Earnings Guidance, Earnings Management, and Share Prices

Lee Cohen*
Alan J. Marcus*
Zabihollah Rezaee**
Hassan Tehranian*

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Abstract

We reassess the stock market response to management earnings forecasts. We argue that past estimates of the impact of these guidance announcements can be affected by endogeneity in management forecasts. Such endogeneity can arise if the firm adjusts the forecast in response to its anticipated stock price impact. In contrast to existing literature, we find that controlling for this endogeneity, the price impact of positive guidance announcements is actually greater than that of negative ones. We further find that when firms have demonstrated greater proclivity to manage earnings, the market responds less vigorously to positive guidance announcements, while the response to disappointing guidance announcements is unchanged. These results are consistent with a discount for potentially self-serving guidance forecasts. In contrast, the impact of earnings volatility on the market response to a guidance forecast is symmetric for positive and negative announcements. As a whole, our results demonstrate that the information environment is a crucial determinant of the market’s response to a guidance announcement.

Key words: guidance, earnings management, management earnings forecasts

JEL classification: M41, G14, G30

* Carroll School of Management, Boston College
** Fogelman College of Business and Economics, University of Memphis

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1. **Introduction**

Management forecasts of earnings clearly provide valuable information about firms’ prospects. Many studies, going back at least to Foster (1973), have shown that these forecasts affect stock prices. More recent work has emphasized the conditional nature of the value of these forecasts. These studies, reviewed below, find that the impact of managerial guidance on stock market prices may be related to the complexity of the earnings process, the good versus bad news nature of the announcement, the precision of the forecast, the mode of disclosure, the quality of corporate governance, and manager credibility established by the history of past forecasts.

Recently, however, only about one-fifth of firms have actually provided management forecasts of earnings in any year (see Figure 1), and that fraction has declined over the last decade. The decision to provide earnings guidance is discretionary, and presumably managers offer guidance based on their privileged information only if they think it will be beneficial for the firm. Similarly, it would hardly be surprising if one driver of the earnings forecast is management’s assessment of the likely impact on stock market price. But if managers release a portion of their private information to the market through guidance decisions that are even in part affected by anticipated price impact, then the guidance numbers provided cannot be treated as exogenous. Failure to account for this endogeneity will bias estimates of the price impact of guidance. While a large body of work has emerged exploring the determinants of management’s decision to guide, little attention has been paid to the impact of the potentially endogenous nature of those forecasts on the market’s reaction to them. Specifically, studies of the price response to guidance announcements have not generally addressed the problems posed by endogeneity in earnings forecasts.

As an example of potential endogeneity, suppose that managers are reluctant to announce earnings below analysts’ forecasts. They may then more consistently guide analysts’ forecasts down when analysts are too optimistic than they guide forecasts up when analysts are too pessimistic. Because managers have privileged information when they assess the relative optimism of analysts, this induces a potential feedback from stock prices to the guidance forecast. Managers may also envisage an optimal speed of “walk-down” of analysts’ expectations. In this case, too, they may tailor their guidance to gradually reduce
analysts’ expectations, perhaps considering a forecast of the price response as they partially release their information to the market.

This paper reconsiders the impact of management forecasts of earnings in light of these issues. We argue that consistent estimation requires instrumental variables to deal with the endogeneity of those forecasts. We use a 2-stage least squares regression technique to deal with the potential endogeneity. We first project management earnings forecasts onto a set of correlated and arguably exogenous variables. The projection thus purges the forecasts of their endogenous component. Using these fitted forecasts in second-stage regressions that measure the market response to guidance news, we challenge some of the more interesting conclusions of the literature on management earnings forecasts, particularly that bad-news forecasts are generally more impactful than good-news ones.

Given these results, we ask next why positive guidance announcements may appear to be less potent than negative ones. Here, we focus on the impact of earnings credibility on the price response to guidance. We show that a measure of earnings management developed by Hutton, Marcus, and Tehranian (2009) significantly interacts with guidance announcements in determining price response. Their earnings management variable reflects the reliability of reported earnings and thus also affects the information content of a forecast of those earnings. We find that when we control for endogeneity, positive guidance announcements interact substantially with past proclivity to manage earnings, but negative ones do not, lending support to the hypothesis that positive announcements are more prone to be received skeptically by the market—at least when firms have a history of earnings management. In contrast, simple historical earnings volatility affects the market response to both positive and negative earnings forecasts highly symmetrically, making the asymmetric response to earnings management all the more striking. These results add to the literature documenting the importance of the information environment on the market’s response to a guidance announcement.

The next section briefly reviews some of the literature on the impact of management earnings forecasts. Section 3 lays out our empirical specification. In that section, we address the possible endogeneity of the guidance announcement, and argue that an instrumental variables approach is necessary for consistent estimation of the market price
response. Section 4 describes our data set, and Section 5 presents our findings. Section 6 concludes.

2. Related literature

The information content of management earnings forecasts was established in early studies that demonstrated significant stock price responses to such announcements (Foster, 1973; Patel, 1976; Jaggi, 1978; Penman, 1980; Waymire, 1984; Pownall and Waymire, 1989b). More recent work on the stock price response to these forecasts has focused on the conditional nature of their information value. For example, the impact of guidance on stock prices seems related to the precision of the forecast (Baginski, Conrad, and Hassel, 1993; Pownall, Wasley and Waymire, 1993) as well as the complexity of the earnings process (Hutton, 2005). One widely corroborated conclusion is that “bad news forecasts” (management forecasts that are below current analysts’ expectations for earnings) seem to have greater impact than good news forecasts (Skinner, 1994; Soffer, Thiagarajan, and Walther, 2000; Hutton, Miller and Skinner, 2003; Ng, Tuna, and Verdi, 2008; Kothari, Shu and Wysocki, 2009). High-quality corporate governance such as more independent boards, greater institutional ownership, and more effective audit committees seems to convey greater credibility to guidance announcements (Ajinka, Bhojraj, and Sengupta, 2005; Karamanou and Vafeas, 2005). Similarly, manager credibility established by the accuracy of past forecasts also affects response to a forecast (Hutton and Stocken, 2010; Ng, Tuna and Verdi, 2008). Other work has demonstrated information transfer due to management earnings forecasts, specifically that forecasts of one firm move stock prices of other firms in the industry (Baginski, 1987; Pownall and Waymire, 1989a).

Our results are related to this broad strand of literature, in that we also look at the relationship between earnings quality and the market reaction to management earnings forecasts. However, rather than employ proxies for the veracity of earnings forecasts and announcements, as measured for example by governance variables, we use a measure of earnings quality introduced in Hutton, Marcus, and Tehranian (2009). Their measure captures the extent to which reported earnings are affected by discretionary accruals. They interpret a pattern of substantial abnormal accruals as a sign of earnings management that makes it difficult to verify the true profitability of the firm, and point out that this variable
may in addition proxy more generally for a predilection toward opacity in sharing information with security markets. We will demonstrate that their earnings management measure does in fact strongly influence the market’s reaction to a guidance announcement.

Other studies on the information content of management earnings forecasts look at their impact on analysts’ earnings forecasts. Not surprisingly in light of the stock-price response literature, guidance announcements move analyst forecasts of earnings along with stock prices, thus providing additional evidence of their information content. More precise forecasts lead to greater revisions in analyst forecasts (Baginski, Conrad, and Hassell, 1993; Pownall, Wasley, and Waymire, 1993; Bamber and Cheon, 1998). Cotter, Tuna and Wysocki (2006) demonstrate that firms may employ guidance to mitigate over-optimism in analysts’ forecasts. However, Feng and McVay (2010) conclude that analysts may overly revise their public forecasts (but not necessarily their private forecasts) after a guidance announcement simply to curry favor with management.

Most firms do not issue forecasts, and several variables have been shown to significantly predict the likelihood that guidance will be offered. Ajinka, Bjhojraj and Sengupta (2005) find that firms with more outside directors and greater institutional ownership are more likely to provide guidance. Hutton (2005) concludes that firms are more likely to guide when the earnings process is more difficult to understand. Litigation risk also affects the choice to provide guidance (Johnson, Kasnik, and Nelson, 2001; Baginski, Hassell, and Kimbough, 2002; Field, Lowry, and Shu, 2005). Cotter, Tuna and Wysocki (2006) find firms are more likely to guide when analysts are relatively optimistic (compared to eventual earnings) and when their earnings forecasts exhibit less dispersion. This is consistent with a desire to avoid negative earnings surprises (Matsumoto, 2002; Skinner and Sloan, 2002). In fact, the “walk-down” hypothesis argues that guidance is used to manage earnings expectations to a level that firms can meet or beat at the official earnings announcement (Richardson, Teoh, and Wysocki, 2004). Of note for our study is that the walk-down hypothesis is predicated on the notion that both the decision to provide guidance and the guidance forecast itself are driven at least in part by the perceived stock market reaction to the announcement.

In sum, while studies of price response to earnings guidance have considered a wide range of important factors that can affect the information content of management earnings
forecasts, the literature as a whole has not generally addressed endogeneity in the guidance announcement, despite the fact that the walk-down hypothesis posits that these forecasts are influenced by a consideration of potential stock market impact.\textsuperscript{1} We address these issues explicitly in this paper, and additionally provide further evidence concerning the impact of earnings quality on the market reaction to management earnings forecasts.

