Mandatory management forecasts, forecast revisions, and abnormal accruals

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Abstract

Purpose – Current systems of regulation in Japan require that listed firms disclose earnings forecasts for the coming fiscal year. The Japanese Business Federation is contesting this requirement, requesting that mandatory forecast disclosures be abolished. The purpose of this paper is to investigate the relationships between accruals and initial management earnings forecast errors (MFERR), and between accruals and forecast revisions. Further, the study offers a preliminary discussion of the economic costs of mandatory earnings forecasting, with a specific focus on firms operating under conditions of uncertainty or facing difficulty in analyzing economic information.

Design/methodology/approach – To investigate the relationship between accruals and management forecast errors (revisions), multiple regression models were designed using data covering the period between 2003 and 2013, pertaining to listed Japanese firms. A model developed by Dechow and Dichev (2002) was applied to estimate normal and abnormal accruals.

Findings – The author found a positive relationship between accruals and initial MFERR, and a negative relationship between accruals and forecast revisions. Further, the relationship between accruals and management forecast errors (revisions) is more pronounced among firms operating in uncertain business environments or facing difficulty in analyzing economic information.

Originality/value – The study provides an important analysis of abnormal working capital accruals in relation to both initial MFERR and forecast revisions. While total accruals or working capital accruals have been documented in prior studies in this regard, abnormal accruals have not. Furthermore, this study offers a preliminary discussion of the economic costs associated with earnings forecasting under conditions of mandatory disclosure. The economic impact of forecasting has not previously been addressed under either mandatory or voluntary conditions.

Keywords Accruals, Abnormal accruals, Forecast errors, Forecast revisions, Management earnings forecasts

Paper type Research paper

1. Introduction

The purpose of this study is to investigate the relationships between accruals and initial management earnings forecast errors (MFERR), and between accruals and forecast revisions. In addition, consideration is paid to the economic costs associated with mandatory earnings forecasts for firms operating in uncertain business environments or facing difficulty in analyzing economic information.

Compared to current earnings, earnings forecasts have a greater effect on stock prices (Ota, 2010). As such, earnings forecasts are a critical information source in Japanese financial markets. Japanese financial market regulators strongly recommend all listed firms to disclose earnings forecasts for the coming fiscal year. Approximately 97 percent of listed firms comply with this recommendation, disclosing forecasts for year t+1 at the beginning of each fiscal year (Study Group on Earnings Reports, 2006).

While compliance rates are high, firms abiding by mandatory disclosure requirements typically incur substantial economic costs. These costs include a combination of litigation expenses and declining stock value – many investors consider

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forecasts to be representative of firm commitments; therefore, an inability to meet earnings forecasts suppresses stock value. This situation creates an incentive for firms to disclose management forecasts carefully to avoid downward revisions (*The Nikkei*, 2007)[1]. However, the potential for an economic downside also creates an incentive for managers to seek opportunities to evade earnings forecast disclosure requirements. As a result, the Japan Business Federation is requesting the abolition of mandatory earnings forecast disclosures (Nippon Keizai-dantai Rengokai, 2010).

Evaluating the impact of mandatory earnings forecast disclosures requires an assessment of the effects of accounting information. Specifically, it is important to compare accruals (abnormal working capital accruals (ABWCA) and normal working capital accruals (NABWCA)) in year t with either the initial MFERR for year t+1 or the forecast revisions of the current fiscal year. This comparison assists in analyzing the degree to which accounting information affects management earnings forecasts. The Japanese financial market provides a comprehensive data set for assessing the relationship between accounting information and variations in earnings forecasts – almost all listed Japanese firms disclose earnings forecasts at the beginning of the fiscal year and many provide revised forecasts throughout the year.

In addition to assessing accounting information, earnings forecasting also requires knowledge of economic parameters (Penman, 2001; Palepu *et al.*, 2004). This includes knowledge of a firm's operating environment. When a firm's operating environment is uncertain, accounting earnings typically include measurement errors pertaining to future cash flows. For example, when the operating environment forecast is optimistic, accounting accruals (such as inventory) increase – the opposite is true for pessimistic forecasts. In addition, environmental uncertainty may limit management's ability to leverage available information for effective and accurate forecasting. As such, managers will be required to rely more heavily on historical accounting data. For these reasons, environmental uncertainty injects error into both accrual measurements and initial management earnings forecasts.

When managers revise forecasts through an analysis of economic information, the relationship between accruals and final MFERR may become weak. That is, forecast revisions become negatively correlated to accruals. The relationship between accruals and forecast revisions is a simple extension of the association between accruals and earnings forecast errors; however, its importance should not be overlooked. Specifically, forecast revisions mitigate the effects of forecast errors that arise through systematic account processes. Accrual accounting requires the abnormal accruals of one period to be reversed in the following period. Thus, a negative relationship between abnormal accruals in year t and earnings in year t+1 is probable. In addition, actual earnings in year t+1 also possibly include discretionary accruals due to earnings management.

One of the central problems with mandatory forecast disclosures is the requirement to complete 12-month forecast projections. This condition creates complications for firms operating under conditions of uncertainty or facing difficulty in analyzing economic information. In such cases, firms typically encounter severe accrual measurement errors – an outcome perceived to lead to substantial economic costs. Variances in accrual measurement errors, due to uncertainty or difficulty in analyzing economic information (and the associated financial expenses), suggest inequality in the system of mandatory disclosure. To test for this, the current study has developed a series of portfolios according to different business environments.

In this paper, I investigate listed Japanese firms using data covering the period between 2003 and 2013 (11,414 firm-years). The results reveal the following regarding the impact of abnormal accruals: a positive correlation between accruals and initial MFERR; a weak relationship between accruals and final MFERR; a negative correlation between accruals and forecast revisions; a pronounced relationship between accruals and management forecast errors (revisions) for firms operating in uncertain business environments or facing difficulty in analyzing economic information. Taken together, these results suggest that initial forecast earnings are largely based on accounting information rather than economic information. In addition, my study gives weight to the theory that systems of mandatory forecast disclosure result in uneven magnitudes of forecast errors between firms operating in different business environments. That is, mandatory forecasting is inequitable and influences a disproportionate spread of economic costs.

