



CFOs and CEOs: Who have the most influence on earnings management?

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ARTICLE INFO

Article history:

Received 15 April 2008

Received in revised form

27 February 2009

Accepted 10 August 2009

Available online 12 February 2010

JEL classification:

M41

M52

Keywords:

Compensation

Earnings management

Equity incentives

CFO

ABSTRACT

This study examines the association between chief financial officer (CFO) equity incentives and earnings management. Chief executive officer (CEO) equity incentives have been shown to be associated with accruals management and the likelihood of beating analyst forecasts (Bergstresser and Philippon, 2006; Cheng and Warfield, 2005). Because CFOs' primary responsibility is financial reporting, CFO equity incentives should play a stronger role than those of the CEO in earnings management. We find that the magnitude of accruals and the likelihood of beating analyst forecasts are more sensitive to CFO equity incentives than to those of the CEO. Our evidence supports the Securities and Exchange Commission's (SEC) new disclosure requirement on CFO compensation.

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1. Introduction

This study investigates whether chief financial officer (CFO) equity incentives are associated with earnings management. Extant research has focused on how chief executive officer (CEO) equity incentives affect earnings management. For example, prior research finds that CEO equity incentives are associated with accruals management (Bergstresser and Philippon, 2006) and the likelihood of beating analyst forecasts (Cheng and Warfield, 2005).

Both commentators and policymakers have expressed a concern that CFO equity-based compensation might also contribute to earnings management. Fuller and Jensen (2002) allege that the increasing proportion of stock options in a manager's compensation package causes both CEOs and CFOs to focus on boosting short-term stock

prices at the expense of long-run value creation. As described by Katz (2006), during testimony before the Senate Finance Committee, Internal Revenue Service (IRS) Commissioner Mark Everson expressed that the temptations of stock appreciation demand "heroic" virtue to keep managers from wrongdoing. He suggested that CFOs who are in charge of "minding the cookie jars" should not be paid by stock options, but by "generous but fixed compensation for specified contract periods." Echoing concerns over CFO compensation, the Securities and Exchange Commission (SEC) recently amended its disclosure rules on executive compensation by requiring that firms disclose their CFO pay. The SEC argues that "compensation of the principal financial officer is important to shareholders because along with the principal executive officer, the principal financial officer provides the certifications required with the company's periodic reports and has important responsibility for the fair presentation of the company's financial statements and financial information" (Securities and Exchange Commission, 2006, p. 117). Users of financial statements seem to

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agree with the SEC. For example, one analyst claims that the mandatory disclosure of CFO compensation is “a major benefit” of the amended SEC disclosure rule (Harris, 2007).

Despite the concerns over CFO compensation, prior research has focused on CEO equity incentives rather than those of the CFO. This is likely because CEO equity incentives are much larger than those of the CFO and therefore believed to be most influential (see, e.g., McAnally, Weaver, and Srivastava, 2008, p. 194). Furthermore, given that CFOs are CEO agents (Graham and Harvey, 2001, p. 194) and a CEO has the power to replace a CFO who does not follow the CEO's preferences (Mian, 2001; Fee and Hadlock, 2004), it may be the case that CFOs do not respond directly to their own equity incentives but only to the wishes of their CEOs.

We believe, however, that it is worthwhile to empirically examine the role of CFO equity incentives in financial reporting because this is an area in which CFOs wield significant influence. As evidence of CFOs' important role in financial reporting, Geiger and North (2006) show that discretionary accruals decrease significantly surrounding the appointment of a new CFO. They further demonstrate that this finding is not driven by concurrent CEO appointments. Their findings indicate that CFOs exercise independent influence on firms' financial reporting. Survey evidence in Graham, Harvey, and Rajgopal (2005) suggests that CFOs are also concerned with beating earnings benchmarks and seek to report a smooth series of earnings. Consistent with these voiced concerns, Mergenthaler, Rajgopal, and Srinivasan (2008) find that CFO turnover increases following the failure to meet certain earnings benchmarks. Finally, recent corporate fraud cases such as Enron, Worldcom, Qwest, and Adelphia indicate that CFOs can significantly affect accounting quality.¹ Consistent with this view, the Sarbanes-Oxley Act of 2002 (SOX hereafter) formally requires that CFOs, as well as the CEOs, provide personal certification on the accuracy and completeness of the financial information released by the company. In this study we posit that CFO equity incentives may have a stronger impact on earnings management than those of CEOs because CFOs have the ultimate responsibility for the management of the financial system, including the preparation of financial reports (Mian, 2001).

To examine the role of CFO equity incentives in earnings management relative to those of CEOs, we separately and jointly examine the association between CFO and CEO equity incentives and earnings management.

We consider two settings and utilize methodologies similar to those used in prior research that show an association between CEO equity incentives and earnings management. Prior research suggests that SOX is likely to have changed earnings management behavior (Cohen, Dey, and Lys, 2008). So we perform all of our tests separately on the pre- and post-SOX periods.

We first consider accruals management by reexamining Bergstresser and Philippon's (2006) finding that CEO equity incentive ratios explain firms' accruals management during 1994–2000. We confirm their finding for our sample of CEOs over a similar period (1993–2001), which happens to be pre-SOX. More importantly, we find that the magnitudes of accruals are significantly more increasing in CFO equity incentives than in CEO equity incentives. For example, our results suggest that if a CFO equity incentive ratio moves from the first quartile to the third quartile of the distribution of our sample CFO equity incentive ratios, the absolute total accruals as a percent of total assets would increase almost 75% more than the increase associated with a similar move of CEO equity incentive ratios.

In addition, we find that neither the CEO nor the CFO equity incentives are positively associated with the magnitude of accruals during the 2002–2006 post-SOX period. This is not surprising given that Cohen, Dey, and Lys (2008) report that earnings management via discretionary accruals declines in the post-SOX period, and the relation between discretionary accruals and their various measures of the combined total of CEO and CFO equity compensation components also declines in the post-SOX period.

Second, we consider the relation between CFO equity incentives and the likelihood of meeting or beating analysts' consensus forecasts, which we collectively refer to as beating analyst forecasts. Cheng and Warfield (2005) demonstrate that the likelihood that a firm beats analysts' consensus forecasts is increasing in CEO equity incentives. For both our sample periods from 1993 to 2001 (the pre-SOX period) and 2002 to 2006 (the post-SOX period), we find that CFO equity incentive ratios significantly dominate those of CEOs in explaining the probability a firm beats analyst earnings forecasts.²

Similar to prior research on earnings management, we measure a manager's equity-based incentives as the sensitivity of the manager's equity compensation to changes in the firm's stock price. But it is reasonable to believe that equity-based incentives may be more important in explaining earnings management by managers of firms that have stronger correlations between earnings and stock prices. Accordingly, we conduct an additional analysis where we allow the impact of equity incentives to vary across firms with high and low correlations between earnings and stock prices. We find

¹ Although our focus is on earnings management measured via accruals and the likelihood of beating analyst forecasts, and not fraud or intentional accounting errors that lead to restatements, there is evidence that CFOs are involved in the most aggressive forms of earnings management. For example, more than 50 CFOs have been convicted for committing fraud since 2002 (Department of Justice, 2007). In addition, Feng, Ge, Luo, and Shevlin (2009) find that about 21% of the CFOs were charged with fraud while the CEOs were not in a sample of 493 firms associated with the Accounting and Auditing Enforcement Releases (AAER) during 1982–2005. Furthermore, Hennes, Leone, and Miller (2008) show that CFO turnover rates are higher than CEO turnover rates following accounting restatements.

