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Earnings management to avoid earnings decreases and losses: Empirical evidence from Japan

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Abstract

The main purpose of this study is to investigate *whether* and *how* Japanese firms manage reported earnings to avoid decreases in earnings and losses. Burgstahler and Dichev (1997) examine the distribution of reported earnings to assess whether there is any evidence of earnings management. In this study, we first investigate *whether* Japanese firms use earnings management to avoid decreases in earnings and losses by examining earnings distribution. However, this approach has several disadvantages. For one thing, the test of earnings distribution does not capture the magnitude of earnings management. What is more, the test of earnings distribution does not specify the method by which earnings are managed. To address this problem, we estimate discretionary accruals to capture the magnitude of earnings management and investigate *how* Japanese firms manage reported earnings. If managers of the firms engage in earnings management, we would find that discretionary accruals of these firms are unusually higher than other firms.

We expect that a combination of the research of earnings distribution and discretionary accruals can be a powerful approach to examining earnings management. The results in this paper support two hypotheses with respect to earnings management. First, Japanese firm managers engage in earnings management to avoid decreases in earnings and losses. Secondly, Japanese firm managers control accounting accruals with discretion to manage earnings.

1. Introduction

The main purpose of this study is to investigate *whether* and *how* Japanese firms manage reported earnings to avoid decreases in earnings and losses. This study is motivated by numerous earnings management studies in the U.S. Burgstahler and Dichev (1997) and Degeorge et al. (1999), among others, hypothesize that firm managers have incentive to avoid reporting decline in earnings or reporting losses, and examine the distribution of reported earnings around these points. The findings indicate that there are unusually low frequencies of small decreases in earnings and small losses, but there are unusually high frequencies of small increases in earnings and small positive income.

Studying the relation of analysts' forecast and reported earnings, Burgstahler and Eames (1998), Degeorge et al. (1999), and Dechow et al. (2000) show the same empirical regularity holds in analysts' forecast errors. These results suggest that some firms use earnings management to avoid reporting decreases in earnings, negative earnings, or falling short of market expectations.

We refer to these studies as Earnings Distribution Approach (EDA) in earnings management research. Previous research of earnings management, such as Jones (1991) and Dechow et al. (1995), has tried to identify discretionary accruals as a common method of earnings management. We refer to these studies as Discretionary Accruals Approach (DAA) in earnings management research.

Several recent studies have questioned the reliability of measured discretionary accruals and relevance of DAA (Guay et al 1996; McNichols, 2000). EDA does not have to estimate (potentially noisy) discretionary accruals; instead, it inspects the distribution

of reported earnings for abnormal discontinuities at a certain threshold. Furthermore, EDA captures earnings management through cash flows (i.e., reduced advertising expenditure or R&D) that may not be captured by discretionary accrual measures. EDA has some appealing features as a research method (Healy and Wahlen, 1999).

However, it should be noted that EDA also has several disadvantages. First, the test of earnings distribution does not capture the magnitude of earnings management. Secondly, it dose not specify the method by which earnings are managed.

Thus, each of two approaches, EDA and DAA, has both merits and demerits. In this study, we examine earnings management in Japanese firms by applying two approaches together. By using the test of earnings distribution, we investigate *whether* Japanese firms engage in earnings management to avoid decreases in earnings. If earnings are managed by the firm managers, we expect to observe an unusual discontinuity in the earnings distribution. By estimating discretionary accruals, we investigate *how* Japanese firm managers manage reported earnings. If some managers have been using earnings management, we would find that discretionary accruals of these firms are unusually higher than for other firms. We expect that a combination of two approaches, EDA and DAA, can be a powerful method to test earnings management.

The evidence in this paper supports two hypotheses about earnings management by Japanese firms. The first hypothesis is that Japanese firm managers manage reported earnings to avoid decreases in earnings and losses. Our test of earnings distribution shows that the frequencies of small decreases in earnings and small losses are abnormally low relative to other regions of the distribution, while the frequencies of small increases in earnings and small positive earnings are abnormally high. We interpret these findings as evidence that Japanese firm managers engage in earnings management to avoid decreases

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in earnings and losses. Especially, the distribution of earnings levels indicates that Japanese firm managers have very strong incentive to avoid earnings losses.

The second hypothesis is that managers use accounting accruals as a method of earnings management. We find the evidence to show that managers control accounting accruals with discretion to manage reported earnings upward when pre-managed earnings are losses or decreases. We also find that the prevalence of earnings management is associated with the cost of earnings management. Our results suggest that firms which can manage earnings at low cost are more likely to engage in earnings management to move from negative pre-managed earnings to positive post-managed earnings.

The remainder of this paper is organized as follows. Section 2 outlines the sample selection procedure and describes the variables used in this study. Section 3 reports the empirical results of the earnings management. Section 4 concludes with a summary.

2. Sample selection and variable measurement

2.1 Sample selection

The sample is selected from the period 1990-2000 using the following criteria:

ⅰ) The firms are listed on at least one of the eight stock exchanges in Japan or traded on the over-the-counter market[1].

