

Equity Incentives and Earnings Management

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Abstract

In this paper, we develop the link between managers' equity incentives – arising from stock-based compensation and stock ownership – and earnings management. We posit that managers with high equity incentives are more likely to sell shares in the future to diversify idiosyncratic risk and this motivates these managers to engage in earnings management to increase the value of the shares to be sold. Using stock-based compensation and stock ownership data over the 1993-2000 time period, we document that managers with high equity incentives are more likely to sell shares in subsequent periods. As expected, we find that managers with high equity incentives are more likely to report earnings that meet or just beat analysts' forecasts compared to managers with low equity incentives. Additional analyses indicate that high equity incentive managers are less likely to report large positive earnings surprises, consistent with earnings smoothing, particularly for firms with persistent equity incentives. Collectively, the results indicate that equity incentives, in the form of stock-based compensation and stock ownership, lead to incentives for earnings management.

Key Words: Equity incentives, stock-based compensation, stock ownership, insider trading, earnings management, meeting or beating analysts' forecasts, abnormal accruals.

Data Availability: Data used in this study are available from the sources identified in the text.

1. Introduction

Regulators and investors have raised concerns that certain management incentives could lead to earnings management, reducing the informativeness of financial reporting and contributing to recent corporate scandals (Levitt 1998; Knowledge at Wharton 2003). Of particular recent concern is that stock-based compensation might induce managers to increase the short-term stock price through earnings management, if they believe that investors fixate on reported earnings. For example, Michael Jensen argues that stock-based compensation and other equity incentive elements can encourage managers to increase short-term stock prices in order to benefit from subsequent selling of their own firms' stocks (The Economist 2002).¹

Indeed, these concerns have contributed to new calls for the expensing of stock options and other regulatory constraints on compensation practices (Conference Board 2002; Morgenson 2003; FASB 2004). However, there is little empirical evidence on the relation between equity incentives and earnings management. The purpose of this paper is to examine this relation, thereby providing evidence that can be used to corroborate or refute allegations of equity incentive related earnings management.

Modern corporations employ various mechanisms to remedy the adverse consequences arising from the separation of ownership and control (Jensen and Meckling 1976). Encouraging managerial ownership is an example of such mechanisms. Theoretically, as managers own more shares, they are more likely to act in the interests of shareholders. One way to increase the level of managerial ownership is to award managers options or shares of stock (Core and Guay 1999). Prior research examines the relationship between managerial ownership, stock-based compensation, and future firm performance and finds results consistent with the incentive-alignment effects of these equity incentive elements (Lambert and Larcker 1987; Morck et al. 1988; Hanlon et al. 2003, among others). However, at the same time, these elements

¹ Dechow and Skinner (2000) also express concerns that when stock market valuations are high, managers have incentives to maintain or even increase those valuations, probably via earnings management. See Erickson et al. (2003) for discussion of similar concerns expressed in the popular press that equity incentives might lead to earnings management.

can lead managers to focus on short-term stock prices, thereby leading to incentives for earnings management.

The incentives for earnings management arise from managers' diversifying the increased risk exposure due to ownership or stock-based compensation. For example, Ofek and Yermack (2000) examine the dynamics of ownership and stock-based compensation, and find that when managers are awarded stock-based compensation, they tend to sell shares they already own for risk diversification reasons. Managers are likely to continue selling shares in the future if the risk exposure due to current equity incentive elements is above the level that managers are willing to bear, or if it increases above this level in the future. The latter can occur because when stock prices increase in the future, managerial wealth becomes more concentrated in the stock and managers' option holdings become riskier (more sensitive to stock prices).

As a result of the risk diversification via selling shares, the wealth of managers with higher equity incentives is sensitive to the short-term stock price. This sensitivity can motivate managers with high equity incentives to increase the short-term stock price and thus the value of the shares they are going to sell in the future. Given that the capital market uses current earnings to predict future earnings when pricing firm equity, these managers are expected to use their accounting discretion to manage earnings in order to keep the short-term stock price high (Stein 1989).

In this paper, we explicitly examine the links from equity incentives – broadly defined as stock-based compensation and stock ownership – to earnings management. In particular, we examine the following equity incentive elements: option grants, unexercisable options, exercisable options, restricted stock grants, and stock ownership. Because the positive relation between equity incentives and managers' future trading of their own firms' stock underpins the earnings management argument, we first examine the existence of this relation. We measure a manager's future trading as net sales, which refer to the difference between open market sales and the sum of open market purchases and the shares received from exercising options. The results indicate that, as expected, managers with higher equity incentives have significantly higher levels of net sales in the year after earnings announcements. This relation motivates managers to care about short-term stock prices and introduces incentives for earnings management.

Next, we investigate the association between equity incentives and earnings management by examining the extent to which managers report earnings that meet or *just* beat analysts' forecasts. As expected, we find a significantly higher incidence of meeting or just beating analysts' forecasts for companies with high equity incentives than for companies with low equity incentives. As discussed later in detail, these results are more consistent with earnings management induced by equity incentives as opposed to better firm performance attendant to incentive alignment benefits or to equity incentive elements proxying for omitted correlated firm characteristics.

Finally, we examine whether managers who predictably engage in earnings management sell more after actual earnings management. We find that managers with high equity incentives, who are more likely to manage earnings, sell more after meeting or beating analysts' forecasts than after missing analysts' forecasts. In contrast, we do not find such evidence for managers with low equity incentives, who are less likely to manage earnings. These results are consistent with high equity incentive managers increasing sales after earnings management.

We conduct additional analyses to enrich our results on earnings management. First, equity incentives can be recurring; managers with high equity incentives in the current period are more likely to have high equity incentives in the future. Accordingly, managers can benefit from smoothing earnings; by reserving in good years, managers can more easily meet or beat analysts' forecasts in future periods. Consistent with this argument, we find that high equity incentive managers are less likely to report large positive earnings surprises compared to their counterparts with low equity incentives. The evidence is particularly strong for firms with more persistent equity incentives. Second, we find that high equity incentive managers on average report more income-increasing abnormal accruals, especially for managers with less persistent equity incentives – those who are less concerned with the reversal of accruals in the future. We also find that managers sell more shares after taking income-increasing abnormal accruals. Lastly, our findings are robust to alternative measurements of key variables, the inclusion of other control variables, and alternative regression specifications.

Overall, consistent with regulators' and investors' concerns about equity incentives, we find that high equity incentive managers are more likely to engage in earnings management, relative to managers

with low equity incentives. This evidence contributes to the compensation literature by extending research on compensation-related opportunistic behavior. By documenting one potential consequence of stock-based compensation and ownership, this paper should also be of interest to boards of directors contemplating compensation contracts for managers. While stock-based compensation and ownership can yield positive incentive effects, they can also have side effects, such as increased earnings management. An optimal compensation contract should reflect this trade-off.

This paper also contributes to the earnings management literature. Although earnings management has received considerable attention in the accounting literature, little is known about the extent to which stock-based compensation or ownership provides incentives for earnings management. In this paper, we find that equity incentives can lead to earnings management due to capital market considerations. This paper therefore extends research on compensation-related earnings management beyond that related to bonus contracts as documented in Healy (1985), Watts and Zimmerman (1986, 1990), and Warfield et al. (1995).

Our paper is related to other concurrent studies of the capital market pressure on managers due to equity incentives. Skinner and Myers (2000) find that firms tend to manage earnings to maintain a string of earnings increases and Ke (2001) finds that managers' equity incentives are a determinant of such reporting. Beneish and Vargus (2002) find that income-increasing accruals, when accompanied with insider sales, have low quality, *consistent* with the notion that managers might manage earnings upward and then sell their own shares. We extend these studies by explicitly linking equity incentives to managers' subsequent trading and earnings management behavior, such as meeting or just beating analysts' forecasts, avoiding large positive earnings surprises, and recognizing abnormal accruals.²

The remainder of the paper is organized as follows. In the next section, we develop our hypothesis concerning equity incentives and earnings management. In Section 3, we describe the sample and data. In

² Concurrent research by McVay et al. (2004) examines insider trading *following* meeting and beating analysts' forecasts. Unlike the analyses in this paper, McVay et al. do not examine *ex-ante* incentives for earnings management, and thus do not test whether equity incentives motivate earnings management.

Section 4, we present primary results. Section 5 discusses further analyses that provide additional insights and ensure the robustness of our results; Section 6 concludes with a summary.

2. Hypothesis development

The theoretical linkages for our study are illustrated in Figure 1. As indicated, the link between equity incentives and managers' future trading is important because such trading motivates managers to care about short-term stock prices, resulting in earnings management incentives. We first discuss the relation between equity incentives and managers' future trading in their own firms' stock, and then present our hypothesis on earnings management.

2.1 Equity incentives and their relation to future manager trading

Managerial ownership is an important mechanism to align managers' incentives with those of shareholders (Jensen and Meckling 1976; Morck et al. 1988). One way to increase ownership is through stock-based compensation. When a manager is granted options, the options usually are not exercisable until three or four years later. When options become exercisable (i.e., vested), managers can choose to hold exercisable options or to exercise the options and hold shares instead. (To finance option exercises, managers generally sell the shares received from exercising options right away.) Occasionally, managers are also awarded restricted stock. Similar to option grants, restricted stock usually does not vest (i.e., cannot be traded) until after three or four years. Another way to obtain shares is through open market purchases. This practice is especially common in early career stages.

These various elements and their interrelationships are summarized in Figure 2. As indicated, at any point in time, such as at the fiscal-year-end, managers might have various forms of equity-based holdings: unexercisable options, exercisable options, and stock ownership. Due to these equity-based holdings, managers' wealth is sensitive to their firms' stock prices, and accordingly, managers bear the idiosyncratic risk of the firm.

The equilibrium risk level results from a balance of two opposing forces. From an incentive-alignment perspective, equity incentives help motivate managers to work in shareholders' interests. However, from the perspective of risk diversification, risk averse managers want to reduce their exposure

to the idiosyncratic risk of the firm. Consequently, managers want to sell shares if the risk exposure level due to current equity-based holdings is higher than the equilibrium level.³ Even if the current risk exposure is at the equilibrium level, it can increase beyond this level in the future due to changes in economic circumstances.

For example, if stock prices increase, managers' wealth becomes more concentrated in a single risky asset (i.e., their firms' stock). Thus, the exposure of a manager's wealth to the idiosyncratic risk increases. Furthermore, based on option valuation theory (such as Black and Scholes 1973), the sensitivity of the value of unexercisable options to prices increases with stock price. Under general capital asset pricing assumptions, stock prices are expected to increase in normal economic circumstances (i.e., the expected return of a firm is positive.) As a result, managers' risk exposure due to equity incentives is expected to increase in the future. If the risk exposure increases beyond the equilibrium level, managers can sell shares they already own to diversify the risk.

In summary, managers with higher equity incentives are more likely to sell shares (Link 2 in Figure 1). Accordingly, these managers' wealth is sensitive to short-term stock prices and they have incentives to increase short-term prices and the value of the shares they are going to sell. To this end, they can make value-increasing production, financing, and investment decisions, or engage in earnings management. The latter is the focus of this study.

