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The Market's Reaction to Bias in Management Earnings Forecasts and Subsequent Return Reversals*

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This study examines whether the market reacts to the bias included in management earnings forecasts(MEF) at the time of the MEF announcement and reverse that reaction at the time of subsequent earnings announcement. In our analyses, we assume that management earnings forecasts contain an "unbiased information component" and a "bias component". If investors are unable to differentiate between these two components and naively respond to the bias component in the MEF, then we expect to observe a subsequent return reversal when actual earnings are announced.

Our empirical results are as summarized as follows: (1) investors initially respond to the bias component in MEF but the magnitude of that response is smaller than the magnitude of the response to the unbiased information component. (2) we find the statistical significant evidence of return reversal occurring when earnings are subsequently reported. (3) the naive response of investors to the bias component in MEF is restricted to only long-term forecasts. The magnitude of the stock price response to the bias in short-term forecasts is not significantly different from zero.

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I. Introduction

This study examines whether the market, as a whole, reacts to the bias included in management earnings forecasts (MEF) at the time of the MEF announcement and reverses that reaction at the time of the subsequent earnings announcement. In our analyses, we assume that management earnings forecasts contain an unbiased "information component" and a "bias component." If investors are unable to differentiate between these two components and naively respond to the bias component in the MEF, then we expect to observe a subsequent return reversal when actual earnings are announced.

For example, if the management earnings forecast contains an optimistic (pessimistic) bias, we expect to observe the market responding more positively than it would given the information component only. Accordingly, the resulting stock price is higher (lower) than if it were based solely on the unbiased information. If no other information is provided prior to the earnings announcement, then the market's optimistic (pessimistic) expectations for earnings will cause a negative (positive) earnings surprise at the earnings announcement date.[1] This original optimistic (pessimistic) bias in MEF and the resulting negative (positive) earnings surprise may result in a pattern of economically significant return reversals at the time of the actual earnings announcement.

To promote voluntary disclosure of prospective information, the Security and Exchange Commission (SEC) passed the Safe Harbor rule (SEC, 1979). According to this rule, as long as the forecast is made in good faith, the firm is free from legal liability caused by the forecast. The Private Securities Litigation Reform Act of 1995 also recognizes that some information that is useful to investors is inherently subject to less certainty or reliability than is other information [Kieso and Weygandt, 1998: p. 1364]. In addition, Skinner (1997) clearly shows

1) Although there may be some additional information provided from other sources, that information may not be adequate to recalibrate expectations and override the bias. Accordingly, a corresponding earnings surprise would still exist and this surprise would be linked to the bias in the management earnings forecast.

that the act of disclosure (whether it contains errors or not) is better than non-disclosures in terms of reducing legal liability costs. As a result, firms have incentives to disclose MEF even though a biased MEF could result in litigation against the firm. The effects of these biased information disclosures on market prices have not been investigated.

There exists some anecdotal evidence regarding the market reaction to bias in management earnings forecasts and subsequent return reversals.[2] For example, on December 3, 1995, Medeva PLC agreed to pay $6.75 million to settle a class-action lawsuit brought by investors. Investors alleged that Medeva intentionally disclosed biased information to inflate its stock prices during 1992~1993. After the company revealed the truth about disappointing earnings, which were significantly different from their prior forecasts, the stock value plunged 45 percent in a single day (July 19, 1993). Danka Business Systems is another example. When the firm's third quarter earnings were revealed on December 16, 1997, the firm's stock declined by $17, more than 59 percent of its value in one day. This sharp price drop led to lawsuits against company for allegedly false and misleading (optimistic) forecasts made by Danka's top officials. This anecdotal evidence suggests that investors clearly (or at least allegedly) trusted the voluntarily disclosed information and used that information in making their investments. Price decreases at the time of subsequent earnings announcements certainly represent the reversal of prior biased reactions. Although this issue has important practical implications, no study has directly investigated the empirical links between bias in MEF and the market's reaction to both the MEF announcement and the subsequent earnings announcements. This study fills that void.

Our study has important implications for researchers in understanding whether the market can "see through" the bias in MEF. For investors, our evidence may assist them in better understanding how to interpret management earnings forecasts.

The MEF observations used in this study are collected from the First Call database over

2) To identify these cases, we searched news wire services using the *Academic Universe* database provided by Lexis-Nexis. Skinner's (1997) study shows that there exist many investor class-action lawsuits against firms with alleged misleading (or omitted) information. See Francis, Philbrick, and Schipper (1994) for additional examples.

the period of 1993~1997. Only annual point and range forecasts with the necessary analysts' forecasts, returns, and financial data are used, resulting in a sample size of 751 observations. Our results are summarized as follows:

(1) Investors initially respond to the bias component in MEF but the magnitude of that response is smaller than the magnitude of the response to the unbiased information component. It seems that investors adjust for about thirty to fifty percent of the bias in MEF.

(2) A statistically significant return reversal occurs when earnings are subsequently reported. The degree of reversal decreases as the number of analysts following the firm increases, suggesting that private information search activity by analysts somewhat corrects the biased market expectations before the earnings announcement date.

(3) Our results are robust with respect to firm size, book-to-market ratio, and earnings persistence. In addition, the results are robust to the type of news (good or bad news).

(4) The naive response of investors to the bias component in MEF is restricted to only long-term forecasts. The magnitude of the stock price response to the bias in short-term forecasts is not significantly different from zero.

This paper is organized as follows. In the next section we describe the hypothesized process regarding stock price changes accompanying MEF announcements and the subsequent earnings reports. We review the prior research on this issue in Section 3. In Section 4 we discuss our methodology, including the sample selection criteria, variable measures, and summary statistics. We report our findings for the main analysis as well as the sensitivity analyses in Section 5. The last section summarizes our results and discusses possible extensions and implications.

II. Hypothesized links between MEF bias and stock responses

Figure 1 summarizes the effect of bias in MEF on stock price.

A voluntarily announced earnings forecast by management is usually accompanied by a stock price change. If the management earnings forecast is good (bad) news, the stock price

This figure depicts the stock price changes caused by announcement of an optimistically biased forecast. The optimism in MEF initially causes higher stock price for the period from MEF announcement date to the earnings report date. At earnings report date, due to negative earnings surprises representing lower earnings than the market's expectation, the stock price decreases.