ⅱ) Financial statements data necessary to the study is available from *Nikkei- Zaimu Data.*

ⅲ) Banks, securities firms, and insurance firms are deleted.

The income statement in Japan is divided into three major sections, namely, operating

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[1] The eight stock exchanges are Tokyo, Osaka, Nagoya, Sapporo, Niigata, Kyoto, Hiroshima and Fukuoka.

income, ordinary income, and net income. Operating income includes revenue and expenses arising from operations such as sales, cost of sales, selling expenses, and general and administrative expenses. Ordinary income, which follows operating income, includes revenues and expenses arising from sources other than from business operations such as interest and gains or losses on the sale of marketable securities. Other income or loss items, except extraordinary items, should be included to arrive at ordinary income. Net income follows ordinary income and includes certain prior period adjustments, gains or losses on the sales of fixed assets, and other extraordinary items.

We have studied earnings management of ordinary income and net income. The results are generally consistent for these two measures of earnings. We mainly show the results of net income.

The earnings measures are scaled by beginning-of-the-year total assets to adjust firm size. In this paper, we investigate two earnings variables. One is earnings change and the other is earnings level. For the earnings change study, there are 20,245 firm-year observations and for the earnings level study, there are 20,464 firm-year observations.

Table 1 shows descriptive statistics about two earnings variables.

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Please insert Table 1 about here.

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2.2 Discretionary accruals proxy

We focus on discretionary accruals to observe earnings management of the firms. The discretionary accruals are estimated as total accruals (TAC) minus non-discretionary accruals (NDA). Non-discretionary accruals are calculated using a cross-sectional Jones model (cf. DeFond and Jiambalvo, 1994; Subramanyam, 1996). We use the

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cross-sectional model to control for the effect of changing industry-wide economic conditions on total accruals and allow the coefficient to vary across years. Estimating the cross-sectional accruals model, each firm-year sample is assigned to an estimation portfolio that consists of similar firms matched on the Nikkei industry classification code (*Nikkei sangyo chu-bunrui*) and the fiscal year.

Kasznik (1999) estimates non-discretionary accruals as a function of change in revenue adjusted for the change in receivables, the level of property, plant and equipment, and the change in cash flow from operation. As the reason for this additional variable[2], Kasznik (1999) has indicated that Dechow (1994) finds that the change in operating cash flow is negatively correlated with total accruals. Following the model used in Kasznik (1999), we include the change in operating cash flow among variables to estimate non-discretionary accruals.

Our model to estimate non-discretionary accruals is as follows:

$$TAC_{j,p} = \alpha_p + \beta_{1,p}(\Delta REV_{j,p} - \Delta REC_{j,p}) + \beta_{2,p}PPE_{j,p} + \beta_{3,p}\Delta CFO_{j,p} + \varepsilon_{j,p}$$

where:

TAC = (Δ Current Assets - Δ Cash and cash equivalents) - (Δ Current liabilities - Δ Financing item[3]) - Δ Other allowance[4] - Depreciation

Δ REV = Δ Sales revenue

Δ REC = Δ Accounting receivables

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[2] Many of prior studies use the accruals model of Jones (1991), which estimates non-discretionary accruals as a function of change in revenue and the level of property, plant and equipment. It does not include changes in cash flow from operation as a explanatory variable.
[3] Δ Financing item is the sum of following item: the change in short-term debt, the change in commercial paper, the change in bond and convertible bond.
[4] Δ Other allowance is the change in allowances classified into fixed assets.

PPE = Gross property, plant, and equipment

Δ CFO = Δ (EBEI – TAC)

EBEI = Net income - gain from extraordinary item + loss from extraordinary item

=Ordinary income

A Suffix j denotes firm index for the number of firms within estimation portfolio p. All variables are deflated by total assets at the beginning of the year. Table 2 provides descriptive statistics for OLS estimation of the model. As expected, the coefficient on the change in operating cash flow is generally negative (98%). The mean (median) Adj. R^2 of the estimation model is 0.569 (0.594). The results are almost the same as Kasznik's (1999,Table 3, p.66).

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Please insert Table 2 about here.

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Using estimated coefficients of the model, we measure the non-discretionary accruals (NDA) for firm-year samples assigned to estimation portfolio p. The difference between total accruals and measured non-discretionary accruals is a proxy for discretionary accruals (DA). We define pre-managed earnings (PME) as net income (NI) minus discretionary accruals (Table 1 summarizes descriptive statistics for them):

DA = TAC - NDA

PME = NI - DA

3. Test of earnings distribution

3.1 Existence of earnings management to avoid earnings decreases

We present graphical evidence in the form of histograms of the pooled cross-sectional empirical distributions of scaled earnings changes. Earnings management to avoid decreases in earnings is likely to be reflected in cross-sectional distributions of earnings in the form of unusually low frequencies of small decreases in earnings and unusually high frequencies of small increases in earnings.

