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Bundled forecasts in empirical accounting research ☆

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ABSTRACT

This paper examines "bundled" forecasts, or management earnings forecasts issued concurrently with earnings announcements, which have evolved to become the most common type of management forecast. We describe the econometric problems associated with measuring bundled forecast news and, in particular, provide evidence that the measurement error in the traditional calculation of forecast news is material and is systematically associated with variables frequently studied in forecast-related research. We illustrate an application of conditional expectations to overcome these problems. Finally, we offer guidance and caveats to researchers considering the use of this method in the future.

1. Introduction

The management earnings forecasts literature spans several decades, and has addressed numerous research questions. Among those questions are whether forecasts have information content and are viewed as credible, whether investors respond to different forecast types in different ways, whether forecasts reflect opportunistic behavior on the part of the manager, and whether forecasts are truly voluntary. "Forecast news", or the difference between the forecasted value and prevailing expectations, is central to answering each question.

Due to a recent shift in forecasting practices, the conventional approach for measuring forecast news may no longer be appropriate. Specifically, the now-common practice of issuing forecasts in conjunction with earnings announcements, noted by Anilowski et al. (2007), results in both noise and bias in the conventional measure of forecast news.[1] Implicitly acknowledging this problem, prior studies of management forecasts often exclude these "bundled" forecasts from their samples. However, doing so for recent periods (when roughly 70–80% of all forecasts are bundled) causes two problems: a substantial loss of empirical power

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[1] Waymire (1984) notes that contemporaneous disclosures, in general, can bias measured forecast news. In Section 2.2, we discuss the factors making noise and bias especially likely when forecasts are issued concurrently with earnings announcements.

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and the risk of drawing erroneous conclusions from a non-representative sample. Considering the ongoing importance of management forecasts,[2] a new approach to measuring and evaluating forecast news is necessary.

This study examines bundled forecasts, with the goal of identifying and correcting the measurement error inherent in the traditional calculation of forecast news as applied to bundled forecasts. We provide a new method for calculating forecast news for bundled forecasts, validate this measure based on investor response, and show that failing to appropriately measure forecast news yields misleading inferences about forecast characteristics and the managerial incentives behind those disclosures.

As an illustration of misleading inferences, we estimate that the conventional measure of forecast news misclassifies approximately one-quarter of bundled forecasts, most of which are good news forecasts incorrectly identified as bad news. (A detailed discussion can be found in Section 5.) After we account for the measurement error, the bundled forecasts in our sample represent good news, on average, which is consistent with evidence of selective disclosure in other settings (Cheng and Lo, 2006; Kothari et al., 2009; Sletten, 2009). Using the traditional method of calculating forecast news would have implied the opposite—that forecasts were more likely to reflect bad news.[3]

We then identify several specific contexts in which researchers have used forecast news as a measure of strategic disclosure, such as securities litigation, insider trading, and the meeting-or-beating expectations "game." In each of these settings, the measurement error in traditional forecast news is significantly correlated with the variable of interest, which indicates that incorrectly measuring forecast news will likely bias empirical studies in these areas. Including the contemporaneous earnings surprise as an additional regressor (as prior studies have done in an effort to solve the problem) is not a fix; forecast news measurement error continues to be correlated with variables such as insider trading and litigation risk even after controlling for the earnings surprise. Nor can researchers avoid the problem by excluding bundled forecasts from their sample. We document that the characteristics of bundled forecasts differ significantly from those of non-bundled forecasts; inferences drawn from a sample of non-bundled forecasts do not appear to be generalizable to the (much larger) population of bundled forecasts.

In short, the traditional measure of forecast news introduces bias into a variety of commonly studied research settings, and this paper describes a method of correcting that bias. We recognize that our method of calculating conditional analyst expectations and forecast news is new and will likely be improved in the future. In addition, we note several caveats related to our proposed method. First, our measure of conditional forecast news is, itself, measured with error. We use the analyst response to non-forecasting firms' earnings announcements to infer how analysts *would have* responded to forecasting firms' earnings announcements in the absence of a forecast. If analyst response differs between forecasting and non-forecasting firms because of non-forecast reasons (e.g., differences in other earnings-related disclosures), the accuracy of the estimate will suffer.

Second, our ability to estimate analyst response is better for shorter-horizon forecasts of annual earnings, and is worse for quarterly earnings estimates and longer-horizon estimates. Consequently, conditional forecast news for quarterly and long-horizon forecasts will be measured with less precision than for annual and short-horizon forecasts.[4] Finally, our model uses only the current earnings surprise to update analyst expectations, which effectively treats forecasting firms as if they issue a single forecast with their earnings announcement. In practice, some firms issue multiple forecasts with their earnings announcements. Because of this, our model is more appropriate when firms issue a single forecast or when researchers are not interested in distinguishing forecast news among multiple forecasts issued on the same date.

We also emphasize that our method may not be appropriate or desirable in all forecast-related settings. The methodological issues discussed in this paper relate solely to forecast *news* (and the associated market response); forecast bundling does not cause measurement problems in forecast bias (relative to realized earnings) or forecast precision. Researchers may also consider different techniques to quantify forecast news for bundled forecasts. One alternative would be to follow a similar procedure to what we describe, but decompose the observed stock price response into the forecast and non-forecast components. The estimated forecast component of returns could then be used to infer the sign/magnitude of forecast news.[5]

Notwithstanding these caveats, we believe this study identifies a common measurement problem and provides a way for researchers to address that problem. At the very least, researchers can use conditional forecast news in concert with traditional forecast news to triangulate their results and ensure the results are not influenced by the measurement error we discuss.

This paper proceeds as follows: Section 2 discusses related research and motivates our analysis. Our sample is described in Section 3. Section 4 describes the process by which we estimate and validate conditional forecast news, while Section 5 examines the conditional forecast news and the estimated measurement error in unconditional news. Section 6 discusses alternative methods for calculating conditional forecast news. Section 7 summarizes.

[2] Beyer et al. (2010) document that, within a quarter, management forecasts provide the majority of accounting-based information to the stock market. Berger (2011) discusses several limitations to the analysis provided in Beyer et al. (2010).

[3] Altinkiliç and Hansen (2009) identify a similar problem for analyst recommendations—recommendations are frequently issued in response to company events. They show that using daily stock returns to measure the impact of recommendation revisions erroneously combines the effect of the recommendation with the effect of the corporate event. Using narrow return intervals, they document that analyst recommendation revisions are usually information-free, in contrast to prior research that was subject to the contamination of contemporaneous events.

[4] This is not to say that the underlying measurement problem is less severe for these forecasts, but rather that our correction for the problem is less precise than for shorter-term horizons.

[5] As we discuss in Section 6.2, forecast news and the investor response to that news are two different constructs. Forecast news can be thought of as the signal sent by the manager, while the investor response is the perception of that signal, colored by investors' assessment of the manager's credibility. Depending on the particular research question, one construct may be more appropriate than the other.

2. Related research

In this section, we discuss the use of forecast news in empirical accounting research, the methodological problems associated with forecasts in the presence of contemporaneous news (including forecasts bundled with earnings announcements), and the widespread move to bundled forecasts in the recent past.[6] In Section 2.4, we outline our hypotheses and research design.

2.1. The use of forecast news in empirical accounting research[7]

Early empirical, forecast-related studies investigate whether management forecasts convey information to investors. For example, Foster (1973) uses observed volume and price behavior around the forecasts to infer that management forecasts convey new information. Subsequent research by Patell (1976), Jaggi (1978), Nichols and Tsay (1979), and Penman (1980) extends those results by examining whether management forecast-related returns are associated with the sign of the forecast news. Such studies necessarily require a measure of forecast news to distinguish between good news and bad news forecasts. In each of the previously mentioned studies, forecast news is evaluated based on how the manager's forecast compares to a mechanical model of market expectations based on prior earnings. These studies find evidence of a positive relation between returns and forecast news, although these results are restricted to positive forecast news and not detected for negative forecasts.

Noting that analyst estimates are a better proxy for market expectations than the previously employed earnings models, Waymire (1984) refines the calculation of forecast news by comparing the forecasted value to analyst expectations, rather than to a model of earnings expectations. Using this approach, he finds that both good news and bad news forecasts are associated with significant abnormal stock returns of the expected signs. (Relevant to our study, Waymire notes that fewer than 20% of his sample forecasts are issued in isolation, and attempts to control for the contemporaneous information by grouping disclosures into good news and bad news packages. He finds that accounting for contemporaneous information increases the power of his tests.)

After showing that management forecasts convey information to investors, researchers moved on to study whether investor responses to management forecasts vary with factors such as the credibility of the manager, the type of forecast, and the firm's economic environment. For example, Jennings (1987) finds that investor response is stronger when "believability" (measured by the magnitude of analyst revisions) is higher, and that this effect is important only for good news forecasts. In a similar vein, Pownall and Waymire (1989) study the credibility of (unaudited) management forecasts relative to (audited) earnings announcements, and find no evidence that investors discount forecasts. Since then, many researchers have continued to examine investor responses to management forecasts.[8] Just as in the earlier studies, this body of research depends upon an appropriate measure of forecast news; investor response is measured per unit of forecast news.

Another stream of literature focuses on management incentives, and attempts to discern managers' goals using forecast characteristics.[9] An early example is Ajinkya and Gift (1984), who argue that managers use forecasts to adjust market participants' expectations, and conclude that managers issue both good and bad news forecasts to do so, rather than selectively disclosing only when they possess good news. In contrast, Kothari et al. (2009) find an asymmetric response to good and bad forecast news and conclude that, on average, managers delay the release of bad news. Other studies ask the question of whether managers selectively disclose good news in specific settings. These studies include Frankel et al. (1995), who study disclosure attributes prior to equity financing, Cheng and Lo (2006), who ask whether managers take advantage of voluntary disclosure to profit from insider trading, and Kross et al. (2011), who ask whether "meet or beat" firms are more likely to issue bad news or good news forecasts.

Successful execution of these and other forecast-related research questions requires an appropriate measure of forecast news. The next section discusses a significant impediment to calculating forecast news: the presence of confounding events, specifically earnings announcements.

2.2. Forecasts in the presence of contemporaneous news

Confounding events have challenged researchers focusing on management forecasts. A common example is the analysis of market reaction to assess the information content of those forecasts, like those described in the previous section. Obviously, if the forecast is issued contemporaneously with some other news event, it is difficult to attribute the market

[6] Prior studies (e.g., McNichols, 1989; Rogers and Stocken, 2005) distinguish management forecasts from management "warnings" or "preannouncements", which are forecasts issued so late in the fiscal period that the manager effectively knows what actual earnings will be. We do the same, limiting our sample to only those forecasts issued prior to the end of the fiscal period. Our conclusions are unaffected if we adopt a broader definition of warnings and exclude all forecasts issued within 20 trading days of the end of the fiscal period.

[7] Because the forecasting literature is so voluminous, this is not an exhaustive review. Instead, this section describes the variety of ways in which forecast news has been, and continues to be, of central importance to the forecasting literature.

[8] Examples include Baginski and Hassell (1990), Han and Wild (1991), Baginski et al. (1993, 1994), Pownall et al. (1993), Baginski et al. (2000), Hutton et al. (2003), Atiase et al. (2005), Rogers and Stocken (2005), Rogers et al. (2009), Hilary and Hsu (2011).

[9] Papers in this setting tend to characterize management earnings forecasts as entirely voluntary disclosures. As noted by Heitzman et al. (2010) and Li et al. (2010), though, securities laws and exchange requirements influence the disclosure choice, as well.

reaction to the management forecast rather than the other news. In recognition of this problem, researchers frequently exclude forecasts made in conjunction with other news items (e.g., Foster, 1973; Ajinkya and Gift, 1984; Skinner, 1994; Yeo and Ziebart, 1995; Coller and Yohn, 1997; Hutton et al., 2003; Anilowski et al., 2007; Hilary and Hsu, in press), or ensure that their results are robust to excluding those forecasts (e.g., Patell, 1976; Penman, 1980; Pownall and Waymire, 1989; Cheng and Lo, 2006).[10] Some studies, though, make no mention of contemporaneous events in either their sample description or empirical tests, leaving the possibility that such events may influence their results (e.g., Jennings, 1987; McNichols, 1989; Baginski et al., 1993; Frankel et al., 1995; Ajinkya et al., 2005; Kross et al., 2011).

