentive contracts in the presence of career concerns: theory and evidence. *Journal of Political Economy* 100 (3): 468-505.

Gupta, M., M. Pevzner, and C. Seethamraju. 2005. The implications of absorption cost accounting and production decisions for firms' future performance and valuation. *Working paper, Washington University in St. Louis*.

Healy, P. M., S. Kang, and K. G. Palepu. 1998. The effects of accounting procedure changes on CEOs' cash salary and bonus compensation. *Journal of Accounting and Economics* 9 (1): 7-34.

Holmstrom, B. 1979. Moral hazard and observability. *The Bell Journal of Economics* 10 (1): 74-91.

Horngren, C., S. Dater, and G. Foster. 2005. *Cost Accounting: A Managerial Emphasis*, 12th edition. Prentice-Hall.

Jensen, M. C., and W. Meckling. 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4): 305-360.

Jiambalvo, J., E. Norean, and T. Shevlin. 1997. Incremental information content of the change in percent of production added to inventory. *Contemporary Accounting Research* 14 (1): 69-97.

Koh, K., D. Matsumoto, and S. Rajgopal. 2005. Meeting or beating Analyst's expectations in the Post-Sarbanes-Oxley (SOX) world: Changes in Stock Market Rewards and Managerial Actions. *Working Paper.*

Lambert, R., and D. Larcker. 1987. An analysis of the use of accounting and marketing measures of performance in executive compensation contracts. *Journal of Accounting Research* 25, Studies on Stewardship Uses of Accounting Information: 85-125.

Lev, B., and R. Thiagarajan. 1993. Fundamental information analysis. *Journal of Accounting Research* 31 (2): 190-215.

Matsumoto, D. A. 2002. Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77 (3): 483-514.

Morse, D., and J. Zimmerman. 1997. *Managerial Accounting*, 2nd edition. McGraw-Hill.

Murphy, K. J. 1999. Executive compensation. In *Handbook of Labor Economics* (3B). Amsterdam, The Netherlands: North-Holland.

Revsine, L., D. Collins, and W Johnson. 2004. *Financial Reporting and Analysis*, 3rd edition. Prentice Hall.

Roychowdhury, S. 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economics* 42 (3): 335-370.

Sloan, R. 1993. Accounting earnings and top executive compensation. *Journal of Accounting and Economics* 16 (1-3): 55-100.

TABLE 1
Sample Selection

Panel A: Steps of Sample Selection

		No. of firm-CEO-years
Original sample: CEOs in manufacturing firms in EXECUCOMP from 1993-2004		8,862
Less firm-CEO-years:		
(1) with missing "became CEO" or "leaving office" dates	4,847	
(2) when CEO does not serve for a full year in the current year or a full year in the year prior	1,170	
(3) with insufficient CEO option portfolio data or other compensation data	886	
(4) with insufficient stock return data	95	
(5) with insufficient financial statement data	10	
(6) in year 2004, since the number of total available observations in this year is only 9.	9	7,017
No. of firm-CEO-years in final sample (from 1993-2003)		**1,845**

Panel B: Sample Distribution by Fiscal Year

Fiscal Year	No. of firm-CEO-years
1993	85
1994	190
1995	225
1996	216
1997	216
1998	209
1999	189
2000	168
2001	143
2002	119
2003	85
Total Sample Period	**1,845**