The remainder of this paper is organized as follows: Section 2 covers the Japanese management earnings forecast system, a literature review, and testable hypotheses; Section 3 describes my research design and sample selection process; Section 4 is a discussion of results; and Section 5 offers concluding remarks.

2. Background and hypotheses development

Japanese management forecasts

In accordance with the rules for the listing of securities (Yukashoken Joujou Kitei) and the guidelines for publishing earnings reports (Kessan Tanshin/Shihanki Kessan Tanshin no sakuseiyouryou), the Tokyo Stock Exchange requires all listed firms to prepare and disclose earnings reports (Kessan Tanshin) no more than 45 days after the closing day. That is, listed firms must produce quarterly earnings reports.

Earnings reports in Japan include the following data – sales figures, earnings, asset values, and other relevant metrics for year t, as well as management earnings forecasts for year t+1. Although management earnings forecasts are not required to be disclosed at the same time as initial earnings reports, listed firms must explain their forecasts when there is a substantial discrepancy between actual earnings in year t and earnings forecasts for year t+1[2]. In addition, listed firms must not participate in insider trading or selective disclosure. For these reasons, Japanese financial market regulators recommend that all listed firms disclose earnings forecasts for the coming fiscal year at the same time as initial earnings reports.

Literature review and hypotheses

Many previous studies have explored the geneses of management forecast errors (or bias). Research has shown that firms characterized by financial distress or poor past performance have management earnings forecasts with an inherent optimistic bias (Frost, 1997; Irani, 2000; Choi and Ziebart, 2004; Rogers and Stocken, 2005; Kato *et al.*, 2009; Cho *et al.*, 2011; Ota, 2011). Other studies have demonstrated that the management earnings forecasts of growing firms have an inherent pessimistic bias as a means to avoid negative surprises (Matsumoto, 2002; Richardson *et al.*, 1999, 2004; Choi and Ziebart, 2004; Ota, 2011). Similarly, large firms' management earnings forecasts are characterized by an inherent pessimistic bias (Baginski and Hassell, 1997; Bamber and Cheon, 1998; Choi and Ziebart, 2004; Kato *et al.*, 2009; Ota, 2011). Further, studies have shown that earnings forecasts (or their errors) may be related to the accuracy of subsequent earnings forecasts (Williams, 1996; Hirst *et al.*, 1999; Ota, 2011) or affected by other industrial and macroeconomic factors (Rogers and Stocken, 2005; Ota, 2006).

Management earnings forecasts may also be attributable to accounting income. By modeling the accounting process, Dechow *et al.* (1998) demonstrated accounting income to be a more effective measure of future cash flows than current cash flows. Other studies corroborate this position, showing accounting income or accruals to be effective predictors of future earnings or cash flows (Sloan, 1996; Fairfield *et al.*, 2003; Richardson *et al.*, 2005. Dechow *et al.*, 2010).

If managers forecast earnings using accounting information, errors inherent in accounting income (particularly accounting accruals) may contribute to earnings forecast errors. Palepu *et al.* (2004) argue that an earnings forecast is only as good as the business strategy and the financial accounting analysis that underlie it. Gong *et al.* (2009) explored the relationship between accruals and earnings forecast errors, and found that accruals during year t significantly correlate with earnings forecast errors in year t+1. Xu (2010) similarly showed that there is a positive relationship between accruals and earnings forecast errors, and that managers overestimate the persistence of accruals in their forecasts when they experience difficulty in forecasting earnings[3],[4].

While prior studies have used total accruals or working capital accruals (WCA) to assess accrual forecast errors, the current study applies ABWCA and NABWCA. Specifically, WCA include: accruals generated from the accurate measurement of historical cash flows; accruals generated from the accurate measurement of future cash flows; and accruals generated by errors associated with measurement of future cash flows. Dechow and Dichev (2002) use the following model to represent WCA as a function of cash flows and measurement errors in a given period:

$$\mathrm{ACC}_t = \mathrm{CF}^t_{t-1} - \left(\mathrm{CF}^{t+1}_t + \mathrm{CF}^{t-1}_t\right) + \mathrm{CF}^t_{t+1} + \varepsilon^t_{t+1} - \varepsilon^{t-1}_t$$

In this model, ACC represents WCA in year t. CF signifies cash flows from operations, and ε represents the measurement errors pertaining to future cash flows. The subscripts associated with CF and ε represent the periods when the cash flows occur. The superscripts represent the periods when the cash flows are recognized in earnings. In this model, the variable for current accruals generated by measurement errors associated with future cash flows (ε^t_{t+1}) is particularly important – while managers can identify most variables associated with earnings forecasts at the beginning of a fiscal year, the variable for current accruals generated by cash flow measurement errors may not be recognized as easily. If managers use accounting information to forecast earnings, this variable can contribute to errors in earnings forecasts for year t+1. *H1a* tests for this possibility:

H1a. There is a positive correlation between WCA and initial MFERR.

Dechow and Dichev (2002) categorized WCA into NABWCA and ABWCA. They described ABWCA as unrelated to (or not dependent on) cash flow realizations. As such, ABWCA involve more measurement errors of cash flows than NABWCA. If accrual measurement errors create a positive relationship between WCA and initial MFERR (as proposed in *H1a*), then the relationship between abnormal accruals and initial MFERR will be more pronounced. *H1b* tests for this possibility:

H1b. There is a positive correlation between ABWCA and initial MFERR.

The first set of *H1a* and *H1b* test the relationship between WCA and initial MFERR due to accrual measurement errors. It is not sufficient, however, to limit the study to initial MFERR. With reference to the fact that accrual accounting requires abnormal

accruals to be reversed in the following period, it is plausible there exists a negative correlation between accruals and initial MFERR. In addition, actual earnings at year t+1 also possibly include discretionary accruals due to earnings management; therefore, forecast revisions should also be examined.