² Cheng and Warfield (2005) focus on analyst consensus forecasts. As they acknowledge, reporting a positive surprise based on analyst forecasts could also be driven by earnings guidance rather than earnings management, so even if earnings management declined after SOX, we might still observe a positive relation between equity incentives and the likelihood of beating analyst forecasts.

some weak evidence that equity-based incentives of both CEOs and CFOs are more (less) important in affecting earnings management by firms that have a high (low) correlation between earnings and stock prices.

Our study fills a void in the literature by providing the first empirical evidence on the impact of CFO equity incentives on firms' financial reporting behavior. Prior research suggests that newly appointed CFOs drive changes in discretionary accruals of their new firms (Geiger and North, 2006). However, it is not clear what role CFO equity-based incentives play in earnings management. Our evidence suggests that because CFOs are primarily responsible for preparing the financial statements, the impact of their equity incentives on financial reporting dominates the impact of CEO equity incentives. Furthermore, earnings management is a key tool that the CFO can expertly use in response to equity incentives, while the CEO has many other oversight responsibilities and various other tools to call upon. As a result, future research should consider compensation of CFOs when investigating incentives for earnings management. More importantly, our results confirm policymakers' concerns over CFO compensation and thus, provide indirect support for the SEC's new requirement for disclosure of CFO compensation. The disclosure of CFO compensation should be relevant to users of financial statements in evaluating the quality of firms' financial reporting.

This paper proceeds as follows. Section 2 presents descriptive statistics of CEO and CFO compensation and equity incentives for firms covered by Standard and Poor's (S&P hereafter) ExecuComp database from 1993 to 2006. Section 3 presents our empirical tests on whether CFO equity incentives are associated with earnings management, measured through discretionary accruals and beating earnings benchmarks. Section 4 concludes.

2. Descriptive statistics of CEO and CFO compensation and equity incentives

Our analyses focus on the S&P 1500 firms covered by ExecuComp with both the CEO's and CFO's compensation data available. We identify CEOs following ExecuComp's classification (data item CEOANN=CEO). We identify CFOs based on managers' titles in ExecuComp (data item "titleann") that include any of the following phrases: CFO, chief financial officer, treasurer, controller, finance, and vice president-finance. From 1993 to 2006 there are a total of 17,542 firm-years with compensation data available for both CEOs and CFOs. Although ExecuComp starts from year 1992, we exclude this year because ExecuComp's coverage is not complete (Aggarwal and Samwick, 2003, p. 167).

Panel A of Table 1 reports descriptive statistics on both CEO and CFO compensation metrics measured in millions of 1996 dollars. We report two flow compensation measures—cash pay and total pay. Cash pay is the sum of salary and bonus, whereas total pay is the sum of cash pay, stock option grants, restricted stock grants, long-term incentive plan payouts, and other annual compensation (data item "TDC1"). We also separately report managers'

stock compensation—stock and stock option holdings. To capture the power of the CEO and CFO incentives from holding stocks and stock options, we use Bergstresser and Philippon's (2006) equity incentive ratio. The ratio is ONEPCT normalized by ONEPCT plus cash pay, where ONEPCT is the effect of a one percentage point increase in a firm's stock price on the value of the firm's shares held by a manager (i.e., $0.01 \times \text{share price} \times \text{number of stocks a manager owns}$) plus the effect of a one percentage point increase in the firm's stock price on the value of the manager's options, calculated for newly granted options, unexercised exercisable options, and unexercised unexercisable options following Core and Guay (2002). This ratio "captures the share of a hypothetical [manager's] total compensation that would come from a one percentage point increase in the value of the equity of his or her company" (Bergstresser and Philippon, 2006, p. 520).

Panel A shows that on average, CFO total pay is roughly one-third of that of the CEO. CFOs also have much fewer stock holdings compared to CEOs. Finally, CFOs' average equity incentive ratio is about 11%, while that of CEOs is nearly 24%. These statistics are consistent with Aggarwal and Samwick (2003) who argue that due to their different responsibilities within the firm, CEOs get a lion's share of total compensation and equity incentives paid to executives.³ Interestingly, the last row indicates that there is variation in the ratio of the equity incentives of the CFO relative to the CEO across our sample firms. Specifically, CFO equity incentives range from 28% (the lower quartile) to 81% (the upper quartile) of CEO equity incentives. If a manager's relative pay and reliance on equity-based incentives reflects his importance inside a firm, then our statistics indicate that the importance of CFOs varies considerably across firms. Importantly, our argument that CFO equity incentives should be more important than those of the CEO in earnings management does not rely on the notion that CFOs have more powerful equity incentives but rather that they have more control over financial reporting.

Panel B of Table 1 reports the correlations between CEO and CFO compensation and equity incentives. We find that CFO and CEO cash pay and total pay are highly correlated (78% for cash pay and 72% for total pay). The correlation between CFO and CEO stock option holdings is 68%. However, the equity incentive ratio for CFOs and CEOs is less highly aligned with a correlation of only 50%. Recall that this ratio captures a manager's equity wealth changes arising from the changes in the firm's stock price. This relatively moderate correlation suggests that it is possible that CFO equity incentives have an independent effect on firms' earnings management activities.

³ Our statistics on CEO compensation are very similar to what Aggarwal and Samwick (2003) report. For example, our sample CEO mean and median cash pay (in millions of 1996 dollars) is 1.115 and 0.815, where Aggarwal and Samwick (2003, p. 1623) report their sample CEO mean and median cash pay (in millions of 1997 dollars) as 1.127 and 0.825.

Table 1

Descriptive statistics of CEO and CFO compensation from 1993 to 2006.

Cashpay is the sum of salary and bonus; *Totalpay* is the sum of cash pay, stock option grants, restricted stock grants, long-term incentive plan payouts, and other annual compensation (TDC1, per Execucomp); *Stockhld* is the value of stocks owned by the manager (*shown_excl_opts* × *prccf*, per Execucomp); *Optionhld* is the value of stock options owned by the manager (*opt_unex_exer_est_val* + *opt_unex_unexer_est_val*, per Execucomp); *Incentive* is the equity incentive ratio per Bergstresser and Philippon (2006) calculated as $ONEPCT / (ONEPCT + \text{Cash Pay})$. *ONEPCT* is the effect of a one percentage point increase in a firm's stock price on the value of the firm's shares held by a manager (i.e., $0.01 \times \text{share price} \times \text{number of stocks a manager owns}$) plus the effect of a one percentage point increase in the firm's stock price on the value of the manager's options, calculated for newly granted options, unexercised exercisable options, and unexercised unexercisable options following Core and Guay (2002). All the compensation metrics are measured in millions of 1996 dollars using the consumer price index for all urban consumers. We winsorize each variable at 1% and 99% of its distribution. The decrease in the number of observations for *Incentive_CFO/Incentive_CEO* in Panel A is due to zero values in the *Incentive_CEO* variable. For Panel B, correlations significant at the 5% level or less appear in bold.