Figure 1 shows the distribution of earnings changes scaled by total assets ((*Earnings t – Earnings $t-1$*) / *TA $t-2$*). Positive values of earnings changes consist of the firms' successfully avoiding decreases in earnings, and negative values consist of the firms' reporting decreases in earnings. If managers are trying to avoid decreases in earnings, we expect to observe unusually few observations immediately to the left of zero, and an unusually large number of observations immediately to the right of zero.

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Please insert Figure 1 about here.

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Figure 1 is a histogram of the scaled earnings change with histogram interval widths of 0.00025 for the range -0.01 to +0.01. The scaled earnings changes greater than 0.01 or less than -0.01 are not shown here. The figure shows a single-peaked, bell-shaped distribution with an irregularity near zero. Our result is similar to Figure 1 of Burgstahler and Dichev (1997, p.105). The irregularity means that earnings changes slightly less than zero occur less frequently than would be expected given the smoothness of the remainder of the distribution, and earnings changes slightly higher than zero occur more frequently

than would be expected. This empirical distribution with an irregularity near zero is consistent with earnings management to avoid decreases in earnings.

The significance of this irregularity near zero is confirmed by the statistical test. We apply the standardized differences test based on Burgstahler and Dichev (1997, pp.102-103) to test the significance of the irregularity. The standardized differences is the difference between the actual number of observations in an interval and the expected number of observations in the interval (operationally defined as the average of the number in the two adjacent intervals) divided by the estimated standard deviation of the difference[5]. This test relies on the assumptions that the distribution of scaled earnings is relatively smooth. For smooth earnings distribution not affected by earnings management, the distribution of standardized differences should be approximately normal with mean 0 and standard deviation 1. Therefore, the critical values for a one-tailed test of significance at levels of 0.05, 0.01, and 0.001 are, respectively, 1.645, 2.236, and 3.090.

The standardized differences corresponding to the intervals immediately adjacent to zero provide two alternative tests for earnings management, but the relative power of the two alternative tests will depend on what pattern describes the effect of earnings management on the empirical distribution of earnings. In this study, the result below focus on standardized differences for the interval left of zero as the primary test of statistical significance (cf. Burgstahler, 1997, p.10).

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[5] Tests based on the standardized differences assume the number of observations in an interval is a random variable which is independent of the number of observation in adjacent intervals. Thus, the variance of this difference is approximately the sum of the variances of the components of the difference. Denoting the probability that an observation will fall into interval i by p_i, the variance of the differences between the observed and expected number of observation for interval i is approximately $Np_i(1-p_i)+(1/4)N(p_{i-1}+P_{i+1})(1-p_{i-1}-p_{i+1})$.

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Please insert Table 3 about here.

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The standardized differences for Figure 1 and Figure 2 are summarized in Table 3. The two left side columns report the values of test intervals: standardized difference for the interval immediately left of zero and standardized difference for the interval immediately right of zero. "Values for standardized differences for the remaining 76 intervals" in Table 3 include standardized differences for 76 of 80 shown in each of the figures, where the four omitted standardized differences correspond to the two intervals adjacent to zero, the most extreme negative and the most extreme positive interval[6].

The standardized difference for the interval immediately left of zero (right of zero) is -7.425 (9.641). These results suggest that there are significantly less (more) observation than expected under smoothness in the interval immediately left of zero (right of zero). In addition, these standardized differences are much larger in absolute magnitude than standardized differences for the remaining 76 intervals in Table 3: the next largest standardized difference has a value of -3.427. Thus, the statistical tests confirm that there is empirical irregularity near zero that is consistent with managerial action to avoid decreases in earnings.

3.2 Existence of earnings management to avoid earnings losses

We present graphical evidence in the form of histograms of the pooled cross-sectional empirical distributions of scaled earnings losses. Earnings management to avoid losses is

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[6] The standardized differences for most extreme intervals are undefined because there is an adjacent interval on only one side. Note that the expected number of observations in any given interval of the distribution is the average of the number in the two *adjacent* intervals.

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likely to be reflected in cross-sectional distributions of earnings in the form of unusually low frequencies of small losses and unusually high frequencies of small positive earnings.

Figure 2 is the distribution of earnings levels scaled by total assets (*Earnings$_t$ /TA$_{t-1}$*). Positive values of earnings consist of the firms successfully avoiding earnings losses and negative values consist with the firms' reporting of losses. If managers are trying to avoid losses, we expect to observe unusually few observations immediately to the left of zero and an unusually large number of observations immediately to the right of zero.

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Please insert Figure 2 about here.

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Figure 2 is a histogram of the scaled earnings with histogram interval widths of 0.0015625 for the range -0.05 to +0.05. The scaled earnings changes greater than 0.05 or less than -0.05 are not shown here. The distributions are approximately a bell-shaped distribution with an extreme irregularity near zero.

Figure 2 shows that earnings slightly less than zero occur much less frequently than would be expected given the smoothness of the remainder of the distribution, and earnings slightly higher than zero occur much more frequently than would be expected. Compared to Figure 1 and previous studies in the U.S., Burgstahler and Dichev (1997, Figure 3, p.109), we observe a more abnormal discontinuity at zero in the earnings distribution. The discontinuity at zero for Figure 2 is clear and much more pronounced than the U.S. firms and decreases in earnings observed in Japanese firms. This result suggests that Japanese firm managers have very strong incentive to avoid losses.