MFERR can harm a manager's reputation, including the perceived reliability of his/her forecasts (Kato *et al.* 2009). Forecast errors also increase the reporting firm's exposure to litigation (Skinner, 1994). Furthermore, negative unforeseen firm performance drives stock prices down. As such, managers often revise their forecasts during the fiscal year or manipulate actual earnings in the following year (Degeorge *et al.*, 1999; Kasznik, 1999; Bartov *et al.*, 2002; Matsumoto, 2002; Abarbanell and Lehavy, 2003; Das *et al.*, 2011). If initial management earnings forecasts include errors related to accruals, forecasts will be adjusted according to all current available information. When a forecast includes an upward (downward) error, managers tend to revise their forecasts downward (upward). As a result, managers improve the accuracy of their forecasts and the relationship between accruals and forecast errors due to accrual measurement error becomes weak as the year progresses.

By utilizing the nature of forecast revisions, the current study mitigates the systematic relationship between accruals and earnings forecast errors, and the effect of earnings manipulations at the year t+1. If the relationship between accruals and earnings forecast errors is influenced by accrual measurement error, I should also be able to explain the relationship between accruals and forecast revisions. In addition, because abnormal accruals are perceived to be associated with a greater number of measurement errors, it is the intention of this study to focus observations on forecast revisions with respect to abnormal accruals. *H2a* and *H2b* test these respective predictions:

H2a. There is a negative correlation between WCA and forecast revisions.

H2b. There is a negative correlation between ABWCA and forecast revisions.

Management's ability to accurately forecast future earnings depends on a number of factors, including depth of economic data. To forecast future earnings, it is necessary to incorporate accounting data with other economic information (Penman, 2001; Palepu *et al.*, 2004)[5]. When firms face difficulty in analyzing available economic data, they become more dependent on accounting information to complete management forecasts. For this reason, it is plausible that accruals associated with initial earnings forecast errors or forecast revisions are more pronounced for firms operating under conditions of uncertainty or facing difficulty in analyzing economic information. Gong *et al.* (2009) and Xu (2010) report that the relationship between accruals and earnings forecast errors is more clearly observed in uncertain business environments. The current study tests the impact of abnormal accruals on Japanese firm earnings forecast errors (revisions) in various business environments. It is predicted that the economic costs associated with accruals differ across alternative business environments. *H3a* and *H3b* test these respective predictions:

H3a. The positive correlation between ABWCA and initial MFERR is more pronounced for firms operating under conditions of uncertainty or facing difficulty in analyzing economic information.

H3b. The negative correlation between ABWCA and forecast revisions is more pronounced for firms operating under conditions of uncertainty or facing difficulty in analyzing economic information.

3. Research design and sample selection

Calculation of initial earnings forecast errors and forecast revisions

Earnings forecast errors are calculated by deducting actual future earnings from forecast earnings according to the following formula (Kato *et al.* 2009; Gong *et al.*, 2009; Ota 2011):

$$\text{MFERR}_t = (\text{INITIAL MF}_t - E_t)/A_{t-1}$$

MFERR_t represents management forecast errors for year t. INITIAL MF_t depicts the initial management net income (NI) forecasts for year t. E_t indicates actual NI for year t, and A is equal to total assets. Large MFERR values suggest optimistic initial management forecasts.

Forecast revisions are calculated by subtracting initial management forecasts from revised forecasts according to the following formula (Kato *et al.*, 2009):

$$\text{REVISION}_t = (\text{FINAL MF}_t - \text{INITIAL MF}_t)/A_{t-1}$$

REVISION_t represents the degree to which initial management earnings forecasts are revised during fiscal year t. FINAL MF_t signifies the last management NI forecast in year t. Large REVISION values indicate that management earnings forecasts have been revised upward.

Estimation of normal accruals and abnormal accruals

I use Dechow and Dichev's (2002) model (the DD model) to estimate normal accruals and abnormal accruals. Many researchers have applied the DD model using cross-sectional data (i.e. industry-specific regressions). However, I applied the DD model using time series data to accurately match MFERR and abnormal accruals (i.e. firm-specific regressions):

$$\text{WCA}_t = \alpha_0 + \alpha_1 \text{CFO}_{t-1} + \alpha_2 \text{CFO}_t + \alpha_3 \text{CFO}_{t+1} + \varepsilon$$

In this model, WCA represents WCA according to the following formula: Δ current assets $-\ \Delta$ cash and deposit $-\ \Delta$ current liabilities $+\ \Delta$ short term loans payable and corporate bones (Δ indicates change of variables). CFO is cash flow from operations. Subscripts indicate fiscal years. All variables are deflated by total assets at the beginning of the year.

NABWCA are defined by the following equation:

$$\text{NABWCA}_t = \widehat{\alpha_0} + \widehat{\alpha_1} \text{CFO}_{t-1} + \widehat{\alpha_2} \text{CFO}_t + \widehat{\alpha_3} \text{CFO}_{t+1}$$

The above DD model was used to estimate the parameters $\widehat{\alpha_0}$, $\widehat{\alpha_1}$, $\widehat{\alpha_2}$, $\widehat{\alpha_3}$ for each firm.

ABWCA are calculated by subtracting NABWCA from WCA:

$$\text{ABWCA}_t = \text{WCA}_t - \text{NABWCA}_t$$

Research design

With consideration to the work of Ota (2011), the following factors were controlled to reduce bias in the calculation of MFERR: financial distress, potential for growth, firm size, and persistence of forecast errors. In addition, the variables potentially affecting forecast errors and the variables potentially affecting accruals were also controlled (Gong *et al.*, 2009). The following regression model is used to test *H1*:

$$\begin{aligned}\text{MFERR}_t = {} & \beta_0 + \gamma_1 \text{WCA}_{t-1} + \beta_1 \text{ROA}_{t-1} + \beta_2 \text{PSURP}_{t-1} + \beta_3 \text{DEBTR}_{t-1} \\ & + \beta_4 \text{LOSS}_{t-1} + \beta_5 \Delta\text{SALE}_{t-1} + \beta_6 \text{MTB}_{t-1} + \beta_7 \text{RET}_{t-1} + \beta_8 \text{MVE}_{t-1} \\ & + \beta_9 \text{MFERR}_{t-1} + \beta_{10} \text{MFERR}_{t-2} + \beta\ \text{INDDUM} + \beta\ \text{YEARDUM} + \varepsilon\end{aligned}$$

