Exclusion of Stock-based Compensation Expense from Analyst Earnings Forecasts: Incentive- and Information-based Explanations

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Abstract

All firms must recognize stock-based compensation expense beginning in 2006. Yet, for some firms consensus analyst forecasts of 2006 earnings exclude stock-based compensation expense. This study investigates two potential explanations for the exclusion of stock-based compensation expense from consensus forecasts. Consistent with the incentive-based explanation, the likelihood of exclusion is increasing in the magnitude and volatility of the expense and is higher when the firm beat the consensus earnings forecast in the prior year and when including the expense in the prior year would have resulted in a loss. Consistent with the information-based explanation, we find that stock-based compensation expense is more likely to be excluded when it is a less accurate predictor of firm fundamentals, such as future cash flows, future earnings, and contemporaneous returns and, thus, the value of the firm's equity. We find that both incentives and information separately and incrementally explain stock-based compensation exclusion.

JEL Classification: G10; M4; M41; M43; M45

Keywords: analyst exclusions, stock-based compensation, SFAS123 R, Street earnings

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I. Introduction

Statement of Financial Accounting Standards No. 123(R) (SFAS 123R; FASB, 2004) requires all firms to recognize stock-based compensation expense beginning in 2006. Yet, for some firms consensus analyst forecasts of 2006 earnings exclude stock-based compensation expense. We investigate two explanations for exclusion of the expense. The first explanation relates to incentives of firms and analysts, and the second relates to the predictive ability of stock-based compensation expense for firm fundamentals and, thus, the value of the firm's equity. We find evidence that both incentives and the informational properties of stock-based compensation expense explain the exclusion of the expense from consensus analyst earnings forecasts.

The Financial Accounting Standards Board (FASB) issued SFAS 123R in the face of strong resistance from many sides, similar to the resistance that resulted in the FASB making recognition voluntary in the prior standard, SFAS 123 (FASB, 1995). In light of the controversy surrounding recognition of stock-based compensation expense, the fact that analysts exclude stock-based compensation expense from earnings forecasts for some firms raises the question of what factors are associated with the exclusion decision. Also, First Call/IBES treats the exclusion of stock-based compensation expense from analyst forecasts differently from the way it treats exclusion of other earnings components.[1] First Call/IBES usually requires that all analysts calculate their earnings forecasts in the same way as the majority of analysts issuing

[1] IBES and First Call are data services of Thomson Financial that similarly treat actual earnings and analyst earnings forecasts. Thus, we refer to them collectively as First Call/IBES except when discussing our data sources; First Call and IBES maintain separate databases.

forecasts for the firm, i.e., excluding or including particular earnings components. Only for stock-based compensation expense does First Call/IBES allow analysts to provide forecasts that exclude or include stock-based compensation expense regardless of the majority treatment, even though the consensus earnings forecast is based on the majority treatment. Thus, factors associated with excluding stock-based compensation expense from analyst earnings forecasts can differ from those associated with excluding other earnings components.

Our tests focus on two potential explanations offered in related literature for the exclusion of particular earnings components from consensus analyst forecasts. Net income excluding these components is referred to as "Street" earnings. The first explanation, which we refer to as "incentive-based," posits that exclusion of an earnings component such as stock-based compensation expense reflects incentives of firms and analysts, largely to obtain higher equity valuations by reporting higher or smoother forecasted Street earnings. Such incentives lead to efforts to increase Street earnings, enable the firm to meet earnings benchmarks, exclude an earnings component that is difficult to predict, and mitigate information asymmetry. The second explanation, which we refer to as "information-based," posits that an earnings component is excluded from analyst earnings forecasts when doing so results in an earnings number that better reflects information about firm fundamentals, such as future cash flows, future earnings, and returns and, thus, the value of the firm's equity.

Regarding the incentive-based explanation, we test whether the likelihood that the 2006 consensus analyst earnings forecast excludes stock-based compensation expense is associated with firm and analyst incentives. We focus on forecasts of 2006 earnings because 2006 was the first year that recognition of stock-based compensation was mandatory, even though firms have disclosed the expense since 1996. As predicted, we find that the likelihood of exclusion is increasing in the magnitude of stock-based compensation expense, whether the firm beat the consensus analyst earnings forecast in the prior year, whether the inclusion of stock-based compensation expense in the prior year would have resulted in the firm incurring a loss, and the historical volatility of the firm's stock-based compensation expense. We also find that exclusion of stock-based compensation expense is decreasing in information asymmetry. We also examine whether the percentage of analysts excluding stock-based compensation expense from their 2006 earnings forecasts is related to the same incentives. Consistent with the consensus forecast results, we find that a larger percentage of analysts issuing forecasts for a firm exclude the expense the greater the incentives to do so.

Regarding the information-based explanation, we test whether the ability of stock-based compensation expense to predict future firm fundamentals differs for firms with and without stock-based compensation expense excluded from their consensus earnings forecast. In particular, we estimate the relation between stock-based compensation expense and future net income, future cash flow from operations, and contemporaneous stock returns, permitting the relation to differ for the two groups of firms. As predicted, we find that the predictive ability of stock-based compensation expense for these fundamentals is significantly lower for firms whose consensus forecast excludes the expense than for other firms.

Our study relates to the literature examining the exclusion of earnings components from Street earnings. Studies in this literature typically focus only on the information-based explanation as it relates to a various non-recurring or special items. By focusing on a particular earnings component – one that is recurring and afforded unique treatment in arriving at analyst earnings forecasts – we are able to develop more specific tests of the incentive- and information-based explanations than is possible when focusing on a variety of earnings components. We find support for both explanations, separately and incrementally.

The remainder of the paper is as follows. Section II provides institutional background on the accounting for stock-based compensation and First Call/IBES's treatment of stock-based compensation expense, and discusses related research. Section III develops our predictions and describes our research design. Sections IV and V discuss our data and results. Section VI concludes.

II. Background and Related Research

A. Background

SFAS 123R was issued by the FASB in December 2004 and took effect for fiscal years beginning on or after June 15, 2005. The primary effect of SFAS 123R was the elimination of the option to use the measurement approach of Accounting Principles Board Opinion No. 25 (APB 25). Under APB 25, stock-based compensation expense relating to employee options was measured as the difference between the stock price and the option exercise price on the grant date. For most employee options, this amount equals zero. SFAS 123 (FASB, 1995), the predecessor to SFAS 123R, allowed firms to apply the measurement approach of APB 25, rather than the recommended grant date value approach. Most firms continued to apply the measurement approach of APB 25 until the summer of 2002 (Aboody, Barth, and Kasznik, 2004a), although some more switched to the grant date value approach in the period leading up to issuance of SFAS 123R (Brown and Lee, 2006 report that 483 firms had so elected by February 2004). Although SFAS 123 permitted firms to apply the measurement approach of APB 25, it required that firms doing so disclose, among other items, pro forma net income, which is what net income would have been had stock-based compensation expense been measured using SFAS 123's grant date value approach. The disclosure of pro forma net income enables us to calculate a measure of stock-based compensation expense equal to the difference between net income and pro forma net income.

Major data services such as First Call/IBES do not prescribe which items are to be included or excluded from forecasted earnings (Jones, 2006). Lambert (2004) notes that for a forecast to appear in the First Call/IBES database, the earnings forecast must be calculated on the same basis, e.g., including or excluding extraordinary items, as that used by the majority of analysts issuing forecasts for the firm. Thus, in effect, the analysts covering the firm collectively determine Street earnings for the firm, which can be interpreted as the measure of earnings analysts view as most relevant for analyzing the firm. As a result, the measure of earnings that analysts forecast often varies across firms.