The statistical test shown in the Table 3 confirms the significance of the

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irregularity near zero. The standardized difference for the interval immediately left of

zero is -26.176, and the standardized difference for the interval immediately right of zero

is 12.815. Both values are extremely significant.

Thus overall these results in section 3.1 and 3.2 suggest that Japanese firms

manage reported earnings to avoid decreases in earnings and losses.

4. The method of earnings management

4.1 The method of earnings management to avoid decreases in earnings

In this section we investigate *how* Japanese firms manage reported earnings to

avoid decreases in earnings. We set the hypothesis to be tested that managers control

accounting accruals with discretion to avoid decreases in earnings. In the distribution of

scaled earnings changes (Figure1), we focus on the observations in small regions centered

on zero. Testing the hypothesis, we also focus on the observations in small regions

centered on zero and use a proxy for the earnings changes variable as if there were no

earnings management activity. This is termed pre-managed earnings (PME, see the

definition in the section 2.2). We estimate pre-managed earnings based on the

discretionary accruals and calculate the pre-managed earnings *changes* variable that is

measured as pre-managed earnings minus last reported earnings (($NDE_t - Earnings_{t-1}$

/ TA_{t-2}). If firm managers have tried to avoid decreases in earnings, we would find that

they control accounting accruals with discretion to manage reported earnings upward

when pre-managed earnings changes are decreases.

We research the frequencies of positive and negative earnings changes in small

regions centered on zero and the ratio of firms successfully avoiding decreases in

earnings to all firms in the regions. We show the results in Table 4. This table indicates that the interval between -.000025 and +.000025 includes 120 observations and a ratio of firms avoiding reported decreases in earnings (103 observations) to all firms (120 observations) is 85.8%. Based on pre-managed earnings changes, we observe that a ratio of firms avoiding decreases (69 observations) to all firms (120 observations) is 57.5%.

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Please insert Table 4 about here.

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Results shown in Table 4 can be summarized in two points: First, the ratio of avoiding decreases based on reported earnings is much greater than the ratio based on pre-managed earnings. The difference of the ratio is significant at a 1% level. In all ranges, the ratio of avoiding decreases based on reported earnings is significantly greater than the ratio based on pre-managed earnings. The findings are consistent with the prediction that managers use income-increasing discretionary accruals to avoid decreases in earnings when pre-managed earnings changes are decreases.

Second, the longer intervals to be observed is (i.e., moving down the line of Table 4), the higher ratios of firms avoiding decreases in earnings based on reported earnings, while the ratios of firms avoiding decreases in earnings based on pre-managed earnings are relatively stable. This result suggests a relation between costs of earnings management and a firm's earnings management activity. We interpret this to mean that firms with pre-managed earnings slightly below the target find it relatively less costly to avoid decreases in earnings. In contrast, firms with pre-managed earnings largely below the target incur high costs of earnings management. We expect these firms incurring high costs of earnings management to fall into the longer intervals of Table 4. Thus, results

suggest that firms which can manage earnings at low cost are more likely to manage earnings to move from pre-managed decreases in earnings to post-managed increases in earnings.

As the next research of earnings management to avoid decreases in earnings, we directly measure discretionary accruals (DA). Table 5 reports the mean and median DA for the observations shown in Table 4. Columns of "The distribution based on PME changes" and "The distribution based on reported earnings" in Table 5 report the mean (median) DA of decreases in earnings observations and avoiding decreases in earnings observations respectively.

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Please insert Table 5 about here.

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If managers control accounting accruals with discretion to manage reported earnings upward when PME changes are decreases, we expect to observe that discretionary accruals for decreases in earnings observations will be higher than that for avoiding decreases in earnings observations. Our results support this prediction. Table 5 shows, in the interval between -.000025 and +.000025, the mean (median) DA for decreases in earnings observations is 0.027 (0.019), and the mean (median) DA for avoiding decreases in earnings observations is -0.027 (-0.025).

Table 5 also provides the results of the parametric and non-parametric significance tests of the differences between DA for decreases in earnings observations and that for avoiding decreases in earnings observations[7]. In all intervals, the mean (median) DA for

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[7] Parametric test is two-sample t-tests using a common or uncommon variance assumption as appropriate, and non-parametric test is Wilcoxon two-sample tests with normal approximation.

decreases in earnings observations is significantly higher than that for avoiding decreases in earnings observations. On the other hand, the distribution based on reported earnings that is post-managed earnings shows no significant differences in all intervals. Thus all results in section 4.1 indicate that Japanese firm managers control accounting accruals with discretion to avoid decreases in earnings.

4.2 The method of earnings management to avoid losses

We research the frequencies of positive and negative earnings in small regions centered on zero in Figure 2 and the ratio of firms successfully avoiding losses to all firms in the regions. We provide the results on Table 6.

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Please insert Table 6 about here.

