Limited Attention to Detail in Financial Markets

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Abstract

We show that financial analysts and market investors reduced valuations following a large drop in accounting earnings that did not reveal new information about firm fundamentals. FAS 123-R required firms to begin expensing option compensation in income statements, instead of disclosing costs only in footnotes. We exploit that FAS 123-R's compliance dates were staggered quasi-randomly based on firms' fiscal year-ends. Firms that expensed options experienced a significant reduction in earnings growth, but their underlying profitability was unchanged. These firms were more likely to miss analysts' earnings forecasts, relative to firms that did not yet expense options. Analysts also more often revised down their recommendations, resulting in significant stock price underperformance. Our results are consistent with the limited attention hypothesis: Analysts and investors overvalue firms when value-relevant information is less accessible.

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The amount of information relevant for economic analysis is growing dramatically. More than 2.5 billion gigabytes of data are created each day, equal to 1,000 times the human brain's memory capacity. Since 2000 the average corporate annual report (10-K) has increased by 25% to 42,000 words, and now almost matches the length of Fitzgerald's *Great Gatsby*.[1] In light of these developments it is important to understand whether economic agents who possess finite time and cognitive resources can efficiently process large amounts of information. This question is particularly relevant for the efficiency of financial markets, which aggregate information produced by market participants as they make or advise investment decisions.

Little is known about whether markets can effectively synthesize the immense amount of information available about companies. If limited attention is prevalent among market participants, then data that is value relevant but requires substantial effort to compile may be overlooked. One implication is that asset prices may depend not only on the content of information, but also the ease with which it can be cognitively processed (we call this "information visibility"). This paper studies how market participants react to changes in information visibility, and whether their reactions ultimately affect asset prices. If information visibility impedes agents from processing value-relevant information, technologies such as text scraping or machine learning might increase market efficiency.

An ideal experiment to identify the effects of information visibility would alter the presentation of financial information without changing its content. This paper exploits an accounting rule change that approximates this ideal setting. FAS 123-R was adopted in 2004 and required firms for the first time to expense the cost of stock option grants in their income statements. This caused a highly noticeable decrease in earnings growth among firms that relied on stock options to pay their employees. Crucially,

[1] See IBM's 2013 annual report; "The 109,894-Word Annual Report" published on June 1, 2015 by *The Wall Street Journal*; and "What Is the Memory Capacity of the Human Brain?" published on May 1, 2010 by *Scientific American*.

the rule change did *not* lead to disclosure of new information, because prior to FAS 123-R firms were required to report all information related to option costs in footnotes to their financial statements. The regulation also did not directly impact fundamental values, as it only mandated firms to formally recognize the cost of options they had already been granting for years.

Hirshleifer and Teoh (2003) use FAS 123-R as a motivating example of how information presentation can affect asset prices when investors have limited processing ability.[2] They develop a limited-attention model in which information is absorbed more effectively when it is presented in a salient, easily processable format. Footnote disclosures in particular require greater cognitive processing, causing investors with limited attention to overvalue firms when their option compensation costs are reported only in footnotes. The model predicts stronger effects for firms that rely more on option compensation. It also shows that mandating full expensing of options can lead to undervaluation if investors misinterpret the resulting earnings reduction.

We empirically analyze how financial markets reacted to the increased visibility of option expenses and the resulting slowdown in earnings growth after FAS 123-R. Our tests focus on financial analysts, whose role is to make stock recommendations by synthesizing large amounts of information from financial statements, company notices, and interviews with management (Womack (1996)). Before FAS 123-R, analysts may have lacked the time or attention to detail to accurately incorporate option compensation costs from financial statement footnotes into their forecasts and valuations (or even to estimate these costs).[3] After FAS 123-R took effect, analysts may have underestimated option expenses or mistakenly continued to overlook them, in which case their forecasts would not fully account for the

[2] Prior work in psychology shows that individuals exhibit limited attention and constraints on processing information (e.g., Slovic (1972), Kahneman (1973), Payne, Bettman, and Johnson (1993)). There is also a literature in economics on rational inattention, showing that agents may rationally ignore parts of the environment when it is costly to acquire information (e.g., Sims (2003)).

[3] Practitioners frequently criticized analysts for failing to accurately assess option expenses (Mauboussin (2006)).

impact on earnings.[4] We therefore examine whether firms' likelihood of missing earnings forecasts increased after FAS 123-R, and how analysts revised their stock recommendations in response. We also study whether asset prices were affected by these changes, to evaluate the real effects of analysts' attention limitations. This is important to understand, as there is debate about whether manifestations of imperfect rationality affect prices or are eliminated by arbitrageurs.

Empirically testing these predictions is challenging. First, macroeconomic shocks or concurrent regulatory events may have simultaneously affected firm earnings as well as market participants' reactions. Second, some firms may have endogenously chosen to accentuate positive information when they started to expense options, to strategically influence analysts and markets.

To overcome these challenges, our identification strategy uses a staggered difference-in-differences model that exploits quasi-random variation in FAS 123-R's compliance dates. Each firm had to comply in the first *fiscal* quarter starting after June 15, 2005. For example, June fiscal year-end firms first expensed options in the quarter starting in July 2005, while May fiscal year-end firms could delay expensing until the quarter starting in June 2006. We observe each firm over the four fiscal quarters before its FAS 123-R compliance date through the four fiscal quarters afterward (with option expenses first reported in quarter +1). Our specification compares each firm's outcomes following FAS 123-R compliance to those of other firms that did not yet have to expense options in contemporaneous income statements.[5] Firms' fiscal years were set years prior to FAS 123-R's adoption, so compliance dates should not coincide with changes to firm fundamentals. We exclude firms that voluntarily expensed option costs prior to FAS 123-R and a small number of firms that changed their fiscal year in 2005 or 2006.

[4] An alternative possibility is that some analysts overestimated option costs while others underestimated them. This should cause overall forecast dispersion to rise, but may not imply that analysts set earnings forecasts too high on average. We find little evidence of an increase in forecast dispersion.

[5] For example, firms with June to August fiscal year-ends began to expense options in earnings reported in fall 2005. We compare their outcomes to those of firms with other fiscal year-ends that did not expense options at this time.

We further exploit cross-sectional variation in FAS 123-R's expected impact on accounting expenses. Earnings should have dropped most among firms that paid employees with large amounts of options *prior to* FAS 123-R, and less among firms that granted mostly cash or restricted stock. This is because the regulation equalized the accounting cost of stock options and other types of compensation. Most high-option firms operate in the information technology or pharmaceuticals sectors. High- and low-option firms exhibited parallel trends in earnings prior to FAS 123-R. Because our strategy combines time-series and cross-sectional variation, an omitted variable can only bias results if it disproportionally affected high-option firms *and* its impact was staggered with firms' fiscal year-ends. This is very high bar for an omitted variable.

Our setting also allows us to incorporate a wide range of fixed effects. Our strictest specification compares firms in the same industry, with the same fiscal-year end, in the same quarter of the fiscal year and three-month period in calendar time. Additionally, we perform placebo tests among firms that voluntarily adopted option expensing prior to FAS 123-R to ensure that our results are not driven by confounding factors correlated with firms' fiscal year ends.

The analysis first shows that option expensing had a significant impact on firms' earnings growth. High-option firms' earnings per shares (EPS) were $0.045 lower than low-option firms' EPS after FAS 123-R compliance (equal to 10% of the interquartile range). We estimate similar effects for operating and net income. We document lower GAAP earnings, which firms report in financial statements, and lower *pro forma* earnings, which firms emphasize in reports to analysts and investors. At the same time, high-option firms reported no change in top-line revenues relative to low-option firms. Revenues were unaffected by option expensing but would have decreased if FAS 123-R coincided with shocks to fundamentals.

Next, we show that high-option firms' likelihood of missing their consensus EPS forecast rose by 5.1 percentage points after FAS 123-R, relative to low-option firms that began to expense options at the

same time. This is a 16% increase over the unconditional probability of missing a forecast prior to FAS 123-R. Moreover, the rise in missed earnings occurred mostly in the first fiscal quarter that firms expensed options, and largely dissipated by the third fiscal quarter. This suggests that analysts corrected their estimates of option compensation costs within two fiscal quarters. We further find that dispersion of analyst forecasts rose after FAS 123-R, but the increase was similar across high- and low-option firms.

We find that firms were more likely to miss forecasts when their analysts had covered the firm for a shorter period of time. In contrast, the frequency of missed forecasts did not rise among firms whose analysts had significant experience covering the firm. This suggests that high familiarity with individual firms' financial statements may have reduced the cognitive resources needed to accurately estimate option expenses.

After observing firms miss their forecasts, analysts may have subsequently adjusted valuations to correctly incorporate options expenses (thus improving valuations), or they may have misinterpreted the earnings decline as a sign of lower profitability (undervaluation, as in Hirshleifer and Teoh (2003)). We find that analysts downgraded stock recommendations of high-option firms relative to low-option firms after FAS 123-R. Four percent fewer analysts issued buy recommendations on these firms' stocks, and 1.4 percentage-point more analysts issued sell ratings. The latter is a significant increase as only 6% of analysts issued sell recommendations prior to FAS 123-R. The reduction in recommendations was concentrated in the first two fiscal quarters following FAS 123-R compliance, precisely when firms' likelihood of missing earnings forecasts rose. This suggests that analysts initially misinterpreted missed forecasts, but quickly corrected their valuations.

We complete our analysis by examining how asset prices responded to the information produced by analysts. If limited attention led investors to misvalue option expenses, then asset prices should have declined when firms missed analyst forecasts or experienced recommendation downgrades. On the other

hand, if investors correctly incorporated all available information about firms' option expenses prior to FAS 123-R, they would have inferred that analysts' valuations were inaccurate and stock prices should have remained unchanged. The adoption of FAS 123-R thus provides a unique setting to directly test market participants' ability to accurately process information. We find that high-option firms whose earnings fell only due to FAS 123-R experienced a 2.2% decline in stock prices around missed forecasts. This represents a $45m drop in the average market capitalization of these firms.

We rule out alternative channels that may have triggered negative reactions by analysts and markets. Reductions in dividends could cause analysts to downgrade their recommendations, but we find that high-option firms did not change dividend policy following FAS 123-R. We also find no evidence that firms were more likely to violate debt covenants following the decrease in earnings.

Our findings are consistent with two non-mutually exclusive explanations. One is that analysts overvalued firms prior to FAS 123-R by neglecting value-relevant information on option costs that was disclosed only in financial statement footnotes. Once firms began to expense options, analysts quickly realized that they had set earnings targets and valuations too high, leading to downward adjustments in stock recommendations. Alternatively, analysts may have misinterpreted firms' lower earnings after FAS 123-R as a reduction in fundamental profitability. This would lead them to overreact by lowering stock recommendations too much. Both interpretations are consistent with Hirshleifer and Teoh (2003), who show that option expensing may correct prior overvaluations, but also may lead to subsequent undervaluation. Independent of the interpretation, our results suggest that limited attention affected market participants' ability to correctly gauge option expenses.

A broad literature documents how limited attention among investors affects stock prices and trading activity (see Daniel, Hirshleifer, and Teoh (2002) for a review). Prior works shows that stock price reactions around earnings announcements are weaker when investors are distracted (DellaVigna and

Pollet (2009), Hirshleifer, Lim, and Teoh (2009)), and investor reactions are generally stronger among attention-grabbing stocks (Barber and Odean (2008), Da, Engelberg, and Gao (2011), Engelberg, Sasseville, and Williams (2012), Tetlock (2011)) or those that have recently experienced price run-ups (Aboody, Lehavy, and Trueman (2010)). Limited investor attention also leads to return predictability across economically linked stocks (Peng and Xiong (2006), Cohen and Frazzini (2008), Cohen and Lou (2012)). Corwin and Coughenour (2008) show that limited attention can have real effects by reducing liquidity in stock trading. An empirical challenge this literature faces is cleanly identifying shocks to attention. For example, media coverage focuses attention on certain stocks, but also may be correlated with changes to value-relevant firm characteristics. Our paper contributes by analyzing a change in information visibility that is likely uncorrelated with other changes to the firm.

Our findings also contribute to the literature on the determinants of analysts' forecasts and recommendations. Prior work finds that analysts produce biased research on firms that have business relationships with the analysts' employers (e.g., Lin and McNichols (1998), Michaely and Womack (1999), Barber, Lehavy, and Trueman (2007)). Conrad et al. (2006) show that analysts adjust recommendations following information shocks, but their measure of shocks (large price changes) might be correlated with changes in firm conditions. Our paper complements this literature by showing that earnings sometimes matter more for analysts' forecasts and recommendations than information contained in footnotes. A large body of work shows that stock returns react to analysts' recommendations (Womack (1996), Barber et al. (2001)), and we extend this finding to recommendation downgrades based on accounting changes rather than firm fundamentals.

Finally, our findings are related to the literature on disclosure versus recognition in accounting (e.g., Amir (1993), Aboody (1996) or Michels (2017)). They are also related to Espahbodia et al. (2002), who find that markets value the recognition of option costs over its disclosure, by studying how markets

reacted when FASB proposed in 1993 to expense options (which was rescinded later). An advantage of our setting is that it allows us to account for confounding shocks that may affect all firms exposed to a new regulation at the same time.

