

Properties Of Management Forecast And Analysts' Responsiveness

Yura Kim, Kookmin University, Korea

Kyunbeom Jeong, Korea Advanced Institute of Science and Technology (KAIST), Korea

ABSTRACT

This paper examines the degree of analysts' responsiveness to voluntary management guidance. Prior studies report that the management guidance is informative and influential (e.g. Baginski et al., 1993). This paper studies various factors that trigger equity market reactions around the management forecast issuance date and find that analysts are more reactive to new information contained in management guidance when the guidance conveys information that affects the stock market. The extent of the analysts' reaction to management guidance increases when the analysts find that the guidance is more credible. Credibility of management guidance from the standpoint of analysts means ex-post accuracy of the earnings estimate by the management. The direction and the magnitude of earnings forecast revisions are influenced by the assessment of the credibility of management earnings forecast by financial analysts.

Keywords: Management Guidance; Analysts Forecast; Management Earnings Forecasts

1. INTRODUCTION

Management guidance is influential. Market participants respond to management guidance. It influences investors' trading decisions reflected in stock price movement around management forecast issuance date (Pownall et al., 1993; Skinner, 1994; Anilowski, et al., 2007) and affects analysts' earnings forecasts (Hassell et al., 1988; Baginski and Hassell, 1990; Baginski et al., 1993). Prior studies examine stock market reactions to the management forecast, subsequent analysts' forecast revisions and how both investors' and analysts' reactions are associated with forecast properties and information environment characteristics. Stock market around the management forecast issuance date is affected by the management forecast precision (Baginski et al., 1993), history of prior forecast accuracy (Hirst et al., 1999), magnitude of management forecast surprise relative to preceding consensus analyst forecast (Waymire, 1984), and the sign of the management forecast (Anilowski et al., 2007). Management issues forecasts to provide guidance to analysts towards targeted earnings and to avoid negative earnings surprises (Kasznik and Lev, 1995; Matsumoto, 2002; Brown and Higgins, 2005). Analysts decide to follow the management guidance understanding that the firm with inside information manages earnings to avoid negative earnings surprises at the earnings announcement date (Kasznik and Lev, 1995; Cotter et al., 2006). Other studies find that analysts timely update their earnings estimates, 47% within 5 days, and revise their earnings forecasts to the meetable or beatable earnings targets (Cotter et al., 2006).

In this paper we examine how influential the management forecast is to affect analysts in updating their quarterly earnings estimates. Forecast properties, firm- and industry-specific factors, management's ability and reputation, believability of management guidance, and analysts' richness of private information comprehensively and interactively affect the magnitude of analysts' revision toward the management guidance. When the management provides earnings guidance, analysts make two important decisions. The first decision is whether to revise their earnings estimates or not. Once analysts decide to make forecast revisions in response to the earnings guidance provided by the management, the analysts then decide how fully they adopt management-provided information about the future earnings. This paper focuses on the second decision that analysts face by examining varying degrees of responsiveness of analysts to information contained in the management forecast. The first research question is to study various factors that affect the degree of analysts' responsiveness to the management guidance. Financial analysts do not fully adopt the information contained in the management forecasts. The

magnitude of analysts' revisions that incorporate the earnings prospects of the management guidance differs. How seriously analysts listen to management earnings guidance and how closely they follow the guidance is an interesting question to pursue empirically. The second research question is whether analysts have abilities to access the accuracy and the credibility of the management guidance ex ante, and decide how much of that information to be incorporated in their subsequent revisions. Large management forecast errors may result from managers' optimistically biased disclosures or from the lack of private information about a firm's earnings prospects. This examines whether financial analysts know when managers provide biased information and when managers lack the abilities in collecting more precise inside information, and whether they have insights to selectively update their estimates when management's earnings guidance contains "healthy" information. Since it is difficult to examine managers' abilities and their efforts in providing "healthy" guidance, we use ex-post accuracy of the management forecast as a proxy for the accurate and credible management forecast. Believable or credible management forecast means that the forecasted earnings guidance by the firm is close to the subsequently realized actual earnings in this paper. Thus, believability or credibility of the guidance is from the analyst's standpoint that the guidance contains less error compared to the actual value. That is, it means it is "accurate" rather than "truthful." Prior studies report that the managers walk analyst towards their reachable earnings targets, and the analysts respond to the management guidance by timely updating their forecast (Cotter et al., 2006). The "smart" analysts, who understand the intention of the managers that is to guide the analysts towards the meetable or beatable earnings target in order to avoid negative earnings surprise at the time of actual earnings announcement, are expected to listen more carefully and update their earnings forecasts accordingly. Analysts' abilities to access the accuracy of the management guidance affect the extent to which the analysts revise their forecasts.

In this paper, we find that the direction and the magnitude of analysts' responses to management guidance are aligned with equity market movements. Analysts adopt the information provided by the management more fully when they know that the management guidance contains properties that significantly affect the stock market. The precision of the management forecast is positively related to analysts' responsiveness once it is jointly tested with the direction of the management guidance. The degree of analysts' reactions to the management guidance increases as the perceived accuracy of the management forecast increases.

This paper studies the extent of analysts' responsiveness to management guidance and examine whether analysts successfully filter credible management guidance and revise their earnings estimates to match the information provided by the management. Although extant literature examines analyst reactions to managers' earnings guidance, most studies focus on identifying determinants that influence analysts' decision to revise their earnings forecast. There is little research that comprehensively examines how the various properties of the management guidance and perceived credibility of the information by analysts impact the degree to which the analysts react to the management earnings guidance. This study extends prior studies on analysts' reaction to public management forecasts by analyzing properties of the management forecast and varying degrees of responsiveness of subsequent analyst revisions and by examining whether how much the analysts agree to the management guidance foresees the ex-post accuracy of the managers' earnings estimates.

The rest of the paper is organized as follows. Section 2 reviews the literature and develops hypothesis. Section 3 describes the sample selection process. Section 4 provides summary statistics of main variables and explains research methodologies. Section 4 provides regression results followed by the conclusion in Section 5.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Management faces conflicting incentives from the market when they issue earnings guidance to market participants. The management has incentives to issue favorable forecasts to attract the capital market. Managers are optimistically biased for the concerns of higher stock prices, equity-based compensations, performance evaluations, and promotion opportunities tied to stock market performance. On the other side, managers consider their long-term reputation. Firm's managers have specific knowledge about the firm's operating environment and financial condition and possess inside information about future financial prospects of the firm. The managers who want to gain reputation provide more accurate and reliable guidance to market participants and minimize earnings surprises at the actual earnings announcement. This reputational concern gives the managers an incentive to achieve market expectations (Graham et al., 2005). In fact, forecasting is a process that involves multi-periods and multi-agents.

Prior earnings forecasts and their dimensions affect subsequent periods' forecasting directions and respondents' reactions to them (Williams, 1996). Management builds reputation over time by issuing accurate management forecasts. Analysts more closely adopt the management guidance issued by management with history of accurate prior forecasts (Williams, 1996). The market imposes a stricter penalty when the firm misses consensus analysts forecast for the firm that issues the guidance than the firm that does not issue any guidance (Lennox and Park, 2006).

Similar to firm's managers, analysts have conflicting incentives. Analysts are likely to be optimistically biased to maintain good relationship with the firm's managers. On the other hand, analysts care about their reputation in the market and thus, try to provide more accurate forecasts to investors who rely on their earnings estimates. Therefore, analysts have incentives to provide accurate estimates to earn credibility from the market and to maintain their reputation. Financial analysts respond to the estimates that the management provides. Analysts then revise their beliefs about future earnings prospects following the management guidance (Waymire, 1986; Jennings, 1987; Hassell et al., 1988; Baginski and Hassell, 1990; Williams, 1996; Libby and Tan, 1999; Hansen and Noe, 1999; Cotter et al., 2006).