Panel A: Comparison of CEO and CFO compensation (1993–2006)						
Variables	N	Mean	Median	Std. dev.	Lower quartile	Upper quartile
Cashpay_CEO	17,542	1.115	0.815	0.991	0.512	1.356
Cashpay_CFO	17,542	0.465	0.368	0.34	0.25	0.558
Totalpay_CEO	17,542	3.605	1.902	4.834	0.958	4.103
Totalpay_CFO	17,542	1.237	0.754	1.456	0.423	1.422
Stockhld_CEO	17,542	39.083	4.586	127.569	0.983	17.814
Stockhld_CFO	17,542	1.88	0.406	4.592	0.052	1.563
Optionhld_CEO	17,542	9.383	2.032	21.498	0.183	8.161
Optionhld_CFO	17,542	1.985	0.479	4.121	0.043	1.868
Incentive_CEO	17,542	0.236	0.158	0.227	0.075	0.319
Incentive_CFO	17,542	0.105	0.072	0.109	0.033	0.14
Incentive_CFO/Incentive_CEO	17,369	0.631	0.525	0.59	0.279	0.805
Panel B: Pearson correlations						
Variables	Cashpay_CEO	Totalpay_CEO	Stockhld_CEO	Optionhld_CEO	Incentive_CEO	
Cashpay_CFO	0.78					
Totalpay_CFO		0.72				
Stockhld_CFO			0.26			
Optionhld_CFO				0.68		
Incentive_CFO					0.50	

3. Tests on the relation between CFO equity incentives and earnings management

In this section we examine the impact of CFO equity incentives in two settings where prior literature finds a positive association between earnings management and CEO equity incentives: (1) earnings management measured through the absolute values of total accruals and discretionary accruals (Bergstresser and Philippon, 2006), and (2) the likelihood of beating analyst forecasts (Cheng and Warfield, 2005).

We first replicate these prior studies to confirm inferences on the impact of CEO equity incentives for our selected sample of firms. Then we substitute CFO equity incentives for CEO equity incentives to examine whether CFO equity incentives are associated with earnings management. We compare the estimated coefficients on CFO equity incentives with those on CEO equity incentives to examine whether earnings management is more increasing in CFO equity incentives. To test whether CFO equity incentives contribute to earnings management independently, we further include CEO and CFO equity incentives jointly in the same model. One needs to be careful in drawing inferences based on this specification because of the fairly high correlation between CEO and CFO equity incentives. However, if CFO equity incentives are important determinants of a firm's financial reporting,

as alleged by commentators and policymakers, we expect CFO equity incentives to matter even after controlling for CEO equity incentives.

3.1. Accruals management

Using absolute values of total accruals and a measure of discretionary accruals from a modified Jones model as proxies for accruals management, Bergstresser and Philippon (2006) find that firms with higher CEO equity incentive ratios have more accruals management during the period of 1994–2000. Following Bergstresser and Philippon (2006), we estimate the following model:

$$\text{Accruals management} = \beta_0 + \beta_1 \text{incentive} + \gamma' \text{Controls} + \varepsilon. \quad (1)$$

We also use two proxies for accruals management. First, we calculate the absolute value of total accruals scaled by lagged total assets. We measure total accruals as the difference between earnings before extraordinary items and cash flows from operations reported in the statement of cash flows, scaled by total assets at the end of year $t-1$. Second, we calculate discretionary accruals using the forward-looking discretionary accruals model developed by Dechow, Richardson, and Tuna (2003). Dechow, Richardson, and Tuna (2003) first estimate nondiscretionary accruals using the coefficients from the

following regression:

$$\begin{aligned} \text{Total Accruals}_{it} = & \alpha + \beta_1((1+k)\Delta\text{Sales}_{it}-\Delta\text{REC}_{it}) + \beta_2\text{PPE}_{it} \\ & + \beta_3 \text{Total Accruals}_{it-1} + \beta_4 \text{GR_Sales}_{t+1}, \end{aligned} \quad (2)$$

where k is the slope coefficient from a regression of changes in accounts receivable (ΔREC_{it}) on changes in sales (ΔSales_{it}) for each two-digit Standard Industrial Classification (SIC)-year grouping and captures the expected change in accounts receivable for a given change in sales.⁴ Their estimation of nondiscretionary accruals also controls for the gross amount of property, plant, and equipment scaled by average total assets (PPE), lagged total accruals scaled by average total assets ($\text{Total Accruals}_{it-1}$), and future sales growth (GR_Sales_{t+1}). Finally, they estimate forward-looking discretionary accruals as the difference between total accruals and the estimated nondiscretionary accruals. We use the absolute value of the forward-looking discretionary accruals in our analysis and refer to this measure as absolute discretionary accruals.⁵

Similar to Bergstresser and Philippon (2006), our control variables include firm size (*Size*), firm age dummy (*Oldfirm*), volatility of sales growth (*StdSalesGrowth*), firm leverage (*Leverage*), a set of untabulated dummy variables to proxy for corporate governance features following Gompers, Ishii, and Metrick (2003), deciles of market-to-book ratio, year indicators, exchange indicators, and the Fama and French (1997) industry indicators. In addition, we also control for the standard deviation of cash flows from operations (*StdCashFlow*) and the standard deviation of revenues (*StdRev*) to account for firm-specific volatility (Hribar and Nichols, 2007). Detailed variable definitions appear in Table 2.

In 2002 SOX became effective. Empirical evidence suggests that firms responded to SOX by reducing accruals management (Cohen, Dey, and Lys, 2008). However, it is unclear whether the relation between managers' equity incentives and accruals management in the pre-SOX period shown in Bergstresser and Philippon (2006) still holds in the post-SOX period. We therefore estimate model (1) separately for the periods of 1993–2001 (pre-SOX) and 2002–2006 (post-SOX).

Panel A of Table 2 reports the descriptive statistics and Panel B reports the Pearson correlations for all the variables used in the model. Panel C reports the regression results using the 13,435 firm-year observations on absolute total accruals, while Panel D reports the results using the 11,129 firm-year observations on absolute

discretionary accruals. The first and last three columns of Panels C and D report results for the pre-SOX period and the post-SOX period, respectively. The significantly positive coefficients on *Incentive_CEO* and *Incentive_CFO* reported in columns 1 and 2 of Panels C and D show that both CEO and CFO equity incentive ratios are positively associated with the two accruals management measures during the pre-SOX period. The finding on CEO equity incentives is generally consistent with those in Bergstresser and Philippon (2006) for a similar time period. Importantly, the coefficient on *Incentive_CFO* is about three times as large as the coefficient on *Incentive_CEO*, and the differences in the coefficients across CEOs and CFOs are highly significant in both models ($p < 0.01$).⁶ Furthermore, in column 3 when *Incentive_CEO* and *Incentive_CFO* are jointly included in the same regression, the coefficient on *Incentive_CFO* retains its significance ($p < 0.01$), yet the coefficient on *Incentive_CEO* is not significant in the total accruals model and is less than one-third the size of the coefficient on *Incentive_CFO* in the discretionary accruals model.⁷

To interpret the differences in the magnitude of the impact of CEO and CFO equity incentives on accruals management during the pre-SOX period, we use the coefficients on the incentive ratios in columns 1 and 2 to estimate how changes in equity incentives for CEOs versus CFOs translate into different magnitudes of the accruals measures. We find that if the CEO equity incentive ratio moves from the first quartile to the third quartile of its distribution, the absolute total accruals as a percent of total assets would increase by 0.23 percentage points. But if the CFO equity incentive ratio moves from the first quartile to the third quartile of its distribution, the absolute total accruals as a percent of total assets would increase by 0.40 percentage points, which is almost 75% greater than the increase associated with the CEO equity incentive. Similarly, absolute discretionary accruals increase by 0.40 percentage points for the CEO and 0.45 percentage points for the CFO when moving from the first to third quartile of equity incentive ratios (a difference of over 12%). This suggests that even though CFOs have lower equity incentives, their equity incentives play a more powerful role in accruals management than those of the CEOs.