In addition to biasing return-based studies, concurrent disclosures introduce noise, and potentially bias, into measured management forecast news. Forecast news is typically calculated as the manager's forecast of future earnings minus analysts' estimates of those future earnings immediately prior to the forecast (Ajinkya and Gift, 1984; Waymire, 1984, 1985; McNichols, 1989; Baginski et al., 1993). If a researcher can establish that no significant events occurred between the date of the analyst estimate and the date of the manager's forecast, then it is reasonable to believe that the analyst consensus is a valid proxy for the market's up-to-date expectation of future earnings. However, if significant events occur between those dates, there could be a material difference between the prevailing (unconditional) expectation, as proxied by the consensus analyst estimate, and the market's expectation conditional on the event. Using the traditional approach to measure forecast news when forecasts are released concurrently with other disclosures can therefore result in a biased measure of forecast news.

Three factors make this problem especially salient when forecasts are bundled with earnings announcements. First, analysts tend to revise estimates of future earnings immediately after quarterly earnings announcements (Stickel, 1989). So, if an earnings announcement is imminent and analysts possess updated information about future earnings, they may withhold their revised estimate until after the release of the current period's earnings (knowing that they will almost certainly be issuing a revised estimate after the earnings report). In isolation, this would simply result in pre-earnings analyst estimates often being stale. However, given the remaining two factors, the difference between the stale estimates and (unobserved) actual estimates is likely to be both biased and correlated with the earnings surprise.

The second factor is the stylized fact that analysts' estimates tend to begin at optimistic levels, and then decline over time to pessimistic levels (Matsumoto, 2002; Richardson et al., 2004). As a result of this pattern, which some describe as an intentional "walk-down" to allow managers to beat analysts' consensus estimates, we expect a systematic downward revision in analyst estimates around earnings announcements.

The third factor is based on the persistence of earnings and earnings surprises. Since earnings innovations have positive persistence (Kormendi and Lipe, 1987), and market participants update their beliefs about future earnings based on current period results (Stickel, 1989; Ball and Bartov, 1996), the pre-earnings analyst estimate will be a stale measure of market expectations, with predictable errors.

The combination of these factors suggests that evaluating management forecast news based on pre-forecast (and, therefore, pre-earnings) estimates is likely to yield a measure of forecast news that is both downwardly biased and spuriously correlated with the contemporaneous earnings surprise. Although we are not the first to highlight the concern with regard to contemporaneous disclosures,[11] we believe that we are the first to provide a systematic approach to calculating forecast news that accounts for each of the identified factors and to quantify the difference between the traditional calculation and our new calculation. (We describe our approach in detail in Section 5.) The next section discusses the dramatic increase in bundled forecasts over the last 10–15 years.

2.3. Increase in bundled forecasts

Anilowski et al. (2007) show that bundled forecasts increased steadily from 1994 until 2004, with the greatest increase occurring in the 2000–2001 period.[12] This increase is consistent with two factors that have been studied in prior literature: a steady expansion in earnings announcement information over time (Francis et al., 2002), and the enactment of Reg FD. Examples of the expanded disclosures include segment information (Botosan and Harris, 2000), balance sheet information (Chen et al., 2002), and the hosting of earnings-related conference calls (Bushee et al., 2003).

[10] Several studies examine the features of concurrent disclosures. Hoskin et al. (1986) study the effect of concurrent disclosures on returns and find that many news types (including prospective officer comments, but not specific forecasts of earnings) have predictable associations with stock returns. Hutton et al. (2003) analyze supplementary disclosure provided with forecasts and find that bad news is always interpreted as bad news by investors, but good forecast news is only viewed as credible when supplemented by verifiable forward-looking statements. Baginski et al. (2004) similarly focus on managers' decisions to provide attributions with their earnings forecasts. Atiase et al. (2005) study earnings and forecasts issued simultaneously to assess whether investors appear to prefer (more reliable) earnings to (more relevant) forecasts of future earnings. For a hand collected sample, they show that current period earnings have a stronger association with returns than forecast news, and conclude that investors prefer reliability to relevance. More recently, Milian (2008) uses a large sample from First Call and finds results that conflict with Atiase et al.'s study.

[11] Waymire (1984) notes the probable bias introduced by contemporaneous disclosures and documents that the traditional measure of forecast news is positively associated with the news in the concurrent disclosure.

[12] Table 2 of Anilowski et al. (2007) shows the proportion of annual forecasts at the earnings announcement date increasing from 31% in 2000 to 55% in 2001. The proportion of quarterly forecasts at the earnings announcement date increases from 15% in 2000 to 34% in 2001. Depending on the sample selection procedures, bundled forecasts may be even more prominent in a particular research setting than in the general population. For example, Gong et al. (2009) report that 87% of their management forecasts were issued with earnings announcements.

The over-time increase in earnings-related disclosure, though, does not explain the spike observed in the 2000–2001 period. Anilowski et al. note that the timing suggests a possible link with Reg FD, which became effective on October 23, 2000, but they do not investigate why the regulation would have such an effect. To gain insight into why bundled forecasts would be relatively more attractive after Reg FD, we contacted several investor relations consultants. Our discussions with these consultants revealed the likely link between Reg FD and the increase in bundled forecasts: earnings-related conference calls. They explained that forecasts tend to generate a flurry of analyst questions, which managers were previously able to answer privately.[13] In a post-Reg FD world, such private communication of material information is explicitly prohibited, leaving managers to choose among no longer issuing forecasts, no longer responding to analysts' questions, and responding to analysts' questions in a public venue. Earnings announcement conference calls provide an opportunity for managers to issue and discuss forecasts. (We provide supporting empirical evidence for this claim in Section 3.)

In summary, management forecasts have been the focus of substantial research and, given their continued importance, are likely to be studied at length in the future. Forecast news is central to analyzing most forecast-related research questions and is measured with error when forecasts are issued in conjunction with earnings announcements. Due to the shift towards bundled forecasts and the related error in the conventional measure of forecast news, the vast majority of management forecasts will either be discarded or incorrectly measured. Our goals are to (1) develop a method to improve the measurement of forecast news for bundled forecasts, (2) validate our measure of forecast news relative to the traditional measure, and (3) illustrate several research settings where correcting the measurement error is likely to be important.

2.4. Hypothesis development

In general terms, our null hypothesis is that research studies examining management forecasts are unaffected by measurement error in the traditional measure of forecast news. It is not feasible to conclusively determine how a different version of forecast news would impact the results in prior research. Instead, we select a sample of variables that have been studied in prior research and assess whether our calculation method is likely to affect studies that focus on those variables.

Our assessment is based on the following process: we first estimate conditional analyst expectations following the earnings announcement, reflecting the hypothetical (and unobserved) future earnings estimates that analysts possess immediately following the earnings announcement, but without the effect of the management earnings forecast. We then measure conditional forecast news as the management earnings forecast minus this conditional expectation. We compare our measure of conditional forecast news to the traditional measure of forecast news, and label the difference as the measurement error.

We examine how this measurement error relates to questions studied in prior research, the most fundamental of which is whether managers, on average, disclose good news more readily than bad news. This topic has been the focus of extensive studies, many of which use the distribution of forecast news to assess the tendency for managers to disclose good vs. bad news forecasts, and continues to be of interest (for example, see Kothari et al., 2009).[14] Consistent with this, we ask two questions: (1) Is measurement error biased either positively or negatively? and, (2) Is the inference of selective disclosure (i.e., whether forecast news tends to be positive or negative, on average), affected by the measurement error?

We then examine the correlation between the measurement error in the traditional proxy for forecast news and the following items, each of which has been studied in the context of management forecasts and disclosure incentives: *Insider Trading/Ownership* (Noe, 1999; Rogers and Stocken, 2005; Cheng and Lo, 2006; Rogers, 2008; Kothari et al., 2009; Li et al., 2012), *Litigation Risk* (Kasznik and Lev, 1995; Skinner, 1994; Rogers and Stocken, 2005; Baginski et al., 2002), and *Meeting or Beating Earnings Estimates* (Soffer et al., 2000; Bartov et al., 2002; Burgstahler and Eames, 2006; Kross et al., 2011). A significant correlation between measurement error and these variables suggests that measurement error in management forecast news could bias studies that focus on these variables.

In each of our correlation tests, we also control for the current period's earnings surprise. Some prior studies include the sign and magnitude of the contemporaneous earnings surprise in their empirical tests, potentially controlling for the problem that we describe (e.g., Waymire, 1984; Atiase et al., 2005). By including earnings surprises (which we expect to be correlated with our measurement error) in our correlation tests, we can assess whether this variable adequately controls for the measurement error that we document.

3. Sample selection and descriptive statistics

3.1. Earnings announcements

We start with the intersection of earnings announcements on I/B/E/S and First Call between 1995 and 2007 that have both an actual reported earnings figure as well as at least one I/B/E/S analyst estimate for that period. Additionally,

[13] This observation is consistent with the results in Francis et al. (1997), who study investor conference transcripts between 1986 and 1992 and find that over half of analysts' questions seek forward-looking information from managers, most commonly regarding sales and earnings levels.

[14] Beyer et al. (2010) discuss this literature in their survey of financial reporting. Studies specifically using the distribution of forecast news to infer the tendency to disclose good news include Ajinkya and Gift (1984), McNichols (1989), Baginski et al. (1994), and Anilowski et al. (2007).

we require stock price and return information in CRSP. We classify each quarterly earnings announcement into one of three categories based on the earnings surprise, calculated as the difference between actual earnings and the mean analyst estimate as of 3 trading days prior to the announcement (deflated by the stock price 3 trading days prior to the announcement). We classify an announcement as a positive surprise if the deflated earnings surprise is greater than 0.0001 (half a cent on a $50 stock). We classify an announcement as neutral if the deflated earnings surprise is between 0.0001 and −0.0001, and we classify an announcement as a negative surprise if the deflated earnings surprise is less than −0.0001.[15] Our sample includes 181,435 quarterly earnings announcements, 56.3% of which were positive surprises, 9.1% of which were neutral, and 34.6% of which were negative surprises.[16]

3.2. Management forecasts and conference calls

We obtain management forecasts of earnings per share from First Call's Company Issued Guidelines (CIG) database and use all forecasts issued from 1995 to 2007.[17] These forecasts are issued via press releases, conference calls, and interviews and may be point estimates, range estimates, open-ended estimates, or qualitative in nature. Like Anilowski et al. (2007), we define *Bundled* forecasts as those forecasts falling within two days of the earnings announcement date and *Non-Bundled* forecasts as those issued outside earnings announcement periods. To focus on earnings forecasts rather than earnings preannouncements, we follow prior literature and eliminate forecasts issued on or after the fiscal period end (Waymire, 1984; McNichols, 1989; Frankel et al., 1995; Rogers and Stocken, 2005; Li et al., 2012).[18]

We obtain earnings-related conference calls from First Call and Best Calls. Our First Call dataset includes conference calls between the 1st Quarter of 1995 and the 1st Quarter of 2003, while the Best Calls database starts coverage in 1999 and includes conference calls through the end of 2007. Detailed descriptions of these databases are provided by Frankel et al. (1999) and Bushee et al. (2003).

3.3. Descriptive statistics

Panel A of Table 1 provides the details of the management forecast sample selection separated into pre-Reg FD and post-Reg FD periods. The number of management forecasts has increased substantially since the mid-1990s, from a total of 668 in 1995 to 8,569 in 2007. A portion of this trend could be due to expansion of First Call's coverage through time. Also evident is an even greater increase in bundled forecasts as a percentage of all forecasts, moving from less than 10% in 1995 and 1996 to roughly 80% in 2007. Across our sample period, these bundled management forecasts make up over 63% of the forecasts in the First Call universe. In the pre-Reg FD period they are 25.3%, while in the post-Reg FD period they make up 70.0%.