Many studies examine stock market reactions around the management forecast issuance dates (Skinner, 1994; Anilowski et al., 2007). In order to avoid negative earnings surprises that lead to unfavorable stock market movements (Skinner and Sloan, 2002; Kasznik and McNichols, 2002), the firm has incentives to engage in earnings expectations to walk the analysts towards their targeted earnings. Cotter et al. (2006) find that more analysts choose to revise their forecasts in response to the earnings guidance that leads to achievable targets. By examining analysts forecasts one month prior to and one month post to management guidance, Williams (1996) documents that analysts respond more to the management forecasts with reputable forecast history. Baginski and Hassell (1990) report that the analysts revisions following the management forecast are positively associated with the magnitude of the management forecast surprise relative to the initial analysts' forecasts and the security price reaction around the management forecast issuance. Other empirical evidence shows that the equity market asymmetrically reacts to downward earnings guidance (Anilowski et al., 2007). That is, the magnitude of negative stock price reaction to downward guidance is larger than the magnitude of positive stock price reactions to optimistic management forecasts. Kaznik and Lev (1995) report on the negative effect of pessimistic guidance that the stock market reacts more negatively to earnings surprises of the firm that issues a downward guidance prior to the actual earnings disclosure compared to the earnings surprises of the firm that doesn't issue any guidance.

The information environment in which the firm operates has impacts on financial reporting quality and on disclosure decisions, especially on voluntary disclosures. The firms that face more litigation risks are less likely to issue optimistic forecasts in order to avoid legal liabilities (Skinner, 1994). The firms in concentrated industries may issue pessimistic forecasts so as to discourage market entry. On the other side, market competitiveness can discourage the firms in revealing information that can potentially benefit rival firms.

When the management publicly issues earnings guidance, the first decision that analysts make is whether to revise their initial earnings forecasts or not. Secondly, the analysts who decide to revise their beliefs decide how closely they will follow the information contained in the management forecast. Earlier studies find that management earnings forecasts are predominantly optimistic (Waymire, 1984), but this trend has changed over time. Recently, more management forecasts contain bad news (Hutton and Stocken, 2007). Market penalties associated with missing earnings target are costly. Managers issue pessimistic forecasts to avoid negative earnings surprises at the time of earnings announcement. Managers not only face legal costs but also incur reputational costs if they withhold from disclosing bad news and subsequently surprises investors with large negative earnings. Investors take bad-news forecasts more seriously because they expect that the managers who have more accurate information about the firm's financial prospects and who want to avoid negative market reaction as a consequence of missing earnings target would guide the market respondents towards ex-post more accurate and "honest" earnings target. Thus, when the management issues a bad-news forecast, the market sees that as a warning signal that the current consensus forecast may be optimistically biased. Understanding that the management faces asymmetric market response at the earnings announcement, analysts are expected to respond asymmetrically to the pessimistic guidance vs. optimistic guidance. Previous studies report that the precision of the forecast form, magnitude and sign of the management guidance and prior forecast accuracy individually or interactively affect the equity market investors. Knowing that

equity market investors react to certain properties of the management, the extent of analysts' responsiveness in making forecast revisions may vary. Many studies show that firms engage in expectations management (Cotter et al., 2006) or earnings management to meet investors' expectations (Kasznik, 1999; Matsumoto, 2002). For this reason, we expect that analysts who care for the reputation in the equity market and who want to maintain good relationship with the management are more likely to follow closely the management guidance which contains information that captures investors' attention in the stock market. Based on the arguments above, we conjecture that the magnitude of management forecast surprise is positively associated with the analyst's revision and analysts are more likely to react to the pessimistic news in the guidance. However, different properties of management guidance may have interacting effects on analysts' forecasts revisions. Therefore, we hypothesize the following:

H1a: The magnitude of management forecast surprises and the sign of management forecast news jointly influence financial analysts' earnings forecast revisions

The precision of management forecast may affect the degree that market respondents react to the management guidance. Management guidance form can influence investor's reaction to the guidance (Pownall et al., 1993). In an experimental study, Hirst et al. (1999) find that investor reactions to the management forecast are jointly affected by the precision of the forecast and prior forecast accuracy. The management guidance takes the form of point, range, open-ended (less than or more than) or qualitative. Management forecast is perceived to be more precise in the following order of point, range, open-ended and qualitative. Although the literature supports that the stock market reaction is positive to more precise management forecasts (Baginski et al., 1993) and that the market returns are abnormally high for management guidance's with larger surprises, financial analysts' reactions in making revision decisions are mixed. Cotter et al. (2006) report that financial analysts are more likely to make revisions to earlier forecasts if the management forecast takes the form of range or "less than" guidance while analysts are less reactive to the management guidance that takes the form of point or "greater than" guidance. Libby et al. (2006) show experimentally that the forecast form does not influence forecast revisions by the analysts. Many studies find that the investors asymmetrically react more to the management guidance that contains pessimistic news by examining abnormal market returns surrounding the management forecast issuance dates. This paper expects that the management forecast precision plays a role by separating the nature of the management news. Financial analysts are more likely to give weight to the precision of the guidance when the management issues more "confirming forecasts" relative to the preceding analyst consensus forecast. We define the management EPS estimate is more confirming when the absolute value of the difference between EPS forecasted by the management and initial analyst consensus forecast is small (within 3%). Based on evidence in the literature, we hypothesize the following:

H1b: The precision of management forecasts has more influence on analyst forecast revisions when the management guidance is more confirming to the initial analyst consensus forecast and when the management issues pessimistic guidance.

Investors respond more strongly when the management forecast is more believable (Jennings, 1987; Hansen and Noe, 1999). Jennings (1987) finds that analyst forecast revision is influenced by the believability of the management forecast. Financial analysts would fully adopt the management guidance if the management guidance contains new information and if the analysts perceive the information as credible. In reality, the analysts' responsiveness to the management guidance varies. The degree to which the analysts revise their EPS forecasts in response to the management forecast increases as the perceived credibility of the information conveyed by the management guidance increases. If analysts can successfully differentiate the management guidance that is ex-post more accurate, then the financial analysts would update their earnings forecasts more closely when their ex-ante perceived accuracy and credibility of the information contained in the management guidance is high. With this argument, we hypothesize the following:

H2: Analysts' responsiveness to the management guidance is positively associated with the ex-post accuracy of the management guidance.

The more analysts find the management information credible, the managers will update their beliefs in line with the guided information by the management. How much of the management-provided information is reflected in the revised analyst forecasts is examined in conjunction with the perceived credibility of the management guidance.

Other information properties may affect the level of analysts’ responsiveness to the management forecast. More public information is available when the size of a firm is bigger. For example, bigger firms have more media coverage. Number of analysts following can be a proxy for analysts’ accessibility to the private information. The more analysts follow the firm, the richer the private information is. Where there is more private information available about the firm, the analysts are less likely to listen carefully to the management guidance because they have less need to search for the information.

3. DATA

We obtain information of quarterly management earnings per share (EPS) forecasts from First Call Company-Issued Guidelines (CIG) database. Quarterly management forecasts made prior to 1995 are deleted, due to limited coverage in the First Call database. We delete duplicate forecasts and the forecasts with inconsistent dates in the database. Over the sample period between 1995 and 2009, we only include the management forecasts that are in point or range form. Qualitative and open-ended management forecasts are excluded because of the difficulty in quantifying EPS estimates. For the range forecasts, we use the midpoint of the range as an EPS estimate. In our sample, firms must issue public forecast in the sample quarter and the analyst should provide earnings estimates for the current quarter both before and after the issuance of the management forecast. Our sample requires the firms have financial information in Compustat database to obtain the value of the firm, market-to-book ratio, return-on-asset ratio and Herfindahl and Hirschman index (HHI).