Consistent with this policy, the consensus earnings forecast on First Call/IBES reflects whether the majority of analysts covering a firm exclude stock-based compensation expense when forecasting earnings. However, unlike other earnings components, First Call/IBES allows analysts to provide earnings forecasts that exclude or include stock-based compensation expense regardless of the majority view. This analyst choice has two implications for our paper. First, because analysts can deviate from the majority with regard to the exclusion of stock-based compensation expense, we expect incentives to play a greater role in stock-based compensation exclusion than they do for other inclusions or exclusions from earnings forecasts.[2] Second, it allows us to construct a measure of stock-based compensation expense exclusion that reflects the

[2] Frankel, McVay, and Soliman (2006) notes that it is difficult to distinguish exclusions from analyst earnings forecasts that are attributable to managers and those that are attributable to analysts. For example, analysts may want to exclude a highly volatile component of earnings because it is difficult to forecast, and managers may want to exclude a highly volatile component of earnings because it will result in smoother Street earnings. Thus, we do not attempt to make the distinction. However, some incentive proxies that we use are more easily interpreted as relating to management or analyst incentives.

percentage of analysts excluding the expense in addition to a measure that indicates the majority view.

B. Related Research

This paper relates primarily to two streams of literature. The first stream relates to accounting for stock-based compensation, including the accounting choice and information reflected in stock-based compensation expense. Aboody, Barth, and Kasznik (2004a, ABKa) examines the decision of firms in 2002 and early 2003 to voluntarily recognize stock-based compensation expense in accordance with SFAS 123. ABKa finds that the likelihood of voluntary recognition is related to a firm's activity in capital markets, private incentives of management and the board of directors, information asymmetry, and political costs. As explained in Section IV, several factors ABKa posits as affecting voluntary recognition likely affect the exclusion of stock-based compensation expense from analyst forecasts. Consistent with this, none of the 356 firms voluntarily recognizing stock-based compensation expense by September 2003 (McConnell et al., 2003) has a consensus earnings forecast that excludes stock-based compensation expense.

Aboody, Barth, and Kasznik (2004b, ABKb) examines the stock market's valuation of unrecognized stock-based compensation expense. Controlling for the mechanical relation between stock-based compensation expense and share price, ABKb finds a significant negative relation between stock-based compensation expense and share prices. ABKb interprets this finding as indicating that investors view stock-based compensation expense as an expense of the firm. Following ABKb, in our returns tests we use an instrumental variables approach to control for the mechanical relation between stock-based compensation expense and share price. However, unlike ABKb, our focus is on whether the association between changes in stock-based compensation expense and returns differs for firms with stock-based compensation expense included or excluded from analyst earnings forecasts.

The second stream of literature relates to the exclusion of particular earnings components from analyst forecasts. Bradshaw and Sloan (2002) focuses on the difference between net income and Street earnings and finds that the difference has increased over time, and that the explanatory power of Street earnings for stock returns has increased in recent years relative to that of net income. Doyle, Lundholm, and Soliman (2003) and Gu and Chen (2004) test the information-based explanation for exclusions of income components by focusing on the predictive ability of items included in or excluded from Street earnings. Doyle, Lundholm, and Soliman (2003) finds that items excluded from Street earnings have significant predictive ability for future abnormal returns and future operating cash flows, which calls into question the information-based explanation. However, consistent with the information-based explanation, Gu and Chen (2004) finds that items excluded from Street earnings have less predictive ability for future operating cash flows, future earnings, and future returns than items included in Street earnings. In concurrent research, Baik, Farber, and Petroni (BFP, 2007) tests both the information-based and incentive-based explanations for exclusion of items from Street earnings. Consistent with an incentive-based explanation, BFP finds that analysts are more likely to include in Street earnings income-increasing items for glamour firms. However, BFP does not find evidence consistent with an information-based explanation.

We contribute to this research in three primary ways. First, we test for a relation between the exclusion of an earnings component from analyst forecasts and firm and analyst incentives, including beating earnings benchmarks and information asymmetry, as well as for a relation between the excluded component and stock returns and future firm performance. Prior research focuses primarily on the latter and finds some support for an information-based explanation. The one study that tests both incentive-based and information-based explanations finds support for incentive-based explanations but not for information-based explanations. We test both explanations as they relate to the exclusion of stock-based compensation expense and find support for both, separately and incrementally.

Second, we study the exclusion of a particular earnings component, stock-based compensation expense. Unlike other items excluded from analyst forecasts, stock-based compensation expense is defined by SFAS 123(R), which requires the expense to be disclosed. Prior literature focuses on special or non-recurring items. These items differ from stock-based compensation in two respects. First, because firms have substantial discretion in identifying earnings components as special items (McVay, 2006), the informational properties of such components reflect this management discretion, which may vary by firm. Second, firms differ in the items they identify as special items and thus the characteristics of these items, such as persistence, likely differs across items and firms (see, e.g., Gu and Chen, 2004). Our focus on a single, well-defined item minimizes possibly confounding effects attributable to these two forms of heterogeneity. It also permits us to develop proxies for testing our hypotheses that are specific to the exclusion we test – stock-based compensation expense – which enables us to conduct more direct and powerful tests.

Third, by focusing on a persistent earnings component, our study is arguably the first to provide direct evidence relating to the exclusion of an earnings component from analyst forecasts. Special or non-recurring items studied in prior literature may be implicitly excluded because the items are unexpected and, thus, not forecasted. Thus, it is not possible to determine whether special or non-recurring items are excluded from the forecast or whether the items are included but the forecasted amount equals zero. Because the forecasted amount of stock-based compensation expense should not equal zero, exclusion of it from analyst forecasts must result from an explicit decision to exclude it.[3] Because earnings forecasts, rather than realized earnings, typically are direct inputs to analysts' valuation models (Bradshaw, 2004), we view our study as providing more direct evidence than prior research on the information-based explanation for excluding earnings components from analyst forecasts.

III. Empirical Predictions and Research Design

Bradshaw and Sloan (2002) offers two explanations for exclusion of particular earnings components from Street earnings. The first explanation is that the exclusion reflects incentives of firms and analysts, largely to obtain higher equity valuations by reporting higher or smoother Street earnings. Such incentives lead to efforts to increase Street earnings, enable the firm to meet earnings benchmarks, exclude an earnings component that is volatile or difficult to predict, and mitigate information asymmetry. The second explanation is that the exclusion results in a measure of earnings that better reflects firm fundamentals, such as future cash flows and, thus, better reflects information relevant to valuing the firm's equity. We test predictions from both explanations, although, as Bradshaw and Sloan (2002) notes, they are not mutually exclusive.

A. Incentive-based Explanation

The incentive-based explanation for analyst exclusions leads to several testable predictions. First, the incentive-based explanation predicts that exclusion of stock-based compensation expense is more likely when the exclusion has a greater positive effect on

[3] Evidence that stock-based compensation expense can be forecast is provided by the many analysts in our sample that include stock-based compensation expense in their forecasts.

valuation metrics. Thus, we predict that higher stock-based compensation expense is associated with a higher likelihood of excluding the expense.