$$\begin{aligned}\text{MFERR}_t = {} & \beta_0 + \gamma_2 \text{ABWCA}_{t-1} + \gamma_3 \text{NABWCA}_{t-1} + \beta_1 \text{ROA}_{t-1} \\ & + \beta_2 \text{PSURP}_{t-1} + \beta_3 \text{DEBTR}_{t-1} + \beta_4 \text{LOSS}_{t-1} + \beta_5 \Delta\text{SALE}_{t-1} \\ & + \beta_6 \text{MTB}_{t-1} + \beta_7 \text{RET}_{t-1} + \beta_8 \text{MVE}_{t-1} + \beta_9 \text{MFERR}_{t-1} \\ & + \beta_{10} \text{MFERR}_{t-2} + \beta\ \text{INDDUM} + \beta\ \text{YEARDUM} + \varepsilon\end{aligned}$$

The model variables are defined as follows: ROA is the return on assets (NI of year *t*/total assets of year *t*−1); PSURP, a dummy variable that takes a value of 1 if the actual NI is greater than the final management earnings forecasts in year *t*, and 0 for all other scenarios; DEBTR, the debt-to-total-assets ratio (total debt at the end of fiscal year *t*/total assets at the end of fiscal year *t*); LOSS, a dummy variable that takes a value of 1 if the firm experiences a loss in year *t*, and 0 for all other scenarios. ΔSALE, the sales growth (natural logarithm of: sales in year *t*/sales in year *t*−1); MTB, market-to-book ratio (market value of equity at the end of fiscal year *t*/(total assets at the end fiscal year *t*–total debt at the end of fiscal year *t*)); RET, the stock return (natural logarithm of: market value of equity at the end of fiscal year *t*/market value of equity at the end of fiscal year *t*−1); MVE, the market value of equity (natural logarithm of market value of equity at the end of fiscal year *t*); INDDUM, a vector of industry dummy variables; YEARDUM, a vector of year dummy variables.

ROA and PSURP are proxies for factors potentially affecting accruals. Specifically, ROA accounts for the effect of firm performance on accrual estimation (Dechow *et al.*, 1995), while PSURP accounts for the effect of earnings management to achieve earnings benchmarks (Kasznik 1999).

DEBTR and LOSS are proxies for financial distress. I anticipate the coefficients for both these variables to be positive. ΔSALE and MTB serve as proxies for the firm's growth potential. I predict the coefficients for each of these to be negative.

McNichols (1989) and Gong *et al.* (2009) reveal a significant, negative correlation between management forecast error and past stock returns. This suggests management earnings forecasts do not comprehensively incorporate all information related to prior stock price. As such, RET is controlled in the model to account for variable stock returns.

MVE is a proxy for firm size. I predict MVE coefficients to be negative. Lagged variables for MFERR are proxies for the persistence of forecast errors. MFERRs are also used to control historical accrual measurement errors. INDDUM and YEARDUM control industrial and macroeconomic effects, respectively.

H1a predicts a positive relationship between accruals and earnings forecast errors ($\gamma_1 > 0$). *H1b* similarly predicts a positive correlation between abnormal accruals and earnings forecast errors ($\gamma_2 > 0$). γ_3 represents the coefficient for normal accruals. I am unable to predict the sign of the coefficient associated with γ_3.

The following regression models are used to test *H2*:

$$\begin{aligned}\text{REVISION}_t = {} & \beta_0 + \gamma_4 \text{WCA}_{t-1} + \beta_1 \text{ROA}_{t-1} + \beta_2 \text{PSURP}_{t-1} + \beta_3 \text{DEBTR}_{t-1} \\ & + \beta_4 \text{LOSS}_{t-1} + \beta_5 \Delta\text{SALE}_{t-1} + \beta_6 \text{MTB}_{t-1} + \beta_7 \text{RET}_{t-1} + \beta_8 \text{MVE}_{t-1} \\ & + \beta_9 \text{MFERR}_{t-1} + \beta_{10} \text{MFERR}_{t-2} + \beta\ \text{INDDUM} + \beta\ \text{YEARDUM} + \varepsilon\end{aligned}$$

$$\begin{aligned}\text{REVISION}_t = {} & \beta_0 + \gamma_5 \text{ABWCA}_{t-1} + \gamma_6 \text{NABWCA}_{t-1} + \beta_1 \text{ROA}_{t-1} \\ & + \beta_2 \text{PSURP}_{t-1} + \beta_3 \text{DEBTR}_{t-1} + \beta_4 \text{LOSS}_{t-1} + \beta_5 \Delta\text{SALE}_{t-1}\end{aligned}$$

$$+\beta_6 \mathrm{MTB}_{t-1}+\beta_7 \mathrm{RET}_{t-1}+\beta_8 \mathrm{MVE}_{t-1}+\beta_9 \mathrm{MFERR}_{t-1}$$
$$+\beta_{10} \mathrm{MFERR}_{t-2}+\beta\ \mathrm{INDDUM}+\beta\ \mathrm{YEARDUM}+\varepsilon$$

The predictor variables used to test *H2* are the same as those applied in the regression model for *H1*; only the dependent variables differ. The predictor variables testing *H2* are classified as follows: DEBTR and LOSS (measurements of financial distress) and lagged variables of MFERR are considered negative predictor variables, while ΔSALE and MTB (measurements of growth potential), RET (information of historical stock prices), as well as MVE (a measurement of firm size) are considered positive predictor variables.

H2a predicts there will be a negative correlation between accruals and forecast revisions ($\gamma_4 < 0$). Similarly, *H2b* predicts there will be a negative correlation between abnormal accruals and forecast revisions ($\gamma_5 < 0$). γ_6 is the coefficient for normal accruals. I am unable to predict the sign of the coefficient associated with γ_6.

To verify *H3*, a series of portfolios simulating a range of business environments has been developed. These portfolios include firms facing difficulty in analyzing economic information. A firm's ability to process economic data is related to two proxy variables: firm size and profitability. Small firms and firms recording low-profit margins are typically less effective at leveraging salient economic information in earnings forecasts. In addition, firms undergoing restructure may also find it difficult to apply market data in initial management earnings forecasts.