Panel B of Table 1 documents a similar pattern, but focuses on how frequently earnings announcements are accompanied by a management forecast. The percentage of bundled earnings announcements has increased from 3.3% in the pre-Reg FD period to 28.9% in the post-Reg FD period.[19] The patterns in Table 1 illustrate that, more and more, studying either earnings announcements or management forecasts necessitates an understanding of bundled forecasts and bundled earnings announcements.

Table 2 provides descriptive statistics for *Bundled* and *Non-Bundled* forecasts, again presented for pre-Reg FD (Panel A) and post-Reg FD (Panel B). The final column presents the differences between bundled and non-bundled forecasts, as well as the statistical significance of these differences. To mitigate the effect of extreme observations and potential data errors, we winsorize variables at the 1% and 99% levels.

Across the measures typically studied, bundled forecasts differ significantly from non-bundled forecasts. In both the pre-Reg FD and post-Reg FD periods, the stock market response around the forecast release, *Forecast Period Stock Return*, is significantly more positive (less negative) for bundled forecasts than for non-bundled forecasts. *Traditional Forecast News*, defined as the difference between the forecasted value and pre-forecast analyst expectations, is also less negative for bundled forecasts than for non-bundled forecasts. Both the signed value and absolute values of *Forecast Error* differ across the bundled/non-bundled split, but the direction of the difference is inconsistent across the pre- and post-Reg FD periods. Finally, bundled forecasts have longer horizons than non-bundled forecasts, with the difference being much larger in the pre-Reg FD period (65 days difference) than in the post-Reg FD period (14 days difference, with the pre- vs. post-FD difference significant at the $p=0.05$ level). The difference in forecast horizon stems from bundled forecasts being issued approximately 23 days earlier in the quarter than non-bundled forecasts.

[15] Our results are robust to using cutoffs of ±0.0002 and ±0.0005.

[16] Using median analyst estimates results in a similar distribution: 55.0% positive earnings surprises, 13.7% neutral surprises, and 31.4% negative surprises. Throughout the paper, our results are robust to using the median analyst earnings estimate (and revision) rather than the mean.

[17] Even though our management forecasts come from First Call, we use I/B/E/S for analyst forecasts and actual earnings because I/B/E/S provides raw files, unadjusted for stock splits. The raw files do not suffer from the rounding problems associated with the split-adjusted files (Diether et al., 2002), and they enable us to ensure that management forecasts, analyst forecasts, actual earnings, and prices are all on the same split-adjusted basis.

[18] All of our conclusions are unchanged if we adopt an expanded definition of preannouncements and retain only forecasts issued more than 20 trading days before the end of the fiscal period.

[19] The total number of bundled earnings announcements in Panel B is less than the total number of bundled forecasts in Panel A because firms can issue multiple forecasts on a single earnings announcement date.

Table 1
Sample population.

Panel A: Management forecasts, "Bundled" (issued with an earnings announcement) and "Non-Bundled"

Year	Total	Bundled forecasts	Non-Bundled forecasts	Bundled as % of forecasts
1995	668	65	603	9.7%
1996	960	103	857	10.7%
1997	1,409	225	1,184	16.0%
1998	2,818	615	2,203	21.8%
1999	3,245	1,069	2,176	32.9%
2000	2,462	852	1,610	34.6%
Pre-Reg FD total	11,562	2,929	8,633	25.3%
Year	**Total**	**Bundled forecasts**	**Non-Bundled forecasts**	**Bundled as % of forecasts**
2000	1,239	427	812	34.5%
2001	7,871	4,373	3,498	55.6%
2002	8,938	5,628	3,310	63.0%
2003	8,982	6,181	2,801	68.8%
2004	10,214	7,266	2,948	71.1%
2005	9,261	7,010	2,251	75.7%
2006	9,547	7,499	2,048	78.5%
2007	8,569	6,865	1,704	80.1%
Post-Reg FD total	64,621	45,249	19,372	70.0%
Grand total	76,183	48,178	28,005	63.2%

Panel B: Earnings announcements, "Bundled" (issued with an earnings forecast) and "Non-Bundled"

Year	Total	Bundled	Non-Bundled	% Bundled
1995	8,143	79	8,064	1.0%
1996	9,211	116	9,095	1.3%
1997	10,805	223	10,582	2.1%
1998	15,767	531	15,236	3.4%
1999	16,810	875	15,935	5.2%
2000	13,432	658	12,774	4.9%
Pre-Reg FD total	74,168	2,482	71,686	3.3%
Year	**Total**	**Bundled**	**Non-Bundled**	**% Bundled**
2000	2,203	295	1,908	13.4%
2001	14,602	3,014	11,588	20.6%
2002	14,158	3,717	10,441	26.3%
2003	14,086	4,102	9,984	29.1%
2004	14,595	4,906	9,689	33.6%
2005	15,497	4,812	10,685	31.1%
2006	15,901	5,241	10,660	33.0%
2007	16,225	4,900	11,325	30.2%
Post-Reg FD total	107,267	30,987	76,280	28.9%
Grand total	181,435	33,469	147,966	18.4%

Notes: This table documents the population of earnings announcements and forecasts used in our study.
Panel A shows management forecasts, which we obtain from First Call's Company Issued Guidelines database. In order for a forecast to be included, the forecast must have been a forecast of Earnings Per Share issued between 1995 and 2007 by a firm with CRSP and IBES coverage. Bundled Forecasts (Non-Bundled Forecasts) are those forecasts (not) issued in the 5-day window surrounding an earnings announcement.
Panel B shows actual earnings announcements. Earnings announcements are included if the firm is covered by both First Call and IBES, with both datasets reporting the same earnings announcement date. The earnings announcements are separated into 2 groups based on whether the firm issued a forecast in the 5-day window surrounding the earnings announcement ("Bundled") or not ("Non-Bundled"). The decrease in Bundled Forecasts from Panel A to Panel B is due to the fact that firms issue multiple forecasts on the same date. (Multiple bundled forecasts issued on the same date will count multiple times in Panel B but only once in Panel A.)
In both panels, the year 2000 is included twice—the first time including observations before the enactment of Reg FD (October 23, 2000), the second time including observations on or after the enactment.

3.4. The decision to issue a forecast when announcing earnings

We next analyze management's decision to issue a forecast with their earnings announcement. We do so for two reasons. The first is to provide more information about why the dramatic shift in forecasting practices occurred.

Table 2
Management forecast characteristics.

Panel A: Pre-Reg FD management forecasts

	Bundled		Non-Bundled		Bundled–Non-Bundled
Variable	***N***	**Mean**	***N***	**Mean**	**Mean**
Forecast period stock return	2,929	−1.81%	8,633	−6.20%	4.39%***
|Forecast period stock return|	2,929	8.38%	8,633	10.98%	−2.61%***
Traditional Forecast News	1,486	−0.30%	4,573	−0.66%	0.36%***
|Traditional Forecast News|	1,486	0.68%	4,573	0.90%	−0.23%***
Forecast Error	1,444	−0.70%	4,634	−0.46%	−0.24%***
|Forecast Error|	1,444	1.26%	4,634	0.96%	0.31%***
Horizon	2,929	186.60	8,633	121.12	65.49***
Issued	2,929	26.63	8,608	58.98	−32.36***

Panel B: Post-Reg FD management forecasts

	Bundled		Non-Bundled		Bundled–Non-Bundled	Diff in diff
Variable	***N***	**Mean**	***N***	**Mean**	**Mean**	**Mean**
Forecast period stock return	45,249	0.41%	19,372	−1.65%	2.06%***	2.33%***
|Forecast period stock return|	45,249	6.21%	19,372	7.09%	−0.88%***	−1.73%***
Traditional Forecast News	41,363	−0.08%	14,894	−0.26%	0.18%***	0.18%***
|Traditional Forecast News|	41,363	0.38%	14,894	0.58%	−0.20%***	−0.03%
Forecast Error	40,551	−0.20%	15,539	−0.33%	0.14%***	−0.38%***
|Forecast Error|	40,551	0.78%	15,539	1.02%	−0.23%***	0.54%***
Horizon	45,249	159.84	19,372	145.53	14.31**	51.18**
Issued	45,249	29.38	19,323	54.53	−23.35**	−9.01**

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level). All continuous variables are winsorized at the 1% and 99% levels.
Bundled Forecasts (Non-Bundled Forecasts) are those forecasts (not) issued within 2 days of an actual earnings announcement.
Forecast Period Stock Return is the firm's stock return for the 3 trading days centered on the forecast date. *Traditional Forecast News* is the manager's earnings forecast minus the mean analyst estimate 3 trading days prior to the forecast, deflated by the firm's stock price 3 trading days prior to the forecast. *Forecast Error* is the firm's actual earnings (from IBES) minus the manager's estimate, deflated by the firm's stock price 3 trading days prior to the forecast. For both *Traditional Forecast News* and *Forecast Error*, the manager's estimate is equal to the point estimate provided or the midpoint of the range estimate—neither measure is calculated for open-ended or qualitative forecasts. *Horizon* is the number of days between the forecast date and the end of the fiscal period being forecast. *Issued* is the number of days between the most recent fiscal quarter end and the forecast date.

The second is to calculate propensity scores (i.e., the likelihood that a particular firm will issue a forecast at a particular earnings announcement date), which we use when calculating our adjusted measure of forecast news.[20]

We analyze the decision to issue an earnings-period forecast using a probit regression, with the dependent variable equal to 1 for earnings announcements accompanied by forecasts and 0 for earnings announcements without forecasts. The independent variables are defined as follows:

Conference Call:	Equal to 1 if the firm hosted a conference call within one day of the earnings announcement, and 0 otherwise
Post-Reg FD:	Equal to 1 if the earnings announcement was after October 23, 2000, and 0 otherwise
Provided Forecast for Current Earnings:	Equal to 1 for earnings announcements for which management had previously issued an earnings forecast, and 0 otherwise
Bundled Forecast at Last Earnings:	Equal to 1 if the firm issued a forecast at the prior quarter's earnings announcement date.
Positive Earnings Surprise Indicator:	Equal to 1 for earnings surprises (actual earnings minus analyst estimates, deflated by stock price) greater than 0.0001
Negative Earnings Surprise Indicator:	Equal to 1 for earnings surprises (actual earnings minus analyst estimates, deflated by stock price) less than −0.0001
|*Deflated Earnings Surprise*|:	Absolute value of the actual earnings minus analyst estimates, deflated by stock price
Loss:	Equal to 1 for negative reported earnings

[20] As we discuss in Section 4, our calculation of forecast news uses analyst earnings revisions for non-forecasting firms to estimate how analysts would have revised their earnings estimates for forecasting firms, had those firms not issued a forecast. We include the propensity score in this calculation to account for (observable) differences between forecasting and non-forecasting firms that could influence analyst revision behavior.

Analyst Dispersion:	Standard deviation of analyst estimates for the current period's earnings
Prior Stock Return:	Cumulative stock return over the 90-day period ending 3 trading days prior to the earnings announcement
Log(Market Value):	Natural logarithm of market value of equity, 3 trading days prior to the earnings announcement
Log(Analyst Following):	Natural logarithm of the number of analysts with outstanding I/B/E/S estimates 3 trading days prior to the earnings announcement
Proportion Meet-or-Beat:	The percentage of last 4 earnings announcements that the firm met or beat analyst expectations
Year:	Year of the earnings announcement

We perform this regression over two samples—the full earnings announcement sample from 1995 to 2007 and the post-Reg FD sample from 2000 to 2007. We use the full sample to examine whether the interaction between Reg FD and conference calls affects the likelihood of issuing a bundled forecast. In other words, we use this sample to essentially validate the consultants' claim that firms are more likely to issue forecasts when they can use conference calls to respond to forecast-related analyst inquiries while complying with Reg FD.