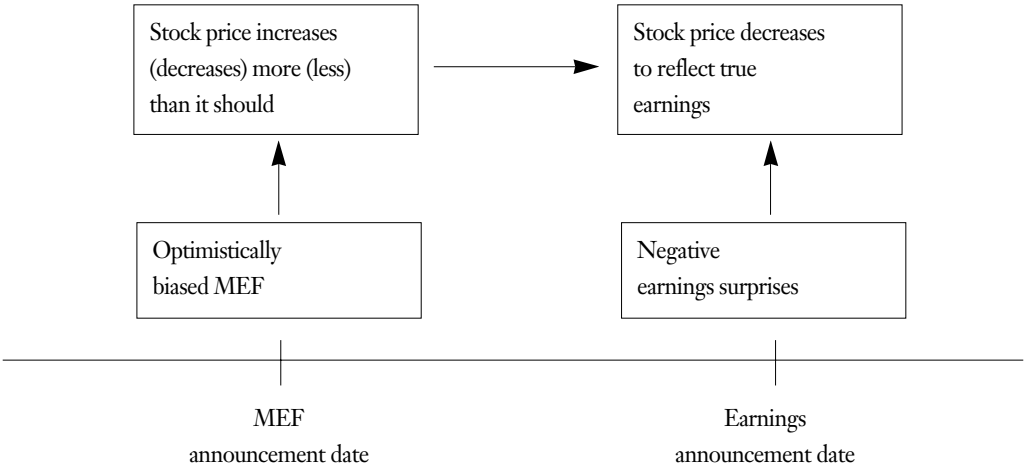

Fig. 1. Voluntary disclosure of management earnings forecast and subsequent earnings announcement.

increases (decreases). If the forecast is optimistically biased, the forecast of good news may cause the stock price to increase more than it should. When the forecast is bad news, an optimistically biased forecast may cause the stock price to decrease less than it should. In short, the inability of investors to differentiate the bias component in the management earnings forecast results in a biased stock price. Subsequently, when earnings are announced there is a negative earnings surprise since the market's earnings expectation was optimistically biased. Even if some portion of the true earnings information is provided to the market after the MEF but before the earnings announcement, the revision in earnings expectations may not fully reverse the biased priors. Accordingly, stock prices decline to reflect the negative earnings surprises and a return reversal occurs to correct for the prior optimistically biased expectations. Similar (but in the opposite direction) market movements are expected for pessimistically biased MEF announcements.

III. Literature review

Although there is anecdotal evidence about the market's reaction to bias in management earnings forecasts and the subsequent return reversal, no study has investigated this issue using U.S. stock market data.[3] Clarkson et al. (1992) examine if the market responds to MEF included in IPO prospectuses with Canadian data. Although Clarkson et al. (1992) documented that the Canadian market does not respond to the bias component in MEF included in IPO prospectuses, it may be difficult to generalize their findings. First, it has been documented that the earnings forecasts for IPO firms are much more optimistic than forecasts for other firms [Ritter, 1991]. Accordingly, it is likely that the investors do not fully respond to and/or discount the information contained in IPO prospectuses because the optimistic bias in them is evident. In contrast, voluntarily disclosed management earnings forecasts (such as we examine in this study) have not been considered as biased [McNichols, 1989].[4] Second, U.S. firms may have greater legal liability with respect to their disclosure than Canadian firms [Muller et al., 1994]. This greater legal liability may deter management from releasing overly biased forecasts. As a result, in the U.S. market investors may more naively trust management earnings forecasts.

In this study, we decompose the unexpected portion (the "surprise") of the management earnings forecast into a bias component and an information component. We then measure

3) Please refer to King, Pownall, and Waymire (1990) for an excellent review on research about MEF. Studies on MEF have covered various issues such as the value-relevance of MEF (Lev and Penman, 1990 and Penman, 1980), motivation to disclose MEF (Ajinkya and Gift, 1984, Diamond, 1985, and Skinner, 1994), forms and venues of MEF (Baginski and Hassell, 1997, Bamber and Cheon, 1998, Kasznik and Lev, 1995, and Pownall, Wasley, and Waymire, 1993), litigation issues surrounding MEF (Francis, Philbrick, and Schipper, 1994, and Skinner, 1997), earnings management (Kasznik, 1999) and accuracy and bias of MEF (Choi and Ziebart, 2000, Hassell and Jennings, 1986 and McNichols, 1989).

4) Contrary to the results in McNichols (1989), Choi and Ziebart (2000) show that short-term MEF are pessimistically biased while long-term MEF are optimistically biased.

the association between the stock price reaction at the time of the forecast and these two components. If investors are completely naive, the magnitude of the price response should be equal for both the bias and the information components. Alternatively, if investors can completely discern the bias component, the stock price response to the bias component should not be different from zero. A third possibility is that the investors can only imperfectly discern the bias. In this situation, the stock price response to the bias would be different from zero but less than the stock price response to the information component. This decomposition of the stock price reaction to the management earnings forecast into the bias and information components is the first issue we investigate in this study.[5)]

The second issue we study is the return reversal phenomenon at the time of the earnings announcements following the management earnings forecasts. Liu and Ziebart (1999) document return reversals at the time of earnings announcements for firms that previously announced bad news MEF. They did not explain the reason for this reversal except to describe it as an anomaly. We believe that this reversal could be due to the market's initial reaction to bias in MEF.

Choi and Ziebart (2000) document that a bad news MEF is more likely to be pessimistically biased. At the time of bad news MEF announcements, the stock price may drop more than it should because of the pessimistic bias in MEF. The results in Liu and Ziebart (1999) may imply subsequent stock price increases for these firms at the time of their earnings announcements. The studies by Kellogg (1984) and Francis, Philbrick, and Schipper's (1994) are germane to this issue. Kellogg (1984) examines investors' lawsuits against firms for alleged disclosures of biased information or failures to disclose material information. He documents significant price drops when the truth is revealed about the

5) Although not directly related, several studies have investigated if investors can see through the bias in analysts' earnings forecasts. However, the results are mixed. For example, Dechow and Sloan (1997), Hand (1995), and La Porta (1996) claimed that investors naively respond to biased analysts' earnings forecasts, while Dugar and Nathan (1995) found that investors somehow adjust for the bias in sell-side analysts' earnings forecasts and rely more on those of buy-side analysts. Hirst, Koonce, and Simko's (1995) experimental study yields mixed results. It is not evident whether investors see through the bias in analysts' earnings forecasts.

firms' actual financial situations. This price drop may represent the reversal of the prior optimistically biased information. According to Francis, Philbrick, and Schipper's (1994) study, pre-announcement stock returns are, on average, positive in their sample of lawsuits firms. This may suggest optimistically biased information disclosures (or non-disclosures of material bad news) during the pre-announcement period. Then, at the announcement date, the return is significantly negative (–17.16% on average). Skinner (1997) observes the same phenomenon by comparing disclosure firms with non-disclosure firms.