3. Model specification

As in much of the literature (e.g., Skinner, 1994; Soffer, Thiagarajan, and Walther, 2000; Hutton, Miller and Skinner, 2003; Ng, Tuna, and Verdi, 2008; Kothari, Shu and Wysocki, 2009), we distinguish between good-news and bad-news announcements, that is, management earnings forecasts either greater or less than the most recent analyst-consensus forecasts. We also allow the market response to a guidance announcement to be tempered by the information environment, specifically, by the reliability of past financial statements. The motivation is that the market may be more skeptical of announcements from firms with a history of earnings management and respond more cautiously to their guidance.

We also allow earnings volatility to affect market response. First, earnings innovations for firms with more volatile earnings may be interpreted as less predictive of future earnings, and therefore warrant a smaller price impact. Second, as we shall see, it is important to distinguish purposeful management of earnings (which may induce oscillating swings in discretionary accruals) from pure volatility of earnings. Including earnings volatility thus serves as a useful control in interpreting results on earnings management.

Our basic specification is that the price response to a management forecast of quarterly earnings may be written as a function of the NEWS in the forecast (defined as the difference between the guidance forecast and the median analyst forecast shortly prior to the guidance announcement, expressed as a fraction of stock price) and two interaction variables: earnings management and earnings volatility. We require analyst forecasts to be sampled at least 3 days but not more than 90 days prior to the guidance announcement.

The dependent variable is the firm’s abnormal return in the period surrounding the announcement. We use a 5-day cumulative abnormal return (CAR) beginning 2 days prior

\textsuperscript{1}Shu (2005) and Tucker (2007) address endogeneity, but of a different sort, arising from self selection. Moreover, they treat only bad-news guidance announcements. We are more interested in the differential reaction to good versus bad news. We consider self-selection issues in our model below (as one of our robustness checks).
to the management earnings forecast and ending 2 days after the announcement. The abnormal return on each day is the residual from a 4-factor model of returns using the three Fama-French (1993) factors augmented by a momentum factor (Carhart, 1997).

As noted, much other research has concluded that positive forecasts have less impact on prices than negative ones. Therefore, we distinguish between positive and negative news, denoted respectively as $NEWS^+$ (defined as $\max(NEWS, 0)$) and $NEWS^-$ (defined as $\min(NEWS, 0)$), allowing each to have different coefficients.

We are also interested in the interaction between the quality of reported earnings and the impact of a management earnings forecast. For example, does a proclivity to manage earnings affect the market reaction to a guidance forecast? We hypothesize that the market may respond with greater sensitivity to guidance announcements from firms with greater earnings transparency.

We adopt a measure of earnings management proposed by Hutton, Marcus, and Tehranian (2009). Their measure is the three-year moving sum of the absolute value of annual discretionary accruals from a modified Jones (1991) model.\(^2\) They argue that firms with consistently large absolute values of discretionary accruals are more likely to be managing reported earnings. For example, a large positive discretionary accrual in one year used to artificially inflate earnings would tend to be followed by negative abnormal accruals when the cash flow “predicted” by the original accrual fails to materialize. Because the original abnormal accrual as well as its reversal would signify earnings management, the moving sum of the absolute value of discretionary accruals is used to signal such practices.

Positive guidance announcements may be especially discounted when firms have shown greater past proclivity to manage earnings, so that a good-news forecast from this group has particular credibility problems. Negative news may be less prone to such problems: Firms presumably would not issue bad news voluntarily unless there is a felt need to convey this information to the market. To test for these differential effects, we interact both positive and negative guidance $NEWS$ with earnings management, $EARN_MGT$.

Finally, we also interact $NEWS$ with earnings volatility ($EARN_VOL$). If earnings innovations are highly volatile and therefore less predictive of future earnings, they may be capitalized into price at a lower multiple, thus reducing the coefficient on $NEWS$. In

\(^2\) We discuss the specifics of variable construction in the next section.
addition, controlling explicitly for earnings volatility makes it easier to distinguish the effects of earnings swings due to accruals-based earnings management with those due to innocent earnings variability.

These considerations motivate the following regression specification:

\[
\text{CAR}_{it} = \alpha_i + \beta_{11} \text{NEWS}^+_{it} + \beta_{12} \text{NEWS}^+_{it} \times \text{EARN}_\text{MGT}_{it} + \beta_{13} \text{NEWS}^-_{it} \times \text{EARN}_\text{VOL}_{it} \\
+ \beta_{14} \text{NEWS}^-_{it} + \beta_{15} \text{NEWS}^-_{it} \times \text{EARN}_\text{MGT}_{it} + \beta_{16} \text{NEWS}^-_{it} \times \text{EARN}_\text{VOL}_{it} + \epsilon_{it}
\]  

(1)

where \(i\) indexes firms and \(t\) indexes quarters in the panel regression. We estimate Eq. (1) including both firm and fiscal year fixed effects, which help control for outside influences on guidance decisions such as the adoption of Reg FD.

We have noted that the guidance \text{NEWS} may suffer from endogeneity. Managers have private information about the firm’s earning prospects, and it seems plausible that their guidance forecasts are influenced in part by their assessments of the possible impact of their announcements. Indeed, this is the foundation of the walk-down hypothesis. In other words, as we noted in the introduction, management might strategically alter its earnings forecast depending on its better-informed assessment of the likely stock price reaction, thus inducing potential feedback from the stock market response to the guidance \text{NEWS}.\textsuperscript{3} If management forecasts are in part affected in this manner, it would make the guidance \text{NEWS} an endogenous variable. We will present below specification tests for the endogeneity of \text{NEWS}. The tests support our conjecture concerning the need for an instrumental variables or 2SLS approach.\textsuperscript{4}

Therefore, when estimating Eq. (1), we will use a two-stage least square (2SLS) estimator for the guidance \text{NEWS}. In the first stage regression, each management earnings

\textsuperscript{3} The overwhelming evidence in the existing literature that management earnings forecasts move both stock prices and analysts’ earnings estimates is evidence that the market recognizes that managers are in fact better informed about the firm. This suggests another way to think about the source of the potential endogeneity. Eq. (1) specifies a general price response function to guidance announcements. If managers have additional private information about the specific circumstances of the firm that might affect the market’s response to their guidance announcement, that private information would be an omitted variable from the perspective of Eq. (1), and managers would then be able to infer something about the value of \(e_{it}\). If that knowledge in turn influences the earnings forecast they announce to the public, the resulting reverse causality would be a source of endogeneity.

\textsuperscript{4} Even if reported median analyst forecasts are noisy measures of the distribution of analysts’ actual expectations, that noise should not be endogenous. Analysts’ forecasts are measured prior to the guidance announcement date and therefore cannot be simultaneously determined with stock returns at that future date. Even if analysts respond strategically to managers’ better-informed forecasts (for example, Feng and McVay (2010) conclude that they may overly tilt their public forecasts in the direction of firms’ guidance announcements), that response does not occur until after we measure their expectations.
forecast is projected onto a set of exogenous variables. In the second stage, the fitted value of the forecast, which has been purged of the effect of endogeneity, replaces the original value when estimating the stock price response to the guidance announcement.

Valid instruments for the first stage regression must be correlated with the management earnings forecast, but unlike that forecast, must be exogenous. We use three instruments for NEWS: analyst pessimism (or equivalently, optimism), the dispersion of analyst forecasts, and institutional ownership of the firm.

We start with analyst pessimism. The NEWS in the management earnings forecast should be related to pessimism: the lower the median analyst forecast compared to management’s private forecast, the more likely it is for the guidance announcement to exceed the analyst consensus. Therefore, the projection of NEWS onto pessimism should result in a positive coefficient. Moreover, pessimism should be exogenous. While management guidance presumably responds to analyst pessimism, causality cannot move in the reverse direction: earnings expectations of analysts must be independent of any incremental NEWS contained in a later guidance announcement. Even if management were to release some of their private information to induce analysts to update their expectations, that NEWS innovation would be independent of current pessimism.

We measure analyst PESSIMISM (following Cotter, Tuna, and Wysocki, 2006) as realized earnings per share minus the median analyst forecast at the survey just prior to the guidance announcement, standardized by stock price at the end of the prior fiscal year. As managers typically do not know for certain what reported earnings will be, this measure uses some information not available at the time of the guidance announcement. However, this knowledge is not necessary for PESSIMISM to be a valid instrument. Rather, it is sufficient for managers merely to recognize at the time of their forecast that the analysts are currently too optimistic or pessimistic. In other words, the variable PESSIMISM is measured with noise, but it is still an informative proxy for managers’ assessment of analyst pessimism at the time of the announcement. But while management’s forecast is potentially influenced by the firm’s strategic considerations, PESSIMISM cannot be affected by those considerations. Projecting NEWS onto PESSIMISM therefore should preserve a good part of NEWS’s original value, but nevertheless remove the impact of endogenous manipulation by management.
Dispersion of analyst estimates, *DISPERSION*, is used as a second instrument; we know that analyst dispersion as well as analyst pessimism affect the likelihood of issuing guidance (Cotter, Tuna and Wysocki, 2006), and so may be related as well to the *NEWS* in the forecast. Moreover, when there is greater dispersion of forecasts, guidance may resolve more uncertainty, thereby making the *NEWS* contained in the forecast related to *DISPERSION*.