Table 1: Sample Distribution

Panel A: Management Forecast Form				
Year	Total	Point	Range	Cumulative
1995	335	148	187	2.64
1996	457	216	241	6.23
1997	580	299	281	10.8
1998	896	436	460	17.85
1999	848	340	508	24.53
2000	1,057	407	650	32.85
2001	1,620	519	1,101	45.6
2002	1,387	424	963	56.52
2003	1,091	284	807	65.11
2004	1,130	298	832	74.01
2005	955	232	723	81.52
2006	943	184	759	88.95
2007	670	134	536	94.22
2008	681	125	556	99.58
2009	53	5	48	100.00
Total	12,703	4,051	8,653	
Panel B: Optimistic and Pessimistic Management Forecast				
Year	Total	Goodnews	Badnews	Cumulative
1995	335	181	154	2.64
1996	457	229	228	6.23
1997	580	278	302	10.8
1998	896	370	526	17.85
1999	848	345	503	24.53
2000	1,057	477	580	32.85
2001	1,620	714	906	45.6
2002	1,387	741	646	56.52
2003	1,091	585	506	65.11
2004	1,130	619	511	74.01
2005	955	479	476	81.52
2006	943	449	494	88.95
2007	670	242	428	94.22
2008	681	266	415	99.58
2009	53	17	36	100.00
Total	12,703	5,992	6,711	

Table 2: Correlation Matrix

	RATIO	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) SURPRISE_MF	0.0392* (0.000)									
(2) BADNEWS	0.3594* (0.000)	0.1005*								
(3) POINT	-0.0950* (0.000)	-0.0498*	-0.1571*							
(4) ANALYSTS	-0.1781* (0.000)	-0.1605*	-0.1779*	0.0443*						
(5) HORIZON	-0.0597* (0.000)	-0.0285*	-0.0041	-0.0980*	0.1089*					
(6) DISPERSION	0.1265* (0.000)	0.5771*	0.0945*	-0.0333*	-0.0944*	-0.0396*				
(7) CHANGEDISPERSION	-0.0340* (0.002)	0.0990*	0.0164	0.0007	-0.008	0.0286*	-0.1381*			
(8) MF_ERROR	-0.0866* (0.000)	0.3725*	-0.0580*	0.0094	-0.0338*	0.0411*	0.1110*	0.1185*		
(9) MEET_BEAT	0.2219* (0.000)	-0.0979*	0.2782*	-0.0096	-0.0643*	-0.0723*	0.0321*	-0.0332*	-0.1591*	
(10) MEET_BEAT_PY	-0.0115 (0.240)	-0.1231*	-0.1766*	0.0603*	0.1104*	-0.0322*	-0.0672*	-0.0545*	-0.0750*	0.2647*

This table presents Pearson correlations among management forecast property variables. * indicates significance at the 10% level. Detailed variables definitions are in Appendix A.

We obtain analysts’ quarterly earnings per share forecasts for one quarter ahead from Institutional Brokerage Estimate Systems (IBES) database. We use actual EPS in IBES to calculate the forecast accuracy of both the analyst forecasts and the management forecast. We exclude observations if forecasted EPS by the management is equal to the analyst consensus forecast prior to the earnings guidance since we are interested in investigating the analysts’ responsiveness relative to the management forecast.

Our final sample involves 3,356 firms, consisting of 12,703 firm-quarter observations of which 11,511 firm-quarters have both pre- and post-guidance analyst following. Table 1 summarizes the sample distributions by the forecast form, direction of the management forecast news and magnitude of management forecast surprise compared to the initial consensus forecast. In our sample, about 68% of the management forecasts are range forecasts. 53% of the forecasts are pessimistic. The trend has changed over time. Earlier management guidance is dominantly optimistic. Recently, firms issue more downward guidance than upward guidance. Table 2 shows correlations among key variables.

4. RESEARCH DESIGN AND EMPIRICAL FINDINGS

4.1 Time sequence of quarterly earnings disclosures

We examine how much financial analysts revise their beliefs and what factors influence the magnitude and direction of their revisions. Our sample requires quarterly observations with the management forecasts that are both preceded by and followed by analysts’ earnings per share forecasts for the given quarter. The time sequence is shown in figure 1. We use all of the analyst forecasts before the issuance of the management guidance to calculate dispersion and consensus of forecast. For the analyst forecast revision, we separately test only those revisions made within 10 days following the issuance of the management forecast. Cotter et al. (2006) report that financial analysts quickly revise their earnings forecasts after the issuance of the management forecast. Of those who revise their prior forecasts, Cotter et al. (2006) find that approximately 47% of the analysts update their forecasts within five days of the release of the management guidance. In this paper, we include more revisions by including forecast revisions made within ten days following the management guidance.

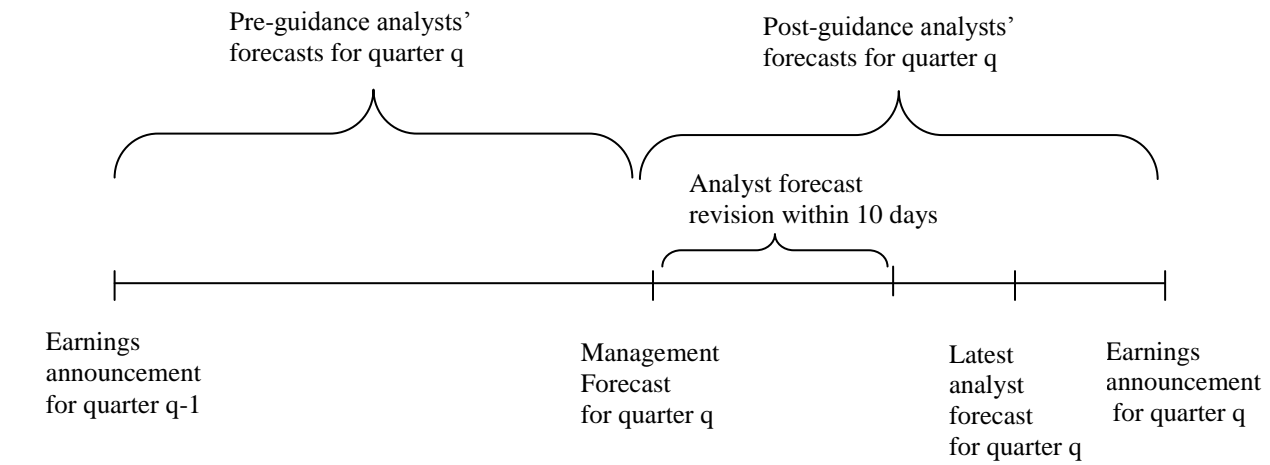


Figure 1: Time sequence of quarterly earnings forecasts

4.2 Control variables

In our regression models, we include control variables to take into account of firm-specific and industry-specific factors. SIZE is the natural log of the market value of the firm’s common equity at the end of previous

quarter. To measure the size of the firm, we also consider the natural logarithm of the total assets. On average, richer private and public information is available for larger firms and it is more costly to the firm when the forecast is biased. ANALYSTS is the natural log of the average number of analysts with earnings forecasts on IBES for the firm. The size of the firms is a proxy for the amount of public information whereas the number of analysts is a proxy for the amount of private information. HORIZON is the natural log of the number of days between the management forecast date and the actual earnings announcement date. MB is market-to-book ratio at the end of prior quarter. Market-to-book ratio controls for the firm’s growth prospects. The industry in which the firm operates can affect the firm’s disclosure policies. The firms that face more litigation risks are less likely to issue optimistic forecasts, because the management is afraid of potential legal issues when the guidance is turned out to be misleading. LITIGATION is a dummy variable that equals one if the firm belongs to a litigious industry and zero otherwise. The firms tend to issue pessimistic guidance to mitigate litigation liability (Skinner, 1994). REGULATION is a dummy variable equals to 1 if the firm belongs to a regulated industry. Market competition has impact on the firm’s disclosure policy. The firms may be reluctant to reveal certain information since the rivals can get benefits from the disclosed information. The firms in concentrated industries tend to issue pessimistic forecasts to discourage competition. We use Herfindahl and Hirschman index (HHI) to proxy for market competition. The HHI is computed as the following:

$$HHI_{jt} = \sum_{i=1}^{N_j} S_{ijt}^2,$$

where S_{ijt} is the market share of firm i in industry j at time t . Market share is computed using sales of the firm in Compustat. For industry classification, we use 4-digit SIC code in Compustat. High value of the HHI indicates high industry concentration or less market competition. The HHI is close to zero as the industry consists of huge number of small firms in relatively equal sizes. The HHI increases as the number of firms in industry decreases and the firms size is dispersed. Variable definitions are provided in Appendix A. Correlation table is presented in Table 2. We dropped SIZE since this variable is highly correlated with ANALYSTS.