The full 1995–2007 sample is inappropriate for the purposes of calculating propensity scores, though. Because earnings guidance was frequently provided via private communication before Reg FD's enactment, using pre-Reg FD earnings announcements introduces the possibility of misclassifying some earnings announcements as non-bundled when the manager actually did issue a forecast. Therefore, when we calculate expected analyst revisions in Section 4, we use the propensity scores from the post-Reg FD sample. For both samples, the regression includes industry fixed effects and independent variables winsorized at the 1% and 99% levels. Table 3 shows the results of the two regressions.

Several variables stand out in the results. Most prominently, whether or not a firm issued a forecast at the prior earnings announcement date (*Bundled Forecast at Last Earnings*) is the most important determinant of a firm issuing a forecast at the current earnings announcement. This is not surprising—disclosure practices are often sticky from one period to the next. Also expected is the positive coefficient on Post-Reg FD, even after controlling for a linear time trend, suggesting that Reg FD prompted the move to bundled forecasts. The coefficient on *Conference Call* is positive and significant, which is consistent with Lang and Lundholm (1996)—firms that disclose more on one dimension are likely to disclose more on another dimension. Finally, we find a positive and significant coefficient on the interaction between Post-Reg FD and Conference Call. This relation supports the consultants' explanation for why bundled forecasts increased so dramatically following Reg FD's enactment—conference calls allow managers to publicly respond to analysts' questions about management's forecast.

4. Estimating and validating conditional forecast news

Our primary objective is to examine forecast news and quantify the measurement error when using traditional methods to calculate forecast news for bundled forecasts. Recall from Panel B of Table 2 that bundled forecast news, measured traditionally, has a mean value of −0.08%. (For the remainder of the paper, we refer exclusively to forecasts issued post-Reg FD for the reasons we discussed earlier.) At first glance, this would seem to indicate that bundled forecasts reveal slightly negative news, on average. However, for reasons articulated in Section 2, the traditional measure of forecast news is subject to substantial error and bias.

In Table 4, we provide univariate statistics of the post-Reg FD bundled forecasts for the measures described in Table 2, this time separated into three groups based on the sign of the earnings news with which the forecast was bundled. (Univariate differences between the positive earnings surprise group and negative earnings surprise group are shown in the right-most column.) When split into these categories, the evidence of likely measurement error emerges. Specifically, both traditional forecast news and forecast period stock return are more positive for those forecasts issued with positive earnings surprises (0.02% and 1.94%, respectively) than for the forecasts issued with negative earnings surprises (−0.37% and −3.47%, respectively). This is precisely the pattern to be expected when using stale measures of analyst estimates that do not account for the contemporaneous earnings surprise. The positive correlation between *Traditional Forecast News* and earnings surprise is not surprising, nor is it informative about management incentives to issue favorable disclosures. Rather, the correlation is evidence of measurement bias in analyst expectations, resulting in a naïve measure of forecast news.

In the next section, we discuss our method of correcting the measurement problems described earlier.

4.1. Estimating conditional expectations of future earnings

The principal issue with measuring forecast news for bundled forecasts is that the pre-forecast analyst expectations are stale. Researchers need a measure of what the market's expectations of earnings would have been in the absence of the manager's forecast, but one that incorporates all other relevant information, namely earnings information.

We generate this measure by first distinguishing between conditional and unconditional expectations of future earnings. Consider a firm that discloses earnings, x_t, for the period ending at time t. Immediately prior to that earnings

Table 3
Determinants of forecast issuance at earnings announcement.

Independent variable	All earnings announcements Marginal effect (*z*-statistic)	Post Reg FD earnings announcements Marginal effect (*z*-statistic)
Conference Call	0.030***	0.124***
	(6.06)	(14.40)
Post-Reg FD	0.088***	
	(12.26)	
Post Reg FD*Conference Call	0.053***	
	(6.96)	
Provided Forecast for Current Earnings	0.113***	0.150***
	(31.71)	(24.34)
Bundled Forecast at Last Earnings	0.443***	0.548***
	(83.69)	(77.85)
Positive Earnings Surprise Indicator	0.006	0.021***
	(1.56)	(2.96)
Negative Earnings Surprise Indicator	−0.006	−0.009
	(−1.35)	(−1.22)
|Deflated Earnings Surprise|	0.071	−0.227
	(0.56)	(−0.93)
Loss	−0.057***	−0.104***
	(−14.88)	(−14.89)
Analyst Dispersion	−0.337***	−0.616***
	(−9.23)	(−9.31)
Prior Stock Return	−0.013***	0.003
	(−2.81)	(0.35)
Log(Market Value)	0.013 ***	0.017***
	(9.13)	(6.17)
Log(Analyst Following)	0.015***	0.025 ***
	(4.93)	(4.77)
Proportion Meet-or-Beat	0.045***	0.090***
	(11.38)	(12.21)
Year	0.006***	0.006***
	(9.94)	(5.83)
N	136,273	82,545
Pseudo R^2	46.74%	42.49%

Note: *z*-statistics in parentheses.
***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level).
This table reports the results of a probit regression with the dependent variable equal to 1 for earnings announcements accompanied by a management forecast and 0 for earnings announcements without a management forecast. The population consists of earnings announcements made from 1995 to 2007 (see Table 1 for more details).
Conference Call is equal to 1 for earnings announcements issued with a contemporaneous conference call, and 0 otherwise. *Post-Reg FD* is equal to 1 for earnings announcements after October 23, 2000, and 0 otherwise. *Provided Forecast for Current Earnings* is equal to 1 for earnings announcements for which management had previously issued an earnings forecast, and 0 otherwise. *Bundled Forecast at Last Earnings* is equal to 1 if the firm issued a forecast at the prior quarter's earnings announcement date, and 0 otherwise.
Positive Earnings Surprise Indicator is equal to 1 for earnings surprises (actual earnings minus analyst estimates, deflated by stock price) greater than 0.0001 (i.e., actual earnings exceed analyst estimates by at least half a cent for a $50 stock), and 0 otherwise. *Negative Earnings Surprise Indicator* is equal to 1 for earnings surprises less than −0.0001, and 0 otherwise. *|Deflated Earnings Surprise|* is the absolute value of the actual earnings minus analyst estimates, deflated by the firm's stock price. *Loss* is equal to 1 for negative IBES actual earnings, and 0 otherwise. *Analyst Dispersion* is the standard deviation of analyst estimates for the current period's earnings. *Prior Stock Return* is equal to the cumulative stock return over the 90-day period ending 3 trading days prior to the firm's earnings announcement. *Log(Market Value)* is the natural logarithm of the firm's market value of equity, measured 3 trading days prior to the earnings announcement. *Log(Analyst Following)* is the natural logarithm of the number of analysts with outstanding IBES estimates 3 trading days prior to the earnings announcement. *Proportion Meet-or-Beat* is the proportion of the previous 4 quarters that the firm's reported earnings met or exceeded analysts' consensus earnings estimates. *Year* is the calendar year of the earnings announcement.
All continuous independent variables are winsorized at the 1% and 99% levels. The regression includes industry fixed effects (2-digit SIC code).

announcement, analysts had expectations of earnings for both period t, $E[x_t]$, and for period $t+1$, $E[x_{t+1}]$. The earnings surprise for period t can be calculated as simply $x_t - E[x_t]$.

If the firm's manager provides a forecast for period $t+1$ earnings, $f[t+1]$, on the period t earnings announcement date, the traditional approach to calculating forecast news would use prevailing analyst estimates, $f[x_{t+1}] - E[x_{t+1}]$. However, since the earnings surprise is likely to influence analyst expectations of future earnings, the more relevant benchmark is the expectation of period $t+1$ earnings, *conditional on the fact that a period t earnings surprise has occurred*, or $E[x_{t+1}|x_t]$. In most cases, the conditional analyst expectation will differ from the unconditional expectation, with the difference being correlated with the current period's earning surprise. This difference, $E[x_{t+1}|x_t] - E[x_{t+1}]$, can be thought of as the change in next period's analyst earnings estimates due to observing current period earnings. The appropriate way to calculate

Table 4
Forecast characteristics by sign of current earnings surprise.

	Positive Earnings Surprise		Neutral Earnings		Negative Earnings Surprise		Positive Group–Negative Group
	N	Mean	*N*	Mean	*N*	Mean	Mean
Forecast period stock return	30,707	1.94%	4,730	−1.47%	9,812	−3.47%	5.41%***
|Forecast period stock return|	30,707	6.14%	4,730	5.30%	9,812	6.84%	−0.70%***
Traditional Forecast News	28,067	0.02%	4,301	−0.09%	8,757	−0.37%	0.39%***
|Traditional Forecast News|	28,067	0.32%	4,301	0.22%	8,757	0.62%	−0.31%***
Forecast Error	27,684	−0.02%	4,235	−0.24%	8,632	−0.74%	0.72%***
|Forecast Error|	27,684	0.69%	4,235	0.52%	8,632	1.22%	−0.53%***
Horizon	30,707	159.57	4,730	160.82	9,812	160.19	−0.62

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level). All continuous variables are winsorized at the 1% and 99% levels. The sample consists of management forecasts made from 2000 to 2007. This table documents the characteristics of the bundled forecasts used in our study. Bundled Forecasts are those forecasts issued within 2 days of an earnings announcement. Earnings Announcements are classified as positive surprises, neutral, or negative surprises based on the magnitude of the earnings surprise, which we calculate as the actual earnings minus analyst consensus estimate, deflated by the firm's stock price. Positive surprises are those for which the deflated earnings surprise is greater than 0.0001 (i.e., greater than half a cent for a $50 stock). Negative surprises are those for which the deflated earnings surprise is less than −0.0001. Neutral earnings announcements are those for which the deflated earnings surprise is between −0.0001 and 0.0001.

Forecast Period Stock Return is the firm's stock return for the 3 trading days centered on the forecast date. *Traditional Forecast News* is the manager's earnings forecast minus the mean analyst estimate 3 trading days prior to the forecast, deflated by the firm's stock price 3 trading days prior to the forecast. *Forecast Error* is the firm's actual earnings (from IBES) minus the manager's estimate, deflated by the firm's stock price 3 trading days prior to the forecast. For both *Traditional Forecast News* and *Forecast Error*, the manager's estimate is equal to the point estimate provided or the midpoint of the range estimate—neither measure is calculated for open-ended or qualitative forecasts.

forecast news for forecasts issued contemporaneously with other information is to estimate the market's (i.e., analysts') expectations conditional on that information.[21]

Our method for estimating conditional analyst expectations of future earnings is based on the observation that, even in the absence of an explicit management forecast, analysts update their earnings estimates for future earnings after observing current period earnings. In order to compare the manager's forecast to the (unobserved) conditional analyst expectations, we estimate conditional analysts' revisions based on the current period earnings surprise and add these predicted revisions to the pre-earnings announcement expectations to produce our estimate of conditional expectations. To generate predicted revisions, we use the group of firm-observations where the earnings surprise and analysts' estimate (and revision) are observable, but the firm did not issue a management forecast. For these observations, we attribute the revision in future earnings estimates to the current period's earning surprise (implicitly including the tendency for analysts to walk down their earnings estimates). Using these observations, we estimate pooled time series and cross section models of conditional revisions in future earnings estimates and apply the estimated coefficients to the group of firm-observations that did issue forecasts. In matrix notation, we regress observed analyst revisions (AR) for the non-forecasting group (represented by the subscript NF) on control variables (X) for that group, including the current period's earnings surprise:

$$AR_{NF} = \beta_{NF} X_{NF} + \varepsilon_{NF} \tag{1}$$

We apply the estimated coefficients from the above regression to the group of forecasting firms (represented by the subscript F) to predict how analysts would have revised their estimates in the absence of management's forecast:

$$\widehat{AR_F} = \widehat{\beta_{NF}} X_F \tag{2}$$

Forecast News is then calculated as the difference between the manager's forecast of future earnings and our prediction of analysts' expectation of future earnings, conditional on the current period's earnings surprise:

$$Conditional\ Expectations(E[x_{t+1}|x_t]) = E[x_{t+1}] + \widehat{AR_F} \tag{3}$$

$$Forecast\ News = f[x_{t+1}] - E[x_{t+1}|x_t] \tag{4}$$

Our specific procedure follows. Using only those observations without bundled forecasts, we estimate the following regression on an annual basis from 2000 to 2007:

$$\begin{aligned} AR_{NF} = {} & \alpha_0 + \alpha_1\ Positive\ Earnings\ Surprise\ Indicator + \alpha_2\ Negative\ Earnings\ SurpriseIndicator \\ & + \alpha_3\ Deflated\ Earnings\ Surprise \times Positive\ Earnings\ SurpriseIndicator \\ & + \alpha_4\ Deflated\ Earnings\ Surprise \times Negative\ Earnings\ SurpriseIndicator \\ & + \alpha_5\ Prior\ Stock\ Return + \alpha_6 Deflated\ Earnings\ Surprise \times |DeflatedEarnings\ Surprise| \end{aligned}$$