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Table 6 shows, in the interval between -0.01 and +0.01, that the ratio of firms successfully avoiding losses based on reported earnings is 93.5%, and that this is significantly greater than the ratio based on pre-managed earnings (53.2%). The same empirical results are found in all remaining intervals. These results are consistent with results from the earnings changes sample (Table 4) and support the prediction that managers use income-increasing discretionary accruals to avoid losses when pre-managed earnings changes are losses.

We also find that the prevalence of earnings management is associated with the length of the intervals. Table 6 shows that the longer intervals observed are the higher ratios of firms avoiding earnings losses based on reported earnings becomes, while the ratios of firms avoiding earnings losses based on pre-managed earnings are stable around 50%.

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This result suggests the relation between costs of earnings management and a firm's earnings management activity. We interpret this to mean that firms with pre-managed earnings slightly below the target find it relatively less costly to avoid earnings losses. In contrast, firms with pre-managed earnings largely below the target involve high costs of earnings management. We expect these firms incurring high costs of earnings management to fall into the longer intervals of Table 6. Thus, results suggest that firms that can manage earnings at low cost are more likely to manage earnings to move from pre-managed decreases in earnings to post-managed increases in earnings.

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Please insert Table 7 about here.

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For the next research of earnings management to avoid earnings losses, we measure discretionary accruals (DA). Table 7 presents the mean and median DA for the observations shown in Table 6. If managers control accounting accruals with discretion to manage reported earnings upward when PME are losses, we expect to find that discretionary accruals for earnings loss observations will be higher than that for avoiding loss observations.

Consistent with our prediction, the mean (median) DA for earnings losses observation is significantly higher than the mean (median) DA for avoiding earnings losses observation in the distribution based on pre-managed earnings. Table 7 shows, in the interval between -0.01 and +0.01, the mean (median) DA for loss observations is 0.032 (0.025), which is higher than the DA for avoiding loss observation (mean -0.038, median -0.024).

Table 7 provides the results of the t test and Wilcoxon test about significance of the

differences between DA for loss observations and that for avoiding loss observations. In all intervals, the mean (median) DA for loss observations is significantly higher than that for avoiding loss observations. On the other side, as for the distribution based on reported earnings that are post-managed earnings, there are no significant differences in all intervals. Thus all results in section 4.2 indicate that Japanese firm managers control accounting accruals with discretion to avoid earnings losses.

4. Conclusion

This study investigates *whether* and *how* Japanese firms manage reported earnings to avoid decreases in earnings and losses. We apply two approaches, EDA and DAA, to examine earnings management. By using tests of earnings distribution, we study *whether* earnings management exists, and by estimating discretionary accruals, we investigate *how* managers engage in earnings management.

The evidence in this paper supports two hypotheses with respect to earnings management. The first hypothesis is that Japanese firm managers engage in earnings management to avoid decreases in earnings and losses. Test of earnings distribution shows that the frequencies of small decreases in earnings and small losses are abnormally low relative to other regions of the distribution, while the frequencies of small earnings increases and small positive earnings are abnormally high. We interpret these findings as evidence that Japanese firm managers engage in earnings management to avoid decreases in earnings and losses. Especially, the distribution of scaled earnings level indicates that these managers have very strong incentive to avoid losses.

The second hypothesis is that Japanese firm managers control accounting accruals with discretion to manage earnings. We provide evidence that managers control

accounting accruals with discretion to manage reported earnings upward when pre-managed earnings (changes) are losses (decreases). We also find that the prevalence of earnings management is associated with the cost of earnings management. Our results suggest that firms which can manage earnings at low cost are more likely to manage earnings to move from negative pre-managed earnings to positive post-managed earnings.

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Table 1. Descriptive statistics

Variables	Mean	Median	S.D.	1Q	3Q
Earnings changes	-0.0004	0.0001	0.0520	-0.0070	0.0061
Earnings	0.0162	0.0146	0.0491	0.0048	0.0302
Discretionary accruals (DA)	0.0001	-0.0006	0.0537	-0.0233	0.0229
Pre-managed earnings (PME)	0.0161	0.0157	0.0654	-0.0120	0.0438

Note: Earnings changes consists of 20,245 firm-year observations. Earnings consists of 20,464 firm-year observations.

Earnings changes: the earnings changes scaled by total assets $((Earnings_t-Earnings_{t-1})/TA_{t-2})$.

Earnings: the earnings level scaled by total assets $(Earnings_t/TA_{t-1})$.

DA : DA are estimated as the difference between total accruals and estimated non-discretionary accruals. Non-discretionary accruals are estimated for each firm year as the predicted value of accruals based on the estimated coefficients of the accruals model (see table 2 for model description).

PME: PME is defined as total accruals minus discretionary accruals.

