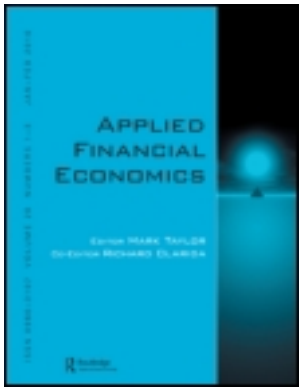

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Analysts' awareness of systematic bias in management earnings forecasts

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Analysts' awareness of systematic bias in management earnings forecasts

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The effectively mandatory provision of management forecasts of earnings is a unique feature of Japan's financial disclosure system. The first objective of this study is to identify the determinants of systematic bias in management forecasts using a sample of more than 36 000 one-year-ahead earnings forecasts announced by Japanese firms at the beginning of a fiscal year over the period 1979 to 2005. The examination of *ex post* management forecast errors shows that financial distress, firm growth, firm size and prior forecast errors are all associated with bias in management forecasts. The second objective of this study is to investigate whether analysts are aware of these factors that are found to be related to systematic bias in management earnings forecasts. The examination of analysts' forecasts issued subsequent to the announcement of management forecasts reveals that analysts take account of these factors when they issue their own earnings forecasts. The overall findings suggest that analysts are to some extent aware of the determinants of systematic bias in management forecasts.

Keywords: management earnings forecasts; analysts' earnings forecasts; determinants of forecast bias; forecast accuracy

JEL Classification: G15; G14

I. Introduction

A major disclosure difference between Japan and other countries is that management of almost all the listed firms in Japan provides forecasts of next year's earnings. This practice was initiated by the stock exchanges in 1974, at which time a letter was sent to listed firms requesting them to disclose forecasts of key accounting information. Although the forecasts are technically voluntary, most Japanese firms comply with the request and provide them. As a consequence, management forecasts of the upcoming year's sales, ordinary income, net income (earnings), earnings per share and dividends per share are announced simultaneously with the most recently completed year's actual accounting figures in annual press releases.[1] This unique setting in Japan makes it possible to conduct a large-scale study on management forecasts over a long period of time.

While management forecasts are much less common in the US, a number of studies have investigated and found several factors that are associated with systematic bias in Management Forecasts of Earnings (hereafter referred to as MFE). For example,

[1] The term 'earnings' used in this article indicates 'net income' unless otherwise stated.

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Frost (1997) and Koch (2002) report optimistic bias in MFE issued by financially distressed firms. Koch also finds that such forecasts are viewed by analysts with scepticism. In contrast to the US studies, there has been little research in Japan that examines the properties of management forecasts nor their impact on analysts' forecasts despite the fact that the provision of management forecasts is a major feature of the Japanese disclosure system. This lack of research on Japanese management forecasts is partly because the dataset is not readily available in an electronic form and needs to be collected manually.

The first objective of this study is to investigate the determinants of bias in MFE. Based on the findings from prior research on management forecasts, I investigate the effects of four factors, namely financial distress, firm growth, firm size and persistence of previous years' management forecast errors, on bias in MFE using a sample of more than 36 000 forecasts announced by Japanese firms at the beginning of a fiscal year over the period 1979 to 2005. The examination of *ex post* management forecast errors reveals that these factors are all associated with systematic bias in MFE. The major findings of the analysis are: (i) financially distressed firms with high debt ratios and losses issue more optimistic MFE; (ii) growth firms with high sales growth ratios and low book-to-market ratios announce less optimistic MFE; (iii) small firms issue more optimistic MFE and (iv) firms whose previous years' MFE are optimistic tend to remain optimistic in their current forecasts.

The second objective of this study is to investigate whether financial analysts are aware of the aforementioned systematic bias in MFE. Both management and analysts' forecasts used in this study are one-year-ahead earnings forecasts and are the first forecasts announced at the beginning of a fiscal year. MFE are announced at the annual earnings announcement and Analysts' Forecasts of Earnings (hereafter referred to as AFE) are publicized shortly after MFE. Because of the information asymmetry that exists between managers and outsiders about future performance of firms, especially at the beginning of a fiscal year when little alternative information is available, it is both rational and practical for analysts to use management forecasts as a basis for their own forecasts.

However, financial analysts do not simply mimic earnings forecasts announced by management. The forecast accuracy tests between MFE and AFE show that AFE are significantly more accurate than MFE, which may be an indication of analysts' awareness of systematic bias in management forecasts. The following investigation of the analysts' forecast errors reveals that, though analysts' forecasts are also biased in the same direction as management forecasts, the magnitude of the forecast bias is less severe for analysts' forecasts than for management forecasts. Further tests that examine the deviation of AFE from MFE show that analysts take account of the financial factors that have been found to be related to systematic management forecast errors when they publicize their own earnings forecasts.

Overall, the findings in this study suggest that analysts do not necessarily take management forecasts at face value, but rather pay close attention to the financial conditions of the issuing firms in formulating their own earnings forecasts. These efforts by analysts may account for the higher forecast accuracy of analysts' earnings forecasts.

The remainder of the article is organized as follows. Section II provides some background on Japanese management forecasts. Section III develops the research hypotheses, while Section IV discusses the estimation models based on the hypotheses. Section V describes the data and Section VI provides the empirical results. Section VII reports the results of sensitivity tests. Section VIII summarizes the findings and concludes the article.

II. Background on Japanese Management Forecasts

The timing and extent of corporate disclosure in Japan is affected by legal and stock exchange requirements. The Financial Instruments and Exchange Law, which covers companies listed on the security exchanges, requires firms to file annual securities reports with the Ministry of Finance within 3 months of fiscal year end. The form and content of the annual securities report is prescribed by the Ministry of Finance Ordinance, and the report provides detailed information on business activities and financial condition of an enterprise in a fiscal year. Although the scope and amount of information being disclosed is extensive and comprehensive, there is a 3-month time lag between the disclosure of the report and the closing of the firm's fiscal year.