[21] This is true not only for earnings announcements, but for any situation where forecasts are released in close proximity to other significant news events, regardless of whether the firm released that news (e.g., new product announcement) or the news was obtained through other sources (e.g., news of a natural disaster likely to affect the firm).

$$+\alpha_7 Deflated\ Earnings\ Surprise \times MarketValue$$

$$+\alpha_8 Deflated\ Earnings\ Surprise \times Earnings/Price + \alpha_9 Pr(Bundled\ Forecast) + \varepsilon \quad (5)$$

The dependent variable, AR_{NF}, is equal to the mean analyst estimate 5 trading days after the current period's earnings announcement minus the mean analyst estimate outstanding immediately prior to the current period's earnings announcement (deflated by lagged stock price). Based on the earlier discussion of earnings persistence and analyst walkdowns, we expect that revisions will be negative, on average, and be positively associated with the current earnings surprise.

Our regression is admittedly *ad hoc*, but stems from a straightforward premise—that analyst revisions following earnings announcements are affected by the same factors that influence investors' response to earnings announcements (as documented in the ERC literature). Following this literature, we allow the coefficient on earnings surprise to vary with factors likely associated with earnings persistence.[22] Because positive and negative earnings shocks likely have different levels of persistence (Hayn, 1995), we allow for different coefficients on positive and negative earnings surprises. To account for the non-linearity between stock price reactions and earnings surprises (e.g., Freeman and Tse, 1992; Kinney et al., 2002), we interact the current period earnings surprise with its absolute value.

We also account for the differences between the forecasting group and the non-forecasting group by controlling for prior stock returns, size, and growth opportunities. In recognition that forecasting firms self-select, we include the propensity to issue bundled forecasts as estimated by the probit model described earlier. To mitigate the effect of extreme observations and potential data errors, we truncate the dependent variable and winsorize all independent variables at the 1% and 99% levels. Our independent variables in Eq. (5), which have not previously been defined in Section 3.4, are defined as follows:

Market Value:	Equal to the decile rank of the firm's pre-earnings announcement market value.
Earnings/Price:	Equal to the decile rank of the firm's pre-earnings announcement Earnings/Price ratio, where earnings is the current quarter's earnings value from IBES.
Pr(Bundled Forecast):	Equal to the predicted probability of the firm issuing a forecast with the earnings announcement, estimated by the post-Reg FD model described in Table 3.

The persistence of earnings innovations, and therefore revision behavior, is likely to differ based on whether analysts are estimating annual or quarterly earnings, how far into the future the analysts are estimating, and the outlook of the general economy. Therefore, for each year, we estimate revisions in annual earnings for annual periods ending one through 5 quarters in the future, and for quarterly earnings 1 or 2 quarters in the future. We focus on these seven models because the revision process is likely to be less predictable as the horizon increases, and because this set of revisions encompasses approximately 97% (not tabulated) of the bundled forecasts in our sample.

4.2. Analyst revision model results

The results of our revision model are shown in Table 5. Each of the columns represents the regression estimates for revisions of a given periodicity (i.e., annual vs. quarterly) and horizon (up to 5 quarters in the future), using the average of coefficients and *t*-statistics from the seven calendar year regressions (2001–2007). Panel A shows the results for revisions in annual earnings estimates from one through 5 quarters ahead, while Panel B shows estimates for revisions in quarterly estimates 1 and 2 quarters in the future.

As expected, the intercepts are negative and generally significant, which is consistent with analysts' estimates exhibiting a "walk-down" pattern. Not surprisingly, analysts expect both positive and negative earnings surprises to persist, based on the two *Deflated Earnings Surprise* variables. The negative coefficient on the nonlinear term shows that the rate of persistence is declining with the size of the current period's earnings surprise. The positive coefficient on *Prior Stock Return* suggests that analyst revisions incorporate information that was previously reflected in stock prices, consistent with the results in Lys and Sohn (1990) and Ali et al. (1992). The coefficients on the market value and earnings/price interactions tend to be insignificantly different from 0.

The coefficients on the propensity score, *Pr(Bundled Forecast)*, are generally negative, but only statistically significant (on average) for the sample of one-period ahead quarterly earnings revisions (Panel B). The lack of significance in the annual earnings revision estimates could indicate one of several things: that differences between forecasting and non-forecasting firms are not a serious concern in estimating analyst revisions, that the other independent variables adequately control for those differences, or that our propensity score does not adequately capture the differences (Larcker and Rusticus, 2010). We note that our results are unaffected by excluding the propensity score from our analyst revision model, and that our results are robust to using an alternative measure of forecast news free from self-selection issues. (We discuss this alternative approach in Section 6.1.) Considering the consistency of our results across these multiple specifications, it seems unlikely that self-selection is driving our results.

[22] In Section 4.3, we discuss validation tests for this regression model.

Table 5
Analyst revision model.

Panel A: Annual earnings estimates

Independent variable	1 Quarter Ahead	2 Quarters Ahead	3 Quarters Ahead	4 Quarters Ahead	5 Quarters Ahead
Intercept	−0.0008	−0.0012	−0.0012	−0.0035	−0.0022
	(−1.72)	(−1.97)	(−2.17)	(−4.06)	(−2.92)
Positive Earnings Surprise Indicator	0.0008	0.0007	0.0005	0.0017	0.0010
	(1.58)	(1.37)	(0.98)	(2.06)	(1.34)
Negative Earnings Surprise Indicator	−0.0009	−0.0010	−0.0010	−0.0014	−0.0018
	(−1.49)	(−1.56)	(−1.12)	(−1.31)	(−1.76)
Deflated Earnings Surprise for Positive Surprises	0.7469	0.8663	0.7052	0.2504	0.0912
	(3.67)	(3.47)	(2.71)	(0.90)	(0.49)
Deflated Earnings Surprise for Negative Surprises	1.0650	1.3804	1.0180	0.8857	0.6844
	(4.95)	(4.70)	(4.12)	(3.44)	(2.90)
Prior Stock Return	0.0042	0.0055	0.0056	0.0087	0.0099
	(3.46)	(4.16)	(4.23)	(4.20)	(5.92)
Deflated Earnings Surprise∗|Deflated Earnings Surprise|	−6.8861	−9.9893	−8.6986	−5.0213	−4.6803
	(−2.96)	(−4.04)	(−3.74)	(−3.01)	(−2.94)
Deflated Earnings Surprise∗Market Value	−0.0148	−0.0172	0.0084	−0.0629	−0.0212
	(−0.47)	(−0.49)	(0.27)	(−1.79)	(−0.67)
Deflated Earnings Surprise∗E/P Ratio	0.0000	0.0014	0.0048	0.0382	0.0375
	(−0.09)	(0.24)	(0.27)	(1.43)	(1.23)
Pr(Bundled Forecast)	−0.0013	−0.0009	−0.0003	0.0000	−0.0003
	(−1.44)	(−1.00)	(−0.30)	(0.18)	(−0.20)
Average N	1,867.9	1,859.9	1,844.9	1,768.6	1,847.4
Average R^2	41.1%	35.7%	29.2%	15.0%	15.3%

Panel B: Quarterly earnings estimates

Independent variable	1 Quarter Ahead	2 Quarters Ahead
Intercept	−0.0007	−0.0005
	(−5.28)	(−5.11)
Positive Earnings Surprise Indicator	0.0003	0.0002
	(2.50)	(2.38)
Negative Earnings Surprise Indicator	−0.0006	−0.0005
	(−3.60)	(−3.21)
Deflated Earnings Surprise for Positive Surprises	0.1401	0.0553
	(2.83)	(1.27)
Deflated Earnings Surprise for Negative Surprises	0.3197	0.2095
	(6.50)	(4.89)
Prior Stock Return	0.0022	0.0019
	(7.94)	(7.90)
Deflated Earnings Surprise∗|Deflated Earnings Surprise|	−2.1457	−1.4503
	(−5.90)	(−4.87)
Deflated Earnings Surprise∗Market Value	−0.0097	−0.0061
	(−1.39)	(−1.05)
Deflated Earnings Surprise∗E/P Ratio	−0.0001	0.0028
	(0.29)	(0.77)
Pr(Bundled Forecast)	−0.0006	−0.0002
	(−3.04)	(−1.22)
Average N	7,156.4	6,859.1
Average R^2	15.3%	10.4%

Dependent variables are truncated and continuous independent variables are winsorized at the 1% and 99% levels.
This table shows the results of our estimation of analyst revisions. The population over which the regression is performed is the set of all earnings announcements from 2001 to 2007 that were not accompanied by management forecasts. The dependent variable is analyst revisions of future period earnings. We calculate this value as the average of all analyst estimates for period $t+n$ earnings outstanding as of 5 trading days following the earnings announcement for period t earnings minus the average analyst estimate for period $t+n$ earnings as of 3 trading days before the current period earnings announcement. This value is deflated by the firm's stock price 3 trading days prior to the current period's earnings announcement.
Regressions are performed on an annual basis, and this table shows the average coefficients and t-statistics from those annual regressions. (The averages omit the 2000 regression, as that year only includes the post-October 23rd earnings announcements, and features several coefficients that are insignificant, but large in magnitude.) The 5 columns in Panel A represent the average annual results from 5 sets of observations: Revisions of annual earnings estimates for annual periods ending 1–5 quarters in the future. Panel B shows the average annual results from 2 sets of observations: Revisions of quarterly earnings estimates for the two quarterly periods following the current quarter.
Positive Earnings Surprise Indicator is equal to 1 for earnings surprises (actual earnings minus analyst estimates, deflated by stock price) greater than 0.0001 (i.e., actual earnings exceed analyst estimates by at least half a cent for a $50 stock), and 0 otherwise. *Negative Earnings Surprise Indicator* is equal to 1 for earnings surprises less than −0.0001, and 0 otherwise. *Deflated Earnings Surprise (Positive Surprises)* is the actual earnings minus analyst estimates, deflated by stock price, for firms reporting positive earnings surprises, and 0 otherwise. *Deflated Earnings Surprise (Negative Surprises)* is the actual earnings minus analyst estimates, deflated by stock price, for firms reporting negative earnings surprises, and 0 otherwise. *Prior Stock Return* is the firm's cumulative return over the 90 day prior to the earnings announcement. |*Deflated Earnings Surprise*| is the absolute value of the actual earnings minus analyst estimates, deflated by the firm's stock price. *Market Value* is the decile rank of the firm's pre-earnings announcement market value. *E/P Ratio* is the decile rank of the firm's pre-earnings announcement Earnings/Price ratio, where earnings is equal to the current quarter's earnings value from IBES. *Probability of Issuing Bundled Forecast* is the fitted probability of the firm issuing a bundled forecast, calculated from the probit regression described in Table 3 (using only the Post-FD observations).

