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Determinants of Bias in Management Earnings Forecasts: Empirical Evidence from Japan

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11.1 Introduction

A major disclosure difference between Japan and other countries is that management of almost all listed firms in Japan provides forecasts of next period's earnings. This practice was initiated by the stock exchanges in 1974, during which 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 period's sales, ordinary income, net income (earnings), earnings per share, and dividends per share are announced simultaneously with the most recently completed period'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 USA, a number of recent studies have investigated and found several factors that are associated with systematic bias in management earnings forecasts (MEFs). For example, Frost (1997) and Koch (2002) found optimistic bias in MEFs issued by financially distressed firms. Choi and Ziebart (2000) and Irani (2000) documented that firm size, firm performance, abnormal earnings growth, etc. are all related to the bias in MEFs. In contrast to the USA, there has been little research in Japan that examines the properties of management forecasts, despite the fact that their provision 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 electronic form and needs to be collected manually for each forecast.

The first objective of this chapter is to investigate the determinants of bias in MEFs. This chapter investigates the effects of 10 factors on bias in MEFs using a sample of 28,000 forecasts announced by Japanese firms over the period 1979–1999. They are macroeconomic influence, industry, firm size, exchange/OTC, external financing, financial distress, prior management forecast errors, growth, losses, and management forecasts of dividends. The results of both univariate and multivariate analyses show that these factors are all associated with forecast errors. The major findings of these analyses are: (1) yearly mean management earnings forecast errors are highly correlated with annual GDP growth rates ($r = 0.863$); (2) firms in the price-regulated industries issue pessimistic MEFs; (3) MEFs of small firms and OTC firms are optimistic; (4) MEFs of equity-issuing firms are pessimistic; (5) financially distressed firms and loss-making firms announce optimistic MEFs; (6) firms whose prior MEFs were pessimistic (optimistic) tend to remain pessimistic (optimistic) in their current forecasts; and (7) MEFs that are accompanied by an increase in forecast dividends are pessimistic.

The second objective of this chapter is to examine the extent to which the aforementioned systematic bias in MEFs is reflected in share prices. Because of the information asymmetry that exists between managers and outsiders about future performance of firms, it is both rational and practical for investors to use MEFs as a basis for their own forecasts. If investors fixate on MEFs, share prices of firms that issue optimistic earnings forecasts will be overvalued while those that issue pessimistic earnings forecasts will be undervalued. Then, a trading strategy taking a long position in the stock of firms reporting relatively pessimistic MEFs and a short position in the stock of firms reporting relatively optimistic MEFs will generate positive abnormal stock returns. To test the hypothesis, predicted management forecast errors are estimated for each firm using a fixed effects model with panel datasets. Only *ex ante* factors are used as independent variables to make the strategy actually implementable. The hedge portfolio strategy based on the predicted management forecast errors produces positive abnormal returns in 14 of the 15 years examined, with a 15-year average return of 4.5%, suggesting the possibility that information about systematic errors in MEFs may not be fully incorporated into share prices.

The provision of next period's earnings forecasts by management is a major feature of the Japanese disclosure system. Despite this fact, little research has been conducted on the nature of the information, partly due to difficulties in obtaining the data. This study is probably the first to investigate the properties of Japanese MEFs. Its findings suggest the existence of systematic bias in Japanese management forecasts. Furthermore, investors appear to fixate on MEFs and do not fully incorporate systematic forecast errors into share prices.

The remainder of the chapter is organized as follows. The next section describes the background on Japanese management forecasts. Section 11.3 describes the data and Section 11.4 investigates the determinants of bias in MEFs. The market awareness of systematic bias in MEF is examined in Section 11.5 and Section 11.6 concludes the chapter.

11.2 Background on Japanese management forecasts

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

In order to supplement the lack of timeliness in statutory disclosure under the Securities and Exchange Law, Japanese stock exchanges, which are self-regulatory organizations, request that listed firms publish condensed financial statements (*Kessan Tanshin*) immediately upon board of director approval of a draft of financial statements[2]. As a result, earnings figures are made public well before the three-month legal deadline. For the vast majority of Japanese companies, earnings announcements take place 25–40 trading days after the 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 earnings forecasts for the upcoming period are provided in the condensed financial statements, together with current financial results (sales, ordinary income, net income, earnings per share, and dividends per share)[3]. Thus, technically speaking, the provision of MEFs is voluntary without any legal backing. In fact, some financial institutions, especially securities firms, do not provide management forecasts, citing the difficulty of predicting the future business environment. However, on the whole, compliance has been so high that almost all firms provide earnings forecasts[4]. This is partly due to continuous efforts made by stock exchanges to comply with the request and partly due to the guidelines prescribed by the Ministry of Finance Ordinance regarding revisions of MEFs. 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, ±30% of net income). As far as firms follow the guidelines, they are not to be held responsible for failing to meet their initial forecasts. This is in contrast with the safe harbor for forward-looking statements in the USA (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 interpretation (Rosen, 1998). In addition, shareholder litigations against companies and management are traditionally less common in Japan. These factors seem to have contributed to create the favorable environment in which most firms issue earnings forecasts in Japan.

11.3 Data

11.3.1 Sample selection

The sample is selected from the 1979 to 1999 time period using the following criteria:

1. The firms are listed on one of the eight stock exchanges in Japan or traded on the over-the-counter (OTC) market.
2. The accounting period ends in March (78% of listed firms).
3. Banks, securities firms, and insurance firms are excluded (5% of listed firms).

There are eight stock exchanges in Japan, namely Tokyo, Osaka, Nagoya, Sapporo, Niigata, Kyoto, Hiroshima, and Fukuoka. The Tokyo Stock Exchange (TSE) is by far the largest among them. As of June 1999, 2433 firms were listed on the stock exchanges in Japan, of which 1854 firms were listed on the TSE. In terms of volume and value, the TSE accounts for 80–90% of the nation's trading. The OTC market (currently called the JASDAQ market after the NASDAQ market in the USA) consists of small and newly listed firms. As of June 1999, the number of issues listed on the OTC market stood at 853. However, it accounts for merely 2–4% of the trading volume and value in Japan.

Annual accounting data and stock price data were extracted from *Nikkei-Zaimu Data* and *Kabuka CD-ROM 2000*. MEFs were manually collected from the *Nihon Keizai Shinbun* (the leading business newspaper in Japan). Other necessary data, such as stock splits, capital reduction, and changes in par values, were collected from *Kaisha Shikihou CD-ROM*. The selection process yielded 29,177 firm-year observations.