In order to supplement the lack of timeliness in statutory disclosure under the Financial Instruments and Exchange Law, Japan's stock exchanges, which are self-regulatory organizations, request that listed firms publicize condensed financial statements immediately upon board of director approval of a draft of financial statements.[2] As a result, earnings figures are

[2] The condensed financial statements are available from the Tokyo Stock Exchange (TSE) website (http://www.tse.or.jp).

publicized well before the 3-month legal deadline. For the vast majority of Japanese companies, earnings announcements take place 25–40 trading days after fiscal year end. This practice of timely disclosure was initiated by the stock exchanges in 1974, at which time a letter was sent to listed firms requesting them to disclose key accounting information. Management forecasts of main accounting items, which are net sales, ordinary income, net income, earnings per share and dividends per share, for the upcoming year are provided in the condensed financial statements together with current financial results.[3] Thus, technically speaking, the provision of management earnings forecasts is voluntary without any legal backing. In fact, some financial institutions, especially securities firms, do not provide earnings forecasts, citing the difficulty of predicting the future business environment. However, as a whole, compliance has been so high that almost all firms provide earnings forecasts.[4]

At least, the following three factors seem to have contributed to the disclosure of management forecasts taking root in Japan. First, since the inception of the timely disclosure practice in 1974, stock exchanges in Japan have been making continuous efforts to make firms comply with the request to provide forecasts of key accounting information. Second, legal guidelines prescribed by the Ministry of Finance Ordinance regarding revisions of management forecasts are established. Under the guidelines, firms are required to announce revised forecasts immediately when a significant change in previously published forecasts arises (e.g. ±10% of sales, ±30% of ordinary income and ±30% of net income). To the extent firms follow the guidelines, they will not be held liable for missing their initial forecasts. This is in contrast with the safe harbour for forward-looking statements in the US (the Private Securities Litigation Reform Act of 1995). The Reform Act was intended to encourage companies to make good faith projections without fear of a securities lawsuit but has been said to be ineffective due to ambiguity in interpretations (Rosen, 1998). Third, Japan is not culturally a litigious country and class action securities litigation against companies and management is traditionally less common (CFA Institute, 2009). These factors seem to have contributed to create the favourable environment in which most firms issue earnings forecasts.

Perhaps, with due caution about different legal systems and cultural backgrounds, Japan's disclosure system could serve as a model case for other countries that are trying to encourage firms to disclose forward-looking information.

III. Hypothesis Development

While management forecasts are much less common in the US and other major countries, a number of studies have investigated and found several factors that are associated with systematic bias in MFE.[5] The first factor is financial distress. Prior research documents optimism in financial disclosures released by managers of financially distressed firms. Using a sample of 81 UK firms that received modified audit reports, Frost (1997) finds that managers of distressed firms make disclosures about expected future performance that are overly optimistic relative to actual financial outcomes. While Frost (1997) conducts a univariate analysis, Irani (2000) performs a multivariate analysis and finds a positive linear correlation between optimism in MFE and the degree of financial distress. Moreover, Choi and Ziebart (2004) find that firms reporting losses for the previous year announce more optimistic earnings forecasts for the current year than those reporting profits. These results suggest that financially distressed firms are inclined to issue more optimistic earnings forecasts.

The second factor is firm growth. The evidence in previous studies suggests that managers of growth firms have more incentives to announce pessimistic forecasts. Matsumoto (2002) and Richardson *et al.* (1999, 2004) investigate the propensity for firms to avoid negative earnings surprises and find that high-growth firms are more likely to guide analysts' forecasts downward to meet their expectations at the earnings announcement. Choi and Ziebart (2004) also find weak evidence that managers of growth firms release more pessimistic management forecasts. One possible explanation for these findings is that the stock market reaction to negative earnings surprises is particularly large for high-growth firms (Skinner and Sloan, 2002). Thus, the evidence suggests that high-growth firms are inclined to issue

[3] All forecasts for the upcoming year are publicized in the form of point forecasts except for dividends per share that are sometimes provided in the form of range forecasts.

[4] A survey reports that already in 1980, more than 90% of listed firms excluding those in the financial sector provided management forecasts. A more recent survey in 2006 reports that 3790 of the 3831 listed firms (98.9%) including financial institutions provided management forecasts.

[5] Although most of the literature on management forecasts uses the US data, there are some studies that make use of the data outside the US (Mahipala *et al.*, 2009; Hartnett, 2010).

more pessimistic earnings forecasts in order to avoid earnings disappointments.

The third factor is firm size. Several studies report that firm size is associated with forecast behaviour such as forecast precision and venue (Baginski and Hassell, 1997; Bamber and Cheon, 1998). Choi and Ziebart (2004) also document that MFE are more optimistic for small firms than for large firms. They conjecture that larger firms face a higher degree of legal liability, which deter them from issuing overly optimistic forecasts. In addition, I hypothesize that managers of large firms may regard publicized earnings forecasts as commitments to the investment community and other interested parties. Their projections, therefore, tend to be conservative in order to avoid missing the forecasts. On the other hand, managers of small firms may consider earnings forecasts to be their targets for the upcoming year. Consequently, their projections tend to be optimistic.

The fourth factor is the persistence of prior management forecast errors. Williams (1996) reports that the accuracy of a prior management earnings forecast serves as an indicator to analysts of the believability of a current management forecast. Hirst *et al*. (1999) also conduct an experimental study and find that prior forecast accuracy by management affects investors' earnings predictions when current management forecasts are given to them. Although these results do not provide direct evidence on the persistence of management forecast errors, they suggest that analysts and investors believe in the persistence.

Thus, a number of previous studies on management forecasts support the existence of systematic bias in MFE, and this leads to my first prediction:

Hypothesis 1: Management forecasts are systematically biased, and financial distress, firm growth, firm size and prior forecast errors are all associated with the bias.

Finding evidence in support of Hypothesis 1 confirms that management forecasts are systematically biased, and the question arises as to whether financial analysts are aware of the systematic bias and the contributing factors associated with it. There is some evidence that implies analysts' awareness of systematic bias in MFE. For example, Koch (2002) reports that MFE issued by financially distressed firms exhibit greater optimism and are viewed as less credible by analysts than similar forecasts made by nondistressed firms. The aforementioned findings of Williams (1996) and Hirst *et al*. (1999) that prior earnings forecast accuracy by management affects investors' perceptions on current management forecasts are also indicative of analysts' awareness of the persistence of management forecast errors.

In a similar vein, a number of studies investigate the stock market's response to the predictable bias in management forecasts. Frost (1997) documents that investors discount financially distressed firms' optimistic announcements about restructuring and expected financial improvements. Rogers and Stocken (2005) also find evidence that investors filter out the predictable forecast errors in MFE. Moreover, Ng *et al*. (2008) and Hutton and Stocken (2009) examine the effects of disclosure quality and reputation, which is measured by prior forecast accuracy, forecast precision and forecast frequency, on the stock market's initial reaction to the announcement of management forecasts. They find that investors are more responsive to management forecasts issued by firms with higher disclosure quality and forecasting reputation.