4.3 Descriptive evidence

Table 3 provides descriptive statistics of the variables. Panel A of Table 3 shows the descriptive statistics of total observations. Summary shows that there are more bad news forecasts than good news forecasts. Panel B separates sample into confirming vs. non-confirming management forecast groups. Consistent with Clement et al. (2003), analysts make small revisions to confirming management forecast. Also, confirming management forecast containing more positive news compared to non-confirming forecasts. Panel C separates the sample into observations that are revised and that are not revised. For the revised group, there are more pessimistic forecasts. The analysts are more likely to revise their forecasts for larger firms and the firms with more analysts following. Panel D compares pessimistic vs. optimistic management forecasts. Pessimistic management forecasts are more meetable or beatable although final analyst forecast is less likely to be meetable or beatable. Also, the management forecast errors for the pessimistic management forecasts are smaller than those of the optimistic management forecasts.

4.4 When financial analysts more carefully listen to the management guidance?

To study when analysts follow the management earnings guidance more closely and when they resist following management provided information, we estimate a multiple regression of the fiscal-quarters with the management guidance and the analysts’ forecasts of the pre- and post-management guidance. The basic regression that examines the varying degrees of analysts’ reactions to the management guidance is as follows:

$$\begin{aligned} RATIO = & \alpha_0 + \alpha_1 SURPRISE_MF + \alpha_2 BADNEWS + \alpha_3 POINT \\ & + \alpha_4 CHANGEDISPERSION + \alpha_5 MF_ERROR_PY + \alpha_6 MEET_BEAT_PY \\ & + \alpha_7 HORIZON + \alpha_8 ANALYSTS + \alpha_9 MB + \alpha_{10} HHI + \alpha_{11} ROA + \alpha_{12} LITIGATION \\ & + \alpha_{13} REGULATION + \varepsilon, \end{aligned} \tag{1a}$$

Table 3

Panel A: Descriptive Statistics for All Observations

Variable	All Observations					
	N	Mean	Std. Dev.	p25	p50	p75
SURPRISE_MF	12,703	0.0070	0.0160	0.0008	0.0032	0.0077
SURPRISE_MF*BADNEWS	12,703	0.0045	0.0146	0	0.0003	0.0040
SURPRISE_MF*GOODNEWS	12,703	0.0025	0.0080	0	0	0.0021
CHANGEDISPERSION	9,399	0.0022	0.0905	-0.0016	-0.0001	0.0011
REVISION	11,511	-0.051	0.1525	-0.08	-0.015	0.005
BADNEWS	12,703	0.5283	0.4992	0	1	1
GOODNEWS	12,703	0.4717	0.4992	0	0	1
MF_ERROR	12,703	0.0039	0.0186	0.0003	0.0010	0.0036
ANALYSTS	12,703	2.0605	0.7862	1.4881	2.0767	2.6418
SIZE	12,703	6.9811	1.7381	5.7834	6.8122	8.0668
MB	12,571	0.9504	0.7413	0.4645	0.8945	1.3567
ROA	11,696	0.0336	0.0408	0.0169	0.0336	0.0515
HHI	12,696	8.4052	1.8239	7.2697	8.2651	9.3251
LITIGATION	12,703	0.2652	0.4415	0	0	1
REGULATION	12,703	0.0324	0.1769	0	0	0
HORIZON (days)	12,703	34.5211	25.7475	15	29	46
HORIZON (log value)	12,591	3.2855	0.7838	2.7726	3.3673	3.8501
POINT	12,703	0.3189	0.4661	0	0	1
RANGE	12,703	0.6811	0.4661	0	1	1
MEET_BEAT_MF	12,703	0.6694	0.4705	0	1	1
MEET_BEEAT_AF	12,703	0.8081	0.3938	1	1	1

Variable definitions are provided in Appendix A.

where *RATIO* captures how responsive the analysts are to the information contained in the management guidance. *RATIO* is equal to *REVISION* divided by *SURPRISE*. We use decile rankings of *RATIO* due to high positive skewness of this variable. *REVISION* is the difference of the consensus analyst forecast before and after the management guidance, and *SURPRISE* is the management estimate of EPS less the analyst consensus forecast prior to the issuance of the management guidance. *RATIO* is one if all the analysts choose to fully adapt the earnings estimate of the management guidance. The negative value of *RATIO* indicates that analysts revised earnings forecast in the opposite direction to the management forecast guidance. That is, the analysts disagree with the management in making earnings forecast for the quarter. *SURPRISE_MF* is the absolute value of difference between the analysts’ consensus and the estimate by the management. This variable measures the magnitude of the surprise by the management in comparison to the analysts’ consensus forecast. *CHANGEDISPERSION* measures the changes in dispersion of earnings forecasts before and after the management guidance divided by the absolute value of prior dispersion. Negative value of *CHANGEDISPERSION* means that the analysts forecast is less diverse as a result of the management forecast. *BADNEWS* is a dummy variable equal to 1 if the management forecast is pessimistic when it is compared to the preceding consensus analyst forecast. *HORIZON* is the natural log of the number of the days between the date of the management forecast and the actual earnings announcement date. *POINT* is a dummy variable which equals 1 if the management forecast provides exact estimate of the EPS forecast and 0 when the guidance is in range format. *ANALYSTS* is the natural log of the average number of analysts that follow a particular firm. *MF_ERROR_PY* is the management forecast error of prior years. Management forecast error is calculated by subtracting forecasted EPS by the management from the realized EPS at the actual earnings announcement date, deflated by the closing stock price at the end of prior quarter. *MEET_BEAT_PY* is the natural log of the number of management forecasts that meet or beat the subsequently realized actual earnings in the previous year.

Panel B: Analysts' Revision to Management Forecasts

Variable	Revise						Don't Revise					
	N	Mean	Std. Dev.	p25	p50	p75	N	Mean	Std. Dev.	p25	p50	p75
SURPRISE_MF	11,511	0.007	0.014	0.001	0.003	0.008	1,192	0.011	0.031	0.000	0.002	0.009
SURPRISE_MF*BADNEWS	11,511	0.004	0.012	0.000	0.000	0.004	1,192	0.007	0.028	0	0	0.002
SURPRISE_MF*GOODNEWS	11,511	0.002	0.007	0.000	0.000	0.002	1,192	0.004	0.015	0	0	0.003
CHANGEDISPERSION	9,399	0.002	0.090	-0.002	0.000	0.001						
REVISION	11,511	-0.051	0.153	-0.080	-0.015	0.005						
BADNEWS	11,511	0.543	0.498	0	1	1	1,192	0.383	0.486	0	0	1
GOODNEWS	11,511	0.457	0.498	0	0	1	1,192	0.617	0.486	0	1	1
MF_ERROR	11,511	0.004	0.015	0.000	0.001	0.003	1,192	0.007	0.040	0	0.001	0.005
ANALYSTS	11,511	2.132	0.757	1.591	2.147	2.691	1,192	1.372	0.728	0.811	1.308	1.846
SIZE	11,511	7.117	1.701	5.932	6.936	8.182	1,192	5.666	1.529	4.577	5.538	6.654
MB	11,400	0.962	0.735	0.482	0.906	1.363	1,171	0.833	0.793	0.299	0.778	1.312
ROA	10,636	0.034	0.039	0.017	0.034	0.052	1,060	0.026	0.056	0.011	0.033	0.051
HHI	11,507	8.303	1.787	7.194	8.189	9.203	1,189	9.395	1.886	8.147	9.028	10.481
LITIGATION	11,511	0.263	0.440	0	0	1	1,192	0.290	0.454	0	0	1
REGULATION	11,511	0.032	0.177	0	0	0	1,192	0.031	0.173	0	0	0
HORIZON (days)	11,511	35.879	25.785	17	30	48	1,192	21.409	21.334	7	15	29
HORIZON (log value)	11,460	3.348	0.718	2.833	3.401	3.871	1,131	2.652	1.081	2.079	2.773	3.401
POINT	11,511	0.298	0.457	0	0	1	1,192	0.522	0.500	0	1	1
RANGE	11,511	0.702	0.457	0	1	1	1,192	0.478	0.500	0	0	1
MEET_BEAT_MF	11,511	0.669	0.471	0	1	1	1,192	0.674	0.469	0	1	1
MEET_BEEAT_AF	11,511	0.822	0.383	1	1	1	1,192	0.674	0.469	0	1	1

Variable definitions are provided in Appendix A.