Columns 4 through 6 of Panels C and D in Table 2 show that in the post-SOX period neither CEO nor CFO equity incentive ratios are positively associated with the two accruals management measures. This is not surprising given that Cohen, Dey, and Lys (2008) find that the

⁴ We prefer forward-looking discretionary accruals to the discretionary accruals estimated from the modified Jones model as used in Bergstresser and Philippon (2006), because prior research has shown that the forward-looking discretionary accruals model has much greater explanatory power than the modified Jones model and produces discretionary accruals that better detect earnings management as identified in the SEC's enforcement actions (Dechow, Richardson, and Tuna, 2003; Larcker and Richardson, 2004).

⁵ We focus on the absolute value of discretionary accruals rather than a signed measure because prior research suggests that equity incentives are increasing in extreme accruals (Cohen, Dey, and Lys, 2008).

⁶ All reported p -values are one-sided if they relate to a signed prediction; otherwise the p -values are two-sided.

⁷ We also examine the relation between equity incentives and the signed discretionary accruals by running separate regressions on the positive and negative discretionary accruals (for a similar split of abnormal accruals see Yu, 2008). We find that the coefficients on *Incentive_CFO* are significantly different from zero and significantly greater in magnitude than the coefficients on *Incentive_CEO* for both groups, suggesting that CFO equity incentives are more likely to be associated with extreme accruals, not necessarily more income-increasing accruals. This finding is similar to a finding by Cohen, Dey, and Lys (2008) on the combined CEO and CFO equity incentives.

Table 2

Analysis of the relation between accruals management and CFO equity incentives.

Incentive is the equity incentive ratio per Bergstresser and Philippon (2006); *StdCashFlow* is the standard deviation of cash flows from operations (Compustat DATA138) deflated by total assets over the current and previous four years; *StdRev* is the standard deviation of sales (Compustat DATA12) deflated by total assets over the current and previous four years; *Size* is the natural logarithm of lagged total assets (Compustat DATA6 adjusted to the 1996 dollar);

Oldfirm equals one if a firm is listed on Compustat for more than 20 years, and zero otherwise; *StdSalesGrowth* is the standard deviation of sales growth over the current and previous four years; *Leverage* is total liabilities (Compustat DATA181) deflated by total assets (Compustat DATA6); *G1* equals one if the Gompers, Ishii, and Metrick (2003) governance index is less than or equal to six, and zero otherwise; *G2* equals one if the Gompers, Ishii, and Metrick (2003) governance index is between seven and nine, and zero otherwise; *G3* equals one if the Gompers, Ishii, and Metrick (2003) governance index is between ten and 12, and zero otherwise; *G4* equals one if the Gompers, Ishii, and Metrick (2003) governance index is equal to or greater than 13, and zero otherwise; *Deciles of market-to-book ratio* represents deciles of market value of assets (Compustat DATA6+DATA199*DATA25-DATA60-DATA74) divided by the book value of assets (DATA6) ranked within each year. For Panel B, correlations significant at the 5% level or lower appear in bold. In Panel C, the pre-SOX analysis includes firm-years from 1993 to 2001 and the post-SOX analysis includes firm-years from 2002 to 2006. In Panel C the dependent variable is absolute total accruals, measured as the absolute value of (Compustat (DATA123-DATA308+DATA124)/DATA6). In Panel D, the dependent variable is the absolute value of forward-looking discretionary accruals estimated following Dechow, Richardson, and Tuna (2003). Both total accruals and discretionary accruals are multiplied by 100 for ease of presentation. Robust *p*-values (in parentheses) are based on standard errors adjusted for clustering at firm-level and are one-tailed for coefficients that have the predicted sign and two-tailed for those without a predicted sign or those that do not have the predicted sign. For sake of brevity, we do not report coefficient estimates for *G*-Index dummies (*G1*, *G2*, *G3*, and *G4*), deciles of market-to-book ratio, year indicators, exchange indicators, and the Fama and French industry indicators. The chi-square statistics and *p*-values test whether the coefficient on *Incentive_CEO* is less than that on *Incentive_CFO* when each variable is included in the model individually.

Panel A: Descriptive statistics of main variables									
Variables	N	Mean	Median	Std. dev	Lower quartile	Upper quartile			
Total accruals	13,435	0.082	0.063	0.078	0.033	0.104			
Discretionary accruals	11,129	0.074	0.047	0.085	0.021	0.093			
Size	13,435	6.814	6.665	1.482	5.752	7.739			
Oldfirm	13,435	0.52	1	0.50	0	1			
StdSalesGrowth	13,435	0.256	0.137	0.428	0.073	0.269			
Leverage	13,435	0.515	0.521	0.224	0.357	0.654			
StdRev	13,435	0.16	0.118	0.137	0.069	0.203			
StdCashFlow	13,435	0.054	0.042	0.044	0.026	0.066			
Panel B: Pearson correlations									
Variables	Total accruals	Discretionary accruals	Incentive_CEO	Incentive_CFO	StdCashFlow	StdRev	Size	Oldfirm	StdSalesGrowth
Discretionary accruals	0.53								
Incentive_CEO	0.03	0.04							
Incentive_CFO	0.02	0.04	0.47						
StdCashFlow	0.29	0.31	−0.01	−0.04					
StdRev	0.13	0.18	−0.01	−0.05	0.37				
Size	−0.15	−0.15	0.07	0.19	−0.39	−0.21			
Oldfirm	−0.19	−0.15	−0.16	−0.09	−0.25	−0.14	0.37		
StdSalesGrowth	0.14	0.15	0.08	0.05	0.36	0.18	−0.15	−0.24	
Leverage	−0.03	−0.05	−0.18	−0.11	−0.09	0.03	0.40	0.22	−0.07

Panel C: Regression analysis of absolute total accruals on equity incentives

Model : $|Total\ accruals\ Bar| = \beta_0 + \beta_1 Incentive + \gamma' Controls + \varepsilon$

Variables	Predicted signs	Pre-SOX (N=8,090)			Post-SOX (N=5,345)		
		(1)	(2)	(3)	(4)	(5)	(6)
Incentive_CEO	+	0.90 (0.06)		0.26 (0.33)	−0.60 (0.28)		−0.40 (0.49)
Incentive_CFO	+		3.96 (0.00)	3.77 (0.00)		−1.66 (0.16)	−1.41 (0.26)
StdCashFlow	?	45.10 (0.00)	44.95 (0.00)	45.02 (0.00)	34.03 (0.00)	34.05 (0.00)	33.98 (0.00)
StdRev	?	0.31 (0.75)	0.30 (0.76)	0.29 (0.76)	1.11 (0.39)	1.09 (0.41)	1.08 (0.41)
Size	?	−0.15 (0.15)	−0.22 (0.03)	−0.22 (0.03)	−0.28 (0.01)	−0.26 (0.02)	−0.26 (0.03)
Oldfirm	?	−1.39 (0.00)	−1.35 (0.00)	−1.34 (0.00)	−1.21 (0.00)	−1.21 (0.00)	−1.22 (0.00)
StdSalesGrowth	?	−0.23 (0.51)	−0.22 (0.53)	−0.23 (0.51)	0.63 (0.18)	0.63 (0.17)	0.64 (0.17)
Leverage	?	0.59 (0.42)	0.65 (0.37)	0.68 (0.35)	1.89 (0.03)	1.89 (0.03)	1.84 (0.03)
Adjusted R ²		0.16	0.16	0.16	0.14	0.14	0.15
Chi-stat (p-Value)		7.87 (0.01)			0.87 (0.82)		