A second aspect of the range of business environments tested in *H3* is exposure to uncertainty. Business uncertainty is related to two proxy variables: volatility of sales growth and volatility of NI. Firms operating in unstable, uncertain business environments may face difficulty in conducting earnings forecasts for the coming fiscal year. As such, *H3a* predicts a positive correlation between abnormal accruals and initial MFERR for firms operating in uncertain business environments or facing difficulty in analyzing economic information. *H3b* predicts a negative correlation between abnormal accruals and forecast revisions for firms operating in uncertain business environments or facing difficulty in analyzing economic information. The coefficients γ_2, γ_3, γ_5, and γ_6 are compared in each portfolio.

Sample selection

This study applies accounting data and forecast data from *The Nikkei* NEEDS Financial QUEST database[6]. Firms with five years of data available for the period 2002-2012 were used to estimate both normal and abnormal accruals.

To evaluate the relationship between management earnings forecasts and accruals over the period 2003-2013, data were selected using two key inclusion criteria:

(1) data must be related to firms listed under Section 1 of the Tokyo Stock Exchange between 2003 and 2013 – this excludes banks, securities companies, insurance firms, or other financial institutions (1,674 firms; maximum time series length: 11 years); and

(2) data must be from firms that are not missing any data needed to perform the analysis (1,278 firms; maximum time series length: 11 years).

Data positioned more than three standard deviations from respective means were treated as outliers and deleted from the data set. The final study sample included 11,414 firm-year observations based on data collected from 1,266 firms (maximum time series length: 11 years).

4. Results

Descriptive statistics

Panel A of Table I summarizes the descriptive statistics for the sample firms. The mean value of the initial MFERR was 0.004. This indicates optimistic initial earnings forecasts across all firms. The mean value of management earnings forecast revisions (REVISION) was −0.004, indicating forecast revisions throughout the fiscal year. These results are consistent with prior studies that report a pattern of optimistic bias in management earnings forecasts issued early in the year followed by downward revisions (Choi and Ziebart, 2004; Kato *et al.*, 2009). The mean score for PSURP was 0.617, suggesting that 61.7 percent of firms achieved their management earnings forecasts.

Panel B of Table I summarizes the Pearson correlations of all variables. The results for MFERR and REVISION show a negative correlation (−0.968). This suggests that managers adjust for errors and revise initial forecasts to enhance the accuracy of

Panel A: descriptive statistics

	Mean	Median	5%	95%	SD
MFERR	0.004	0.001	−0.024	0.044	0.021
REVISION	−0.004	0.000	−0.043	0.021	0.020
WCA	0.002	0.001	−0.062	0.068	0.040
ABWCA	0.000	0.000	−0.037	0.037	0.023
NABWCA	0.002	0.001	−0.050	0.054	0.033
ROA	0.024	0.021	−0.031	0.081	0.035
PSURP	0.617	1.000	0.000	1.000	0.486
DEBTR	0.548	0.555	0.233	0.840	0.186
LOSS	0.135	0.000	0.000	1.000	0.341
ΔSALES	0.016	0.021	−0.187	0.200	0.123
MTB	1.216	0.974	0.418	2.753	0.954
RET	0.009	0.001	−0.609	0.644	0.370
MVE	10.841	10.618	8.681	13.710	1.530

Panel B: Pearson's correlations

	REVISION	WCA	ABWCA	NABWCA	ROA	PSURP
MFERR	−0.968	0.066	0.074	0.027	−0.051	−0.121
REVISION	1.000	−0.064	−0.076	−0.024	0.037	0.107
WCA		1.000	0.544	0.813	0.184	0.008
ABWCA			1.000	−0.046	0.196	0.037
NABWCA				1.000	0.083	−0.016
ROA					1.000	0.133
PSURP						1.000
	DEBTR	LOSS	ΔSALES	MTB	RET	MVE
MFERR	0.002	0.069	0.000	−0.050	−0.230	−0.038
REVISION	0.005	−0.061	−0.008	0.051	0.230	0.031
WCA	−0.071	−0.146	0.159	0.020	−0.016	0.073
ABWCA	−0.027	−0.181	0.160	0.026	0.083	0.039
NABWCA	−0.066	−0.048	0.078	0.006	−0.077	0.060
ROA	−0.351	−0.610	0.400	0.367	0.199	0.241
PSURP	0.034	−0.121	0.062	0.076	0.156	0.137
DEBTR	1.000	0.162	−0.022	0.108	0.020	−0.055
LOSS		1.000	−0.289	−0.100	−0.194	−0.164
ΔSALES			1.000	0.215	0.146	0.128
MTB				1.000	0.250	0.326
RET					1.000	0.108
MVE						1.000

Table I. Summary of descriptive statistics and Pearson's correlations

forecasts throughout the fiscal year. Although WCA were positively related to both ABWCA and NABWCA, the results indicate a negative correlation between ABWCA and NABWCA (−0.046). Prior studies did not separate ABWCA and NABWCA. Because there is a negative correlation between ABWCA and NABWCA, the correlation between either one of these variable with earnings forecast may present a different result.

Gong *et al.* (2009) report a positive correlation between WCA and MFERR. The current study supports this finding and extends this analysis with a comparison of earnings forecasts as well as forecast revisions in relation to both WCA and ABWCA. Consistent with *H1*, a positive relationship was found when MFERR was evaluated against WCA and ABWCA (0.066 and 0.074, respectively). *H2* was also confirmed with a negative correlation detected when REVISION was evaluated against WCA and ABWCA (−0.064 and −0.076, respectively). Although correlations between MFERR and the control variables were all consistent with the expected results, relationships between REVISION and some control variables (i.e. DEBTR, ΔSALE) were not.

Relationship between accruals and MFERR

Table II summarizes initial MFERR and final MFERR for each portfolio (ABWCA, NABWCA, and WCA). The highest mean (median) value of initial MFERR was recorded in Category 5 of the WCA portfolio (mean = 0.0061, median = 0.0018). The lowest mean (median) value of initial MFERR was recorded in Category 1 of the WCA portfolio (mean = 0.0027, median = −0.0002). These results are consistent with prior studies. Gong *et al.* (2009) report large initial MFERR values corresponding to large WCA values. The ABWCA portfolio presented results similar to that of the WCA portfolio. This suggests a positive correlation between ABWCA and initial MFERR.