2.2 Equity incentives and earnings management

Managers who will sell shares in the future might have earnings management incentives (Link 3 in Figure 1) if two conditions hold: (1) the capital markets rely on reported earnings in forming beliefs about future earnings so that earnings management can affect stock prices, and (2) managers can take advantage of the increased stock prices. With respect to the first condition, Stein (1989, 657) argues, "... the stock market uses earnings to make a rational forecast of firm value – higher earnings today will be correlated

³ Some firms explicitly specify the target stock ownership for CEOs to facilitate incentive alignment (Core and Larcker 2002). If managers' equity incentive levels are lower than the equilibrium level, they can purchase shares from the open market.

with higher earnings in the future.” Extant accounting research shows that stock prices generally react to earnings announcements in the direction of earnings surprises, with analysts’ forecasts as the proxy for earnings expectations (Brown and Kim 1991; O’Brien 1988; Schipper 1991, among others). Thus, managers can use their accounting discretion to affect reported earnings and stock prices if the capital markets have difficulty in detecting earnings management.⁴

If stock prices increase with earnings management, managers gain more from the shares to be sold in the future than without earnings management. Thus, condition (2) is satisfied, unless litigation or reputation concerns deter managers from taking advantage of the increased stock price. However, the evidence in prior research is consistent with managers’ benefiting from insider trading. For example, Seyhun (1998), Lakonishok and Lee (2001), among others find that insiders are better informed and generally earn abnormal returns. With respect to accounting information disclosed through management forecasts or earnings announcements, Penman (1982), Noe (1999), and Sivakumar and Waymire (1994) find that managers sell more after good news than after bad news. Beneish (1999) and Summers and Sweeney (1998) find that managers of firms accused of accounting fraud sell their own shares before these firms are formally subject to SEC enforcement actions. Similarly, Beneish and Vargus (2002) document that managers strategically trade on their private information about the quality of accruals; managers sell more after income-increasing abnormal accruals, which might be a result of upward earnings management.

Thus, extant research supports the link from insider trading to earnings management. This link, combined with the link from equity incentives to future trading discussed in Section 2.1, suggests that high equity incentive managers are more likely to engage in earnings management, relative to low equity

⁴ While the efficient market assumption posits that managers cannot fool investors with earnings management, extant empirical evidence suggests otherwise. For example, Kasznick (1999) finds that earnings management can help companies avoid market penalties associated with missing earnings targets. Sloan (1996) and Richardson et al. (2004), among others, suggest that the capital markets mis-price accruals, especially abnormal accruals, consistent with earnings management influencing stock prices. See Fields et al. (2002) for additional discussion of the pricing effects of earnings management. However, as discussed below, incentives for earnings management exist in this context even if on average earnings management cannot affect stock prices.

incentive managers (Link 1 in Figure 1). This prediction is consistent with the conclusion in Stein (1989): managers who care about short-term stock prices are expected to manage earnings to increase short-term stock prices and such behavior increases with the sensitivity of managers' utility to current stock prices.⁵

Earnings management incentives exist not only when investors are naïve – fixating on reported earnings, but also when investors are sophisticated – adjusting for expected earnings management when pricing equity. Stein (1989) shows that when investors are sophisticated, in equilibrium, investors rationally expect managers to engage in earnings management, which they do. In other words, if the market has rational expectations of earnings management behavior but cannot completely undo earnings management of individual firms, it is optimal for market participants to price the reported earnings by adjusting for the impact of earnings management. From the perspective of managers, given investors' pricing behavior, managers find it optimal to engage in earnings management.

In sum, as depicted in Figure 1, managers with high equity incentives are likely to sell shares to diversify idiosyncratic risk. Due to this trading behavior, managers care about short-term stock prices. Because reporting higher earnings likely increases the short-term stock prices and the value of the shares to be sold, managers with high equity incentives have incentives to manage earnings. Accordingly, we hypothesize that:

H1: The incidence of earnings management is positively associated with equity incentives.

In this paper, we focus on one particular proxy for earnings management – meeting or *just* beating analysts' forecasts. Recent studies of earnings management, starting with Burgstahler and Dichev (1997), suggest that the disproportionate likelihood of meeting or *just* beating analysts' forecasts is an important manifestation of earnings management. This proxy is preferred because it is subject to fewer measurement errors than other proxies, such as abnormal accruals, and is associated with favorable market

⁵ Potential costs of earnings management, such as audit qualifications, SEC enforcement sanctions, or management reputation effects, can constrain earnings management. In this paper, we first assume that the costs of earnings management are not correlated with equity incentives and thus do not affect the predicted relation between equity incentives and earnings management. In Section 5.1, we relax this assumption, discuss the possibility that certain costs of earnings management vary with equity incentives, and explicitly test the implications of this possibility.

consequences. Prior research has documented the negative market consequences of missing analysts' forecasts (Skinner and Sloan 2002) and the reward for meeting analysts' forecasts (Bartov et al. 2002; Kasznik and McNichols 2002).

In addition to the disproportionate likelihood of meeting or just beating analysts' forecasts, we also analyze the likelihood of large positive earnings surprises to investigate the existence of earnings smoothing (reserving for the future) and the recognition of abnormal accruals to manage earnings. These analyses are summarized at the bottom of Figure 1 and presented in Section 5.

3. Sample and Data

The sample is identified starting with all firm-year observations with CEOs' stock-based compensation and ownership available from the Standard & Poor's ExecuComp database for the period 1993-2000.⁶ We exclude financial institutions (SICs between 6000 and 6999) and utilities (SICs between 4400 and 5000) because managers in these regulated industries might have different motivations to manage earnings (Burgstahler and Eames 2003, among others). The final sample used for specific analyses varies due to additional data requirements and is discussed in the empirical analysis sections.

The timing of variable measurement is chosen to be consistent with our theoretical development. As summarized in Figure 3, all equity incentive variables are measured during or at the end of fiscal year t . Since we hypothesize that these variables are correlated with *future* manager trading and earnings management, earnings management is measured based on the information disclosed at the earnings announcement for fiscal year t , generally from one to four months *after* the fiscal-year-end. All manager trading variables are measured *after* earnings announcements (subsequent to the measurement of equity incentive variables and earnings management).

⁶ This database contains compensation and ownership information for top managers, including CEOs, of firms filing proxy statements with the Securities and Exchange Commission (SEC). We use CEO equity incentives in the analyses because CEOs are the ultimate decision-makers. Results based on equity incentives of all managers included in the database are similar. Also, although ExecuComp started coverage in 1992, the coverage is lower in 1992 than in other years. Thus, including 1992 data, although yielding similar results, might introduce a sample selection bias.

Equity incentives

We consider five equity incentive elements: option grants in the current period, unexercisable options (excluding option grants in the current period), exercisable options, restricted stock grants, and stock ownership. We deflate these measures (in shares) by total outstanding shares of the firm. Because the potential benefit of increasing short-term stock prices, if any, is shared by all shareholders (whether non-CEO shareholders realize it or not), the benefit enjoyed by CEOs is thus proportional to the ratio of equity incentive measures (in shares) to total outstanding shares.⁷

Panel A of Table 1 reports the descriptive statistics on CEO equity incentive measures. Because we assume that CEOs can sell already held shares to diversify risk due to option or stock grants, we restrict our analyses to firm-years with ownership higher than option and stock grants.⁸ As reported in the table, option grants are on average 0.163% of outstanding shares, with a median of 0.051%. Option grants are part of the unexercisable options at the end of the year; the remaining unexercisable options average 0.254%, with a median of 0.078%. Exercisable options are on average 0.637%, while the median is 0.295%.

Restricted stock grants appear to play a small role in stock-based compensation. While 63.2% of the sample report option grants, only 18.3% have restricted stock grants. The mean restricted stock grant is only 0.008%. Due to this small magnitude, stock grants can hardly have an economically significant impact on future trading or earnings management; thus for the sake of brevity, we do not separate them from ownership in the analyses. As reported in Panel A, CEO ownership averages 4.184%, with a median of 0.825%. These descriptive statistics are similar to those reported in Ofek and Yermack (2000).

Panel B of Table 1 reports correlations between equity incentive measures. The three option measures are

⁷ Baker and Hall (1998) analyze the conditions under which alternative proxies for managers' equity incentives are valid. In brief, equity incentive proxies measured in proportion to firm value are most appropriate when managers' actions affect firm value on a dollar-to-dollar basis (e.g., purchasing a corporate jet.) Thus, if the earnings management activities affect firm value on a dollar-to-dollar basis, instead of on a proportional basis (e.g., a corporate reorganization), the ratio measure we use is appropriate. Otherwise, a measure based on the magnitude of equity incentive is appropriate. We examine alternative measurements of equity incentives as part of our sensitivity tests reported later.

⁸ This restriction increases the power of the tests but reduces the sample by about 25 percent. Relaxing this restriction does not affect the results in any significant way.

positively correlated with each other and are also positively correlated with ownership.

CEOs' trading

CEOs' trading data are collected from the SEC ownership reporting system data file (from Forms 3, 4, 5). Insiders (including CEOs) are required to report their transactions by the 10th day of the calendar month after the trading month. As in prior research of insider trading (e.g., Lakonishok and Lee 2001), we examine three primary types of transactions: open market purchases, purchase of shares through the exercise of options, and open market sales (which include sales of shares from exercised options).

Because the database assigns different names for CEOs, we regard individuals with titles like "Chairman of board" (42.4%), "CEO" (12.6%), and "President" (45.0%) as CEOs, as done in Ke et al. (2003).

We examine CEOs' trading in the year after the earnings announcement for fiscal year t . CEOs' trading is measured as net sales:⁹

$$\text{Net sales} = \text{Open market sales} - (\text{Open market purchases} + \text{Options exercised}).$$

Since the frequency of CEO trading is generally low, using past trading data as the deflator, as in Lakonishok and Lee (2001), is not feasible. Instead, we scale net sales, measured in dollars, by the market value of the firm at the end of fiscal year t (before net sales are measured). Using unscaled measures, either logarithm transformations or decile rankings, does not affect our inferences.

Panel C of Table 1 reports descriptive statistics on CEOs' net sales. To allow for variation in CEO trading within the year, we separately investigate net sales in the first and second six-month periods. Net sales, on average, are approximately \$2 million in a six-month period, representing about 0.2% of the firms' market value. These descriptive statistics are consistent with those reported in Lakonishok and Lee (2001) and suggest that CEOs are net sellers on average.

Earnings surprises

Earnings surprises are calculated as the difference between actual earnings and analysts' forecasts, both of which are measured on a per-share basis and are collected from First Call. To better capture the

⁹ Excluding options exercised from the calculation of net sales does not affect the inferences.

market's expectation, we use the most recent consensus forecasts within the three-month period before the earnings announcement. As reported in Panel D of Table 1 and consistent with prior research, there are more firm-years meeting or just beating analysts' forecasts than just missing analysts' forecasts.¹⁰ Of 4,301 firm-years with equity incentives and earnings surprises in the period 1993-2000, 25% have zero earnings surprises, i.e., meeting analysts' forecasts, 17% just beat analysts' forecasts by one cent, but less than 9% miss analysts' forecasts by just one cent.

4. Primary empirical results

As discussed in Section 2, the link between equity incentives and future CEOs' trading is critical to establishing the link from equity incentives to earnings management. Since prior studies do not provide direct evidence on the first link, in this section, we first report results on the relation between equity incentives and future trading (Section 4.1).¹¹ We then report results on the impact of equity incentives on the probability of meeting or just beating analysts' forecasts (Section 4.2). In Section 4.3, we investigate whether managers sell more after earnings management.