Panel D: Regression analysis of absolute discretionary accruals on equity incentives

Model : $|Discretionary\ accruals| = \beta_0 + \beta_1 Incentive + \gamma' Controls + \varepsilon$

Variables	Predicted signs	Pre-SOX (N=7,195)			Post-SOX (N= 3,934)		
		(1)	(2)	(3)	(4)	(5)	(6)
Incentive_CEO	+	1.56 (0.00)		0.91 (0.04)	−0.58 (0.47)		0.00 (0.50)
Incentive_CFO	+		4.44 (0.00)	3.75 (0.00)		−4.31 (0.01)	−4.31 (0.01)
StdCashFlow	?	38.77 (0.00)	38.37 (0.00)	38.62 (0.00)	35.51 (0.00)	35.45 (0.00)	35.45 (0.00)
StdRev	?	5.27 (0.00)	5.26 (0.00)	5.24 (0.00)	5.66 (0.00)	5.57 (0.00)	5.57 (0.00)
Size	?	−0.25 (0.01)	−0.31 (0.00)	−0.32 (0.00)	−0.40 (0.00)	−0.32 (0.02)	−0.32 (0.03)
Oldfirm	?	−0.59 (0.01)	−0.59 (0.01)	−0.54 (0.01)	−0.56 (0.10)	−0.59 (0.09)	−0.59 (0.09)
StdSalesGrowth	?	−0.19 (0.60)	−0.16 (0.66)	−0.19 (0.59)	1.09 (0.04)	1.11 (0.04)	1.11 (0.04)
Leverage	?	0.99 (0.14)	0.99 (0.14)	1.08 (0.11)	2.42 (0.02)	2.28 (0.03)	2.28 (0.03)
Adjusted R ²		0.18	0.18	0.18	0.16	0.16	0.16
Chi-stat (p-Value)		6.58 (0.01)			5.99 (0.99)		

Table 3

Analysis of the relation between beating analyst earnings forecasts and CFO equity incentives.

Incentive is the equity incentive ratio per Bergstresser and Philippon (2006); *Size* is the natural logarithm of a firm's total assets (Compustat DATA6) at the end of year *t*; *Growth* is the book value of equity to market value of equity (Compustat DATA60/DATA199*DATA25) at the beginning of year *t*; *SalesGrowth* is the sales in year *t* divided by sales in year *t*-1 (Compustat DATA12); *NOA* is the net operating assets (Compustat DATA216-DATA1+DATA9+DATA34) deflated by sales (Compustat DATA12) measured at the beginning of year *t*; *Shares* is the natural logarithm of common shares outstanding (Compustat DATA25) measured at the end of year *t*; *Litigation* equals one if the firm is in the following industries: pharmaceutical/biotechnology (SIC codes 2833–2826, 8731–8734), computer (3570–3577, 7370–7374), electronics (3600–3674), or retail (5200–5961), and zero otherwise; *ImplicitClaims* equals one minus the ratio of gross PPE to total assets (Compustat DATA7/DATA6) measured at the end of year *t*; *AnalystFollowing* is the number of analysts whose forecasts are included in the I/B/E/S consensus annual earnings forecast; *ForecastDispersion* is the coefficient of variation of the consensus forecast (standard deviation divided by the mean of analyst forecasts). In Panel B, correlations significant at the 5% level or lower appear in bold. For Panel C, the pre-SOX analysis includes firm-years from 1993 to 2001 and the post-SOX analysis includes firm-years from 2002 to 2006. The dependent variable takes the value of one if a firm's actual earnings per share (EPS) is greater or equal to the latest analyst consensus forecast. Robust *p*-values (in parentheses) are based on standard errors adjusted for clustering at firm-level and are one-tailed for coefficients that have the predicted sign and two-tailed for those without a predicted sign or those that do not have the predicted sign. Predicted signs are based on Cheng and Warfield (2005). For sake of brevity, we do not report the coefficient estimates for the year indicators. The chi-square statistics and *p*-values test whether the coefficient on *Incentive_CEO* is less than that on *Incentive_CFO* when each variable is included in the model individually. The generalized pseudo-*R*² is the Cragg and Uhler (1970) *R*².

Panel A: Descriptive statistics of main variables											
Variables	N	Mean	Median	Std.dev	Lower quartile	Upper quartile					
Positive surprise	9,855	0.738	1	0.44	0	1					
Size	9,855	7.245	7.091	1.524	6.158	8.203					
Growth	9,855	0.441	0.386	0.302	0.239	0.578					
SalesGrowth	9,855	1.156	1.102	0.286	1.02	1.223					
NOA	9,855	0.817	0.576	0.884	0.353	0.947					
Shares	9,855	4.17	3.976	1.169	3.311	4.868					
Litigation	9,855	0.314	0	0.464	0	1					
ImplicitClaims	9,855	0.45	0.533	0.382	0.201	0.757					
AnalystFollowing	9,855	11	9	7	5	15					
ForecastDispersion	9,855	0.023	0.014	0.1	0.007	0.031					
Panel B: Pearson correlations											
Variables	Positive Surprise	Incentive_CEO	Incentive_CFO	Size	Growth	SalesGrowth	NOA	Shares	Litigation	ImplicitClaims	AnalystFollowing
Incentive_CEO	0.08										
Incentive_CFO	0.10	0.49									
Size	0.02	0.05	0.18								
Growth	-0.07	-0.26	-0.28	0.03							
SalesGrowth	0.06	0.19	0.20	-0.09	-0.19						
NOA	-0.05	0.01	0.06	0.27	0.16	0.13					
Shares	0.06	0.21	0.31	0.82	-0.19	-0.06	0.15				
Litigation	0.07	0.18	0.15	-0.17	-0.13	0.07	-0.18	0.08			
ImplicitClaims	0.11	0.20	0.18	-0.09	-0.14	0.15	-0.14	0.00	0.18		
AnalystFollowing	0.05	0.20	0.31	0.58	-0.22	0.05	0.14	0.67	0.11	-0.06	
ForecastDispersion	-0.05	-0.03	-0.03	-0.01	0.02	0.03	0.01	-0.04	-0.03	-0.06	-0.01

Panel C: Logistic analysis of the likelihood of beating analyst forecasts and equity incentives

Model: $\text{Prob}(\text{Positive surprise}=1)=\beta_0+\beta_1 \text{ Incentive}+\gamma' \text{ Controls}+\varepsilon$