Second, the explanation suggests that firms are more likely to seek stock-based compensation expense exclusion if doing so allows the firm to meet earnings benchmarks, such as analyst forecasts (Kasznik and McNichols, 2002) or positive earnings (Burgstahler and Dichev, 1997). Based on Kasznik and McNichols (2002), we expect firms that have met earnings benchmarks in the past to have greater incentives to do so in the future. Thus, to the extent that excluding stock-based compensation expense helps firms to meet or beat analyst earnings forecasts, we predict a positive relation between stock-based compensation expense exclusion and a firm's history of meeting or exceeding analyst forecasts. Burgstahler and Dichev (1997) finds that firms seek to avoid losses. Thus, we predict that firms that report positive earnings only if stock-based compensation expense is excluded are more likely to seek to have the expense excluded from their earnings forecasts. We also expect that such firms are more likely to seek to exclude the expense, the larger it is. However, the information-based explanation suggests that analysts are more likely to want to include a larger expense to the extent that it is predictive of a larger future expense, suggesting a negative relation. Thus, we do not predict the sign of the relation between the likelihood of stock-based compensation expense exclusion and the interaction between the magnitude of stock-based compensation expense and whether the firm would have reported a loss if stock-based compensation expense had been included.

Third, Lambert (2004) suggests that analysts seek to exclude from Street earnings earnings components that are difficult to predict. Also, firms may seek to exclude a more volatile expense to enable them to report smoother earnings (Fudenberg and Tirole, 1995;

DeFond and Park, 1997). Thus, we predict that the greater the historical volatility of a firm's stock-based compensation expense, the more likely is the expense to be excluded from analyst forecasts. Finally, Aboody, Barth, and Kasznik (2004a) predicts that firms with less information asymmetry are less likely to voluntarily adopt the recognition provisions of SFAS 123. Extending this logic to exclusion of stock-based compensation expense from analyst earnings forecasts, we predict that exclusion is more likely for firms with less information asymmetry.

To test the incentive-based explanation, we employ two approaches. First, we test whether the incentives for excluding stock-based compensation expense explain the likelihood that the consensus earnings forecasts excludes the expense. In particular, we estimate the following equation using probit regression.

$$Pr(D_{EX} = 1) = F(\beta_0 + \beta_1\, COMPXA + \beta_2\, D_{SURP} + \beta_3\, D_{ILOSS} + \beta_4\, D_{ILOSS}*COMPXA + \beta_5\, \sigma(COMPXA) + \beta_6\, \sigma(AF) + \beta_7\, ANALYSTS + \beta_8\, INSTIT + \beta_9\, SIZE + \beta_{10}\, ROA_{IBES} + \varepsilon) \quad (1)$$

$Pr(.)$ denotes probability and D_{EX} is an indicator variable that equals one if the consensus forecast of the firm's 2006 earnings excludes stock-based compensation expense, and zero otherwise. $F(.)$ is the standard normal distribution function. We estimate equation (1) including industry fixed effects. The explanatory variables are 2005 amounts because these are the data available to analysts when they decide whether to exclude stock-based compensation expense from their forecasts of 2006 earnings.

To capture the magnitude of stock-based compensation expense we use *COMPXA*, stock-based compensation expense, i.e., net income minus pro forma net income, *COMPX*, deflated by beginning of year total assets.[4] We predict β_1 is positive. To capture incentives relating to

[4] For a small number of firms we confirmed that Compustat data #399, our measure of *COMPX*, is calculated as the difference between net income and pro forma net income, per share, disclosed under SFAS 123. *COMPX* is total

meeting analyst forecasts, we use D_{SURP}, which is an indicator variable that equals one if *SURP* is positive, and zero otherwise, where *SURP* is actual earnings per IBES minus the last consensus earnings forecast before year-end. To capture incentives relating to reporting positive earnings, we use D_{ILOSS}, which is an indicator variable that equals one if excluding stock-based compensation expense allows the firm to avoid reporting a loss, i.e., $NI_{IMPLIED}$ is negative and NI_{IBES} is non-negative, and zero otherwise, where $NI_{IMPLIED}$ is NI_{IBES} minus *COMPX* and NI_{IBES} is actual earnings per IBES. D_{ILOSS}*COMPXA* is the interaction between D_{ILOSS} and *COMPXA*. We predict β_2 and β_3 are positive; we do not predict the sign of β_4. To capture volatility in stock-based compensation expense, we use σ(*COMPXA*), which is the standard deviation of a firm's *COMPXA* across sample years. We predict β_5 is positive.

We use three proxies for information asymmetry. The first is σ(*AF*), which is the standard deviation of a firm's analyst earnings forecasts at the end of the year scaled by total assets, and the second is *ANALYSTS*, which is the number of analysts providing earnings forecasts for the firm at the end of the year. We interpret higher σ(*AF*) and lower *ANALYSTS* as indicating more information asymmetry. Thus, we predict β_6 is negative and β_7 is positive. The third proxy is *INSTIT*, which is the percentage of shares outstanding held by institutional investors at the end of the year as reported on Form 13-F. We interpret lower *INSTIT* as greater information asymmetry. However, institutional investors might ask analysts to exclude stock-based compensation expense from their earnings forecasts to enhance the value of their stock holdings (Bradshaw and Sloan, 2002). Also, to the extent that exclusion of stock-based

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stock-based compensation expense for firms that apply the measurement method in APB 25, but not for firms that recognize the expense using the grant date value measurement method in SFAS 123. However, our sample excludes firms that measure stock-based compensation expense using the grant date value measurement method in SFAS 123.

compensation expense increases information asymmetry, institutional investors may seek exclusion to maximize their information rents. Thus, we do not predict the sign of β_8.

SIZE and ROA_{IBES} are control variables, where *SIZE* is the natural logarithm of end of year market value of equity and *ROA* is the ratio of actual earnings per IBES to beginning of year total assets. We do not predict the sign of β_9 or β_{10}.

In our second approach, we use the percentage of a firm's earnings forecast footnotes in First Call that indicate the respective forecast excludes stock-based compensation expense, %*EX*, as a proxy for the percentage of analysts covering the firm who exclude the expense. In particular, we estimate the following equation using tobit regression with left censoring at zero and right censoring at one.

$$
\begin{aligned}
\%EX = F(&\beta_0 + \beta_1\ COMPXA + \beta_2\ D_{SURP} + \beta_3\ D_{ILOSS} + \beta_4\ D_{ILOSS}{*}COMPXA \\
&+ \beta_5\ \sigma(COMPXA) + \beta_6\ \sigma(AF) + \beta_7\ ANALYSTS + \beta_8\ INSTIT \\
&+ \beta_9\ SIZE + \beta_{10}\ ROA + \varepsilon) \qquad (2)
\end{aligned}
$$

Because %*EX* is a continuous measure, it potentially contains more information than the binary variable D_{EX} in equation (1). However, because not all forecasts have footnotes and analysts issue multiple forecasts and the database does not permit us to determine the identity of the analyst whose forecast has a footnote, it likely measures with error the percentage of analysts that exclude stock-based compensation expense. Thus, we view our two approaches as providing complementary evidence on the determinants of stock-based compensation expense exclusion. As with equation (1), we estimate equation (2) with industry fixed effects. The variables and coefficient sign predictions for equation (2) are the same as for equation (1).

B. Information-based Explanation

The information-based explanation predicts that stock-based compensation expense is excluded from Street earnings when doing so results in a measure of earnings that better predicts future cash flows and, thus, aids in assessing firm value. To test the information-based explanation we employ two approaches.