		ABWCA		NABWCA		WCA		
		Mean	Median	Mean	Median	Mean	Median	Obs.
Initial earnings forecast errors								
Highest	5	0.0061	0.0017	0.0046	0.0013	0.0061	0.0018	2,282
	4	0.0044	0.0010	0.0037	0.0009	0.0046	0.0012	2,283
	3	0.0041	0.0010	0.0031	0.0004	0.0028	0.0005	2,283
	2	0.0024	−0.0001	0.0042	0.0006	0.0026	0.0001	2,283
Lowest	1	0.0019	−0.0003	0.0031	0.0000	0.0027	−0.0002	2,283
		Diff. mean	*t*-stat.	Diff. mean	*t*-stat.	Diff. mean	*t*-stat.	
(5)−(1)		0.0043	6.290***	0.0015	2.233**	0.0034	5.086***	
Final earnings forecast errors								
Highest	5	−0.0005	−0.0002	−0.0005	−0.0002	−0.0004	−0.0002	2,282
	4	−0.0005	−0.0002	−0.0004	−0.0002	−0.0006	−0.0002	2,283
	3	−0.0005	−0.0002	−0.0006	−0.0002	−0.0005	−0.0002	2,283
	2	−0.0005	−0.0002	−0.0004	−0.0002	−0.0005	−0.0003	2,283
Lowest	1	−0.0007	−0.0002	−0.0007	−0.0002	−0.0007	−0.0002	2,283
		Diff. mean	*t*-stat.	Diff. mean	*t*-stat.	Diff. mean	*t*-stat.	
(5)−(1)		0.0002	0.961	0.0002	1.175	0.0003	1.918*	

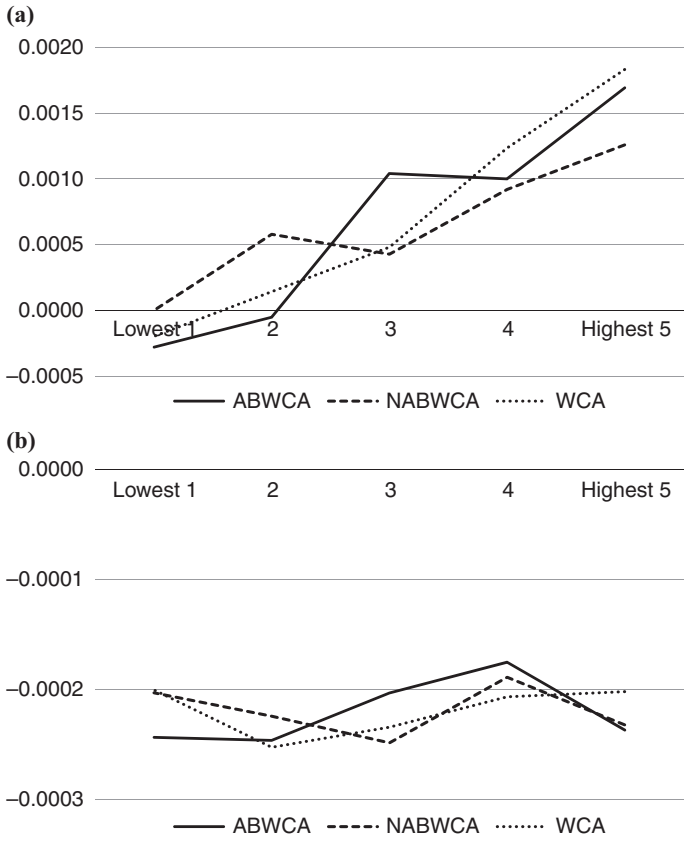
Table II. Relationship between accruals and management forecast errors

Notes: The table presents the mean and median forecast errors in each portfolio. Portfolios were determined according to accrual levels (ABWCA, NABWCA, and WCA). *,**,***Statistically significant at the 10, 5, and 1 percent levels, respectively

Final MFERR mean and median values are negative in all portfolios. This indicates that, regardless of the magnitude of accruals, managers have a tendency to apply downward forecast revisions to promote favorable variances against actuals. A significant difference was not observed in the mean value of the final MFERR between Categories 1 and 5 in the ABWCA portfolio. These results suggest that the relationship between accruals and MFERR weakens throughout the fiscal year. Figure 1 illustrates the positive relationship between accruals and MFERR.

Results of H1 and H2

Models 1 and 2 of Table III summarize the results of tests for *H1*. According to Model 1, the coefficient associated with WCA is positive and statistically significant ($\gamma_1 = 0.026$, $t = 3.401$). This result is consistent with *H1a* as well as the results of prior studies (Gong *et al.*, 2009). Model 2 indicates that ABWCA is a significant, positive predictor of MFERR ($\gamma_2 = 0.075$, $t = 4.903$). However, the coefficient for NABWCA is not significant ($\gamma_3 = 0.005$). This result supports *H1b*, suggesting a positive correlation between accruals and initial MFERR.