11.3.2 Management forecast error

The MEF error is defined as the difference between actual earnings and management forecast of earnings scaled by the share price at the beginning of the fiscal year. It is calculated for each firm-year observation as:

$$\text{MFERR}_{i,t} = \frac{E_{i,j} - \text{MF}_{i,j}}{P_{i,j}},$$

where:

$\text{MFERR}_{i,t}$ = management forecast error for firm i in period t

$E_{i,t}$ = actual earnings per share for firm i in period t
$MF_{i,t}$ = management forecast of earnings per share for firm i in period t, which is usually announced within 10 weeks into the accounting period t
$P_{i,t}$ = share price of firm i at the beginning of period t.
(The subscript i, which denotes a sample firm, will be omitted in the following sections for clarity.)

A positive MFERR implies a pessimistic forecast, while a negative MFERR indicates an optimistic forecast. To ensure that the results are not sensitive to extreme values, observations in the top and bottom 1% of MFERR are removed[5]. This results in a final sample of 28,593 firm-year observations[6].

11.4 Determinants of bias in management earnings forecasts

11.4.1 Univariate analysis

This section tries to identify factors that are associated with bias in management forecasts. Since there are almost no prior studies investigating systematic bias in Japanese management forecasts, many factors examined in this section are based on the US literature on management forecasts. Although the two disclosure systems are quite different, one is effectively mandatory and the other is voluntary, I believe that the arguments used in the US research can help make predictions of bias in Japanese management forecasts.

11.4.1.1 Macroeconomic influence

Previous research in the USA on bias in management forecasts has produced varying results. Studies using management forecast data released in the 1960s and early 1970s found evidence of optimism in management forecasts (McDonald, 1973; Basi et al., 1976; Patell, 1976; Penman, 1980; Ajinkaya and Gift, 1984; Waymire, 1984). However, studies using management forecast data from the late 1970s and early 1980s found no evidence of optimism in management forecasts (McNichols, 1989; Frankel et al., 1995). Bamber and Cheon (1998) collected MEFs during the 1981–1991 period and found that management forecasts were optimistic. Irani (2000) also reported optimism in MEFs during the 1990–1995 period. Thus, these results appear to be driven by the time periods that were examined.

Figure 11.1 plots the yearly mean MFERR from 1979 to 1999. Of the 21 years examined, 17 years have negative mean MFERRs and four years have positive mean MFERRs. They are all significantly different from zero at the 5% level or higher except for two years, namely 1979 and 1990. One noticeable finding is that the mean MFERR is significantly positive for the 1987–1989 period. This period coincides with the alleged economic bubble period of the late 1980s in Japan. Figure 11.1 also provides time-series plots of the annual real GDP growth rate for the 1979–1999 period. The yearly mean MFERR and the real GDP growth rate are observed to peak and bottom out at the same period, and the correlation coefficient between the two variables is 0.863 and is statistically significant at the 1% level[7].

Thus, the yearly mean MFERR appears to be largely influenced by a macroeconomic factor. This indicates that managers are not able to predict accurately the macroeconomic trend for the coming period and issue earnings forecasts based on the previous year's economic situation. Therefore, MEFs tend to be pessimistic when the economy is booming and optimistic when the economy is declining[8].

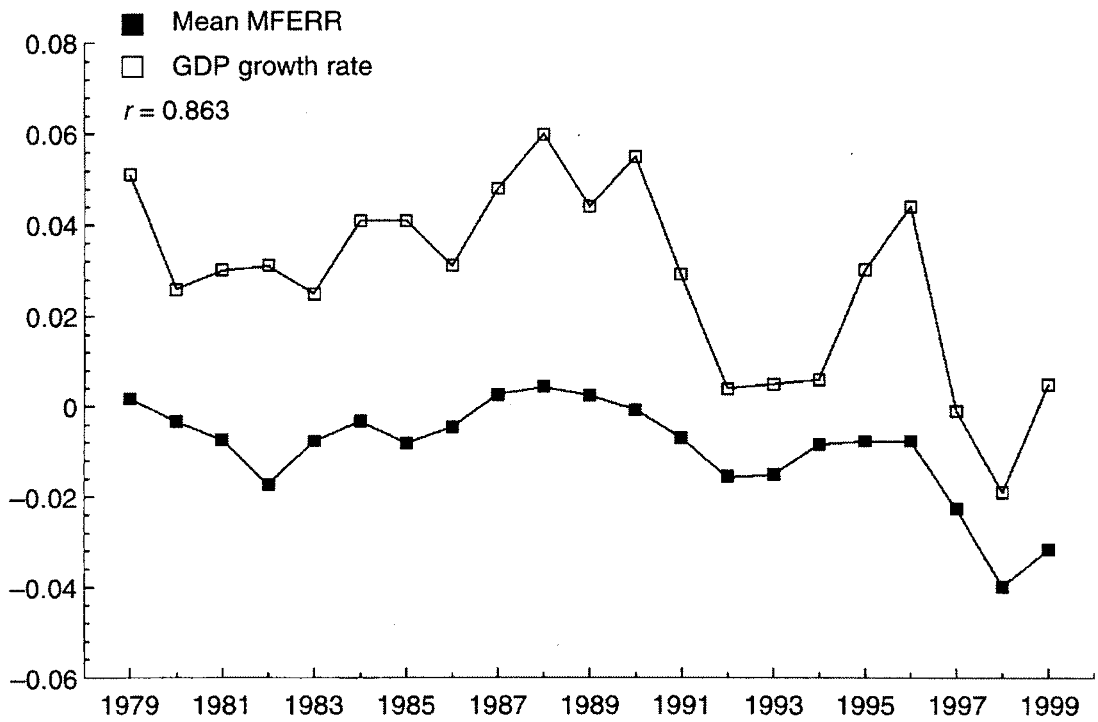

Figure 11.1 Yearly mean management forecast error and real GDP growth rate, 1979–1999. This figure depicts the yearly mean MFERR and the real GDP growth rate for the 1979–1999 period. $MFERR_t = (E_t - MF_t)/P_t$, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, and P_t is share price at the beginning of period t. The total number of observations is 28,593

11.4.1.2 Industry

The cross-industry variation in MFERR is examined with particular emphasis on price-regulated industries. The positive accounting theory suggests that managers in price-regulated industries have incentives to decrease reported earnings to avoid appearing overly profitable (Watts and Zimmerman, 1986). In a similar argument, they may not want to look profitable even at the forecast stage and may announce relatively pessimistic earnings forecasts.

Figure 11.2 depicts cross-industry variation in the mean MFERR. Of the 29 industries examined, 27 industries have negative mean MFERRs and two industries, *Electricity and Gas* and *Communication*, have positive mean MFERRs. They are all significantly different from zero at the 5% level or higher. Both the *Electricity and Gas* and *Communication* industries are in the price-regulated category. Thus, firms in price-regulated industries appear to publish pessimistic earnings forecasts.