TABLE 2
Descriptive Statistics

	N	Mean	Std.Dev	Min.	Q1	Median	Q3	Max.
Panel A: Total Compensation = Total Pay + Change in Value of Total Equity Holdings ($ millions)								
Annaul $Pay_{i,t}$								
$Salary_{i,t}$	1845	0.68	0.33	0.00	0.45	0.63	0.85	3.65
$Bonus_{i,t}$	1845	0.63	0.79	0.00	0.11	0.42	0.86	14.28
Other $Pay_{i,t}$	1845	2.57	8.30	0.00	0.05	0.61	2.50	285.71
Total $Pay_{i,t}$	1845	3.88	8.64	0.00	0.91	1.89	4.14	289.17
Change in Value of Equity $Holdings_{i,t}$								
Stock $Holdings_{i,t}$	1845	14.41	404.18	-4,080.76	-0.77	0.17	2.66	15,300.97
Option $Holdings_{i,t}$	1845	1.03	31.78	-613.43	-2.61	0.00	3.07	758.62
Total Equity $Holdings_{i,t}$	1845	15.44	425.98	-4,397.88	-3.96	0.25	7.37	16,059.59
Total $Compensation_{i,t}$	1845	19.31	432.01	-4,393.28	-2.17	1.93	11.39	16,348.75
Panel B: Change in Log of Compensation (proxied by Bonus, Total Pay, and Total Compensation)								
$\Delta log(Bonus_{i,t})$	1845	-0.06	5.97	-16.47	-0.57	0.03	0.51	14.84
$\Delta log(Total\_Pay_{i,t})$	1845	-0.00	1.26	-15.05	-0.60	0.03	0.63	14.08
$\Delta log(Total\_Comp_{i,t})$	1845	0.00	1.93	-8.15	-1.15	0.02	1.07	7.00
Panel C: Variables of performance measures, proxies for overproduction, and control variable.								
$\Delta ROA_{i,t}$	1845	-0.01	0.10	-1.01	-0.03	-0.00	0.02	1.14
$RET_{i,t}$	1845	0.13	0.50	-0.93	-0.16	0.08	0.32	4.55
$CPAI_{i,t}$	1845	-0.00	0.10	-0.77	-0.03	0.00	0.03	0.70
$SURP_{i,t}$	1622	0.00	0.39	-12.60	-0.01	0.01	0.04	3.16
$PROF_{i,t}$	1845	0.06	0.15	-2.03	0.04	0.08	0.11	0.81
$LTD_{i,t}$	1834	0.18	0.14	0.00	0.07	0.17	0.27	0.83
$MB_{i,t}$	1845	3.60	4.19	-38.12	1.65	2.56	4.18	54.78

This sample consists of 1,845 firm-CEO-years of EXECUCOMP data (465 firms, 544 CEOs) from 1993-2003.

i,t = indices for firm-CEOs and fiscal years, separately;

Other $Pay_{i,t}$ = the sum of long-term incentive plan payouts, the value of restricted stock grants, the value of options granted, and any other annual pay to CEO of firm i in fiscal year t;

Total $Pay_{i,t}$ = the sum of salary, bonus, and other pay to CEO of firm i in fiscal year t;

Change in the value of CEO's Stock $Holdings_{i,t}$ = the number of shares of stock held by the CEO at the beginning of year t (including restricted stock holdings) multiplied by change in stock price (including dividends) of firm i during year t;

Change in the value of CEO's Option $Holdings_{i,t}$ = the number of options held by the CEO at the beginning of year t multiplied by an estimate of the change in the average option price of firm i during year t;

Total $Compensation_{i,t}$ = the sum of CEO total pay and change in value of CEO's equity holdings of firm i in year t;

$\Delta log(Bonus_{i,t}) = log(Bonus_{i,t})-log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t}) = log(Total\_Pay_{i,t})-log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t}) = log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t} = ROA_{i,t}- ROA_{i,t-1}$, where $ROA_{i,t}$ is earnings before extraordinary items deflated by average assets of firm i in year t;

$RET_{i,t}$ = annual stock return of firm i in year t;

$CPAI_{i,t} = \Delta Inv_{i,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SURP_{i,t}$ = *Actual* $EPS_{i,t}$ - *Latest Analyst Forecast of* $EPS_{i,t}$;

$PROF_{i,t}$ = *Pre-tax Income*$_{i,t}$ / *Market-value-equity*$_{i,t-1;}$

$LTD_{i,t}$ = *Long-term Debt*$_{i,t}$ / *Asset*$_{i,t}$;

$MB_{i,t}$ = *Market-value-equity*$_{i,t}$ / *book-value-equity*$_{i,t}$.

