Accrual-Based Risk Reduction

An Indicator to Identify Managers' Discretion Using a Break-Even Point of Cash Flows[1)]

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1. INTRODUCTION

This paper examines an indicator to transform abnormal accruals (AA) into a proxy for accrual-based risk reduction caused by managers' discretionary behaviors. A break-even point based on operating cash flows $(CFBEP)$ is introduced to derive the indicator[2)]. Early studies specifically addressed total accounting accruals (TA) for the purpose of detecting earnings management (Healy [1985]; DeAngelo [1986]). Later, TA was categorized into an expected component, as nondiscretionary accruals (NDA), and an unexpected residual component, as discretionary accruals (DA). The latter is assigned as a proxy of managers' discretionary behaviors. However, these models presented the possibility of yielding biased results because their residual, AA, is defined as a proxy of an unobservable error term in the estimating model of NDA. Therefore these models were modified by addition of some explanatory variables to improve their NDA estimation precision (Jones [1991]; Dechow et al. [1995]; Kasznik [1999]; Kothari et al. [2001]).

However, in spite of a series of modifications, AA remains primarily useful as the indicator to analyze the vector (downward or upward) of earnings management. This study adds the above indicator as another proxy for managers' discretionary behaviors. The big bath accounting hypothesis should be especially tested to investigate the significance of the indicator[3)]. In addition, total sample firm-years are divided into a subsample for which the sign of AA shows negative to examine behaviors of big bath accounting firms. In this subsample, the sign of AA cannot be used to test for earnings management to any greater

1) I would like to thank the AAA conference of 'Quality of Earnings' participants in Emory University, which was held in 2002 by the American Accounting Association. Particularly, I should express my appreciation to Jane F. Mutchler, Georgia State University and Grace Pownall, Emory University, who enabled me to attend this conference.

2) The word ' break-even point of cash flow ' is introduced in Eiteman [1951] and Kunihiro [1958]. In particular, the *CFBEP* is systematically introduced by Kunihiro [1958] and extended by Kato [1987] from the perspective of financial analysis.

3) The term 'big bath accounting' is ordinarily used to indicate manipulation that temporarily reduces income and can be called 'income-decreasing accounting decision', although the term is typically used when income is reduced by a large amount (Penman [2001]). I do not investigate 'aggressive accounting management' in this paper. That term is used to indicate manipulation that temporarily increases income. Other hypotheses and samples are required for such a study.

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extent, whereas the indicator presented in this paper can be used freely in examination.

Results of this study show that the big bath accounting hypothesis is supported strongly by the indicator within the subsample. These findings can be interpreted that the indicator provides useful assistance for the sign of AA in detecting earnings management.

This paper is organized as follows. Section 2 reviews some prior studies on measurement of DA and examines common properties of these models. Section 3 describes an indicator of risk exposure caused by fluctuation of operating cash flows and another indicator to transform AA into a proxy for the degree of risk reduction. Some working hypotheses associated with the indicator are stated in section 4. Section 5 examines the definition of financially distressed firms to test the working hypothesis; descriptive statistics are shown there. Section 6 presents empirical results for tests of the hypotheses; the last section comprises a conclusion and future subjects for study.

2. MEASURE OF DISCRETIONARY ACCRUALS

Shipper [1989] reported that earnings management is defined as "purposeful intervention in the external reporting process, with the intent of obtaining some private gain to manager or shareholders." The focal point of the study of earnings management is to recognize not only the emergence of managers' discretion, but the influence or incentive of managers' discretionary behaviors. This paper examines managers' incentives toward accrual-based risk reduction as their discretionary behaviors.

In this section, the representative residual models of DA are reviewed in accordance with Dechow et al. [1995]. In these studies, total accruals are defined as the change in non-cash current assets less the change in current liabilities (exclusive of short-term debt and taxes payable), less depreciation and amortization expense as

$$TA_{it} = (\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta STD_{it}) - DEP_{it} \qquad (2.1)$$

where:

TA_{it} = total accruals for firm i in year t;
ΔCA_{it} = change in current assets for firm i between year t and year t-1;
$\Delta \mathrm{Cash}_{it}$ = change in cash and cash equivalent for firm i between year t and year t-1;
ΔCL_{it} = change in current liabilities for firm i between year t and year t-1;
ΔSTD_{it} = change in debt included in current liabilities for firm i between year t and year t-1;
ΔDEP_{it} = depreciation and amortization expense for firm i between year t and year t-1.

When Dechow et al. [1995] examined representative accruals-based residual models[4], they characterized all models in the same general framework to facilitate compatibility by adjusting the original form of each model. Therefore their approach can be formulated as

$$DAP_{it} = TA_{it} - NDA_{it} = TA_{it} - E(TA_{it}), \tag{2.2}$$

where:

DAP_{it} = proxy of discretionary accruals for firm i in year t;
TA_{it} = total accruals for firm i in year t;
NDA_{it} = nondiscretionary accruals for firm i in year t, and
$E(TA)_{it}$ = prediction of total accruals for firm i in year t.

Dechow et al. [1995] argued that the expected value of TA is defined as NDA, and that the difference between TA and NDA is inferred to be a proxy of DA (DAP). In other words, DAP is given as a prediction error (residual) of the regression model of NDA. Therefore, DAP can be called abnormal accruals (AA).