The first approach follows prior research (e.g. Doyle, Lundholm, and Soliman, 2003), and tests whether the ability of stock-based compensation expense to predict future operating performance differs for firms with and without stock-based compensation expense excluded from their analyst earnings forecasts. In particular, we estimate equation (3).

$$X_{t+1} = \alpha_0 + \alpha_1 SIZE_t + \alpha_2 BM_t + \alpha_3 X_t + \alpha_4 COMPXA_t + \varphi_0 D_{EX} + \varphi_1 D_{EX}{*}COMPXA_t + \varepsilon_t \quad (3)$$

where X is either *ROA* or *CFOA*, where *ROA* (*CFOA*) is net income before extraordinary items (cash flow from operations) deflated by beginning of year total assets. *BM* is the end of year equity book to market ratio and t denotes year. All other variables are as previously defined. Following prior research, we include year and industry fixed effects in equation (3), and equations (4) and (5) below. We estimate these equations using eight years of data rather than only 2005 data to increase the power of our tests.[5] Our inferences from equation (3) are based on t-statistics calculated using standard errors clustered by firm and year, allowing for both time-series and cross-sectional dependence (Petersen, 2007; Gow, Ormazabal, and Taylor, 2007).

Based on Aboody, Barth, and Kasznik (ABKb, 2004b) and SFAS 123R's identification of stock-based compensation expense as an expense of the firm, we predict α_4 is negative.

[5] Equations (1) and (2) focus on analyst decisions at the end of 2005 to include or exclude stock-based compensation expense from a firm's earnings forecast. Thus, we estimate those equations using only 2005 data. Equations (3) through (5) test predictions about the ability of stock-based compensation expense to predict future firm performance and variation in returns. Thus, we estimate those equations using several years of data, where the number of years we use is limited by the availability of stock-based compensation expense. See Section IV.

However, the information-based explanation predicts that the predictive power of stock-based compensation expense is lower for firms with stock-based compensation expense excluded from consensus forecasts than for other firms. That is, the information-based explanation predicts φ_1 is positive. We do not predict the signs of the other coefficients in equation (3).

Because there could be intertemporally constant cross-sectional differences between firms whose consensus forecasts exclude and include stock-based compensation expense, we also estimate a first-difference version of equation (3) (Christie, 1987; Kothari and Zimmerman, 1995). In particular, we estimate the following equation.

$$\Delta X_{t+1} = \alpha_0 + \alpha_1\, SIZE_t + \alpha_2\, BM_t + \alpha_3\, \Delta X_t + \alpha_4\, \Delta COMPXA_t + \varphi_0\, D_{EX} + \varphi_1\, D_{EX}{*}\Delta COMPXA_t + \varepsilon_t \quad (4)$$

where Δ denotes annual change. As in equation (3), we predict α_4 is negative and φ_1 is positive. Also as in equation (3), we do not predict the signs of the other coefficients in equation (4) and base our inferences on *t*-statistics calculated using standard errors clustered by firm and year.

In the second approach, we use two-stage instrumental variable estimation to control for the mechanical relation between stock-based compensation expense and share price (Aboody, 1996; ABKb). In the second stage, following ABKb, we estimate the following equation.

$$RET_t = \alpha_0 + \alpha_1\, NI_t + \alpha_2\, \Delta NI_t + \alpha_3\, \Delta LTG_t + \alpha_4\, \Delta COMPMX\hat{}_t + \varphi_0\, D_{EX} + \varphi_1\, D_{EX}{*}\Delta COMPXM\hat{}_t + \varepsilon_t \quad (5)$$

where *RET* is annual stock return, *NI* is net income before extraordinary items scaled by beginning of year market value of equity, and *LTG* is the last analyst long-term growth forecast on the last IBES summary file for the firm's fiscal year. $\Delta COMPXM\hat{}$ is the fitted value from a first-stage regression of $\Delta COMPXM_t$ on $\Delta COMPXM_{t-1}$ and all other second-stage explanatory variables, where *COMPXM* is stock-based compensation expense scaled by beginning of year market value of equity. We use $\Delta COMPXM_{t-1}$ as our instrument because the ABKb instruments are unavailable to us. Valid instruments should be uncorrelated with the error in the main equation, and correlated with the variable for which they are instruments. Because in an efficient market we do not expect lagged compensation expense to be associated with returns and change in stock-based compensation expense is serially correlated, the lagged value of $\Delta COMPX$ appears to be a valid instrument. As in equations (3) and (4), we predict α_4 is negative and φ_1 is positive, and do not predict the signs of other coefficients.

We use a bootstrap procedure to assess significance of the coefficients in the second-stage regression. In particular, we randomly assign firms as having stock-based compensation expense included or excluded from their earnings forecasts by randomly setting D_{EX} equal to one (zero) for 98 (1,747) firms and estimate our two-stage regression using the resulting data. We repeat this procedure 1,000 times to obtain an empirical distribution of the coefficients on D_{EX} and D_{EX}*$\Delta COMPXM$^ under the null hypothesis that these variables are uncorrelated with the dependent variable (Piotroski, 2000).

We view the predictive ability and return tests as providing complementary evidence on the information-based explanation. The predictive ability tests do not rely on market efficiency; the return tests rely on some degree of market efficiency, but may capture value implications not captured by our predictive ability tests.

C. Joint test of the incentive-based and information-based explanations

Thus far, our tests separately examine the incentive-based and information-based explanations for exclusion of stock-based compensation expense from consensus analyst earnings forecasts. To test whether both explanations incrementally explain the exclusion, we include in equations (1) and (2) a firm-specific measure of the predictive ability of stock-based compensation expense as an additional explanatory variable. The information-based explanation predicts that the greater stock-based compensation expense's predictive ability for future net income or cash flows, the less likely it is to be excluded from analyst forecasts. However, if the incentive-based explanation alone explains the exclusion we do not expect to find a relation between the predictive ability of the expense and the likelihood it is excluded from analyst forecasts after controlling for incentives.

To construct a firm-specific measure of the predictive ability of stock-based compensation expense we first estimate the following equation, firm by firm.

$$ROA_{t+1} = \alpha_0 + \alpha_1\, ROA_t + \alpha_2\, COMPXA_t + \varepsilon_t \qquad (6)$$

We estimate equation (6) for each firm with at least five observations of the dependent and explanatory variables. We use the rank of magnitude of the coefficient on *COMPXA*, $|\alpha_2|$, as our firm-specific measure of the predictive ability of stock-based compensation expense (*CRC*) – the greater is a firm's $|\alpha_2|$, the more predictive is its *COMPXA* for future *ROA*. We use ranks rather than raw values because of the likelihood of extreme coefficient estimates from regressions with so few observations.

We do not include in equation (6) *SIZE* and *BM*, as we do in equation (3), because of the small number of observations available to estimate the firm-level regressions and because we include them in equation (3) primarily to control for cross-sectional differences in the relation between past *ROA* and *COMPXA* for future *ROA* associated with firm size and the equity book-to-market ratio. However, untabulated findings reveal the same inferences when we estimate the predictive ability of stock-based compensation expense from firm-level estimations of equation (6) that include these two variables, replace *ROA* with *CFOA*, or use quintiles rather than ranks.

To test the incremental explanatory power of the incentive- and information-based explanations we then estimate the following expanded version of equation (1).

$$Pr(D_{EX} = 1) = F(\beta_0 + \beta_1\, COMPXA + \beta_2\, D_{SURP} + \beta_3\, D_{ILOSS} + \beta_4\, D_{ILOSS}*COMPXA + \beta_5\, \sigma(COMPXA) + \beta_6\, \sigma(AF) + \beta_7\, ANALYSTS + \beta_8\, INSTIT + \beta_9\, SIZE + \beta_{10}\, ROA + \beta_{11}\, CRC + \varepsilon_7) \quad (7)$$

We also estimate an analogous expanded version of equation (2) with *%EX* as the dependent variable. We regard *CRC* as a measure of the predictive ability of *COMPX* for future firm performance and predict that lower values of *CRC* will be associated with greater likelihood of exclusion of stock-based compensation expense, i.e., we predict β_{11} is negative. Because our firm-level measure of the predictive ability of *COMPX* is based on a small number of observations and, thus, likely contains substantial estimation error, we expect tests based on equation (7) to be a less powerful test of the information-based explanation than those based on equation (4). However, the primary purpose of estimating equation (7) is to test whether the incentive-based and information-based explanations incrementally explain the exclusion of stock-based compensation expense from analyst forecasts.