Panel C: Pessimistic vs. Optimistic Forecasts

Variable	Bad News						Good News					
	N	Mean	Std. Dev.	p25	p50	p75	N	mean	Std. Dev.	p25	p50	p75
SURPRISE_MF	6,711	0.009	0.019	0.001	0.004	0.009	5,992	0.005	0.011	0.000	0.003	0.007
SURPRISE_MF*BADNEWS	6,711	0.009	0.019	0.001	0.004	0.009	5,992	0	0	0	0	0
SURPRISE_MF*GOODNEWS	6,711	0.000	0.000	0	0	0	5,992	0.005	0.011	0.000	0.003	0.007
CHANGEDISPERSION	5,164	0.004	0.117	-0.002	0.000	0.002	4,235	0.000	0.040	-0.001	0.000	0.001
REVISION	6,254	-0.109	0.175	-0.140	-0.070	-0.020	5,257	0.018	0.075	0.000	0.005	0.030
BADNEWS	6,711	1.000	0.000	1	1	1	5,992	0	0	0	0	0
GOODNEWS	6,711	0.000	0.000	0	0	0	5,992	1	0	1	1	1
MF_ERROR	6,711	0.003	0.020	0.000	0.001	0.002	5,992	0.005	0.017	0.000	0.002	0.006
ANALYSTS	6,711	1.928	0.769	1.363	1.923	2.474	5,992	2.209	0.779	1.656	2.228	2.784
SIZE	6,711	6.764	1.699	5.578	6.606	7.779	5,992	7.224	1.750	6.025	7.048	8.345
MB	6,654	0.883	0.732	0.404	0.826	1.285	5,917	1.026	0.744	0.537	0.972	1.430
ROA	6,171	0.023	0.040	0.008	0.027	0.042	5,525	0.045	0.038	0.027	0.042	0.061
HHI	6,709	8.447	1.776	7.333	8.306	9.325	5,987	8.358	1.875	7.161	8.237	9.326
LITIGATION	6,711	0.290	0.454	0	0	1	5,992	0.237	0.425	0	0	0
REGULATION	6,711	0.033	0.179	0	0	0	5,992	0.032	0.175	0	0	0
HORIZON (days)	7,182	33.711	23.482	16	28	44	5,992	35.939	28.199	15	29	49
HORIZON (log value)	6,671	3.283	0.708	2.773	3.332	3.761	5,920	3.289	0.861	2.708	3.401	3.892
POINT	6,711	0.250	0.433	0	0	0	5,992	0.396	0.489	0	0	1
RANGE	6,711	0.750	0.433	1	1	1	5,992	0.604	0.489	0	1	1
MEET_BEAT_MF	6,711	0.793	0.405	1	1	1	5,992	0.531	0.499	0	1	1
MEET_BEEAT_AF	6,711	0.742	0.437	0	1	1	5,992	0.882	0.323	1	1	1

Variable definitions are provided in Appendix A.

To test interaction effects of management forecast properties, we estimate the following regression model:

$$\begin{aligned}
 \text{RATIO} = & \alpha_0 + \alpha_1 \text{SURPRISE_MF} * \text{BADNEWS} + \alpha_2 \text{SURPRISE_MF} * \text{GOODNEWS} \\
 & + \alpha_3 \text{POINT_BADNEWS} + \alpha_4 \text{POINT_GOODNEWS} + \alpha_5 \text{RANGE_BADNEWS} \\
 & + \alpha_6 \text{CHANGEDISPERSION} + \alpha_7 \text{MF_ERROR_PY} + \alpha_8 \text{MEET_BEAT_PY} \\
 & + \alpha_9 \text{HORIZON} + \alpha_{10} \text{ANALYSTS} + \alpha_{11} \text{MB} + \alpha_{12} \text{HHI} + \alpha_{13} \text{ROA} \\
 & + \alpha_{14} \text{LITIGATION} + \alpha_{15} \text{REGULATION} + \varepsilon
 \end{aligned}
 \tag{1b}$$

We interact management forecast surprise with the nature of news: good news and bad news. In equation (1b), SURPRISE_MF_GOODNEWS (SURPRISE_MF*BADNEWS) is an interaction term that is the absolute value of the management forecast surprise relative to the initial consensus financial forecast times the dummy variable, GOODNEWS (BADNEWS). Management forecast form (POINT vs. RANGE) and nature of the news (GOODNEWS vs. BADNEWS) are stacked into four groups. In the above equation (1b), POINT_BADNEWS is 1 if management forecast provides a point estimate and contains bad news, and 0 otherwise. POINT_GOODNEWS is 1 if management guidance provides an exact forecast and have bad news, and 0 otherwise. RANGE_BADNEWS is 1 if management guidance provides a range and contains bad news and 0 otherwise. For post-guidance revisions, We separate the observations into two groups; all analyst forecasts following the management guidance and only those issued within 10 days following the management guidance. We find no statistically meaningful differences between these two groups of the sample.

Panel A of Table 4 reports the regression results of analysts’ responsiveness level to the management forecast and its relationship with information properties. Analysts follow the management forecast more closely when the magnitude of management forecast surprise is large and when the guidance contains pessimistic news. In model 3 and 4, the coefficient of POINT is negative and significant. The result seems to be contradicting to the expectation that analysts are more responsive to precise forecasts. However, the coefficients in model 1 and 2 in Panel B of Table 4 show that precision of management guidance positively influences the ratio of analysts’ responsiveness to management guidance when it is jointly viewed with BADNEWS indicator variable. This suggests that the direction of the management forecast news is a more dominant factor in influencing the analysts’ responsiveness to the management forecast. The coefficient of POINT_BADNEWS is positive and significant, but the coefficient of POINT_GOODNEWS is negative. This seems to suggest that the precision of the management forecast matters when the management provides bad news to the analysts. Changes in dispersions among analysts forecasts seem insignificant in influencing analysts forecasts revisions. As both Panel A and Panel B of Table 4 indicate, prior history of forecast accuracy seems to be insignificant while the frequency of the management guidance that meets or beats in prior years has positive influence on the analysts’ responsiveness. The farther the guidance issuance date is from the actual earnings announcement date, the less the analysts would respond to the management forecasts. When the firm is followed by my larger number of analysts, the analysts are less responsive to management guidance. This confirms the prior findings that the number of analyst following is a proxy for rich private information. When the analysts have access to rich private information, they require less information from the management. Financial analysts are more skeptical of the management forecast of growth firms. The management guidance issued by firms in litigious industry has some effect in influencing the analysts.

4.5 Do the analysts know the credibility of the management guidance, ex ante?

When analysts decide to revise their forecasts by incorporating the information that is contained in management guidance, do the analysts do so because they know that the management guidance is accurate and credible? The analysts’ responsiveness to the given management forecast varies. That is, some management guidance is more influential than others. The natural question is whether analysts respond more actively when the information disclosed by the management is more accurate and informative. Do they become more responsive due to stock market concerns? Or, do they decide to follow the management guidance to meet or beat the expectations knowing that the managers are engaging in earnings management? We define the management forecast to be credible when it is close to the realized actual EPS. To test how much the believability of the management forecast affects the extent of the analyst forecast revisions, we add independent variables that proxy for the credibility of the management forecast in the regression (1b). All other variables remain the same.

Table 4

Panel A: Factors Influencing Magnitude of Analysts’ Responsiveness to Management Forecasts

This table presents factors that influence analysts' forecast revisions in response to management forecast. All variables are defined in Appendix A. *, **, and *** indicate significance levels at 1%, 5%, and 10% respectively. The t-values are computed using robust standard errors for firm clusters.