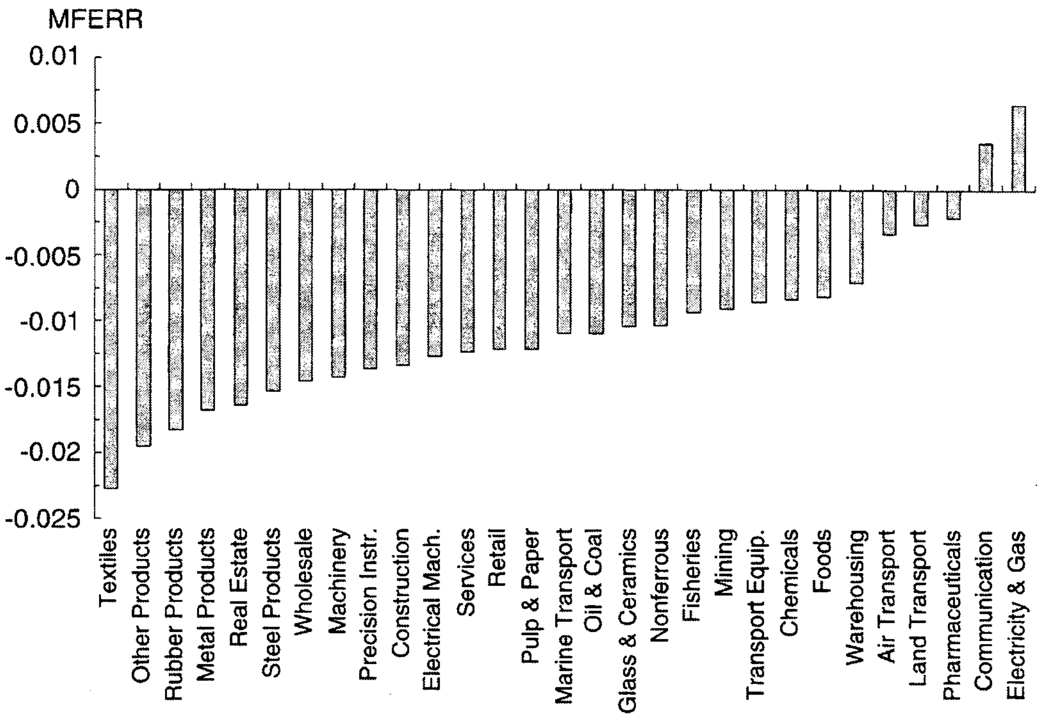

Figure 11.2 Cross-industry variation in mean management forecast error. This figure depicts cross-industry variation in mean MFERR. Sample firms are classified into 29 industries according to Toyokeizai industry classification. $MFERR_t = (E_t - MF_t)/P_t$, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, and P_t is share price at the beginning of period t. The total number of observations is 28,593

11.4.1.3 Size and exchange/OTC effects

Previous studies on analysts' forecasts have shown that firm size is related to bias in analysts' earnings forecasts (Brown, 1997; Das et al., 1998; Matsumoto, 2002). They found less optimism in analysts' earnings forecasts for large firms. Choi and Ziebart (2000) also reported a similar size effect for MEFs without providing a theoretical explanation for their findings.

I hypothesize that managers of large firms may regard published earnings forecasts as commitments to 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 as their targets for the upcoming period. As a result, their projections tend to be optimistic. This may be particularly true for OTC firms that are not only small but also young.

To investigate the size effect, the following regression equation is estimated:

$$\text{MFERR}_t = \alpha_0 + \alpha_1\text{LNMVE}_t + \varepsilon_t,$$

where:

LNMVE_t = log of the inflation-adjusted market value of equity three months after the beginning of period t.

Table 11.1(A) reports the results of the regression equation. It shows that the estimated coefficient of LNMVE is 0.0055 and is statistically significant, which suggests that MEFs of large firms are more pessimistic than those of small firms.

Next, the exchange/OTC effect is examined by testing the difference in the mean (median) MFERR between exchange firms and OTC firms. Table 11.1(B) presents the results. The mean (median) MFERRs for exchange firms and OTC firms are −0.0110 (−0.0011) and −0.0189 (−0.0045) respectively. The difference in the two means (medians) is statistically significant at the 1% level. Thus, MEFs of OTC firms appear to be more optimistic than those of exchange firms.

Lastly, the size effect, the exchange/OTC effect, and the interactive effect are examined simultaneously using the following regression equation:

$$\text{MFERR}_t = \alpha_0 + \alpha_1\text{LNMVE}_t + \alpha_2\text{OTC}_t + \alpha_3\text{OTC*LNMVE}_t + \varepsilon_t,$$

where:

$$\text{OTC}_t = \begin{cases} 1 & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases}, \text{ and}$$

$$\text{OTC*LNMVE}_t = \begin{cases} \text{LNMVE}_t & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases},$$

The estimation results reported in Table 11.1(C) show that all estimated coefficients are statistically significant. This indicates that small OTC firms announce the most optimistic management forecasts.

11.4.1.4 External financing

Frankel et al. (1995) documented a positive association between firms' tendencies to access capital markets and to disclose earnings forecasts. However, they did not find statistically significant bias in MEFs of financing firms and argued that potential legal liability and reputation costs deter management of financing firms from issuing optimistic forecasts. Similarly, Irani (2000) hypothesized that managers may exhibit optimism in their forecasts if their firms are planning to access capital markets in the near future. However, he also did not find optimism in MEFs of financing firms.

One potential limitation of both studies with regard to research design is that they treated debt financing and equity financing equally. Richardson et al. (2004) argued that analysts obtain much of their information about earnings prospects directly from firm management, and that firms issuing new equity guide analysts toward beatable forecasts to avoid earnings disappointments. Thus, while equity-financing firms are sensitive to investors' perceptions of their profitability, debt-financing firms may not be as sensitive because investors are probably more concerned about their default risk.

Based on the foregoing reasoning, I treat debt financing and equity financing separately and examine bias in MEFs announced by debt-financing firms and equity-financing firms.

Table 11.2(A) shows that the mean (median) MFERR of debt-financing firms is higher than that of non-debt-financing firms, −0.0061 (−0.0003) vs −0.0135 (−0.0017), and the difference in the two means (medians) is statistically significant. Similar results are obtained between equity-financing firms and non-equity-financing firms, 0.0028 (0.0020) vs −0.0126 (−0.0015), though the difference in the two means (medians) is larger. These results indicate relative pessimism in MEFs for both debt- and equity-financing firms. However, debt-financing firms tend to be large firms, such as utilities and public transport, and previous results

Table 11.1 Size and exchange/OTC effects

	α_0	α_1	Adj. R^2	N
Regression model	$MFERR_t = \alpha_0 + \alpha_1 LNMVE_t + \varepsilon_t$			
Coefficient	−0.0692	0.0055	0.036	28,593
(t-statistic)	(−39.33)**	(32.85)**		

Panel A: Size effect.