TABLE 3
Correlation Matrix

(N=1,823)	$\Delta log(Bonus_{i,t})$	$\Delta log(Total\_Pay_{i,t})$	$\Delta log(Total\_Comp_{i,t})$	$\Delta ROA_{i,t}$	$RET_{i,t}$	$PCPAI_{i,t}$	$SMBE_{i,t}$	$SPROF_{i,t}$	$SCROA_{i,t}$	$HLTD_{i,t}$	$MB_{i,t}$
$\Delta log(Bonus_{i,t})$	-	0.45****	0.17****	0.35****	0.21****	0.15****	0.06**	-0.11****	0.11****	0.00	0.14****
$\Delta log(Total\_Pay_{i,t})$	0.31****	-	0.38****	0.16****	0.23****	0.05**	0.03	-0.01	0.10****	0.01	0.14****
$\Delta log(Total\_Comp_{i,t})$	0.09****	0.32****	-	0.09****	0.20****	0.01	0.00	0.01	0.04*	0.01	0.15****
$\Delta ROA_{i,t}$	0.16****	0.10****	0.04*	-	0.21****	0.16****	0.08***	-0.06**	0.16****	-0.03	0.17****
$RET_{i,t}$	0.14****	0.21****	0.19****	0.19****	-	0.07***	0.06**	-0.07***	0.09****	-0.03	0.33****
$PCPAI_{i,t}$	0.12****	0.05**	0.01	0.10****	0.07***	-	0.05**	-0.04*	0.04**	0.01	0.04
$SMBE_{i,t}$	0.04**	0.02	-0.01	0.06**	0.04*	0.05**	-	0.05*	0.02	0.00	0.24****
$SPROF_{i,t}$	-0.08****	-0.01	-0.02	-0.01	-0.06***	-0.04*	0.05*	-	-0.04	0.05**	-0.04
$SCROA_{i,t}$	0.08****	0.08****	0.05**	0.07***	0.05**	0.05**	0.02	-0.04	-	-0.00	0.05**
$HLTD_{i,t}$	0.01	0.03	0.01	-0.01	-0.02	0.01	0.00	0.05**	-0.00	-	-0.01
$MB_{i,t}$	0.05**	0.12****	0.12****	0.12****	0.23****	0.03	0.13****	-0.01	0.05**	-0.00	-

Spearman correlations above the diagonal and Pearson correlations below the diagonal.

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001, respectively.

i = index for firm-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t})$ = $log(Bonus_{i,t})-log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t})$ = $log(Total\_Pay_{i,t})-log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}- ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t}$ >0, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SMBE_{i,t}$ = 1 if 0<= $SURP_{i,t}$ <=0.01, and 0 otherwise, where $SURP_{i,t}$ =Actual $EPS_{i,t}$ - Latest Analyst Forecast of $EPS_{i,t}$;

$SPROF_{i,t}$ = 1 if 0<= $PROF_{i,t}$ <=0.01, and 0 otherwise, where $PROF_{i,t}$ = Pre-tax $Income_{i,t}$ / Market-value-$equity_{i,t-1}$;

$SCROA_{i,t}$ = 1 if 0<= $\Delta ROA_{i,t}$ <=0.02, and 0 otherwise;

$HLTD_{i,t}$ = 1 if $LTD_{i,t}$ in top 10% of LTD for the same SIC firms in year t, and 0 otherwise, where $LTD_{i,t}$ = Long-term $Debt_{i,t}$ / $Asset_{i,t}$;

$MB_{i,t}$ = Market-value-$equity_{i,t}$ / book-value-$equity_{i,t}$.

TABLE 4
Incremental Effect of Overproduction on Earnings Weight in CEO Compensation

Independent Variable	Predicted Sign	Δlog ($Bonus_{i,t}$)	Δlog ($Total\_Pay_{i,t}$)	Δlog ($Total\_Comp_{i,t}$)
Intercept	?	-0.64***	-0.17****	-0.17**
		(0.01)	(0.001)	(0.02)
$\Delta ROA_{i,t}$	+	11.02****	0.64	0.68
		(0.000)	(0.11)	(0.27)
$RET_{i,t}$	+	0.87**	0.39****	0.51*****
		(0.03)	(0.000)	(0.000)
$PCPAI_{i,t}$	?	1.01****	0.07	-0.07
		(0.000)	(0.26)	(0.44)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	**-7.28*** **	0.14	**-1.64***
		(0.01)	(0.82)	(0.08)
$PCPAI_{i,t} * RET_{i,t}$	?	0.75	0.10	**0.30***
		(0.18)	(0.39)	(0.09)
$MB_{i,t}$	+	0.00	0.02***	0.03***
		(0.91)	(0.00)	(0.00)
Sample Size		1,845	1,845	1,845
Adjusted R-square		4.66%	4.91%	4.11%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i = index for firm-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t}) = log(Bonus_{i,t}) - log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t}) = log(Total\_Pay_{i,t}) - log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t}) = log(Total\_Compensation_{i,t}) - log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t} = ROA_{i,t} - ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t} > 0$, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t} / (COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1} / (COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$MB_{i,t}$ = $Market\text{-}value\text{-}equity_{i,t} / book\text{-}value\text{-}equity_{i,t}$.