1. Background on FAS 123-R

Prior to FAS 123-R, accounting standards in the United States required firms to expense only the intrinsic value of stock option compensation—the stock price on the option grant date minus the options strike price. Almost all firms avoided such accounting expenses by granting at-the-money options. As a result, most firms did not report stock option compensation as an expense in their income statements. In 1993, the Financial Accounting Standards Board (FASB) issued a proposal requiring firms to expense the grant-date fair value of options. This proposal drew substantial criticism from accountants, shareholder groups, and firms that relied heavily on stock options to compensate employees. The U.S. Senate also weighed in, passing a resolution urging FASB to abandon the proposal. In response, FASB adopted watered-down rules (FAS 123) that only required firms to disclose option expenses in their financial statement footnotes.

The perceived role of stock options in the corporate scandals of the early 2000s generated new momentum for changes to option expensing, and FASB issued a new proposal in mid-2004. Firms in Silicon Valley lobbied fiercely against option expensing, and executives of these firms argued at a FASB hearing in June 2004 that the proposal would lead firms to stop issuing options.[7] Despite such protests, option expensing was adopted on December 15, 2004 as accounting rule FAS 123-R (now ASC 718).

[7] See "Stock Options Debate Comes to Silicon Valley", The New York Times, June 25, 2004. One example of a common counter-argument to the proposal is a statement by Palm co-founder Donna Dubinsky at the hearing: *"The whole debate is based on a false premise ... [the cost of stock options is] a fictitious expense on the income statement, one that is not related to cash in any way."*

The regulation required firms to expense the fair value of all new options granted to employees after the compliance date. It also required the expensing of previously granted, unvested options. The compliance date was staggered across firms and was each firm's first full fiscal year that started after June 15, 2005. The option expensing led to an increase in firms' operating expenses, and a reduction in earnings (which we will document). Importantly for our setting, FAS 123-R did not change the amount of information available to analysts and other investors. Since 1995, FAS 123 required firms to provide in their financial statements all the information that analysts needed to calculate option expenses. FAS 123-R therefore only required firms to recognize expenses in their income statements, but not to disclose new information.[8] Prior work finds that some firms responded to FAS 123-R by granting more restricted stock and fewer stock options (Hayes, Lemmon, and Qiu (2012)), but this also increased expenses as accounting rules required firms to claim charges for the fair value of restricted stock.

The tax treatment of options was unaffected by FAS 123-R. According to U.S. tax rules, the granting of options did not constitute a tax event for firms, neither before nor after FAS 123-R. Tax treatment after the grant date depended on whether options were considered non-qualified or qualified. For non-qualified options, by far the most frequently used type, the difference between the stock and exercise price was tax deductible by firms when employees exercised their options. Qualified options did not have tax effects if stocks were held for at least one year after the exercise decision. The tax treatment after the grant date was also unaffected by FAS 123-R.

Firms were unable to anticipate their precise FAS 123-R compliance schedule. The reason is that the compliance date was delayed just two months before the regulation took effect. FAS 123-R originally

[8] Some firms may have changed the inputs used to value options after FAS 123-R took effect to underestimate the costs of options (see Choudhary (2011)). However, this would rather bias against finding any effects of FAS 123-R on earnings and analyst behavior. Moreover, firms already used some discretion prior to FAS 123-R to strategically chose inputs that reduce the cost of options disclosed in footnotes (Aboody, Barth, and Kasznik (2006)).

required all firms to begin expensing options on June 15, 2005, independent of their fiscal years. However, on April 14, 2005 the SEC changed the effective date to financial statements issued in the first fiscal year starting after June 15, 2005. The reason for the delay was that accountants worried about the difficulty of changing accounting standards in the middle of a fiscal year (McConnell el al. (2005)). Thus the first quarterly reports to be affected by the rule change were for fiscal years starting in June 2005, and firms with fiscal years staring January through May were able to avoid expensing options until 2006.

This compliance schedule was not uncontroversial. Investment professionals worried that lack of earnings comparability caused by staggered compliance dates would lead to analyst errors and cause firms to miss earnings forecasts.[9] Choudhary, Rajgopal, and Venkatachalam (2009) and Balsam, Reitenga, and Yin (2008) provide additional information about the regulatory features of FAS 123-R.

2. Data and Identification Strategy

2.1 Sample

Our sampling procedure starts with all 5,570 U.S. firms that are in the intersection of the Compustat and IBES databases when FAS 123-R took effect. We exclude 417 firms that voluntarily expensed the fair value of stock options prior to FAS 123-R ("early adopters"), as these firms' accounting expenses should not have changed when the regulation took effect. We further omit 1,189 financial and utilities firms and 49 firms that changed their fiscal year in 2005 or 2006, perhaps to delay option expensing. The final sample contains 3,915 firms. We observe each firm over an eight-fiscal-quarter period, covering the four fiscal quarters before its FAS 123-R compliance date through the four fiscal

[9] For example, CFO Magazine wrote that *"The staggered start for options expensing is upsetting many investment professionals because there is no consensus as to whether, or when, analysts should begin including the expense figure in earnings projections, which are widely used by investors. This variable could play a major role in whether a company meets, beats, or misses consensus earnings estimates, which in turn affect its stocks performance."* See "Staggered Start for Option Expensing", CFO Magazine, June 1, 2005.

quarters afterward. Hence, each firm's fiscal quarter is observed twice. We label the analysis window as [-4,+4] quarters, with option expenses recorded starting in quarter +1.

2.2 Empirical Methodology and Identification

Our identification strategy uses a staggered difference-in-differences model. We classify treatment and control firms based on the amount of options they granted to employees *prior to* FAS 123-R. The regulation should have led to a significantly larger increase in accounting expenses among high-option firms, which previously did not have to recognize their option compensation costs in income statements. This comparison allows us to account for potential confounding effects of FAS 123-R that uniformly affected all firms. Our strategy also accounts for shocks that affected all high-option firms at the same time, by exploiting the fact that FAS 123-R compliance was staggered quasi-randomly across time based on firms' fiscal year-end months. Similar staggered difference-in-differences models have been used by Jayaratne and Strahan (1996), among others.

Our model compares firms with high versus low reliance on option compensation prior to FAS 123-R, over the four fiscal quarters before versus after the regulation took effect. All variables are measured at the firm-fiscal quarter level. For each firm *f* and fiscal quarter *q*, the empirical model is:

$$\textit{Firm Outcome}_{f,q} = \pi_1 \textit{ Post FAS 123-R}_{f,q} \times \textit{High-Option Firm}_f + \pi_2 \textit{ Post FAS 123-R}_{f,q} \quad (1)$$

$$+ \pi_3 \textit{ High-Option Firm}_f + \delta X_{f,q-1} + \mu_f + \Theta_q + u_{f,q}$$

The dependent variable $\textit{Firm Outcome}_{f,q}$ represents measures of earnings, missed earnings forecasts, and stock recommendations, depending on the hypothesis being tested (see Section 2.3 for detailed definitions). $\textit{Post FAS 123-R}_{f,q}$ equals 1 for fiscal-quarter observations after FAS 123-R took effect, and 0 otherwise. This indicator varies across our sample in calendar time because each firm had to comply

with FAS 123-R in its first fiscal year starting after June 15, 2005. Some regressions replace *Post FAS 123-R*$_{f,q}$ with indicator variables for each individual fiscal quarter following compliance.

High-Option Firm$_f$ equals 1 in all quarters for firms that relied heavily on option compensation *prior to* FAS 123-R, and 0 for firms that did not. We exploit that FAS 123-R also required the expensing of previously granted, unvested options, in addition to options granted after the compliance date. This allows us to condition treatment on option pay prior to FAS 123-R, which is less endogenous than option pay after FAS 123-R took effect. To construct this variable, we first calculate each firm's *Options-to-Shares Ratio* as the total number of options granted during a fiscal year, divided by diluted common shares outstanding at the end of the fiscal year. I.A. Table 1 shows that in the two fiscal years prior to FAS 123-R, *Options-to-Shares Ratio* was twice as high for information technology and healthcare/pharmaceuticals firms as for firms in other sectors. We therefore classify all firms in these two sectors as high-option firms. We also set *High-Option Firm*$_f$ equal to 1 for firms in other industries with an *Options-to-Shares Ratio* above the 75th percentile. The vector $X_{f,q-1}$ contains firm-level control variables that are commonly used in the literature on financial analysts.

We saturate our model with a wide range of fixed effects that address different concerns with our analysis. The baseline model contains industry fixed effects and fixed effects for each firm's fiscal year-end month. Industry fixed effects account for economic shocks that affect firms within an industry, while the fiscal-year-end fixed effects address the concern that firms with certain fiscal year-endings might differ systematically (e.g., December fiscal-year-end firms might have lower earnings). Regressions with both sets of fixed effects are identified from within-fiscal-year-end variation within industries. Our tests also include an expanded set of fixed effects for each fiscal quarter and for each three-month calendar period in which the fiscal quarter ends. Fiscal-quarter fixed effects account for any seasonality in business activity across a firm's fiscal year. In particular, they address the concern that earnings might generally be lowest

in first quarter of the fiscal year, which coincides with the quarter when FAS 123-R took effect. We can estimate regressions identified from within-fiscal-quarter variation as our sample contains each firm's fiscal quarter twice. The same holds for calendar-quarter fixed effects, which account for shocks that affect all firms during a calendar quarter (e.g., earnings may generally be lower in the first calendar quarter). These fixed effects are useful to ensure results are unaffected by shocks that coincide with firms first FAS 123-R compliance. For example, the first quarter of 2006 was a period during which many firms, particularly those with December fiscal year-ends, started to expense options. Finally, we also estimate specifications using firm fixed effects. Standard errors in all regressions are clustered at the firm level.

Figure 1 depicts FAS 123-R's staggered compliance schedule and the predicted effects on earnings, missed forecasts, and analyst recommendations. The figure shows, for example, that firms with a June fiscal year-end had to begin expensing options in the fiscal quarter covering July through September 2005. The sample contains these firms' fiscal quarters ending between September 2004 and June 2006. To the contrary, firms with a May fiscal year-end began option expensing in the fiscal quarter covering June through August 2006, and the sample contains their fiscal quarters ending between August 2005 and May 2007. The figure shows that in each month between June 2005 and May 2006, some firms had begun to expense options while others had not yet or already complied. This staggered compliance structure allows us to account for shocks that affect the earnings of all high-option firms in a particular quarter.

A key identifying assumption for Eq. (1) is the parallel-trends condition. This condition requires that our outcome variables follow the same trend across high- and low-option firms in the absence of FAS 123-R. In other words, our strategy assumes that the evolution of the outcomes of low-option (control) firms after FAS 123-R represents the counterfactual for high-option (treatment) firms. This condition cannot be tested directly, but we provide evidence that high- and low-option firms' earnings were not diverging before FAS 123-R. We further verify that revenues of these firms moved in parallel in the

quarters before and after FAS 123-R compliance. This indicates that the accounting change did not affect firms' fundamental profitability, and earnings fell only because firms began to expense options.

Our approach is equivalent to the reduced form of the 2SLS model in Jochem, Ladika, and Sautner (2018) and Ladika and Sautner (2018). These papers use fiscal year-ends to instrument for the decision by some firms to accelerate option vesting periods in anticipation of FAS 123-R. In our setting, an instrument is not necessary because all firms had to expense options after FAS 123-R took effect.[10]

2.3 Empirical Measures

We examine the impact of option expensing on three different measures of accounting earnings that are commonly used in both discounted cash flow and relative valuation analyses. *EPS* is diluted earnings per share as reported by the firm. This measure equals quarterly net income divided by outstanding common shares and unexercised stock options. *EBIT/Share* measures operating income before interest payments and taxes, and *Net Income/Share* measures earnings after deducting all expenses except extraordinary items. Both are scaled by shares outstanding at the end of the previous fiscal year, because financial analysts typically use per-share earnings to compare firms of different sizes. For *EBIT/Share* and *Net Income/Share* we measure shares outstanding at the end of the previous fiscal year to ensure that the variables are not affected by quarterly changes in option exercises. Each of these measures should be directly impacted by option expenses. This is because firms typically record employee compensation under Selling, General, and Administration (SG&A) expenses, which are deducted from revenues prior to calculating operating and net income.

[10] Our setting thus resembles a 2SLS model with an instrument that generates perfect compliance. Notably, firms could not circumvent accounting expenses by adjusting the structure of compensation following FAS 123-R. This is because other forms of compensation, including restricted stock grants, already had and continued to be expensed in the income statement.

We measure each variable using earnings based on GAAP accounting rules that firms are required to report in their 10-Ks, and earnings that firms emphasize in their reports to analysts and investors. The latter earnings are reported in IBES and they are frequently referred to as *pro forma* earnings. Firms have broad leeway when defining these earning as long as they are reported alongside GAAP earnings. *Pro forma* earnings in IBES exclude option expenses if the majority of analysts also did so in their forecasts (earnings forecasts by analysts are popularly referred to as *Street* earnings). If firms and analysts coordinate to ignore option expenses after FAS 123-R, then *pro forma* earnings might not change.[11] FAS 123-R in turn may not affect the behavior of analysts and investors if they focus on *pro forma* earnings that exclude option expenses.