Finally, our third instrument is institutional ownership. Firms with greater institutional ownership may feel they have less discretion concerning earnings forecasts. These firms may tend to curtail inflated positive forecasts and/or reveal the full extent of any negative news.

4. Data

4.1 Data sources

The guidance sample consists of quarterly firm observations spanning 1998:Q1 – 2008:Q4. We obtain management earnings forecasts from the First Call historical database of Company Issued Guidelines. We also obtain analyst survey (I/B/E/S) estimates of earnings announcements, such as survey medians and means, from First Call’s Historical Summary Statistics database, and we gather actual earnings announcement data from the First Call Actuals database. Depending on data availability, First Call provides point values of earnings forecasts as well as ranges of estimates. To avoid truncation issues associated with range estimates, we use only observations for which point values are available.

Our company financials data come from the CRSP/COMPSTAT Merged Databases of quarterly and annual fundamentals, and we use daily stock returns from the Center for Research in Security Prices (CRSP). We obtain daily market index returns, industry level returns, and the Fama-French-Carhart factors from the Eugene Fama and Kenneth French data library.

Our initial sample contains 90,255 firm-quarter management earnings forecasts. We eliminate observations that are not associated with a CUSIP identifier, as these cannot be merged reliably with Compustat data (191 observations). We also eliminate forecasts with announcement dates more than thirty days after the associated firm-quarter’s fiscal period end date (1,907 observations). We exclude announcements that concurrently provide
guidance about multiple fiscal periods, because abnormal returns around these announcements will reflect management forecasts of earnings in a variety of future quarters, making it impossible to disentangle which quarters’ forecasts (and associated guidance NEWS) are driving the abnormal return (9,153 observations). Within firms, we drop announcements that take place within a span of five days or less because our primary dependent variable is calculated in the five-day window centered around each forecast (209 observations). We also exclude observations with analyst survey dates occurring within three days of each forecast (3,521 observations), as well as those which precede their forecast by more than 90 days (2,292 observations). We exclude quarterly observations that occur during firm-years where there is a change in the fiscal-year end date (558), and, finally, we follow Kothari, Shu, and Wysocki (2009) in excluding the extreme one percent of observations of NEWS in order to reduce the effects of miscoded analyst earnings forecast and forecasts data (576 observations). We are left with a sample of 71,848 firm-quarter observations.

4.2 Variable Construction

Cumulative Abnormal Returns. We construct cumulative abnormal returns from a momentum-augmented Fama-French three-factor model, with additional leading and lagging market excess return factors to control for potential effects of nonsynchronous trading (Dimson, 1979). We require at least 25 trading days in the [−200, −91] forecast announcement pre-period to estimate factor betas. As in Kothari, Shu, and Wysocki (2009), we compute cumulative abnormal returns (CARs) over the five-day window centered around each guidance announcement.

Guidance News. We treat the median value of the most recent analyst survey of quarterly earnings expectations as the market consensus forecast of quarterly earnings. We define the NEWS in the guidance announcement as the difference between the management earnings forecast and the I/B/E/S survey median, standardized by the firm’s stock price at the end of the previous fiscal year:

\[
NEWS = \frac{\text{Management earnings forecast} - \text{Survey median}}{\text{Lagged stock price}}
\]
NEWS benchmarks each management earnings forecast against the most recent analyst earnings survey within the three to ninety day pre-announcement window.\(^5\) Since analyst earnings surveys are often updated in-between guidance announcements, this one-to-one survey-to-guidance matched structure allows our panel to consider multiple management forecasts preceding actual earnings announcements. Finally, we define positive and negative NEWS as \(NEWS^+ = \max(NEWS, 0)\) and \(NEWS^- = \min(NEWS, 0)\) respectively.

Earnings management. Hutton, Marcus, Tehranian construct a measure of earnings management from discretionary accruals in the modified Jones (1991) model (see Dechow, Sloan, and Sweeney, 1995). We use the same procedure and estimate the following cross-sectional regression equation for firms in each Fama-French industry:

\[
\frac{TA_{jt}}{Assets_{jt-1}} = \frac{1}{Assets_{jt-1}} + \beta_1 \frac{\Delta Sales_{jt}}{Assets_{jt-1}} + \beta_2 \frac{PPE_{jt}}{Assets_{jt-1}} + \epsilon_{jt},
\]

where \(TA_{jt}\) denotes total accruals for firm \(j\) during year \(t\), \(Assets_{jt}\) denotes total assets for firm \(j\) at the end of year \(t\), \(\Delta Sales_{jt}\) denotes change in sales for firm \(j\) in year \(t\), and \(PPE_{jt}\) denotes property, plant, and equipment for firm \(j\) at the end of year \(t\).\(^6\)

Discretionary annual accruals as a fraction of lagged assets for firm \(j\) during year \(t\) (\(DiscAcc_{jt}\)) are then calculated using the parameter estimates from Eq. (2):

\[
DiscAcc_{jt} = \frac{TA_{jt}}{Assets_{jt-1}} - \left(\hat{\alpha}_0 \frac{1}{Assets_{jt-1}} + \hat{\beta}_1 \frac{\Delta Sales_{jt} - \Delta Receivables_{jt}}{Assets_{jt-1}} + \hat{\beta}_2 \frac{PPE_{jt}}{Assets_{jt-1}}\right)
\]

where hats over the coefficients denote estimated values from regression Eq. (2).

Hutton, Marcus, Tehranian (2009) define earnings management (which they call opacity) as the three-year moving sum of the absolute value of annual discretionary accruals:

\[
EARN\_MGT = |DiscAcc_{t-1}| + |DiscAcc_{t-2}| + |DiscAcc_{t-3}|
\]

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\(^5\) We require each guidance announcement to be preceded by an updated analyst survey. We do not allow two consecutive guidance announcements to be benchmarked against the same analyst survey. For example, if two guidance forecasts are issued in a short time span, we would benchmark the first guidance announcement against the most recent analyst forecast, but we would ignore the second unless an updated analyst survey were available.

\(^6\) Total annual accruals equal income before extraordinary items and discontinued operations minus cash flow from operating activities.
Earnings management can result in positive and negative abnormal accruals. Positive abnormal accruals are observed if the firm artificially inflates earnings, but when those accruals are later reversed, we observe negative abnormal accruals. By taking absolute values, both positive and negative abnormal accruals will increase the firm’s value for $EARN\_MGT$ in Eq. (4).

We actually measure $EARN\_MGT$ by rank ordering firms in each industry in terms of their raw values for $EARN\_MGT$ for each fiscal year and then assigning each firm its percentile score within that industry-fiscal year. This transformation helps control for variation across industries in the fit of the modified Jones model. Otherwise, industries with intrinsically more variable accruals patterns (or industries not as well described by the Jones model) would generate more extreme values of earnings management. $EARN\_MGT$ therefore ranges from zero (for the most transparent firm in each industry) to just below 1 (for the firm with the greatest value of $EARN\_MGT$ in each industry).

*Earnings volatility.* We estimate earnings volatility, $EARN\_VOL$, using quarterly data over the past 3 years. To allow for seasonality, we regress quarterly earnings data on dummy variables for each fiscal quarter and take the residual standard deviation as the estimate of earnings volatility. Analogously to our treatment of earnings management, we rank each firm by earnings volatility within its industry and use the percentile score as the measure of $EARN\_VOL$. (As a robustness check, we also calculated total standard deviation of quarterly earnings as an alternative measure of volatility, and found that our results were unchanged.)

*Analyst pessimism.* $PESSIMISM$ equals the difference between realized quarterly earnings and the median consensus forecast from the most recent analyst survey of quarterly earnings expectations prior to each guidance announcement, standardized by the firm’s stock price at the end of the prior fiscal year:

$$PESSIMISM = \frac{Actual\ EPS - Survey\ median}{Lagged\ stock\ price}$$

*Analyst Dispersion.* Analyst $DISPERSION$ is defined as the difference between the highest and lowest forecast of earnings per share in the most recent analyst survey, normalized by stock price at the close of the previous fiscal year.
Institutional holdings. The percentage of each firm’s common stock held by institutions (lagged one year to ensure exogeneity), \textit{INST\_HOLD}, is included as an instrument for \textit{NEWS}. These data come from the Thomson Reuters Institutional (13f) Holdings.

Winsorization. We winsorize at the 1st and 99th percentiles analyst \textit{PESSIMISM} and several variables used later in our robustness checks, including dispersion of analyst forecasts, institutional share holdings, size, and R&D expenditures. In addition, to guard against data errors, we exclude observations with \textit{NEWS} falling outside the first and ninety-ninth percentiles of its distribution.

4.3 Sample characteristics

Table 1 presents summary statistics for the sample. The full sample, comprising guiders and non-guiders, contains 71,848 firm-quarter observations. The number of guidance forecasts, 14,830, is about one-fifth that value. Most of the statistics in the table pertain to the full sample, but the data for the guidance \textit{NEWS} obviously pertain only to the guiding subsample. Notice that both the mean and median values of analyst \textit{PESSIMISM} are near zero. Positive guidance news is considerably less frequent than negative news, but conditional on observing positive guidance, it is considerably larger in absolute value.