Variables	Dependent var. = Ratio			
	Model (1)	Model (2)	Model (3)	Model (4)
SURPRISE_MF	3.552*** (2.74)		1.885 (1.62)	4.010** (2.35)
BADNEWS		0.931*** (25.92)	0.913*** (25.18)	0.512*** (10.41)
POINT			-0.153*** (-5.57)	-0.064* (-1.92)
CHANGEDISPERSION				0.001 (1.26)
MF_ERROR_PY				-4.277 (-1.21)
MEET_BEAT_PY				0.492*** (10.03)
HORIZON				-0.100*** (-4.03)
ANALYSTS				-0.150*** (-4.80)
MB				-0.052* (-1.85)
HHI				0.006 (0.48)
ROA				-1.387** (-2.37)
LITIGATION				0.025 (0.60)
REGULATION				0.191 (1.51)
Constant	2.679*** (121.86)	2.146*** (70.53)	2.187*** (63.19)	2.781*** (17.12)
Observations	10,429	10,429	10,429	6,341
R-squared	0.002	0.129	0.133	0.149

Panel B: Factors Influencing Magnitude of Analysts’ Responsiveness to Management Forecasts

This table presents determinants that affect analysts' forecast revisions in response to management guidance. Management forecast surprise (SURPRISE_MF) is interacted with bad news and good news indicator variables. Management forecast form (POINT vs. RANGE) and the direction of the news (GOODNEWS vs. BADNEWS) are stacked into four groups. In this regression, three groups are included: POINT_BADNEWS, POINT_GOODNEWS, and RANGE_GOODNEWS. All variable definitions are provided in Appendix A. *, **, and *** indicate significance levels at 1%, 5%, and 10% respectively. . The t-values are computed using robust standard errors for firm clusters.

Variables	Dependent var. = Ratio	
	Model (1)	Model (2)
SURPRISE_MF*BADNEWS	5.982*** (3.16)	9.471*** (4.27)
SURPRISE_MF*GOODNEWS	-13.729*** (-3.73)	-7.714* (-1.79)
POINT_BADNEWS	0.636*** (11.70)	0.378*** (5.72)
POINT_GOODNEWS	-0.188*** (-4.06)	-0.101* (-1.86)
RANGE_BADNEWS	0.759*** (13.94)	0.412*** (6.35)
CHANGEDISPERSION		0.000 (1.01)
MF_ERROR_PY		-1.064 (-0.34)
MEET_BEAT_PY		0.489*** (9.88)
HORIZON		-0.098*** (-3.97)
ANALYSTS		-0.145*** (-4.62)
MB		-0.058** (-2.02)
HHI		0.007 (0.55)
ROA		-0.744 (-1.24)
LITIGATION		0.027 (0.66)
REGULATION		0.195 (1.54)
Constant	2.301*** (50.57)	2.798*** (16.70)
Observations	10,429	6,341
R-squared	0.140	0.153

Table 5
Management Forecast Accuracy and Analysts' Responsiveness to Management Forecast

This table reports whether financial analysts successfully segregate more accurate management guidance and make revisions accordingly. Both management forecast accuracy and financial analyst forecast accuracy is considered to test whether forecast accuracy affects analysts' revision decisions. Management forecast surprise (SURPRISE_MF) is interacted with bad news and good news indicator variables. Management forecast form (POINT vs. RANGE) and nature of the news (GOODNEWS vs. BADNEWS) are stacked into four groups. In this test, POINT*BADNEWS, POINT*GOODNEWS, and RANGE*GOODNEWS are included. Variable definitions are provided in Appendix A. *, **, and *** indicated significance levels at 1%, 5%, and 10% respectively. . The t-values are computed using robust standard errors for firm clusters.

Variables	Dependent var. = Ratio		
	Model (1)	Model (2)	Model (3)
SURPRISE_MF*BADNEWS	8.361*** (9.10)	11.415*** (8.60)	9.440*** (6.11)
SURPRISE_MF*GOODNEWS	-6.583*** (-3.66)	-4.483** (-2.09)	-3.170 (-1.42)
POINT_BADNEWS	0.379*** (9.20)	0.323*** (7.00)	0.284*** (5.86)
POINT_GOODNEWS	-0.187*** (-4.98)	-0.121*** (-2.85)	-0.105** (-2.38)
RANGE_BADNEWS	0.572*** (17.75)	0.450*** (12.24)	0.404*** (10.50)
ERROR_RATIO	-0.194*** (-21.69)	-0.196*** (-18.82)	-0.208*** (-19.04)
ERROR_RATIO*MEET_BEAT_MF		0.126*** (4.57)	0.133*** (4.62)
ERROR_RATIO*BADNEWS		0.015** (2.18)	0.024*** (2.60)
MEET_BEAT_PY		0.035 (0.99)	0.065* (1.77)
CHANGEDISPERSION		0.001 (0.36)	0.000 (0.33)
HORIZON		-0.056*** (-2.99)	-0.038* (-1.94)
ANALYSTS		-0.157*** (-8.45)	-0.136*** (-6.66)
MB			-0.064*** (-3.13)
HHI			-0.004 (-0.42)
ROA			-1.732*** (-4.05)
LITIGATION			0.069** (2.16)
REGULATION			0.055 (0.66)
Constant	2.982*** (74.12)	3.458*** (38.78)	3.522*** (27.78)
Observations	10,335	8,124	7,486
R-squared	0.178	0.184	0.188

We examine whether management forecast error is related to the responsiveness of the analysts to the management forecast in the following regression analysis:

$$\begin{aligned}
 RATIO = & \alpha_0 + \alpha_1 SURPRISE_MF * BADNEWS + \alpha_2 SURPRISE_MF * GOODNEWS \\
 & + \alpha_3 POINT_BADNEWS + \alpha_4 POINT_GOODNEWS + \alpha_5 RANGE_BADNEWS \\
 & + \alpha_6 ERROR_RATIO + \alpha_7 ERROR_RATIO * MEET_BEAT_MF + \alpha_8 ERROR_RATIO * BADNEWS \\
 & + \alpha_9 MEET_BEAT_AF + \alpha_{10} HORIZON + \alpha_{11} ANALYSTS + \alpha_{12} MF_ERROR_PY \\
 & + \alpha_{13} MEET_BEAT_PY + \alpha_{14} LOGMB + \alpha_{15} LOGHHI + \alpha_{16} ROA + \alpha_{17} LITIGATION \\
 & + \alpha_{18} REGULATION + \varepsilon,
 \end{aligned} \tag{2}$$

where ERROR_RATIO is relative error of the management forecast to the initial analyst consensus forecast. ERROR_RATIO is the absolute value of the realized actual EPS minus the forecasted EPS by the management divided by the actual EPS minus initial consensus forecast by the financial analysts. We use decile ranking of ERROR_RATIO variable due to high positive skewness. ERROR_RATIO measures the inverse of the accuracy of management forecast relative to the accuracy of initial analyst forecast. Higher ERROR_RATIO means that the management forecast is less credible. This is ex-post measure of management forecast accuracy. MEET_BEAT_MF is 1 if the EPS forecast by the management is achievable and 0 otherwise. MEET_BEAT_AF is 1 if the final analyst forecast before the actual earnings announcement is achievable and 0 otherwise.

Table 5 presents results of the regression (2). The direction and statistical significance are similar to the empirical findings of the regression (1a) and (1b). The coefficient of ERROR_RATIO is negative and significant. When the ex-post measure of the management is less accurate, the analysts respond less to the information provided by the management. An interaction term of ERROR_RATIO and MEET_BEAT_MF is positively related to analysts' responsiveness. This may be interpreted that analysts react to the management forecast with some bias if they believe that the management issues guidance to avoid negative earnings surprises. The coefficient of another interaction term, ERROR_RATIO * BADNEWS is positive. This suggests that investors are asymmetrically reactive to pessimistic management forecasts. Analysts believe that negative guidance is more credible and follow them more closely.