Variables	Predicted signs	Pre-SOX (N=5,927)			Post-SOX (N=3,928)		
		(1)	(2)	(3)	(4)	(5)	(6)
Incentive_CEO	+	0.41 (0.01)		0.19 (0.13)	0.12 (0.30)		−0.04 (0.86)
Incentive_CFO	+		1.42 (0.00)	1.25 (0.00)		1.03 (0.01)	1.06 (0.01)
Size	?	0.08 (0.09)	0.07 (0.11)	0.08 (0.08)	−0.04 (0.46)	−0.05 (0.40)	−0.05 (0.40)
Growth	−	−0.15 (0.20)	−0.11 (0.34)	−0.10 (0.39)	−0.23 (0.10)	−0.19 (0.19)	−0.19 (0.19)
SalesGrowth	+	0.50 (0.00)	0.48 (0.00)	0.47 (0.00)	0.58 (0.00)	0.57 (0.01)	0.57 (0.01)
NOA	−	−0.12 (0.00)	−0.13 (0.00)	−0.13 (0.00)	−0.17 (0.00)	−0.17 (0.00)	−0.17 (0.00)
Shares	?	−0.16 (0.01)	−0.16 (0.01)	−0.17 (0.01)	0.07 (0.34)	0.08 (0.33)	0.08 (0.33)
Litigation	?	0.19 (0.02)	0.18 (0.02)	0.18 (0.03)	0.07 (0.54)	0.06 (0.57)	0.06 (0.57)
ImplicitClaims	+	0.25 (0.00)	0.23 (0.01)	0.22 (0.01)	0.61 (0.00)	0.59 (0.00)	0.60 (0.00)
AnalystFollowing	+	0.02 (0.00)	0.02 (0.00)	0.02 (0.00)	0.02 (0.00)	0.02 (0.02)	0.02 (0.02)
ForecastDispersion	−	−1.10 (0.00)	−1.09 (0.00)	−1.10 (0.00)	−0.42 (0.19)	−0.40 (0.19)	−0.41 (0.19)
Generalized pseudo-R ²		0.053	0.056	0.056	0.046	0.048	0.048
Chi-stat (p-value)		8.14 (< 0.01)			4.27 (0.02)		

relation between the combined CEO and CFO equity incentives and discretionary accruals significantly weakens in the post-SOX period. Interestingly, however, the coefficient on the CFO equity incentives is negative in both panels and significantly so in Panel D for the absolute discretionary accruals model. This finding suggests that the positive relation between the CFO equity incentives and firms' accruals management does not just dampen after the implementation of SOX but actually reverses. One possible explanation for this reversal is that CFOs believe that after SOX investors penalize earnings management by executives with high equity incentives. Consistent with this possibility, Koh, Matsumoto, and Rajgopal (2006, Table 7) show that in the post-SOX period the market reacts *negatively* to *positive* earnings surprises by firms whose CEOs have higher equity incentives. Their evidence implies that the reward for earnings management that executives enjoyed pre-SOX has turned into a penalty post-SOX for managers with high equity incentives. We believe that this penalty imposed on managers with higher equity incentives might be driving the negative coefficient on CFO incentive ratios in the post-SOX period.

3.2. Beating analyst forecasts

Prior literature has recognized that accruals are a noisy proxy and are not always powerful in detecting earnings management in different settings (Kothari, Leone, and Wasley, 2005; Ayers, Jiang, and Yeung, 2006). Burgstahler and Dichev (1997) and DeGeorge, Patel, and Zeckhauser (1999) develop an additional measure of earnings management—a firm's tendency to report small profits, small earnings increases over last year, and small earnings surprises over analysts' earnings forecasts. Compared to discretionary accruals, a firm's tendency to beat earnings benchmarks is an *outcome*-based proxy for earnings management (Leuz, Nanda, and Wysocki, 2003). Cheng and Warfield (2005) is a study that links such outcome-based measures of earnings management to CEO equity incentives.

Cheng and Warfield (2005) find that firms with higher CEO equity incentives are more likely to report positive earnings surprises over analysts' earnings forecasts during the period of 1993–2000.⁸ They conclude that higher equity incentives motivate CEOs to manage earnings to beat the analyst forecast benchmark. Similar to Cheng and Warfield (2005), we estimate the logit model below to examine whether CFO equity incentives also affect a firm's likelihood of beating analyst forecasts.

$$\text{Prob(Positive surprise} = 1) = \beta_0 + \beta_1 \text{ incentive} + \gamma' \text{ Controls} + \varepsilon. \quad (3)$$

The dependent variable (*Positive surprise*) equals one if a firm's actual annual earnings per share reported in Institutional Brokers' Estimate System (I/B/E/S) is greater

than or equal to the latest analyst consensus earnings forecast from the I/B/E/S unadjusted summary file, and zero otherwise. Our main variable of interest is the equity incentive ratio per Bergstresser and Philippon (2006).⁹ Following Cheng and Warfield (2005), we control for firm size (*Size*), growth option (*Growth*), sales growth (*SalesGrowth*), net operating assets (*NOA*), shares outstanding (*Shares*), litigation risk (*Litigation*), implicit claims (*ImplicitClaims*), numbers of analysts contributing to the consensus annual earnings forecast (*AnalystFollowing*), the dispersion of the consensus forecasts (*ForecastDispersion*), and year indicators (see Table 3 for detailed variable descriptions).

Panel A of Table 3 reports descriptive statistics and Panel B displays Pearson correlations for the variables used in this model. The regression results appear in Panel C of Table 3. The results in column 1 of Panel C confirm the finding in Cheng and Warfield (2005) that in the pre-SOX period, CEO equity incentives are positively associated with the likelihood of reporting positive earnings surprises. Column 2 indicates that during this same period, CFO equity incentives are also significantly positively associated with a firm's likelihood of reporting positive earnings surprises ($p < 0.01$). The estimated coefficient on CFO equity incentive ratios in column 2 is more than three times the coefficient on CEO equity incentive ratios in column 1 ($p < 0.01$). Furthermore, when we include both CEO and CFO equity incentives ratios in the same regression, the coefficient on *Incentive_CEO* is not significantly different from zero while the coefficient on *Incentive_CFO* is still significantly positive ($p < 0.01$).

To interpret the differences in the magnitude of the impact of CFO and CEO equity incentives on the likelihood of beating analyst earnings forecasts, we calculate the changes in the odds ratio for beating analyst forecasts when equity incentive ratios increase from the first quartile to the third quartile of each distribution.¹⁰ The change in the odds ratio moving from the first quartile to the third quartile of the CEO's equity incentive distribution is 12% while a similar movement along the CFO's equity incentive distribution is 17%. Furthermore, if we assume that all other variables in the models in columns 1 and 2 are at their respective medians, the likelihood of beating analyst forecasts increases from 60% to 62% for the CEO that moves from the first to the third quartile of

⁹ Cheng and Warfield (2005) define CEO equity incentives as the various stock and options owned by the CEOs as a percent of total shares outstanding and find that the likelihood of beating benchmarks is increasing in the unexercisable stock options of the CEO. In an untabulated analysis, we use equity incentive measures similar to Cheng and Warfield (2005) and find that the likelihood of beating analyst forecasts is increasing in unexercisable stock options of the CEO and the CFO, but more so for the CFO than the CEO. We focus on the Bergstresser and Philippon (2006) equity incentive ratio because we believe it more finely measures equity incentives.

¹⁰ The odds ratio is the likelihood of beating analyst forecasts divided by the likelihood of not beating analyst forecasts. The change in odds ratio associated with equity incentives is the effect of a change in equity incentives on the odds ratio. The percent change in the odds ratio moving from the first quartile to the third quartile of equity incentives is calculated as $100 \times [\exp(\text{incentive coefficient} \times (Q3 - Q1)) - 1]$ (Greene, 2000).