4.1 Equity incentives and CEOs' future trading

We examine the relation between equity incentives (Eq_Incent) and CEOs' future trading ($NetSale$) using the following regression:

$$NetSale_{i,t+j} = \gamma_0 + \beta Eq_Incent_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}, \quad (1)$$

where $j = 1$ or 2 , denotes the j^{th} six-month period after the earnings announcement. See Appendix A for variable measurement. Our focus is whether the coefficients on Eq_Incent are positive. In the regression,

¹⁰ Baber and Kang (2002) find that analysts' forecast data in I/B/E/S or FirstCall are subject to split adjustment bias; because these databases adjust stock splits retrospectively and split-adjusted data are rounded to the nearest cent, the probability of zero or one cent of forecast errors might be overstated. While the impact of this split-adjustment bias on our results is unclear ex ante, we replicate our analyses on observations without stock splits in the sample period (61% of the sample). The results are essentially the same.

¹¹ Ofek and Yermack (2000) study the relation between stock/option grants and contemporaneous insider sales, rather than future insider sales. Also, Ofek and Yermack do not study the relation between option/stock holdings and future insider sales.

we also include several control variables based on prior research of insider trading.¹² Lakonishok and Lee (2001) find that insiders in large firms sell more shares, although in a smaller proportion to market value. Rozeff and Zaman (1998) find that insiders in growth firms sell more shares. Prior returns are included to control for contrarian trading behavior by insiders; that is, insiders tend to sell more shares after high stock returns (Lakonishok and Lee 2001). Change in operating cash flow is included to control for any potential impact of firm performance on insider trading (change in earnings is not used, because it can be affected by earnings management.) The correlations reported in Appendix B indicate that these control variables are significantly correlated with each other and thus it is important to control for them at the same time.

The regression results are reported in Table 2. Consistent with our prediction, option grants, other unexercisable options, and ownership have significantly positive coefficients, suggesting that CEOs with high equity incentives are more likely to sell in the next year. Since option grants and other unexercisable options are similarly correlated with future trading, we combine these two variables together in subsequent analyses for the sake of brevity. This modification does not affect our inferences.

In contrast, exercisable options have an insignificant impact on CEOs' trading. This result might seem unexpected, given the apparent similarity between unexercisable and exercisable options. However, unexercisable options differ from exercisable options in the hedge ratio (referring to the sensitivity of the value of options to the stock price), which captures CEOs' risk exposure due to option holdings. To illustrate, when options are first granted, the hedge ratio is between zero and one. If stock prices increase after option grants, the hedge ratio of unexercisable options increases. To diversify the increased risk, the manager can sell shares already owned.¹³ By the time options are exercisable and in the money, the hedge

¹² As in all other analyses, we also include year dummies to control for potential year-specific effects. Throughout the paper, outliers, defined as observations with an absolute value of the R-student measure greater than three, are excluded. None of the regressions are subject to multicollinearity based on the diagnostics in Belsley et al. (1980).

¹³ For example, suppose that the hedge ratio of options is 0.6 when granted, as measured in Jensen and Murphy (1990), and 1 when exercisable and in the money. Managers might sell shares to diversify the increase in risk ($0.6 \times$ number of options) when they are awarded options and sell more shares [$(1-0.6) \times$ number of options] before these options become exercisable.

ratio is approximately one and does not increase with stock prices. Thus, the risk exposure does not increase and no more risk diversification is needed. As a result, while unexercisable options are positively related to future insider sales, exercisable options are not.

One might argue that although exercisable options likely have a constant hedge ratio, they expose CEOs to the firm's idiosyncratic risk, just as ownership does. However, relative to exercisable options, ownership is a more predominant equity incentive element (a much larger proportion of CEOs' wealth, as indicated in Panel A of Table 1) and is thus a better proxy for CEOs' over-exposure to idiosyncratic risk.¹⁴ Importantly for our subsequent analyses, the measures that predict future CEO trading should be correlated with earnings management, but those that do not predict future trading should not be correlated with earnings management.

The control variable results are generally consistent with prior research. Size exhibits a negative association with net sales, suggesting that sales by CEOs of large firms are smaller in proportion to market value than those of small firms. Book-to-market also has a negative coefficient, suggesting that CEOs of growth firms sell more shares. The positive coefficient on stock return is consistent with a contrarian strategy – CEOs sell more shares after price increases. Change in cash flow, however, has an insignificant coefficient, although it becomes significantly positive when growth and stock returns are not included.

In sum, we find that CEOs with higher unexercisable options or higher stock ownership are more likely to sell in the future. This evidence suggests that equity incentives can cause managers' utility to be sensitive to short-term stock prices: if the short-term stock price is higher (lower), the value of the shares to be sold, part of the management wealth, is higher (lower). Below we investigate whether this sensitivity induces a positive relation between equity incentives and earnings management, as hypothesized in H1.

4.2 Equity incentives and earnings management

Tests of H1 are based on logit regressions of the probability of earnings surprises being in a certain

¹⁴ Nevertheless, we admit that there are other possible explanations for the insignificant results on exercisable options, a topic we leave for future research.

range on equity incentive measures (*Eq_Incent*) and various control variables:

$$\begin{aligned}
 Prob(Surprise_{i,t} \in \Phi_k) = & \text{logit}(\gamma_{0,k} + \beta_k Eq_Incent_{i,t} + \gamma_{1,k} Size_{i,t} + \gamma_{2,k} Growth_{i,t-1} + \gamma_{3,k} Sales_Growth_{i,t} \\
 & + \gamma_{4,k} NOA_{i,t-1} + \gamma_{5,k} Shares_{i,t} + \gamma_{6,k} Litigation_{i,t} + \gamma_{7,k} ImplicitClaim_{i,t} \quad (2) \\
 & + \gamma_{8,k} Num_Estimate_{i,t} + \gamma_{9,k} CV_AF_{i,t} + \gamma_{10,k} Down_Rev_{i,t} + \zeta_{i,t})
 \end{aligned}$$

Surprise_{it} is earnings surprise per share, as defined above; Φ could be one of the following two sets of earnings surprises: (1) negative earnings surprises; (2) zero or one cent; equity incentive measures include unexercisable options, exercisable options, and ownership. See Appendix A for details of variable measurement. Hypothesis H1 predicts a positive coefficient on equity incentive measures when investigating the probability of meeting or just beating analysts' forecasts (i.e., earnings surprises being zero or one cent). Relatedly, H1 implies a negative relation between equity incentives and the probability of missing analysts' forecasts (i.e., negative earnings surprises).

Following prior research, we include various control variables that might be correlated with earnings surprises and/or equity incentives. Equity incentives are generally higher for small firms or firms with high growth, and high growth firms might be more likely to meet or beat analysts' forecasts to avoid the torpedo effect associated with missing analysts' forecasts, as documented in Skinner and Sloan (2002). Thus, we control for firm size and growth (proxied by the book-to-market ratio and sales growth). Beginning-of-period net operating assets is included because Barton and Simko (2002) find that firms with high net operating assets in the previous year are less likely to meet or just beat analysts' forecasts, arguably due to a lack of flexibility in managing earnings upward. The number of outstanding shares is included because firms with more outstanding shares have smaller earnings per share and are thus more likely to meet or just beat analysts' forecasts of earnings per share (Barton and Simko 2002).

Prior research suggests other incentives to avoid negative earnings surprises. Ali and Kallapur (2001) and Francis et al. (1994) find that price declines due to negative earnings surprises can lead to litigation liability. Similarly, Bowen et al. (1995) argue that negative earnings surprises can have negative publicity effects, which can adversely affect the implicit claims between a firm and its stakeholders. Thus, the incentive to avoid negative earnings surprises increases with litigation risk and implicit claims. We include an industry-based litigation dummy variable and an implicit claim variable (proxied by labor intensity) as controls.

We also include three variables to control for analyst forecast attributes: number of analysts, coefficient of variation, and a downward revision dummy. The incentives to meet analysts' forecasts can be stronger if more analysts are following the firm or if there is greater consensus among analysts (Payne and Robb 2000). As shown in Matsumoto (2002), it is easier to meet or beat analysts' forecasts that have been guided downward, so we include a dummy variable to indicate whether analysts' forecasts are revised downward in the three months before earnings announcements.

As reported in Appendix B, the univariate correlations between the probability of meeting or just beating analysts' forecasts and independent variables, especially the equity incentive measures, are generally consistent with our predictions. While many correlations between independent variables are significant, none is substantial enough to lead to multicollinearity.

Table 3 reports the logit regression results. As expected, both unexercisable options and ownership exhibit significant positive effects on the probability of firms' meeting or just beating analysts' forecasts. For example, a one standard deviation increase in unexercisable options increases by 16.3% the odds of meeting or just beating analysts' forecasts, while a one standard deviation increase in ownership increases by 30.5% the odds of meeting or just beating analysts' forecasts.¹⁵ Also as expected, unexercisable options and ownership are negatively associated with the probability of missing analysts' forecasts.

Although exercisable options are negatively correlated with the probability of missing analysts' forecasts, they are not correlated with the probability of meeting or just beating analysts' forecasts. This is consistent with the insider trading evidence, as reported in Section 4.1, and the argument that equity incentives lead to earnings management via future trading. That is, unlike unexercisable options and ownership, exercisable options are not correlated with future trading and are thus not correlated with earnings management.

¹⁵ The odds of an event are the ratio of the probability that this event occurs to the probability that this event does not occur. For example, the odds of meeting or just beating analysts' forecasts are the ratio of the probability that a firm meets or just beats analysts' forecasts to the probability of the firm having earnings surprises other than zero or one cent. The odds are a positive function of the probability that the event occurs. We interpret the results based on the change in the odds because this measure is a function of the coefficient in the logit regressions only. In contrast, calculating the change in the probability requires a reference point.

Results for the control variables are generally consistent with those reported in prior research. Large firms are less likely to miss analysts' forecasts and growth firms are more likely to meet or just beat analysts' forecasts. Consistent with Barton and Simko (2002), firms with large net operating assets in the previous year are more likely to miss analysts' forecasts. Firms with more outstanding shares, firms in high litigation industries, and firms with more implicit claims are more likely to meet or just beat analysts' forecasts. Also, firms are more likely to meet or just beat analysts' forecasts when more analysts provide forecasts or when there is greater consensus among forecasts. In contrast to the expectation management argument, firms with downward revisions are more likely to miss analysts' forecasts than those without downward revisions, but this result is consistent with analyst under-reaction to bad news, as documented in Abarbanell and Bernard (1992), because the downward revision can be due to underlying economic changes.

To further investigate whether expectation management contributes to the reported results, we replicate the analyses using "old" consensus forecasts – the latest consensus forecast six months before the earnings announcement. These "old" forecasts are less subject to management guidance, which generally occurs in a short period before earnings announcements. If expectation management is driving the results, we should not observe similar patterns when we use "old" consensus forecasts. The results, not reported for the sake of brevity, are similar to those reported, suggesting that our results are mainly due to earnings management.¹⁶

To summarize, the results presented in this section are consistent with hypothesis H1. CEOs with high equity incentives are more likely to meet or just beat analysts' forecasts and less likely to miss analysts' forecasts, compared to their counterparts with low equity incentives.

4.3 Earnings management and future CEO trading conditional on equity incentives

¹⁶ The overall weak results on expectation management are consistent with its ambiguous net effect on stock prices. Managers can benefit from the guidance *if* the stock price is higher after (1) managing analysts' forecasts downward (and presumably resulting in a lower price) and (2) meeting or beating analysts' forecasts later. If managers are uncertain whether the upward impact of meeting or beating analysts' forecasts outweighs the downward impact of guidance, they are likely not to use this tool.