In summary, Liu and Ziebart's (1999) study suggests that pessimistically biased bad news MEF may be associated with subsequent return reversal. Kellogg (1984), Francis, Philbrick, and Schipper (1994), and Skinner (1997) suggest that optimistically biased good news MEF could cause a reversal as well.[6] However, none of those studies directly examines the association between biased disclosures and return reversals. If investors respond to the bias component in MEF, there would be positive association between the bias in MEF and the return surrounding the MEF. As a result, the market's expectation for future earnings would be higher (lower) for firms that previously announced optimistically (pessimistically) biased forecasts. At the time of the subsequent earnings announcements, these over-expectations (under-expectations) of earnings cause negative (positive) unexpected earnings. As a result, the stock price drops (rises). This results in a negative association between the bias component in MEF and the returns measured during the earnings announcement period. We examine these two predictions empirically in this study.

IV. Research methodology and sample statistics

First Call Corporation maintains the First Call database; it contains MEF data on U.S.

6) Only optimistically biased good news disclosures drive investors' lawsuits. This is due to investors' asymmetric utility functions (Skinner, 1994). Investors rarely sue firms for over-achieving previously announced predictions. Because of this, the anecdotal evidence we found is all related to optimistically biased information.

firms.[7),8)] In our initial search of this database, we found data on 9,739 MEF for the period of 1993~2000. From these we selected only point or range forecasts of annual earnings that were announced by the end of 1997. We selected only point or range forecasts because of the difficulty in measuring the accuracy or bias in other qualitative statements or forecasts.[9)] The resulting sample size was 1,468 observations. We found that 662 firms were either not covered by IBES or were not followed by any analyst during the period from three months before to four days before the MEF announcement date. In addition, twenty-six firms did not have the necessary Compustat data and twenty-nine firms' did not have CRSP data. Our final sample consists of 751 observations.[10)]

We measure the cumulative abnormal return as the difference between expected return and actual return. The expected return is calculated using the following conventional market model:

$$R_{it} = a + b\, R_{mt}$$

Where: R_{it} = raw return of firm i at time t

R_{mt} = value-weighted market return at time t

The regression parameters a and b are estimated by using 100 daily returns ending four days before the corresponding MEF announcement dates.

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7) We are grateful to First Call Corporation for making available the database for our research.

8) The First Call database uses the term 'company issued guidelines' rather than MEF.

9) Qualitative statements represent all the other kinds of earnings forecasts made by management other than point or range forecasts - such as minimum or maximum forecasts and other vague verbal statements. It has been shown that firms very frequently disclose these "soft" forecasts rather than point or range forecasts (Bamber and Cheon, 1998, Kasznik and Lev, 1995, and King, Pownall, and Waymire, 1990).

10) We also conducted our tests with hand-collected MEF data via a search of the *Dow-Jones News Retrieval System* for the period of 1993~1996. The results are qualitatively similar between our hand-collected sample and the First Call sample (the hand-collected sample results are available upon request). The hand-collected data set's size is 306 firm-year observations for 1993~1996.

CARM is the abnormal return measured during the MEF announcement period and CARE is the abnormal return measured during the earnings announcement period. For our analyses we use three alternative abnormal return measurement periods surrounding the forecast or earnings announcement. CARM1 (CARE1) returns are cumulated for five days starting from two days before the MEF (earnings) announcement date through two days after the announcement. CARM2 (CARE2) returns are cumulated for three days from one day before the MEF (earnings) announcement date to one day after the announcement date. CARM3 (CARE3) are the abnormal returns measured for three days from two days before the MEF (earnings) announcement date to the forecast (earnings) announcement date.

The Pearson (Spearman) correlation between CARM1 and CARM2 is .9425 (.9298); between CARM1 and CARM3, it is .8258 (.7985); and between CARM2 and CARM3, it is .7534 (.7392). Similarly, the Pearson (Spearman) correlation between CARE1 and CARE2 is .8482 (.8086); between CARE1 and CARE3, it is .7366 (.7175); and between CARE2 and CARE3, it is .6670 (.6187). Since all of the correlations are highly significant (p =<. 0001 for all cases), it appears that all the measures provide similar information on the market movement, suggesting that our results will be robust across these alternative return windows.

The unexpected information (UF) in the management earnings forecast is computed as the difference between the management forecast and the analysts' consensus forecast measured four days before the forecast announcement date scaled by the fiscal year's beginning stock price. The analysts' consensus forecast is the mean of the analysts' earnings forecasts announced during the period starting three months before the forecast announcement date and ending four days before the forecast announcement date.[11] The analysts' earnings forecast data are retrieved from the IBES detail tape and stale forecasts are eliminated. We delete firms with share prices less than $5.00 in order to avoid the small denominator problems. The UF (i.e., the overall surprise in the management forecast) is calculated as:

11) If an analyst announced more than one forecast for a specific firm during the period, only the last forecast is included to calculate the mean.

$$\frac{\text{(MEF – consensus forecast)}}{\text{Price}}$$

The sign of this variable represents whether the news is good or bad and its magnitude represents the strength of the news. We decompose this surprise into a bias component and a true information component.

The first component, the bias in the management earnings forecast (BC), is computed using the difference between each management earnings forecast and the actual ex post earnings scaled by stock price:

$$\frac{\text{(MEF – actual ex } \textit{post} \text{ earnings)}}{\text{Price}}$$

Accordingly, when BC is positive (negative), the forecast is deemed to be optimistically (pessimistically) biased.

The true (unbiased) information component of the earnings surprise (IC) is computed as the difference between the total surprise and the bias (the difference between UF and BC). If management provides an unbiased forecast, the expected value of the forecast is equal to 'actual ex post earnings.'[12] The information provided by the unbiased forecast is the difference between the unbiased forecast (i.e., the actual ex post earnings) and the market's expectation (i.e., the consensus forecast) as follows:

$$\frac{\text{(actual } \textit{ex post} \text{ earnings – consensus forecast)}}{\text{Price}}$$

Accordingly, the unexpected portion (surprise) in the management forecast (UF) is decompo-sed into the bias component (BC) and the information component (IC) in the

12) The unbiased forecast should be equal to 'actual *ex post* earnings plus some noise.' As a result, the expected value of the forecast is equal to the *ex post* earnings.

following way:[13)]

UF = (MEF – consensus forecast)
= (MEF – *ex post* earnings) + (*ex post* earnings – consensus forecast)
= BC + IC

In our analysis, we include the number of analysts who update their forecasts during the period from three months before to four days before the corresponding MEF announcement date (NUMBER) to control for potential differences in the information environment across firms. This number may be smaller than the total number of analysts following the firm that is found in the IBES summary tape but may better reflect the number of analysts who actively follow the firm.

We report various characteristics of the sample in Table 1. Panel A shows the sample size by year for the sample selection period of 1993~1997. Since the First Call database started to cover MEF data around the end of 1993, only 8 observations are from that year. Only 34 obser- vations are for 1994. The number of observations per year increases substantially after that.