To examine whether firms were more likely to miss analysts' forecasts after FAS 123-R, we create the variable *Missed Forecast.* This variable equals 1 when a firm's reported quarterly earnings per share fall below the average ("consensus") earnings estimate of all analysts following the firm, and 0 when earnings meet or beat the consensus estimate. We focus on analysts' EPS forecasts because this is the most commonly used valuation metric, yet we obtain similar results for other earnings measures. We also measure *Forecast Dispersion* as the scaled standard deviation of individual analysts' EPS forecasts in a fiscal quarter.

We use three variables for analyst stock recommendations. *Analyst Recommendation* is the average recommendation across all analysts covering the firm. IBES categorizes individual recommendations on a scale of 1 ("strong buy") to 5 ("sell"), so higher values reflect worse stock recommendations. *Pct. Buy Recommendation* is the percentage of analysts issuing a "strong buy" or "buy"

[11] For large firms, this is unlikely. Barth, Gow, and Taylor (2012) find that 73% of analysts included option costs in some form in their forecasts after FAS 123-R, even though 19% of firms excluded them from *pro forma* earnings. To show this, Barth, Gow, and Taylor (2012) use data compiled by Bear Stearns to identify firms in the S&P 500 and NASDAQ 100 that included or excluded option expenses.

recommendation on a firm's stock, and *Pct. Sell Recommendation* is the percentage of analysts issuing a "sell" recommendation. For both the earnings forecast and stock recommendation variables, we use the consensus measure immediately preceding each firm's quarterly earnings announcement. Tests using these variables exclude firms covered by fewer than three analysts.

Control variables include *Log Assets* to account for a relationship between size and earnings, and *Market-to-Book Ratio* to control for differences in growth opportunities. We also control for *Leverage* because firms with higher debt capacity might be more profitable, and for *Investment/Sales* because R&D spending and capital depreciation reduce earnings. Some tests control for the number of analysts covering the firm using *Log Analyst Coverage*.

2.4 Summary Statistics

Table 1, Panel A shows summary statistics. Statistics are reported for the four quarters before through four quarters after firms' (staggered) FAS 123-R compliance dates. The median firm reported GAAP earnings per share (*EPS*) of $0.09 and operating earnings (*EBIT/Share*) of $0.17 per share. The table also shows that 38% of firms miss their EPS forecast each quarter, and about half of analysts issue "strong buy" or "buy" recommendations while very few (6%) recommend selling a stock. The median firm is covered by five analysts.

Our identification strategy depends crucially on variation in the timing of FAS 123-R compliance. Table 1, Panel B shows that most firms have a fiscal year that overlaps with the calendar year. However, the sample also contains 31% of firms with fiscal years that end in other months.

I.A. Table 2 presents pairwise correlations. The table shows a very high correlation between GAAP and *pro forma* earnings. The correlations between the analyst variables and measures of earnings are low, as are the correlations between these variables and other firm characteristics.

3. Effect of FAS 123-R on Corporate Earnings

3.1 Graphical Evidence: Effects of FAS 123-R and Parallel Trends

Figure 2 shows how firms' earnings (*EBIT/Share* and *EPS*) evolved over the four fiscal quarters prior to FAS 123-R compliance through the four fiscal quarters afterward, separately for the average high- and low-option firm. The plots are normalized to 1 in the fiscal quarter prior to FAS 123-R compliance. The figures show a sharp drop in high-option firms' earnings precisely when they had to begin recognizing option expenses in their income statements. The bottom panel shows that *EPS* fell by 4% for high-option firms from the quarter before FAS 123-R compliance to the quarter afterward, while low-option firms' EPS rose slightly. High-option firm's earnings remain lower in the following quarters.

Figure 2 also provides support for the parallel-trends assumption: high- and low-option firms' earnings followed similar trends prior to FAS 123-R, indicating that corporate earnings fell due to the accounting change rather than because of unobserved heterogeneity between these firms.

3.2 Difference-in-Differences Analysis

Table 2 formally tests the effect of FAS 123-R's option expensing requirement on corporate earnings. Panel A presents results for the GAAP version of our three earnings measures. The interaction term *Post FAS 123-R x High-Option Firm* in the table compares earnings before and after the staggered FAS 123-R compliance dates, for high- versus low-option firms. The coefficient estimates across all columns show that earnings of high-option firms, who were most affected by FAS 123-R, were much lower than those of low-option firms when firms started to expense options.[12] For example, Column (1) shows that high-option firms' *EPS* were 0.045 lower than those of low-option firms in the four fiscal quarters

[12] As displayed in Figure 2, earnings of both sets of firms increased after FAS 123-R, but the earnings growth of high-option firms was much lower than that of low-option firms.

after FAS 123-R took effect. This difference is more than 10% of the variable's interquartile range of 0.39 (see Table 1). Column (1) contains industry fixed effects and fixed effects for each firm's fiscal year-end month, to account for shocks that may affect firms within an industry and to address the concern that firms with certain fiscal year-ends might differ systematically. We obtain identification in this regression from within-fiscal-year-end variation within an industry, which is possible as our sample includes each firm twice. Columns (2) and (3) shows that high-option firms also reported relatively lower operating earnings and net income following compliance.

The panel further indicates that the relative decrease in *EPS* is robust to inclusion of firm fixed effects (Column (4)), as well as fiscal- and calendar-quarter fixed effects (Column (5)). The fiscal-quarter fixed effects ensure that results are unaffected by seasonality in business activity across a firm's fiscal year. They account for the possibility that quarterly earnings are generally low in a firm's first fiscal quarter, which is also the quarter when FAS 123-R took effect. The calendar-quarter fixed effects account for shocks that may affect all firms during a calendar quarter.

Table 2, Panel B repeats the analysis using the *pro forma* earnings that many firms emphasize in communications with market participants. If many firms omitted option expenses for these earnings, then FAS 123-R may not have had a significant impact on the figures that analysts forecast. However, the coefficients on *Post FAS 123-R x High-Option Firm* indicate that *pro forma* earnings also fell sharply after FAS 123-R took effect, with magnitudes similar to those for GAAP earnings.

Coefficients on the control variables indicate that larger firms reported higher earnings, as did more highly levered firms. The negative coefficients on *Market-to-Book Ratio* imply that high-growth firms are less profitable overall, perhaps because they are in a stage of their corporate life cycle in which their business model is not yet mature (the effect turns insignificant when firm fixed effects are included).

Investment/Sales is negatively correlated with earnings, indicating that firms that spend more on investment report lower earnings.

Table 3 uses the same difference-in-differences framework to examine revenues around the time when FAS 123-R took effect. The regulation's mandate to expense options had no direct impact on top-line revenues, which are calculated before deducting any accounting expenses. However, if FAS 123-R had a confounding effect on high-option firms' fundamentals or coincided with other shocks to profitability, then both sales and earnings would decrease. Thus, Table 3 provides a falsification test of the accounting rule's impact on fundamental values.

The table shows that coefficients on *Post FAS 123-R x High-Option Firm* are generally small in magnitude and statistically insignificant in all specifications, indicating that high- and low-option firms' revenues followed the same trend around FAS 123-R. This confirms that the drop in high-option firms' earnings reflected an accounting effect rather than a genuine reduction in profitability.

4. Effects of FAS 123-R on Missed Earnings Forecasts, Recommendations and Firm Value

4.1 Effects for Missed Earnings Forecasts

Analysts with limited attention may have omitted or miscalculated the cost of options prior to FAS 123-R, when firms disclosed expenses only in footnotes. One possible implication is that analysts' consensus forecasts overestimated earnings shortly after FAS 123-R took effect, leading high-option firms to experience a rise in missed earnings forecasts. Alternatively, uncertainty about the size of option expenses may have led to an increase in the variance of analysts' forecasts, without affecting the consensus forecast level.

Table 4 tests how option expensing affected the frequency of a missed EPS forecast and the dispersion of analyst forecasts. In Columns (1) to (3), *Post FAS 123-R x High-Option Firm* compares the

frequency of missed forecasts before versus after each firm's staggered FAS 123-R compliance date, for high- versus low-option firms. A positive coefficient would indicate that high-option firms' earnings were relatively more likely to fall short of analysts' expectations after option expenses were deducted. This would indicate that analysts overestimated these firms' earnings by omitting or underestimating option costs. In Column (4), *Post FAS 123-R x High-Option Firm* compares forecast dispersion before versus after each firm's staggered FAS 123-R compliance date, for high- versus low-option firms. A positive coefficient would indicate that individual analysts' forecasts for high-option firms became more spread out after FAS 123-R, consistent with an increase in uncertainty about expensing options.

The interaction term coefficients in Columns (1) through (3) are all positive and highly significant. Column (1), for example, indicates that after FAS 123-R took effect, high-option firms' likelihood of missing an EPS forecast rose by 5.1 percentage points relative to that of low-option firms. This is a 16% (=5.1/31.5) increase in these firms' frequency of missing a forecast, relative to the four quarter before FAS 123-R. Results are robust to the inclusion of industry and fiscal-quarter fixed effects (Column (1)), firm fixed effects (Column (2)), or fiscal- and calendar-quarter fixed effects (Column (3)).

Column (4) shows that analyst forecast dispersion rose overall after FAS 123-R, but the increase was not significantly larger for high-option firms. This indicates that most analysts omitted or underestimated option expenses for these firms, and thus forecast earnings that were too high on average.

Table 5 analyzes the dynamics of analysts' forecast errors. If limited attention led analysts to overestimated earnings after FAS 123-R, then they should have realized their mistakes over time. Firms would be most likely to miss an earnings forecast in the first fiscal quarter after complying with FAS 123-R, while in subsequent quarters analysts may have adjusted earnings estimates downward after observing the missed forecasts. To investigate such dynamic learning, we re-estimate the specifications from Table

4 replacing *Post FAS 123-R_{fq}* with indicator variables for each individual fiscal quarter following FAS 123-R compliance. The coefficients on these indicators are comparable to the average likelihood of missing an earnings forecast over the four fiscal quarters prior to compliance.

Table 5 documents that high-option firms' likelihood of missing a forecast is much higher in the first fiscal quarter after compliance with FAS 123-R. Column (1) shows that these firms were 11% more likely to miss an EPS forecast in the first fiscal quarter, relative to low-option firms that complied with FAS 123-R in the same quarter. The results also suggest that many analysts subsequently adjusted their estimates of option expenses: High-option firms' frequency of missing a forecast was just 4% higher (and marginally insignificant) in the second quarter, and the same as low-option firms in the third quarter. Forecast errors then rose slightly in the fourth quarter. One possibility is that analysts project earnings for some firms only at the end of the fiscal year, and estimated their option expenses for the first time in this quarter.

I.A. Table 3 further examines analyst learning over time. The table compares the frequency of missed forecast among firms that complied with FAS 123-R between June and December 2005, versus those that complied between January and May 2006. Because firms expensed options in the first fiscal quarter after compliance, Column (1) examines all quarterly earnings issued between September 2005 and March 2006. High-option firms that expensed options in this period were more likely to experience missed forecasts than low-option firms that also complied with FAS 123-R, as well as high-option firms that had not yet complied. In contrast, Column (2) shows that high-option firms that began expensing options between April and September 2006 (due to a later FAS 123-R compliance date) did not experience an increase in missed forecasts. This is consistent with analysts learning from forecast errors made earlier in calendar time and adjusting estimates of option expenses throughout 2006.

4.2 Effects on Stock Recommendations

We next examine whether missed earnings forecasts after FAS 123-R led analysts to revise down their recommendations on high-option firms' stocks. Theories of limited attention predict that analysts overvalued firms prior to FAS 123-R by neglecting to fully incorporate the option costs reported in footnotes (Hirshleifer and Teoh (2003)). Once these costs were expensed, analysts may have realized that firms' profitability was lower than previously modelled, leading to a persistent reduction in stock recommendations. Alternatively, analysts may have misinterpreted the reduction in accounting earnings as a signal of lower profitability. This would also lead to recommendation downgrades shortly after FAS 123-R, possibly followed by upward revisions after analysts realized their mistakes.

We test these hypotheses using two specifications. First, Table 6 examines whether a firm that missed its consensus EPS forecast in a fiscal quarter around the compliance with FAS 123-R experienced a downgrade in the following fiscal quarter. This specification tests the general relationship between missing a forecast and analyst recommendations in our sample. Columns (1) through (7) examine the effect of missed forecasts during the eight fiscal quarters [-4,+4] around each firm's compliance date, while Columns (8) and (9) examine the effect only during the four fiscal quarters [+1,+4] following compliance. Estimates from the latter two columns test whether missed forecasts had a differential effect on stock recommendations following the start of option expensing. We measure downgrades using *Analyst Recommendation* (higher values represent lower recommendations), *Pct. Buy Recommendations,* and *Pct. Sell Recommendations.*

The regressions provide strong evidence that missed forecasts in the fiscal quarters around FAS 123-R compliance triggered analysts to subsequently downgrade firms' stocks. Column (1) shows that *Analyst Recommendation* increased by 0.083 in the quarter after a firm missed an earnings forecast, equal to almost 10% of the variable's interquartile range (see Table 1). This is a substantial change given that

analysts typically resist downgrading recommendations or issuing "sell" ratings (e.g., Jegadeesh and Kim (2006)). Column (3) shows that the magnitude of this effect is similar for high-option firms. We also find that missed forecasts led to 4 percent fewer analysts issuing a buy recommendation (Column (4)), and 1.4 percent more analysts recommending "sell" (Column (6)). The latter finding is notable as only 6% of analysts issued "sell" recommendations around FAS 123-R.