Table 2. Descriptive statistics for OLS estimation of the accruals model[a,b]

	N	Mean	Median	S.D.	Q1	Q3	% Positive
α	240	0.001	0.001	0.031	-0.011	0.017	52%
t-statistic	240	(0.180)	(0.059)	(1.935)	(-0.895)	(1.341)	
β_1	240	0.010	0.013	0.195	-0.042	0.074	57%
t-statistic	240	(0.559)	(0.300)	(2.693)	(-0.755)	(1.887)	
β_2	240	-0.140	-0.132	0.116	-0.179	-0.082	8%
t-statistic	240	(-2.674)	(-2.596)	(1.893)	(-3.839)	(-1.350)	
β_3	240	-0.515	-0.515	0.193	-0.638	-0.417	2%
t-statistic	240	(-9.240)	(-8.743)	(6.173)	(-12.255)	(-5.040)	
Adj. R^2	240	0.569	0.594	0.217	0.476	0.693	

Note:

[a] The accrual model: $TAC_{j,p} = \alpha_p + \beta_{1,p}(\Delta REV_{j,p} - \Delta REC_{j,p}) + \beta_{2,p}PPE_{j,p} + \beta_{3,p}\Delta CFO_{j,p} + \varepsilon_{j,p}$

TAC: TAC is total accruals, defined as following. TAC = (Δ Current Assets - Δ Cash and cash equivalents) - (Δ Current liabilities - Δ Financing item) - Δ Other allowance – Depreciation. Δ REV: Δ REV is the change in sales revenue. Δ REC: Δ REC is the change in accounting receivables. PPE: PPE is gross property, plant, and equipment. Δ CFO: Δ CFO is the change in cash flow from operation, defined as following. CFO = EBEI - TAC. EBEI = Net income - gain from extraordinary item + loss from extraordinary item. j denotes firm index for the number of firms within estimation portfolio p. All variables are deflated by total assets at the beginning of the year. α, β_1, β_2, β_3 in table denote estimated coefficient on the accruals model.

[b] Each sample firm-year is assigned an estimation portfolio that consists of all firms matched on fiscal year and Nikkei medium-classification code.

Table 3. Standardized differences for Figure 1 and Figure 2

	Values for test intervals		Values for standardized differences for remaining 76 intervals[c]			
	Standardized difference left of 0[a]	Standardized difference right of 0[b]	Mean	Median	Minimum	Maximum
Figure 1	-7.425	9.641	-0.072	0.030	-3.427	2.151
Figure 2	-26.176	12.815	-0.005	0.000	-2.154	3.884

Note:

[a] The standardized difference for the interval immediately left of zero is expected to provide the more powerful test of earnings management to avoid decreases in earnings and losses and should be considered the primary test for earnings management. Negative values represent evidence of earnings management to avoid decreases in earnings or losses.

[b] The standardized difference for the interval immediately right of zero provides an alternative, and probably less powerful, test of earnings management to avoid decreases in earnings or losses. Positive values represent evidence of earnings management to avoid decreases in earnings and losses.

[c] Includes standardized differences for 76 of 80 shown in each of the figures, where the four omitted standardized differences correspond to the two intervals adjacent to zero and the most extreme negative and the most extreme positive interval. (The standardized differences for most extreme intervals are undefined because there is an adjacent interval on only one side).

Table 4. The frequencies of positive and negative earnings changes [a]

Interval	N	The distribution based on PME changes[b]			The distribution based on reported earnings changes[c]		
		$\Delta NI<0$	$0\leq\Delta NI$	% Avoiding decreases[e]	$\Delta NI<0$	$0\leq\Delta NI$	% Avoiding decreases[e]
$-.000025\leq\Delta NI\leq.000025$	120	51	69	57.5%**	17	103	85.8%
$-.00005\leq\Delta NI\leq.00005$	205	102	103	50.2%**	42	163	79.5%
$-.0001\leq\Delta NI\leq.0001$	397	211	186	46.8%**	102	295	74.3%
$-.0002\leq\Delta NI\leq.0002$	727	373	354	48.7%**	215	512	70.4%
$-.0004\leq\Delta NI\leq.0004$	1272	669	603	47.4%**	435	837	65.8%

Note:
[a] This table provides statistics on earrings changes in small regions centered on zero.
[b] Provides the frequencies and the ratio of avoiding decreases in earnings to all earnings changes in the distribution based on pre-managed earnings. Pre-managed earnings is defined as net income minus discretionary accruals.
[c] Provides the frequencies and the ratio of avoiding decreases in earnings to all earnings changes in the distribution based on reported earnings.
[e] Calculates chi-square tests on differences between the ratio based on pre-managed earnings and the ratio based on reported earnings.
** Denotes significance at the 0.01 level

Table 5. Discretionary accruals in small regions centered on zero: Earnings change sample