[Table 1 here]

Figure 1 shows the fraction of firms issuing guidance forecasts in each fiscal year. There is a noticeable increase in guidance announcements in 2001 following the adoption of Reg FD in 2000, but, as noted, the fraction then drops back steadily.

[Figure 1 here]

\footnote{This may seem at odds with the fact that only about one-fifth of firms offer guidance in any year. However, those firms that offer guidance in one quarter tend to offer it in multiple quarters. Moreover, some firms actually offer guidance more than once in a quarter, updating previously issued management earnings forecasts for the same quarter. This practice increases the ratio of forecasts to firm-quarters.}

\footnote{For example, the mean value of \textit{NEWS} has absolute value around 1.5 times that of \textit{NEWS}. Similarly, the absolute value of the median value of \textit{NEWS} is around double that of \textit{NEWS}. The 25th percentile value of \textit{NEWS} is around double that of the 75th percentile value of \textit{NEWS}, and the 75th percentile value of \textit{NEWS} is around 1.5 times that of the 25th percentile value of \textit{NEWS}.}
Figure 2 shows the composition of guidance $NEWS$ in each fiscal year. While the incidence of negative and positive $NEWS$ was roughly equal until 2001, since then, the number of disappointing forecasts has slowly grown while the number of positive ones has more dramatically declined. By the end of the sample, negative $NEWS$ forecasts outnumbered positive ones by almost a 4 to 1 ratio. The source of this trend is apparent in Figure 3, which shows the frequency with which firms issue guidance forecasts that “correct” analyst misperceptions. When analysts are optimistic (dashed line), there is a very high likelihood that a management earnings forecast will be below the median forecast. By the end of the sample period, that probability is above 90%. But when analysts are pessimistic (solid line), the likelihood of positive $NEWS$ averages only around 50% across the entire period and is actually less than 50% in the latter portion of the sample. This pattern seems consistent with the walk-down hypothesis, in which guidance is used to manage optimistic analyst predictions to attainable levels. On the other hand, the pattern suggests that the “true news” in a management forecast may differ from conventionally measured $NEWS$. While negative $NEWS$ seems to reliably signal analyst optimism, analyst pessimism does not reliably elicit positive $NEWS$. Instead, it looks as though the guidance announcement is subject to strategic management by the firm.

[Figures 2 and 3 here]

Table 2 presents correlation matrices among the key variables (some of which are employed in robustness tests below) using the full sample in Panel A and the guiding subsample in Panel B. Notice from Panel A that analyst forecast dispersion is positively correlated with $EARN\_MGT$, supporting the hypothesis that the earnings of firms with more

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9 This observation suggests another way to think about the many studies that find the stock-price impact of positive guidance announcements less pronounced than that of negative ones. While bad-news guidance forecasts in the face of analyst optimism appear to be reliable indicators of management’s earnings expectations, good-news forecasts seem far more prone to an errors-in-variables problem that could bias downward their estimated coefficients in a standard price-response regression.

10 Moreover, when firms release negative guidance in the presence of analyst pessimism, $NEWS^-$ tends to be very small. For the pessimistic subsample, when negative $NEWS$ is released, its average value is $-0.0022$, whereas when positive news is released for this subsample, its magnitude is almost three times as large, 0.0062. This pattern is also consistent with the hypothesis that firms strategically manage guidance announcements. Negative $NEWS$ announcements in the presence of pessimism may be designed to be low-impact events, possibly intended to allow managers to avoid breaking their pattern of issuing guidance without meaningfully affecting analyst forecasts. In contrast, average $NEWS^+$ and $NEWS^-$ in the optimistic subsample are similar in magnitude, 0.0055 and $-0.0058$ respectively, while guidance forecasts are negative in over 80% of these cases.
aggressive earnings management are in fact more difficult to project. Consistent with other research, guidance is more prevalent for larger firms, for firms with greater institutional holdings, and for firms with low analyst dispersion. Firms with high \textit{EARN\_MGT} are slightly less likely to provide guidance. In Panel B, we see that the correlation between \textit{PESSIMISM} and the guidance \textit{NEWS} is strongly positive, .555, which reflects the fact that the guidance announcement is more likely to be good news when analysts are currently too pessimistic.

[Table 2 here]

5. **Regression Results**

Table 3 shows regression results for the first-stage regression of \textit{NEWS} onto its instruments. As expected, the coefficient on \textit{PESSIMISM} is positive, .474, with a very large \textit{t}-statistic. Analyst \textit{DISPERSION} has a highly significant, negative coefficient, \textit{−}.237, suggesting that conditional on providing guidance, firms are more likely to guide down when there is greater disagreement among analysts. Institutional ownership also has a statistically significant impact on \textit{NEWS}. The R-square of this regression is 33.42%.

[Table 3 here]

Table 4 shows regression results for the price response to a management earnings forecast. For each specification, we present both OLS and 2SLS estimates of Eq. (1). One specification allows only direct effects of positive and negative guidance \textit{NEWS}; the other allows for interactions of each with both earnings volatility and earnings management.\textsuperscript{11}

[Table 4 here]

The OLS regressions in Column 1 seem to confirm the prevalent findings in earlier research that negative \textit{NEWS} results in a bigger market impact than positive \textit{NEWS}.\textsuperscript{12} The coefficient on \textit{NEWS}\textsuperscript{−}, 4.812, is considerably less than that on \textit{NEWS}\textsuperscript{+}, 7.583, with both

\textsuperscript{11} We also experimented with regressions allowing for only one of these interactions. As it turns out, however, the impact of these two variables is surprisingly robust to the inclusion of the other, so we report results only for the most inclusive specification.

\textsuperscript{12} Our sample period begins in 1998, so we cannot directly comment on potential biases in the earlier literature. We merely note that our sample period results in similar patterns as earlier papers when we use similar estimation techniques, i.e., OLS without correction for potential endogeneity. In this sense, there does not appear to be anything peculiar about our sample period.
coefficients significant at better than the 1% level. (All standard errors are clustered at the firm level.)

The OLS regressions allowing for interaction effects (Column 3) yield similar patterns in that the impact of negative guidance announcements dominates the impact of positive ones. The coefficient on \( NEWS^+ \), 3.123, is only about one-third that on \( NEWS^- \), 10.668, with both variables significant at better than the 1% level. The impact of the interaction effect between \( EARN\_MGT \) and a positive guidance announcement, \( NEWS^+ \), is not even close to statistically significant. Similarly, the interaction effect between \( EARN\_MGT \) and a negative guidance announcement, \( NEWS^- \), is likewise not even close to statistically significant. In contrast, the interaction between earnings volatility and \( NEWS^+ \) is positive and statistically significant at a 5% level. However, the interaction between earnings volatility and \( NEWS^- \) is negative, −4.659, and statistically significant at the 1% level. Thus, according to these OLS estimates, the impact of guidance \( NEWS \) seems largely unrelated to earnings management, while the impact of \( NEWS \) with earnings volatility is inconsistent: the interaction effect is negative for disappointing \( NEWS \), but positive for positive announcements. Most important for our purposes, however, is this fact: even ignoring the imprecision of the interaction terms, these OLS point estimates imply that at almost any level of observed earnings management or volatility, positive \( NEWS \) induces lower price responses than negative \( NEWS \) of equal magnitude. (Remember that \( EARN\_MGT \) and \( EARN\_VOL \) are percentile values, bounded between 0 and 1.)

In summary then, when using OLS, our sample presents patterns broadly consistent with prior research. Bad-news management earnings forecasts seem to have a greater impact than good-news forecasts. However, these results fail to take account of endogeneity in the forecast.

The Column 2 and 4 regressions use 2SLS for the guidance \( NEWS \). The fitted values for \( NEWS \) come from the first-stage regressions in Table 3. The 2SLS results reverse the conclusions of the OLS estimates concerning the relative impact of positive versus negative \( NEWS \). In Column 2, the coefficient on \( NEWS^+ \), 14.225, is more than double that on \( NEWS^- \), 5.907. The Column 4 estimates similarly differ substantially from those in Column 3. First, compare the coefficient estimates on \( NEWS^+ \) in the OLS and 2SLS regressions. The coefficient increases from 3.123 in Column 3 to 29.890 in Column 4. Not only is the
2SLS coefficient far greater than the OLS coefficient (and highly significant with a $t$-statistic of 8.983), it is now also substantially greater than the coefficient on $NEWS^{-}$, 12.911. Thus, using 2SLS estimation, positive $NEWS$ seems more impactful than negative $NEWS$.

Notice that the difference in the coefficients on $NEWS^{-}$ in the OLS versus 2SLS regressions is far smaller than the difference in the coefficients on $NEWS^{+}$ (compare the coefficients in column 1 to column 2 or in column 3 to column 4). Apparently, the endogeneity of management earnings forecasts is less of an issue for disappointing guidance announcements than it is for positive ones. This seems plausible. Why voluntarily issue negative guidance unless there is some news that is desirable to get out on the table? The market may thus be willing to accept negative guidance announcements at closer to face value. But positive guidance may reflect greater amounts of discretion. As such, the market may be more skeptical. Thus, the difference between the OLS coefficient on $NEWS$ and the 2SLS coefficient on its instrumented value (which has been purged of the effect of any strategic considerations) is far greater for positive announcements than for negative ones.