	N	Mean MFERR	Median MFERR	Difference in means[a]	Difference in medians[b]
Exchange firms	24,738	−0.0110	−0.0011	0.0079	0.0034
OTC firms	3855	−0.0189	−0.0045	(8.73)**	(12.42)**

Panel B: Exchange/OTC effect.

	α_0	α_1	α_2	α_3	Adj. R^2	N
Regression model	$MFERR_t = \alpha_0 + \alpha_1 LNMVE_t + \alpha_2 OTC_t + \alpha_3 OTC*LNMVE_t + \varepsilon_t$					
Coefficient	−0.0643	0.0051	−0.0540	0.0058	0.039	28,593
(t-statistic)	(−32.95)**	(27.61)**	(−8.65)**	(8.66)**		

Panel C: Size and exchange/OTC effects.

The definitions of the variables are: $MFERR_t = (E_t - MF_t)/P_t$, $LNMVE_t = \ln(MVE_t/\text{Consumer Price Index})$,

$$OTC_t = \begin{cases} 1 & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases},$$

$$OTC*LNMVE_t = \begin{cases} LNMVE_t & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases},$$

where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, P_t is share price at the beginning of period t, and MVE_t is the market value of equity three months after the beginning of period t.

[a] The unequal variances t-test is used and its t-statistic is reported in parentheses in this column.
[b] The Wilcoxon rank-sum test is used and its z-statistic is reported in parentheses in this column.
* Significant at the 0.05 level (two-tailed). ** Significant at the 0.01 level (two-tailed).

Table 11.2 External financing

	N	Mean MFERR	Median MFERR	Difference in means[a]	Difference in medians[b]
Debt-financing firms	5754	−0.0061	−0.0003	0.0074	0.0014
Non-debt-financing firms	22,839	−0.0135	−0.0017	(14.37)**	(10.48)**
Equity-financing firms	1072	0.0028	0.0020	0.0154	0.0035
Non-equity-financing firms	27,521	−0.0126	−0.0015	(29.21)**	(17.02)**

Panel A: External financing.

	Firm size (1P is the smallest and 5P is the largest quintile)					
	1P	2P	3P	4P	5P	Total
Number of debt-financing firms	365	602	912	1395	2480	5754
Number of equity-financing firms	118	278	266	239	171	1072

Panel B: Impact of size on external financing. Quintile portfolios are constructed according to $LNMVE_t$ with the first quintile portfolio (1P) comprising the smallest firms and the fifth quintile portfolio (5P) comprising the largest firms.

	α_0	α_1	α_2	α_3	Adj. R^2	N
Regression model	$MFERR_t = \alpha_0 + \alpha_1 LNMVE_t + \alpha_2 BONDS_t + \alpha_3 OFFER_t + \varepsilon_t$					
Coefficient	−0.0693	0.0055	0.0004	0.0151	0.040	28,593
(t-statistic)	(−37.98)**	(30.63)**	(0.52)	(11.09)**		

Panel C: External financing and size effects.

The definitions of the variables are: $MFERR_t = (E_t - MF_t)/P_t$, $LNMVE_t = \ln(MVE_t/\text{Consumer Price Index})$,

$$BONDS_t = \begin{cases} 1 & \text{if a firm issued either straight bonds or convertible bonds in period } t \\ 0 & \text{otherwise} \end{cases},$$

$$OFFER_t = \begin{cases} 1 & \text{if a firm made a seasoned public offering in period } t \\ 0 & \text{otherwise} \end{cases},$$

where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, P_t is share price at the beginning of period t, and MVE_t is the market value of equity three months after the beginning of period t.

[a] The unequal variances t-test is used and its t-statistic is reported in parentheses in this column.

[b] The Wilcoxon rank-sum test is used and its z-statistic is reported in parentheses in this column.

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

suggest that large firms tend to announce pessimistic management forecasts. To investigate the influence of size effect, all firm-year observations are classified into quintile portfolios according to LNMVE and the number of debt- and equity-financing firms is tallied for each portfolio. Table 11.2(B) reveals that the number of debt-financing firms increases rapidly as the quintile portfolio based on LNMVE becomes larger. Such a trend is not observed for equity-financing firms.

To control for the impact of firm size on MFERR, the following regression equation is estimated:

$$MFERR_t = \alpha_0 + \alpha_1 LNMVE_t + \alpha_2 BONDS_t + \alpha_3 OFFER_t + \varepsilon_t,$$

where:

$$BONDS_t = \begin{cases} 1 & \text{if a firm issued either straight or convertible bonds in period } t \\ 0 & \text{otherwise} \end{cases},$$

and

$$OFFER_t = \begin{cases} 1 & \text{if a firm made a seasoned public offering in period } t \\ 0 & \text{otherwise} \end{cases}$$

The estimation results reported in Table 11.2(C) indicate that MEFs of equity-financing firms are pessimistic even after controlling for the size effect, while MEFs of debt-financing firms are not. These findings suggest the different impacts of different types of financing on bias in management forecasts.

11.4.1.5 Financial distress

Prior research has documented 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) found that managers of distressed firms make disclosures about expected future performance that are overly optimistic relative to actual financial outcomes. Koch (2002) found that MEFs issued by distressed firms exhibit greater optimism and are viewed as less credible by analysts than similar forecasts made by nondistressed firms. While both Frost (1997) and Koch (2002) conducted univariate analyses, Irani (2000) performed a multivariate analysis and found a positive linear correlation between optimism in MEFs and the degree of financial distress.

In Koch (2002) and Irani (2000, 2001), the probability of bankruptcy is used as a proxy for financial distress, which is derived from the coefficients provided by Ohlson (1980). However, these coefficients cannot be applied to Japanese firms without modification to estimate the intensity of financial distress.

Moreover, Penman (2001) suggested that the Ohlson (1980) estimates were made quite a while ago and the coefficients should be re-estimated from more recent data. Therefore, I employ the principal components method of factor analysis to condense the variables used in the Ohlson (1980) bankruptcy probability model. The factor scores from the first component are used as a proxy for financial distress.