IV. Data and Descriptive Statistics

Our sample includes firms that we identify as having stock-based compensation expense excluded from their 2006 consensus earnings forecasts (Excluders), and firms meeting our data requirements that are in the same industry with at least one Excluder (Includers). We define industries as in Barth, Beaver, and Landsman (1998). We eliminate from the sample firms with (i) missing 2005 book value of equity, total assets, earnings before extraordinary items, number of shares outstanding, and market value of common equity for 2005, (ii) negative stock-based compensation expense, and (iii) missing stock-based compensation expense for all years prior to

2005. We also require sample firms to have at least one one-year-ahead analyst earnings forecast of 2006 earnings. The consensus earnings forecast is the latest consensus forecast prior to the end of the firm's fiscal year 2005 on the IBES summary file. Because early adoption of the grant date value measurement method in SFAS 123 is likely to confound our inferences, we eliminate firms that voluntary recognize stock-based compensation expense (McConnell et al. 2003). These data requirements result in a sample of 1,845 firms, 98 Excluders and 1,747 Includers.[6]

For our tests of the information-based explanation, we include all observations for our 1,845 sample firms with available data from 1998 to 2005. The sample period begins in 1998 because stock-based compensation expense is available beginning in 1996 and our tests require lagged change in stock-based compensation expense. For these tests, we require non-missing data on current and lagged values of total assets, net income before extraordinary items, cash flow from operations, and book value of equity, and require non-negative stock-based compensation expense. We also require stock returns over the fiscal year and beginning-of-year market value of equity from CRSP, and change in long-term analyst earnings growth forecast from IBES. These data requirements result in 8,406 firm-year observations, 601 of which are Excluders and 7,805 are Includers.

Table 1 presents descriptive statistics separately for Excluders and Includers. The reported *t*-statistics (Wilcoxon Z) test for differences in means (ranks) between the two groups of firms. Table 1 reveals that for most variables there are significant differences between Excluders and Includers. In particular, Excluders are generally larger and have more variable

[6] Senyek et al. (2007) identifies 102 firms with consensus earnings forecasts that exclude stock-based compensation expense. We are able to match 100 of these firms to Compustat and CRSP; 98 meet our data requirements and, therefore, are included in our sample.

stock-based compensation expense, more institutional investors, greater analyst coverage, and more positive unexpected earnings, more frequently would have reported a loss if stock-based compensation expense were included, and, as expected, have a larger percentage of footnotes stating that stock-based compensation expense is excluded from the earnings forecast. Table 2 reveals that Excluders are in seven industries, with the largest number – 70 of 98 – in the Computers industry.

V. Results

A. Tests of the incentive-based explanation

Table 3 presents regression results from estimating equations (1) and (2). We first discuss the results for equation (1). Regarding incentives, table 3 reveals inferences consistent with predictions. In particular, it reveals that the likelihood of excluding stock-based compensation expense is significantly higher for firms with more stock-based compensation expense (*COMPXA* coef. = 9.62, *t*-stat. = 4.26), significantly higher for firms that beat analyst expectations in the prior year, (D_{SURP} coef. = 0.30, *t*-stat. = 2.07), and significantly higher when including stock-based compensation in the prior year would have caused an otherwise profitable firm to report a loss (D_{ILOSS} coef. = 1.06, *t*-stat. = 3.32).

Although we do not predict the sign of the coefficient on D_{ILOSS}*COMPXA*, it is significantly negative. This indicates that the relation between the magnitude of stock-based compensation expense and the likelihood the expense is excluded from the consensus analyst forecast is significantly less positive when including stock-based compensation expense in the prior year would have caused an otherwise profitable firm to report a loss (D_{ILOSS}*COMPXA* coef. = –14.43, *t*-stat. = –2.77). This is consistent with the information-based explanation in that, conditional on inclusion of stock-based compensation expense triggering a loss, the larger the expense, i.e., the larger the loss, the less likely analysts forecasts exclude it. Untabulated statistics reveal that the marginal effect of *COMPXA* for such firms, i.e., the sum of the coefficients on *COMPXA* and D_{ILOSS}*COMPXA*, is not significantly different from zero. This suggests that there is a stronger incentive to avoid losses than to forecast more positive earnings.

Table 3 also reveals that the likelihood of exclusion is higher for firms for which it is more difficult to predict stock-based compensation expense (σ(*COMPX*) coef. = 2.75, *t*-stat. = 2.18) and that exclusion is significantly less likely when information asymmetry is higher, as reflected in the standard deviation of analyst forecasts and number of analysts following the firm and (σ(*AF*) coef. = –47.92, *t*-stat. = –1.90; *ANALYSTS* coef. = 0.07, *t*-stat. = 6.31). The relation between the extent of institutional ownership and the likelihood of exclusion is not significant (*INSTIT* coef. = 0.23, *t*-stat. = 0.87). This lack of significance is consistent with *INSTIT* reflecting the conflicting incentives discussed earlier.

Regarding the control variables, the coefficient on *SIZE* is insignificantly different from zero (*t*-stat. = 0.93), which indicates that firm size is not a significant in explaining stock-based compensation expense exclusion after controlling for incentives. The coefficient on *ROA* is significantly positive (*t*-stat. = 2.09), which indicates that stock-based compensation expense is more likely to be excluded for firms with higher profitability, measured before stock-based compensation expense.

The inferences obtained from equation (2) are the same as those obtained from equation (1). In particular, the coefficients on *COMPXA*, D_{SURP}, D_{ILOSS}, σ(*COMPX*), and *ANALYSTS* are significantly positive, that on D_{ILOSS}*COMPXA* is significantly negative, and that on *INSTIT* is insignificantly different from zero (*t*-stat. = 4.21, 2.21, 2.67, 4.37, 4.46, –2.61, and 0.67). The coefficient on σ(*AF*) is insignificantly different from zero (*t*-stat. = –1.24). Also consistent with equation (1), untabulated statistics reveal that the marginal effect of *COMPXA* is insignificantly different from zero when including stock-based compensation expense in the prior year would have caused an otherwise profitable firm to report a loss. Regarding the control variables, consistent with equation (1), the equation (2) statistics reveal that a larger percentage of analysts exclude the expense for more profitable firms (*ROA* coef. = 2.24, *t*-stat. = 5.21). In contrast to equation (1), they reveal a smaller percentage of analysts exclude stock-based compensation expense for larger firms (*SIZE* coef. = –0.23, *t*-stat. = –4.49).