Results are similar in the four quarters after FAS 123-R took effect, but the sensitivity of stock recommendations to missed forecasts is about 20% lower (Columns (8) and (9)). This indicates that some analysts realized that firms missed their forecasts due to option expensing rather than a deterioration in profitability, and thus were less likely to revise recommendations downward in response.

Our second specification uses the difference-in-differences framework to explicitly identify the effect of option expensing on recommendations. Table 7 compares high- and low-option firms' recommendations in each of the four fiscal quarters after FAS 123-R compliance. High-option firms experienced recommendation downgrades after they began to expense options. Column (2), for example, shows that *Analyst Recommendation* rose by 0.04 for these firms in the first fiscal quarter after FAS 123-R, relative to low-option firms that complied in the same quarter. The timing of the downgrades concurs with the reduction in earnings and increase in missed forecasts experienced by high-option firms shortly after FAS 123-R compliance. Similarly, Columns (3) through (6) show that high-option firms experienced a relative decrease in the percentage of analysts recommending "strong buy" or "buy", and an increase in percentage of analysts issuing a "sell" rating. Effects are strongest overall when identified from within-firm variation.

Table 7 shows that analysts revised recommendations downward after they observed firms missing their forecasts (or perhaps shortly beforehand, if firms issued guidance of lower earnings). The table also provides some evidence that high- and low-option firms' recommendations converged in

subsequent quarters, which suggests that analysts revised their recommendations upward after realizing that they misvalued option costs.

4.3 Effects of Analyst Heterogeneity

The results presented thus far are consistent but indirect evidence that limited attention caused analysts to underestimate firms' option expenses prior to FAS 123-R. We next examine in Table 8 how missed earnings forecasts correlate with three characteristics of individual analysts that may affect the ability to accurately assess the accounting regulation's impact. The first is the number of years that an analyst covered the firm (Columns (1) and (2)). Limited attention should matter more for analysts with little experience covering the firm, as they are less familiar with the structure of the firm's financials. The second characteristic is an analyst's overall tenure (Columns (3) and (4)). Analysts with greater experience should have a better overall understanding of how accounting regulations affect financials, but they also may have struggled to gauge the impact of FAS 123-R because they had not previously estimated option expenses. The third characteristic is whether an analyst changed brokerage house in the current fiscal quarter (Columns (5) and (6)), which may proxy for an analyst's career progression or overall ability (Hong and Kacperczyk (2010)).

In Columns (1) through (4), for each firm and fiscal quarter we calculate the average experience or tenure of all individual analysts that issued an EPS forecast for the firm. We then re-estimate the model from Column (1) of Table 4, separately for firms with analyst experience or tenure in the lowest or highest tercile of the sample. Columns (5) and (6) split firms by whether no analysts or at least one analyst covering the firm changed brokerage house during the fiscal quarter.

Table 8 shows that high-options firms were 10.8 percentage-points more likely to experience a forecast error after FAS 123-R when their analysts had low familiarity with the firm. In contrast, high-

option firms covered by analysts with high familiarity did not experience a rise in forecast errors. However, firms covered by analysts with low overall experience were just as likely to experience a forecast error as firms covered by analysts with high experience. One possible explanation is that an analyst's overall experience did not reduce the cognitive resources necessary to accurately estimate option expenses for a particular firm, but high familiarity with the firm itself did. Columns (5) and (6) show that only firms covered by analysts who did not change jobs experienced an increase in forecast errors. This could indicate that high-ability analysts are less affected by limited attention.

4.4 Effects on Asset Prices

We round out our analysis by examining the broader reaction of financial markets to the change in information visibility due to FAS 123-R. A wide body of research finds that stock prices generally decrease when firms miss forecasts and analysts issue sell recommendations. However, these documented results are largely due to investors reacting to new information about underlying profitability that is contained in earnings. Our unique setting offers a clean test of investors' ability to process information available in financial statements.

If asset prices declined when firms missed forecasts or experienced recommendation downgrades due to FAS 123-R, this would indicate that investors, like analysts, misvalued the cost of option compensation. This would suggest that limited attention is common among a broad set of financial market participants. On the other hand, if investors correctly incorporated all available information about firms' option expenses prior to FAS 123-R, then they would have realized that analysts' forecasts and recommendations were too optimistic at that time (or alternatively too pessimistic after FAS 123-R took effect). In this case, stock prices should not have responded to missed forecasts or recommendation downgrades after FAS 123-R took effect.

Figure 3 examines raw and cumulative abnormal returns (CARs) of high-option firms' stocks around missed forecasts following FAS 123-R. We plot returns only for firms that missed a forecast in the first fiscal quarter after compliance, yet experienced an increase in sales relative to both the previous fiscal quarter and the same fiscal quarter from the previous year (i.e., fiscal quarters -1 and -4). These firms likely reported lower earnings only due to option expensing. The figure shows that firms' CARs were flat in the two weeks prior to their earnings announcements, but fell sharply precisely when firms reported earnings that missed the consensus forecast of their analysts. CARs estimated by the 4-factor model fall by 3% due to the missed forecast, and remain at this level over the next two weeks.

Table 9 reports raw returns and CARs following missed forecasts and recommendation downgrades. Returns are estimated over a one-day (two-sided) window around each announcement, as well as a wider three-day (two-sided) window. The first row of Panel A reports returns only for high-option firms that missed an EPS forecast in the first fiscal quarter after FAS 123-R, yet also experienced an increase in sales. In the one-day window these firms' CARs fell by 2.2% upon announcing earnings that fell short of analysts' forecasts, equal to a $45m decrease in the average market capitalization of these firms.

To facilitate comparison with the general value impact of a missed forecast, the panel also reports returns of all low-option firms that missed a forecast in the same quarter, and all high-option firms that missed a forecast in the fiscal year prior to FAS 123-R. These two sets of firms were largely unaffected by FAS 123-R, so their missed forecasts are more likely to represent decreases in profitability. The table shows that their CARs were more negative CARs following missed forecasts. This suggests that investors were somewhat less responsive to a missed forecast due to option expensing than due to underperformance. This suggests that investors were somewhat less responsive to a decrease in earnings due to option expensing. Yet, our findings overall show that markets displayed limited attention by misvaluing firms' option compensation costs prior to FAS 123-R.

Table 9, Panel B reports returns following recommendation downgrades. The sample in this panel contains all dates on which at least one analyst revised a recommendation downward, for the same three sets of firms as in Panel A. High-option firms' CARs fell by -1.7% in the 1-day window around a downgrade (-2.2% in the wider window). CARs for the other two groups of firms fell by a smaller amount following downgrades. One possible explanation is that investors faced greater uncertainty when trying to interpret high-option firms' earnings after FAS 123-R, and thus assigned greater weight to analysts' stock recommendations for these firms.

Overall, the negative CARs in Table 9 are consistent with investors failing to incorporate all available information on firms' option compensation costs prior to FAS 123-R. This indicates that limited attention was common among market participants in our setting.

4.5 Placebo Tests: Voluntary Adopters of Option Expensing

To corroborate that our results are due to analysts' miscalculation of option expenses, Table 10 presents results from a falsification test using only firms that voluntarily adopted FAS 123-R in calendar year 2004 or earlier. Because these firms already expensed the costs of option compensation in the four fiscal quarters prior to FAS 123-R, their earnings did not decrease due to the accounting regulation. If the limited attention hypothesis is correct, analyst forecast errors for these firms should not rise around FAS 123-R compliance. However, if our results our driven by unobserved variables that correlate with firms' fiscal years, then voluntary adopters should also be affected by these confounders.

Table 10 uses the same staggered difference-in-differences models as in tables 2 and 4. Columns (1) and (2) show that high-option voluntary adopters experienced a slight increase in earnings when FAS 123-R took effect. Additionally, Columns (3) and (4) show that these firms did not experience an increase in missed earnings forecasts. These findings therefore rule out the possibility that our results are driven

by confounding factors, unless those unobservables are correlated with firms' fiscal year ends *and* only impact non-voluntary adopters.

4.6 Alternative Channels: Changes to Dividend Policy, Covenant Violations, and Pay Structure

We further address three alternative channels that may explain the negative reactions by analysts and financial markets following FAS 123-R. First, high-option firms may have decreased dividends when they began to expense options, because dividend payouts are frequently tied to the level of earnings (Farre-Mensa, Michaely, and Schmalz (2014)). Analysts in turn may have reduced their recommendations, prompting a decrease in stock prices.[14] Table 11, Panel A shows that high-option firms were not more likely to suspend dividend payments or cut dividends in response to FAS 123-R, indicating that changes to dividend policy do not explain our results.

Second, the recognition of option costs in income statements might have caused some firms to violate debt covenants, which are often based on earnings (Chava and Roberts (2008)). Table 11, Panel B examines the frequency of covenant violations around FAS 123-R using data from Roberts and Sufi (2009)). It shows that covenant violations did not rise following compliance, for either high- or low-option firms.

Third, financial market participants may have reacted negatively to the broad shift in CEO compensation after FAS 123-R from stock options to bonuses and restricted stock (Hayes, Lemmon, and Qiu (2012)). This shift may have reduced CEO pay convexity, which could have a negative impact on firm value. However, Skantz (2012) shows that CEO pay changes following FAS 123-R reduced excessive compensation and pay for luck, which should lead to higher firm valuations.

[14] For example, Ofer and Siegel (1987) or Denis, Denis, and Sarin (1994) show that dividend changes cause analysts to change their earnings forecasts, and Michaely, Thaler, and Womack (1995) find that markets react negatively to dividend omissions.

5. Conclusion

This paper studies how market participants react to changes in information visibility, and whether their reactions ultimately affect asset prices. As a setting to study these questions we exploit the introduction of an important accounting regulation. Regulation FAS 123-R required firms to begin deducting employee option compensation expenses in their income statements. This led to a sharp drop in earnings, but it did not reveal new information, as firms had previously disclosed option expenses in their financial statement footnotes. Theoretical models of limited attention predict that such a change in information visibility could affect how market participants value firms (Hirshleifer and Teoh (2003)). Our paper tests this prediction by examining how financial analysts' recommendations and asset prices changed when FAS 123-R took effect.

Our identification strategy uses a staggered difference-in-differences design with time-series and cross-sectional variation in FAS 123-R's requirement to expense option grants. The time-series dimension exploits that FAS 123-R's compliance dates were staggered quasi-randomly over time. Each firm had to begin expensing stock options in the *fiscal* year starting after June 15, 2005. The cross-sectional dimension compares firms based on the expected impact of FAS 123-R on their earnings. Earnings should drop the most among firms that previously granted large amounts of options.

We first confirm that option expensing had a significant impact on earnings. Growth in earnings fell sharply once firms started to expense options, especially for high-option firms. The drop in earnings growth at high-option firms increased the probability of missing analysts' forecasts. This indicates that the consensus analyst forecast were too high for firms that started to comply with the regulation. The missed forecasts had significant effects on analysts' beliefs about firm valuations, as analysts reacted with downgrades. However, analysts who were highly familiar with the firms they covered did not make forecast errors.

We complete our analysis by examining how asset prices responded to firms' missed forecasts and analysts' downward revisions. High-option firms' stock prices fell by 2.2% upon announcing earnings that fell short of analysts' forecasts, equal to a $45m decrease in the average market capitalization of these firms. High-option firms' CARs also fell by -1.7% when analysts revised their stocks downward in the first fiscal quarter of option expensing.

Our findings are consistent with analysts having underestimated option expenses prior to FAS 123-R, when accurate valuation required time-consuming, meticulous inspection of financial statement footnotes. After firms began to expense options, analysts realized that they had set previous earnings targets too high and overvalued firms, leading them to correct their recommendation to reflect the correct value. Alternatively, analysts may have overreacted to the lower reported earnings or mistakenly interpreted them as a reduction in fundamental profitability.

Our results show that an increase in the visibility of firms' option compensation costs led to an increase in missed earnings forecasts, to downward revisions in stock recommendations, and affected real asset prices. Our results indicate that financial analysts and investors display limited attention when evaluating firm expenditures that are not directly recorded in the income statement. These findings are consistent with Hirshleifer and Teoh (2003), who show that option expensing may have corrected a prior overvaluation of firms, but also may have led to a subsequent undervaluation. Our paper contains important implications for policymakers debating new requirements for company disclosures of key expenditures. The results also indicate that recent technological advancements in the scraping and analysis of data in annual reports can be valuable.

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Data Appendix. Variable Definitions

This table provides definitions of the variables used in the empirical analysis. All variables are measured at the firm-quarter level.