The following nine variables are included in the Ohlson (1980) bankruptcy probability model:

$$\text{SIZE} = \ln, \left(\frac{\text{Total Assets}}{\text{GNP Price-level Index}}\right), \ \text{TLTA} = \left(\frac{\text{Total Liabilities}}{\text{Total Assets}}\right),$$

$$\text{WCTA} = \left(\frac{\text{Working Capital}}{\text{Total Assets}}\right), \ \text{CLCA} = \left(\frac{\text{Current Liabilities}}{\text{Current Assets}}\right),$$

$$\text{NITA} = \left(\frac{\text{Earnings}}{\text{Total Assets}}\right), \ \text{FUTL} = \left(\frac{\text{Operating Cash Flows}}{\text{Total Liabilities}}\right),$$

$$\text{INTWO} = \begin{cases} 1 & \text{if earnings were negative for the last two periods} \\ 0 & \text{otherwise} \end{cases},$$

$$\text{OENEG} = \begin{cases} 1 & \text{if total liabilities exceed total assets} \\ 0 & \text{otherwise} \end{cases},$$

$$\text{and CHIN} = \frac{E_t - E_{t-1}}{|E_t| + |E_{t-1}|}.$$

Of the nine variables, SIZE is omitted from the analysis because it is already represented by LNMVE. The results of factor analysis are shown in Table 11.3(A). The expected signs are from the Ohlson (1980) bankruptcy probability model. The signs of factor loadings and score coefficients (factor weights) of the first principal component are all consistent with the expected signs from the Ohlson (1980) model, suggesting that the first principal component represents the intensity of financial distress.

The factor scores from the first principal component are defined as a new variable, DIST, and the following regression equation is estimated:

$$\text{MFERR}_t = \alpha_0 + \alpha_1 \text{DIST}_t + \varepsilon_t,$$

where:

DIST_t = the factor scores from the principal component analysis on the variables used in the Ohlson (1980) bankruptcy probability model.

Table 11.3 Financial distress

Variables	Expected sign	Factor loading	Score coefficient
TLTA	+	0.833	0.296
WCTA	−	−0.878	−0.312
CLCA	+	0.844	0.299
NITA	−	−0.531	−0.188
FUTL	−	−0.304	−0.108
INTWO	+	0.350	0.124
OENEG	+	0.371	0.132
CHIN	−	−0.087	−0.031
Eigenvalue			
(% of variance explained)	2.818		
	(35.2%)		
Correlation between factor score and MFERR	−0.120**		

Panel A: Principal component analysis. The variables used to perform the principal component analysis are from the Ohlson (1980) bankruptcy probability model. The definitions of the variables are:

$$\text{TLTA} = \left(\frac{\text{Total Liabilities}}{\text{Total Assets}}\right),\ \text{WCTA} = \left(\frac{\text{Working Capital}}{\text{Total Assets}}\right),\ \text{CLCA} = \left(\frac{\text{Current Liabilities}}{\text{Current Assets}}\right),$$

$$\text{NITA} = \left(\frac{\text{Earnings}}{\text{Total Assets}}\right),\ \text{FUTL} = \left(\frac{\text{Operating Cash Flows}}{\text{Total Liabilities}}\right),$$

$$\text{INTWO} = \begin{cases} 1 & \text{if earnings were negative for the last two years} \\ 0 & \text{otherwise} \end{cases},$$

$$\text{OENEG} = \begin{cases} 1 & \text{if total liabilities exceed total assets} \\ 0 & \text{otherwise} \end{cases},\ \text{and CHIN} = \frac{E_t - E_{t-1}}{|E_t| + |E_{t-1}|}$$

	α_0	α_1	Adj. R^2	N
Regression model	$\text{MFERR}_t = \alpha_0 + \alpha_1 \text{DIST}_t + \varepsilon_t$			
Coefficient	−0.0196	−0.0142	0.014	26,176
(t-statistic)	(−26.98)**	(−19.48)**		

Panel B: Effect of financial distress. The definitions of the variables are: $\text{MFERR}_t = (E_t - \text{MF}_t)/P_t$ and DIST_t = the factor scores from the principal component analysis on the variables used in the Ohlson (1980) bankruptcy probability model, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, and P_t is share price at the beginning of period t.

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

The results reported in Table 11.3(B) show that the coefficient on DIST is significantly negative, −0.0142. This indicates that firms in financial distress measured by DIST tend to issue optimistic earnings forecasts.

11.4.1.6 Persistence of prior management forecast errors

Several studies have presented evidence of the persistence of management forecast errors. Williams (1996) found 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) conducted an experimental study and found 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 of the persistence of management forecast errors, they suggest that analysts and investors believe in this persistence.

To examine the persistence of management forecast errors, the following regression equation is estimated:

$$\text{MFERR}_t = \alpha_0 + \alpha_1\text{MFERR}_{t-1} + \alpha_2\text{MFERR}_{t-2} + \alpha_3\text{MFERR}_{t-3} + \varepsilon_t.$$

The results reported in Table 11.4(A) show that the estimated coefficients on lagged management forecast errors are all significantly positive and become smaller as the lags get longer, 0.3480, 0.1030 and 0.0368 respectively. This indicates that firms whose previous forecasts were optimistic (pessimistic) tend to remain optimistic (pessimistic) in their current forecasts.

11.4.1.7 Growth

Previous research suggests that high-growth firms have more incentives to announce pessimistic forecasts. Matsumoto (2002) and Richardson et al. (1999, 2004) investigated the propensity for firms to avoid negative earnings surprises and found that high-growth firms are more likely to guide analysts' forecasts downward to meet their expectations at the earnings announcement. Choi and Ziebart (2000) also found some weak evidence that high-growth firms tend to release pessimistic management forecasts. One possible explanation for these findings is that the stock market reaction to negative earnings surprises is particularly pronounced for high-growth firms (Skinner and Sloan, 2002). These results suggest that high-growth firms are inclined to issue more pessimistic earnings forecasts in order to avoid earnings disappointments.

Table 11.4 Persistence of prior management forecast errors, growth, and losses

	α_0	α_1	α_2	α_3	Adj. R^2	N
Regression model $MFERR_t = \alpha_0 + \alpha_1 MFERR_{t-1} + \alpha_2 MFERR_{t-2} + \alpha_3 MFERR_{t-3} + \varepsilon_t$						
Coefficient	−0.0087	0.3480	0.1030	0.0368	0.114	21,761
(t-statistic)	(−27.77)**	(43.98)**	(10.68)**	(3.76)**		

Panel A: Persistence of previous MFERRs.

	α_0	α_1	Adj. R^2	N
Regression model	$MFERR_t = \alpha_0 + \alpha_1 GROWTH_t + \varepsilon_t$			
Coefficient	−0.0720	0.0569	0.025	25,652
(t-statistic)	(−31.37)**	(25.79)**		

Panel B: Growth.

	N	Mean MFERR	Median MFERR	Difference in means[a]	Difference in medians[b]
Negative earnings firms	2942	−0.0482	−0.0164	−0.0401	−0.0153
Positive and zero earnings firms	25,013	−0.0081	−0.0011	(−25.13)**	(−26.20)**

Panel C: Losses.

The definitions of the variables are: $MFERR_t = (E_t - MF_t)/P_t$ and $GROWTH_t = Sales_{t-1}/Sales_{t-2}$, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, and P_t is share price at the beginning of period t.

[a] The unequal variances t-test is used and its t-statistic is reported in parentheses in this column.