Finally, there is significant variation in the explanatory power of our regressions. Our ability to explain revision behavior is declining as the horizon increases—explanatory power decreases from 41% for 1 quarter ahead annual estimates to 15% for 5 quarter ahead annual estimates. There is a particularly sharp drop from 3 quarters ahead (29.2%) to 4 quarters ahead (15.0%). This drop is at least partially mechanical, due to the aggregation of quarterly earnings figures into annual earnings estimates, which can be illustrated as follows. If a firm reports a $1.00 positive earnings surprise in its 1st, 2nd, or 3rd fiscal quarter, that earnings surprise will lead to a $1.00 revision in that period's annual earnings estimates, even if the remaining quarterly estimates are unchanged (i.e., there is no persistence in the earnings surprise). On the other hand, a purely transitory quarterly earnings surprise will *not* lead to a revision in annual earnings estimates 4 or more quarters in the future (because that earnings surprise will not be a component of the future annual figures). The same is true for the quarterly earnings estimates analyzed in Panel B—purely transitory earnings surprises will not lead to revisions in future quarterly earnings estimates. Thus, it is not surprising that the explanatory power of the longer horizon (4 and 5 quarters) annual estimates is similar to that of the quarterly estimates.

4.3. Validation of conditional expectations model

In theory, a measure that incorporates additional news is better than a measure that does not. In practice, our ability to explain analyst revisions is incomplete, as evidenced by the R^2 values in Table 5, particularly for long-horizon and quarterly estimates. As a result, incorporating the contemporaneous earnings news may introduce sufficient noise, or even bias, to negate the benefits of any incremental information. We evaluate whether our procedure generates higher-quality measures based on the characteristics of the estimates it produces. Specifically, we expect a valid procedure to produce the following results:

(1) Because the conditional expectations are based on more information (i.e., the current earnings value), these predicted estimates should predict future earnings more accurately than the pre-earnings estimates.
(2) Because the conditional expectations incorporate the expectation of analysts' walkdown behavior, the predicted estimates should, on average, be lower than the pre-earnings estimates.
(3) If the conditional forecast news is a more accurate measure of the forecast signal and investors view management forecasts as credible, then conditional forecast news should be more highly associated with contemporaneous stock returns than the naïvely calculate forecast news.

We analyze the first and second prediction by measuring and comparing three values: the pre-earnings analyst estimation error, the post-earnings analyst estimation error, and our calculated conditional expectations error. Table 6, Panel A shows the results of this analysis using unsigned (absolute) errors. The figures for the in-sample (non-forecasting) firms are on the left, while the figures for the out-of-sample (forecasting) firms are on the right. For both samples, analysts' estimates are more accurate with the benefit of more information; the calculated conditional expectations error is smaller than the pre-earnings analyst estimation error (by.17% of share price in sample and 0.05% out of sample). To put that into context, the out of sample estimates are 1.5 cents more accurate for a stock trading at $30 per share.

In Panel B of Table 6, we show the results of a similar analysis, this time using signed errors. (Negative errors indicate optimistic expectations.) A comparison of the pre-earnings analyst estimate to the post-earnings analyst estimate for both groups shows a significant downward revision. Analysts' optimism falls by 28% for the non-forecasting firms (-0.76% to -0.55%) and by 36% for the forecasting firms (-0.27% to -0.17%), and is consistent with the walkdown pattern existing for both forecasting and non-forecasting firms. Our conditional expectation shows this as well—the average signed error based on our predicted calculation is -0.14% for forecasting firms, compared to the -0.27% average pre-earnings estimation error.[23]

The third expectation is that investor responses are more consistent with their use of conditional rather than unconditional forecast news. We test this expectation by regressing earnings announcement period stock returns on the earnings surprise and other variables included in Eq. (5) earlier, as well as the two measures of forecast news for the bundled forecasts. For these tests, we restrict the sample to quarterly forecasts issued 1 quarter ahead, resulting in a sample of 14,767 forecasts. The results are presented in Table 7. In the first column, forecast news is calculated based on the pre-earnings analyst expectations. In the second column, forecast news is calculated based on our predicted post-earnings analyst expectations (i.e., conditional forecast news). Forecast news is positively associated with contemporaneous stock returns in both columns, with a t-statistic of 19.19 using unconditional forecast news and a t-statistic of 20.89 using conditional forecast news. The R^2 value of the second model (14.0%) is slightly larger than the first model (13.5%), indicating that conditional forecast news explains a (modestly) greater proportion of contemporaneous returns relative to unconditional forecast news.[24]

In the last column, we directly compare the two measures of forecast news by including both variables in the regression. The results from this specification confirm our expectation that the market's price response is more consistent with conditional

[23] The results in Table 6 are based on both quarterly and annual management forecasts. Inferences are unchanged if the sample is restricted to only quarterly forecasts.

[24] A Vuong test indicates that this difference is significant at the $p=0.01$ level.

Table 6
Properties of conditional expectations.

Panel A: Unsigned errors	**In sample (N=161,744)**	**Out of sample (N=36,058)**
Abs(Pre-Earnings Analyst Estimation Error)	1.79%	0.88%
Abs(Post-Earnings Analyst Estimation Error)	1.48%	0.71%
Abs(Calculated Conditional Expectations Error)	1.62%	0.83%
Comparisons		
Pre-Earnings Analyst–Post-Earnings Analyst	0.32%***	0.17%***
Post-Earnings Analyst–Conditional Expectations	−0.15%***	−0.12%***
Pre-Earnings Analyst–Conditional Expectations	0.17%***	0.05%***
Panel B: Signed errors	**In sample (N=161,744)**	**Out of sample (N=36,058)**
Pre-Earnings Analyst Estimation Error	−0.76% ***	−0.27% ***
Post-Earnings Analyst Estimation Error	−0.55% ***	−0.17% ***
Calculated Conditional Expectations Error	−0.54% ***	−0.14% ***
Comparisons		
Pre-Earnings Analyst–Post-Earnings Analyst	−0.22% ***	−0.10% ***
Pre-Earnings Analyst–Conditional Expectations	−0.22% ***	−0.13% ***
Post-Earnings Analyst–Conditional Expectations	0.00%	0.03% ***

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level). All continuous variables are winsorized at the 1% and 99% levels.
This table shows the characteristics of three different earnings estimates, for two groups of firms. *Pre-Earnings Analyst Estimation Error* is equal to the reported earnings for a future fiscal period minus analysts' estimates for that period as of 3 trading days prior to the *current* earnings announcement. *Post-Earnings Analyst Estimation Error* is equal to the reported earnings for a future fiscal period minus analysts' estimates for that period as of five calendar days after the current earnings announcement. *Calculated Conditional Expectations Error* is reported earnings for a future fiscal period minus the conditional expectation for that future period. The conditional expectation is equal to the pre-earnings analyst plus our predicted revision. All three measures are deflated by stock price 3 trading days prior to the current earnings period.
The *In Sample* population reflects all estimation errors for firms that did not issue a forecast at the current earnings announcement (i.e., the firms that were used in the revision model described in Table 5). The *Out of Sample* population reflects the group of future earnings estimates for firms that provided a forecast in the current earnings announcement period.
Panel A shows the absolute value of each estimation error. A smaller number indicates a more accurate estimate. (For example, post-earnings analysts' estimates are more accurate than pre-earnings analysts' estimates.) Panel B shows the signed value for each estimation error. A more negative number indicates a more optimistic estimate. (For example, post-earnings analysts' estimates are less optimistic than pre-earnings analysts' estimates.)

forecast news than unconditional forecast news; the coefficient on the conditional forecast news variable is positive and statistically significant, while unconditional forecast news is negatively associated with stock returns.[25]

In summary, the results in Tables 6 and 7 support each of the three predictions, helping to ensure that the revision model and the resulting estimates are valid proxies for post-earnings analyst expectations. In the next section, we examine whether correcting for measurement error in forecast news is likely to influence empirical research. In other words, does it matter whether researchers use this (or a similar) approach to measure forecast news, versus relying upon the traditional (unconditional) measure of forecast news?

5. Analysis of conditional forecast news and expected measurement error

Our method of using conditional expectations yields a measure of forecast news that is very highly correlated with the conventional measure of forecast news (correlation coefficient of 0.89). In this section, we analyze the effects of using the conditional measure, rather than the unconditional measure, in common research settings.

5.1. The selective disclosure of good news

A recurring research question is whether managers, on average, selectively disclose good news and withhold bad news. One way of answering this question has been to observe the distribution of forecast news; if forecast news is positive more often than negative, then researchers infer that managers are selectively disclosing good news.[26] In Table 8, we examine forecast

[25] We recognize that our third prediction represents a joint hypothesis. Failure to find evidence consistent with this prediction could be driven by a poor estimate of forecast news or investors doubting the credibility of the forecast.

[26] This inference is based on the assumption that managers are endowed with private information that is evenly balanced between good news and bad news. We do not test this assumption, but note that prior studies in this area make a similar assumption. For example, Ajinkya and Gift (1984) observe a roughly symmetric split between good news and bad news forecasts and infer relatively full disclosure of private information, rather than selective disclosure of good news.

Table 7
Association between returns and management forecast news.

Dependent variable: 3-days earnings announcement period stock return			
	(1)	(2)	(3)
Traditional Forecast News	3.775***		−5.787***
	(19.19)		(−5.34)
Conditional Forecast News		4.353***	10.60***
		(20.89)	(8.93)
Positive Earnings Surprise Indicator	0.025***	0.027***	0.029***
	(12.81)	(13.55)	(14.25)
Negative Earnings Surprise Indicator	−0.013***	−0.015***	−0.018***
	(−5.52)	(−6.22)	(−7.24)
Deflated Earnings Surprise for Positive Surprises	−0.537	−0.0848	0.610
	(−1.00)	(−0.16)	(1.13)
Deflated Earnings Surprise for Negative Surprises	−1.987***	−0.909	0.811
	(−3.18)	(−1.51)	(1.20)
Prior Stock Return	−0.036***	−0.028***	−0.015***
	(−9.82)	(−7.82)	(−3.58)
Deflated Earnings Surprise∗|Deflated Earnings Surprise|	1.102	−6.110	−17.480***
	(0.22)	(−1.24)	(−3.28)
Deflated Earnings Surprise∗Market Value	0.301***	0.268***	0.212**
	(3.21)	(2.84)	(2.17)
Deflated Earnings Surprise∗E/P Ratio	0.409***	0.415***	0.429***
	(4.91)	(5.00)	(5.15)
Pr(Bundled Forecast)	−0.003	−0.005*	−0.007***
	(−1.27)	(−1.95)	(−2.76)
Constant	−0.008***	−0.011***	−0.016 ***
	(−2.96)	(−4.05)	(−5.58)
N	14,767	14,767	14,767
R^2	13.5%	14.0%	14.3%

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level). Dependent variables are truncated and continuous independent variables are winsorized at the 1% and 99% levels.
Table 7 reports the results of a regression with the dependent variable equal to the 3-days stock return surrounding the firm's earnings announcement date.
Traditional Forecast News is equal to the value forecast by the manager minus the consensus analyst estimate for the same period, as of 3 trading days prior to the earnings announcement (i.e., 3 trading days prior to the forecast). *Conditional Forecast News* is equal to the value forecast by the manager minus the conditional analysts' expectation. The conditional expectation is equal to the pre-earnings analyst plus our predicted revision. Both *Traditional* and *Conditional Forecast News* are deflated by stock price 3 trading days prior to the earnings announcement date.
Positive Earnings Surprise Indicator is equal to 1 for earnings surprises (actual earnings minus analyst estimates, deflated by stock price) greater than 0.0001 (i.e., actual earnings exceed analyst estimates by at least half a cent for a $50 stock), and 0 otherwise. *Negative Earnings Surprise Indicator* is equal to 1 for earnings surprises less than −0.0001, and 0 otherwise. *Deflated Earnings Surprise (Positive Surprises)* is the actual earnings minus analyst estimates, deflated by stock price, for firms reporting positive earnings surprises, and 0 otherwise. *Deflated Earnings Surprise (Negative Surprises)* is the actual earnings minus analyst estimates, deflated by stock price, for firms reporting negative earnings surprises, and 0 otherwise. *Prior Stock Return* is the firm's cumulative return over the 90 day prior to the earnings announcement. |*Deflated Earnings Surprise*| is the absolute value of the actual earnings minus analyst estimates, deflated by the firm's stock price. *Market Value* is the decile rank of the firm's pre-earning s announcement market value. *E/P Ratio* is the decile rank of the firm's pre-earnings announcement Earnings/Price ratio, where earnings is equal to the current quarter's earnings value from IBES. *Probability of Issuing Bundled Forecast* is the fitted probability of the firm issuing a bundled forecast, calculated from the probit regression described in Table 3 (using only the Post-FD observations).

news for our sample. Our objective is not to definitively answer whether or not managers withhold bad news. Rather, our goal is to demonstrate the extent to which incorrectly measuring forecast news can lead to incorrect inferences.