The earnings management and earnings volatility interaction effects also differ considerably across the OLS and the 2SLS regressions as well as across positive versus negative guidance announcements. Whereas the interaction of $NEWS^{+}$ with $EARN\_MGT$ in the OLS regression (column 3) is small and statistically insignificant, the interaction in the 2SLS regression (column 4) is large, $-10.258$, and statistically significant ($t$-statistic $= 2.242$).\textsuperscript{13} Apparently, the market views positive guidance announcements with increasing skepticism against a background of past earnings management.

The difference between OLS and 2SLS estimates of the interaction between $EARN\_VOL$ and positive $NEWS$ is even more dramatic. The coefficient on the interaction term changes from 2.930 (Column 3) to a value of $-17.404$ (Column 4), with a $t$-statistic of 3.642.

Negative $NEWS$ displays some different patterns. The interaction of $NEWS^{-}$ with $EARN\_MGT$ is small and insignificant in both the OLS and 2SLS regressions. So while a history of earnings management strongly tempers the market’s reaction to positive $NEWS$, it seems to have little or no effect on the reaction to negative $NEWS$. This seems plausible:

\textsuperscript{13} Statistical significance levels for the 2SLS regressions are based on bootstrapped standard errors. See Angrist and Pischke (2009), Chapter 4.
because guidance is voluntary, firms that wish to delay disclosure of bad news can simply choose not to issue guidance. There is less reason to doubt voluntary forecasts with negative news even if the firm has a history of earnings management.

On the other hand, the interaction of earnings volatility with \( NEWS^- \) in the 2SLS regression is highly statistically significant (\( t \)-statistic = 5.621), and economically important. The coefficient on the interaction term is \(-9.873\), which is nearly the same magnitude as the coefficient on the point estimate of \( NEWS^- \).

Figures 4 and 5 use point estimates from the regression equations in columns 3 and 4 to plot the “full” price response to a unit change in either \( NEWS^+ \) or \( NEWS^- \), specifically, the percentage price change (or CAR) corresponding to guidance \( NEWS \) equal to \( \pm 1\% \) of the pre-announcement stock price. That full response is the sum of the direct coefficient on either \( NEWS^+ \) or \( NEWS^- \) plus the additional response that derives from the interaction terms with \( EARN_MGT \) and \( EARN_VOL \). Because both the stock price change and \( NEWS \) are both normalized by price, this sensitivity may be interpreted equivalently as the price response (in dollars per share) to a $\_\_ change in management’s forecast of earnings per share. The price response profiles are presented for both OLS and the 2SLS regressions.

Figure 4 presents four profiles, two for OLS (Panel A) and two for 2SLS regressions (Panel B). Each profile holds \( EARN_VOL \) at a value of .50 (i.e., fiftieth percentile) and shows the total response to a 1% value for \( NEWS \) as \( EARN_MGT \) moves from 0 to 1. The OLS profiles are nearly flat; their most noteworthy feature, as pointed out above, is that the plot for the response to positive \( NEWS \) lies uniformly below that for negative \( NEWS \), consistent with prior literature. However, the profiles in Panel B based on 2SLS regressions tell a very different story. First, note that the plot for positive \( NEWS \) now lies uniformly above that for negative \( NEWS \). Second, notice the very different impact that earnings management has on the market response to positive versus negative \( NEWS \). The negative \( NEWS \) profile is essentially flat, whereas the positive \( NEWS \) profile is steeply downward sloping. Whereas the price response to positive \( NEWS \) is more than double that for the most transparent firms (with the least earnings management), the difference largely dissipates for the least transparent firm.

[Figure 4 here]
In Figure 5, we plot the profiles for the market reaction to NEWS as earnings volatility varies, holding EARN\_MGT at the median value of .50. Again, OLS estimates are used to form the profiles in Panel A and 2SLS estimates in Panel B. Using OLS, the positive NEWS profile again lies below that for negative NEWS except for the most extreme levels of earnings volatility. In contrast, in the 2SLS regressions, positive NEWS is again apparently more impactful than negative NEWS. Here, however, both price response profiles are steeply downward sloping, and in fact are roughly parallel, implying that increases in \textit{EARN\_VOL} reduce market reaction to positive and negative NEWS nearly symmetrically. This symmetry is in marked contrast to the asymmetry of response to earnings management displayed in Panel B of Figure 4. A reasonable interpretation of these patterns is that high values of \textit{EARN\_VOL} raise doubts about the persistence of any earnings innovation signaled by a guidance announcement (and thus limit the price response to NEWS) while high values of \textit{EARN\_MGT} raise questions about the veracity of any earnings forecast. However, while volatility equally affects the price response to both positive and negative NEWS, veracity seems to be a salient issue only for positive-NEWS announcements.

Further corroboration for the plausibility of the 2SLS estimates over the OLS ones is found in the magnitude of the price responses. Consider the price response to NEWS for a “median firm,” which we will interpret as one that is at the 50th percentile for both \textit{EARN\_MGT} and \textit{EARN\_VOL}. Using the Table 4 regression coefficients, an increase in earnings guidance of $1 per share would increase the price of a median firm by $16.06, which is broadly consistent with observed price-earnings multiples. In contrast, using point estimates from the OLS regressions (and ignoring the fact that the coefficients on both interaction effects are not statistically significant), the median price response to that increase in forecast earnings is only $4.83, which is implausibly low in comparison to common P/E multiples.

However, negative NEWS forecasts do not show this discrepancy. The 2SLS estimates imply a price decline of $8.00 for every $1 decrease in forecast EPS for a firm that is median with respect to both earnings management and earnings volatility. This response is somewhat lower than the price response for positive guidance announcements, and lower
than typical P/E multiples. The median response based on the OLS estimates is essentially
the same, $7.99.

In sum, our results imply that:

• Using consistent 2SLS regressions rather than OLS, positive NEWS seems more
  impactful than negative NEWS.

• A history of earnings management substantially reduces the market’s response to
  positive guidance announcements, but has no effect on its response to negative
  announcements.

• High earnings volatility reduces the market response to both positive and negative
  guidance announcements.

While some of these results run counter to past research, they are plausible. Not all
positive NEWS is tainted and thus discounted. Our results show that positive NEWS
announcements from firms with histories of minimal earnings management have high
impact. The discounting of positive announcements is observed primarily for suspect firms.
In other words, if positive guidance NEWS is credible enough to move expectations of future
earnings, there is no reason for its impact on price to be less than that of a negative NEWS
event. Using 2SLS estimates to eliminate the impact of guidance endogeneity, the estimated
response to positive NEWS is actually greater than to negative NEWS.

These results taken together seem consistent with a market response that is
conditioned by the quality of the information released. We observe higher responses to
better NEWS, more credible NEWS, and less noisy NEWS.

5.1 Endogeneity Tests

We have argued that many tests of the market response to guidance NEWS have
suffered from an endogeneity bias, and that an instrumental approach proposed is necessary
to eliminate that bias. In this section, we use a Hausman (1978) specification test to buttress
this claim. In our setting, the Hausman test compares two estimators: The OLS regressions
using the raw values of NEWS$^+$ and NEWS$^-$ are consistent and efficient if NEWS is
exogenous, but are neither consistent nor efficient if NEWS is endogenous. In contrast, the
2SLS regressions using the fitted values of NEWS$^+$ and NEWS$^-$ are consistent even if NEWS
is endogenous (but are inefficient if it is exogenous). Therefore, if NEWS is exogenous, then both estimators are consistent and ought to yield similar results, but if not, then the OLS estimators will be biased, and the OLS and 2SLS results will differ. A statistically significant difference between them therefore implies that NEWS is indeed endogenous and that an instrumental variable approach is necessary.

In our case, the Hausman test can be simplified to a conventional $F$-test. Wu (1973) suggests estimating the equation including as explanatory variables both the original value of NEWS as well as the fitted value of NEWS from the first stage regression, denoted $\hat{\text{NEWS}}$. If NEWS is actually exogenous, then the fitted values will be extraneous, and should receive statistically insignificant coefficients. However, if NEWS is endogenous, the fitted values will contribute to the explanatory power of the regression and receive statistically significant coefficients. For example, in the stripped-down specification (i.e., without interaction terms) used in column (1) of Table 4, we would estimate

$$\text{CAR}_{it} = \alpha_i + \beta_{i1} \text{NEWS}_{it}^+ + \beta_{i2} \hat{\text{NEWS}}_{it}^+ + \beta_{i3} \text{NEWS}_{it}^- + \beta_{i4} \hat{\text{NEWS}}_{it}^- + e_{it}$$ (5)

and use an $F$-statistic to test for the joint significance of $\beta_{i3}$ and $\beta_{i4}$.

Table 5 presents this specification test, which overwhelmingly rejects the exogeneity of NEWS at better than a 0.01% significance level. Column (1) of the table estimates the specification corresponding to column (1) of Table 4. Interestingly in light of our earlier discussion of the impact of the interaction of earnings management with guidance surprises, the coefficient of $\hat{\text{NEWS}}_{it}^+$ is highly significant, while that of $\hat{\text{NEWS}}_{it}^-$ is insignificant, suggesting that endogeneity is an issue primarily for the good-news forecasts. Column (2) presents similar tests, but allowing for interaction terms. Again, the exogeneity of NEWS is overwhelmingly rejected.