Interval	All	The distribution based on PME changes			The distribution based on reported earnings changes		
		DA $\Delta NI<0$	DA $0\leq\Delta NI$	t-value[a] z-value[b]	DA $\Delta NI<0$	DA $0\leq\Delta NI$	t-value[a] z-value[b]
$-.000025\leq\Delta NI\leq.000025$							
N	120	51	69	-	17	103	-
Mean	-0.004	0.027	-0.027	-12.64**	-0.013	-0.002	-1.118
(Median)	(-0.005)	(0.019)	(-0.025)	(-9.330)**	(-0.021)	(-0.003)	(-1.298)
$-.00005\leq\Delta NI\leq.00005$							
N	205	102	103	-	42	163	-
Mean	0.000	0.026	-0.027	-14.53**	0.006	-0.002	1.252
(Median)	(-0.001)	(0.016)	(-0.025)	(-12.33)**	(0.001)	(-0.001)	(-0.735)
$-.0001\leq\Delta NI\leq.0001$							
N	397	211	186	-	102	295	-
Mean	0.000	0.029	-0.033	-15.34**	0.003	-0.001	0.653
(Median)	(0.001)	(0.019)	(-0.024)	(-17.18)**	(0.002)	(0.001)	(-0.137)
$-.0002\leq\Delta NI\leq.0002$							
N	727	373	354	-	215	512	-
Mean	0.000	0.029	-0.031	-22.72**	0.001	-0.001	0.388
(Median)	(0.001)	(0.019)	(-0.023)	(-23.30)**	(0.001)	(0.001)	(-0.316)
$-.0004\leq\Delta NI\leq.0004$							
N	1272	669	603	-	435	837	-
Mean	0.001	0.028	-0.030	-31.73**	0.002	0.000	0.606
(Median)	(0.001)	(0.019)	(-0.021)	(-30.79)**	(0.001)	(0.002)	(-0.128)

Note:
This table reports the mean and median DA for the observation specified in table 4.
[a] t-value is based on two-sample t-tests using a common or uncommon variance assumption as appropriate.
[b] z-value is based on Wilcoxon two-sample tests with normal approximation.
** Denotes significance at the 0.01 level

Table 6. The frequencies of positive and negative earnings

Interval	N	The distribution based on pre-managed earnings			The distribution based on reported earnings		
		$NI<0$	$0 \leq NI$	% Avoiding losses	$NI<0$	$0 \leq NI$	% Avoiding losses
$-0.01 \leq NI \leq 0.01$	491	230	261	53.2%**	32	459	93.5%
$-0.02 \leq NI \leq 0.02$	1020	526	494	48.4%**	90	930	91.2%
$-0.03 \leq NI \leq 0.03$	1601	830	771	48.2%**	163	1438	89.8%
$-0.04 \leq NI \leq 0.04$	2169	1099	1070	49.3%**	227	1942	89.5%
$-0.05 \leq NI \leq 0.05$	2746	1366	1380	50.2%**	309	2437	88.7%

Note:
[a] This table provides statistics on earrings in small regions centered on zero.
[b] Provides the frequencies and the ratio of avoiding decreases in earnings to all earnings changes in the distribution based on pre-managed earnings. Pre-managed earnings is defined as net income minus discretionary accruals.
[c] Provides the frequencies and the ratio of avoiding earnings losses to all earnings changes in the distribution based on reported earnings.
[e] Calculates chi-square tests on differences between the ratio based on pre-managed earnings and the ratio based on reported earnings.
** Denotes significance at the 0.01 level

Table 7. Discretionary accruals in small regions centered on zero: Earnings level sample

| Interval	All	The distribution based on pre-managed earnings			The distribution based on reported earnings		
		DA $NI<0$	DA $0 \leq NI$	t-value z-value	DA $NI<0$	DA $0 \leq NI$	t-value z-value
$-0.01 \leq NI \leq 0.01$							
N	491	230	261	-	32	459	-
Mean	-0.005	0.032	-0.038	-18.84**	-0.005	-0.005	0.012
(Median)	(-0.002)	(0.025)	(-0.024)	(-19.13)**	(0.001)	(-0.002)	(-0.133)
$-0.02 \leq NI \leq 0.02$							
N	1020	526	494	-	90	930	-
Mean	-0.001	0.031	-0.035	-28.75**	0.001	-0.001	0.335
(Median)	(0.002)	(0.024)	(-0.022)	(-27.62)**	(0.003)	(0.001)	(-0.285)
$-0.03 \leq NI \leq 0.03$							
N	1601	830	771	-	163	1438	-
Mean	0.001	0.031	-0.032	-37.01**	0.004	0.000	0.906
(Median)	(0.002)	(0.023)	(-0.021)	(-34.57)**	(0.003)	(0.002)	(-0.709)
$-0.04 \leq NI \leq 0.04$							
N	2169	1099	1070	-	227	1942	-
Mean	0.001	0.032	-0.031	-43.16**	0.001	0.003	0.853
(Median)	(0.002)	(0.023)	(-0.020)	(-40.24)**	(0.001)	(0.003)	(-0.587)
$-0.05 \leq NI \leq 0.05$							
N	2746	1366	1380	-	309	2437	-
Mean	0.002	0.033	-0.029	-45.67**	0.002	0.002	-0.004
(Median)	(0.001)	(0.024)	(-0.020)	(-45.18)**	(0.002)	(0.001)	(-0.062)

Note:
This table reports the mean and median DA for the observation specified in table 4.
[a] t-value is based on two-sample t-tests using a common or uncommon variance assumption as appropriate.
[b] z-value is based on Wilcoxon two-sample tests with normal approximation.
** Denotes significance at the 0.01 level