Thus, the findings in prior research are indicative of financial analysts' awareness of the determinants of systematic bias in management forecasts, and this leads to my second prediction:

Hypothesis 2: Analysts are aware of systematic bias in management forecasts and make adjustments to reduce the bias in publicizing their own forecasts.

IV. Research Design

Variable definitions

Figure 1 depicts the sequence of events using a March year-end firm, which is most common for Japanese firms. For a typical March year-end firm, the earnings announcement takes place in the last week of May, at which time actual earnings for year $t-1$ are announced simultaneously with MFE for year t. AFE for year t are publicized in mid June, by which time all management forecasts are announced. Since only one-year-ahead forecasts are available for both MFE and AFE, management forecasts in late May and analysts' forecasts in mid June are the first earnings forecasts available for year t.

First, the *ex post* forecast errors of MFE and AFE are defined as the difference between actual and forecast earnings scaled by the share price at the beginning of the fiscal year.

$$MFERR_t = (E_t - MF_t)/P_t \quad \text{and}$$
$$AFERR_t = (E_t - AF_t)/P_t$$

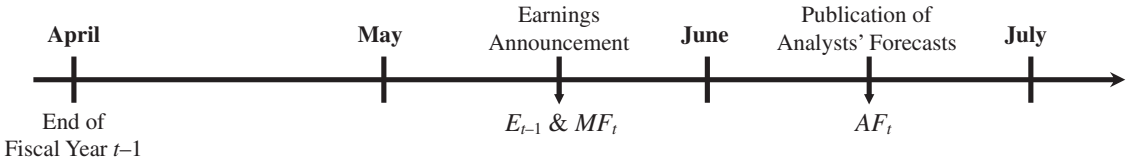

Fig. 1. Sequence of events
Notes: E_t = actual earnings per share for year t, MF_t = management forecast of earnings per share for year t that is publicized simultaneously with E_{t-1} at the earnings announcement and AF_t = analysts' forecast of earnings per share for year t that is issued subsequent to MF_t.

where

$MFERR_t$ management forecast error for year t,
$AFERR_t$ analysts' forecast error for year t,
E_t actual earnings per share for year t,
MF_t management forecast of earnings per share for year t that is usually announced within 2 months into year t,
AF_t analysts' forecast of earnings per share for year t that is issued subsequent to MF_t and
P_t share price at the beginning of year t.

Therefore, negative (positive) *MFERR* and *AFERR* mean that these earnings forecasts are optimistic (pessimistic) relative to the actual outcomes.

Next, the *ex post* forecast accuracy of MFE and AFE is defined as the absolute difference between actual and forecast earnings scaled by the share price at the beginning of the fiscal year.

$$MFACC_t = |E - MF_t|/P_t \quad \text{and}$$
$$AFACC_t = |E_t - AF_t|/P_t$$

where

$MFACC_t$ management forecast accuracy for year t and
$AFACC_t$ analysts' forecast accuracy for year t.

Finally, the deviation of analysts' forecast from management forecast is measured as the difference between MFE and AFE scaled by the share price at the beginning of the fiscal year.

$$AFDEV_t = (MF_t - AF_t)/P_t$$

where

$AFDEV_t$ analysts' forecast deviation from management forecast for year t.

A positive *AFDEV* implies that analysts view the management forecast as optimistically biased, while a negative *AFDEV* indicates that analysts consider it to be pessimistically biased.

Models for testing hypotheses

I estimate the following regression model to test Hypothesis 1. The expected signs are shown in parentheses below the equation.

$$\begin{aligned} MFERR_t = {} & \alpha_0 + \alpha_1 \underset{(-)}{DEBTR_t} + \alpha_2 \underset{(-)}{LOSS_t} + \alpha_3 \underset{(+)}{\Delta SALE_t} \\ & + \alpha_4 \underset{(-)}{BMR_t} + \alpha_5 \underset{(+)}{SIZE_t} + \alpha_6 \underset{(+)}{MFERR_t - 1} \\ & + \alpha_7 \underset{(+)}{MFERR_{t-2}} + \alpha_8 INDDUM_t \\ & + \alpha_9 YEARDUM_t + \varepsilon_t \end{aligned} \tag{1}$$

where

$DEBTR_t$ total liabilities divided by total assets at the beginning of year t,
$LOSS_t$ one if E_{t-1} is negative and zero otherwise,
$\Delta SALE_t$ sales revenue for year $t-1$ divided by sales revenue for year $t-2$,
BMR_t book value of shareholders' equity divided by market value of equity at the beginning of year t,
$SIZE_t$ log of inflation-adjusted market value of equity at the beginning of year t,
INDDUM a set of industry dummy variables and
YEARDUM a set of year dummy variables.

Equation 1 includes *DEBTR* (debt ratio) and *LOSS* to proxy for financial distress, $\Delta SALE$ and *BMR* (book-to-market ratio) for firm growth, *SIZE* for firm size and lagged *MFERR*s for the persistence of management forecast errors. I use a pooled time-series cross-sectional regression framework, so that *INDDUM* and *YEARDUM* are also included to control for possible variation in forecast errors across industry and over the years.

According to Hypothesis 1, financially distressed firms tend to have negative management forecast errors (optimistically biased forecasts), while growth firms and large-sized firms are inclined to have positive management forecast errors (pessimistically biased forecasts). Moreover, management forecast errors are conjectured to be persistent. Thus, I expect the coefficient on $DEBTR$ (α_1) to be negative, the coefficient on $LOSS$ (α_2) to be negative, the coefficient on $\Delta SALE$ (α_3) to be positive, the coefficient on BMR (α_4) to be negative, the coefficient on $SIZE$ (α_5) to be positive and the coefficients on lagged $MFERR$s (α_6 and α_7) to be positive.