We also test for the strength of our instruments. Stock and Yogo (2005) point out that instruments with low correlation with the endogenous variable will result in unreliable estimators. The high R-square (.3342) in our first-stage regressions, where we fit NEWS onto our instruments, strongly suggests that this is not a concern in our application. Nevertheless, to formally test for weak instrument problems, we computed a Kleinbergen-Paap (2006) $F$-statistic, which generalizes the Stock-Yogo procedure for clustered error
terms. The resulting $F(3,1904)$ statistic of 211.5 easily exceeds Stock-Yogo’s highest critical value of 22.3 for acceptable instruments (see their Table 5).

5.2 Robustness Checks

PESSIMISM instrument. Analyst PESSIMISM is used as an instrument for guidance NEWS, and is calculated using the most recent survey prior to the actual management earnings forecast. We also calculated PESSIMISM using the initial survey of analysts, i.e., the first survey of analyst predictions for each particular fiscal period. The initial survey is almost always within 2 years of the ultimate earnings announcement. Using an earlier survey is a noisier instrument for the ultimate value of NEWS (and in fact, the R-square from the fit of NEWS on PESSIMISM and the other instruments declines), but being more separated in time, it is even less likely to be subject to any endogeneity that might result from leaks of information in advance of a formal guidance announcement. Using this earlier (albeit noisier) instrument reduces the precision of our estimates somewhat, but does not affect our conclusions.

Fiscal period issues. Our sample includes management forecasts of earnings made after the end of the fiscal period, at which point uncertainty about earnings is largely eliminated, at least to management. Conceivably, these forecasts might be received differently than those issued prior to the end of the fiscal quarter. Excluding these observations reduces our sample size only moderately, from 14,618 to 12,079, and has little effect on the regression estimates. Coefficient estimates in the restricted sample are nearly the same as those in Table 4.

Self-selection bias. We have focused on one source of endogeneity, the possibility that a guidance forecast is influenced by the firm’s strategic concerns. But in light of the facts that most firms do not even offer guidance and that forecasts provided by the firms that do offer guidance are heavily skewed toward negative announcements, another sort of endogeneity—sample self-selection of guiders versus non-guiders—also seems like a potential concern. Therefore, we estimate our price response equations in a Heckman (1979) selection model that controls for potential biases due to self selection.
Suppose that the true model for the market reaction to a management earnings forecast is

\[ R_i = \alpha + X_i \beta + \varepsilon_i \]  

(6)

where \( R_i \) denotes the firm’s abnormal return during the event period (i.e., the period surrounding its guidance announcement), and \( X_i \) is a vector of variables containing information about the guidance announcement, including for example, the deviation of the forecast from prior consensus expectations, characteristics of the earnings process, and so on. However, only a sub-sample of firms chooses to provide guidance. The decision to guide is determined by a selection equation:

Guidance if \( W_i = Z_i \gamma + \eta_i > 0 \)  

(7)

No guidance if \( W_i = Z_i \gamma + \eta_i \leq 0 \)  

(8)

where \( Z_i \) denotes the vector of publicly observable variables that affect the firm’s decision to guide. The actual value of \( W_i \) is not observable, but the decision to guide reveals whether it is positive or negative, which allows us to estimate the guidance parameters \( \gamma \) in a probit framework.

The Heckman system of equations can be estimated jointly using maximum likelihood techniques assuming that \( \varepsilon_i \) and \( \eta_i \) are bivariate normal. However, in practice, selection models are usually estimated in two discrete steps (Li and Prabhala, 2006). The conditional (on the decision to provide guidance) expected value of the error term in Eq. (6) is treated as a variable that is omitted from the right-hand side of the equation. If that omitted self-selection variable is included, however, one can both control for and estimate the statistical significance of the selection effect. Conditional on management’s decision to select into the sample of guiders, the expected value of the error term in Eq. (6) is given by the inverse Mills ratio, \( \phi(Z_i \gamma)/\Phi(Z_i \gamma) \), where \( \phi \) and \( \Phi \) are the normal density and distribution functions respectively. Thus, we can insert the inverse Mills ratio into the regression Eq. (6) and use its estimated coefficient to test the importance of self-selection to the estimation of that equation.

We estimate the decision to provide guidance as a probit equation, given by Eq. (7), with the following vector of explanatory variables, \( Z \).
Analyst Pessimism. Cotter, Tuna, and Wysocki (2006) find that management guidance is more likely when analysts are pessimistic. Therefore, we include PESSIMISM as an explanatory variable in our probit equation.

Analyst dispersion. Cotter, Tuna, and Wysocki (2006) also find that management guidance is more likely when the dispersion of analyst forecasts of earnings is low. Therefore, we include DISPERSION as an explanatory variable in our probit equation.

Institutional holdings. Share holdings of institutional investors are well known to be associated with the quality of corporate governance generally, and the decision to provide guidance specifically (e.g., Ajinka, Bhojraj and Sengupta, 2005). Therefore, the percentage of common stock held by institutions, INST_HOLD, lagged one year, is included as a determinant of the decision to guide.

R&D/Sales. Cheng, Subrahmanyan, and Zhang (2009) find that firms with high levels of research and development activity relative to sales may have less predictable earnings. Therefore, we include the ratio of R&D expenses to sales, R&D, as a determinant of the decision to guide.

Dividend yield. Firms with high dividend yields, DIV_YLD, typically have more predictable earnings prospects, and thus may perceive less of need to provide guidance to the marketplace.

Size. Large firms draw greater institutional following and have more extensive relations with analysts. It seems plausible that they will have greater incentive to provide guidance to the market. We measure SIZE as the natural log of total assets, measured in real 2008 dollars, and lagged by one year.

Earnings management. We include EARN_MGT in the probit equation. It seems reasonable that firms choosing more opaque accounting practice may be less likely to provide guidance.

Earnings volatility. We also include EARN_VOL in the probit equation. Earnings predictability may affect the propensity to provide guidance.

Regulation FD. We observe in Figure 1 that guidance announcements increase dramatically following the adoption of Regulation FD. We expect the RegFD dummy (with a value of 0
prior to 2001 and a value of 1 in 2001 and thereafter) to significantly and substantially affect the likelihood of guidance.

Table 6 shows the probit equation determining the decision to provide a guidance forecast. The first column of figures gives the estimated regression coefficient with z-scores for statistical significance in the second column.

[Table 6 here]

As predicted, large firms are a bit more likely to guide. Firms with greater R&D relative to sales are less likely to guide, in accordance with Cheng, Subrahmanyan, and Zhang (2009). As in Ajinka, Bjhojraj and Sengupta (2005), we find that greater institutional holdings are associated with greater likelihood of providing guidance, and as in Cotter, Tuna, and Wysocki (2006), we find that management guidance is more likely when analysts are optimistic and when the dispersion of their earnings forecasts is low. The RegFD dummy has very high impact, implying a large increase of 10% in the probability of issuing guidance in any quarter; this result is not surprising in light of the dramatic upsurge in management earnings forecasts after 2000 (see Figure 1). Earnings management has no statistically significant impact on the incidence of guidance. Earnings volatility, however, is significant: firms with greater volatility are less likely to offer guidance. Finally, high dividend yield firms are less prone to issue guidance announcements. By and large, these results are consistent with the prior literature.

Table 7 repeats the analysis of Table 4, but with the inverse Mills ratio added to the right-hand side. The inverse Mills ratio for the decision to guide attains high statistical significance (t-statistic above 6 in all regressions), but it has little impact on the point estimates of the price response regression.14 Thus, accounting for self-selection has virtually no impact on our earlier results concerning the price response to a management earnings forecast. The results clearly suggest that endogeneity in the guidance forecast is more important than self-selection.

[Table 7 here]

6. Conclusion and summary

14 The number of observations in Table 7 is slightly less than that in Table 4; the first-stage probit estimation for the Heckman model uses additional variables which result in a few more missing values.
We reassess the stock market response to earnings guidance announcements, controlling for potential endogeneity that arises from strategic management of the earnings forecast. Ignoring these endogeneities, our sample produces estimates broadly consistent with the extant literature. Disappointing management earnings forecasts appear to have greater impact on market prices than positive ones. However, accounting for endogeneity reverses the conclusion: the price impact of positive NEWS is actually greater than that of negative NEWS of equal magnitude.

We also extend the prior literature on the impact of the information environment on the market’s response to guidance announcements. We find that when firms have demonstrated greater proclivity to manage earnings opportunistically, the market responds less vigorously to positive guidance announcements; in contrast, the response to disappointing guidance announcements is unchanged. This is consistent with a discount for potentially self-serving announcements, while robust credibility is ascribed to news releases that will reduce stock price.

In contrast to earnings management, we find that the impact of earnings volatility on the market response to a guidance forecast is nearly identical for positive and negative announcements. The roughly symmetric interaction between volatility and guidance announcements makes the asymmetric interaction of earnings management with guidance all the more striking.