Managers with high equity incentives can gain from the earnings management behavior documented above if it increases stock prices, and thereby the value of the shares they will sell in the future. These managers can gain more if they increase sales after successful earnings management, such as selling more after meeting or beating analysts' forecasts than after missing analysts' forecasts. In this section, we explicitly test this conjecture. In particular, we investigate the impact of meeting or beating analysts' forecasts on net sales separately for managers with high equity incentives and for those with low equity incentives. Observing more selling for managers with high equity incentives, who are more likely to manage earnings based on results reported above, than for managers with low equity incentives, suggests that managers increase sales after earnings management.

To capture the differential impact, we first classify the sample into four groups based on aggregate equity incentives and earnings surprises:

- (1) H_MB : firms with *high* equity incentives and *meeting or beating* analysts' forecasts,
- (2) H_Miss : firms with *high* equity incentives and *missing* analysts' forecasts,
- (3) L_MB : firms with *low* equity incentives and *meeting or beating* analysts' forecasts,
- (4) L_Miss : firms with *low* equity incentives and *missing* analysts' forecasts.

We measure the aggregate equity incentives as the sum of unexercisable options, weighted by their hedge ratios as measured in Core and Guay (1999), and ownership; high (low) equity incentive managers are those with aggregate equity incentives higher (lower) than the sample median.

We then include dummy variables that indicate each of the four groups into equation (1):

$$\begin{aligned}
 NetSale_{i,t+j} = & \beta_1 H_MB_{i,t} + \beta_2 H_Miss_{i,t} + \beta_3 L_MB_{i,t} + \beta_4 L_Miss_{i,t} \\
 & + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}
 \end{aligned} \tag{3}$$

The coefficient on each dummy variable captures how much each group of firms sells in the future. The difference in coefficients, $\beta_1 - \beta_2$ ($\beta_3 - \beta_4$), can be used to test whether high (low) equity incentive managers sell more after meeting or beating analysts' forecasts than after missing analysts' forecasts.

Table 4 reports the regression results. Coefficients on all dummy variables are significantly positive, suggesting that firms in each group are net sellers. As reported at the bottom of the table, the coefficient on H_MB is significantly higher than that on H_Miss , at the 0.05 level in the first six-month

period and at the 0.07 level in the second six-month period. Thus, for high equity incentive managers, meeting or beating analysts' forecasts leads to more net sales in the first year after earnings announcements than missing analysts' forecasts. However, meeting or beating analysts' forecasts does not appear to motivate low equity incentive managers to sell more: there is no significant difference between the coefficient on L_MB and that on L_Miss .¹⁷

Overall, these results are consistent with high equity incentive managers increasing their sales after earnings management. Doing so is beneficial if such earnings management can increase stock prices in the near term. In this sense, subsequent trading serves as the "exit strategy" for earnings management, thereby increasing the credibility of our earnings management evidence (Schipper 1989).

5. Additional analyses

5.1 Equity incentives and earnings smoothing

The evidence that managers with high equity incentives are more likely to report earnings that meet or just beat analysts' forecasts is consistent with their incentives to manage earnings upward to avoid negative earnings surprises, as suggested by Stein (1989). At the same time, managers might have incentives to manage earnings downward in years with good performance to reserve for the future. This earnings smoothing strategy is appealing in this context for at least two important reasons. First, it is difficult, if not impossible, for a firm to manage earnings upward consistently. By engaging in income-decreasing earnings management in years with good performance, managers can increase earnings as needed. Such smoothing reduces the likelihood of the negative consequences of missing analysts' forecasts and increases the likelihood of meeting analysts' forecasts in future periods (Kasznik and McNichols 2002; Skinner and Sloan 2002).

Second, equity incentives can be recurring – managers with high equity incentives are more likely to have high equity incentives in the future. Unreported results indicate that equity incentives are

¹⁷ A formal test indicates that $(\beta_1 - \beta_2) - (\beta_3 - \beta_4)$ is significantly different from zero.

positively serially correlated. Furthermore, as reported in Panel A of Table 5, equity incentives are positively correlated with managers' sales in the second year after earnings announcements, also consistent with recurring equity incentives. (As before, exercisable options are not correlated with future trading.) Thus, managers with recurring equity incentives care about stock prices in the future – if they cannot meet analysts' forecasts in the future, then they bear negative consequences.

These discussions suggest that high equity incentive managers are likely to smooth earnings. Smoothing earnings implies a lower likelihood of large positive earnings surprises. By avoiding large positive earnings surprises, managers can reserve for the future and increase the likelihood of meeting or just beating analysts' forecasts in the future. Thus, we expect that the incidence of large positive earnings surprises is negatively associated with equity incentives. We test this prediction in Panel B of Table 5.

Column (1) of Panel B reports the results of logit regressions of the probability of large positive earnings surprises (earnings surprises equal to or greater than four cents) on equity incentives and control variables as in equation (1). The results are consistent with earnings smoothing: high equity incentive managers are less likely to report large positive surprises. A one standard deviation increase in unexercisable options reduces by 14.3% the odds of having large positive earnings surprises, while a one standard deviation increase in ownership reduces by 11.6% the odds of having large positive earnings surprises. The results are similar if we use different cutoff points (such as three cents, five cents, or six cents) to measure large positive earnings surprises. Consistent with the future trading evidence, exercisable options on the other hand are not negatively correlated with the probability of large positive earnings surprises.

If reserving for the future is successful, equity incentive measures should be positively correlated with the probability of meeting or just beating analysts' forecasts in the next year. Column (2) of Panel B reports the logit regression of meeting or just beating analysts' forecasts in year $t+1$ on equity incentives in year t . While the results for option holdings are insignificant, firms with high ownership are more likely to meet or just beat analysts' forecasts in the next year, consistent with earnings smoothing.

Furthermore, if the incentives to smooth earnings partially arise from the recurring nature of equity incentives, we expect to find stronger evidence of earnings smoothing for firms with persistent equity

incentives. To explicitly test this, we first rank all firm-years into three equal-sized groups: high, medium, or low, based on the aggregate equity incentive measure – the sum of unexercisable options, weighted by the hedge ratio as measured in Core and Guay (1999), and ownership. We then calculate the average ranking for each firm over the sample period. To increase the reliability of the classification, we only consider the 1,400 firms that have at least five years of data from ExecuComp over the eight-year period 1993-2000.

If a firm's average ranking is above the 3rd quartile or below the 1st quartile of the average ranking distribution, this firm is regarded as having persistent equity incentives (consistently high or consistently low equity incentives, respectively). Under this approach, 56% of the firm-years exhibit persistent equity incentives. We use a dummy variable, *recurring*, to denote these firm-years.¹⁸ Lastly, we add an interaction of this dummy with equity incentives to the logit regression (equation 2) to capture the incremental effect for firms with persistent equity incentives. To simplify the analyses, we use the aggregate equity incentive measure (*Total*).

The results are reported in Column (1) of Panel C, Table 5. As expected, equity incentives are negatively correlated with the probability of large positive earnings surprises only for firms with persistent equity incentives. That is, firms with persistent equity incentive measures are more likely to reserve for the future; those with less persistent equity incentives do not have such incentives.

In addition, we test whether managers with persistent equity incentives drive the results on meeting or just beating analysts' forecasts reported in Table 3. In Column (2) of Panel C, Table 5, we add an interaction between the recurring dummy and equity incentives in the logit regression of meeting or just beating analysts' forecasts in the current period. The coefficient on the interaction term is insignificant, suggesting that equity incentives affect the likelihood of meeting or just beating analysts' forecasts similarly for firms with persistent or non-persistent equity incentives, although those with more persistent equity incentives might be more likely to meet or just beat in the future.

¹⁸ The results are similar if we exclude observations with consistently low equity incentives.

5.2 *Equity incentives and earnings management via abnormal accruals*

In this section, we investigate the relation between equity incentives and abnormal accruals, a commonly used proxy for earnings management. In this context, managers can benefit from income-increasing abnormal accruals. At the same time, they can recognize income-decreasing abnormal accruals to reserve for the future in years with good performance, because of the incentives to smooth earnings. The reversal nature of abnormal accruals also strengthens the incentives to smooth earnings. Thus, ex ante, the direction of the correlation between equity incentives and abnormal accruals is unclear. If the incentive for increasing income dominates that for decreasing income, the correlation is positive; otherwise, it is negative.

Abnormal accruals are defined as the difference between total accruals and normal accruals. Normal accruals are estimated using the cross-sectional Jones (1991) model as described in DeFond and Jiambalvo (1994). Panel A of Table 6 describes the estimation method and reports the descriptive statistics for abnormal accruals. The mean and median abnormal accruals (scaled by beginning-of-period total assets) are 0.002 and 0.001, respectively. Untabulated statistics suggest that these numbers are insignificantly different from zero at the 0.05 level.

Panel A also reports comparisons on accrual related variables between our sample and all Compustat firms with abnormal accruals. By construction, the average or median of abnormal accruals is about zero for the population as well. In contrast, the sample firms have stronger performance than the Compustat population: earnings and operating cash flow on average are 5% and 11.5% for the sample firms, but -10.8% and -2.6% for the Compustat population, likely due to the fact that the Compustat population includes many bankrupt firms and firms with poor performance. Also, due to the data restrictions on equity incentive measures, the sample firms are much larger than the Compustat population. The average total assets are around \$2 billion for the sample firms, but only \$886 million for the broader population. Accordingly, we include both firm performance and firm size when analyzing abnormal accruals.

Equity incentives and abnormal accruals

We use the following regression to investigate the impact of equity incentives (*Eq_Incent*) on

abnormal accruals (AA) after controlling for other factors:

$$AA_{i,t} = \gamma_0 + \beta Eq_Incent_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Leverage_{i,t} + \gamma_3 Bonus_{i,t} + \gamma_4 Risk_{i,t} + \gamma_5 Growth_{i,t} + \gamma_6 NOA_{i,t-1} + \gamma_7 Litigation_{i,t} + \gamma_8 Implicit Claim_{i,t} + \zeta_{i,t} \quad (4)$$

See Appendix A for variable measurement. Positive accounting theory suggests that managers tend to manage earnings to decrease political costs (proxied by size), to relax debt covenants (the closeness to debt covenant violation is proxied by leverage), and to increase bonuses (Watts and Zimmerman 1986; Healy 1985; Sweeney 1994, among others).¹⁹ In addition, firms with high equity incentives are generally smaller, faster-growing, and riskier (Lambert and Larcker 1987; Murphy 1999), and Warfield et al. (1995) indicate that riskier and high growth firms have more abnormal accruals (which could be of either sign). Thus, we also control for the impact of systematic risk and growth opportunities, and several other variables that might affect earnings management, as discussed in Section 4.2.

The regression results are reported in Panel B of Table 6. Both unexercisable options and ownership are positively correlated with abnormal accruals, and exercisable options are not. These results suggest that *on average*, high equity incentive CEOs increase earnings via abnormal accruals.²⁰ With respect to control variables, firms with high leverage, without a bonus plan, with high beginning-of-period net operating assets, in high litigation industries, and with high implicit claims take less positive abnormal accruals.