Next, I estimate the following three models to test Hypothesis 2. The expected signs are shown in parentheses below the equations.

$$AFERR_t = \beta_0 + \underset{(-)}{\beta_1} DEBTR_t + \underset{(-)}{\beta_2} LOSS_t + \underset{(+)}{\beta_3} \Delta SALE_t + \underset{(-)}{\beta_4} BMR_t + \underset{(+)}{\beta_5} SIZE_t + \underset{(+)}{\beta 6} MFERR_{t-1} + \underset{(+)}{\beta_7} MFERR_{t-2} + \beta_8 INDDUM_t + \beta_9 YEARDUM_t + \varepsilon_t \quad (2)$$

$$AFDEV_t = \gamma_0 + \underset{(+)}{\gamma_1} DEBTR_t + \underset{(+)}{\gamma_2} LOSS_t + \underset{(-)}{\gamma_3} \Delta SALE_t + \underset{(+)}{\gamma_4} BMR_t + \underset{(-)}{\gamma_5} SIZE_t + \underset{(-)}{\gamma_6} MFERR_{t-1} + \underset{(-)}{\gamma_7} MFERR_{t-2} + \gamma_8 INDDUM_t + \gamma_9 YEARDUM_t + \varepsilon_t \quad (3)$$

$$ORDER_t = \delta_0 + \underset{(+)}{\delta_1} DEBTR_t + \underset{(+)}{\delta_2} LOSS_t + \underset{(-)}{\delta_3} \Delta SALE_t + \underset{(+)}{\delta_4} BMR_t + \underset{(-)}{\delta_5} SIZE_t + \underset{(-)}{\delta_6} MFERR_{t-1} + \underset{(-)}{\delta_7} MFERR_{t-2} + \delta_8 INDDUM_t + \delta_9 YEARDUM_t + \varepsilon_t \quad (4)$$

where

$ORDER_t$ an ordered variable that takes the value of zero if $AFDEV_t$ is negative, one if $AFDEV_t$ equals zero, and two if $AFDEV_t$ is positive.

Equations 2 and 3 are Ordinary Least Squares (OLS) regression models, while Equation 4 is an ordered probit model that uses an ordered variable $ORDER$ as the dependent variable instead of a continuous variable $AFDEV$. The explanatory variables included in Equations 2–4 are all the same as those in Equation 1. Only the dependent variables are different across the models.

Equation 2 uses $AFERR$ as the dependent variable in place of $MFERR$ in Equation 1. I compare the magnitude of estimated coefficients by dividing the estimated coefficients in Equation 2 by those in Equation 1. If analysts simply mimic management forecasts, the obtained values will be equal to one. On the other hand, if the values are smaller (larger) than one, it will indicate that analysts' forecasts are less (more) systematically biased than management forecasts. Therefore, under Hypothesis 2 that analysts are aware of bias in management forecasts, the divided values are expected to be less than one.

Equations 3 and 4 use $AFDEV$ and $ORDER$, respectively, as the dependent variables. If analysts are aware of the contributing factors to the systematic management forecast errors in Equation 1, analysts will make some adjustments to the recently announced management forecasts to lessen the bias in publicizing their own forecasts. Since both $AFDEV$ and $ORDER$ are defined as the differences between management forecasts and analysts' forecasts, the signs of estimated coefficients in Equations 3 and 4 are expected to be the opposite of those in Equation 1.

V. Data

The sample is selected from the 1979 to 2005 time period using the following criteria[6]:

(i) The firms are listed on one of the five stock exchanges in Japan or traded on the Over-The-Counter (OTC) market.
(ii) The fiscal year ends in March (78% of listed firms).
(iii) Banks, securities firms and insurance firms are excluded (5% of listed firms).

There are five stock exchanges in Japan, namely Tokyo, Osaka, Nagoya, Sapporo and Fukuoka. The TSE is by far the largest among them. As of January 2005, 2788 firms are listed on the stock exchanges in Japan, of which 2276 firms are listed on the TSE. In terms of volume and value, the TSE accounts for 80–90% of the nation's trading.[7] The OTC market (generally called the Japanese Association of

[6] The sample period is limited to 1979 to 2005 due to the difficulty in collecting forecast data. Both management and analysts' earnings forecasts are hand-gathered from the *Nihon Keizai Shinbun* (the major business newspaper in Japan) and the *Kaisha Shikihou* (the Japan company quarterly handbook), respectively.
[7] See Japan Securities Research Institute (2006) for further details on the equity markets in Japan.

Table 1. Descriptive statistics and correlations

Variable	Mean	SD	Min	1Qrt	Median	3Qrt	Max	Number of obs.	
Panel A: Descriptive statistics									
MFERR	−0.0205	0.0804	−0.9795	−0.0165	−0.0021	0.0039	0.5508	36 063	
AFERR	−0.0197	0.0800	−0.9795	−0.0160	−0.0020	0.0041	0.6613	36 063	
DEBTR	0.5979	0.2145	0.0003	0.4488	0.6125	0.7635	4.3515	36 063	
LOSS	0.1492	0.3563	0.0000	0.0000	0.0000	0.0000	1.0000	36 063	
$\Delta SALE$	1.0237	0.1439	0.0934	0.9566	1.0179	1.0795	5.0690	36 063	
BMR	0.8492	0.7539	−21.2440	0.3756	0.6289	1.0683	9.6952	36 063	
SIZE	10.1558	1.6443	5.3893	8.9517	9.9986	11.2011	17.0921	36 063	
Variable	*MFERR*	*AFERR*	*DEBTR*	*LOSS*	$\Delta SALE$	*BMR*	*SIZE*	$MFERR_{t-1}$	$MFERR_{t-2}$
Panel B: Pearson correlation coefficients									
MFERR	1.000								
AFERR	0.989**	1.000							
DEBTR	−0.059**	−0.053**	1.000						
LOSS	−0.248**	−0.233**	0.146**	1.000					
$\Delta SALE$	0.124**	0.116**	−0.007**	−0.236**	1.000				
BMR	−0.232**	−0.228**	−0.283**	0.162**	−0.180**	1.000			
SIZE	0.183**	0.174**	−0.055**	−0.221**	0.127**	−0.435**	1.000		
$MFERR_{t-1}$	0.163**	0.153**	−0.111**	−0.344**	0.135**	−0.004	0.117**	1.000	
$MFERR_{t-2}$	0.125**	0.117**	−0.096**	−0.136**	0.051**	−0.107**	0.136**	0.097**	1.000

Notes: The definitions of the variables are as follows: $MFERR_t$ is the management forecast error for year t $((E_t - MF_t)/P_t)$; $AFERR_t$ the analysts' forecast error for year t $((E_t - AF_t)/P_t)$; $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; E_t the actual earnings per share for year t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t and P_t the share price at the beginning of year t.
**Significant at the 0.01 level (two-tailed).

Securities Dealers Automated Quotation (JASDAQ) market after the National Association of Securities Dealers Automated Quotation (NASDAQ) market in the US) consists of small and newly listed firms.[8] As of January 2005, the number of issues listed on the OTC market stands at 944. The OTC market, however, accounts for merely 2–4% of the trading volume and value in Japan.