Panel B reports the magnitude and frequency of bias in the sample. Among the 751 observations, 386 observations have a negative forecast error and this represents a pessimistically biased MEF. There are 333 observations that are optimistically biased; positive forecast errors. Only 32 observations have no forecast error.

Panel C reports descriptive statistics for all of our regression variables. The mean value of the bias component (BC) is .0043, while the true information component (IC) is -.0055. Summing them, the total exactly equals the mean of the total surprise in the management earnings forecast (-.0012). The negative mean (and median) values of the UF (total earnings surprise) and IC (information component in the total surprise) variables may imply that MEF

13) In the following equations, the denominator (price) is dropped for simplicity purposes but the actual analysis uses the variables deflated by stock price. This decomposition was first used by Clarkson et al. (1992).

Table 1. Summary statistics

This table reports summary statistics for the management earnings forecast samples collected for the period of 1993~1997. The total number of the sample is 751, which includes only annual point or range forecasts. Panel A reports the sample size by each year. Panel B shows the frequency of observations belongs to a specific range of bias. Panel C reveals the descriptive statistics of the variables used in the regression analyses employed in this study.

Panel A: Sample size by year

Year	1993	1994	1995	1996	1997
Sample size	8	34	167	247	295
% out of total	1.07	4.53	22.24	32.89	39.28

Panel B: Magnitude and frequency of bias

Range of bias	~-.003	-.003~-.0015	-.0015~0	0	0~.0015	.0015~.03	.03~
# of observation	143	77	166	32	87	45	201
Average magnitude of bias	-.0140	-.0021	-.0006	0	.0006	.0021	.0266

Panel C: Descriptive statistics of regression variables

Variable	Mean	Variance	1%	25%	50%	75%	99%
UF	-.0012	.0003	-.0485	-.0025	-.00005	.0009	.0513
BC	.0043	.0007	-.0417	-.0020	-.0001	.0036	.1236
IC	-.0055	.0006	-.1352	-.0049	-.0001	.0018	.0327
NUMBER	9.3849	140.45	1	2	5	12	61
CARM1	-.0123	.0139	-.4247	-.0499	-.0005	.0386	.3277
CARM2	-.0118	.0082	-.3437	-.0321	-.0036	.0259	.1949
CARM3	-.0104	.0108	-.4204	-.0401	-.0013	.0304	.2717
CARE1	.0044	.0059	-.1909	-.0330	.0034	.0371	.2338
CARE2	.0050	.0047	-.1785	-.0227	.0033	.0361	.2069
CARE3	.0038	.0031	-.1527	-.0212	.0031	.0296	.1503

UF = unexpected portion of forecasts = (MEF - analysts' consensus forecasts)/Price
BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price
IC = information component in MEF = (Actual (ex post) earnings - analysts' consensus forecasts)/Price, IC + BC = UF
NUMBER = number of analysts following the firm
CARM1 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day
CARM2 = Abnormal return cumulated for three days surrounding MEF announcement date (from day -1 to day 1)
CARM3 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 0)
CARE1 = Abnormal return cumulated for five days surrounding earnings announcement date (from day -2 to day
CARE2 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -1 to day 1)
CARE3 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -2 to day 0)

are more likely to be bad news (a result consistent with Skinner (1994). The positive mean value of the bias component (BC) suggests that, on average, the bias in the management earnings forecasts is optimistic. However, the median value of the bias component (BC) is negative (-.0001), suggesting that more MEF are pessimistically biased.

The number of analysts following the firms varies significantly with a mean of nine analysts. The median number of analysts is five. Only one analyst follows about fifteen percent (111 observations) of the firms. At the other extreme, fifty or more analysts follow eleven firms. More than seventy percent of the firms are followed by less than eleven analysts and around ten percent of the sample is followed by more than twenty analysts.

The negative values (both mean and median) for the abnormal return for the management earnings forecast (CARM) suggests that the forecasts are, on average, bad news. The mean and median values for the market reaction to the following actual earnings announcements (CARE) are both positive. This evidence is consistent with Burgstahler and Dichev's (1997) argument that firms manipulate either the reported earnings or the market's expectations of earnings in order to report a positive surprise. Accordingly, the positive unexpected earnings accompany stock price increases at the time of the earnings announcements.

V. Empirical analyses

Before presenting the empirical analysis of the main topic of this study, we first test our data for the normal positive return-earnings relationship. Prior studies have shown that the market responds to the announcements of MEF. If the characteristics of our data are not different from the data of prior studies, we should observe the same positive relationship between the unexpected portion of the management forecast and the cumulative abnormal return measured during the announcement period. The following model is used for this purpose.

$$CARM = a + b\ UF$$

Table 2. The investors' price response to management earnings forecast announcements

This table reports the association between the unexpected portion of forecasts and the cumulative abnormal return at the time of forecast announcements. The regression analyses are performed after removing outliers having an absolute value of the standardized error greater than three. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method.

CARM = a + b UF

Dependent variable	a	b	R^2	n
CARM1	-.0087**	1.3508***	.0655	731
CARM2	-.0048*	.9552***	.0531	732
CARM3	-.0057**	.7648***	.0316	730

UF = unexpected portion of forecasts = (MEF - analysts' consensus forecasts)/Price

CARM1 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 2)

CARM2 = Abnormal return cumulated for three days surrounding MEF announcement date (from day -1 to day 1)

CARM3 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 0)

*, **, and *** = significant at 10, 5, and 1% level

For this analysis CARM is the cumulative abnormal return measured during the MEF announcement period. CARM1 is accumulated for five days from day -2 to day 2; CARM2 is accumulated for three days from day -1 to day 1; and, CARM3 is accumulated from day -2 to day 0. UF represents the unexpected portion (or surprise) of the forecast. The empirical results of the analyses using this model are reported in Table 2.

In the regression analyses reported in Table 2 and in all the other tables, we define any obser-vation with an absolute value of the standardized error greater than three as an outlier and remove that observation from our analyses. As a result, the sample size used for each test is slightly smaller than the total sample size of 751.[14] In addition, we employ White's (1980) method to correct for heteroskedasticity. In Table 2, the coefficients of UF (b) are all positive

14) The resulting sample sizes (after removing the outliers) are reported in the body of the tables.

and significantly different from zero at the one percent level.