TABLE 5
Analysis of Incremental Effect of Small Meeting-or-Beating Analyst Forecast

Independent Variable	Predicted Sign	Δlog ($Bonus_{i,t}$)	Δlog ($Total\_Pay_{i,t}$)	Δlog ($Total\_Comp_{i,t}$)
Intercept	?	-0.61**	-0.18****	-0.18**
		(0.02)	(0.001)	(0.04)
$\Delta ROA_{i,t}$	+	14.17****	0.85*	0.90
		(0.000)	(0.08)	(0.22)
$RET_{i,t}$	+	0.82*	0.32****	0.41***
		(0.06)	(0.001)	(0.004)
$PCPAI_{i,t}$	?	0.90***	0.10	-0.03
		(0.01)	(0.15)	(0.72)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-8.48**	-0.51	-1.36
		(0.03)	(0.53)	(0.27)
$PCPAI_{i,t} * RET_{i,t}$	?	0.53	0.15	0.42**
		(0.41)	(0.25)	(0.04)
$SMBE_{i,t}$	?	0.33	0.06	0.09
		(0.54)	(0.59)	(0.60)
$SMBE_{i,t} * PCPAI_{i,t}$	?	0.21	-0.18	-0.34
		(0.77)	(0.26)	(0.16)
$SMBE_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-	1.33	2.21	**-5.47****
		(0.86)	(0.17)	(0.03)
$SMBE_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?	0.42	0.16	-0.01
		(0.70)	(0.50)	(0.97)
$MB_{i,t}$	+	-0.01	0.02***	0.04****
		(0.85)	(0.002)	(0.001)
Sample Size		1,622	1,622	1,622
Adjusted R-square		5.19%	4.68%	4.27%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i = index for firms-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t})$ = $log(Bonus_{i,t})-log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t})$ = $log(Total\_Pay_{i,t})-log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}- ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t}$ >0, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SMBE_{i,t}$ = 1 if 0<= $SURP_{i,t}$ <=0.01, and 0 otherwise, where $SURP_{i,t}$ = *Actual* $EPS_{i,t}$ - *Latest Analyst Forecast of* $EPS_{i,t}$;

$MB_{i,t}$ = *Market-value-equity*$_{i,t}$ / *book-value-equity*$_{i,t}$.

TABLE 6
Analysis of Incremental Effect of Small Profit

Independent Variable	Predicted Sign	Δlog ($Bonus_{i,t}$)	Δlog ($Total\_Pay_{i,t}$)	Δlog ($Total\_Comp_{i,t}$)
Intercept	?	-0.54**	-0.16****	-0.17**
		(0.02)	(0.001)	(0.03)
$\Delta ROA_{i,t}$	+	11.20****	0.65	0.68
		(0.000)	(0.11)	(0.27)
$RET_{i,t}$	+	0.82**	0.39****	0.52****
		(0.04)	(0.000)	(0.000)
$PCPAI_{i,t}$	?	0.93****	0.05	-0.08
		(0.001)	(0.42)	(0.37)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-7.85***	0.18	-1.42
		(0.007)	(0.77)	(0.13)
$PCPAI_{i,t} * RET_{i,t}$	?	0.80	0.12	0.33*
		(0.15)	(0.29)	(0.07)
$SPROF_{i,t}$	?	-4.31****	-0.25	0.15
		(0.001)	(0.36)	(0.72)
$SPROF_{i,t} * PCPAI_{i,t}$	?	2.68	0.50	-0.29
		(0.32)	(0.38)	(0.74)
$SPROF_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-	28.58	-2.78	**-18.28*** **
		(0.20)	(0.55)	(0.01)
$SPROF_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?	-4.33	-1.02	-0.95
		(0.30)	(0.25)	(0.49)
$MB_{i,t}$	+	0.01	0.02***	0.03***
		(0.87)	(0.002)	(0.002)
Sample Size		1,845	1,845	1,845
Adjusted R-square		5.21%	5.00%	4.43%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i = index for firms-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t})$ = $log(Bonus_{i,t})-log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t})$ = $log(Total\_Pay_{i,t})-log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}- ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t} > 0$, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SPROF_{i,t}$ = 1 if $0 <= PROF_{i,t} <= 0.01$, and 0 otherwise, where $PROF_{i,t}$ = *Pre-tax Income*$_{i,t}$ / *Market-value-equity*$_{i,t-1}$;

$MB_{i,t}$ = *Market-value-equity*$_{i,t}$ / *book-value-equity*$_{i,t}$.