Annual accounting data and share price data are extracted from *Nikkei-Zaimu Data* and *Kabuka CD-ROM 2006*. MFE are manually collected from the *Nihon Keizai Shinbun* (the leading business newspaper in Japan). AFE are also hand gathered from *Kaisha Shikihou* (June issue, Toyo Keizai Inc.), which is generally accepted by the Japanese securities industry as the standard publication source for analysts' forecasts (Conroy *et al.*, 1998, 2000).[9] Other necessary data such as stock splits, capital reduction and changes in par values are collected from *Kaisha Shikihou CD-ROM*.

The sample selection criteria produce an initial sample of 41 933 firm-year observations. Due to missing accounting data, particularly lagged variables, the sample is reduced to 36 420 firm-year observations. I also eliminate 357 observations with studentized residuals greater than 2.5 to control for outliers. This yields the final sample of 36 063 firm-year observations. The selected sample represents approximately 70% of listed firms in Japan and is fairly representative across firm size and industry sectors except for firms in the retail industry, many of which traditionally have a February year-end and thus are omitted from the sample.

VI. Empirical Results

Descriptive statistics

Table 1 presents descriptive statistics and the Pearson correlations for the estimation model variables.

[8] The JASDAQ market became a regular stock exchange in December 2004.
[9] The management and analysts' earnings forecast data are available upon request from the author. Also note that the management forecast data after the year 2000 are available from Nikkei Media Marketing Inc.

Table 2. Determinants of bias in management earnings forecasts

Regression model: $MFERR_t = \alpha_0 + \alpha_1 DEBTR_t + \alpha_2 LOSS_t + \alpha_3 \Delta SALE_t + \alpha_4 BMR_t + \alpha_5 SIZE_t + \alpha_6 MFERR_{t-1} + \alpha_7 MFERR_{t-2} + \alpha_8 INDDUM_t + \alpha_9 YEARDUM_t + \varepsilon_t$ (1)

Variables	Expected sign[a]	Coefficient	*t*-statistic[b]	Wald statistic[b]
CONSTANT	?	0.0037	0.48	
DEBTR	−	−0.0377	−14.48**	
LOSS	−	−0.0306	−15.21**	
$\Delta SALE$	+	0.0203	5.24**	
BMR	−	−0.0201	−12.69**	
SIZE	+	0.0014	4.86**	
$MFERR_{t-1}$	+	0.0363	5.22**	
$MFERR_{t-2}$	+	0.0344	5.14**	
INDDUM				311.01**
YEARDUM				1106.15**
Adjusted R^2	0.1565			
Number of obs.	36 063			

Notes: The definitions of the variables are as follows: $MFERR_t$ is the management forecast error for year t $((E_t - MF_t)/P_t)$; $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; *INDDUM* a set of industry dummy variables; *YEARDUM* a set of year dummy variables; E_t the actual earnings per share for year t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t and P_t the share price at the beginning of year t.
[a]The expected signs are based on Hypothesis 1.
[b]*t*-statistics and Wald statistics are calculated using White's heteroscedastic-consistent covariance matrix.
**Significant at the 0.01 level (two-tailed).

Panel A shows that the mean and median *MFERR*s are both negative, −0.0205 and −0.0021, suggesting that management forecasts are on average optimistic.

Panel B shows that *DEBTR*, *LOSS* and *BMR* are all significantly negatively correlated with *MFERR* with the corresponding correlation coefficients of −0.059, −0.248 and −0.232, while $\Delta SALE$, *SIZE*, $MFERR_{t-1}$ and $MFERR_{t-2}$ are all significantly positively correlated with *MFERR* with the corresponding correlation coefficients of 0.124, 0.183, 0.163 and 0.125. Thus, the signs of univariate correlations are all consistent with Hypothesis 1.

Determinants of bias in management forecasts: test of Hypothesis 1

Table 2 reports the regression results from estimating Equation 1. The estimated coefficients on *DEBTR*, *LOSS* and *BMR* are significantly negative, while those on $\Delta SALE$, *SIZE*, $MFERR_{t-1}$ and $MFERR_{t-2}$ are significantly positive. The signs of the estimated coefficients are all consistent with the expected signs in the table that are based on Hypothesis 1.

The estimated results of Equation 1 suggest that firms in financial distress with high debt ratios (*DEBTR*) and losses (*LOSS*) issue relatively more optimistic management forecasts, that growth firms with high sales growth ratios ($\Delta SALE$) and low book-to-market ratios (*BMR*) announce relatively less optimistic management forecasts, that small firms (*SIZE*) publicize relatively more optimistic management forecasts, and that firms whose previous years' management forecasts were optimistic ($MFERR_{t-1}$ and $MFERR_{t-2}$) tend to remain optimistic in their current forecasts.

Regarding the control variables, *INDDUM* and *YEARDUM*, they are both statistically significant, indicating the need to control for variation in management forecast errors across industry and over the years.

Overall, the results presented in Table 2 suggest the existence of systematic management forecast errors and provide strong evidence for Hypothesis 1.

Forecast accuracy of management and analysts' forecasts

Panel A of Table 3 reports descriptive statistics of *MFERR*, *AFERR*, *MFACC* and *AFACC*. The average *MFERR* is −0.0205, while the average *AFERR* is −0.0197. Negative average forecast errors indicate that both MFE and AFE are optimistically biased, but the finding that the average *AFERR* is less negative than the average *MFERR* suggests that

Table 3. Forecast accuracy of management and analysts' earnings forecasts

Variable	Mean	SD	Min	1Qrt	Median	3Qrt	Max	Number of obs.
Panel A: Descriptive statistics								
MFERR	−0.0205	0.0804	−0.9795	−0.0165	−0.0021	0.0039	0.5508	36 063
AFERR	−0.0197	0.0800	−0.9795	−0.0160	−0.0020	0.0041	0.6613	36 063
MFACC	0.0337	0.0758	0.0000	0.0029	0.0091	0.0263	0.9795	36 063
AFACC	0.0335	0.0753	0.0000	0.0029	0.0090	0.0261	0.9795	36 063
		Difference		Parametric test[a]		Nonparametric test[b]		
Panel B: Differences in forecast errors and forecast accuracy								
MFERR−AFERR		−0.0008		−12.93**		−22.64**		
MFACC−AFACC		0.0002		4.12**		14.23**		

Notes: The definitions of the variables are as follows: $MFERR_t$ is the management forecast error for year t $((E_t-MF_t)/P_t)$; $AFERR_t$ the analysts' forecast error for year t $((E_t-AF_t)/P_t)$; $MFACC_t$ the management forecast accuracy for year t $(|E_t-MF_t|/P_t)$; $AFACC_t$ the analysts' forecast accuracy for year t $(|E_t-AF_t|/P_t)$; E_t the actual earnings per share for year t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t and P_t the share price at the beginning of year t.