In the next analysis, we examine the investors' responses to the bias component in the management earnings forecast using the following regression:

$$CARM = a + b_1\, IC + b_2\, BC + b_3\, (BC \times NUMBER)$$

CARM is the cumulative abnormal return measured during the period surrounding the MEF announcement date. IC is the information component in MEF and BC is the bias component in MEF. Three possible alternatives exist for the degree to which investors react to the bias component. First, if investors can see through the bias component in MEF, they should not respond to BC but respond only to IC. In that case, b_1 would be different from zero but b_2 would not be different from zero. Second, if investors cannot tell the difference between the bias (BC) and the true information (IC), then their response to the two components should be equal (b_1 should be equal to b_2). Third, if investors realize that a bias exists but are unable to completely see through the bias, then the reaction to the bias component would be significant (b_2 would be different from zero) but less than the reaction to the true information (b_2 would be smaller than b_1). In this regression analysis, NUMBER represents the number of analysts following the firm. Since there is a possibility that investors know more about the firm (i.e., better interpret the bias component) as more analysts follow the firm, we include an interaction between BC and NUMBER. This inclusion of an interaction term is based upon the reasoning that a greater number of analysts would, via private information search, provide more detailed and accurate information such that investors could more easily see through the bias (Abarbanell, Lanen, and Verrecchia, 1995 and Barron and Stuerke, 1998). Accordingly, it is expected that b_3 will be negative.

The regression results for this analysis are shown in Table 3. Across the three alternative event windows, both b_1 and b_2 are significantly different from zero. For the analysis using CARM1, reported in the first row of Table 3, b_1 is 1.8838 ($t = 3.329$ and $p = .001$) and b_2 is 1.1632 ($t = 5.216$ and $p = .000$). Accordingly, b_2 is about 61.75 percent of b_1 in terms of the magnitude, and b_1 is greater than b_2 at a statistically significant level ($F = 12.41$ and $p =$

Table 3. The investors' price response to the bias component in management earnings forecasts

This table reports the results of examination whether investors react to the bias component included in management earnings forecasts. The unexpected portion of forecasts (UF) in Table 2 is decomposed into two parts — the bias component (BC) and the information component (IC), and the market's response to these two parts is examined. The regression analyses are performed after removing outliers having an absolute value of the standardized error greater than three. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method.

$$CARM = a + b_1 IC + b_2 BC + b_3 (BC \times NUMBER)$$

Dependent variable	a	b_1	b_2	b_3	b_2/b_1	Test of $b_1 = b_2$ (F value)	R^2	n
CARM1	-.0056*	1.8838***	1.1632***		.6175	12.41***	.0978	732
CARM1	-.0053	1.8928***	1.2524***	-.0251	.6617	8.79***	.0991	732
CARM2	-.0026	1.5004***	1.0065***		.6709	15.41***	.0978	733
CARM2	-.0024	1.5083***	1.0876***	-.0227	.7211	10.80***	.1085	733
CARM3	-.0023	1.1236**	.5851***		.5207	18.87***	.0583	728
CARM3	-.0017	1.0972***	.6319***	-.0259	.5759	10.70***	.0570	729

BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price

IC = information component in MEF = (Actual (ex post) earnings - analysts' consensus forecasts)/Price, IC + BC = UF

NUMBER = number of analysts following the firm

CARM1 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 2)

CARM2 = Abnormal return cumulated for three days surrounding MEF announcement date (from day -1 to day 1)

CARM3 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 0)

*, **, and *** = significant at 10, 5, and 1% level

.0005). All the tests using the alternative event windows reveal qualitatively similar results. The ratios of b_2-to-b_1 are in the range of around 50 to 70 percent. This finding suggests that the market discounts the bias component contained in the management earnings forecast, but the discount is incomplete. Our results suggest that the market adjusts its reaction to the MEF for about 30 to 50 percent of the bias in MEF. All the b_3 variables have the expected negative sign but none of them are significant.[15)]

Our results imply that investors may not see completely through the bias, but do manage to partially adjust for it. Since our results could be affected by other confounding factors we perform additional analyses. The most common confounding factors mentioned in prior studies of the market's response to informative events are firm size, the book-to-market ratio, and earnings persistence.[16] To control for these potential confounding factors, we estimate the following regression:

$$CARM = a + b_1\, IC + b_2\, BC + b_3\, (BC \times NUMBER) + b_4\, SIZE + b_5\, BM + b_6\, PER$$

For this analysis, SIZE (representing firm size) is measured by the natural logarithm of the fiscal year's beginning market value of equity. BM represents the fiscal year's beginning book-to-market ratio and PER is a dummy variable representing an indicator of earnings persistence. This dummy variable has the value of 0 if the rank of the firm's prior period's earnings-to-price ratio belongs to the bottom 25 percent or top 25 percent, and a value of 1 otherwise. This measure is similar to the approach employed by Ali, Klein, and Rosenfeld (1992), Ali and Zarowin (1992), and Cheng, Liu, and Schaefer (1996). We report the results of this regression analysis in Table 4. Our sample of observations drops to 746 because of data availability.

All the results for the regression coefficients of interest (b_1 and b_2) are qualitatively similar to those reported in Table 3 and indicate that our results are robust. All of b_1 and b_2 coefficient estimates are positive and statistically significant. In addition, b_2 is significantly smaller than b_1 and the ratio between b_2 and b_1 is again in the range of around 50 to 70 percent. With CARM1 as the dependent variable and no interaction term (BC × NUMBER), b_1 is 2.1092 (t = 5.286 and p = .000) and b_2 is 2.1092 (t = 3.092 and p =.002).

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15) We also replace NUMBER with firm size and repeat the same tests. Firm size may also reflect the amount of information available in the market for the corresponding firm. The results are qualitatively similar and can be obtained from the authors upon request.

16) Please refer to Cho and Jung (1991) for a list of possible confounding factors influencing the return-earnings relationship.

Table 4. The investors' price response to the bias component in management earnings forecasts: Control for possible confounding factors.

This table reports the results of examination if investors react to the bias component included in management earnings forecasts after controlling for three possible confounding factors - firm size, book-to-market ratio, and earnings persistency. Because not all of the 751 observations have these data, the sample size is decreased to 746. The regression analyses are performed after removing outliers having an absolute value of the standardized error greater than three. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method.

$$CARM = a + b_1\,IC + b_2\,BC + b_3\,(BC \times NUMBER) + b_4\,SIZE + b_5\,BM + b_6\,PER$$

Dependent variable	a	b_1	b_2	b_3	b_4	b_5	b_6	b_2/b_1 $b_1 = b_2$	Test of (F value)	R^2	n
CARM1	-.0509**	2.1092***	1.1432***	.0047*	.0309*	.0021	.5420	14.75***	.0945	737	
CARM1	-.0462**	1.8811***	1.2568***	-.0280	.0042**	.0203	.0078	.6681	8.48***	.1075	727
CARM2	-.0130	1.5102***	1.0061***	.0011	.0071	.0008	.6662	15.66***	.1088	728	
CARM2	-.0136	1.5162***	1.0891***	-.0233	.0012	.0069	.0009	.7183	10.70***	.1107	728
CARM3	-.0084	1.1257***	.5820**	-.0002	.0075	.0087	.5170	19.08***	.0608	723	
CARM3	-.0065	1.0999***	.6262***	-.0254	-.0003	.0072	.0081	.5693	10.80***	.0590	724

BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price

IC = information component in MEF = (Actual (ex post) earnings - analysts' consensus forecasts)/Price, IC + BC = UF

NUMBER = number of analysts following the firm

CARM1 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 2)

CARM2 = Abnormal return cumulated for three days surrounding MEF announcement date (from day -1 to day 1)

CARM3 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 0)

SIZE = ln(fiscal year's beginning market value of equity)

BM = fiscal year's beginning book-to-market ratio

PER = a measure of earnings persistency

0 if fiscal year's beginning earning-to-price ratio is belonged to bottom 1/4 or top 1/4.