B. Tests of the information-based explanation

Table 4 presents regression results from estimating equation (3) where the dependent variable in the first (second) column is *ROA* (*CFOA*). Both sets of results reveal inferences consistent with predictions. Regarding *ROA*, table 4 reveals that the coefficient on $COMPXA_{t-1}$ is significantly negative (coef. = –0.67, *t*-stat. = –1.76), which is consistent with stock-based compensation expense being negatively associated with future *ROA*, as one would expect for an expense. The coefficient on $D_{EX}*COMPXA_{t-1}$, the incremental coefficient for Excluders, is significantly positive (coef. = 0.37, *t*-stat. = 1.69). This indicates that *COMPXA* is less negatively associated with future profitability for Excluders, which would make earnings forecasts that include the expense less accurate predictors of future earnings for these firms. Regarding the other explanatory variables, the *ROA* results reveal that the beginning-of-year book-to-market ratio (prior year *ROA*) is significantly negatively (positively) associated with current year *ROA* (*BM* coef. = –0.03, *t*-stat. = –3.08; ROA_{t-1} coef. = 0.19, *t*-stat. = 2.38). The coefficients on *SIZE* and D_{EX} are not significantly different from zero (*t*-stat. = 1.46 and –0.98).

Regarding *CFOA*, table 4 reveals similar, although somewhat stronger, inferences. In particular, as predicted, the coefficient on $COMPXA_{t-1}$ is significantly negative (coef. = –0.21, *t*-stat. = –3.52) and the coefficient on $D_{EX}*COMPXA_{t-1}$ is significantly positive (coef. = 0.23, *t*-stat. = 2.32). Consistent with the *ROA* results, table 4 reveals that the beginning-of-year equity book-to-market ratio is significantly negatively associated with current year *CFOA* (coef. = –0.03, *t*-stat. = –2.41).

Table 5 presents regression summary statistics from equation (4). The first column presents results relating to change in *ROA*, and the second column presents results relating to change in *CFOA*. Both columns reveal inferences consistent with those in table 4. In particular, the coefficients on $\Delta COMPXA_{t-1}$ and $D_{EX}*\Delta COMPXA_{t-1}$ are significantly negative and positive in both columns; for ΔROA ($\Delta CFOA$) the $\Delta COMPXA_{t-1}$ coefficient is –0.21 (–0.99), with a *t*-statistic of –2.24 (–3.59) and the $D_{EX}*\Delta COMPXA_{t-1}$ coefficient is 0.53 (0.16), with a *t*-statistic of 2.79 (1.65).

Table 6 presents regression results from estimating equation (5). The first column of table 6 presents summary statistics from a regression of *COMPXM* on its lagged value and the other variables in the second-stage regression. This is to facilitate a comparison with Aboody, Barth, and Kasznik (ABKb, 2004b), which uses several instruments for stock-based compensation whereas we use only lagged *COMPXM*. Table 6 reveals that the adjusted R^2 from this regression is approximately 57%. This is similar to the adjusted R^2s reported in ABKb, which range across specifications from 57% to 64%. This finding suggests that lagged *COMPXM* has explanatory power not unlike the set of instruments used in ABKb. The second column of table 6 presents summary statistics from our first-stage regression, which is based on

$\Delta COMPXM$ rather than on *COMPXM*. Not unexpectedly, table 6 reveals that the change specification has a lower adjusted R^2 than the levels specification (11.72% versus 56.92%).

The final set of columns in table 6 presents results from the second-stage regression. It reveals a significant positive correlation between returns and change in net income and change in analyst long-term earnings growth forecasts, (ΔNI coef. = 0.97, *t*-stat. = 2.28; ΔLTG coef. = 0.01, *t*-stat. = 4.93). The coefficients on net income and $\Delta COMPXM$^ are not significantly different from zero (*t*-stat. = 0.60 and 1.20). More importantly for our research question, as predicted, the coefficient on $D_{EX}*\Delta COMPXM$^ is significantly positive (coef. = 13.05, *p*-value = 0.04).

C. Joint test of the incentive-based and information-based explanations

Table 7 presents results from estimating equation (7) and the analogous expanded version of equation (2). Regarding the incentive-based explanation, the inferences obtained from Table 7 are the same as those obtained from Table 3. Regarding the information-based explanation, Table 7 reveals that, as predicted, in both specifications the coefficient on *CRC* is negative and significant (coefs. = –0.001, *t*-stats. = –3.29 and –3.76 respectively). These results provide evidence that the incentive-based and information-based explanations both provide incremental explanatory power for the exclusion of stock-based compensation expense from consensus analyst earnings forecasts.

VI. Conclusion

Statement of Financial Accounting Standards No. 123(R) (SFAS 123R) requires firms to recognize stock-based compensation expense beginning in 2006. Yet, for some firms analyst forecasts of 2006 earnings exclude stock-based compensation expense. We seek to determine the factors associated with the exclusion decision.

Our tests focus on two potential explanations for the exclusion. The first is that exclusion of stock-based compensation expense reflects incentives of firms and analysts, largely to obtain higher equity valuations by reporting higher or smoother Street earnings – the incentive-based explanation. Such incentives lead to efforts to increase Street earnings, enable the firm to meet earnings benchmarks, exclude an earnings component that is difficult to predict, and mitigate information asymmetry. The second explanation is that stock-based compensation expense is excluded from analyst earnings forecasts when doing so results in an earnings number that better reflects information relevant to valuing the firm's equity, such as future cash flows, future earnings, and stock returns – the information-based explanation. We find that both explanations, separately and incrementally, explain the exclusion of stock-based compensation from analyst earnings forecasts.

Regarding the incentive-based explanation, as predicted, we find that the likelihood of excluding stock-based compensation expense from the consensus analyst forecast is increasing in the magnitude of the expense, whether the firm beat the consensus analyst earnings forecast in the prior year, whether the inclusion of the expense in the prior year would have resulted in the firm incurring a loss, and the volatility of the firm's prior years' stock-based compensation expense. We also we find that exclusion of the expense is decreasing in information asymmetry. We also test whether the percentage of the firm's analysts that exclude stock-based compensation expense is associated with these firm and analyst exclusion incentives. Consistent with the consensus forecast results, we find that a larger percentage of a firm's analysts exclude the expense the greater the incentives to do so.

Regarding the information-based explanation, we find that the relations between stock-based compensation expense and future net income, future cash flow from operations, and contemporaneous stock returns are significantly less negative for firms whose consensus forecast excludes the expense. For these firms earnings forecasts that exclude the expense are more accurate predictors of future earnings than earnings forecasts that include the expense.

Taken together, our findings indicate that exclusion of stock-based compensation expense from analyst earnings forecasts depends on firm and analyst incentives and on the ability of stock-based compensation expense to predict future firm fundamentals.

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Table 1
Descriptive Statistics for Firms with Stock-based Compensation Expense Included or Excluded from Analyst Consensus Forecasts of 2006 Earnings

	Excluders ($N = 98$ firms)			Includers ($N = 1,747$ firms)				
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	*t*-stat	Wilcoxon Z
SIZE	8.13	7.90	1.35	6.64	6.47	1.48	–9.74	–9.46
TA	3787.11	1576.07	6672.47	2508.18	479.68	9626.58	–1.30	–7.20
BM	0.34	0.30	0.20	0.42	0.36	0.44	1.75	2.78
NI	310.34	58.35	925.25	122.56	20.61	601.82	–2.90	–5.02
COMPX	68.43	27.77	121.07	13.75	3.72	54.47	–8.80	–12.12
$\sigma(COMPX)$	0.02	0.01	0.03	0.01	0.004	0.04	–2.21	–7.49
INSTIT	0.75	0.79	0.23	0.66	0.73	0.27	–3.09	–3.02
NI_{IBES}	351.64	78.99	854.95	139.18	23.52	641.91	–3.13	–7.01
$\sigma(AF)$	0.002	0.001	0.002	0.01	0.002	0.04	1.42	2.55
ANALYSTS	16.81	15.00	8.44	7.46	5.00	5.83	–15.03	–11.26
SURP	0.01	0.02	0.04	–0.05	0.01	1.03	–0.57	–0.95
D_{SURP}	0.83	1.00	0.38	0.66	1.00	0.47	–3.46	–3.45
$NI_{IMPLIED}$	283.21	54.80	767.32	125.42	18.72	612.87	–2.44	–4.76
D_{ILOSS}	0.11	0.00	0.32	0.06	0.00	0.24	–2.13	–2.13
%EX	0.30	0.22	0.30	0.07	0.00	0.23	–9.38	–15.70