Overall, empirical findings suggest that the analysts update their beliefs in response to the information contained in the management forecast when they perceive that the management provides more accurate information. This finding may be interpreted as analysts' ex-ante ability to successfully filter more accurate and reliable management forecasts from those guidance that are less reliable. That is, analysts adapt more fully to the information provided by the management when the earnings estimate in the guidance contains less bias relative to the subsequently realized earnings.

4.6 Is analysts' degree of responsiveness to the management guidance self-selected?

In this study, we measure the varying degrees of analysts' responsiveness in response to the management guidance. Given that the management issues guidance, analysts first decide whether or not to revise. Therefore, selection of the observations with pre- and post-guidance forecasts may be self-selected. To control for selection bias, we use Heckman two-step procedure. In the first step, we include the variables that are likely to affect analysts' decision whether or not to revise. Estimated parameters from the probit model are then used to calculate the inverse Mills ratio. Inverse Mills ratio is included as an independent variable in the second step. To control for potential self-selection bias, we estimate the following two-step Heckman selection model:

First-stage:

$$\begin{aligned}
 REVISE = & \beta_0 + \beta_1 MF_ERROR_PY + \beta_2 MEET_BEAT_PY + \beta_3 DISPERSION_{pre} \\
 & + \beta_4 ANALYSTS + \beta_5 MB + \beta_6 ROA + \beta_7 HHI + \beta_8 LITIGATION \\
 & + \beta_9 REGULATION + v
 \end{aligned} \tag{3}$$

Table 6
Magnitude of Analysts’ Responsiveness Controlling for Self-selection Bias

This table presents results of Heckman 2-stage analysis. In the first stage, factors affecting forecast revise is estimated using a probit regression. Inverse Mills ratio is computed from the first stage is included as an additional control variable in the second stage OLS regression to control for endogeneity bias. Management forecast surprise (SURPRISE_MF) is interacted with bad news and good news indicator variables. Management forecast form (POINT vs. RANGE) and nature of the news (GOODNEWS vs. BADNEWS) are stacked into four groups. In this test, POINT_BADNEWS, POINT_GOODNEWS, and RANGE_GOODNEWS are included. Variable definitions are provided in Appendix A. *, **, and *** indicate significance levels at 1%, 5%, and 10% respectively.

	First-stage (REVISE)		Second-stage (RATIO)
SURPRISE_MF	6.345 (2.63)***	SURPRISE_MF*BADNEWS	6.172 (4.00)***
BADNEWS	0.546 (10.40)***	SURPRISE_MF*GOODNEWS	-29.598 (8.02)***
MF_ERROR_PY	-4.591 (1.82)*	POINT_BADNEWS	0.661 (13.69)***
MEET_BEAT_PY	-0.045 (0.76)	POINT_GOODNEWS	-0.172 (3.83)**
DISPERSION _{pre}	-20.943 (3.85)***	RANGE_BADNEWS	0.751 (18.89)***
ANALYSTS	0.721 (18.01)***	CHANGEDISPERSION	-0.532 (3.70)***
MB	0.008 (0.22)	HORIZON	-0.133 (6.68)***
LITIGATION	0.052 (0.90)	ANALYSTS	-0.169 (8.31)***
REGULATION	0.253 (1.41)	MB	-0.104 (4.97)***
		ROA	-0.815 (1.91)*
		HHI	-0.002 (0.21)
		LITIGATION	0.071 (2.22)**
		REGULATION	0.127 (1.50)
		INV_MILLS	4.287 (5.40)***
Constant	-0.058 (0.59)***	Constant	3.155 (26.70)***
Observations	8,727	Observations	7,808
R-squared	0.13	R-squared	0.15
		Adj. R-squared	0.15

Second-stage:

$$\begin{aligned} \text{RATIO} = & Y_0 + Y_1 \text{SURPRISE_MF} * \text{BADNEWS} + Y_2 \text{SURPRISE_MF} * \text{GOODNEWS} \\ & + Y_3 \text{POINT_BADNEWS} + Y_4 \text{POINT_GOODNEWS} + Y_5 \text{RANGE_BADNEWS} \\ & + Y_6 \text{HORIZON} + Y_7 \text{ANALYSTS} + Y_8 \text{MB} + Y_9 \text{ROA} + Y_{10} \text{HHI} \\ & + Y_{11} \text{LITIGATION} + Y_{12} \text{REGULATION} + Y_{12} \text{INV_MILLS} + v \end{aligned} \tag{4}$$

The results of Heckman two-step model are presented in Table 6. The first-stage regression results of equation (3) are reported in the first column. Credibility of management guidance is built over time when firms issues earnings guidance that was a close approximate of the actual earnings. If the magnitude of the management forecast error is large, then the management forecast is perceived less credible. The negative and significant coefficient of MF_ERROR_PY indicates that prior forecast error is negatively related to the likelihood of making forecast revisions. Analyst dispersion of the initial forecasts is negatively related to the likelihood of making revisions. This is consistent with the outcome that Cotter et al. (2006) find. The second-stage results show that the direction and the magnitude of statistical significance are consistent with those identified in the one-stage model.

5. CONCLUSION

Disclosures by management and by financial analysts are interdependent. The nature and type of management information and the environment in which the information is produced comprehensively influence belief revision decisions of analysts. This paper studies what factors of the management guidance are influential in providing useful information to the analysts for belief updates about future earnings' prospects. We examine the relative responsiveness of analysts to the management forecast surprises and its relation to various information properties. We find that analysts are reactive to the management forecasts when they find that the guidance contains certain characteristics that affect the stock market. Prior studies report that the management forecasts that contains negative news, large surprises, and precise information cause stock market reactions. Similarly, we find that analysts' relative responsiveness to management guidance is higher when the guidance contains pessimistic information and large surprises compared to preceding consensus forecast. When the magnitude of surprise of the management is small, the forecast precision plays a role in influencing analysts' forecasts revisions. Perceived believability of the guidance affects how much analysts follow the information contained in the management forecasts. Using ex-post forecast errors of the management and analyst consensus forecast, we find that analyst are more reactive when the guidance is more accurate. This seems to suggest that the "smart" analysts can successfully filter credible management forecasts and decide to follow closely.

Our paper has some limitations. We use forecast errors as a proxy for credibility of the management guidance. Managers strategically manage expectations to meet market expectations. Clearly, they have incentives to manage earnings to meet the targeted earnings. The term, "believable" or "credible", means analysts' perception that the guidance will be within achievable reach and thus, analysts see those forecasts as more reliable.

AUTHOR INFORMATION

Yura Kim is an Assistant Professor of Accounting at Kookmin University in Korea. She holds a Ph.D. in Accounting from the University of Maryland, a Master in Business Administration from Purdue University, and a Bachelor of Science from University of California at Los Angeles. Her current research interests include product market competition, earnings management, corporate disclosure, and investor sentiment. Phone: 82.2.910.4568; E-mail: yurak@kookmin.ac.kr (Corresponding author)

Kyunbeom Jeong is a Ph.D. candidate of Accounting at Korea Advanced Institute of Science and Technology (KAIST) in Korea. E-mail: future805@business.kaist.ac.kr