We conduct additional analyses to assess the robustness of our results to possible measurement errors in abnormal accruals (Dechow et al. 1995; Bernard and Skinner 1996) by: (1) adding a control for firm performance (return on assets) or excluding firms with extreme earnings (top 5%, 10%, or 20% based on $|ROA|$ ranking) because firms with extreme performance are more likely to have measurement

¹⁹ To reduce the burden of data collection, details of bonus plans are not exploited in this study. Instead, we use a dummy variable to indicate firm-years with non-zero bonus. We find similar results when using alternative measures of bonus, including a dummy variable based on the ranking of return on assets as used in McNichols and Wilson (1988) and Bowen et al. (1995) and the ratio of cash bonus over total compensation. We also run the regressions after excluding the bonus variable and find similar results on equity incentive variables.

²⁰ Warfield et al. (1995) find a negative association between managerial ownership and the absolute value of abnormal accruals. Unlike Warfield et al., we focus on the relation between all equity incentive elements and signed abnormal accruals. Thus, due to these research design differences and the differences in sample composition, our results are not directly comparable with those of Warfield et al.

errors, (2) including unsystematic risk, earnings persistence, and earnings variability as explanatory variables to better control for the volatility of the firm's economic environment or operations, and (3) using inventory changes, which are less subject to measurement errors than abnormal accruals and shown to be used for earnings management purposes (Thomas and Zhang 2002), as the dependent variable. Our results are robust to these alternative specifications.

Overall, these results suggest that CEOs with high equity incentives take more income-increasing abnormal accruals than those with low equity incentives. These results suggest that the incentive to increase earnings dominates those to reserve for the future in this particular sample. While this result appears at odds with the earnings smoothing argument discussed above, additional analyses indicate that the results are largely driven by managers with less persistent equity incentives (who do not have incentives to reserve for the future and who are less concerned with accrual reversal.) When we split the sample based on the average ranking of equity incentives over the sample period, as discussed in Section 5.1, we find that equity incentives are not significantly correlated with abnormal accruals for firms with persistent equity incentives, and that the correlation is significantly positive for firms with less persistent equity incentives.

Abnormal accruals and future CEO trading

Similar to analyzing the relation between meeting or beating analysts' forecasts and future CEO trading, we also investigate the relation between abnormal accruals and future trading. Panel C of Table 6 reports regression results when abnormal accruals are added to equation (1). We add positive and negative abnormal accruals separately in the regression to detect any differential impact. The coefficient on positive abnormal accruals is significantly positive in the first and second six-month periods after earnings announcements, and the coefficients on negative abnormal accruals are insignificant (marginally significantly negative in the second six-month period). These results are consistent with CEOs increasing

sales after income-increasing abnormal accruals.²¹

5.3 Other sensitivity tests

Alternative measures of equity incentives

We examine the robustness of our results to the measurement of equity incentives in several ways. First, in the main analysis, we implicitly assume that the sensitivity of option value to equity prices is the same across firms. To relax this assumption, we explicitly measure the sensitivity of the Black-Scholes (1973) value of options to equity prices as in Core and Guay (1999) for individual firms (details of this methodology are provided in Appendix A of Core and Guay 1999). Second, as argued in Baker and Hall (1998), if earnings management affects firm value on a proportionate basis rather than on a dollar-for-dollar basis, a more appropriate measure is the dollar value of the incentive variable. Thus, we also use the magnitude of equity incentives, measured as the natural logarithm of one plus the change in the value of unexercisable options and ownership due to one percent increase in stock prices. We re-estimate all regressions using these alternative equity incentive measures and find results similar to those reported above.

Lastly, we measure stock-based compensation as the ratio of stock grants and option grants (all in dollars) to the total compensation (the sum of salary, bonus, restricted stock grants, option grants, long-term incentive payouts, and other compensation). This measure captures the proportion of CEOs' compensation that is sensitive to stock prices. The results on this alternative measure, as reported in Panel A of Table 7, are consistent with earnings management behavior: stock-based compensation is positively correlated with the probability of meeting or just beating analysts' forecasts. The results on other variables, including ownership, are similar to those from the main analyses.

Analyses of future CEO trading conditional on future realized returns

As discussed in Section 2.1, one important reason for managers with high equity incentives to sell

²¹ Further analyses (not reported for the sake of brevity) indicate that managers taking negative abnormal accruals sell more in the second year after earnings announcements, presumably after the reversal of abnormal accruals. This result is consistent with managers postponing sales if they take negative abnormal accruals.

shares in the future is that their exposure to the idiosyncratic risk increases with stock prices, because the sensitivity of options to stock price increases, or because their wealth becomes more concentrated in stocks, or both. If this is true, it follows that managers with the same equity incentives will sell more when stock prices increase more. To explicitly test this prediction, we add interactions between equity incentive measures and future realized returns into the future trading regressions. We use a high return dummy variable to capture large increases in stock prices; the dummy variable is one if the future realized return (i.e., in the period when net sales are measured) is in the top quartile.

We report the results in Panel B of Table 7. Consistent with our prediction, the interactions of unexercisable options and ownership with the high return dummy have significantly positive coefficients, suggesting that managers sell more in the future due to equity incentives when stock prices increase dramatically than otherwise. These results lend support to our argument on future trading motivated by equity incentives.

Results for sub-periods

To ensure that boom markets in late 1990s do not drive our results, we split the sample into two sub-samples: 1993-1996 and 1997-2000. The results in these two sub-samples are similar except that the impact of unexercisable options on net sales and earnings management, while significant in both sub-samples, is slightly stronger in later years than in earlier years.

5.4 Alternative explanations

One might argue that our results on meeting or beating analysts' forecasts are consistent with better firm performance attendant to incentive alignment benefits of equity incentives. This alternative explanation is unlikely to drive our results for at least two reasons. First, financial analysts are generally regarded, and empirically confirmed, as sophisticated information intermediaries; thus, analysts arguably have incorporated into their forecasts the performance improvement due to equity incentives. If so, forecast errors should not be correlated with firm performance attendant to equity incentives. Second, better firm performance arising from incentive alignment benefits cannot explain the evidence that firms with high equity incentives are *less* likely to have large positive earnings surprises. Being less likely to have large positive earnings surprises is not a signal of good performance, but is consistent with our

reserving for the future argument.

Another alternative explanation relates to the possibility that our results are driven by equity incentives proxying for firm characteristics, such as growth, risk, or earnings volatility. In the main and sensitivity analyses, we explicitly control for these factors and the results on variables of interest are similar. Also, our findings indicate that firms with volatile earnings (high CV_{AF}) are less likely to meet or just beat analysts' forecasts and more likely to have large positive earnings surprises, while the results on equity incentives are just the opposite. Furthermore, while exercisable options and unexercisable options are similarly related to firm characteristics (as shown in Appendix B), unlike unexercisable options, exercisable options are not associated with future trading and accordingly not with earnings management measures. Such evidence suggests that omitted correlated variables are unlikely to drive our results.

Finally, to control for industry characteristics (e.g., performance volatility and earnings informativeness) that might affect the level of equity incentives and the probability of meeting or just beating analysts' forecasts, we replicate all analyses using an industry-demeaned equity incentive measures. To this end, we combine unexercisable options, weighted by their hedge ratios, with stock ownership and then deduct from this measure its mean in the industry-year level (industry is defined based on 3-digit SICs). The inferences based on this measure are essentially the same.

Overall, we believe that our results are more consistent with earnings management incentives induced by equity incentives rather than with these alternative explanations.²²

6. Summary and conclusions

In this paper, we develop the links between equity incentives – broadly defined as stock-based compensation and stock ownership, managers' future trading, and earnings management. We first examine the relation between equity incentives and managers' future trading. Based on all firm-years with

²² However, we cannot completely reject the possibility that these alternative explanations may still contribute to the reported results.

available data over the 1993-2000 period, we find that high equity incentive managers are more likely to sell shares in the year after earnings announcements. This finding suggests that managers could benefit from earnings management with the objective of keeping stock prices high, thereby increasing the value of the shares they are going to sell in the future.

We then test whether managers with high equity incentives engage in earnings management. In particular, we examine whether high equity incentive managers are more likely to report earnings that meet or just beat analysts' forecasts. The analyses indicate a significantly higher incidence of meeting or just beating analysts' forecasts for managers with high equity incentives. Additional analyses document that managers with high equity incentives, especially those with consistently high equity incentives, are also less likely to report large positive earnings surprises, consistent with reserving for the future.

Overall, our results suggest that stock-based compensation and ownership can lead to incentives for earnings management. If earnings management can increase short-term stock prices, managers can benefit from doing so by increasing the value of the shares they are going to sell. Results from additional analyses indicate that high equity incentive managers can even gain more by selling more shares after reporting earnings that meet or beat analysts' forecasts or after recognizing income-increasing abnormal accruals. Consequently, such earnings management behavior likely increases managers' wealth at the expense of outside shareholders. Thus, this paper extends research on compensation-related opportunistic behavior, such as Aboody and Kasnik (2000).

Our findings should also be of interest to boards of directors contemplating compensation contracts for managers. While stock-based compensation and ownership can yield positive incentive effects, they can also have side effects, such as increased earnings management. An optimal compensation contract should reflect this trade-off. Our results also have implications for financial reporting regulators, who have criticized managers for focusing too much on short-term performance targets, potentially to the detriment of earnings quality (Levitt 1998). Given the increased importance of stock-based compensation as a form of executive compensation and managerial ownership as an incentive alignment mechanism, our analyses indicate that regulatory responses to address opportunistic earnings management should consider incentives arising from stock-based compensation and ownership.

Appendix A Variable measurement

Variables	Measurement
<u>A. Equity Incentives</u>	
Eq_Incent _{i,t}	= Equity incentives are measured in shares during or at the end of fiscal year t, scaled by the number of outstanding shares; this measure includes five components: restricted stock grants, option grants, unexercisable options (excluding option grants), exercisable options, and ownership. In most tables, restricted stock grants are combined with ownership, and option grants are combined with unexercisable options (excluding option grants) together as unexercisable options.
<u>B. Future net sales</u>	
NetSale _{i,t+j}	= CEO's net sales (in dollars) in the j th six-month period after the earnings announcement for fiscal year t, scaled by the market value at the end of fiscal year t, where j=1 and 2, and net sales = open market sales – (open market purchases + options exercised).
<u>C. Earnings surprises</u>	
Surprise _{i,t}	= The difference between actual earnings and analysts' forecasts, both of which are measured on a per-share basis and are collected from First Call; it is rounded to the nearest cent;
D_MB _{i,t}	= The meeting or just beating dummy variable, one if earnings surprises are zero or one cent, and zero otherwise;
<u>D. Abnormal accruals</u>	
AA _{i,t}	= Abnormal accruals estimated from the modified cross-sectional Jones (1991) model (see Panel A of Table 6 for the estimation details);
Positive abnormal accruals _{i,t}	= Abnormal accruals if abnormal accruals are positive, and zero otherwise;
Negative abnormal accruals _{i,t}	= Abnormal accruals if abnormal accruals are negative, and zero otherwise.
<u>E. Factors affecting future net sales</u>	
Size _{i,t}	= Natural logarithm of market value (in million dollars) at the end of fiscal year t;
Growth _{i,t}	= The book-to-market ratio at the end of fiscal year t;
Ret _{i,t}	= Buy and hold raw return in the 12 months prior to the earnings announcement for fiscal year t;
ΔOCF _{i,t}	= Change in operating cash flow in year t, scaled by total assets at the beginning of year t.