Variable	Definition	Source
1. FAS 123-R Compliance Variables		
Post FAS 123-R	Dummy variable that equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for quarters before.	Compustat
Post FAS 123-R Q1	Dummy variable that equals 1 for the first fiscal quarter after FAS 123-R takes effect, and 0 for other quarters. *Post FAS 123-R Q2*, *Post FAS 123-R Q3*, and *Post FAS 123-R Q4* are defined accordingly but equal 1 in the second, third, and fourth fiscal quarter after FAS 123-R takes effect, respectively.	Compustat
2. Earnings and Sales Variables		
EPS	Diluted earnings per share. For GAAP earnings, it is Compustat data item EPSFX. For *pro forma* earnings, it is IBES data item ACTUAL that corresponds to the value of "EPS" for IBES data item MEASURE for Forecast Period 1. This variable is winsorized at the 1% level.	Compustat / IBES
EBIT/Share	Operating income (earnings before interest and taxes) divided by the number of shares outstanding. For GAAP earnings, operating income is Compustat data item EBIT. For Pro Forma earnings, it is IBES data item ACTUAL that corresponds to the value of "EBI" for IBES data item MEASURE for Forecast Period 1. This variable is winsorized at the 1% level.	Compustat / IBES
Net Income/Share	Net income divided by the number of shares outstanding. For GAAP earnings, net income is Compustat data item IB. For Pro Forma earnings, it is IBES data item ACTUAL that corresponds to the value of "NET" for IBES data item MEASURE for Forecast Period 1. This variable is winsorized at the 1% level.	Compustat / IBES
Sales/Share	Sales divided by the number of shares outstanding. Sales is Compustat data item SALE. This variable is winsorized at the 1% level.	Compustat / IBES
Missed Forecast	Dummy variable that equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. The consensus estimate is the mean value of individual analysts' forecasts for the upcoming fiscal quarter (IBES data item MEANEST for Forecast Period 1). Earnings are the corresponding value of IBES data item ACTUAL (value of "EPS" for IBES data item MEASURE).	Compustat / IBES
Forecast Dispersion	The standard deviation of analysts' earnings per share (EPS) forecasts, scaled by the absolute value of the firm's actual earnings per share.	Compustat / IBES
3. Analyst Variables		
Analyst Recommendation	Consensus (median) analyst stock recommendation. The variable ranges between 1 (strong buy) and 5 (sell).	IBES
Pct. Buy Recommendations	Percentage of analysts issuing a "strong buy" or "buy" recommendation for the firm's stock.	IBES
Pct. Sell Recommendations	Percentage of analysts issuing a "sell" recommendation for the firm's stock.	IBES
Analyst Coverage	Number of analysts making an earnings forecast for a stock. The number of forecasts is IBES data item NUMEST.	IBES
4. Option Variables		
High-Option Firm	Dummy variable that equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. To construct this variable, we first calculate each firm's Options-to-Shares Ratio as the total number of stock options granted during a fiscal year, divided by diluted common shares outstanding at the end of the fiscal year. I.A. Table 1 shows that in the two fiscal years prior to FAS 123-R, Options-to-Shares Ratio was twice as high for Information Technology and Healthcare and Pharmaceuticals firms as for firms in other sectors. We therefore classify all firms in these two sectors as high-option firms. We also set High-Option Firm equal to 1 for firms in other industries with an Options-to-Shares Ratio above the 75th percentile.	Compustat
5. Control Variables		

Assets	Total assets (Compustat data item AT) at the end of the fiscal quarter (in millions USD). This variable is winsorized at the 1% level.	Compustat
Market-to-Book Ratio	Market value of equity plus the book value of debt minus current assets, all divided by total capital. This variable is winsorized at the 1% level.	Compustat
Leverage	Book value of debt (items DLTT + DLC) minus cash holdings (item CH), divided by the book value of debt plus market value of equity (item PRCC_F * CSHO). This variable is winsorized at the 1% level.	Compustat
Investment/Sales	Capital expenditures (item CAPX) divided by sales (item SALE). This variable is winsorized at the 1% level.	Compustat
6. Alternative Dependent Variables		
Dividend Payer	Dummy variable that equals 1 for fiscal quarters in which the firm paid a dividend, and 0 for fiscal quarters in which the firm did not pay a dividend.	Compustat
Dividend/Share	Dividends divided by the number of shares outstanding. This variable is winsorized at the 1% level.	Compustat
Covenant Violation	Dummy variable that equals 1 for fiscal quarters in which the firm violated a debt covenant, and 0 for fiscal quarters in which the firm did not violate a debt covenant.	Roberts and Sufi (2009)

Figure 1. Hypothesis Testing using Staggered FAS 123-R Compliance

This figure shows how FAS 123-R compliance dates are staggered based on firms' fiscal year ends, and how this variation should affect firms' earnings and analysts' forecasts and recommendations.

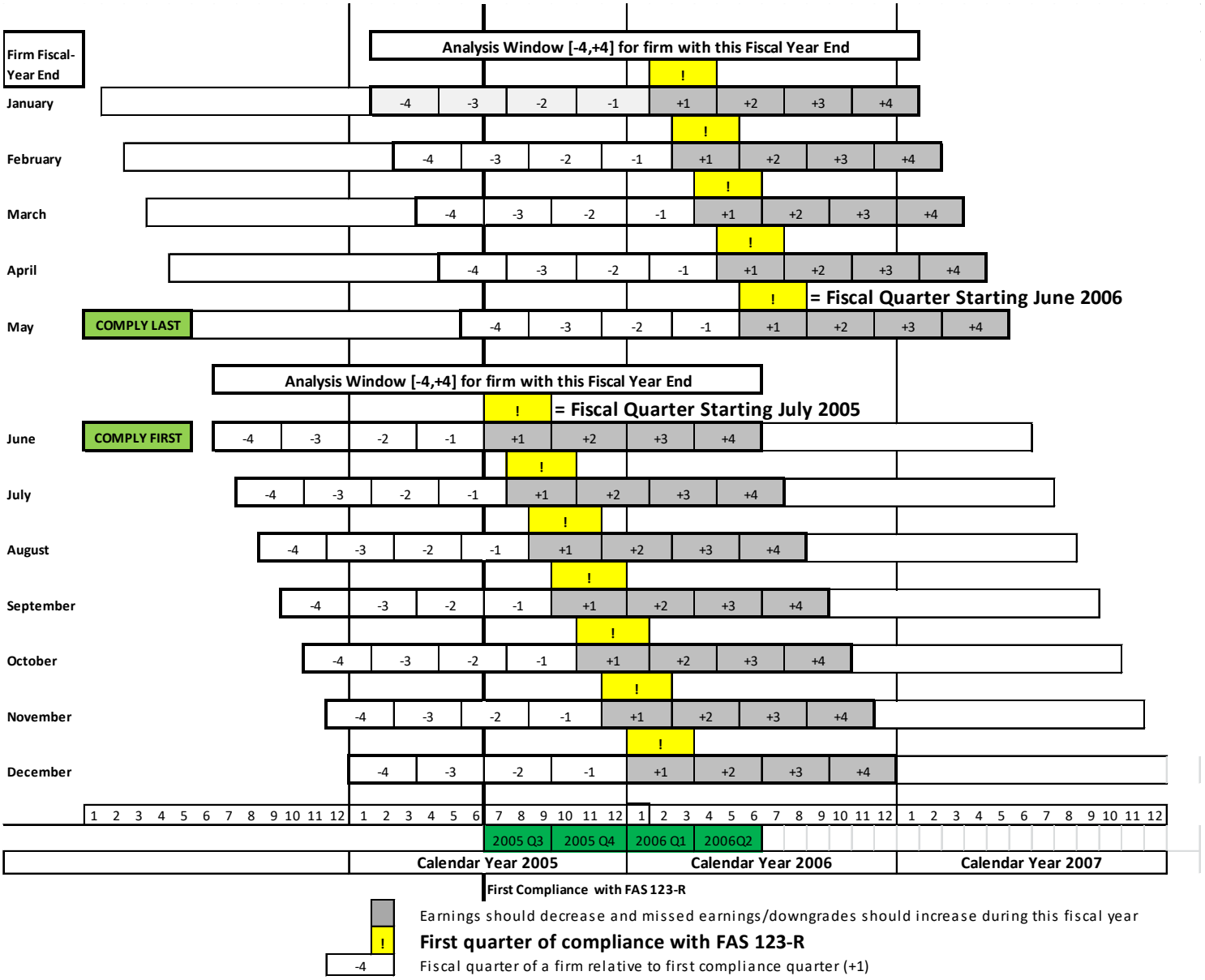
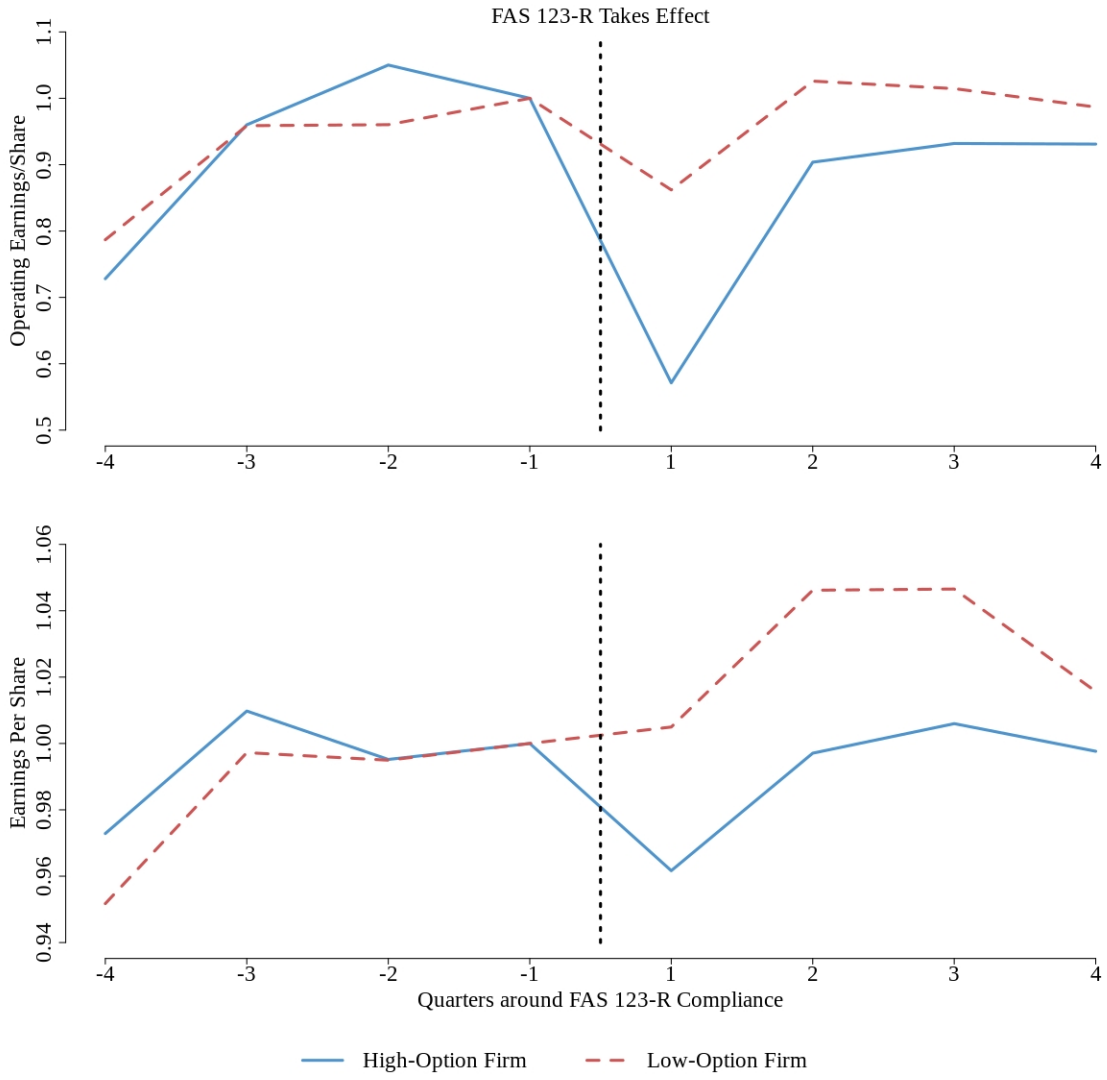


Figure 2. Earnings for High- and Low Option Firms

Firms' earnings are plotted over the four fiscal quarters prior to FAS 123-R compliance through the four fiscal quarters afterward, separately for high- and low-option firms. The figure plots the average values of *EBIT/Share* and *EPS* for each set of firms, normalized to 1 in the fiscal quarter prior to FAS 123-R compliance.



All plots normalized to 1 in quarter -1

Figure 3. Stock Returns around Missed Earnings Forecast for High-Option Firms

This figure shows returns in the 30-days window around missed EPS forecasts. We report raw returns and adjusted returns, using the Fama-French-4-factor model. We report returns for high-option firms that missed a forecast in fiscal quarter +1 *and* did not experience a sales decline. We condition among the first set of firms on not experiencing a sales decline to isolate those firms that had negative outcomes only due to FAS 123-R. Firm started to expense options in fiscal quarter +1.