Notes: (a) Accruals and initial earnings forecast errors (median); (b) accruals and final earnings forecast errors (median). The vertical axis in the figure represents the magnitude of the forecast error

Figure 1. Relationship between accruals and management forecast errors

	Exp. sign	Model 1 MFERR Coeff.	*t*-stat.	Model 2 MFERR Coeff.	*t*-stat.	Exp. sign	Model 3 REVISION Coeff.	*t*-stat.	Model 4 REVISION Coeff.	*t*-stat.
Const.		0.001	0.140	0.001	0.122		−0.001	−0.195	−0.001	−0.177
WCA	+	0.026	3.401***			−	−0.022	−2.924***		
ABWCA	+			0.075	4.903***	−			−0.069	−4.566***
NABWCA	?			0.005	0.505	?			−0.001	−0.101
ROA	?	0.055	2.410**	0.053	2.325**	?	−0.058	−2.919***	−0.056	−2.826***
PSURP	?	−0.003	−8.609***	−0.003	−8.507***	?	0.002	5.635***	0.002	5.552***
DEBTR	+	0.005	2.821***	0.005	2.530**	−	−0.005	−3.131***	−0.004	−2.799***
LOSS	+	0.001	1.528	0.001	1.680*	−	−0.001	−1.928*	−0.002	−2.110**
ΔSALE	−	0.001	0.169	0.000	0.080	+	−0.001	−0.184	0.000	−0.095
MTB	−	−0.001	−3.521***	−0.001	−3.449***	+	0.001	3.696***	0.001	3.694***
RET	−	−0.006	−4.101***	−0.006	−4.157***	+	0.006	4.166***	0.006	4.215***
MVE	−	0.000	−0.109	0.000	−0.039	+	0.000	−0.098	0.000	−0.163
MFERR lag 1	+	0.151	3.352***	0.157	3.522***	−	−0.137	−3.398***	−0.143	−3.569***
MFERR lag 2	+	0.018	0.955	0.016	0.826	−	−0.012	−0.699	−0.010	−0.568
YEARDUM		Yes		Yes			Yes		Yes	
INDDUM		Yes		Yes			Yes		Yes	
Obs.		11,414		11,414			11,414		11,414	
R^2		0.164		0.168			0.160		0.164	
Adj. R^2		0.160		0.164			0.156		0.160	

Table III.
Main results

Notes: To mitigate the effects of cross-sectional correlations, standard errors were computed after clustering observations by year. *,**,***Statistically significant at the 10, 5, and 1 percent levels, respectively

Models 3 and 4 of Table III summarize the results of tests for *H2*. According to Model 3, WCA is a significant, negative predictor of MFERR ($\gamma_4 = -0.022$, $t = -2.924$). This result is consistent with *H2a*. The results of Model 4 show a significant, negative coefficient for ABWCA ($\gamma_5 = -0.069$, $t = -4.566$); however, the coefficient for NABWCA was not significant ($\gamma_6 = -0.001$). Consistent with *H2b*, these results indicate a negative relationship between accruals and forecast revisions.

The coefficients for the control variables are nearly all consistent with the expected results. ROA and PSURP demonstrated significant correlation with initial MFERR – a result matching the research of Gong *et al.* (2009). The proxies for financial distress (DEBTR and LOSS) are positively related to initial forecast errors; the proxy for growth potential (MTB) shows a negative correlation with initial forecast errors; past stock returns (RET) are negatively related to initial forecast errors; and the lag variable associated with forecast errors (MFERR lag 1) is persistent in year *t*. The signs of these coefficients are opposite in Models 3 and 4. These results are consistent with the outcomes predicted. The proxies for growth potential (ΔSALE) and firm size (MVE), as well as the lagged variable for forecast errors (MFERR lag 2) were not significant.

Results for H3

Table IV summarizes the different effects of accruals on initial MFERR on a portfolio-by-portfolio basis. Two portfolios accounting for firm size and profitability were established to represent firms facing difficulty in analyzing economic information. The coefficient for ABWCA among small firms (i.e. SIZE < median) was found to be nearly twice as large as that among other firms. This coefficient difference between these two subsamples is statistically significant at the 5 percent level. This result supports *H3a*.

	Groups that rely on accounting [1] Coefficient	*t*-stat.	Control groups [2] Coefficient	*t*-stat.	[1]/[2] Coeff. ratio	*F*-stat.
	SIZE < median		SIZE ⩾ median			
ABWCA	0.102	4.823***	0.049	3.042***	2.085	6.195**
NABWCA	0.010	1.024	−0.004	−0.360	−2.397	1.904
Obs.	5,706		5,708			
Controls	Yes		Yes			
Adj. R^2	0.154		0.184			
	LOSS = 1		LOSS = 0			
ABWCA	0.110	2.954***	0.068	3.964***	1.620	1.261
NABWCA	−0.003	−0.085	0.004	0.627	−0.614	0.059
Obs.	1,536		9,878			
Controls	Yes		Yes			
Adj. R^2	0.097		0.185			
	ΔSALES VOL. ⩾ median		ΔSALES VOL. < median			
ABWCA	0.106	6.090***	0.035	1.643	3.067	9.212***
NABWCA	0.007	0.531	0.001	0.208	5.447	0.264
Obs.	5,307		6,107			
controls	Yes		Yes			
Adj. R^2	0.187		0.142			
	ROA VOL. ⩾ median		ROA VOL. < median			
ABWCA	0.102	5.446***	0.028	2.838***	3.696	22.502***
NABWCA	0.004	0.294	0.005	0.712	0.724	0.014
Obs.	5,262		6,152			
Controls	Yes		Yes			
Adj. R^2	0.197		0.161			

Notes: This table illustrates the relationship between firm characteristics and management earnings forecast errors. To mitigate the effects of cross-sectional correlations, standard errors were computed after clustering observations by year. Sample firms (or firm-years) were grouped by SIZE, LOSS, ΔSALES volatility, and ROA volatility. SIZE is the natural log of total assets. LOSS is a dummy variable that takes a value of 1 if the firm experiences a loss in year *t*, and 0 for all other scenarios. ΔSALES (ROA) volatility is the standard deviation of ΔSALES (ROA) in each firm's time series. To mitigate the effects of multicollinearity, the LOSS dummy variable is removed from the regression model in the estimation of the LOSS portfolio. **,***Statistically significant at the 5, and 1 percent levels, respectively

Table IV. Firm characteristics in relation to earnings forecast errors

Similarly, the coefficient for ABWCA among unprofitable firms is approximately 1.6 times larger than that of other firms. However, this coefficient difference between these two subsamples is not statistically significant.

A second set of portfolios was established to account for the impact of uncertain business environments (including environments of volatile sales growth and volatile NI) in computing earnings forecasts. The ABWCA coefficients for firms operating in volatile business environments were approximately thrice as large as those for other firms in the group (statistically significant at the 1 percent level). These findings also support *H3a*.