[a]For a parametric test, the paired t-test is used and its t-statistic is reported in this column.

[b]For a nonparametric test, the Wilcoxon signed rank sum test is used and its z-statistic is reported in this column.

**Significant at the 0.01 level (two-tailed).

analysts' forecasts are less optimistically biased than management forecasts. The average *MFACC* and *AFACC* is 0.0337 and 0.0335, respectively, which indicates that analysts' forecasts are on average more accurate than management forecasts with smaller absolute forecast errors.

The differences between *MFERR* and *AFERR*, and *MFACC* and *AFACC* are statistically tested in Panel B of Table 3. The results of the parametric paired t-test and the nonparametric Wilcoxon signed rank sum test both show that analysts' forecasts are significantly less optimistic and more accurate than management forecasts with the corresponding t-statistics of −12.93 and 4.12 and the z-statistics of −22.64 and 14.23.

Both management and analysts' forecasts used in this study are the first forecasts for the upcoming year, and analysts' forecasts are released shortly after management forecasts. Therefore, it is likely that analysts regard the recently published management forecasts as the biggest source of information about the firms' future earnings prospects. However, the higher accuracy of analysts' forecasts implies that analysts do not necessarily take management's views at face value, but rather make some adjustments to current management forecasts in formulating their own forecasts.

Analysts' awareness of systematic bias in management forecasts: test of Hypothesis 2

The findings hitherto show that both management and analysts' earnings forecasts are optimistically biased and certain financial factors are related to systematic bias in management forecasts. The results also reveal that analysts' forecasts are less optimistically biased and more accurate than management forecasts. This may indicate that analysts are to some extent aware of the financial factors that have been found to be associated with systematic bias in MFE. For example, the examination of *ex post* management forecast errors in Table 2 shows that MFE of loss-making firms (*LOSS*) are optimistic. If analysts are aware of the fact, they will discount the earnings forecasts made by loss-making firms. Therefore, under Hypothesis 2 that analysts are aware of systematic bias in management forecasts, the regression of *AFERR* on these financial factors in Equation 2 is expected to produce the estimated coefficients that are closer to zero than those in Equation 1. Similarly, the regression of *AFDEV* that is the difference between *MFERR* and *AFERR* on these financial factors in Equation 3 is expected to yield the estimated coefficients, the signs of which are the opposite of those in Equation 1.

The estimation results of Equation 2 are presented in Table 4. The estimated coefficients are all statistically significant, and the signs of which are all consistent with the expected signs that are from the estimation of Equation 1. This indicates that analysts' forecasts have the same systematic forecast errors as management forecasts. The ratios of the estimated coefficients in Equation 2 to those in Equation 1 are reported in the far right column of Table 4. The ratios vary from a low of 0.785 for *SIZE* to a high of 0.995 for *BMR*, but they are all less than one. This suggests

Table 4. Determinants of bias in analysts' earnings forecasts

Regression model: $AFERR_t = \beta_0 + \beta_1 DEBTR_t + \beta_2 LOSS_t + \beta_3 \Delta SALE_t + \beta_4 BMR_t + \beta_5 SIZE_t + \beta_6 MFERR_{t-1} + \beta_7 MFERR_{t-2} + \beta_8 INDDUM_t + \beta_9 YEARDUM_t + \varepsilon_t$ (2)

Regression model: $MFERR_t = \alpha_0 + \alpha_1 DEBTR_t + \alpha_2 LOSS_t + \alpha_3 \Delta SALE_t + \alpha_4 BMR_t + \alpha_5 SIZE_t + \alpha_6 MFERRt{-}1 + \alpha_7 MFERRt{-}2 + \alpha_8 INDDUM_t + \alpha_9 YEARDUM_t + \varepsilon_t$ (1)

Variables	Expected sign[a]	(2) Coefficient	t-statistic[b]	Wald statistic[b]	(1) Coefficient	(2)/(1) Ratio
CONSTANT	?	0.0090	1.18			
DEBTR	−	−0.0362	−13.98**		−0.0377	0.959
LOSS	−	−0.0280	−14.17**		−0.0306	0.915
$\Delta SALE$	+	0.0181	4.76**		0.0203	0.892
BMR	−	−0.0200	−12.68**		−0.0201	0.995
SIZE	+	0.0011	3.81**		0.0014	0.785
$MFERR_{t-1}$	+	0.0342	5.30**		0.0363	0.944
$MFERR_{t-2}$	+	0.0310	4.89**		0.0344	0.903
INDDUM				311.56**		
YEARDUM				1024.50**		
Adjusted R^2	0.1443					
Number of obs.	36 063					

Notes: The definitions of the variables are as follows: $AFERR_t$ is the analysts' forecast error for year t $((E_t - AF_t)/P_t)$; $MFERR_t$ the management forecast error for year t $((E_t - MF_t)/P_t)$; $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; *INDDUM* a set of industry dummy variables; *YEARDUM* a set of year dummy variables; E_t the actual earnings per share for year t; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t and P_t the share price at the beginning of year t.
[a]The expected signs are based on Hypothesis 1.
[b]t-statistics and Wald statistics are calculated using White's heteroscedastic-consistent covariance matrix.
**Significant at the 0.01 level (two-tailed).

that, though both AFE and MFE are biased systematically in the same direction, the magnitude of the bias is less severe for analysts' forecasts than for management forecasts.

Table 5 presents the regression results from estimating Equation 3. The signs of the estimated coefficients are all consistent with the expected signs that are based on Hypothesis 2. The estimated coefficients are also all significant at the 5% level or higher except for that on *BMR*.

The estimated results from using the ordered probit model in Equation 4 are reported in Table 6. They are qualitatively similar to those from estimating Equation 3 in Table 5, though the statistical significance is somewhat weaker. The estimated coefficients on *BMR* and *DEBTR* are not statistically significant, while those on other variables are statistically significant at the 5% level or higher. Since Equation 4 is estimated using an ordered probit model, marginal effects are shown in the far right column of Table 6. For instance, other things being equal, if the management forecasts are made by loss-making firms rather than by profitable firms (*LOSS*), the probability of analysts' forecasts being lower than management forecasts (Downward) increases by 4.49% points and the probabilities of analysts' forecasts being the same as (No change) and higher than management forecasts (Upward) decrease by 1.74% points and 2.74% points, respectively.