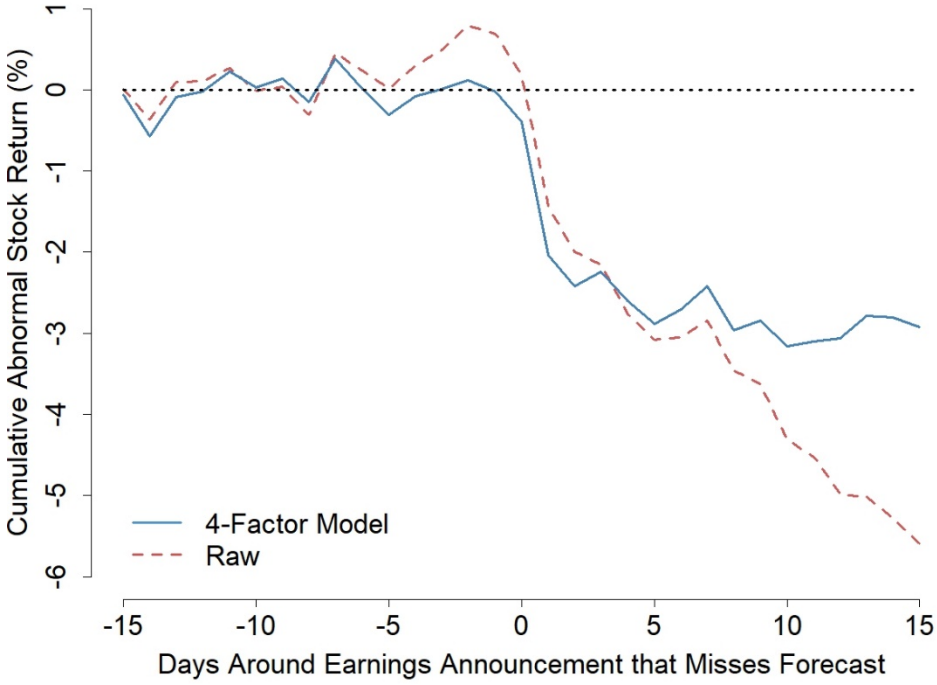


Table 1. Summary Statistics

Panel A shows summary statistics for the sample. Q1 and Q3 are the first and third quartiles (25th and 75th percentiles) of the distribution. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. The sample period covers the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. Panel B reports the distribution of firms' fiscal year ends in the sample. Variable definitions are in the Data Appendix.

Panel A. Firm Characteristics

	Mean	Median	Q1	Q3	Diff., Q3-Q1	Obs.
GAAP Earnings						
EPS	0.02	0.09	-0.08	0.31	0.39	28561
EBIT/Share	0.38	0.17	-0.04	0.62	0.66	28087
NI/Share	0.15	0.09	-0.06	0.36	0.42	28281
Sales/Share	5.18	2.43	0.66	6.71	6.05	28280
Pro Forma Earnings						
EPS	0.06	0.11	-0.05	0.33	0.38	27082
EBIT/Share	0.40	0.21	-0.02	0.66	0.68	23025
NI/Share	0.21	0.13	-0.03	0.40	0.44	25770
Sales/Share	5.36	2.69	0.79	7.03	6.25	26091
High-Option Firm	0.52					30758
Missed Forecast	0.38					18574
Forecast Error	0.16	0.06	0.01	0.14	0.13	18345
Analyst Recommendation	2.31	2.00	2.00	3.00	1.00	19713
Pct. Buy Recommendations (in %)	54.2	50.0	33.3	80.0	46.7	19713
Pct. Sell Recommendations (in %)	6.0	0.0	0.0	6.7	6.7	19713
Log Assets	5.51	5.47	4.09	6.87	2.79	28902
Market-to-Book Ratio	2.37	1.80	1.32	2.73	1.41	27777
Leverage	0.20	0.13	0.00	0.32	0.31	28133
Investment/Sales	0.10	0.02	0.01	0.06	0.05	26577
Analyst Coverage	6.7	5.0	2.0	9.0	7.0	18583
Dividend Payer	0.22					28389
Dividend/Share	0.003	0.00	0.00	0.00	0.00	28015
Covenant Violation	0.01					30758

Panel B. Fiscal Year Ends

Fiscal Year-End Months	% Firms	Cumulative %
January	3.8	3.8
February	0.9	4.8
March	5.1	9.9
April	1.5	11.4
May	1.5	12.9
June	6.5	19.3
July	1.4	20.7
August	1.3	22.0
September	6.2	28.2
October	1.9	30.1
November	0.8	30.9
December	69.1	100.0
Total	100	

Table 2. Effect of FAS 123-R Option Expenses on Corporate Earnings

This table shows the effects of staggered FAS 123-R compliance on corporate earnings. Panel A shows the effect on GAAP values of earnings per share (EPS), EBIT per share, and net income per share. Panel B shows the effect on analysts' pro forma estimates of these three variables. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

	Panel A. GAAP Earnings					**Panel B. Pro Forma Earnings**				
Dependent variable	*EPS*	*EBIT/Share*	*NI/Share*	*EPS*	*EPS*	*EPS*	*EBIT/Share*	*NI/Share*	*EPS*	*EPS*
Estimation window	[-4;+4] fiscal quarters around FAS 123-R					[-4;+ 4] fiscal quarters around FAS 123-R				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post FAS 123-R x High-Option Firm	-0.045***	-0.043***	-0.038***	-0.041***	-0.044***	-0.048***	-0.031**	-0.021**	-0.030**	-0.048***
	(-2.83)	(-3.62)	(-3.75)	(-2.72)	(-2.82)	(-3.43)	(-2.48)	(-2.50)	(-2.44)	(-3.42)
Post FAS 123-R	0.051***	0.012	0.025***	0.065***	0.026	0.045***	0.020*	0.012*	0.056***	0.027
	(4.52)	(1.19)	(3.13)	(5.60)	(1.12)	(4.63)	(1.92)	(1.80)	(5.85)	(1.51)
High-Option Firm	-0.127***	-0.151***	-0.106***		-0.127***	-0.099***	-0.150***	-0.105***		-0.099***
	(-4.23)	(-6.52)	(-6.32)		(-4.22)	(-3.44)	(-6.63)	(-6.85)		(-3.44)
Log Assets (t-1)	0.096***	0.156***	0.089***	-0.085***	0.096***	0.116***	0.159***	0.102***	-0.039*	0.116***
	(18.42)	(31.73)	(26.80)	(-3.30)	(18.42)	(23.66)	(33.17)	(32.70)	(-1.85)	(23.65)
Leverage (t-1)	0.047***	0.045***	0.048***	0.039***	0.047***	0.034***	0.047***	0.041***	0.036***	0.034***
	(6.73)	(11.04)	(16.46)	(6.71)	(6.70)	(5.12)	(11.07)	(14.37)	(5.15)	(5.11)
Market-to-Book Ratio (t-1)	-0.322***	0.097***	-0.212***	-0.024	-0.322***	-0.298***	0.065*	-0.197***	-0.054	-0.298***
	(-5.79)	(2.78)	(-8.26)	(-0.33)	(-5.78)	(-5.62)	(1.82)	(-8.20)	(-0.76)	(-5.62)
Investment/Sales (t-1)	-0.732***	-0.369***	-0.329***	0.049	-0.731***	-0.793***	-0.383***	-0.314***	0.066	-0.791***
	(-9.44)	(-11.86)	(-14.89)	(1.16)	(-9.42)	(-10.48)	(-11.37)	(-13.31)	(1.25)	(-10.45)
Industry Fixed Effects	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Fiscal-Year-End Fixed Effects	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Firm Fixed Effects	No	No	No	Yes	No	No	No	No	Yes	No
Fiscal-Quarter Fixed Effects	No	No	No	No	Yes	No	No	No	No	Yes
Calendar-Quarter Fixed Effects	No	No	No	No	Yes	No	No	No	No	Yes
Obs.	25335	25022	25158	25335	25335	24689	21658	24059	24689	24689
Adj. R-squared	0.187	0.392	0.265	0.008	0.187	0.251	0.416	0.352	0.007	0.251

Table 3. Effect of FAS 123-R Option Expenses on Corporate Sales

This table shows the effects of staggered FAS 123-R compliance on corporate sales. Panel A shows the effect on GAAP values of sales per share, and Panel B on analysts' pro forma estimates of this variable. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

	Panel A. GAAP Sales			**Panel B. Pro Forma Sales**		
Dependent variable	*Sales/Share*			*Sales/Share*		
Estimation window	[-4;+ 4] fiscal quarters around FAS 123-R					
	(1)	(2)	(3)	(4)	(5)	(6)
Post FAS 123-R x High-Option Firm	0.002	-0.074	0.003	0.019	-0.054	0.020
	(0.02)	(-0.98)	(0.04)	(0.20)	(-0.75)	(0.21)
Post FAS 123-R	-0.097	-0.078	-0.327***	-0.094	-0.067	-0.262**
	(-1.23)	(-1.23)	(-3.06)	(-1.23)	(-1.12)	(-2.53)
High-Option Firm	-1.458***		-1.463***	-1.573***		-1.577***
	(-5.18)		(-5.19)	(-5.42)		(-5.43)
Log Assets (t-1)	1.231***	1.102***	1.230***	1.244***	0.965***	1.242***
	(22.82)	(9.42)	(22.80)	(22.52)	(9.04)	(22.49)
Leverage (t-1)	-0.350***	0.115***	-0.351***	-0.401***	0.093***	-0.403***
	(-9.36)	(7.77)	(-9.36)	(-10.06)	(5.42)	(-10.07)
Market-to-Book Ratio (t-1)	1.400***	1.611***	1.394***	1.267***	1.671***	1.262***
	(3.62)	(5.94)	(3.61)	(3.10)	(5.85)	(3.09)
Investment/Sales (t-1)	-0.936***	-0.212***	-0.926***	-0.893***	-0.113	-0.880***
	(-3.56)	(-3.19)	(-3.52)	(-3.38)	(-1.06)	(-3.32)
Industry Fixed Effects	Yes	No	Yes	Yes	No	Yes
Fiscal-Year-End Fixed Effects	Yes	No	Yes	Yes	No	Yes
Firm Fixed Effects	No	Yes	No	No	Yes	No
Fiscal-Quarter Fixed Effects	No	No	Yes	No	No	Yes
Calendar-Quarter Fixed Effects	No	No	Yes	No	No	Yes
Obs.	25159	25159	25159	24403	24403	24403
Adj. R-squared	0.431	0.024	0.432	0.435	0.020	0.436

Table 4. Missed Earnings Forecasts after FAS 123-R Takes Effect

This table shows the effects of staggered FAS 123-R compliance on missed earnings forecasts and forecast dispersion. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Missed Forecast* equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. *Forecast Dispersion* is the standard deviation of analysts' EPS forecasts, divided by the absolute value of EPS. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Missed Forecast*			*Forecast Dispersion*
Estimation window	[-4; + 4] quarters around FAS 123-R			
	(1)	(2)	(3)	(4)
Post FAS 123-R x High-Option Firm	0.051***	0.060***	0.051***	0.005
	(2.92)	(3.31)	(2.93)	(0.37)
Post FAS 123-R	-0.014	-0.036***	0.046	0.018**
	(-1.10)	(-2.73)	(1.41)	(2.32)
High-Option Firm	-0.023		-0.023	0.052***
	(-1.15)		(-1.14)	(3.11)
Log Assets (t-1)	-0.037***	0.187***	-0.037***	-0.037***
	(-6.98)	(5.91)	(-6.98)	(-8.03)
Leverage (t-1)	-0.020***	0.027***	-0.020***	-0.026***
	(-4.87)	(2.89)	(-4.88)	(-7.84)
Market-to-Book Ratio (t-1)	0.136***	-0.180**	0.136***	0.123***
	(4.27)	(-2.11)	(4.26)	(4.15)
Investment/Sales (t-1)	0.069**	0.032	0.067**	-0.000
	(2.24)	(0.37)	(2.17)	(-0.01)
Log Analyst Coverage	-0.020*	0.035	-0.020	-0.019*
	(-1.65)	(1.42)	(-1.64)	(-1.88)
Industry Fixed Effects	Yes	No	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	No	Yes	Yes
Firm Fixed Effects	No	Yes	No	No
Fiscal-Quarter Fixed Effects	No	No	Yes	No
Calendar-Quarter Fixed Effects	No	No	Yes	No
Obs.	12962	12962	12962	12851
Adj. R-squared	0.030	0.007	0.031	0.065