1 otherwise.

*, **, and *** = significant at 10, 5, and 1% level

The coefficient b_2 is 54.20 percent of b_1 and the difference between b_1 and b_2 is significant (F = 14.75 and p = .0001). For all the other analyses, the results are very consistent.

Next, we investigate the association between the bias in the management earnings forecast and the abnormal return at the time of the actual earnings announcement. In essence, we examine whether a return reversal occurs when the actual earnings are announced. Accordingly, the optimistic (pessimistic) bias in the MEF and the resulting positive abnormal return is followed by a stock price decrease (increase) when earnings are announced.[17] In order to investigate this issue, we estimate the following regression:

$$CARE = a + b_1 BC + b_2 (BC \times NUMBER)$$

CARE is the cumulative abnormal return measured during the earnings announcement period. CARE1 is the return measured for five days from day -2 to day +2. CARE2 is the return measured for three days from day -1 to day +1. CARE3 is the return measured for three days from day -2 to day 0. BC is the bias component in MEF and NUMBER is the number of analysts following the firm. Once again, we use the number of analysts to represent the level of private information search activity for the firm, which, in turn, may imply the accuracy of the market's expectation for future earnings. If the private information search of analysts can assist investors in determining (at least partially) the bias in the management earnings forecast, there should be no (or less) return reversal at the earnings announcement date. As a result, b_2 is expected to be positive in order to mitigate the negative sign of b_1. The results of the empirical examination are reported in Table 5.

In Table 5, the b_1 coefficient has the expected negative sign. For example, when CARE1 is the dependent variable, b_1 is -.1317 (t = -1.951 and p = .051) without the interaction variable (BC × NUMBER) and -.3103 (t = -4.212 and p = .000) when the interaction variable is included in the analysis. In general, four of the analyses reveal statistically significant results for b_1. One of the analyses has a marginally insignificant result (when CARE3 is used, the p

17) A positive (negative) bias implies that the management earnings forecast is optimistic (pessimistic).

Table 5. The reversal of return at the time of earnings announcement due to the bias component in prior management earnings forecasts

This table reports the results of examination if return reversal occurs at the time of the annual earnings announcements. If prior management earnings forecasts were biased and investors naively responded to the bias, the resulting stock price would be biased too. Then, by revealing truth by subsequent earnings announcements, a return reversal to the unbiased price may occur. To examine this possibility, the regression analyses for the association between cumulative abnormal return at the time of earnings report and bias component in prior management earnings forecasts are performed. Again, outliers having an absolute value of the standardized error greater than three are removed from the analyses. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method.

$$CARE = a + b_1 BC + b_2 (BC \times NUMBER)$$

Dependent variable	a	b_1	b_2	R^2	n
CARE1	.0033	-.1317*		.0042	737
CARE1	.0042*	-.3163***	.0709***	.0215	739
CARE2	.0048**	-.0024		.0000	738
CARE2	.0045**	-.1596**	.0481***	.0131	738
CARE3	.0035*	-.0982#		.0030	742
CARE3	.0031*	-.2407***	.0437***	.0171	742

BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price

NUMBER = number of analysts following the firm

CARE1 = Abnormal return cumulated for five days surrounding earnings announcement date (from day -2 to day 2)

CARE2 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -1 to day 1)

CARE3 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -2 to day 0)

*, **, and *** = significant at 10, 5, and 1% level

value is .130). When the interaction term between BC and NUMBER is included, the results clearly reveal a negative sign for b_1. The coefficient b_2 is positive and significantly different from zero at the one percent level and b_1 is negatively significant at the same time across all

This coefficient is marginally insignificant. The p value is .130.

three tests.

These results indicate a return reversal. The initial reaction of the market to the bias in MEF is reversed when actual earnings are announced. However, as the number of analysts following the firm increases (a potential indicator of an increasing level of private information search activity), the magnitude of the reversal becomes smaller.[18] The magnitude of b1 is around 4 to 6 times greater than that of b_2. This suggests that the reversal may disappear once there are more than four to six analysts following the firm. Considering that 433 of our observations (57.67% of the total sample) are followed by fewer than seven analysts, it seems that the observed reversal is driven by smaller firms that have limited following by analysts.

To examine whether our results are robust to the inclusion of firm size, the book-to-market ratio, and earnings persistence, we estimate the following regression and report the results in Table 6:

$$CARE = a + b_1\, BC + b_2\, (BC \times NUMBER) + b_3\, SIZE + b_4\, BM + b_5\, PER$$

The results reported in Table 6 are qualitatively similar to those reported in Table 5 and indicate that our results are robust to the inclusion of these additional factors. When the interaction term is introduced, b_1 clearly shows a negative sign.

We believe that there may be two additional factors that may confound our results. They are the type of news in the forecasts (good or bad news) and the forecast horizon (long-term or short-term). First, Skinner (1994) suggests that good news disclosures and bad news

18) Once again, we repeat the same tests after replacing NUMBER with firm size. Our results change such that the interaction terms are not significant in any of the three tests, although b1 is still negative and significant. Although the two variables are highly correlated (Pearson correlation is .5314 and $p<.0001$), it seems that they may represent somewhat different attributes of the information environments for the firms. Baginski and Hassell (1997) explain that firm size is related to the amount of publicly available information while the number of analysts following the firm is related to the amount of privately available information. Abarbanell, Lanen, and Verrecchia (1995) and Barron and Stuerke (1998) suggest that the number of analysts following the firm is related to the level of private information search activity.