In terms of economic significance, the bias is large. The difference in average forecast news based on conditional expectations (0.039%) and naïve expectations (−0.065%) is 0.105%, greater than the level of forecast news itself. The absolute value of this measurement error is larger, at 0.175%.

Panel A of Table 8 shows the mean of the continuous forecast news variable (manager's forecast less analyst expectations, deflated by stock price) across the three categories of current earnings surprises. Our measure of forecast news, based on conditional expectations, is on the left, while the traditional measure of forecast news, based on naïve expectations, is on the right. The difference between the two methods is striking. Using conditional expectations, mean forecast news is positive for the overall sample and in each of the three earnings surprise categories. Using naïve expectations, mean forecast news is significantly negative. Moreover, naïve forecast news is progressively more negative as the contemporaneous earnings surprise is more negative, providing further evidence of the bias in unconditional expectations.

In Panel B, we examine the extent to which forecast news is likely to be misclassified as Good or Bad when using naïve expectations. Forecasts are classified into a 3×3 matrix based on the sign of the forecast news using conditional expectations and the sign of the forecast news using naïve expectations. Forecasts are identified as conveying Good, Bad, or Neutral news based on the sign and magnitude of the surprise (greater than 0.0001, less than −0.0001, and between 0.0001 and −0.0001 of stock price, respectively).

Table 8
Management forecast news.

Panel A: Univariate statistics

Current period earnings surprise category	*N*	Mean conditional forecast news	Mean Naïve forecast news	Mean measurement error	Mean |Measurement Error|
Positive Earnings Surprise	25,062	0.026%***	0.008%*	−0.018%***	0.117%***
Neutral Earnings	3,836	0.072%***	−0.088%***	−0.159%***	0.167%***
Negative Earnings Surprise	7,160	0.066%***	−0.309%***	−0.375%***	0.381%***
All Earnings Surprises	36,058	0.039%***	−0.065%***	−0.105%***	0.175%***
Difference between Positive and Negative Earnings Surprises		−0.040%***	0.316%***	−0.393%***	0.264%***

Panel B: Distribution of forecast news

		Naïve expectations				
		Good	Neutral	Bad	Total	% of Total
Conditional Expectations	Good	13,073	2,279	6,502	21,854	61%
	Neutral	326	174	892	1,392	4%
	Bad	1,379	485	10,948	12,812	36%
	Total	14,778	2,938	18,342	36,058	100%
	% of Total	41%	8%	51%	100%	

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level).
This table describes the properties of *Forecast News*, equal to the earnings value forecast by the manager relative to analyst estimates for the same period, deflated by stock price. We calculate *Forecast News* using two measures of analyst expectations: conditional on the news in current earnings ("Conditional Expectations") and the unconditional expectation prior to earnings ("Naïve Expectations"). Panel A shows the mean of the continuous value of *Forecast News* across different groups based on the sign of the earnings surprise. Panel B classifies each forecast as either "Good News" (greater than 0.0001), "Neutral" (between 0.0001 and −0.0001), or "Bad News" (less than −0.0001) and shows the proportion of forecasts in each category. The rows in Panel B show forecasts classified based on conditional expectations, while the columns in Panel B are based on naïve expectations.

Focusing first on the totals based on conditional forecast news, the majority of management forecasts (61%) are good news and the ratio of good news to bad news forecasts is approximately 1.7:1. In stark contrast, the traditional measure of forecast news is classified as "good news" only 41% of the time, and the ratio of good news to bad new forecasts is approximately 0.8:1.[27]

Based on the totals, it is clear that a failure to condition on current earnings information biases forecast news downward. But the problem is not simply a matter of some good news forecasts being misclassified as bad news—the reverse can occur as well. The individual cells of Panel B reveal the full extent of misclassification. For the 14,778 observations classified as good news using naïve expectations, 1,379 (9%) are actually bad news when conditioning on the current earnings news. For the 18,342 forecasts naïvely classified as bad news, 10,948 (35%) would be reclassified as good news when accounting for current earnings information. In total, researchers classifying management forecasts based on the traditional measure risk misclassifying roughly a quarter of their sample due to measurement error.[28]

Overall, each panel of Table 8 carries the same message: the distribution of forecast news is substantially different when measuring news using conditional rather than unconditional expectations. Researchers using the conventional calculation of forecast news to make inferences about selective disclosure risk drawing erroneous conclusions. Moreover, the characteristics of bundled forecasts are markedly different from those of non-bundled forecasts (described in Table 2), a comparison that emphasizes the risks of generalizing the characteristics of non-bundled forecasts.

To illustrate how the use of conditional forecast news might affect existing research, we note that Kross et al. (2011) examine the frequency of good versus bad news forecasts in the years immediately before and after Reg FD. In their Table 7, they document that 62.14% of post-FD forecasts were bad news (compared to 56.43% in the pre-Reg FD period), and argue strategic disclosure incentives led to managers (publicly) issuing more bad news forecasts after Reg FD.[29]

[27] Chuk et al. (2009) compare a sample of management forecasts in First Call to a hand-collected sample of forecasts contained in company press releases. For the subsample of forecasts not issued in an earnings announcement, they find that First Call coverage is biased towards bad news forecasts. To the extent that this bias is also present in bundled forecasts, the proportion of good news management forecasts will likely be understated (using either conditional forecast news or the traditional approach).

[28] Of the 33,120 forecasts identified as good news or bad news based on naïve expectations, 7,881 (24%) would be classified as the opposite based on conditional expectations. Only cases of good news forecasts being misclassified as bad news (and vice versa) are counted as misclassifications; we do not include neutral forecasts in our totals.

[29] The high proportion of bad news forecasts in Kross et al. (2011) is likely due to their isolation of the last management forecast of quarterly earnings, resulting in a large proportion of short horizon forecasts and earnings warnings. These sample requirements are driven by their interest in the relation between meet-or-beat consistency and bad news forecasts.

We estimate that almost 50% of the Kross et al. sample forecasts were bundled, and that using conditional management forecast news for those bundled forecasts results in just 50.81% of post-FD forecasts being bad news, which is lower than what Kross et al. document for the pre-FD period. In other words, the finding of increased disclosure of bad news forecasts after Reg FD is not robust to using conditional forecast news. (Further details regarding the Kross et al. replication can be found in the Appendix.)

5.2. Forecast news in other research settings

Section 2 discusses several other research settings where forecast news plays a central role. As we stated before, our goal is not to conclude whether managers selectively disclose good news in all of these contexts, but to assess whether measurement error is likely to exist in commonly studied contexts. To do so, we calculate the difference between our estimate of forecast news (based on conditional expectations) and the conventional measure of forecast news. We label this difference as "measurement error".

To determine whether expected measurement error is likely to influence a particular research setting, we test for whether the measurement error is correlated with proxies typically used as independent variables in that research setting. If measurement error is correlated with the proxy, researchers could inappropriately attribute economic effects to the proxy when those affects stem from the measurement error. We examine the relation between measurement error and the following measures: *Quarters Ahead* (the horizon of the forecast), *Lagged Litigation Risk*, *Consistent Meet-or-Beat*, and four different measures of insider trading behavior, focusing on buying/selling occurring before/after the current earnings announcement.

The results of these regressions are shown in Table 9. The first four columns of Panel A show the regression using a single independent variable at a time, while the last column includes all of the proxies in the regression. The first three variables (*Quarters Ahead*, *Lagged Litigation Risk*, and *Consistent Meet-or-Beat*), as well as three of the four insider trading variables, are associated with expected measurement error at the $p < 0.01$ significance level. This is true when the variables are isolated in the regression as well as in the multivariate specification that includes all variables. In summary, measurement error in forecast news is significantly associated with several proxies used in forecast-related research.

In Panel B, we document the results of the same regressions with one change: the addition of the current period's earnings surprise as an independent variable. If the effects of measurement error can be addressed by controlling for the earnings surprise, our conditional expectations calculation would be less critical. This is not the case—each of the variables that is significantly associated with measurement error in Panel A continues to be associated with measurement error in Panel B, even after controlling for the earnings surprise. In short, simply including the earnings surprise as an additional regressor does not solve the problem.

6. Alternative measures of conditional expectations

6.1. Measuring forecast news using rational expectations

Our tests of forecast news assume that the analyst revision behavior observed for non-forecasting firms (AR_{NF}) is representative of what the analysts' revision behavior would have been for those firms issuing earnings forecasts and that we can accurately distinguish between forecasting and non-forecasting firms. These assumptions may not be warranted for three reasons: First, non-forecasting and forecasting firms may be systematically different from one another in ways that cause the analyst revision behavior to be different across the two groups. Second, the forecasting firms and non-forecasting firms may provide other voluntary disclosures with the earnings announcement that cause the analyst revisions to be different. Third, Chuk et al. (2009) find that First Call does not capture all management forecasts, resulting in some management forecast firms being classified as non-forecasting firms.[30]

To address these concerns, we calculate an alternate estimate of analyst expectations that does not depend on the firm's forecasting decision or other disclosures bundled with the current earnings number. In this alternate model, we replace the non-forecasting firms' observed analyst revisions (AR_{NF}) with the difference between reported future earnings (x_{t+1}) and the analyst forecast that existed prior to the current period's earnings announcement ($E[x_{t+1}]$), neither of which is affected by the current earnings disclosure. We then estimate the same regressions described previously to calculate an alternative measure of conditional expectations. One can think of this model as capturing how analysts would have revised their estimates if they had rational expectations of future earnings.

As expected, this alternative measure of conditional forecast news is positively correlated with our primary measure of conditional forecast news (correlation coefficient of 0.60). This alternative measure, however, is much less correlated with the conventional measure of forecast news (correlation of 0.36), and thus represents a more dramatic shift in estimation. Our reported results in Section 5 are virtually unaffected by the use of this alternate measure of conditional expectations; we continue to find that forecast news is biased downward using the conventional measure.

[30] According to Chuk et al. (2009), excluding years prior to 1997 and excluding firms with no analyst following should help mitigate management forecast coverage biases induced by using First Call. Nevertheless, some coverage bias likely remains. Erroneously including forecasting firms in the non-forecasting group would increase the noise in our estimated revisions.

Table 9
Relation between predicted measurement error and strategic disclosure proxies.