[b] The Wilcoxon rank-sum test is used and its z-statistic is reported in parentheses in this column.

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

To examine whether MEFs announced by high-growth firms are more pessimistic, the following regression equation is estimated using annual sales growth rates as an indicator of growth:

$$MFERR_t = \alpha_0 + \alpha_1 GROWTH_t + \varepsilon_t,$$

where:

$GROWTH_t = Sales_{t-1}/Sales_{t-2}$.

The results reported in Table 11.4(B) show that the coefficient on GROWTH is significantly positive, 0.0569. Thus, MEFs of high-growth firms appear to be more pessimistic.

11.4.1.8 Losses

Evidence from the analyst forecast literature indicates that analysts' forecasts are more optimistic for loss firms than for profit firms (Richardson et al., 1999, 2004; Brown, 2001). Choi and Ziebart (2000) also found that firms with losses tend to announce optimistic earnings forecasts for the next year. These results suggest that managers reporting losses for the current period are inclined to issue more optimistic earnings forecasts than those reporting profits. To investigate whether earnings forecasts issued by firms with losses are more optimistic than by those with profits, the mean (median) forecast error for loss firms is compared with that for profit firms.

Table 11.4(C) shows that the mean (median) MFERR is −0.0482 (−0.0164) for loss firms and −0.0081 (−0.0011) for profit firms. The difference in the two means (medians) is statistically significant. Thus, management forecasts of firms with losses appear to be more optimistic than those with profits.

11.4.1.9 Signaling effect of management dividend forecast

Modern corporate finance theory initiated by Modigliani and Miller proposes that, in the presence of perfect capital markets, the dividend policy of a firm *per se* is irrelevant to its valuation (the dividend irrelevance hypothesis). On the other hand, the 'information content of dividends' hypothesis asserts that managers use dividends to signal changes in their expectations about future prospects of the firm (Aharony and Swary, 1980; Healy and Palepu, 1988; Hand and Landsman, 2005). A major difficulty in assessing the impact of dividends on share prices lies in disentangling these two effects, the dividend irrelevance effect and the dividend signaling effect. Conroy et al. (2000) exploited the unique setting in Japan, where managers simultaneously announce the current year's dividends and earnings as well as forecasts of next year's dividends and earnings, to provide a strong test for the two effects. They found that unexpected changes in forecasts of next year's dividends are valued by the Japanese market (the dividend signaling effect), while unexpected changes in current dividends are not (the dividend irrelevance effect). The results hold after controlling for the effects of current and future earnings information.

Based on these studies, I hypothesize that an increase (decrease) in management forecast of next year's dividends from current dividends signals the strong (weak) future performance of the firm.

Table 11.5(A) shows that firms with increased management forecasts of dividends from current dividends have higher mean (median) MFERR, −0.00995 (−0.00038), than those that did not change or decreased management forecasts of dividends from current dividends. A marginal difference in mean (median) MFERR is observed between firms without change in forecast dividends and those with decreased forecast dividends, −0.01271 (−0.00152) and −0.01126 (−0.00153) respectively. The result of the one-way ANOVA rejects the null of no difference in the three mean (median) MFERRs. Table 11.5(B) reports the results of the multiple comparison analysis. It shows that firms with increased forecast dividends have significantly higher mean and median MFERRs than those without change in forecast dividends, and have significantly higher median MFERR than those with decreased forecast dividends.

These results are thus consistent with the hypothesis that an increase in management forecast of next year's dividends from current dividends possesses some information about strong future performance of firms beyond that conveyed by MEFs. However, there appears to be little information in a decrease in management forecast of next year's dividends.

11.4.2 Multivariate analysis

To provide a more comprehensive analysis of the determinants of bias in MEFs, a multivariate model is estimated using the 10 factors identified in the univariate analysis as independent variables. The regression model is:

$$\mathrm{MFERR}_t = \beta_0 + \beta_1\mathrm{LNMVE}_t + \beta_2\mathrm{OTC}_t + \beta_3\mathrm{OTC{*}LNMVE}_t + \beta_4\mathrm{OFFER}_t + \beta_5\mathrm{DIST}_t + \beta_6\mathrm{MFERR}_{t-1} + \beta_7\mathrm{MFERR}_{t-2} + \beta_8\mathrm{GROWTH}_t + \beta_9\mathrm{LOSS}_t + \beta_{10}\mathrm{DIVUP}_t + \beta_{11}\mathrm{INDUST1-28}_t + \beta_{12}\mathrm{YEAR81-98}_t + \varepsilon_t,$$

where:

$$\mathrm{LOSS}_t = \ = \begin{cases} 1 & \text{if } E_{t-1} \text{ is negative} \\ 0 & \text{otherwise} \end{cases},$$

$$\mathrm{DIVUP}_t = \ = \begin{cases} 1 & \text{if a firm increased forecast dividends for period } t \\ 0 & \text{otherwise} \end{cases},$$

Table 11.5 Signaling effect of management forecasts of dividends

	N	Mean MFERR	Median MFERR	Difference in means[d]	Difference in medians[e]
Increase in MF dividends[a]	2634	−0.00995	−0.00038		
No change in MF dividends[b]	22,240	−0.01271	−0.00152	$F_{(2,27952)}$ 5.35**	$\chi^2_{(2)}$ 34.69**
Decrease in MF dividends[c]	3081	−0.01126	−0.00153		

Panel A: One-way ANOVA.

Differences between three groups	Difference in means[f]	Difference in medians[g]
Increase in MF dividends − No change in MF dividends	0.00276 (2.98)**	0.00114 (5.87)**
Increase in MF dividends − Decrease in MF dividends	0.00131 (1.10)	0.00115 (3.75)**
No change in MF dividends − Decrease in MF dividends	−0.00145 (−1.67)	0.00001 (−1.12)

Panel B: Multiple comparisons.

The definitions of the variables are: $\text{MFERR}_t = (E_t - \text{MF}_t)/P_t$, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, and P_t is share price at the beginning of period t.

[a] Increase in MF dividends comprises firm-year observations that increased management forecasts of dividends for the next year compared to current year dividends.

[b] No change in MF dividends comprises firm-year observations that did not change management forecasts of dividends for the next year from current year dividends.

[c] Decrease in MF dividends comprises firm-year observations that decreased management forecasts of dividends for the next year compared to current year dividends.

[d] The one-way analysis of variance (ANOVA) is used to test differences in the three means and its F-statistic is reported in this column.

[e] The Kruskal–Wallis one-way analysis of variance (ANOVA) by ranks is used to test differences in the three medians and its χ^2-statistic is reported in this column.

[f] For parametric tests, Tukey's multiple comparison method is employed and its t-statistic is reported in parentheses in this column.

[g] For nonparametric tests, the Kruskal–Wallis multiple comparison method is employed and its z-statistic is reported in parentheses in this column.