Excluders are firms with stock-based compensation expense excluded from First Call consensus forecasts of 2006 earnings. Includers are firms in the same industry as at least one Excluder. *SIZE* is the natural log of market value of equity, *TA* is total assets (Compustat data # 6), *BM* is year-end ratio of equity book value to market value, *NI* is net income before extraordinary items (data #18), *COMPX* is implied option expense (data #399), σ(*COMPX*) is the standard deviation of a firm's *COMPXA*, which is *COMPX* divided by beginning of year *TA*, for available years in 1998-2005. *INSTIT* is the percent of shares outstanding held by Form 13-F filers from Thomson Financial. NI_{IBES}, $\sigma(AF)$, *ANALYSTS*, and *SURP* are actual earnings, standard deviation of analyst forecasts, number of analysts, and actual earnings minus the consensus forecast from the last IBES summary file prior to year-end. D_{SURP} equals one if *SURP* is positive, and zero otherwise. $NI_{IMPLIED}$ is NI_{IBES} minus *COMPX*, and D_{ILOSS} equals one if $NI_{IMPLIED}$ is negative and NI_{IBES} is non-negative, and zero otherwise. *%EX* is the percent of First Call footnotes for forecasts of 2006 earnings indicating stock-based compensation expense is excluded from the forecast. Unless otherwise noted, all variables are for 2005 and are in millions of dollars. *t*-stat (Wilcoxon *Z*) tests for a difference in means (ranks) across the two samples.

Table 2
Industry Classification for Firms with Stock-based Compensation Expense Included or Excluded from Analyst Consensus Forecasts of 2006 Earnings

Industry	Includers	Excluders	Total
5. Pharmaceuticals	197	9	206
7. Durable Manufacturers	516	13	529
8. Computers	352	70	422
9. Transportation	159	1	160
11. Retail	250	2	252
13. Insurance and Real Estate	20	1	21
14. Services	253	2	255
Total	1,747	98	1,845

Industry classifications based on Barth, Beaver, and Landsman (1998). Excluders are firms in with stock-based compensation expense excluded from First Call consensus 2006 analyst earnings forecasts. Includers are firms from the same industry as at least one Excluder.

Table 3
Likelihood of Exclusion of Stock-based Compensation Expense from Analyst Consensus Forecasts of 2006 Earnings

$$Pr(D_{EX} = 1) = F(\beta_0 + \beta_1\ COMPXA + \beta_2\ D_{SURP} + \beta_3\ D_{ILOSS} + \beta_4\ D_{ILOSS}{*}COMPXA + \beta_5\ \sigma(COMPXA) + \beta_6\ \sigma(AF) + \beta_7\ ANALYSTS + \beta_8\ INSTIT + \beta_9\ SIZE + \beta_{10}\ ROA_{IBES} + \varepsilon)$$

$$\%EX = \beta_0 + \beta_1\ COMPXA + \beta_2\ D_{SURP} + \beta_3\ D_{ILOSS} + \beta_4\ D_{ILOSS}{*}COMPXA + \beta_5\ \sigma(COMPXA) + \beta_6\ \sigma(AF) + \beta_7\ ANALYSTS + \beta_8\ INSTIT + \beta_9\ SIZE + \beta_{10}\ ROA_{IBES} + \varepsilon$$

	Predicted	Dependent Variable	
Controls	Sign	$Pr(D_{EX} = 1)$	*%EX*
D_{SURP}	+	0.30	0.22
		(2.07)	(2.21)
D_{ILOSS}	+	1.06	0.62
		(3.32)	(2.67)
COMPXA	+	9.62	8.10
		(4.26)	(4.21)
D_{ILOSS}*COMPXA*	?	–14.43	–8.07
		(–2.77)	(–2.61)
$\sigma(COMPX)$	+	2.75	5.97
		(2.18)	(4.37)
$\sigma(AF)$	–	–47.92	–6.47
		(–1.90)	(–1.24)
ANALYSTS	+	0.07	0.05
		(6.31)	(4.46)
INSTIT	?	0.23	0.13
		(0.87)	(0.67)
SIZE	?	0.05	–0.23
		(0.93)	(–4.49)
ROA_{IBES}	?	1.47	2.24
		(2.09)	(5.21)
McFadden-R^2		24.91%	8.22%
N		1,845	1,845

D_{EX} is an indicator variable equal to one if the IBES consensus forecast of 2006 earnings excludes options expense and 0 otherwise. *%EX* is the percentage of First Call footnotes that indicate the analyst excluded stock-based compensation expense from the 2006 earnings forecast. ROA_{IBES} is NI_{IBES} for 2005 scaled by beginning total assets. *F*(.) is the standard normal cumulative distribution function. All other variables are as defined in Table 1. The regression with D_{EX} (*%EX*) as the dependent variable is estimated using probit (tobit). Both regressions include industry fixed effects. *t*-statistics are in parentheses. Sample of 98 firms for which the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense and 1,745 other firms on First Call in the same industries.

Table 4
Stock-based Compensation Expense as a Predictor of Levels of Future Operating Performance

$$X_{t+1} = \alpha_0 + \alpha_1\, SIZE_t + \alpha_2\, BM_t + \alpha_3\, X_t + \alpha_4\, COMPXA_t + \varphi_0\, D_{EX} + \varphi_1\, D_{EX}{*}COMPXA_t + \varepsilon_t$$

Variable	Predicted Sign	Dependent Variable (X_t) *ROA*	*CFOA*
SIZE	?	0.01 (1.46)	0.01 (5.78)
BM	?	–0.03 (–3.08)	–0.03 (–2.41)
ROA_{t-1}	?	0.19 (2.38)	
$CFOA_{t-1}$	?		0.07 (1.11)
$COMPXA_{t-1}$	–	–0.67 (–1.76)	–0.21 (–3.52)
D_{EX}	?	–0.02 (–0.98)	0.02 (2.27)
$D_{EX}{*}COMPXA_{t-1}$	+	0.37 (1.69)	0.23 (2.32)
Adjusted R^2		14.25%	15.88%
F		40.71	34.90
N		8,406	8,406

X is *ROA*, is net income before extraordinary items (data #18), or *CFOA*, cash flow from operations (data #308) and *COMPXA* is implied stock option expense (data #399), all scaled by beginning of year total assets (data #6). *SIZE* is the natural logarithm of year end market value of equity, *BM* is year end equity book to market ratio, and D_{EX} is an indicator variable equal to one if the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense, and zero otherwise. *t* denotes year from 1998 to 2004. Both regressions include industry and year fixed effects. *t*-statistics in parentheses are based on standard errors clustered by firm and year, allowing for both cross-sectional and time-series dependence. Sample of 98 firms for which the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense and 1,745 other firms on First Call in the same industries.