Table 6. The reversal of returns at the time of earnings announcements due to the bias component in prior management earnings forecasts: Control for possible confounding factors

This table reports the results of examination if return reversal occurs at the time of annual earnings announcements after controlling for three possible confounding factors - firm size, book-to-market ratio and earnings persistency. Because not all of the 751 observations have these data, the sample size is decreased to 746. Outliers having an absolute value of the standardized error greater than three are removed from the analyses. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method.

$$CARE = a + b_1\,BC + b_2\,(BC \times NUMBER) + b_3\,SIZE + b_4\,BM + b_5\,PER$$

Dependent variable	a	b_1	b_2	b_3	b_4	b_5	R^2	n
CARE1	-.0125	-.1142*		.0025*	-.0019	-.0109	.0115	732
CARE1	-.0132	-.2729***	.0682***	.0019	.0055	.0030	.0235	733
CARE2	-.0070	-.0057		.0013	.0072	-.0163	.0021	731
CARE2	-.0060	-.1519**	.0469***	.0009	.0071	.0019	.0147	731
CARE3	-.0012	-.1019		.0007	.0015	-.0137	.0040	737
CARE3	.0005	-.2413**	.0433***	.0005	.0011	-.0018	.0175	737

BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price

NUMBER = number of analysts following the firm

CARE1 = Abnormal return cumulated for five days surrounding earnings announcement date (from day -2 to day 2)

CARE2 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -1 to day 1)

CARE3 = Abnormal return cumulated for three days surrounding earnings announcement date (from day -2 to day 0)

SIZE = ln(fiscal year's beginning market value of equity)

BM = fiscal year's beginning book-to-market ratio

PER = a measure of earnings persistency

0 if fiscal year's beginning earning-to-price ratio is belonged to bottom 1/4 or top 1/4.

1 otherwise.

*, **, and *** = significant at 10, 5, and 1% level

disclosures may be interpreted differently by the market. If investors believe good news disclosures are less credible than bad news disclosures or vice-versa, the investors' reaction to MEF disclosures and the subsequent reversal phenomenon may vary by the type of news in

the forecast. In additional analyses, not reported in this paper, but available from the authors, we find our results to be robust to the type of news.

Second, the forecast horizon may impact our results if investors treat long-term forecasts differently than short-term forecasts. For example, if the forecast is announced early in the year (a long-term MEF), there may be a stronger reaction to the bias component in MEF because there has been less information regarding the firm and its prospects for the year. As the year progresses, more information will be available regarding the firm and its prospects for the year. For forecasts made near the end of the year, the information environment may be rich because of announ- cements already made. Accordingly, the reaction to the bias component for short-term forecasts would probably be smaller than the reaction to the bias component in long-term forecasts.

For the subsequent reversal, it is not apparent a priori whether the forecast horizon will impact the observed reversal. Given that the long horizon forecasts are made early in the year, there exists ample opportunity for additional information to be released such that the information environments are similar at the time of the earnings announcement for both the short-term and the long-term forecasts. To investigate whether the forecast horizon impacts our results, we estimate the following regressions:

$$\begin{aligned} CARM = a + b_1\, IC + b_2\, BC + b_3\, (BC \times NUMBER) + b_4\, (BC \times HORIZON) \\ + b_5\, SIZE + b_6\, BM + b_7\, PER \end{aligned}$$

$$\begin{aligned} CARE = a + b_1\, BC + b_2\, (BC \times NUMBER) + b_3\, (BC \times HORIZON) \\ + b_4\, SIZE + b_5\, BM + b_6\, PER \end{aligned}$$

In these models, the HORIZON variable indicates if the forecast is a long-term or short-term forecast. To divide the full sample into long- or short-term forecast groups, the median length of the forecast horizon (the number of working days between the forecast announcement date and the subsequent annual earnings announcement date) is used. The median value of the forecast horizon is 113 days. As a result, the HORIZON variable has the value of 1 if the forecast's horizon is longer than 113 days and 0 otherwise. The other

Table 7. The influence of the forecast horizon in the investors' reaction to bias in MEF and subsequent return reversal

This table reports the results of examination if the forecast horizon (long-term or short-term forecasts) influences previously documented empirical results. In the regression models, the dummy variable HORIZON has value 1 if the forecast is classified as a long-term forecast, and 0 otherwise. If the forecast horizon (= number of working days between MEF announcement date and subsequent earnings announcement date) is greater (shorter) than the median value (= 113 days), the forecast is classified as a long-term (short-term) forecast. Outliers having an absolute value of the standardized error greater than three are removed from the analyses. The resulting sample sizes are reported in the body of the table. All of the results are corrected for heteroskedasticity by using White's [1980] method. For simplicity purposes, the results only using CARM1 and CARE1 are reported. The other tests yield qualitatively similar results.

Panel A: The investors' response to bias in MEF

$$CARM = a + b_1\,IC + b_2\,BC + b_3\,(BC \times NUMBER) + b_4\,(BC \times HORIZON) + b_5\,SIZE + b_6\,BM + b_7\,PER$$

	a	b_1	b_2	b_3	b_4	b_5	b_6	b_7	R^2	n
Model 1	-.0054*	1.9916***	-.0535	.0026	1.4688***				.1200	731
Model 2	-.0391**	1.9767***	-.0035	-.0012	1.4249***	.0036*	.0146	.0065	.1263	726

	Model 1	Model 2
Test of $b_1 = b_2$	F=18.12***	F=16.88***
Test of $[b_2 + b_4] = 0$	F=13.36***	F=13.73***
Test of $[b_2 + b_4] = b_1$	F=9.33***	F=8.30***

Panel B: The reversal of return at earnings announcements

$$CARE = a + b_1\,BC + b_2\,(BC \times NUMBER) + b_3\,(BC \times HORIZON) + b_4\,SIZE + b_5\,BM + b_6\,PER$$

	a	b_1	b_2	b_3	b_4	b_5	b_6	R^2	n
Model 1	.0042*	-.3207***	.0709***	.0072				.0215	739
Model 2	-.0132	-.2768***	.0682***	.0065	.0019	.0055	.0030	.0235	733

	Model 1	Model 2
Test of $[b_1 + b_3] = 0$	F = 10.57***	F = 8.00***

BC = bias component included in MEF = (MEF - actual (ex post) earnings)/Price
IC = information component in MEF = (Actual (ex post) earnings - analysts' consensus forecasts)/Price, IC + BC = UF
NUMBER = number of analysts following the firm
CARM1 = Abnormal return cumulated for five days surrounding MEF announcement date (from day -2 to day 2)
CARE1 = Abnormal return cumulated for five days surrounding earnings announcement date (from day -2 to day 2)
HORIZON = 0 if the forecast horizon is smaller than median value (113 days)
1 otherwise.
SIZE = ln(fiscal year's beginning market value of equity)
BM = fiscal year's beginning book-to-market ratio
PER = a measure of earnings persistency
0 if fiscal year's beginning earning-to-price ratio is belonged to bottom 1/4 or top 1/4.
1 otherwise.
*, **, and *** = significant at 10, 5, and 1% level

variables are all defined as before. We report our results in Table 7.