Thus, the findings that the signs of the estimated coefficients in Equations 3 and 4 are reversed from those in Equation 1 indicate that analysts are somewhat aware of the influences that certain financial factors have on the systematic bias in management earnings forecasts and take a countermeasure to reduce the magnitude of the bias.

In summary, the results reported in Tables 4–6 suggest that analysts are to some extent aware of the determinants of systematic bias in MFE, and they provide strong evidence in support of Hypothesis 2.

VII. Sensitivity Tests

The analysis thus far has been mainly based on the estimated results from using pooled OLS models.

Table 5. Analysts' awareness of bias in management forecasts (regression model)

Regression model: $AFDEV_t = \gamma_0 + \gamma_1 DEBTR_t + \gamma_2 LOSS_t + \gamma_3 \Delta SALE_t + \gamma_4 BMR_t + \gamma_5 SIZE_t + \gamma_6 MFERR_{t-1} + \gamma_7 MFERR_{t-2} + \gamma_8 INDDUM_t + \gamma_9 YEARDUM_t + \varepsilon_t$ (3)

Variables	Expected sign[a]	Coefficient	*t*-statistic[b]	Wald statistic[b]
CONSTANT	?	0.0053	4.02**	
DEBTR	+	0.0016	3.44**	
LOSS	+	0.0026	8.49**	
$\Delta SALE$	−	−0.0022	−3.98**	
BMR	+	0.0001	0.39	
SIZE	−	−0.0003	−6.21**	
$MFERR_{t-1}$	−	−0.0020	−2.12*	
$MFERR_{t-2}$	−	−0.0033	−2.26*	
INDDUM				69.99**
YEARDUM				160.55**
Adjusted R^2	0.0261			
Number of obs.	36 063			

Notes: The definitions of the variables are as follows: $AFDEV_t$ is the analysts' forecast deviation from management forecast for year t $((MF_t - AF_t)/P_t)$; $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; $MFERR_t$ the management forecast error for year t $((E_t - MF_t)/P_t)$; *INDDUM* a set of industry dummy variables; *YEARDUM* a set of year dummy variables; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t; E_t the actual earnings per share for year t and P_t the share price at the beginning of year t.
[a]The expected signs are based on Hypothesis 2.
[b]*t*-statistics and Wald statistics are calculated using White's heteroscedastic-consistent covariance matrix.
* and ** are significant at the 0.05 and 0.01 levels (two-tailed), respectively.

Since these OLS models contain some explanatory variables that are constant or have little variance over time, such as *INDDUM*, *DEBTR* and *SIZE*, a possible alternative estimation method is to employ a fixed effects panel model that controls for an unobserved firm-specific effect. In addition, the pooled OLS models also contain autoregressive variables, $MFERR_{t-1}$ and $MFERR_{t-2}$, which leads to an overestimation of these variables when an unobserved firm-specific time-invariant effect is omitted from the OLS models. One way to alleviate this problem is again to use a fixed effects panel model. However, this, in contrast to the OLS model, may lead to an underestimation of the autoregressive terms when the number of time periods available is not long enough. In any case, using a fixed effects model as an additional technique seems to be appropriate both in terms of model specification and in terms of knowing the magnitude of the estimation bias.[10]

Accordingly, the following models are estimated using fixed effects panel data approach. Note that industry-specific dummies, *INDDUM*, are dropped from the models because they are constant over time.

$$MFERR_t = \underset{(-)}{\alpha_1} DEBTR_t + \underset{(-)}{\alpha_2} LOSS_t + \underset{(+)}{\alpha_3} SALE_t + \underset{(-)}{\alpha_4} BMR_t + \underset{(+)}{\alpha_5} SIZE_t + \underset{(+)}{\alpha_6} MFERR_{t-1} + \underset{(+)}{\alpha_7} MFERR_{t-2} + \alpha_8 YEARDDUM_t + \varepsilon_t \quad (5)$$

$$AFERR_t = \underset{(-)}{\beta_1} DEBTR_t + \underset{(-)}{\beta_2} LOSS_t + \underset{(+)}{\beta_3} \Delta SALE_t + \underset{(-)}{\beta_4} BMR_t + \underset{(+)}{\beta_5} SIZE_t + \underset{(+)}{\beta_6} MFERR_{t-1} + \underset{(+)}{\beta_7} MFERR_{t-2} + \beta_8 YEARDDUM_t + \varepsilon_t \quad (6)$$

Table 7 presents the results from estimating Equations 5 and 6. The signs of the estimated coefficients are all the same as those of Equations 1 and 2. The overall statistical significance, however, gets weaker with the coefficients on *DEBTR*, *SIZE* and $MFERR_{t-2}$ becoming insignificant. This is

[10] I am grateful to an anonymous referee for suggesting this point.

Table 6. Analysts' awareness of bias in management forecasts (ordered probit model)

Ordered probit model: $ORDER_t = \delta_0 + \delta_1 DEBTR_t + \delta_2 LOSS_t + \delta_3 \Delta SALE_t + \delta_4 BMR_t + \delta_5 SIZE_t + \delta_6 MFERR_{t-1} + \delta_7 MFERR_{t-2} + \delta_8 INDDUM_t + \delta_9 YEARDUM_t + \varepsilon_t$ (4)

Variables	Expected sign[a]	Coefficient	*t*-ratio	Wald statistic	Margical effect (%)[b] Downward	No change	Upward
CONSTANT	?	2.3762	17.16**				
DEBTR	+	0.0460	1.18		0.86	−0.22	−0.65
LOSS	+	0.2185	10.08**		4.49	−1.74	−2.74
$\Delta SALE$	−	−0.3830	−7.46**		−7.17	1.80	5.38
BMR	+	−0.0166	−1.31		−0.31	0.08	0.23
SIZE	−	−0.0484	−9.54**		−0.91	0.23	0.68
$MFERR_{t-1}$	−	−0.0979	−2.71*		−1.83	0.46	1.38
$MFERR_{t-2}$	−	−0.1735	−3.84**		−3.25	0.81	2.44
INDDUM				56.20**			
YEARDUM				464.94**			
McFadden's R^2	0.0263						
Number of obs.	36 063						

Notes: The definitions of the variables are as follows: $ORDER_t$ is an ordered variable that takes the value of zero if $AFDEV_t$ is negative, one if $AFDEV_t$ equals zero and two if $AFDEV_t$ is positive; $AFDEV_t$ the analysts' forecast deviation from management forecast for year t ($(MF_t - AF_t)/P_t$), $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; $MFERR_t$ is the management forecast error for year t ($(E_t - MF_t)/P_t$); *INDDUM* a set of industry dummy variables; *YEARDUM* a set of year dummy variables; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t; E_t the actual earnings per share for year t and P_t the share price at the beginning of year t.
[a]The expected signs are based on Hypothesis 2.
[b]The marginal effects are evaluated at the mean values of the explanatory variables. For a dummy variable, *LOSS*, the marginal effects indicate the changes in the probabilities that result when the dummy takes 0 and 1.
* and ** are significant at the 0.05 and 0.01 levels (two-tailed), respectively.