Finally, it appears that biases resulting from strategic management of the earnings guidance announcement are far more important than those due to self-selection.
References


Matsumoto, D., 2002. “Managerial incentives to avoid negative earnings surprises.” *Accounting Review* 77,


Figure 1

Percentage of firms issuing at least one guidance announcement.
Figure 2

Number of guidance forecasts with positive NEWS (i.e. guidance forecasts above the median analyst forecast) and with negative NEWS in each fiscal year.
Figure 3

Percent of cases in which management earnings forecast serves to mitigate initial analyst optimism or pessimism. Dashed line: percentage of management earnings forecasts (MEFs) with negative NEWS when analysts are initially optimistic. Solid line: percentage of guidance forecasts with positive NEWS when analysts are initially pessimistic.
Figure 4

Total price response to guidance NEWS of $1 per share as a function of earnings management. Values equal the predicted price response as a multiple of the earnings guidance NEWS. Each profile depicts the firm’s predicted price response as earnings management varies from the first percentile to the 99th percentile within its industry. Earnings volatility percentile is held fixed at 50%. Panel A: OLS estimates. Panel B: 2SLS estimates.
Figure 5

Total price response to guidance *NEWS* of $1 per share as a function of earnings volatility. Values equal the predicted price response as a multiple of the earnings guidance *NEWS*. Each profile depicts the firm’s predicted price response as earnings volatility varies from the first percentile to the 99th percentile within its industry. Earnings management percentile is held fixed at 50%. Panel A: OLS estimates. Panel B: 2SLS estimates.
Table 1

Summary statistics for key variables. Sample period 1998:Q1 – 2008:Q4. The surprise and optimism variables are defined only for those firms that issue guidance, resulting in 14,830 firm-quarter observations. The other statistics are computed from all firms in the sample, resulting in 71,848 firm-quarter observations. NEWS = the difference between management earnings forecast and the prior median earnings estimate of security analysts, expressed as a fraction of lagged stock price. Positive and negative NEWS are respectively, NEWS^+ = max(NEWS,0) and NEWS^- = min(NEWS,0). PESSIMISM equals the difference between the ultimate quarterly earnings announcement and the median consensus forecast from the most recent analyst survey prior to that guidance announcement, standardized by the firm’s fiscal-year lagged stock price. The summary statistics for NEWS^+ are computed from only the set of positive guidance announcements, and those for NEWS^- only from negative guidance announcements.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>25th %ile</th>
<th>Median</th>
<th>75th %ile</th>
<th>Obs</th>
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<tbody>
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<td>Assets ($ million)</td>
<td>4,923</td>
<td>13,537</td>
<td>246</td>
<td>824</td>
<td>2,995</td>
<td>71,848</td>
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<td>R&amp;D/Sales</td>
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<td>0</td>
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<tr>
<td>Analyst dispersion</td>
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<td>0.0121</td>
<td>0.0003</td>
<td>0.0014</td>
<td>0.0036</td>
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</tr>
<tr>
<td>Dividend Yield</td>
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<td>0</td>
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</tr>
<tr>
<td>NEWS</td>
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<td>-0.0005</td>
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<td>NEWS^+</td>
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<td>0.0017</td>
<td>71,848</td>
</tr>
</tbody>
</table>

* Some observations for NEWS were zero. Therefore, the sum of observations for NEWS^+ and NEWS^- do not sum to 14,830.
Table 2

Correlation matrices. Panel A presents correlations for the full sample of firms, including guiders and non-guiders, and therefore includes correlations with the choice to provide guidance. Panel B presents correlations only for guiders, and therefore includes correlations with NEWS.

A. Full Sample

<table>
<thead>
<tr>
<th></th>
<th>ln(Assets)</th>
<th>R&amp;D/Sales</th>
<th>Inst. holdings</th>
<th>Analyst dispersion</th>
<th>Dividend yield</th>
<th>Pessimism</th>
<th>Earnings Mgt</th>
<th>Earnings Volatility</th>
<th>Guidance (1 = yes, 0 = no)</th>
</tr>
</thead>
<tbody>
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<td>N=71,848</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(Assets)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Sales</td>
<td>-0.2022</td>
<td>1.0000</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Inst holdings</td>
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<td>1.0000</td>
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<tr>
<td>Analyst dispersion</td>
<td>0.0357</td>
<td>0.0797</td>
<td>0.0115</td>
<td>1.0000</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dividend Yield</td>
<td>0.3059</td>
<td>-0.0874</td>
<td>-0.1278</td>
<td>0.0420</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Pessimism</td>
<td>0.0301</td>
<td>0.0154</td>
<td>0.0362</td>
<td>-0.0996</td>
<td>-0.0294</td>
<td>1.0000</td>
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</tr>
<tr>
<td>Earnings Management</td>
<td>-0.2480</td>
<td>0.0019</td>
<td>-0.0976</td>
<td>0.0482</td>
<td>-0.0648</td>
<td>-0.0281</td>
<td>1.0000</td>
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<tr>
<td>Earnings Volatility</td>
<td>0.1551</td>
<td>0.0269</td>
<td>0.0845</td>
<td>0.1458</td>
<td>0.0645</td>
<td>-0.0747</td>
<td>0.0582</td>
<td>1.0000</td>
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<tr>
<td>Guidance (1 yes, 0 no)</td>
<td>0.1015</td>
<td>-0.0727</td>
<td>0.2092</td>
<td>-0.0291</td>
<td>0.0660</td>
<td>-0.0189</td>
<td>-0.0346</td>
<td>-0.0100</td>
<td>1.0000</td>
</tr>
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</table>
### B. Guiders Only

<table>
<thead>
<tr>
<th></th>
<th>ln(Assets)</th>
<th>R&amp;D/Sales</th>
<th>Inst holdings</th>
<th>Analyst dispersion</th>
<th>Dividend yield</th>
<th>Pessimism</th>
<th>Earnings Mgt</th>
<th>Earnings Volatility</th>
<th>NEWS</th>
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</thead>
<tbody>
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<td>ln(Assets)</td>
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<td>R&amp;D/Sales</td>
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<td>-0.0230</td>
<td>1.0000</td>
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<tr>
<td>Dividend Yield</td>
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<td>-0.0910</td>
<td>0.0253</td>
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<tr>
<td>Pessimism</td>
<td>0.0882</td>
<td>0.0027</td>
<td>0.0654</td>
<td>-0.0797</td>
<td>-0.0068</td>
<td>1.0000</td>
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<tr>
<td>Earnings Mgt</td>
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<td>0.0446</td>
<td>-0.0460</td>
<td>0.1012</td>
<td>-0.1188</td>
<td>-0.0201</td>
<td>1.0000</td>
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<tr>
<td>Earnings Volatility</td>
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<td>0.0237</td>
<td>0.0503</td>
<td>0.1941</td>
<td>0.0542</td>
<td>-0.0801</td>
<td>0.0658</td>
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<td>NEWS</td>
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<td>-0.0053</td>
<td>-0.2032</td>
<td>-0.0158</td>
<td>0.5552</td>
<td>-0.0460</td>
<td>-0.1332</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* The number of observations used to prepare this Table, 14,717, matches that in the Table 7 regressions, but is very slightly lower than the 14,830 observations employed in the Table 4 regressions. This discrepancy reflects the additional explanatory variables used in Table 7, and the consequent loss of a few observations due to missing values.
Table 3

First-stage regressions fitting NEWS onto instruments. OLS regressions of NEWS onto instruments. t-statistics are reported below regression coefficients. NEWS equals the difference between the management earnings forecast and the prior median earnings estimate of security analysts, expressed as a fraction of lagged stock price. PESSIMISM equals the difference between the ultimate quarterly earnings announcement and the median consensus forecast from the most recent analyst survey prior to that guidance announcement, standardized by the firm’s fiscal-year lagged stock price. DISPERSION is the difference between the highest and lowest analyst forecast of earnings, normalized by lagged stock price. Institutional ownership is the fraction of shares held by institutions. Standard errors used to calculate t-statistics are clustered by firm.

<table>
<thead>
<tr>
<th>Coefficient estimate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.002***</td>
</tr>
<tr>
<td></td>
<td>(5.24)</td>
</tr>
<tr>
<td>PESSIMISM</td>
<td>0.474***</td>
</tr>
<tr>
<td></td>
<td>(23.21)</td>
</tr>
<tr>
<td>DISPERSION</td>
<td>-0.237***</td>
</tr>
<tr>
<td></td>
<td>(-8.97)</td>
</tr>
<tr>
<td>Institutional ownership</td>
<td>-0.001***</td>
</tr>
<tr>
<td></td>
<td>(-3.44)</td>
</tr>
<tr>
<td>Observations</td>
<td>14,830</td>
</tr>
<tr>
<td>R-square</td>
<td>0.3342</td>
</tr>
</tbody>
</table>

***significant at 1% level; **significant at 5% level; *significant at 10% level
**Table 4**

**Stock price response to guidance forecasts.** The dependent variable in each regression is the cumulative abnormal return (from a 4-factor model) in the 5-day window surrounding an earnings guidance announcement. $EARN\_MGT$ is the percentile score of each firm within its industry during each fiscal year for the Hutton, Marcus, Tehranian (2009) measure of earnings management. $EARN\_VOL$ is the percentile score of each firm within its industry fiscal year for earnings volatility. $NEWS = \text{the difference between a management earnings forecast and the prior median earnings forecast of security analysts, expressed as a fraction of lagged stock price}$. Positive and negative $NEWS$ are defined, respectively, as $NEWS^+ = \max(NEWS, 0)$ and $NEWS^- = \min(NEWS, 0)$. All regressions are estimated using firm fixed effects. 2SLS regressions all employ bootstrapped standard errors, allowing for clustering at the firm level.