Table 5. Timing of Missed Earnings Forecasts

This table examines the frequency of missed earnings forecasts in each fiscal quarter after FAS 123-R compliance. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Missed Forecast* equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. *Post FAS 123-R Q1* equals 1 for the first fiscal quarter after FAS 123-R takes effect, and 0 for other fiscal quarters. *Post FAS 123-R Q2*, *Post FAS 123-R Q3*, and *Post FAS 123-R Q4* are defined accordingly but equal 1 in the second, third, and fourth fiscal quarter after FAS 123-R takes effect, respectively. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Missed Forecast*		
Estimation window	[-4;+ 4] fiscal quarters around FAS 123-R		
	(1)	(2)	(3)
Post FAS 123-R Q1 x High-Option Firm	0.108***	0.111***	0.107***
	(4.26)	(4.37)	(4.22)
Post FAS 123-R Q2 x High-Option Firm	0.039	0.036	0.040
	(1.52)	(1.38)	(1.53)
Post FAS 123-R Q3 x High-Option Firm	0.008	0.014	0.011
	(0.32)	(0.50)	(0.40)
Post FAS 123-R Q4 x High-Option Firm	0.049*	0.070***	0.050*
	(1.88)	(2.61)	(1.90)
Post FAS 123-R Q1	-0.041**	-0.048***	0.060
	(-2.36)	(-2.73)	(1.43)
Post FAS 123-R Q2	-0.022	-0.041**	0.071*
	(-1.20)	(-2.22)	(1.73)
Post FAS 123-R Q3	0.013	-0.013	0.077*
	(0.72)	(-0.66)	(1.81)
Post FAS 123-R Q4	-0.006	-0.044**	-0.001
	(-0.35)	(-2.29)	(-0.02)
High-Option Firm	-0.023		-0.023
	(-1.15)		(-1.15)
Control variables	Yes	Yes	Yes
Industry Fixed Effects	Yes	No	Yes
Fiscal-Year-End Fixed Effects	Yes	No	Yes
Firm Fixed Effects	No	Yes	No
Fiscal-Quarter Fixed Effects	No	No	Yes
Calendar-Quarter Fixed Effects	No	No	Yes
Obs.	12962	12962	12962
Adj. R-squared	0.030	0.007	0.031

Table 6. General Effect of Missed Earnings on Analyst Recommendations around FAS 123-R Compliance

This table shows the general effect of missed earnings forecasts on analyst recommendations around FAS 123-R compliance. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level. Columns (1) through (7) examine the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. Columns (8) and (9) examine the four fiscal quarters after FAS 123-R's (staggered) compliance dates. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *Analyst Recommendation* is the consensus (median) analyst stock recommendation and ranges between 1 (strong buy) and 5 (sell). *Pct. Buy Recommendations* (*Pct. Sell Recommendations*) is the percentage of analysts issuing a "strong buy" or "buy" ("sell") recommendation for the firm's stock. *Missed Forecast* equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Analyst Recommendation*			*Pct. Buy Recommendations*		*Pct. Sell Recommendations*		*Analyst Recommendation*	
Sample	All	All	High-Option Firms	All	All	All	All	All	High-Option Firms
Estimation window	[-4;+ 4] fiscal quarters around FAS 123-R							[+1;+ 4] fiscal quarters around FAS 123-R	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Missed Forecast (t-1)	0.083***	0.043***	0.083***	-3.934***	-2.135***	1.361***	0.485***	0.067***	0.066***
	(7.37)	(6.26)	(5.15)	(-6.69)	(-5.87)	(5.42)	(2.77)	(4.52)	(3.20)
Log Assets (t-1)	0.014	-0.022	0.029**	-0.487	1.364	0.171	-1.264*	0.013	0.033*
	(1.32)	(-0.75)	(2.06)	(-0.94)	(0.94)	(0.61)	(-1.69)	(1.09)	(1.94)
Leverage (t-1)	-0.055***	-0.057***	-0.057***	3.246***	3.340***	-0.738***	-0.762***	-0.056***	-0.054***
	(-7.24)	(-6.93)	(-6.36)	(8.52)	(7.73)	(-4.02)	(-3.91)	(-6.71)	(-5.36)
Market-to-Book Ratio (t-1)	0.065	0.036	0.005	-3.040	0.021	1.917	1.612	0.035	-0.032
	(1.19)	(0.38)	(0.07)	(-1.11)	(0.00)	(1.40)	(0.50)	(0.57)	(-0.38)
Investment/Sales (t-1)	-0.138***	-0.104*	-0.106*	10.767***	6.242**	0.506	0.409	-0.149***	-0.112*
	(-2.78)	(-1.78)	(-1.94)	(4.11)	(2.38)	(0.45)	(0.28)	(-2.60)	(-1.75)
Log Analyst Coverage	0.095***	0.001	0.084***	-4.622***	0.131	0.851	0.851	0.087***	0.067*
	(4.24)	(0.04)	(2.81)	(-4.33)	(0.09)	(1.44)	(0.89)	(3.51)	(1.82)
Industry Fixed Effects	Yes	No	No	Yes	No	Yes	No	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	No	No	Yes	No	Yes	No	Yes	Yes
Firm Fixed Effects	No	Yes	Yes	No	Yes	No	Yes	No	No
Fiscal-Quarter Fixed Effects	Yes	No	No	Yes	No	Yes	No	Yes	Yes
Calendar-Quarter Fixed Effects	Yes	No	No	Yes	No	Yes	No	Yes	Yes
Obs.	13136	13136	6373	13136	13136	13136	13136	6728	3241
Adj. R-squared	0.098	0.016	0.109	0.105	0.018	0.050	0.004	0.092	0.097

Table 7. Effect of Missed Earnings due to FAS 123-R on Analyst Recommendations

This table shows the effect of missed earnings forecasts due to FAS 123-R on analyst recommendations. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Analyst Recommendation* is the consensus (median) analyst stock recommendation and ranges between 1 (strong buy) and 5 (sell). *Pct. Buy Recommendations* (*Pct. Sell Recommendations*) is the percentage of analysts issuing a "strong buy" or "buy" ("sell") recommendation for the firm's stock. *Post FAS 123-R Q1* equals 1 for the first fiscal quarter after FAS 123-R takes effect, and 0 for other fiscal quarters. *Post FAS 123-R Q2*, *Post FAS 123-R Q3*, and *Post FAS 123-R Q4* are defined accordingly but equal 1 in the second, third, and fourth fiscal quarter after FAS 123-R takes effect, respectively. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Analyst Recommendation*		*Pct. Buy Recommendations*		*Pct. Sell Recommendations*	
Estimation window	[-4;+ 4] fiscal quarters around FAS 123-R					
	(1)	(2)	(3)	(4)	(5)	(6)
Post FAS 123-R Q1 x High-Option Firm	0.025	0.040**	-1.092	-2.104**	0.675	0.906**
	(1.46)	(2.51)	(-1.21)	(-2.54)	(1.58)	(2.25)
Post FAS 123-R Q2 x High-Option Firm	0.025	0.046**	-1.228	-2.593***	0.793	0.959**
	(1.23)	(2.44)	(-1.13)	(-2.62)	(1.62)	(2.05)
Post FAS 123-R Q3 x High-Option Firm	0.002	0.022	0.301	-1.133	0.330	0.594
	(0.11)	(1.10)	(0.26)	(-1.06)	(0.63)	(1.19)
Post FAS 123-R Q4 x High-Option Firm	-0.039*	-0.014	2.285*	0.288	-0.538	-0.359
	(-1.65)	(-0.63)	(1.79)	(0.24)	(-0.96)	(-0.67)
Post FAS 123-R Q1	-0.000	0.018	-0.189	-1.229**	-0.514*	-0.327
	(-0.01)	(1.62)	(-0.31)	(-2.19)	(-1.66)	(-1.11)
Post FAS 123-R Q2	-0.031**	0.001	1.744**	-0.097	-0.967***	-0.485
	(-2.29)	(0.09)	(2.50)	(-0.15)	(-2.81)	(-1.45)
Post FAS 123-R Q3	-0.022	0.020	0.976	-1.400**	-0.826**	-0.291
	(-1.50)	(1.43)	(1.32)	(-1.98)	(-2.19)	(-0.75)
Post FAS 123-R Q4	0.026	0.084***	-1.211	-4.426***	-0.111	0.622
	(1.62)	(5.35)	(-1.45)	(-5.48)	(-0.27)	(1.43)
High-Option Firm	-0.037		5.285***		0.184	
	(-1.13)		(3.22)		(0.23)	
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	No	Yes	No	No	No
Fiscal-Year-End Fixed Effects	Yes	No	Yes	No	No	No
Firm Fixed Effects	No	Yes	No	Yes	Yes	Yes
Fiscal-Quarter Fixed Effects	Yes	No	Yes	No	No	No
Calendar-Quarter Fixed Effects	Yes	No	Yes	No	No	No
Obs.	14451	14451	14451	14451	14451	14451
Adj. R-squared	0.091	0.021	0.103	0.023	0.047	0.006

Table 8. Analyst Heterogeneity and Missed Earnings Forecasts

This table examines whether missed earnings forecasts following staggered FAS 123-R compliance are correlated with analyst characteristics that may affect the ability to accurately estimate option expenses. Analyst familiarity is measured as the number of years that an analyst has covered the firm. For each firm and fiscal quarter, familiarity is averaged across all individual analysts that covered the firm. Columns (1) and (2) split the sample based on whether average familiarity is in the lowest or highest tercile of the sample distribution. Columns (3) and (4) follow a similar procedure, measuring experience as an analysts' overall tenure in number of years. Columns (5) and (6) separate firms based on whether no analysts or at least one analyst covering the firm changed brokerage house during the fiscal quarter. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Missed Forecast* equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Missed Forecast*					
Sample	Analyst Familiarity		Analyst Experience		Analyst Career Progress	
	Low	High	Low	High	No	Yes
Estimation window	[-4; + 4] quarters around FAS 123-R					
	(1)	(2)	(3)	(4)	(5)	(6)
Post FAS 123-R x High-Option Firm	0.108***	0.047	0.060	0.059	0.085***	0.032
	(2.72)	(1.36)	(1.45)	(1.53)	(2.70)	(0.98)
Post FAS 123-R	-0.042	-0.025	0.009	-0.026	-0.036	0.007
	(-1.34)	(-1.09)	(0.30)	(-1.01)	(-1.57)	(0.31)
High-Option Firm	-0.025	-0.112***	-0.015	-0.115***	-0.092***	-0.036
	(-0.60)	(-2.99)	(-0.36)	(-2.65)	(-2.63)	(-1.16)
Log Assets (t-1)	-0.053***	-0.040***	-0.046***	-0.048***	-0.069***	-0.024***
	(-4.09)	(-4.11)	(-4.30)	(-4.96)	(-8.46)	(-2.82)
Leverage (t-1)	-0.026***	-0.023**	-0.020***	-0.018**	-0.028***	-0.014**
	(-3.90)	(-2.19)	(-2.84)	(-2.07)	(-3.83)	(-2.39)
Market-to-Book Ratio (t-1)	0.289***	0.166***	0.205***	0.187***	0.239***	0.184***
	(4.15)	(2.66)	(3.17)	(2.83)	(4.59)	(3.64)
Investment/Sales (t-1)	0.042	-0.065	-0.001	0.147**	0.008	0.110**
	(0.90)	(-0.56)	(-0.03)	(2.11)	(0.14)	(2.47)
Log Analyst Coverage	0.004	0.004	-0.004	-0.016	0.014	-0.018
	(0.17)	(0.17)	(-0.18)	(-0.68)	(0.67)	(-0.94)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	No	No
Fiscal-Quarter Fixed Effects	No	No	No	No	No	No
Calendar-Quarter Fixed Effects	No	No	No	No	No	No
Obs.	2734	2983	2736	2979	4253	4038
Adj. R-squared	0.045	0.041	0.037	0.045	0.041	0.034

Table 9. Effects of Missed Forecasts and Downgrades on Stock Prices

This table shows in Panel A the effects of missed forecasts on stock prices, and in Panel B the effect of analyst downgrades on stock prices. We report raw returns and adjusted returns, using the Fama-French-4-factor model. Returns are calculated for the [-3,+3) and (-1,+1) window around the missed forecast/downgrade. In Panel A we report results for three sets of firms: (i) high-option firms that missed a forecast in fiscal quarter +1 *and* did not experience a sales decline; (ii) low-option firms that missed a forecast in fiscal quarter +1; and (iii) high-option firms that missed a forecast in fiscal quarter [-4, -1]. We condition among the first set of firms on not experiencing a sales decline to isolate those firms that had negative outcomes only due to FAS 123-R. The other two sets of firms are used to provide a comparison to the value impact of missing a forecast in general. Panel B uses the same approach but measures the effect of an analyst downgrade rather than that of a missed forecast. As before, we label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in fiscal quarter +1. *t*-statistics are reported in parentheses. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