Variables	Measurement
<i>F. Factors affecting earnings surprises</i>	
Size _{i,t} and growth _{i,t-1} are measured as in group E.	
Sales_Growth _{i,t}	= Sales for fiscal year t divided by sales for fiscal year t-1;
NOA _{i,t-1}	= Net operating assets (i.e., shareholders' equity minus cash and marketable securities, plus total debt) at the end of fiscal year t-1, scaled by sales for fiscal year t-1;
Shares _{i,t}	= Number of common shares outstanding at the end of fiscal year t;
Litigation _{i,t}	= One if the firm is in one of the following industries: pharmaceutical / biotechnology (SIC codes 2833-2836, 8731-8734), computer (3570-3577, 7370-7374), electronics (3600-3674), or retail (5200-5961), zero otherwise;
ImplicitClaim _{it}	= Proxied by labor intensity, calculated as one minus the ratio of gross PPE to total assets;
Num_Estimate _{i,t}	= Number of analysts whose forecasts are included in the consensus forecast used to calculate earnings surprise;
CV_AF _{i,t}	= Coefficient of variation (standard deviation scaled by the mean) of the consensus forecast used to calculate earnings surprise;
Down_Rev _{i,t}	= One if at least one of the firm's analysts revised his or her forecast downward in the three months prior to the earnings announcement for fiscal year t, zero otherwise.
<i>G. Factors affecting abnormal accruals</i>	
Size _{i,t} and growth _{i,t} as measured in group E, NOA _{i,t} , Litigation _{i,t} , ImplicitClaim _{i,t} as measured in group F.	
Leverage _{i,t}	= Long-term debt divided by total assets, both at the end of fiscal year t;
Bonus _{i,t}	= One for firm-years whose CEOs have nonzero bonus, and zero otherwise;
Risk _{i,t}	= Market beta in fiscal year t estimated from weekly returns.

Appendix B Correlations between variables

This panel reports correlations between variables used in this paper. Correlations between all variables, except for those variables noted otherwise, are based on the sample used in earnings surprise analyses, 4,301 firm-years. Correlations between net sales or stock returns and other variables are based on the sample used in future trading analyses, 2,723 firm-years. Correlations between leverage or risk and other variables are based on the sample used in abnormal accrual analyses, 6,387 firm-years. If two variables are not included in the same analysis, we do not report their correlation and use “N/A” to denote such occasions. If all correlations in a column or a row are not reported, this column or this row is dropped from the table. See Appendix A for variable measurement. All correlations, except those denoted with “#”, are significant at the 0.05 level or lower.

	Net sales *	D MB	Abnormal accruals	Unexercisable options	Ownership	Exercisable options	Size	Growth	Net operating assets	Litigation	Implicit Claim	CV AF	Leverage
Abnormal accruals	0.005 [#]	0.035											
Unexercisable options	0.073	0.037	0.021 [#]										
Ownership	0.193	0.049	0.030	0.050									
Exercisable options	-0.040 [#]	-0.027 [#]	0.003 [#]	0.472	-0.011 [#]								
Size	0.084	0.140	-0.003 [#]	-0.209	-0.343	-0.243							
Growth	-0.282	-0.194	-0.070	0.026	-0.025	0.108	-0.407						
Stock return	0.269	N/A	-0.019 [#]	0.071	0.019 [#]	-0.003 [#]	0.209	-0.368					
Net operating assets	N/A	-0.030	-0.012 [#]	-0.027	-0.132	0.036	0.051	0.218					
Litigation	N/A	0.120	-0.008 [#]	0.068	0.097	0.037	0.057	-0.194	-0.201				
Implicit Claim	N/A	0.084	0.017 [#]	0.138	0.106	0.088	-0.025	-0.153	-0.211	0.135			
CV_AF	N/A	-0.203	-0.151	-0.005 [#]	0.093	0.009 [#]	-0.196	0.177	0.073	0.070	-0.058		
Down_Rev	N/A	-0.001 [#]	0.004 [#]	-0.063	-0.100	-0.048	0.070	0.027	0.104	-0.047	-0.071	0.081	
Leverage	N/A	-0.036	0.032	-0.148	0.090	0.002 [#]	0.194	-0.036	0.353	-0.261	-0.271	N/A	
Risk	N/A	-0.022 [#]	0.066	0.035	-0.010 [#]	0.141	-0.199	-0.022	-0.067	0.238	0.119	N/A	-0.133

* For the sake of brevity, we only report the correlations between net sales in the 1st six-month period after earnings announcements and other variables. The correlations between net sales in the 2nd six-month period and other variables are similar to those reported for net sales in the 1st six-month period.

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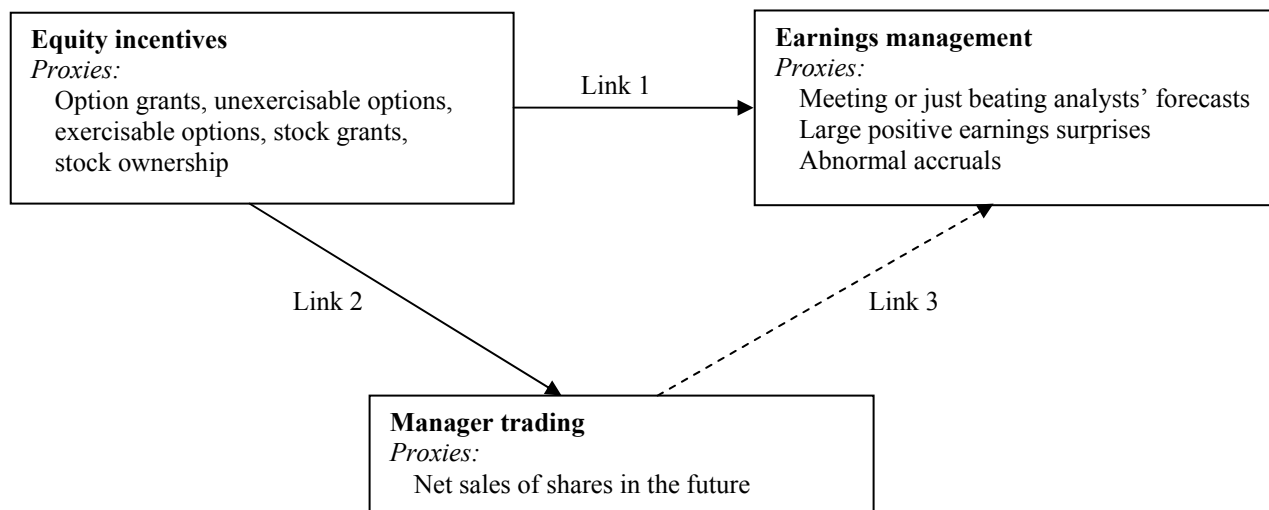
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Figure 1
Theoretical links and empirical tests

This figure depicts the theoretical constructs and links underlying the tests. For each theoretical construct, we list empirical proxies used in the analyses.



Summary of empirical tests

Links	Empirical Tests
<i>Main tests (Section 4)</i>	
Validity check of Link 2: Equity incentives and future manager trading	Do high equity incentive managers sell more in the future?
Link 1 (H1): Equity incentives and earnings management	Are high equity incentive managers more likely to report earnings that meet or just beat analysts' forecasts?
<i>Additional tests(Section 5)</i>	
Equity incentives and earnings smoothing	Are high equity incentive managers less likely to report earnings that beat analysts' forecasts by a large amount?
Equity incentives and abnormal accruals	Do abnormal accruals systematically vary with equity incentives?

Figure 2
The dynamics of equity incentives

This figure uses T-accounts to depict the relation between various components of equity incentives. It also shows the relation between equity incentives (exercisable options and ownership in particular) and manager trading (i.e., open market purchases, options exercised, and open market sales). BB: beginning balance; EB: ending balance.

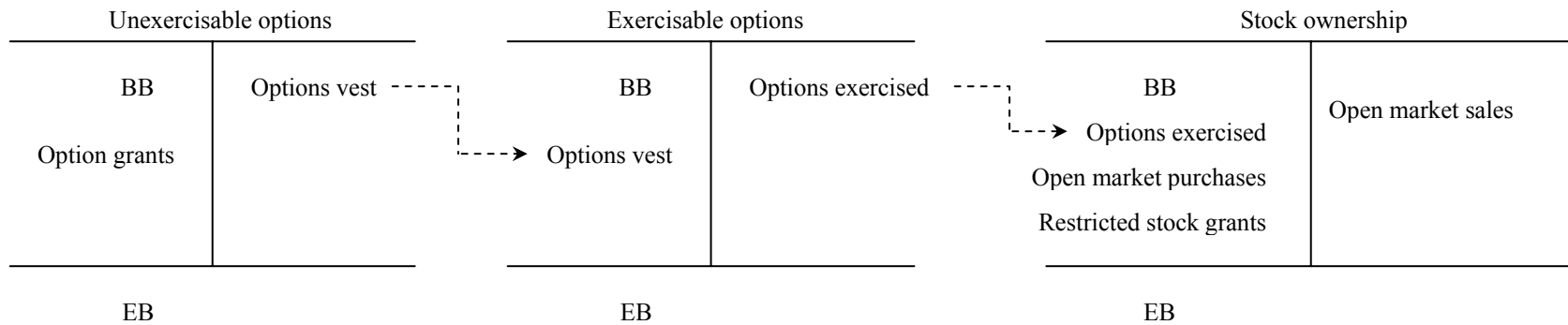


Figure 3
Timing of variable measurement

This figure describes the timeline when the three sets of variables of interest are measured. In brief, equity incentives are measured before earnings management proxies, those based on earnings surprises or abnormal accruals. Managers' trading is measured after earnings announcements.

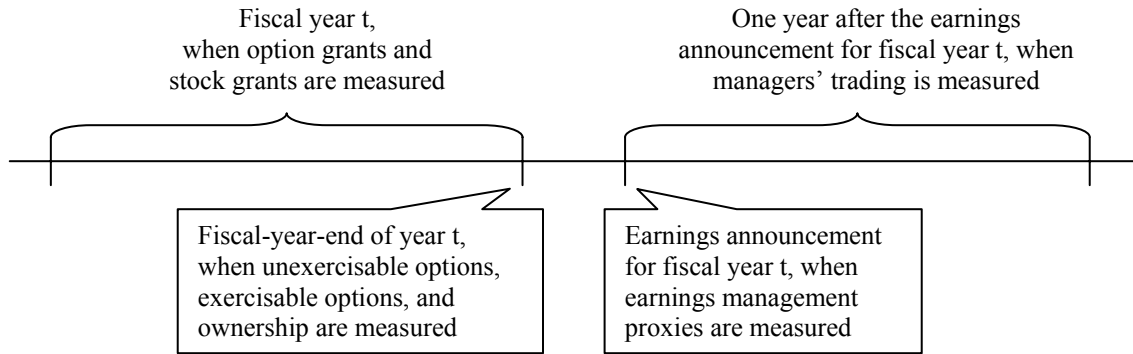


Table 1
Descriptive statistics on equity incentives, CEOs' trading, and earnings surprises

Panel A: Descriptive statistics on equity incentive measures

The descriptive statistics are based on all firm-years with ownership higher than option and stock grants in the period 1993-2000. Equity incentive measures (in shares) are scaled by total outstanding shares of the firm.