TABLE 7
Analysis of Incremental Effect of Small Earnings Increase

Independent Variable	Predicted Sign	Δlog ($Bonus_{i,t}$)	Δlog ($Total\_Pay_{i,t}$)	Δlog ($Total\_Comp_{i,t}$)
Intercept	?	-1.07****	-0.24****	-0.29****
		(0.000)	(0.000)	(0.000)
$\Delta ROA_{i,t}$	+	9.93****	0.45	0.37
		(0.000)	(0.27)	(0.55)
$RET_{i,t}$	+	0.79**	0.38****	0.49****
		(0.05)	(0.000)	(0.000)
$PCPAI_{i,t}$	?	1.21****	0.11*	0.07
		(0.000)	(0.10)	(0.53)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-6.55**	0.29	-1.28
		(0.02)	(0.63)	(0.17)
$PCPAI_{i,t} * RET_{i,t}$	?	1.04*	0.13	0.28
		(0.07)	(0.29)	(0.13)
$SCROA_{i,t}$	?	1.94****	0.34****	0.56****
		(0.000)	(0.001)	(0.000)
$SCROA_{i,t} * PCPAI_{i,t}$	?	-0.11	-0.10	-0.71***
		(0.90)	(0.58)	(0.01)
$SCROA_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-83.06	-11.44	11.31
		(0.21)	(0.41)	(0.60)
$SCROA_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?	-1.49	-0.12	0.29
		(0.15)	(0.58)	(0.39)
$MB_{i,t}$	+	-0.00	0.02***	0.03***
		(0.89)	(0.004)	(0.003)
Sample Size		1,845	1,845	1,845
Adjusted R-square		5.74%	5.44%	4.69%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i = index for firms-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t})$ = $log(Bonus_{i,t})$-$log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t})$ = $log(Total\_Pay_{i,t})$-$log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})$-$log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}$- $ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t}$ >0, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{i,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SCROA_{i,t}$ = 1 if 0<= $\Delta ROA_{i,t}$ <=0.02, and 0 otherwise;

$MB_{i,t}$ = $Market\text{-}value\text{-}equity_{i,t}$ / $book\text{-}value\text{-}equity_{i,t}$.

TABLE 8
Analysis of Incremental Effect of High Long-Term Debt

Independent Variable	Predicted Sign	Δlog ($Bonus_{i,t}$)	Δlog ($Total\_Pay_{i,t}$)	Δlog ($Total\_Comp_{i,t}$)
Intercept	?	-0.64***	-0.18****	-0.16**
		(0.01)	(0.000)	(0.04)
$\Delta ROA_{i,t}$	+	10.93****	0.65	0.70
		(0.000)	(0.11)	(0.26)
$RET_{i,t}$	+	0.84**	0.40****	0.51****
		(0.04)	(0.000)	(0.000)
$PCPAI_{i,t}$	?	0.99****	0.07	-0.11
		(0.001)	(0.25)	(0.26)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-7.93***	0.20	-1.91**
		(0.01)	(0.75)	(0.05)
$PCPAI_{i,t} * RET_{i,t}$	?	0.74	0.02	0.37**
		(0.20)	(0.84)	(0.05)
$HLTD_{i,t}$	?	0.31	0.14	-0.00
		(0.63)	(0.30)	(1.00)
$HLTD_{i,t} * PCPAI_{i,t}$	?	0.05	-0.12	0.28
		(0.95)	(0.53)	(0.33)
$HLTD_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-	12.67	0.12	3.25
		(0.17)	(0.95)	(0.27)
$HLTD_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?	0.11	**0.69*** **	-0.52
		(0.93)	(0.01)	(0.22)
$MB_{i,t}$	+	0.00	0.02****	0.03***
		(0.92)	(0.001)	(0.002)
Sample Size		1,834	1,834	1,834
Adjusted R-square		4.41%	5.14%	4.12%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i = index for firms-CEOs;

t = index for fiscal years;