	Raw Return		CAR from 4-Factor model	
Estimation window	(-3,+3)	(-1,+1)	(-3,+3)	(-1,+1)
Panel A. CARs around Missed EPS Forecasts				
High-Option Firm (Obs. = 105)	-2.46%***	-2.22%***	-2.16%***	-2.16%***
Missed Forecast in Fiscal Quarter +1	(-2.78)	(-3.83)	(-2.87)	(-4.38)
Low-Option Firm (Obs. = 375)	-3.41%***	-2.86%***	-3.24%***	-2.81%***
Missed Forecast in Fiscal Quarter +1	(-7.76)	(-9.94)	(-9.67)	(-12.82)
High-Option Firm (Obs. = 1,559)	-4.43%***	-4.03%***	-4.43%***	-4.03%***
High-Option Firms: Missed Forecast in Fiscal Quarters [-4,-1]	(-13.52)	(-19.24)	(-19.30)	(-26.86)
Panel B. CARs around Analyst Downgrades				
High-Option Firm (Obs. = 71)	-1.01%	-0.87%	-2.16%***	-1.65%***
Analyst Downgrade in Fiscal Quarter +1	(-0.89)	(-1.17)	(-2.62)	(-3.05)
Low-Option Firm (Obs. = 331)	-2.46%***	-2.22%***	-0.65%**	-0.36%*
Analyst Downgrade in Fiscal Quarter +1	(-2.78)	(-3.83)	(-1.99)	(-1.68)
High-Option Firm (Obs. = 1,072)	-0.79%	-0.51%	-1.15%***	-0.56%***
Analyst Downgrade in Fiscal Quarters [-4,-1]	(-0.93)	(-0.92)	(-3.89)	(-2.90)

Table 10. Effect of FAS 123-R Option Expenses: Placebo Tests for Voluntary Adopters

This table shows the effects of staggered FAS 123-R compliance on corporate earnings and missed earnings forecasts for firms that voluntarily expenses options prior to FAS 123-R. The sample is 417 firms in the intersection of the Compustat and IBES databases. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*EPS*		*Missed Forecast*	
Estimation window	[-4;+4] fiscal quarters around FAS 123-R			
	(1)	(2)	(3)	(4)
Post FAS 123-R x High-Option Firm	0.125*	0.128*	-0.070	-0.073
	(1.68)	(1.72)	(-0.80)	(-0.82)
Post FAS 123-R	0.007	0.057	0.002	-0.121
	(0.24)	(0.39)	(0.07)	(-1.23)
High-Option Firm	-0.688***	-0.692***	-0.034	-0.031
	(-2.61)	(-2.61)	(-0.41)	(-0.38)
Log Assets (t-1)	0.100***	0.100***	-0.010	-0.009
	(4.67)	(4.65)	(-0.62)	(-0.53)
Leverage (t-1)	0.009	0.008	-0.004	-0.003
	(0.33)	(0.29)	(-0.16)	(-0.11)
Market-to-Book Ratio (t-1)	-0.519*	-0.523*	0.199**	0.197**
	(-1.73)	(-1.73)	(2.00)	(1.98)
Investment/Sales (t-1)	-0.020	-0.008	0.309**	0.314**
	(-0.07)	(-0.03)	(2.31)	(2.35)
Log Analyst Coverage			-0.068**	-0.070**
			(-2.08)	(-2.15)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No
Fiscal-Quarter Fixed Effects	No	Yes	No	Yes
Calendar-Quarter Fixed Effects	No	Yes	No	Yes
Obs.	1489	1489	1128	1128
Adj. R-squared	0.300	0.298	0.043	0.039

Table 11. Alternative Channels: Dividend Policy and Covenant Violations

This table shows the effects of staggered FAS 123-R compliance on dividends and covenant violations. Panel A shows the effect on a dummy variable that equals one if a firm is a dividend payer and on dividends per share. Both variables are measured in t+1 as dividends for quarter t are paid out in quarter t+1. Panel B shows the effect on covenant violations in t and t+1. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

	Panel A. Dividend Policy				**Panel B. Covenant Violations**			
Dependent variable	*Dividend Payer (t+1)*		*Dividend/Share (t+1)*		*Covenant Violation (t)*		*Covenant Violation (t+1)*	
Estimation window	[-4;+ 4] fiscal quarters around FAS 123-R							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post FAS 123-R x High-Option Firm	-0.007	-0.007	-0.000	-0.000	0.000	0.000	0.004	0.004
	(-1.01)	(-1.02)	(-0.33)	(-0.31)	(0.11)	(0.12)	(1.25)	(1.25)
Post FAS 123-R	-0.004	0.012	-0.000	0.000	-0.001	-0.007	-0.001	-0.002
	(-0.62)	(0.98)	(-0.22)	(1.14)	(-0.41)	(-1.47)	(-0.30)	(-0.48)
High-Option Firm	-0.185***	-0.185***	-0.003***	-0.003***	-0.003	-0.003	-0.004	-0.004
	(-9.49)	(-9.49)	(-8.83)	(-8.84)	(-0.98)	(-0.99)	(-1.34)	(-1.34)
Log Assets (t-1)	0.075***	0.075***	0.001***	0.001***	-0.005***	-0.005***	-0.005***	-0.005***
	(20.24)	(20.23)	(11.03)	(11.02)	(-6.82)	(-6.86)	(-6.90)	(-6.91)
Leverage (t-1)	0.012***	0.013***	0.001***	0.001***	-0.003***	-0.003***	-0.003***	-0.003***
	(3.53)	(3.52)	(6.00)	(6.01)	(-4.44)	(-4.45)	(-5.21)	(-5.14)
Market-to-Book Ratio (t-1)	-0.146***	-0.146***	-0.000	-0.000	0.035***	0.035***	0.036***	0.036***
	(-5.38)	(-5.38)	(-0.20)	(-0.21)	(4.75)	(4.74)	(4.67)	(4.67)
Investment/Sales (t-1)	-0.120***	-0.120***	-0.003***	-0.003***	-0.011***	-0.011***	-0.012***	-0.012***
	(-6.03)	(-6.04)	(-7.24)	(-7.25)	(-3.85)	(-3.85)	(-4.06)	(-4.07)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	No	No	No	No
Fiscal-Quarter Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Calendar-Quarter Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	21003	21003	20961	20961	21078	21078	21078	21078
Adj. R-squared	0.280	0.280	0.158	0.158	0.016	0.017	0.018	0.019

I.A. Table 1. Stock Option Compensation across Industries

This table examines stock option usage across different industries. The table presents the mean and median stock option grant rate for firms in each industry of the Fama-French 12-industry classification. The options-to-shares ratio is the number of options granted annually divided by common shares outstanding plus the number of outstanding options, and it is measured in the two fiscal years before FAS 123-R takes effect. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Variable definitions are in the Data Appendix.

Industry	Options-to-Shares Ratio		Description
	Mean	Median	
Information Technology (Business Equipment)	0.032	0.025	Computers, Software, and Electronic Equipment
Healthcare and Pharmaceuticals	0.031	0.024	Chemicals and Allied Products
Consumer Durables	0.020	0.011	Cars, TV's, Furniture, Household Appliances
Telecommunications	0.018	0.009	Food, Tobacco, Textiles, Apparel, Leather, Toys
Other	0.018	0.010	Healthcare, Medical Equipment, and Drugs
Shops	0.017	0.011	Machinery, Trucks, Planes, Off Furn, Paper, Com Printing
Chemicals	0.017	0.009	Oil, Gas, and Coal Extraction and Products
Consumer Non-Durables	0.015	0.008	Mines, Constr, BldMt, Trans, Hotels, Bus Serv, Entertainment
Energy	0.014	0.006	Telephone and Television Transmission
Manufacturing	0.012	0.007	Wholesale, Retail, and Some Services
Total	0.023	0.015	

I.A. Table 2. Correlations

This table shows correlations for the sample. The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. The sample period covers the 4 quarters before through 4 quarters after FAS 123-R's (staggered) compliance dates. Variable definitions are in the Data Appendix.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
GAAP	*EPS*	(1)	1.00																	
	EBIT/Share	(2)	0.80	1.00																
	NI/Share	(3)	0.96	0.83	1.00															
	Sales/Share	(4)	0.45	0.65	0.46	1.00														
Pro Forma	*EPS*	(5)	0.65	0.61	0.63	0.35	1.00													
	EBIT/Share	(6)	0.80	0.97	0.82	0.64	0.63	1.00												
	NI/Share	(7)	0.87	0.91	0.90	0.54	0.69	0.93	1.00											
	Sales/Share	(8)	0.45	0.64	0.46	0.99	0.35	0.64	0.54	1.00										
	High- Option Firm	(9)	-0.32	-0.40	-0.32	-0.41	-0.27	-0.40	-0.34	-0.42	1.00									
	Missed Forecast	(10)	-0.25	-0.20	-0.24	-0.07	-0.21	-0.21	-0.26	-0.07	0.01	1.00								
	Missed NI Forecast	(11)	-0.22	-0.17	-0.21	-0.06	-0.19	-0.18	-0.24	-0.05	-0.01	0.74	1.00							
	Forecast Error	(12)	-0.22	-0.11	-0.20	-0.02	-0.23	-0.14	-0.22	-0.01	-0.01	0.43	0.40	1.00						
	Analyst Recommendation	(13)	0.00	0.03	-0.01	0.09	0.01	0.03	0.01	0.10	-0.08	0.00	0.01	0.01	1.00					
	Buy	(14)	-0.01	-0.05	-0.01	-0.12	-0.02	-0.05	-0.02	-0.12	0.11	0.00	-0.02	-0.01	-0.85	1.00				
	Sell	(15)	-0.10	-0.06	-0.10	0.02	-0.10	-0.06	-0.09	0.03	-0.01	0.05	0.03	0.04	0.43	-0.39	1.00			
	Log Assets	(16)	0.43	0.53	0.41	0.46	0.42	0.55	0.50	0.46	-0.36	-0.12	-0.10	-0.04	0.21	-0.21	0.08	1.00		
	Market-to-Book Ratio	(17)	-0.06	-0.13	-0.05	-0.29	-0.10	-0.13	-0.08	-0.30	0.24	-0.05	-0.04	-0.05	-0.14	0.18	-0.08	-0.30	1.00	
	Leverage	(18)	-0.02	0.17	-0.01	0.17	-0.01	0.16	0.02	0.17	-0.21	0.06	0.07	0.07	0.07	-0.08	0.06	0.29	-0.19	1.00	
	Investment/Sales	(19)	-0.31	-0.30	-0.31	-0.25	-0.40	-0.30	-0.33	-0.26	0.25	0.04	0.04	0.01	-0.11	0.13	-0.01	-0.28	0.25	0.01	1.00
	Analyst Coverage	(20)	0.25	0.24	0.24	0.09	0.25	0.26	0.28	0.09	-0.04	-0.12	-0.10	-0.05	0.18	-0.13	0.05	0.64	0.08	0.02	-0.09

I.A. Table 3. Missed Earnings Forecasts after FAS 123-R Takes Effect: Calendar Time Effects

This table compares the frequency of missed earnings forecasts for firms that complied with FAS 123-R in calendar year 2005 versus those that complied in calendar year 2006. All firms began to expense options in the first fiscal quarter after FAS 123-R compliance. Firms that complied in calendar year 2005 began to expense options in the quarter ending between September 2005 and March 2006 (Column (1)), and firms that complied in calendar year 2006 began to expense options in the quarter ending between April and September 2006 (Column (2)). The sample is 3,915 firms in the intersection of the Compustat and IBES databases. The sample excludes financials and utilities. Observations are at the firm-fiscal quarter level, for the four fiscal quarters before through four fiscal quarters after FAS 123-R's (staggered) compliance dates. We label the analysis window as [-4,+4] fiscal quarters, with option expenses recorded starting in quarter +1. *Missed Forecast* equals 1 for fiscal quarters in which the firm's actual earnings per share (EPS) are below analysts' mean consensus estimate, and 0 in fiscal quarters in which earnings meet or exceed the forecast. *Post FAS 123-R* equals 1 for fiscal quarters after FAS 123-R takes effect, and 0 for fiscal quarters before. *High-Option Firm* equals 1 in all fiscal quarters for firms that relied heavily on option compensation prior to FAS 123-R, and 0 for firms that did not. Regressions are restricted to firms followed by at least three analysts. *t*-statistics are based on standard errors that are clustered at the firm level. ***, **, * indicate significance levels of 1%, 5%, and 10%, respectively. Variable definitions are in the Data Appendix.

Dependent variable	*Missed Forecast*	
Sample:	Fiscal quarters ending between Sept. 2005 and March 2006	Fiscal quarters ending between April and Sept. 2006
Estimation window	[-4; + 4] quarters around FAS 123-R	
	(1)	(2)
Post FAS 123-R x High-Option Firm	0.118***	-0.175
	(4.13)	(-1.49)
Post FAS 123-R	-0.060***	0.078
	(-2.95)	(0.87)
High-Option Firm	-0.046	0.167
	(-1.64)	(1.41)
Log Assets (t-1)	-0.035***	-0.046***
	(-4.46)	(-5.03)
Leverage (t-1)	-0.009	-0.029***
	(-1.39)	(-4.22)
Market-to-Book Ratio (t-1)	0.143***	0.177***
	(3.22)	(3.22)
Investment/Sales (t-1)	0.029	0.038
	(0.65)	(0.68)
Log Analyst Coverage	-0.013	-0.003
	(-0.73)	(-0.13)
Industry Fixed Effects	Yes	Yes
Fiscal-Year-End Fixed Effects	Yes	Yes
Firm Fixed Effects	No	No
Fiscal-Quarter Fixed Effects	No	No
Calendar-Quarter Fixed Effects	No	No
Obs.	4914	3173
Adj. R-squared	0.027	0.044