Table 5
Stock-based Compensation Expense as a Predictor of Changes in Future Operating Performance

$$\Delta X_{t+1} = \alpha_0 + \alpha_1\, SIZE_t + \alpha_2\, BM_t + \alpha_3\, \Delta X_t + \alpha_4\, \Delta COMPXA_t + \varphi_0\, D_{EX} + \varphi_1\, D_{EX}{*}\Delta COMPXA_t + \varepsilon_t$$

Variable	Predicted Sign	Dependent Variable (ΔX_t) ΔROA	$\Delta CFOA$
SIZE	?	–0.01 (–3.59)	–0.01 (–3.28)
BM	?	–0.02 (–2.45)	–0.01 (–2.63)
ΔROA_{t-1}	?	–0.10 (–1.60)	
$\Delta CFOA_{t-1}$	?		–0.02 (–1.85)
$\Delta COMPXA_{t-1}$	–	–0.99 (–2.24)	–0.06 (–3.59)
D_{EX}	?	0.03 (1.07)	0.02 (4.67)
$D_{EX}{*}\Delta COMPXA_{t-1}$	+	0.53 (2.79)	0.16 (1.65)
Adjusted R^2		6.93%	2.15%
F		11.55	6.41
N		8,406	8,406

X is *ROA*, is net income before extraordinary items (data #18), or *CFOA*, cash flow from operations (data #308) and *COMPXA* is implied stock option expense (data #399), all scaled by beginning of year total assets (data #6). *SIZE* is the natural logarithm of year end market value of equity, *BM* is year end equity book to market ratio, and D_{EX} is an indicator variable equal to one if the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense, and zero otherwise. *t* denotes year from 1998 to 2004 and Δ denotes annual change. Both regressions include industry and year fixed effects. *t*-statistics in parentheses are based on standard errors clustered by firm and year, allowing for both cross-sectional and time-series dependence. Sample of 98 firms for which the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense and 1,747 other firms on First Call in the same industries.

Table 6
Two-stage Estimation of Relation Between Stock-based Compensation Expense and Contemporaneous Stock Returns

First Stage: $\Delta COMPXM_t = \beta_0 + \beta_1\ \Delta COMPXM_{t-1} + \beta_2\ NI_t + \beta_3\ \Delta NI_t + \beta_4\ \Delta LTG_t + \beta_5\ D_{EX} + \varepsilon_t$

Second Stage: $RET_t = \alpha_0 + \alpha_1\ NI_t + \alpha_2\ \Delta NI_t + \alpha_3\ \Delta LTG_t + \alpha_4\ \Delta COMPXM\hat{}_t + \varphi_0\ D_{EX} + \varphi_1\ D_{EX} {*} \Delta COMPXM\hat{}_t + \varepsilon_t$

		First Stage	Second Stage	
Variable	*COMPXM*	*ΔCOMPXM*	Predicted Sign	*RET*
$COMPXM_{t-1}$	0.44 (7.58)			
$\Delta COMPXM_{t-1}$		–0.05 (–6.57)		
NI	–0.01 (–10.79)	0.03 (18.54)	+	0.32 (0.60)
ΔNI	0.002 (3.44)	–0.02 (–26.16)	+	0.97 (2.28)
ΔLTG	–0.0001 (–0.43)	0.0001 (2.39)	+	0.01 (4.93)
*ΔCOMPXM^*			–	19.87 (1.20)
D_{EX}	0.003 (3.50)	0.001 (1.25)	?	0.01 [0.25]
D_{EX}*ΔCOMPXM^			+	13.05 [0.04]
Adjusted R^2	56.92%	11.72%		15.77%
F	617.84	62.97		83.80
N	8,406	8,406		8,406

$\Delta COMPXM_{t-1}$ is lagged change in stock-based compensation expense, and is used as an instrument for change in implied stock option expense, Δ*COMPXM*. *RET* is annual stock return, Δ*COMPXM* is Δ*COMPX* scaled by beginning of year market value of equity, *NI* is net income before extraordinary items scaled by beginning of year market value of equity, *LTG* is long-term growth forecast on the last IBES summary file for the fiscal year, Δ*COMPX^* is the fitted value from the first-stage estimation. All other variables are as defined. The levels specification of the first-stage estimation facilitates comparison with prior research. All regressions include industry and year fixed effects. Sample of 98 firms for which the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense and 1,747 other firms on First Call in the same industries. *t*-statistics are in parentheses. *p*-values are in square brackets and are computed from the empirical distribution of coefficients from 1,000 bootstrap iterations of the two-stage estimation with D_{EX} equal to one (zero) for 98 (1,747) firms selected randomly in each iteration.

Table 7
Likelihood of Exclusion of Stock-based Compensation Expense from Analyst Consensus Forecasts of 2006 Earnings including a Firm-Specific Measure of the Informativeness of Stock-based Compensation Expense

$$Pr(D_{EX} = 1) = F(\beta_0 + \beta_1\ COMPXA + \beta_2\ D_{SURP} + \beta_3\ D_{ILOSS} + \beta_4\ D_{ILOSS}{*}COMPXA + \beta_5\ \sigma(COMPXA) + \beta_6\ \sigma(AF) + \beta_7\ ANALYSTS + \beta_8\ INSTIT + \beta_9\ SIZE + \beta_{10}\ ROA + \beta_{11}\ CRC + \varepsilon)$$

$$\%EX = \beta_0 + \beta_1\ COMPXA + \beta_2\ D_{SURP} + \beta_3\ D_{ILOSS} + \beta_4\ D_{ILOSS}{*}COMPXA + \beta_5\ \sigma(COMPXA) + \beta_6\ \sigma(AF) + \beta_7\ ANALYSTS + \beta_8\ INSTIT + \beta_9\ SIZE + \beta_{10}\ ROA + \beta_{11}\ CRC + \varepsilon$$

Controls	Predicted Sign	Dependent Variable $Pr(D_{EX} = 1)$	*%EX*
D_{SURP}	+	0.45	0.28
		(2.74)	(2.59)
D_{ILOSS}	+	1.07	0.53
		(3.10)	(2.21)
COMPXA	+	8.21	6.67
		(3.35)	(3.26)
D_{ILOSS}*COMPXA*	?	–14.26	–5.85
		(–2.50)	(–1.86)
$\sigma(COMPX)$	+	2.86	5.45
		(1.92)	(3.61)
$\sigma(AF)$	–	–50.17	–6.70
		(–1.87)	(–1.20)
ANALYSTS	+	0.06	0.04
		(5.54)	(3.68)
INSTIT	?	0.23	0.24
		(0.77)	(1.14)
SIZE	?	0.06	–0.22
		(1.02)	(–4.13)
ROA	?	0.96	1.89
		(1.31)	(4.16)
CRC	?	–0.001	–0.001
		(–3.29)	(–3.76)
N		1,523	1,523
McFadden-R^2		26.11%	9.03%

D_{EX} is an indicator variable equal to one if the IBES consensus forecast of 2006 earnings excludes options expense and 0 otherwise. *%EX* is the percentage of First Call footnotes that indicate the analyst excluded stock-based compensation expense from the 2006 earnings forecast. *ROA* is NI_{IBES} for 2005 scaled by beginning total assets. *CRC* is the rank of absolute value of α_2 computed from firm-specific estimation of the equation

$$ROA_{t+1} = \alpha_0 + \alpha_1 ROA_t + \alpha_2 COMPXA_t + \varepsilon_t \quad (6)$$

for firms with at least five observations on dependent and explanatory variables. *F*(.) is the standard normal cumulative distribution function. All other variables are as defined in Table 1. The regression with D_{EX} (*%EX*) as the dependent variable is estimated using probit (tobit). Both regressions include industry fixed effects. *t*-statistics are in parentheses. Sample of 89 firms for which the consensus analyst forecast of 2006 earnings excludes stock-based compensation expense and 1,434 other firms on First Call in the same industries.