$\Delta log(Bonus_{i,t})$ = $log(Bonus_{i,t})-log(Bonus_{i,t-1})$;

$\Delta log(Total\_Pay_{i,t})$ = $log(Total\_Pay_{i,t})-log(Total\_Pay_{i,t-1})$;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}- ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t}$ >0, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$HLTD_{i,t}$ = 1 if $LTD_{i,t}$ in top 10% of LTD for the same SIC firms in year t, and 0 otherwise, where $LTD_{i,t} = Long\text{-}term\ Debt_{i,t} / Asset_{i,t}$;

$MB_{i,t}$ = $Market\text{-}value\text{-}equity_{i,t} / book\text{-}value\text{-}equity_{i,t}$.

TABLE 9
Re-do Main Tests Controlling for CEO Fixed Effects in CEO Total Compensation

Independent Variable	Predicted Sign	Δlog (Total_Comp$_{i,t}$)	Δlog (Total_Comp$_{i,t}$)	Δlog (Total_Comp$_{i,t}$)
Intercept	?	-0.16*	-0.18	-0.17*
		(0.10)	(0.15)	(0.09)
$\Delta ROA_{i,t}$	+	0.85	1.45	0.86
		(0.27)	(0.13)	(0.26)
$RET_{i,t}$	+	0.48***	0.40**	0.46***
		(0.002)	(0.02)	(0.003)
$PCPAI_{i,t}$	?	-0.05	0.03	-0.06
		(0.67)	(0.80)	(0.57)
$PCPAI_{i,t} * \Delta ROA_{i,t}$	-	-1.66	-1.36	-1.59
		(0.20)	(0.44)	(0.22)
$PCPAI_{i,t} * RET_{i,t}$	+	0.33	0.44*	0.38
		(0.15)	(0.09)	(0.11)
$SMBE_{i,t}$	?		0.08	
			(0.72)	
$SMBE_{i,t} * PCPAI_{i,t}$	?		-0.57**	
			(0.05)	
$SMBE_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-		**-4.97***	
			(0.10)	
$SMBE_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?		-0.17	
			(0.73)	
$SPROF_{i,t}$	?			-0.07
				(0.89)
$SPROF_{i,t} * PCPAI_{i,t}$	?			0.37
				(0.77)
$SPROF_{i,t} * PCPAI_{i,t} * \Delta ROA_{i,t}$	-			**-27.61****
				(0.05)
$SPROF_{i,t} * PCPAI_{i,t} * RET_{i,t}$	?			-0.89
				(0.65)
$MB_{i,t}$	+	0.03	0.04	0.03
		(0.13)	(0.12)	(0.12)
Sample Size		1,845	1,622	1,845
Adjusted R-square		4.40%	4.65%	4.73%

*, **, ***, **** Significant at 0.10, 0.05, 0.01, 0.001 respectively.

i,t = indices for firms-CEOs and fiscal years, separately;

$\Delta log(Total\_Comp_{i,t})$ = $log(Total\_Compensation_{i,t})-log(Total\_Compensation_{i,t-1})$;

$\Delta ROA_{i,t}$ = $ROA_{i,t}- ROA_{i,t-1}$;

$RET_{i,t}$ = annual stock return of firm i in year t;

$PCPAI_{i,t}$ = 1 if $CPAI_{i,t}$ >0, and 0 otherwise, where $CPAI_{i,t} = \Delta Invi_{,t}/(COGS_{i,t} + \Delta Inv_{i,t}) - \Delta Inv_{i,t-1}/(COGS_{i,t-1} + \Delta Inv_{i,t-1})$;

$SMBE_{i,t}$ = 1 if 0<= $SURP_{i,t}$ <=0.01, and 0 otherwise, where $SURP_{i,t}$ =*Actual* $EPS_{i,t}$ – *Latest Analyst Forecast of* $EPS_{i,t}$;

$SPROF_{i,t}$ = 1 if 0<= $PROF_{i,t}$ <=0.01, and 0 otherwise, where $PROF_{i,t}$ = *Pre-tax* $Income_{i,t}$ / *Market-value-equity*$_{i,t-1;}$

$MB_{i,t}$ = *Market-value-equity*$_{i,t}$ / *book-value-equity*$_{i,t}$.