⁸ Cheng and Warfield (2005) also find that firms with high CEO equity incentives are more likely to report *small* positive earnings surprises. For the sake of brevity, we focus on beating analyst forecasts.

the CEO equity incentive distribution while the likelihood would increase from 60% to 64% for the CFO that moves from the first to the third quartile of the CFO equity incentive distribution.

In the post-SOX period, the insignificant coefficients on *Incentive_CEO* in columns 4 and 6 suggest that CEO equity incentives are no longer significantly associated with the likelihood of beating analyst forecasts. Yet, the positive and significant coefficients on *Incentive_CFO* in columns 5 and 6 demonstrate that CFO equity incentives still matter (both p -values=0.01). Note that even though others find less *accruals* management in the post-SOX period, there is evidence that there may be more *real activity* management (Cohen, Dey, and Lys, 2008) and more *expectations* management (Koh, Matsumoto, and Rajgopal, 2008) in the post-SOX period. Both real activity management and expectations management can result in beating analyst forecasts. Therefore, it is not surprising that in the post-SOX period, while CFO equity incentives are not associated with accruals management as shown in Table 2, CFO equity incentives are still increasing in the likelihood of beating analyst forecasts. Overall, the results suggest that in both the pre- and post-SOX periods, CFO equity incentives play a more powerful role in beating analyst forecasts than those of the CEO.

3.3. Additional analysis

The focus of our study is the impact of CFOs' equity incentives on earnings management relative to the equity incentives of CEOs. Accordingly we estimate CFOs' equity incentives by using a measure of the sensitivity of compensation to changes in stock price similar to the measure used in prior research on earnings management and CEO equity incentives. Another potential measure, however, would be a direct measure of the sensitivity of the manager's compensation to meeting various earnings targets.¹¹ It is difficult to imagine, however, how one would create such a measure given all the different earnings targets in play. If there was only one earnings target, it would be easier (although still challenging). For example, if managers always had an incentive to increase earnings, one could measure the sensitivity of compensation to increases in earnings. But there are many targets that a manager faces, sometimes simultaneously, such as reporting smooth earnings, beating or missing analyst forecasts, exceeding a bonus threshold, avoiding a covenant violation, taking a big bath, etc.

As an alternative approach to assessing the sensitivity of a manager's pay to meeting various earnings targets, we consider the sensitivity of a firm's stock return to accounting earnings. We expect that holding the relation between managers' compensation and changes in stock prices constant, managers of firms whose stock returns are more sensitive to earnings will have stronger incentives to manage earnings than managers of firms whose stock returns are less sensitive to earnings.

To test this notion, we estimate the relationship between a firm's earnings and stock returns following Easton and Harris (1991), Dechow (1994), Hayn (1995), and Ohlson (1991) by estimating the following model for each firm:

$$R_{it} = \beta_0 + \beta_1 EPS_{it} + \varepsilon_t \quad (4)$$

R_{it} is a firm's 12-month stock returns starting from the fourth month of fiscal year t ; EPS_{it} is the firm's earnings per share before extraordinary items for year t , scaled by the stock price at the end of year $t-1$. The estimated coefficient β_1 captures the sensitivity of a firm's stock returns to earnings. We require at least ten observations for each firm to estimate β_1 . We control for the AR (1) autocorrelation in the error term using the Yule-Walker method.

We estimate β_1 for each firm over the period of 1980–2001 in the absolute total accruals and the absolute discretionary accruals analyses. We focus on the pre-SOX period for the two accruals analyses because, as we report earlier, we only find a positive relation between equity incentives and accruals management during the pre-SOX period. On the other hand, we estimate β_1 for each firm over the full period of 1980–2006 in the analysis of beating analyst forecasts because we find few differences in the relationship between equity incentives and the likelihood of beating analyst forecasts before and after SOX.

We consider firms with a β_1 above the sample median to have high earnings-return sensitivity. We create a dummy variable, *High*, coded as one for firms with high earnings-return sensitivity (i.e., β_1 above the sample median), and zero for firms with low earnings-return sensitivity (i.e., β_1 below the sample median). We then re-estimate our three regression models allowing both CEO and CFO equity incentive ratios to interact with *High*. Panel A of Table 4 reports the regression results for the accruals models for the pre-SOX period and Panel B reports the regression results for the likelihood of beating analyst forecasts during the combined pre- and post-SOX periods. The adjusted R^2 reported in Panel B for the logistic analysis is the generalized pseudo- R^2 following Cragg and Uhler (1970).

Consistent with our prior results, the coefficients on *Incentive_CFO* are larger than the corresponding coefficients on *Incentive_CEO* across all three models.¹² Also, as expected, we find that the coefficients on the interaction terms of *Incentive_CEO* and *Incentive_CFO* with *High* are positive in all cases. The coefficient on the interaction with *High* is generally significant for the CEO in the total accruals and the discretionary accruals models, while the coefficient on the interactions of *High* with *Incentive_CFO* is only significant in the total accruals model as reported

¹² Note that the coefficient on *Incentive_CEO*High* is greater than the coefficient on *Incentive_CFO*High* when we include both CEO and CFO equity incentives in the model. This does not, however, indicate that CEO equity incentives have a stronger impact on earnings management because the sum of the coefficients on *Incentive_CEO* and *Incentive_CEO*High* is still less than the sum of the coefficients on the analogous CFO variables.

¹¹ This insight was provided by an anonymous reviewer.

Table 4

Test of whether the impacts of equity incentives are stronger for firms with higher stock returns sensitivity to earnings.

We test if the impacts of managers' equity incentives are stronger for firms whose earnings are closely correlated with stock returns. We estimate the correlation of a firm's earnings with its stock return following Easton and Harris (1991), Dechow (1994), Hayn (1995), and Ohlson (1991). We run the following model for each firm: $R_{it} = \beta_0 + \beta_1 * EPS_{it} + e$, where R_{it} is a firm's 12-month stock return per share starting from the fourth month of fiscal year t ; EPS_{it} is the firm's earnings per share before extraordinary items for year t , scaled by the stock price at the end of year $t-1$. The estimated coefficient β_1 captures the extent that a firm's accounting earnings is associated with its stock returns. We estimate β_1 for each firm over the period of 1980–2001 for Panel A and from 1980 to 2006 for Panel B, requiring at least ten observations for each firm. We control for the AR (1) autocorrelation in the error term using the Yule-Walker method. Using the estimated earnings-return coefficient β_1 , we create a dummy variable *High* that equals one if the sample firm's β_1 is in the top half. Then we interact *High* with CEO and CFO's equity incentive ratios. All other variables are as previously defined in Tables 2 and 3. Total accruals and discretionary accruals are multiplied by 100 for ease of presentation. The generalized pseudo- R^2 in Panel B is the Cragg and Uhler (1970) R^2 . Robust p -values (in parentheses) are based on standard errors adjusted for clustering at firm-level and are one-tailed for coefficients that have the predicted sign and two-tailed for those without a predicted sign or those that do not have the predicted sign.