Table 7. Sensitivity tests using the fixed effects estimation method

Fixed effects model: $MFERR_t = \alpha_1 DEBTR_t + \alpha_2 LOSS_t + \alpha_3 \Delta SALE_t + \alpha_4 BMR_t + \alpha_5 SIZE_t + \alpha_6 MFERR_{t-1} + \alpha_7 MFERR_{t-2} + \alpha_8 YEARDUM_t + \varepsilon_t$ (5)

Fixed effects model: $AFERR_t = \beta_1 DEBTR_t + \beta_2 LOSS_t + \beta_3 \Delta SALE_t + \beta_4 BMR_t + \beta_5 SIZE_t + \beta_6 MFERR_{t-1} + \beta_7 MFERR_{t-2} + \beta_8 YEARDUM_t + \varepsilon_t$ (6)

Variables	Expected sign[a]	(5) Coefficient	*t*-statistic[b]	(6) Coefficient	*t*-statistic[b]	(6)/(5) Ratio
DEBTR	−	−0.0065	−0.96	−0.0035	−0.50	0.541
LOSS	−	−0.0135	−6.39**	−0.0114	−5.41**	0.841
$\Delta SALE$	+	0.0200	4.84**	0.0177	4.40**	0.886
BMR	−	−0.0262	−9.80**	−0.0263	−9.68**	1.003
SIZE	+	0.0007	0.43	0.0000	0.01	0.023
$MFERR_{t-1}$	+	0.0276	4.61**	0.0265	4.29**	0.961
$MFERR_{t-2}$	+	0.0059	0.88	0.0037	0.58	0.630
Adjusted R^2		0.2133		0.1962		
Number of obs.		36 063		36 063		

Notes: The definitions of the variables are as follows: $MFERR_t$ is the management forecast error for year t ($(E_t - MF_t)/P_t$); $AFERR_t$ the analysts' forecast error for year t ($(E_t - AF_t)/P_t$); $DEBTR_t$ the total liabilities divided by total assets at the beginning of year t; $LOSS_t$ takes the value of one if E_{t-1} is negative and zero otherwise; $\Delta SALE_t$ the sales revenue for year $t-1$ divided by sales revenue for year $t-2$; BMR_t the book value of shareholders' equity divided by market value of equity at the beginning of year t; $SIZE_t$ the log of inflation-adjusted market value of equity at the beginning of year t; *YEARDUM* a set of year dummy variables; E_t the actual earnings per share for year t; MF_t the management forecast of earnings per share for year t that is usually announced within 2 months into year t; AF_t the analysts' forecast of earnings per share for year t that is issued subsequent to MF_t and P_t the share price at the beginning of year t.
[a]The expected signs are based on Hypothesis 1.
[b]*t*-statistics are calculated using White's heteroscedastic-consistent covariance matrix.
**Significant at the 0.01 level (two-tailed).

probably because the fixed effects estimation method transforms the original data into the time-demeaned data, and the variables that do not have much variance over time, such as *DEBTR* and *SIZE*, have little variance left after the transformation to allow for statistical inference. The ratios of the estimated coefficients in Equation 6 to those in Equation 5 are shown in the far right column. As with those reported in Table 4, the ratios are all less than one except for that of *BMR*, which indicates that the forecast bias of analysts' forecasts is less severe than that of management forecasts.

Overall, the results obtained from the fixed effects models are qualitatively similar to those from the pooled OLS models. One possible explanation for this is that the sample used in this study has relatively long time periods, the maximum of 25 years and the average of 14.01 years, so that the estimation bias associated with dynamic panel data is somewhat alleviated.

VIII. Conclusions

The provision of one-year-ahead earnings forecasts at the annual earnings announcement by management of practically all listed firms is a major feature of the Japanese financial disclosure system. Despite the importance, limited data availability has thus far prevented a detailed analysis of Japanese management forecasts. In this study, I have attempted to shed some light on the properties of management forecasts announced by Japanese firms and their impact on analysts' perceptions about the firms' future earnings prospects. First, I investigate the determinants of systematic bias in MFE. The examination of *ex post* management forecast errors reveals that: (i) financially distressed firms with high debt ratios and losses issue more optimistic MFE; (ii) growth firms with high sales growth ratios and low book-to-market ratios announce less optimistic MFE; (iii) small firms issue more optimistic MFE and (iv) firms whose prior MFE were optimistic tend to remain optimistic in their current forecasts.

Second, I examine whether financial analysts are aware of these factors that have been found to be related to systematic bias in MFE. When the forecast bias and accuracy of MFE and the subsequently issued AFE is compared, the results show that, though both MFE and AFE are optimistically biased, analysts' forecasts are significantly less optimistic and more accurate than management forecasts. This may be a manifestation of analysts' awareness of systematic bias in management forecasts.

The following test that investigates the analysts' *ex post* forecast errors shows that analysts' forecasts are also systematically biased in the same direction as management forecasts, but the magnitude of the forecast bias is less severe for analysts' forecasts than for management forecasts. Further tests that examine the deviation of AFE from MFE reveal that analysts take into consideration certain financial factors that are associated with systematic management forecast errors, which are financial distress, sales growth, firm size and past management forecast errors, when they publicize their own earnings forecasts.

Overall, the findings in this study suggest that financial analysts do not necessarily take management forecasts at face value. They rather appear to pay attention to the current financial conditions of firms that announce management forecasts in formulating their perceptions of the firms' future performance.

Lastly, the economic relevance of my empirical results needs to be discussed. Although the findings in this article statistically support the notion that financial analysts are aware of systematic bias in earnings forecasts by corporate managers, the difference between management and analysts' earnings forecasts is relatively small. The average difference between the two is only 0.08% of share price. If the share price of a company is \$100 and its Price-to-Earnings Ratio (PER) is 20, earnings per share forecasts of the two will be \$5.00 and \$4.92. Thus, despite the statistical significance found in this study between management and analysts' earnings forecasts, the economic impact of the difference may be rather limited.

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