REFERENCES

1. Anilowski, C., Feng, M. & Skinner, D. (2007). Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance. *Journal of Accounting and Economics*, 44 (1) 36-63.
2. Baginski, S. P., Conrad, E. J., & Hassell, J. M. (1993). The effects of management forecast precision on equity pricing and on the assessment of earnings uncertainty. *The Accounting Review*, 68(4) 913-927.
3. Baginski, S. P. & Hassell, J. M. (1990). The market interpretation of management earnings forecasts as a predictor of subsequent financial analyst forecast revision. *The Accounting Review*, 65(1) 175-190.
4. Brown, L. D. & Higgins, H. N. (2005). Managers' forecast guidance of analysts: International evidence. *Journal of Accounting and Public Policy* 24(4): 280-299.
5. Clement, M., Frankel, R., & Miller, J. (2003). Confirming management earnings forecasts, earnings uncertainty, and stock returns. *Journal of Accounting Research* 41(4) 653-679.
6. Cotter, J., Tuna, I., & Wysoki, P. (2006). Expectations management and beatable targets: How do analysts react to public earnings guidance? *Contemporary Accounting Research*, 23(3) 593-628.
7. Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, 40 3-73.
8. Hansen, G. A. & Noe, C. F. (1999). When is managers' earnings guidance most influential? Working paper.
9. Hassell, J., Jennings, R., & Lasse, D. (1988). Management earnings forecasts: Their usefulness as a source of firm-specific information to security analysts. *The Journal of Financial Research*, 11(4) 303-320.
10. Hirst, D. E., Koonce, L., & Miller, J. (1999). The joint effect of management's prior forecast accuracy and the form of its financial forecasts on investor judgment. *Journal of Accounting Research*, 37 101-124.
11. Hutton, A., and Stocken, P. (2007). Effect of reputation on the credibility of management forecasts. Working paper, Dartmouth College. Retrieved from: <http://management.bu.edu/academics/departments/documents/HuttonStocken2007.pdf>
12. Jennings, R. (1987). Unsystematic security price movements, management earnings forecasts and revisions in consensus analyst earnings forecasts. *Journal of Accounting Research*, 25(1) 90-110.
13. Kasznik, R. (1999). On the association between voluntary disclosure and earnings management. *Journal of Accounting Research*, 37 57-81.
14. Kasznik, R. & Lev, B. (1995). To warn or not to warn: Management disclosures in the face of an earnings surprise. *The Accounting Review*, 70(1) 113-134.
15. Kasznik, R. & McNichols, M. F. (2002). Does meeting earnings expectations matter: Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research*, 40(3) 727-759.
16. Lenox, C. and Park, C. (2006). The informativeness of earnings and management's issuance of earnings forecasts. *Journal of Accounting and Economics*, 42(3) 439-458.
17. Libby, R. and Tan, H. T. (1999). Analysts' reactions to warnings of negative earnings surprises. *Journal of Accounting Research*, 37(2) 415-435.
18. Libby, R., Tan, H. T., & Hunton, J. E. (2006). Does the form of management's earnings guidance affect analysts' earnings forecasts? *The Accounting Review*, 81(1) 207-225.
19. Matsumoto, D. (2002). Management's incentive to avoid negative earnings surprises. *Accounting Review*, 77(3) 483-514
20. Pownall, G., Wasley, C., & Waymire, G. (1993). The stock price effects of alternative types of management earnings forecasts. *The Accounting Review*, 68(4) 896-912.
21. Skinner, D. (1994). Why firms voluntarily disclose bad news. *Journal of Accounting Research*, 32(1) 38-60.
22. Skinner, D. & Sloan, R. (2002). Earnings surprises, growth expectations and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies*, 7(2-3) 289-312.
23. Waymire, G. (1984). Additional evidence of the information content of management earnings forecasts. *Journal of Accounting Research*, 22(2) 703-718.
24. Waymire, G. (1986). Additional evidence on the accuracy of analyst forecasts before and after voluntary management earnings forecasts. *The Accounting Review* January LXI(1), 129-142.
25. Williams, P. (1996). The relation between a prior earnings forecast by management and analysts' response to a current management forecasts. *The Accounting Review*, 71(1) 103-116

APPENDIX A: Variable Definition

Variable	Definition
SURPRISE	Management forecast surprise, defined as management forecasted EPS minus mean (or median) of analyst EPS estimates prior to the management forecast, deflated by stock price at q-1
SURPRISE_MF	Absolute value of SURPRISE
GOODNEWS	A dummy variable that equals 1 if SURPRISE is positive, 0 otherwise.
BADNEWS	A dummy variable that equals 1 if SURPRISE is zero or negative, 0 otherwise.
SURPRISE_MF*BADNEWS	It is an interaction term of SURPRISE_MF and BADNEWS.
SURPRISE_MF*GOODNEWS	It is an interaction term of SURPRISE_MF and GOODNEWS.
POINT	A dummy variable that equals 1 if management issues point estimate, 0 otherwise.
RANGE	A dummy variable that equals 1 if management issues range estimate, 0 otherwise.
POINT_BADNEWS	It is 1 if management forecast is POINT and contains BADNEWS.
POINT_GOODNEWS	It is 1 if management forecast is POINT and contains GOODNEWS.
RANGE_BADNEWS	It is 1 if management forecast is RANGE and contains BADNEWS.
HORIZON	HORIZON is the natural log of the number of days between the management earnings forecast and the actual earnings announcement date.
ANALYSTS	A number of financial analysts is the number of analysts forecasts at the current quarter to which the management forecast applies. A natural logarithm of this number is used.
DISPERSION _{pre}	Dispersion at pre-management guidance is the standard deviation of individual analyst EPS estimates made before the management forecast issuance.
DISPERSION _{post}	Dispersion at post-management guidance is the standard deviation of individual analyst EPS estimates made after the management forecast issuance.
CHANGEDISPERSION	Change in dispersion is the obtained by subtracting DISPERSION _{pre} from DISPERSION _{post} , divided by the absolute value of consensus forecast before the issuance of management forecast.
AF _{pre}	Consensus forecast of the analysts is measured as a mean or median of individual analyst EPS estimates made before the management forecast issuance.
AF _{post}	Consensus forecast of the analysts is measured as a mean or median of individual analyst EPS estimates made after the management forecast issuance.
REVISION	$AF_{post} - AF_{pre}$, deflated by the share price at the end of previous quarter, q-1.
REVISE	REVISE is a dummy variable equal to 1 if analysts revise their forecasts following to the management forecast issuance.
ERROR_RATIO	ERROR_RATIO is the error of initial analyst consensus forecast before the management forecast divided by the error of the management forecast. This ratio measures the analysts' error relative to the management forecast error. $ERROR_RATIO = (actual\ EPS - AF_{pre}) / (actual\ EPS - Management\ forecasted\ EPS)$. The absolute value of this ratio is used in the regression.
MF_ERROR	An absolute value of management forecast error. Management forecast error is actual EPS less management-provided forecast scaled by share price at q-1.
MF_ERROR_PY	Prior forecast accuracy is obtained by getting the mean of absolute value of moving forecast errors. Management forecast error is calculated by getting the absolute value of the difference between actual earnings per share and the management issued earnings per share deflated by the closing stock price at the end of prior quarter.
MEET_BEAT_AF	It is a dummy variable equal to 1 if the final analyst issues meetable or beatable EPS forecast compared to the actual EPS, and 0 otherwise.
MEET_BEAT_MF	It is a dummy variable that is equal to 1 if the management' earnings forecast is less than or equal to (pessimistic) subsequently announced actual EPS and 0 otherwise.
MEET_BEAT_PY	The frequency of management that issued meetable or beatable EPS forecast is obtained. A natural logarithm of this value is used.
LITIGATION	A dummy variable equals 1 if the firm belongs to an industry of high litigation risk. The industry is identified as high-risk industries: SIC codes 2833 (biotechnology), 3570-3577 and 7370-7374 (computers), 3600-3674 (electronics), and 5200-5961 (retailing).
REGULATION	A dummy variable is equal to 1 if the firm belongs to regulated industries: SIC codes 4812-4813 (Telephones), 4833 (TV), 4841 (cable), 4811-4899 (communications), 4922-4924 (gas), 4931 (electricity), 4941 (water), or 6021-6023, 6035-6036, 6141, 6311, 6321, 6331 (financial firms), and 0 otherwise.
HHI	Herfindahl and Hirschman index (HHI) measures industry concentration of the firm. High HHI indicates concentrated market and low HHI indicates competitive market. A natural logarithm of HHI is used. I use both sales and total asset to calculate the market share.
SIZE	Size of the firm is measured as the natural log of the number of shares outstanding times the share price at q-1.
MB	Market-to-book ratio is defined as market value of equity divided by book value of equity at the end of previous quarter. LOGMB is natural logarithm of market-to-book ratio.
ROA	Return-on-asset ratio is defined as earnings before extraordinary items divided by lagged total asset.