For simplicity, we report only the results using CARM1 and CARE1 in Table 7.[19] Panel A of Table 7 reports the investors' reactions to the bias component in MEF. In these results, b_1 is still significant but b_2 is not. The coefficient b_3 is not as significant as it was in the prior analysis (reported in Table 4). In addition, b_4 is significantly positive. The results in Panel A can be summarized as follows:

> the market's reaction to the bias component in short-term forecasts: b_2 = -.0535 or -.0035 (depending on the model);
> the market's reaction to the bias component in long-term forecasts is:
> $b_2 + b_4$ = 1.4153 or 1.4214 (depending on the model).

The market's reaction to the long-term forecasts is significantly different from zero (test of $[b_2 + b_4] = 0$, F = 13.36 or 13.73 depending on the model) but the market reaction to the short-term forecasts is not significant (b_2 is not statistically significant). These results imply that investors respond to bias only in long-term forecasts.

One plausible reason for this finding relates to the amount of available information in the market. Investors may have a hard time determining the bias in a long-term MEF because there is less information about firm performance at the time of the forecast announcement. For long-term forecasts, the market's reaction to the bias component is still smaller than the market's reaction to the information component (test of $[b_2 + b_4] = b_1$, F = 9.33 or 8.30 depending on the model). For the short-term forecasts, our results suggest that investors can differentiate the bias component and respond accordingly.

The results investigating the influence of the forecast horizon on the reversal are shown in Panel B of Table 7. Consistent with prior analyses, both b_1 and b_2 are statistically significant. However, b_3 is not statistically significant. Again, these results can be summarized as follows:

> return reversal for short-term forecasts: b_1 = -.3207 or -.2768 (depending on the model);
> return reversal for long-term forecasts: $b_1 + b_3$ = -.3135 or -.2703 (depending on the model).

19) The results using CARM2 (CARE2) and CARM3 (CARE3) are qualitatively similar and are available from the authors upon request.

The statistically significant value of b_1 indicates a price reversal for the short-term forecasts. A statistically significant reversal is also observed for the long-term forecasts (test of $[b_1 + b_3] = 0$, F = 10.57 or 8.00 depending on the model).

The observation of a price reversal for short-term forecasts is somewhat confusing since the investors do not seem to respond to the bias in the short-term management earnings forecast. Since they do not respond to the bias (as shown in Panel A of Table 7), the question is what is it that they are responding to in the reversal? McNichols's (1989) study provides a potential answer to this question. She documents a significant drift in returns following MEF announcements. This implies that if the MEF is good (bad) news, the stock price continues to increase (decrease). Accordingly, this return drift may suggest that the investor response to the bias in the short-term MEF is prolonged. As a result, the bias still influences the market's expectations and, in turn, the bias is negatively associated with returns measured during the earnings announcement period.[20)]

VI. Conclusion

Management earnings forecasts are an important issue in accounting research. Various researchers have examined the characteristics of MEF, the market's response to MEF, the accuracy of MEF, and earnings management via MEF. However, the bias in MEF and its influence on market prices have not been formally investigated. In this study, we explore this missing link. Specifically, we examine the market's reaction to the bias component in management earnings forecasts and subsequent return reversals. Using data on 751 management earnings forecasts collected from the First Call database over the period of

20) Although not reported, this study partially examined this issue with hand-collected data. The cumulative returns were measured during the period from three days after the MEF announcement date to three days before the corresponding earnings announcement date. The measured cumulative returns are positively associated with the bias in MEF. This result partially confirms the conjecture that drift explains the return reversal for short-term MEF observations.

1993~1997, we find that: (1) Investors respond to both the bias component and the information component in management earnings forecasts. (2) The magnitude of response to the bias component is significantly smaller than the market's response to the information component (usually 50 to 70 percent). This result is consistent with investors partially seeing through the bias in the forecast and adjusting their response. (3) The bias component is negatively associated with returns at the time of the subsequent earnings announcement, suggesting a return reversal. (4) As the number of analysts following the firm increases, the reversal becomes weaker. This suggests that analysts' private information search improves the information environment and enables investors to adjust their prior response before the earnings announcement. (5) The naive response of investors to the bias component is clearer for long-term forecasts. This result may be due to differential information environments between long-term and short-term forecasts. When a forecast is announced earlier (long-term forecast), the amount of information available to assist the investors in identifying the bias may be limited. Thus, investors could respond more strongly to the bias included in the long-term forecasts. (6) Our results are robust with respect to firm size, book-to-market ratio, and earnings persistence, as well as the type of news (good or bad news).

In summary, we believe that our results provide insights useful to academics as well as investors and regulators. Based on the findings of this study, it may be necessary for regulators to intervene and develop ways to minimize this systematic pattern of price reversals. Given that the number of firms issuing management earnings forecasts is increasing, a systematic pattern of reversals (and increased stock price volatility) may become problematic. Some mechanism may need to be developed to assist investors in identifying the degree of bias in management earnings forecasts.

One of the limitations of this study is our use of the actual *ex post* bias in management earnings forecasts. The actual *ex post* bias may be different from the investors' expectation for the bias in management earnings forecasts. Investors may not respond to the expected portion of bias in MEF, although they do respond to actual *ex post* bias.[21] If one could

21) Given that investors adjust to 30~50 percent of the bias in MEF as documented in this study, there is a

measure the expected portion of bias, this extension could be an interesting research topic.

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경영자 이익 예측정보의 편이에 대한 시장반응과 주가의 역전현상

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본 연구는 경영자 이익 예측정보(management earnings forecasts)에 포함되어 있는 과대예측(optimistic) 또는 과소예측(pessimistic) 偏倚(bias)가 여러 事前的 정보를 이용하여 예측가능함에도 불구하고, 투자자들은 마치 이 偏倚정보를 완전하게 예측하지 못하는 것처럼 행동한다는 것을 보였다. 경영자의 이익 예측정보를 편의가 없는 정확한 예측정보와 편의의 두 가지로 구분한 경우, 투자자들의 편의정보에 대한 반응계수는 정확한 예측정보에 대한 반응계수보다는 작았지만, 0보다는 유의적으로 크게 나타났다. 즉 투자자들은 어느 정도 편의를 예측하여 반응의 크기를 조절하지만, 그 예측이 편의를 완전히 상쇄할 만큼 완벽하지는 않다는 결론이다. 따라서 이렇게 편의에 반응하여 주가가 형성되기 때문에, 이익 예측정보 공시후 시간이 흘러 실제 연간 이익이 공표되는 경우 주가의 역전(reversal) 현상이 나타나게 된다. 즉 과대(과소) 예측 편의가 포함된 이익 예측정보가 과거에 공시되었던 경우 주가가 이에 따라 과대(과소) 평가되어 있기 때문에, 실제 연간이익 정보가 이익보고일에 발표되면 과대(과소) 평가되어 있던 주식의 가격이 하락(상승)하는 현상이 발생하는 것이다.

주요어: 경영자 이익 예측정보, 편이정보, 주가의 역전현상

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