Table IV also reports the coefficient differences of NABWCA between each portfolio. The NABWCA coefficient differences between each portfolio were not statistically significant. Comparing the NABWCA coefficient differences and the ABWCA coefficient differences will help make the results clearer. The results suggest that the correlation between abnormal accruals and management forecast errors is stronger for firms operating under conditions of uncertainty or facing difficulty in analyzing economic information.

Table V summarizes the different effects of accruals on forecast revisions on a portfolio-by-portfolio basis. The ABWCA coefficients among small firms (i.e. SIZE < median) were approximately twice as large as those of other firms. Additionally, the ABWCA coefficients for firms operating in volatile business environments were approximately thrice as large as that for other firms. These results are generally consistent with *H3b*. In summation, the results in Tables IV and V, when combined, indicate that management earnings forecasts are more dependent on accounting information when firms are operating in uncertain business environments or facing difficulty in analyzing economic information.

5. Conclusion

This study investigates the relationships between accruals and initial MFERR, and between accruals and forecast revisions. My analyses reveal a positive relationship between accruals and initial management forecast errors. The results also indicate a negative relationship between accruals and forecast revisions. The latter finding

	Groups that rely on accounting [1]		Control groups [2]		[1]/[2]	
	Coefficient	*t*-stat.	Coefficient	*t*-stat.	Coeff. ratio	*F*-stat.
	SIZE < median		SIZE ⩾ median			
ABWCA	−0.094	−4.542***	−0.044	−2.627***	2.120	4.911**
NABWCA	−0.006	−0.565	0.006	0.580	−0.891	1.331
Obs.	5,706		5,708			
controls	Yes		Yes			
Adj. R^2	0.148		0.186			
	LOSS = 1		LOSS = 0			
ABWCA	−0.090	−2.342**	−0.065	−4.006***	1.375	0.430
NABWCA	0.004	0.151	0.000	−0.068	−9.165	0.033
Obs.	1,536		9,878			
Controls	Yes		Yes			
Adj. R^2	0.091		0.183			
	ΔSALES VOL. ⩾ median		ΔSALES VOL. < median			
ABWCA	−0.097	−4.951***	−0.033	−1.897*	2.996	8.663**
NABWCA	−0.002	−0.186	0.001	0.222	−1.610	0.145
Obs.	5,307		6,107			
Controls	Yes		Yes			
Adj. R^2	0.184		0.139			
	ROA VOL. ⩾ median		ROA VOL. < median			
ABWCA	−0.093	−4.538***	−0.028	−3.559***	3.358	13.136**
NABWCA	0.002	0.151	−0.004	−0.563	-0.475	0.265
Obs.	5,262		6,152			
Controls	Yes		Yes			
Adj. R^2	0.194		0.151			

Notes: This table illustrates the relationship between firm characteristics and earnings forecast revisions. To mitigate the effects of cross-sectional correlations, standard errors were computed after clustering observations by year. Sample firms (or firm-years) were grouped by SIZE, LOSS, ΔSALES volatility, and ROA volatility. SIZE is the natural log of total assets. LOSS is a dummy variable that takes a value of 1 if the firm experiences a loss in year *t*, and 0 for all other scenarios. ΔSALES (ROA) volatility is the standard deviation of ΔSALES (ROA) in each firm's time series. To mitigate the effects of multicollinearity, the LOSS dummy variable is removed from the regression model in the estimation of the LOSS portfolio. *,**,***Statistically significant at the 10, 5, and 1 percent levels, respectively

Table V.
Firm characteristics in relation to earnings forecast revisions

suggests that the relationship between accruals and MFERR becomes weaker toward the fiscal year end. Further, the relationship between accruals and management forecast errors (revisions) is more pronounced among firms operating under conditions of uncertainty or facing difficulty in analyzing economic information.

The primary contribution of this study is its analysis of the relationship between abnormal accruals and forecast errors (revisions). Prior studies have identified a positive relationship between accruals and MFERR; however, little attention has been paid to the specific implications of abnormal accruals. In addition, this paper provides a preliminary discussion of the cost of mandatory earnings forecasts. It is plausible the relationship between accruals and MFERR indicates the magnitude of economic costs incurred by a firm under the mandatory forecast disclosure requirement. The study results suggest that uncertain business environments could complicate earnings forecast disclosures, the repercussions of which are predicted to be manifested in an uneven spread of economic costs. By focussing on the relationship between accruals and MFERR (revisions), Japanese policy makers may be able to address the mandatory forecast disclosure requirement adequately.

The study's findings contribute to the literature, but limitations exist. In particular, the economic costs associated with mandatory earnings forecast disclosures have not been quantified. Investors who perceive a firm to be operating under conditions of uncertainty could discount the value of the firm according to the potential economic costs associated with uncertainty. Similarly, investors who do not understand the relationship between uncertainty and increased economic costs could incorrectly estimate a firm's value. It may be possible to measure economic costs using a comprehensive event study.

Notes

1. *The Nikkei* (2007) conducted a survey of 454 major Japanese firms. The results of this survey found 44 percent of firms claiming to practice cautious disclosure of management earnings forecasts to avoid downward revisions. Firms most affected by external factors (e.g. exchange rates) were found to disclose the most conservative forecasts.
2. Under the guidelines for publishing earnings reports, firms are required to revise forecasts immediately when a significant change to a previous forecast occurs. The term "significant" is defined as a 10 percent change in sales or 30 percent change in earnings.
3. Xu (2010) argued that management forecast errors can be determined by subtracting forecast earnings from actual earnings. Using this calculation method, the original paper indicated a negative relationship between accruals and forecast errors.
4. Hui *et al.* (2009) also explored the relationship between forecast disclosure and accounting behavior. Their results suggested the existence of a negative relationship between accounting conservatism and the frequency of earnings forecasts.
5. For the purposes of the current study, economic information (as described by Palepu *et al.*, 2004) comprises industry-level factors (e.g. industry growth, degree of competition, legal regulation, and bargaining power in input and output markets) and firm-level factors (e.g. business strategy, sources of competitive advantage).
6. Listed Japanese firms typically release point forecasts of annual earnings. However, under justified circumstances, firms can release range forecasts. In this case, the database includes the lower limit value of the range forecast.

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