Figure 1. Empirical distribution of change in annual net income; Earnings changes sample
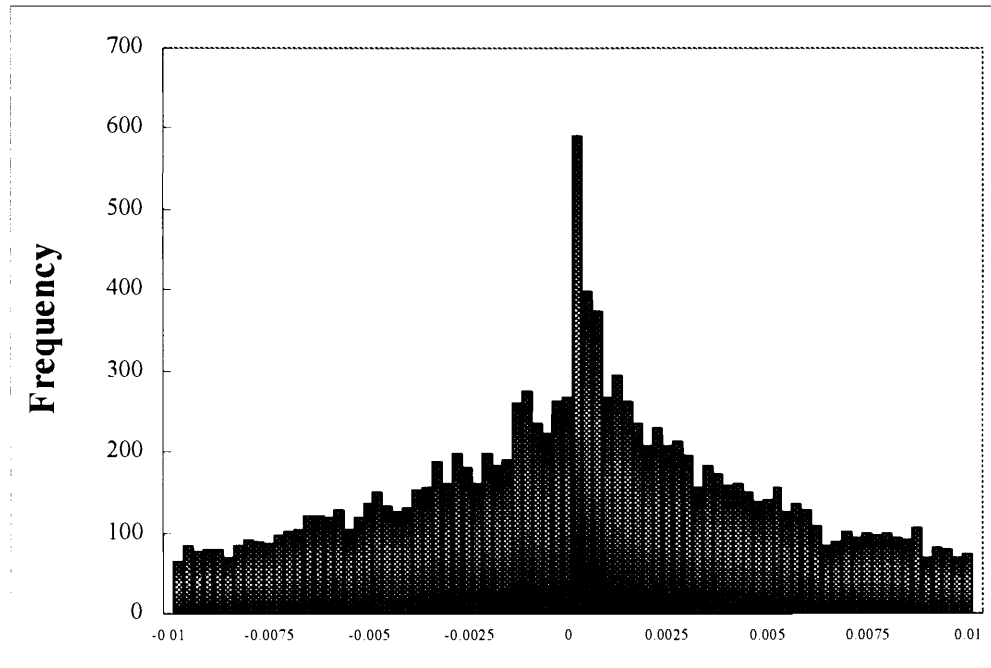
Note: Changes in annual net income are scaled by total assets as of the beginning of the first year; $(Earnings_t-Earnings_{t-1})$ / Total assets$_{t-2}$. The distribution interval widths are 0.00025 and the location of zero on the horizontal axis is marked by the dashed line.

Figure 2. Empirical distribution of annual net income; Earnings level sample
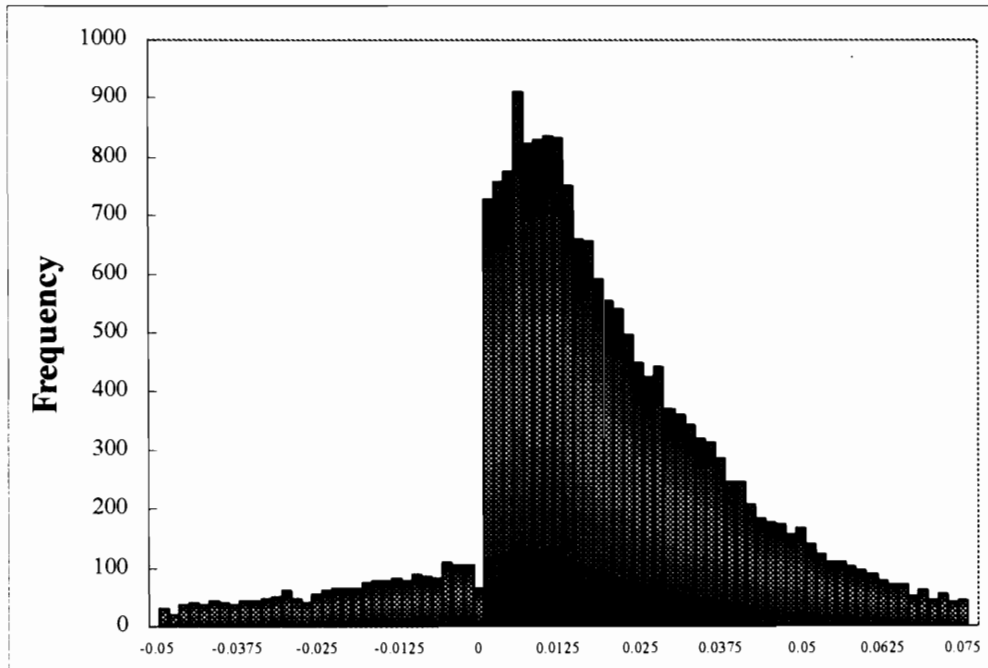
Note: Annual net income is scaled by total assets as of the beginning of the first year; *Earnings*ₜ / *Total assets*ₜ₋₁.
The distribution interval widths are 0.0015625 and the location of zero on the horizontal axis is marked by the dashed line.

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