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

$\text{INDUST1} - 28_t$ = a set of industry dummies, and
$\text{YEAR81} - 98_t$ = a set of year dummies.

The results are reported in Table 11.6. The expected signs are based on the univariate analysis. The signs of the estimated coefficients are all consistent with those from the univariate analysis and they are statistically significant at the 5% level or higher. Overall, the model explains 20.6% of the variation in MFERR. Thus, the multivariate analysis reconfirms the univariate results that the 10 factors, which are macroeconomic influence, industry, firm size, exchange/OTC, external financing, financial distress, prior management forecast errors, growth, losses, and management forecasts of dividends, are all associated with bias in MEFs.

11.5 Market awareness of bias in management earnings forecasts

This section investigates the extent to which systematic errors in MEFs are reflected in share prices. Managers usually have access to inside information that is not available to outsiders. Therefore, managers are considered to have an informational advantage over market participants. Because of this information asymmetry, it will be both rational and practical for market participants to regard management forecasts as a primary source of information about future performance of firms. If the stock market fixates on earnings forecasts released by management and does not correctly adjust for systematic errors in the forecasts, share prices of firms that issue optimistic earnings forecasts will be overvalued while those that issue pessimistic earnings forecasts will be undervalued. However, as the end of the accounting period nears, information about the actual performance of firms will be disseminated in the market and price reversals will occur. Then, a hedge portfolio strategy of buying firms reporting most pessimistic MEFs and selling short those reporting most optimistic MEFs at the time of their release would generate positive abnormal stock returns.

To test whether systematic errors in MEFs are impounded into share prices, the predicted MFERR_t is calculated for each firm using the estimated parameters from the following fixed effects model[9]:

$$\text{MFERR}_{t-1} = \gamma_1\text{FIRMDUM}_{t-1} + \gamma_2\text{LNMVE}_{t-1} + \gamma_3\text{DIST}_{t-1} + \gamma_4\text{GROWTH}_{t-1} + \gamma_5\text{LOSS}_{t-1} + \gamma_6\text{DIVUP}_{t-1} + \gamma_7\text{YEARDUM}_{t-1} + \varepsilon_t,$$

Table 11.6 Multivariate analysis of the determinants of bias in management earnings forecasts

Variables	Expected sign	Coefficient	*t*-statistic[a]	*F*-statistic[a]
Regression model	$MFERR_t = \beta_0 + \beta_1 LNMVE_t + \beta_2 OTC_t + \beta_3 OTC*LNMVE_t + \beta_4 OFFER_t + \beta_5 DIST_t + \beta_6 MFERR_{t-1} + \beta_7 MFERR_{t-2} + \beta_8 GROWTH_t + \beta_9 LOSS_t + \beta_{10} DIVUP_t + \beta_{11} INDUST1-28_t + \beta_{12} YEAR81-98_t + \varepsilon_t$			
CONSTANT	?	−0.0534	−9.55**	
LNMVE	+	0.0016	8.98**	
OTC	−	−0.0263	−2.53*	
OTC*LNMVE	+	0.0029	2.68**	
OFFER	+	0.0035	4.60**	
DIST	−	−0.0016	−3.75**	
$MFERR_{t-1}$	+	0.1852	11.42**	
$MFERR_{t-2}$	+	0.0463	4.36**	
GROWTH	+	0.0180	6.80**	
LOSS	−	−0.0093	−5.27**	
DIVUP	+	0.0023	2.70**	
INDUST1 − 28				7.36**
YEAR81 − 98				67.27**
Adj. R^2	0.206			
N	24,023			

The definitions of the variables are: $MFERR_t = (E_t - MF_t)/P_t$, $LNMVE_t = \ln(MVE_t/\text{Consumer Price Index})$,

$$OTC_t = \begin{cases} 1 & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases},$$

$$OTC*LNMVE_t = \begin{cases} LNMVE_t & \text{if a firm is an OTC firm in period } t \\ 0 & \text{otherwise} \end{cases},$$

$$OFFER_t = \begin{cases} 1 & \text{if a firm made a seasoned public offering in period } t \\ 0 & \text{otherwise} \end{cases},$$

$DIST_t$ = the factor scores obtained from the principal component analysis on the variables used in the Ohlson (1980) bankruptcy probability model,

$$GROWTH_t = \frac{Sales_{t-1}}{Sales_{t-2}},\ LOSS_t = \begin{cases} 1 & \text{if } E_{t-1} \text{ is negative} \\ 0 & \text{otherwise} \end{cases},$$

$$DIVUP_t = \begin{cases} 1 & \text{if a firm increased forecast dividends for period } t \\ 0 & \text{otherwise} \end{cases},$$

$INDUST1-28_t$ = a set of industry dummies, and $YEAR81-98_t$ = a set of year dummies, where E_t is actual earnings per share for period t, MF_t is management forecast of earnings per share for period t, P_t is share price at the beginning of period t, and MVE_t is the market value of equity three months after the beginning of period t.

To control for outliers, observations with studentized residual greater than two are removed.

[a] *t*-statistics and *F*-statistics are based on White's heteroskedastic-consistent standard error.

* Significant at the 0.05 level (two-tailed). ** Significant at the 0.01 level (two-tailed).

where:
$FIRMDUM_t$ = a set of firm dummies and
$YEARDUM_t$ = a set of year dummies.

To make the strategy actually implementable, only *ex ante* factors that are related to management forecast errors are used as independent variables. The model is estimated annually from 1984 to 1998 using panel datasets with at least five-year data available for each firm, and the estimated coefficients are used to obtain the predicted $MFERR_t$. For example, to obtain the predicted management earnings forecast error for a firm in the year 1990, the predicted $MFERR_{1990}$, a set of estimated coefficients derived from data for the 1979–1989 time period are used.

At the end of June for each year from 1985 to 1999, firms are ranked according to their predicted $MFERR_t$ and assigned in equal numbers to quintile portfolios. The top quintile portfolio comprises firms with the highest predicted $MFERR_t$ (predicted to be most pessimistic in their earnings forecasts) and the bottom portfolio comprises firms with the lowest predicted $MFERR_t$ (predicted to be most optimistic in their earnings forecasts). The strategy is to take a long position in the top quintile portfolio and a short position in the bottom quintile portfolio and maintain these investments until the end of September (for a three-month period)[10]. The results of the same strategy based on the actual forecast errors are also reported for comparison purposes.