	N	Mean	Std.	Median
Option grants (%)	9,472	0.163	0.309	0.051
Unexercisable options (%) (excluding option grants)	9,472	0.254	0.429	0.078
Exercisable options (%)	9,472	0.637	0.932	0.295
Restricted stock grants (%)*	9,369	0.008	0.031	0.000
Ownership (%)	9,472	4.184	7.602	0.825

* Due to its small magnitude, we do not analyze restricted stock grants separately from ownership in the following analyses.

Panel B: Spearman correlations between equity incentive measures

The correlations are based on 9,472 firm-years with ownership higher than option and stock grants in the period 1993-2000. Equity incentive measures (in shares) are scaled by total outstanding shares of the firm. All correlations are significant at the 0.05 level or better.

	Option grants	Unexercisable options (excluding option grants)	Exercisable options
Unexercisable options (excluding option grants)	0.210		
Exercisable options	0.366	0.432	
Ownership	0.163	0.034	0.101

Panel C: CEOs' net sales in the year after the earnings announcement

The descriptive statistics are based on all firm-years with both equity incentives and net sales in a specific period after the earnings announcement.

	N	In million dollars			As percentage of market value		
		Mean	Std.	Median	Mean	Std.	Median
1 st six-month	2,830	2.358	11.115	0.065	0.225	1.325	0.008
2 nd six-month	2,411	2.055	9.596	0.009	0.249	1.448	0.004

Panel D: Number of observations in each earnings surprise cell

Earnings surprise per share is measured as the difference between actual earnings and the latest consensus forecast before earnings announcement. The sample includes 4,301 firm-years with equity incentives and earnings surprises in the period 1993-2000.

Earnings surprise (cents)	N	Earnings surprise (cents)	N
		0	1,057
-1	379	1	746
-2	174	2	448
-3	94	3	271
-4	71	4	176
Less than -5	352	Greater than 5	533

Table 2
Equity incentives (%) and CEOs' net sales (%) in the future

This table reports results from regressing CEOs' net sales in the two six-month periods after earnings announcements on equity incentive measures and control variables:

$$NetSale_{i,t+j} = \gamma_0 + \beta Eq_Incent_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}, \quad (1)$$

where $j = 1$ or 2 , denotes the j^{th} six-month period after the earnings announcement. See Appendix A for variable measurement. Year dummies are included in regressions to control for year fixed effects. The regressions are estimated on all observations with data available in the sample period 1993-2000. The p-values in parentheses are based on one-sided t-tests for coefficients with signed predictions and on two-sided t-tests otherwise.

	Predicted signs	1 st six-month	2 nd six-month
<i>Equity incentives</i>			
Option grants	+	0.112 (0.001)	0.045 (0.014)
Unexercisable options (excluding option grants)	+	0.091 (0.001)	0.101 (0.001)
Ownership	+	0.016 (0.001)	0.014 (0.001)
Exercisable options	+	-0.013 (0.862)	0.015 (0.159)
<i>Control variables</i>			
Size	-	-0.027 (0.001)	-0.035 (0.001)
Growth	-	-0.229 (0.001)	-0.191 (0.001)
Stock return	+	0.135 (0.001)	0.099 (0.001)
Change in cash flows	+	-0.058 (0.712)	-0.174 (0.916)
N		2,723	2,316
Adj. R ²		0.110	0.068

Table 3
Equity incentives and meeting or just beating analysts' forecasts

The table reports the change in the odds of firms (1) missing analysts' forecasts, or (2) meeting or just beating analysts' forecasts by one cent, due to a change of one standard deviation of a continuous variable or from zero to one of a dummy variable, and the p-value (in parentheses) of the corresponding coefficient in the logit regressions.

$$\begin{aligned}
 Prob(Surprise_{i,t} \in \Phi_k) = & \text{logit}(\gamma_{0,k} + \beta_k Eq_Incent_{i,t} + \gamma_{1,k} Size_{i,t} + \gamma_{2,k} Growth_{i,t-1} + \gamma_{3,k} Sales_Growth_{i,t} \\
 & + \gamma_{4,k} NOA_{i,t-1} + \gamma_{5,k} Shares_{i,t} + \gamma_{6,k} Litigation_{i,t} + \gamma_{7,k} ImplicitClaim_{i,t} \quad (2) \\
 & + \gamma_{8,k} Num_Estimate_{i,t} + \gamma_{9,k} CV_AF_{i,t} + \gamma_{10,k} Down_Rev_{i,t} + \zeta_{i,t})
 \end{aligned}$$

Surprise_{i,t} is earnings surprises per share; Φ could be one of the following two sets of earnings surprises: (1) negative earnings surprises; (2) zero or one cent. See Appendix A for the measurement of other variables. The logit regressions are based on 4,301 observations with all required data.

	Predicted signs for Column (2)*	Negative earnings surprises $\Phi=(-\infty, 0)$ (1)	Meeting or just beating analysts' forecasts $\Phi=[\$0, \$0.01]$ (2)
<i>Equity incentives</i>			
Unexercisable options	+	-0.159 (0.001)	0.163 (0.001)
Ownership	+	-0.224 (0.001)	0.305 (0.001)
Exercisable options	+	-0.098 (0.020)	-0.043 (0.262)
<i>Control variables</i>			
Size	?	-0.352 (0.001)	0.032 (0.607)
Growth	-	-0.090 (0.031)	-0.243 (0.001)
Sales_Growth	+	-0.194 (0.001)	-0.033 (0.353)
Net operating assets	-	0.100 (0.019)	0.025 (0.527)
Shares	+	0.016 (0.802)	0.309 (0.001)
Litigation	+	-0.083 (0.319)	0.589 (0.001)
Implicit Claim	+	-0.063 (0.104)	0.187 (0.001)
Num_Estimate	+	-0.121 (0.024)	0.242 (0.001)
CV_AF	-	0.496 (0.001)	-0.733 (0.001)
Down_Rev	+	7.939 (0.001)	0.980 (0.811)
Psudo R ²		0.195	0.180
Likelihood ratio		603 (0.001)	612 (0.001)

* The predicted signs for Column (1) are opposite to those for Column (2).

Table 4
The impact of meeting or beating analysts' forecasts on CEOs' trading conditional on equity incentives

This table reports regression results of future net sales on four dummy variables, H_MB , H_Miss , L_MB , and L_Miss , and control variables:

$$NetSale_{i,t+j} = \beta_1 H_MB_{i,t} + \beta_2 H_Miss_{i,t} + \beta_3 L_MB_{i,t} + \beta_4 L_Miss_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j} \quad (3)$$

where $j = 1$ or 2 , denotes the j^{th} six-month period after the earnings announcement, and the four dummy variables are defined as follows:

- H_MB = one if the firm has high equity incentives and meets or beats analysts' forecasts,
- H_Miss = one if the firm has high equity incentives and misses analysts' forecasts,
- L_MB = one if the firm has low equity incentives and meets or beats analysts' forecasts, and
- L_Miss = one if the firm has low equity incentives and misses analysts' forecasts.

High or low equity incentives are classified based on the sample median of an aggregate equity incentive measure, the sum of unexercisable options, weighted by their hedge ratios as measured in Core and Guay (1999), and ownership. See Appendix A for variable measurement. The regressions are estimated on all observations with data available in the sample period 1993-2000. The p-values in parentheses are based on one-sided t-tests for coefficients with signed predictions and on two-sided t-tests otherwise. The table also reports the difference in coefficients between H_MB and H_Miss , that between L_MB and L_Miss , and the p-value of the corresponding F-tests.

	Predicted signs	1 st six-month	2 nd six-month
$H_MB (\beta_1)$	+	0.620 (0.001)	0.567 (0.001)
$H_Miss (\beta_2)$	+	0.534 (0.001)	0.500 (0.001)
$L_MB (\beta_3)$	+	0.469 (0.001)	0.414 (0.001)
$L_Miss (\beta_4)$	+	0.419 (0.001)	0.410 (0.001)
<i>Control variables</i>		Yes	Yes
N		1,637	1,389
Adj. R ²		0.168	0.158
<i>The impact of meeting or beating analysts' forecasts conditional on equity incentives (p-value)</i>			
For high equity incentive managers ($\beta_1 - \beta_2$)	+	0.086 (0.054)	0.067 (0.077)
For low equity incentive managers ($\beta_3 - \beta_4$)	+	0.050 (0.186)	0.004 (0.908)

Table 5
Equity incentives and earnings smoothing

Panel A: Equity incentives and CEOs' trading in the second year after earnings announcements

This table reports results from regressing CEOs' net sales in the second year (the 3rd and 4th six-month periods) after earnings announcements on equity incentive measures and control variables:

$$NetSale_{i,t+j} = \gamma_0 + \beta Eq_Incent_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}, \quad (1)$$

where $j = 3$ or 4 , denotes the j^{th} six-month period after the earnings announcement. See Appendix A for variable measurement. The regressions are estimated on all firm-years with data available in the sample period 1993-2000. Year dummies are included in regressions to control for year fixed effects. The p-values in parentheses are based on one-sided t-tests for coefficients with signed predictions and on two-sided t-tests otherwise.

	Predicted signs	3 rd six-month	4 th six-month
<i>Equity incentives</i>			
Unexercisable options	+	0.076 (0.002)	0.068 (0.011)
Ownership	+	0.021 (0.001)	0.019 (0.001)
Exercisable options	+	0.030 (0.144)	-0.002 (0.538)
<i>Control variables</i>			
Size	-	-0.037 (0.001)	-0.048 (0.001)
Growth	-	-0.233 (0.001)	-0.256 (0.001)
Stock returns	+	0.052 (0.026)	0.079 (0.007)
Change in cash flows	+	0.128 (0.790)	-0.191 (0.133)
N		2,213	1,624
Adj. R ²		0.085	0.086

Table 5 (Continued)

Panel B: Equity incentives and earnings smoothing

The table reports the change in the odds of firms (1) beating analysts' forecasts by at least four cents in the current year, and (2) meeting or just beating analysts' forecasts by one cent in the next year, due to a change of one standard deviation of a continuous variable, and the p-value (in parentheses) of the corresponding coefficient in the logit regressions. See Table 3 for model specifications and Appendix A for variable measurement; Column (1) is based on current year's earnings surprises, $Surprise_{i,t}$, and Column (2) is based on the next year's earnings surprises, $Surprise_{i,t+1}$. $Surprise_{i,t+1}$ is the difference between First Call actual EPS for year $t+1$ and the latest consensus forecast for year $t+1$ disclosed before the earnings announcement for year $t+1$, rounded to the nearest cent.

	Predicted signs for Column (1) *	The probability of large positive earnings surprises in the current year Prob($Surprise_{i,t} > \$0.04$) (1)	The probability of meeting or just beating analysts' forecasts in the next year Prob($Surprise_{i,t+1} = \$0$ or $\$0.01$) (2)
<i>Equity incentives</i>			
Unexercisable options	-	-0.143 (0.002)	0.041 (0.339)
Ownership	-	-0.116 (0.013)	0.167 (0.001)
Exercisable options	-	0.152 (0.005)	-0.064 (0.116)
<i>Control variables</i>			
N		Yes 4,301	Yes 3,429
Pseudo R ²		0.150	0.135
Likelihood ratio		397 (0.001)	291 (0.001)

* The predicted signs for Column (2) are opposite to those for Column (1).