Panel A: Regression analysis of accruals management								
Model: Accruals measures =β ₀ +β ₁ Incentive+β ₂ Incentive*High+γ' Controls+ε								
Variables		Predicted signs	Total accruals (N=6,377)			Discretionary accruals (N=5,726)		
			(1)	(2)	(3)	(4)	(5)	(6)
Incentive_CEO	+	−0.48 (0.54)		−0.70 (0.44)	−0.06 (0.93)		−0.48 (0.49)	
Incentive_CEO*High	+	2.12 (0.02)		1.91 (0.05)	1.37 (0.05)		1.38 (0.06)	
Incentive_CFO	+		0.38 (0.40)	1.21 (0.24)		1.39 (0.18)	1.98 (0.12)	
Incentive_CFO*High	+		3.65 (0.05)	1.88 (0.22)		2.53 (0.10)	1.28 (0.28)	
StdCashFlow	?	45.27 (0.00)	45.23 (0.00)	45.35 (0.00)	40.26 (0.00)	40.23 (0.00)	40.31 (0.00)	
StdRev	?	−0.51 (0.63)	−0.57 (0.59)	−0.53 (0.61)	3.12 (0.00)	3.06 (0.00)	3.09 (0.00)	
Size	?	−0.23 (0.03)	−0.26 (0.01)	−0.27 (0.01)	−0.33 (0.00)	−0.37 (0.00)	−0.38 (0.00)	
Oldfirm	?	−1.46 (0.00)	−1.48 (0.00)	−1.43 (0.00)	−0.42 (0.07)	−0.42 (0.07)	−0.38 (0.10)	
StdSalesGrowth	?	−0.93 (0.00)	−0.90 (0.01)	−0.90 (0.01)	−0.60 (0.13)	−0.56 (0.17)	−0.56 (0.16)	
Leverage	?	1.49 (0.06)	1.53 (0.06)	1.56 (0.05)	1.49 (0.03)	1.55 (0.02)	1.59 (0.02)	
High	?	−0.50 (0.14)	−0.36 (0.29)	−0.61 (0.09)	−0.82 (0.00)	−0.73 (0.01)	−0.91 (0.00)	
Adjusted R ²		0.15	0.15	0.15	0.16	0.16	0.16	
Panel B: Logistic analysis of beating analyst forecasts								
Model: Prob (Positive surprise=1)=β ₀ +β ₁ Incentive+β ₂ Incentive*High+γ' Controls+ε								
Variables		Predicted signs	(N=8,503)					
			(1)	(2)	(3)			
Incentive_CEO	+		0.17 (0.21)		−0.02 (0.92)			
Incentive_CEO*High	+		0.19 (0.24)		0.18 (0.27)			
Incentive_CFO	+			1.02 (0.01)	1.06 (0.02)			
Incentive_CFO*High	+			0.48 (0.20)	0.31 (0.32)			
Size	?		0.05 (0.18)	0.05 (0.21)	0.05 (0.20)			
Growth	−		−0.15 (0.07)	−0.10 (0.16)	−0.10 (0.17)			
SalesGrowth	+		0.55 (0.00)	0.53 (0.00)	0.53 (0.00)			
NOA	−		−0.13 (0.00)	−0.14 (0.00)	−0.14 (0.00)			
Shares	?		−0.06 (0.23)	−0.07 (0.19)	−0.07 (0.18)			
Litigation	?		0.15 (0.04)	0.13 (0.06)	0.13 (0.06)			
ImplicitClaims	+		0.38 (0.00)	0.36 (0.00)	0.36 (0.00)			

Table 4 (continued)

Panel B: Logistic analysis of beating analyst forecasts				
Model: $\text{Prob}(\text{Positive surprise}=1)=\beta_0+\beta_1 \text{ Incentive}+\beta_2 \text{ Incentive}^* \text{High}+\gamma' \text{ Controls}+\varepsilon$				
Variables	Predicted signs	(N=8,503)		
		(1)	(2)	(3)
AnalystFollowing	+	0.02 (0.00)	0.02 (0.00)	0.02 (0.00)
ForecastDispersion	–	–0.99 (0.00)	–1.00 (0.00)	–0.99 (0.00)
High	?	0.14 (0.09)	0.14 (0.08)	0.11 (0.20)
Generalized pseudo-R ²		0.051	0.054	0.054

in column 2 of Panel A. Overall, this additional analysis provides some weak evidence that earnings management incentives are increasing in the extent to which managers have both equity compensation that is more sensitive to changes in stock prices and stock returns that are more sensitive to earnings.

4. Conclusions

In this study we investigate whether CFO equity incentives are associated with earnings management and the incremental role of CFO equity incentives in earnings management relative to those of the CEOs. Our study is motivated by the heightened regulation on the disclosure of CFO compensation packages, as well as the requirement that CEOs and CFOs personally certify the accuracy and completeness of the financial information released by the company. If conventional wisdom holds that CFOs merely act as CEO agents (Graham and Harvey, 2001), we would expect that CFO equity incentives would not have an incremental impact on earnings management beyond the equity incentives of the CEO. Given that a CFO's primary responsibility is preparing financial reports, we expect that CFOs wield independent influence on firms' earnings management activities and that this influence may even be greater than that of the CEO.

We empirically test the impact of CFO equity incentives in settings where prior research shows a positive association between CEO equity incentive and earnings management measured through: (1) accruals and (2) the likelihood of beating analyst forecasts. First, we confirm the inferences from prior research about the impact of CEO equity incentives when considered individually. We also demonstrate that the positive relation between CEO and CFO equity incentives and accrual-based earnings management disappears in the post-SOX period. Second, we find across all of our models (absolute total accruals, absolute discretionary accruals, and beating analyst forecasts) that earnings management is more increasing in CFO equity incentives than CEO equity incentives. Our evidence suggests that CFO equity incentives play an *independent* role in firms' earnings management activities, even after controlling for CEO equity incentives. In

addition, the role of the CFO equity incentives is greater than that of the CEO. We also find some weak evidence that earnings management incentives are strongest when the manager has compensation that is more sensitive to stock prices and the firm's stock returns are more sensitive to accounting earnings.

Our results support the SEC's recent disclosure requirement on the compensation package of all CFOs. First, our results confirm commentators and policymakers' concern that CFO equity-based pay, in addition to that of the CEOs, might create incentives to manipulate earnings. Our evidence indicates that the SEC's disclosure requirement on CFO compensation packages might be useful for investors and analysts to assess a firm's quality of financial reporting. Second, recent research has begun to investigate the determinants of CFO pay (Gore, Matsunaga, and Yeung, 2004, 2007; Wang, 2005). Our study complements this research by empirically showing the consequences of CFO equity-based pay.

One limitation of our study is that we only focus on firm-years with both CFO and CEO compensation data from ExecuComp. That is, our CFOs are among the five highest paid executives of the firm. To the extent that CFO pay reflects their importance within a firm, our inferences may not generalize to firms whose CFOs are not among the five highest paid executives. Future research could rely on the new disclosure data on CFO compensation packages to investigate whether our inferences are generalizable to a broader population of firms.

Another limitation of our study is that we only consider the equity incentives of the CEO and the CFO, while it is likely that incentives of managers at lower levels of the organization also matter. This is particularly important in our setting because firms that provide their CFOs with strong equity incentives are more likely to provide strong equity incentives throughout the organization. If that is the case, then our findings on the influence of CFOs' equity incentives on earnings management may also reflect the impact of other lower level executives in the organization. Therefore, one should be cautious in attributing our findings on the relationship between CFO equity incentives and earnings management solely to the actions of the CFO. We leave it to future research to explore the role of equity incentives of other lower level managers.

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