Figure 11.3(A) plots the abnormal returns from the hedge portfolio strategy based on the actual forecast errors for the 15 years. The returns are positive in all years, with a 15-year average return of 8.0%. This suggests that having perfect foresight on management forecast errors can produce consistent abnormal returns. Figure 11.3(B) plots the abnormal returns from the same strategy based on the predicted forecast errors. The returns are positive in 14 of the 15 years, with a 15-year average return of 4.5%. Thus, the hedge portfolio strategy based on *ex post* forecast errors can generate abnormal returns of as much as 8.0%, and the same strategy based on *ex ante* forecast errors can still produce abnormal returns of 4.5%. These findings may suggest that the stock market fixates on management forecasts and does not completely impound systematic errors in MEFs into share prices.

11.6 Conclusion

The first objective of this chapter was to investigate the determinants of bias in management earnings forecasts (MEFs) announced by Japanese firms over the period 1979–1999. The results of both univariate and multivariate analyses show

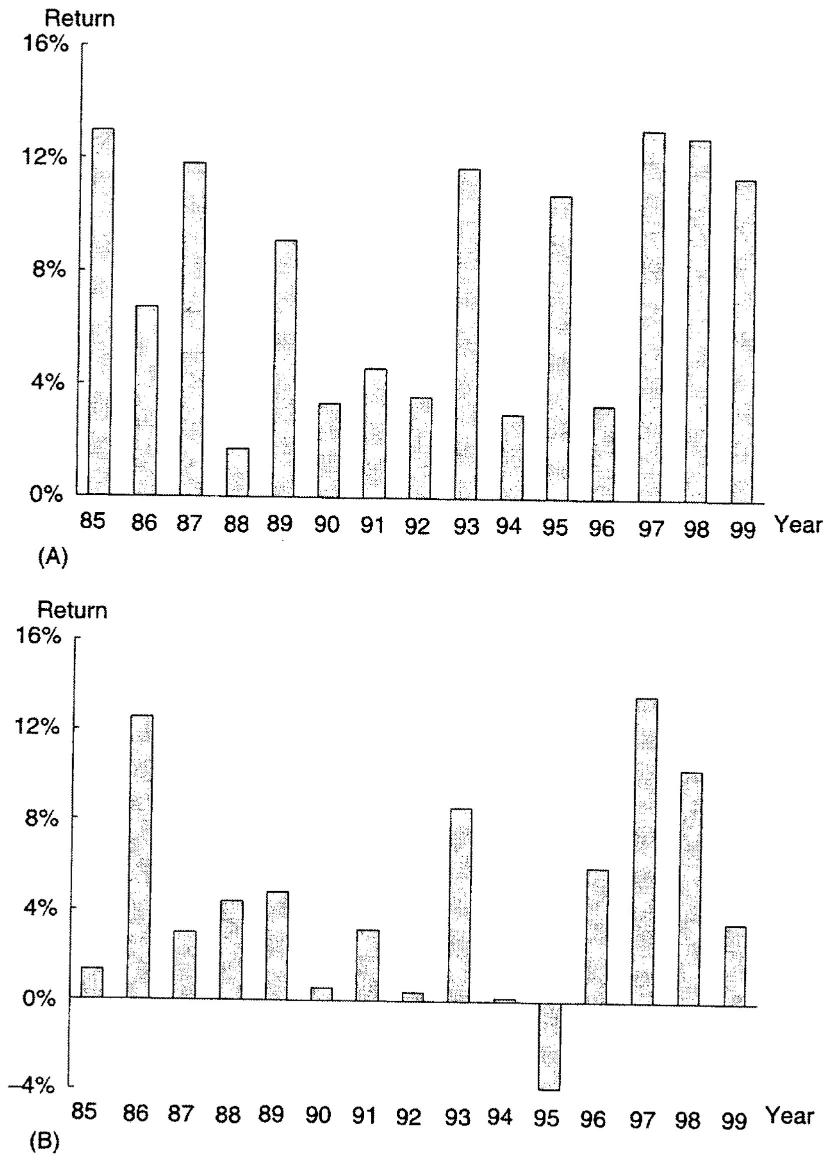

Figure 11.3 (A) Abnormal returns produced by the hedge portfolio strategy based on the actual management forecast errors (MFERR). (B) Abnormal returns produced by the hedge portfolio strategy based on the predicted management forecast errors (MFERR). In both cases, firms are ranked according to the MFERR at the end of June from 1985 to 1999 and assigned in equal numbers to quintile portfolios. The top quintile portfolio comprises firms with the highest MFERR and the bottom quintile portfolio with the lowest MFERR. The strategy is to take a long position in the top quintile portfolio and a short position in the bottom quintile portfolio and maintain these investments until the end of September

that the 10 factors, which are macroeconomic influence, industry, firm size, exchange/OTC, external financing, financial distress, prior management forecast errors, growth, losses, and management forecasts of dividends, are all associated with bias in MEFs. The second objective of this chapter was to examine the extent to which systematic forecast errors are reflected in share prices. The results of the hedge portfolio strategy show that abnormal returns can be earned by predicting errors in MEFs, suggesting that share prices may not fully reflect information about systematic errors in MEFs.

The provision of the next period's earnings forecasts by management of almost all listed firms is a major feature of the Japanese financial disclosure system. Despite that, there has been little research so far on the properties of Japanese management forecasts, partly due to difficulties in obtaining the data. This study is probably the first to investigate the properties of Japanese MEFs. The findings in this chapter suggest the existence of systematic bias in Japanese management forecasts and also provide some evidence of the stock market's fixation on management forecasts. Perhaps future research on the impact of management forecasts on analysts' forecasts would likely shed more light on the nature of management forecast information and its influence on the stock market.

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Notes

1. The term 'earnings' used in this chapter indicates 'net income' unless otherwise stated.
2. The condensed financial statements (Kessan Tanshin) are available from the Tokyo Stock Exchange website (http://www.tse.or.jp).
3. All forecasts are published in the form of point forecasts except for dividends per share, which are sometimes provided in the form of range forecasts.
4. A survey reports that, by 1980, more than 90% of listed firms, excluding those in the financial sector, provided management forecasts.
5. The results presented later are qualitatively similar when observations in the extreme 0.5% and 1.5% are removed.
6. When the analysis requires first-differenced variables and/or lagged variables, the sample size becomes smaller accordingly.
7. Using the yearly median MFERR instead of mean MFERR produces similar results. The correlation coefficient between the yearly median MFERR and the real GDP growth rate is 0.826.
8. McNichols (1989) reports a large negative mean (median) MFERR for the year 1982. The US economy posted −2.0% in real GDP growth rate in 1982, which was the worst in the last 50 years.
9. A fixed effects estimation uses the time-demeaned data. Therefore, any variable that is constant or has little variation over time is excluded from the model.

10. The return cumulation period is limited to a three-month period from the end of June to the end of September. This is because the sample firms used in this study are all March fiscal year-end firms and they publish new forecasts for full-year earnings at the same time as they report semi-annual earnings, at the end of September. The analysis (not reported here) indicates that higher abnormal returns cannot be earned by extending the return cumulation period to nine and 12 months.

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