Panel A: Without controlling for the contemporaneous earnings surprise

Dependent variable: Predicted Measurement Error	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Intercept	−0.000510***	−0.000843***	−0.00112***	−0.00112***	−0.000643***
	(−29.59)	(−39.32)	(−61.48)	(−53.63)	(−22.14)
Quarters Ahead	−0.000241***				−0.000245***
	(−24.30)				(−25.23)
Lagged Litigation Risk		−0.0170***			−0.0182***
		(−9.27)			(−10.15)
Consistent Meet-or-Beat				0.000349***	0.000305***
				(13.10)	(11.75)
Net Insider Buying Before				−0.000107	−0.0000410
				(−1.07)	(−0.42)
Net Insider Selling Before				0.000124***	0.0000937***
				(3.44)	(2.70)
Net Insider Buying After				−0.000596***	−0.000578***
				(−10.84)	(−10.66)
Net Insider Selling After				0.000398***	0.000405***
				(14.38)	(15.15)
N	35,338	35,293	35,338	35,338	35,293
R^2	2.20%	0.37%	0.78%	2.27%	5.54%

Panel B: Controlling for the contemporaneous earnings surprise

Dependent Variable: Predicted Measurement Error	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Intercept	−0.000687***	−0.00103***	−0.00127***	−0.00129***	−0.000798***
	(−26.48)	(−40.84)	(−54.17)	(−46.87)	(−25.62)
Quarters Ahead	−0.000238***				−0.000242***
	(−25.44)				(−26.35)
Lagged Litigation Risk		−0.0154***			−0.0166***
		(−7.64)			(−8.44)
Consistent Meet-or-Beat			0.000283***		0.000241***
			(11.74)		(10.22)
Net Insider Buying Before				−0.000159*	−0.0000962
				(−1.76)	(−1.08)
Net Insider Selling Before				0.000145***	0.000118***
				(4.68)	(3.96)
Net Insider Buying After				−0.000554***	−0.000538***
				(−11.00)	(−10.90)
Net Insider Selling After				0.000373***	0.000383***
				(14.99)	(15.80)
Deflated Earnings Surprise	0.191***	0.191***	0.190***	0.190***	0.188***
	(9.66)	(9.52)	(9.58)	(9.56)	(9.51)
N	35,338	35,293	35,338	35,338	35,293
R^2	17.57%	15.73%	15.94%	17.49%	20.39%

Note: ***, **, * indicate that the value is statistically different from 0 at the 1%, 5%, 10% level, respectively (two-tailed tests and standard errors clustered at the firm level). Dependent variables are truncated and continuous independent variables are winsorized at the 1% and 99% levels. The population over which the regression is performed is the set of all management forecasts from 2001 to 2007 that were issued within 2 days of an actual earnings announcement.
Panel A reports the results of a regression without controlling for the *Deflated Earnings Surprise* while Panel B includes the *Deflated Earnings Surprise* control. The dependent variable, *Predicted Measurement Error*, is equal to the difference between *Forecast News* based on "Naïve Expectations" less *Forecast News* based on "Conditional Expectations". *Quarters Ahead* is the number of quarter into the future that management is forecasting. *Lagged Litigation Risk* is the probability of securities-related litigation lagged by 1 quarter estimated using the Rogers and Stocken (2005) model. *Consistent Meet-or-Beat* is equal 1 for observations where the firm's reported earnings met or exceeded analysts' consensus earnings estimates for all of the previous 4 quarters, and 0 otherwise. *Net Insider Buying Before* (*Net Insider Selling Before*) is equal 1 when firm insiders were net buyers (sellers) in the 30 calendar days prior to the announcement of earnings. *Net Insider Buying After* (*Net Insider Selling After*) is equal 1 when firm insiders were net buyers (sellers) in the 30 calendar days after to the announcement of earnings. Net trading is based on open market transactions for officers and directors (i.e., it excludes transactions for nonofficer insiders (e.g., large shareholders)).

Although this alternative approach has conceptual merit and gives us greater confidence in our conclusions, caution is warranted. Our validation tests in Section 4 suggest that it is an inferior approach for measuring forecast news. Specifically, the rational expectations measure of forecast news fails to be more accurate than pre-earnings analyst estimates (test 1) and fails to be more highly associated with contemporaneous stock returns than the naïvely calculate forecast news (test 3). As a result, we view this alternative measure as providing useful corroborating evidence, but not as a desirable measure of forecast news *per se*.

6.2. Returns-based measures of forecast news

Throughout the paper, we follow the bulk of prior literature by calculating forecast news as the difference between the earnings forecast by the manager and an analyst-based estimate of market expectations prior to the forecast. Some studies, though, use an alternative approach to characterizing news, relying upon the market return to assess whether news is positive or negative. Examples include Noe (1999), Cheng and Lo (2006), and Li et al. (2012).

It is important to note that this approach focuses on the market's interpretation of the manager's disclosure (i.e., its credibility), which may differ from the signal the manager hoped to send. As Hirst et al. (2008) discuss, forecast characteristics (e.g., forecast news) are a fundamentally different construct from the consequences of the forecast (e.g., market response). To illustrate, a manager may disclose good news (a forecast exceeding market expectations) with the goal of boosting the firm's stock price, only to find that the investors do not view the manager as credible and do not respond to the ostensibly good news. In this example, the market return would reflect a lack of credibility rather than the nature of the manager's signal.[31] Prior research suggests that this phenomenon is significant (e.g., Hutton et al., 2003; Rogers and Stocken, 2005).

Conceptually, researchers could distinguish the forecast-related return from the earnings-related return by applying a similar process to that described in this paper. That is, regress earnings-period returns on the earnings surprise and other variables typically used to explain earnings-related returns, and treat the residual as the market response to the manager's forecast. If that residual is positive, it suggests that the market viewed the forecast as good news and if negative, bad news.

7. Summary and conclusions

In recent years, disclosure practices have shifted so that the vast majority of management earnings forecasts are issued contemporaneously with earnings announcements. Because of this shift, the traditional calculation of forecast news (the difference between the manager's earnings forecast and the consensus analyst estimate) is based on stale analyst estimates and generates predictable errors: measured management forecast news is biased downwards and is spuriously correlated with the contemporaneous earnings surprise.

We introduce a method for measuring forecast news for bundled earnings forecasts that explicitly conditions on the information in the contemporaneous earnings announcement. By comparing our conditional measure of forecast news to the traditional forecast news measure, we show that failing to account for the concurrent earnings information significantly alters the distribution of earnings news. Specifically, the bundled forecasts in our sample represent good news, on average, consistent with evidence of selective disclosure in other settings (Cheng and Lo, 2006; Kothari et al., 2009; Sletten, 2009). The traditional calculation of forecast news would have implied the opposite—the forecasts were more likely to reflect bad news. In total, approximately 1 quarter of our sample population is misclassified using the traditional measure of forecast news. We also show that the measurement error in traditional forecast news is correlated with several variables often used in forecast-related research. These results suggest that measurement error in bundled forecast news may have significant effects on empirical results, especially for recent time periods when bundled forecasts are pervasive.

Although we view conditional forecast news as a more accurate measure than the traditional measure of forecast news, there are reasons to be cautious when using this method. First, our conditional measure is itself estimated with error. That error is likely to be greater when the forecasts are quarterly and when the forecasts are issued with longer horizons. Second, we infer what analysts' revisions would have been in the absence of a forecast by observing analyst revisions following earnings announcements for non-forecasting firms. If there are other, non-forecast, differences between the forecasting firms and non-forecasting firms, this inference may generate additional error in conditional forecast news. Third, in situations where firms issue multiple earnings forecasts with a single earnings announcement, we effectively treat the group of forecasts as a single forecast; this may not be sufficient for researchers interested in distinguishing among simultaneous forecasts.

Overall, the measurement problems inherent in bundled forecasts are severe and are likely to affect a variety of research settings. Our method of estimating conditional expectations, while imperfect, allows researchers to address these measurement problems. By using our method, alone or in concert with the traditional measure of forecast news, researchers can reduce the risk of drawing erroneous conclusions based on predictable measurement error.

Appendix A. Replication of Kross et al. (2011) results

In this section, we describe our replication of Kross et al. (hereafter KRS, 2011) in order to assess how our calculation of conditional forecast news would have influenced their results. We chose the KRS study because of their focus on the distribution of good/bad forecast news and how that distribution varies with the likelihood of meeting/beating analyst expectations and the enactment of Reg FD. As discussed earlier, there is reason to believe that good/bad news distributions are influenced by measurement error in management forecast news following Reg FD, and that management forecast news measurement error is correlated with a firm's history of meeting/beating analyst expectations.

[31] A negative market response could also occur when the manager issues a credible earnings forecast, but underestimates the market's pre-forecast expectation of future earnings.

Table A1
Distribution of management forecast news after the enactment of Reg FD.

Panel A: Traditional method (as described in Kross et al.)

	Good news	Neutral news	Bad news	Total	Bad news/(bad news+good news)
Non-bundled	980	274	1,886	3,140	65.81%
Bundled	976	293	1,853	3,122	65.50%
Total	1,956	567	3,739	6,262	65.65%

Panel B: Conditional expectations method for bundled forecasts combined with traditional method for non-bundled forecasts

	Good news	Neutral news	Bad news	Total	Bad news/(bad news+good news)
Non-bundled	980	274	1,886	3,140	65.81%
Bundled	1,905	123	1,094	3,122	36.48%
Total	2,885	397	2,980	6,262	50.81%

Notes: This table documents to distribution of forecast news for management forecasts issued after the effective date of Reg FD (October 23, 2000) for fiscal period ending between January 1, 2000 and December 31, 2004 using the sample selection process described in section 3.1.1 of Kross et al. (2011).
Panel A shows the distribution when using the version of traditional news implemented by Kross et al. (2011).
Panel B shows the distribution for the same sample but recalculates forecast news for bundled forecasts using the conditional expectations method.

We first look at KRS's examination of whether Reg FD affects the likelihood of issuing bad news earnings forecasts. Based on good news and bad news forecasts (and excluding neutral news) from the 8 years surrounding Reg FD, they show that 62.14% of forecasts in the 4-year post-FD period were bad news, compared to 56.43% in the 4-year pre-FD period. They interpret the increase in bad news forecasts after Reg FD as evidence that firms shifted from private to public disclosure of bad news when managing earnings expectations downwards (especially for firms with a long history of meeting/beating analyst expectations).

We examine the same 4-year post-FD period, following the sample selection process KRS described in their Section 3.1.1. We first calculate forecast news based on their traditional calculation, whereby management forecast news is equal to First Call's reported management forecast value less the most recent First Call consensus value.[32] As reported in Table A1, we find this traditional measure of forecast news yields a bad news ratio of 65.7%, slightly higher than KRS's reported 62.14%. (Our sample selection yielded a total of 5,695 good news and bad news forecasts, compared to the 6,279 reported by KRS.) The forecasts in this 4-year period are almost evenly split between bundled and non-bundled forecasts.[33] When using the naïve approach, each group appears to have a similar ratio of bad news forecasts to the sum of good news plus bad news forecasts (the metric reported by KRS).

When we apply our method to the bundled forecasts, we find that the proportion of bad news forecasts drops dramatically: from 65.50% to 36.48%. Combining the bundled forecasts and non-bundled forecasts, we find that the overall proportion of bad news forecasts is 50.81% rather than 65.65%—lower than what KRS report for the pre-Reg FD period.

KRS are primarily interested in the likelihood of issuing a bad news forecast as a function of the firm's consistency of meeting or beating analyst expectations (CMBE), a relation we earlier found to be subject to measurement error. KRS find that firms with a longer streak of meeting/beating expectations are more likely to issue bad news forecasts. We attempted to replicate the results originally reported by KRS, and then substitute our estimate of forecast news to assess whether measurement error would have altered the inferences drawn. However, we were unable to generate a sample of forecasts that demonstrated the same CMBE pattern as that described by KRS in their Table 7. Specifically, they find bad news forecasts are increasingly likely as the firm has a longer streak of meeting/beating analyst expectations. In contrast, we find that the group of firms without a consistent history of meeting/beating analyst expectations (their non-CMBE group) has the greatest tendency to issue bad news forecasts. Given our inability to establish their baseline result, we cannot conclude how the result would change if they had estimated conditional forecast news for bundled forecasts.[34]

Overall, our replication results suggest that, at a minimum, the Reg FD comparison in KRS would be significantly altered by calculating conditional forecast news for bundled forecasts. And, although we are unable to estimate how our calculation would have altered the KRS CMBE-related results, the results in Table 9 indicate that measurement error is likely to have been important in that context, as well.

[32] Although we use the mean of I/B/E/S analyst estimates in our main results, we follow KRS in using the median of First Call estimates for the purposes of replicating their results. Replacing the median consensus with the mean consensus has virtually no impact on the reported results.

[33] The 3,140 "non-bundled" forecasts include 1,349 earnings preannouncements (i.e., forecasts issued on or after the fiscal period end).

[34] We appreciate Inho Suk's assistance in attempting to replicate their data, and speculate that using different vintages of First Call's CIG dataset may have contributed to the difficulty in replicating their results.

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