<table>
<thead>
<tr>
<th></th>
<th>(1) OLS</th>
<th>(2) 2SLS</th>
<th>(3) OLS</th>
<th>(4) 2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$NEWS^+$</td>
<td>4.812***</td>
<td>14.225***</td>
<td>3.123***</td>
<td>29.890***</td>
</tr>
<tr>
<td></td>
<td>(11.236)</td>
<td>(9.895)</td>
<td>(3.767)</td>
<td>(8.983)</td>
</tr>
<tr>
<td>$NEWS^+ \times EARN_MGT$</td>
<td>0.479</td>
<td>-10.258**</td>
<td>(0.326)</td>
<td>(-2.242)</td>
</tr>
<tr>
<td>$NEWS^+ \times EARN_VOL$</td>
<td>2.930**</td>
<td>-17.404***</td>
<td>(2.447)</td>
<td>(-3.642)</td>
</tr>
<tr>
<td>$NEWS^-$</td>
<td>7.583***</td>
<td>5.907***</td>
<td>10.688***</td>
<td>12.911***</td>
</tr>
<tr>
<td></td>
<td>(19.376)</td>
<td>(9.982)</td>
<td>(9.813)</td>
<td>(7.296)</td>
</tr>
<tr>
<td>$NEWS^- \times EARN_MGT$</td>
<td>-0.730</td>
<td>0.050</td>
<td>(-0.484)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>$NEWS^- \times EARN_VOL$</td>
<td>-4.659***</td>
<td>-9.873***</td>
<td>(-3.424)</td>
<td>(-5.621)</td>
</tr>
</tbody>
</table>

Firm FE       Y       Y       Y       Y  
Fiscal Year FE Y       Y       Y       Y  
N            14,830  14,830  14,830  14,830  
R--square    0.114   0.0805  0.116   0.0903  
R-square (first stage regression) 0.3342  0.3342  

***significant at 1% level; **significant at 5% level; *significant at 10% level
Table 5

Specification test for endogeneity of NEWS. \( NEWS = \) the difference between a management earnings forecast and the prior median earnings forecast of security analysts, expressed as a fraction of lagged stock price. Positive and negative \( NEWS \) are defined, respectively, as \( NEWS^+ = \max(NEWS,0) \) and \( NEWS^- = \min(NEWS,0) \). All regressions are estimated using firm fixed effects. \( \hat{NEWS}_{it} \) is the fitted value of \( NEWS \) for firm \( i \) in quarter \( t \) onto the three instruments: analyst PESSIMISM, analyst DISPERSION, and institutional holdings.

<table>
<thead>
<tr>
<th>( NEWS^+ )</th>
<th>3.238***</th>
<th>1.119</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \hat{\text{NEWS}}^+ )</td>
<td>9.484***</td>
<td>24.302***</td>
</tr>
<tr>
<td>( NEWS^+ \times \text{EARN}_MGT )</td>
<td>1.629</td>
<td>0.928</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^+ \times \text{EARN}_MGT )</td>
<td>-11.847**</td>
<td>(-2.455)</td>
</tr>
<tr>
<td>( NEWS^+ \times \text{EARN}_VOL )</td>
<td>2.878**</td>
<td>(2.542)</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^+ \times \text{EARN}_VOL )</td>
<td>-15.586***</td>
<td>(-3.870)</td>
</tr>
<tr>
<td>( NEWS^- )</td>
<td>6.918***</td>
<td>9.243***</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^- )</td>
<td>0.712</td>
<td>1.910</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^- \times \text{EARN}_MGT )</td>
<td>-0.651</td>
<td>(-0.351)</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^- \times \text{EARN}_MGT )</td>
<td>0.196</td>
<td>(0.066)</td>
</tr>
<tr>
<td>( NEWS^- \times \text{EARN}_VOL )</td>
<td>-3.826**</td>
<td>(-2.515)</td>
</tr>
<tr>
<td>( \hat{\text{NEWS}}^- \times \text{EARN}_VOL )</td>
<td>-1.349</td>
<td>(-0.713)</td>
</tr>
</tbody>
</table>

| Firm FE | Y | Y |
| Fiscal Year FE | Y | Y |
| N | 14,830 | 14,830 |
| R square | 0.129 | 0.135 |
| Joint significance of fitted variables (p-value) | \( F(2,1904) = 37.31 \) | \( F(6,1904) = 20.97 \) |
| p-value | 0.0000 | 0.0000 |
Table 6

Probit equations for the likelihood that a firm will issue guidance. Regression coefficients appear in the first column, with z-statistics in the second column. Equation is estimated allowing for firm fixed effects.

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>z-statistic</th>
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<tbody>
<tr>
<td>Lagged Log(Size)</td>
<td>0.062***</td>
<td>5.07</td>
</tr>
<tr>
<td>Lagged R&amp;D/Sales</td>
<td>-0.332***</td>
<td>-7.22</td>
</tr>
<tr>
<td>PESSIMISM</td>
<td>-6.036***</td>
<td>-8.47</td>
</tr>
<tr>
<td>Institutional Holdings</td>
<td>0.927***</td>
<td>14.84</td>
</tr>
<tr>
<td>Analyst Dispersion</td>
<td>-10.379***</td>
<td>-5.49</td>
</tr>
<tr>
<td>RegFD (=1 if year&gt;=2001, =0 otherwise)</td>
<td>0.391***</td>
<td>14.90</td>
</tr>
<tr>
<td>EARN_MGT</td>
<td>-0.078</td>
<td>-1.16</td>
</tr>
<tr>
<td>EARN_VOL</td>
<td>-0.139**</td>
<td>-2.38</td>
</tr>
<tr>
<td>DIV_YLD</td>
<td>-7.527***</td>
<td>-6.87</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.947***</td>
<td>-23.41</td>
</tr>
</tbody>
</table>

Number of obs = 71,848
Wald Chi2(9) = 805.85
Prob > Chi2 = 0.0000
Pseudo R-square = 0.0734

***significant at 1% level; **significant at 5% level; *significant at 10% level
Table 7

Stock price response to guidance forecasts: Heckman selection model. The dependent variable in each regression is the cumulative abnormal return (from a 4-factor model) in the 5-day window surrounding an earnings guidance announcement. $EARN\_MGT$ is the percentile score of each firm within its industry during each fiscal year for the Hutton, Marcus, Tehranian (2009) measure of earnings management. $EARN\_VOL$ is the percentile score of each firm within its industry fiscal year for earnings volatility. $NEWS = \text{the difference between a management earnings forecast and the prior median earnings estimate of security analysts, expressed as a fraction of lagged stock price. Positive and negative } NEWS \text{ are defined, respectively, as } NEWS^{+} = \max(NEWS,0) \text{ and } NEWS^{-} = \min(NEWS,0)$. All regressions are estimated using firm fixed effects. 2SLS regressions all employ bootstrapped standard errors, allowing for clustering at the firm level.

<table>
<thead>
<tr>
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<th>OLS</th>
<th>2SLS</th>
<th>OLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$NEWS^{+}$</td>
<td>4.259***</td>
<td>13.160***</td>
<td>3.259***</td>
<td>28.777***</td>
</tr>
<tr>
<td></td>
<td>(10.316)</td>
<td>(9.490)</td>
<td>(4.146)</td>
<td>(9.622)</td>
</tr>
<tr>
<td>$NEWS^{+} \times EARN_MGT$</td>
<td>-0.082</td>
<td>-11.055**</td>
<td>(-0.057)</td>
<td>(-2.326)</td>
</tr>
<tr>
<td>$NEWS^{+} \times EARN_VOL$</td>
<td>2.055*</td>
<td>-16.719***</td>
<td>(1.768)</td>
<td>(-3.960)</td>
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<tr>
<td>$NEWS^{-}$</td>
<td>7.494***</td>
<td>5.595***</td>
<td>10.064***</td>
<td>12.249***</td>
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<tr>
<td></td>
<td>(19.294)</td>
<td>(10.050)</td>
<td>(9.254)</td>
<td>(6.638)</td>
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<tr>
<td>$NEWS^{-} \times EARN_MGT$</td>
<td>-0.426</td>
<td>0.222</td>
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<td>(0.088)</td>
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<tr>
<td>$NEWS^{-} \times EARN_VOL$</td>
<td>-3.952***</td>
<td>-9.446***</td>
<td>(-2.909)</td>
<td>(-5.391)</td>
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<tr>
<td>INVERSE MILLS RATIO</td>
<td>0.088***</td>
<td>0.073***</td>
<td>0.084***</td>
<td>0.069***</td>
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<table>
<thead>
<tr>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Fiscal Year FE</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>N</td>
<td>14,717</td>
<td>14,717</td>
<td>14,717</td>
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<td>R-square</td>
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<td>0.0862</td>
<td>0.123</td>
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</tr>
<tr>
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<td>0.3356</td>
<td>0.3356</td>
<td>0.3356</td>
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</table>

***significant at 1% level; **significant at 5% level; *significant at 10% level