Table 5 (Continued)

Panel C: The incremental impact of recurring equity incentives on earnings smoothing

This panel reports the incremental impact of recurring equity incentives on earnings surprises: the probability of meeting or just beating analysts' forecasts in Column (1) and the probability of large positive earnings surprises in Column (2), using the following regression:

$$\begin{aligned} Prob(Surprise_{i,t} \in \Phi_k) = & \text{logit}(\gamma_{0,k} + \beta_k Eq_Incent_{i,t} + \gamma_{1,k} Size_{i,t} + \gamma_{2,k} Growth_{i,t-1} + \gamma_{3,k} Sales_Growth_{i,t} \\ & + \gamma_{4,k} NOA_{i,t-1} + \gamma_{5,k} Shares_{i,t} + \gamma_{6,k} Litigation_{i,t} + \gamma_{7,k} ImplicitClaim_{i,t} \quad (2) \\ & + \gamma_{8,k} Num_Estimate_{i,t} + \gamma_{9,k} CV_AF_{i,t} + \gamma_{10,k} Down_Rev_{i,t} + \zeta_{i,t}) \end{aligned}$$

The aggregate equity incentive measure, *Total*, is the sum of unexercisable options, weighted by the hedge ratio as measured in Core and Guay (1999), and ownership. To identify firms with recurring equity incentives we first rank all firm-years into three equal-sized groups: high, medium, or low, based on the aggregate equity incentive measure. We then calculate the average ranking for each firm over the sample period. If a firm's average ranking is above the 3rd quartile or below the 1st quartile of the average ranking distribution, this firm is regarded as having persistent equity incentives (consistently high or consistently low equity incentives, respectively); for these firms, the dummy variable, *Recurring*, is defined as one, and zero otherwise. See Appendix A for the measurement of other variables. The logit regressions are based on 3,958 firm-years with all required data.

	Predicted signs for Column (1)	The probability of large positive earnings surprises in the current year $\Phi=[\$0.04, \infty)$ (1)	Meeting or just beating analysts' forecasts in the current year $\Phi=[\$0, \$0.01]$ (2)
Total	?	0.024 (0.760)	0.262 (0.001)
Total * Recurring	-	-0.218 (0.001)	0.038 (0.509)
Unexercisable options	?	0.063 (0.233)	0.002 (0.961)
<i>Control variables</i>		<i>Yes</i>	<i>Yes</i>
Pseudo R ²		0.164	0.198
Likelihood ratio		368 (0.001)	577 (0.001)

Table 6
Equity incentives and earnings management via abnormal accruals

Panel A: Descriptive statistics on abnormal accruals

	The sample (N=6,867)			Compustat population (N=50,984)		
	Mean	Median	Inter-quartile range	Mean	Median	Inter-quartile range
Abnormal accruals	0.002	0.001	0.086	0.007	0.006	0.141
Total accruals	-0.058	-0.048	0.082	-0.081	-0.052	0.134
Operating cash flows	0.115	0.113	0.111	-0.026	0.056	0.191
Earnings	0.050	0.068	0.087	-0.108	0.026	0.196
Change in revenue	0.230	0.127	0.273	0.238	0.108	0.346
Firm size (total assets, \$million)	2,028	624	1,537	886	66	310

All variables, except firm size, are deflated by beginning-of-period total assets. The descriptive statistics for the sample are based on all firm-years with both equity incentives and abnormal accruals in the period 1993-2000. The Compustat population includes all firm-years in the same period with abnormal accruals. Abnormal accruals are defined as the difference between total accruals and normal accruals. Normal accruals are estimated using the modified cross-sectional Jones (1991) model as described in DeFond and Jiambalvo (1994). In this model, normal accruals are estimated as a function of change in revenues and level of property, plant and equipment:

$$TA_{i,t}/A_{i,t-1} = b_0(1/A_{i,t-1}) + b_1(\Delta REV_{i,t}/A_{i,t-1}) + b_2(PPE_{i,t}/A_{i,t-1}) + \mu_{i,t}$$

Where:

- $TA_{i,t}$ = total accruals, i.e., income before extraordinary items (#18) minus operating cash flows (#308);
- $A_{i,t-1}$ = total assets (#6);
- $\Delta REV_{i,t}$ = change in net revenues (#12) from year t-1 to year t, included to control for normal changes in working capital;
- $PPE_{i,t}$ = gross property, plant and equipment (#7), included to control for normal depreciation expense;
- $\mu_{i,t}$ = error term;
- i,t = subscript for firm i in year t.

The portion of total accruals that is not explained by normal operating activities, i.e., the residual $\mu_{i,t}$ from the above regression, is the estimate of abnormal accruals. Because operating characteristics might vary across industries and years, the estimation is conducted for each industry-year combination, based on all observations with data available from Compustat. Industry is defined on the basis of two-digit SICs, and industry-year combinations with less than 7 observations are deleted. We then calculate abnormal accruals for each observation in the sample based on the estimated coefficients of the industry-year to which the observation belongs.

Table 6 (continued)

Panel B: Regressions of abnormal accruals on equity incentive measures and control variables

$$AA_{i,t} = \gamma_0 + \beta Eq_Incent_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Leverage_{i,t} + \gamma_3 Bonus_{i,t} + \gamma_4 Risk_{i,t} + \gamma_5 Growth_{i,t} + \gamma_6 NOA_{i,t-1} + \gamma_7 Litigation_{i,t} + \gamma_8 Implicit Claim_{i,t} + \zeta_{i,t} \quad (4)$$

All regressions are estimated using the pooled sample with year dummies to control for the year-fixed effects. The table reports the coefficients and the accompanying p-value. The p-values in parentheses are based on two-sided t-tests.

	Abnormal accruals
Intercept	-0.000 (0.984)
<i>Equity incentives</i>	
Unexercisable options	0.695 (0.012)
Ownership	0.070 (0.001)
Exercisable options	0.140 (0.407)
<i>Control variables</i>	
Size	0.001 (0.529)
Leverage	-0.032 (0.003)
Bonus	0.007 (0.059)
Risk	-0.001 (0.841)
Growth	-0.005 (0.342)
Net operating assets	-0.014 (0.001)
Litigation	-0.013 (0.001)
Implicit claim	-0.019 (0.001)
N	6,387
Adj. R ²	0.022

Table 6 (continued)

Panel C: Regressions of future insider trading on abnormal accruals

This Panel reports results from regressing future net sales on equity incentives, control variables, and abnormal accruals:

$$NetSale_{i,t+j} = \gamma_0 + \beta Eq_Incent_{i,t} + \delta AbnormalAccruals_{i,t} + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}$$

Positive and negative abnormal accruals are included in the regressions separately to capture their potentially differential effects. The positive abnormal accruals are zero when abnormal accruals are negative, and the negative abnormal accruals are zero when abnormal accruals are positive. See Appendix A for variable measurement. The regressions are estimated on all firm-years with data available in the sample period 1993-2000. Year dummies are included in regressions to control for year-fixed effects. The p-values in parentheses are based on one-sided t-tests for coefficients with signed predictions and on two-sided t-tests otherwise.

	Predicted signs	1 st six-month	2 nd six-month
<i>Equity incentives</i>			
Unexercisable options	+	0.086 (0.001)	0.064 (0.002)
Ownership	+	0.016 (0.001)	0.014 (0.001)
Exercisable options	+	-0.008 (0.749)	0.018 (0.117)
<i>Abnormal Accruals</i>			
Positive abnormal accruals	+	0.075 (0.019)	0.074 (0.054)
Negative abnormal accruals	?	-0.050 (0.171)	-0.073 (0.093)
<i>Control variables</i>			
N		Yes 2,723	Yes 2,315
Adj. R ²		0.109	0.068

Table 7
Additional analyses

Panel A: Results of meeting or beating analysts' forecasts based on the ratio of stock and option grants to total compensation

This panel reports results of regressing the probability of earnings surprises in a certain range on equity incentives, including a stock and option grant ratio, ownership, and controls:

$$\begin{aligned}
 Prob(Surprise_{i,t} \in \Phi_k) = & \text{logit}(\gamma_{0,k} + \beta_k Eq_Incent_{i,t} + \gamma_{1,k} Size_{i,t} + \gamma_{2,k} Growth_{i,t-1} + \gamma_{3,k} Sales_Growth_{i,t} \\
 & + \gamma_{4,k} NOA_{i,t-1} + \gamma_{5,k} Shares_{i,t} + \gamma_{6,k} Litigation_{i,t} + \gamma_{7,k} ImplicitClaim_{i,t} \quad (2) \\
 & + \gamma_{8,k} Num_Estimate_{i,t} + \gamma_{9,k} CV_AF_{i,t} + \gamma_{10,k} Down_Rev_{i,t} + \zeta_{i,t})
 \end{aligned}$$

The stock and option grant ratio is defined as the ratio of stock grants and option grants (all in dollar) to the total compensation, which includes salary, bonus, restricted stock grants, option grants, long-term incentive payouts, and other compensation. See Appendix A for variable measurement. The regressions are based on 4,274 firm-years with all required data.

	Predicted signs for Column (2)*	Negative surprises $\Phi=(-\infty, 0)$ (1)	Meeting or just beating analysts' forecasts $\Phi=[\$0, \$0.01]$ (2)
<i>Equity incentives</i>			
Stock/option grant ratio to total compensation	+	-0.103 (0.007)	0.105 (0.003)
Ownership	+	-0.203 (0.001)	0.297 (0.001)
<i>Control variables</i>			
Pseudo R ²		Yes 0.195	Yes 0.180
Likelihood ratio		603 (0.001)	612 (0.001)

* The predicted signs for Column (1) are opposite to those for Column (2).

Table 7 (Continued)

Panel B: Analyses of future net sales conditional on future realized stock returns

This table reports results from regressing future net sales on equity incentives, a high return dummy variable (*High_ret*), the interactions between equity incentives and the high return dummy, and control variables:

$$NetSale_{i,t+j} = \gamma_0 + \beta Eq_Incent_{i,t} + \delta StockComp_{i,t} \times High_ret_{i,t+j} + \chi High_ret_{i,t+j} \\ + \gamma_1 Size_{i,t} + \gamma_2 Growth_{i,t} + \gamma_3 Ret_{i,t} + \gamma_4 \Delta OCF_{i,t} + \xi_{i,t+j}$$

where $j = 3$ or 4 , denotes the j^{th} six-month period after the earnings announcement. *High_ret* _{$i,t+j$} is one when the return in the period $t+j$ is in the top quartile. See Appendix A for variable measurement. The regressions are estimated on all firm-years with data available in the sample period 1993-2000. Year dummies are included in regressions to control for year-fixed effects. The p-values in parentheses are based on one-sided t-tests for coefficients with signed predictions and on two-sided t-tests otherwise.

	Predicted signs	1 st six-month	2 nd six-month
<i>Equity incentives</i>			
Unexercisable options	+	0.056 (0.003)	0.017 (0.052)
Ownership	+	0.012 (0.001)	0.008 (0.001)
Exercisable options	+	0.001 (0.476)	0.006 (0.374)
<i>Equity incentives × High_ret</i>			
Unexercisable options × High_ret	+	0.080 (0.017)	0.230 (0.001)
Ownership × High_ret	+	0.016 (0.001)	0.023 (0.001)
Exercisable options × High_ret	+	-0.025 (0.826)	0.046 (0.072)
High_ret	+	0.032 (0.337)	-0.031 (0.435)
<i>Control variables</i>			
N		Yes 2,723	Yes 2,317
Adj. R ²		0.129	0.133