Healy [1985] examined earnings management by comparing mean total accruals as earnings management partitioning variables. He predicted that accrual-based earnings management occurs systematically in every period and that TA in each period could equal NDA. He inferred that the time series of NDA follows a white noise pattern throughout estimation periods. Under his assumption, NDA in every period is independent in preceding and subsequent periods and the mean NDA results in zero. Then DA is computed as $DA = TA - 0$, so that TA in the event period is used as a proxy of DA.

De Angelo [1986] solves the problem of the Healy model using first difference in total accruals. That study presumes that the first difference is equal to zero under the null hypothesis of no earnings management. In other words, TA in previous periods is presumed to equal NDA in the current period. The DeAngelo model can be interpreted as an estimation model with the supposition that the time series of TA follows a random walk process. The first derivative of TA shows a white noise pattern because random walk means a stochastic process of differences in a time series.

A common feature of the Healy and DeAngelo models is that they estimate the magnitude of DA by considering the expected value of TA as a proxy of NDA during estimation periods. However, Kaplan [1985] reported that NDA should be made more accurate to measure such nondiscretionary components directly.

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4) On the other hand, McNichols and Wilson [1988] examined the discretionary portion of a single accrual account. It showed that the effect of allowance on bad assets captured earnings management. They addressed the discretionary component by which managers' accounting choices are likely to be influenced.

Jones [1991] expands the approaches of prior research and allows statistical estimation of NDA. That study introduces regression analysis to separate NDA from TA. This model relaxes the assumption set in Healy [1985] and DeAngelo [1986], whose premise is that NDA is constant. In contrast, Jones [1991] estimates NDA in the event year by the following regression model:

$$NDA = \alpha_1(1/A_{it-1}) + \alpha_2(\Delta REV_{it}) + \alpha_3(PPE_{it}), \tag{2.3}$$

where

ΔREV_{it} = change of sales revenues for firm i in year t scaled by total assets at year t-1;

PPE_{it} = gross property plant and equipment for firm i in year t scaled by total assets at year t-1;

A_{it-1} = total assets for firm i in year t-1, and

α_1, α_2, α_3 = firm specific parameters.

Firm-specific parameters α_1, α_2 and α_3 are given as OLS estimates in the regression model (2.3). This model attempts to control the effect of changes in firms' economic circumstances by which NDA is influenced. Although a contribution of the Jones model is to introduce the regression model of NDA, it includes an implicit problem: sales revenues are considered to be nondiscretionary. This problem biases the orthogonalization related to total accruals and earnings management.

Dechow et al. [1995] proposed eliminating the conjectured tendency of the Jones model. They indicated that revenues include not only components influenced by external economic factors, but also components changed by discretionary management of delivery or shipment. In addition, they show a prediction model of nondiscretionary accruals in which the difference between the change of revenue and the change of revenue on credit sales are adopted as independent variables. By introducing these variables, even as managers attempt to manipulate the volume of sales revenue, the corresponding change of revenue on credit sales absorbs the component of their manipulations. This model is called the "Modified Jones Model" and NDA is estimated during periods in which earnings management is hypothesized as follows:

$$NDA = \alpha_1(1/A_{t-1}) + \alpha_2(\Delta REV_{it} - \Delta REC_{it}) + \alpha_3(PPE_{it}), \tag{2.4}$$

where ΔREC denotes net receivables in year t less net receivables in year t - 1 scaled by total assets at year t - 1.

As noted above, various types of accrual models have been proposed for detecting earnings management[5]. Although these models have been improved incrementally in recent literature, the sign of AA is commonly used as a proxy of DA. This study examines how accurately the sign of AA can indicate managers' discretion and what kind of proxy should be used to analyze earnings management precisely from the financial analysis perspective. Accordingly, a subsequent section proposes the addition of an indicator to transform AA into a proxy for accrual-based risk reduction caused by managers' discretionary behaviors.

3. DISCRETIONARY BEHAVIOR REDUCING CASH FLOW RISK

Even if managers practice upward or downward accrual-based earnings management, they find it difficult to adjust the risk exposure of cash flows stimulated by fluctuation of operating activity. In other words, managers can directly manage firms' reported earnings, but they cannot control the risk of cash flows caused by the uncertain change of sales or other external economic events. The cash flow risk, therefore, emerges as the result of accrual-based earnings management. This section presents a mechanism and indicator of cash flow risk.

3.1 Break-even point based on cash flows

This sub-section proposes a margin of safety ratio and the degree of leverage, both of which are measured on the basis of *CFBEP*.

Operating income is shown as follows according to the process of cost-volume-profit analysis:

$$\begin{aligned} EAR_{it} &= REV_{it} - VC_{it} - FC_{it} \\ &= CM_{it} \cdot REV_{it} - FC_{it}, \end{aligned} \tag{3.1}$$

where

EAR_{it} = operating income for firm i in year t;
REV_{it} = sales revenues for firm i in year t;
VC_{it} = variable cost for firm i in year t;
FC_{it} = fixed cost for firm i in year t;
CM_{it} = contribution margin for firm i in year t and meaning of 1- v_{it} ;
v_{it} = VC -to- REV ratio, VC_{it}/REV_{it}.

Calculation of net cash flows from operating activities (CFO) can be shown as

5) Kasznik [1999] developed a model that controls for the effect of the change of cash flows on the size of *DA*; Kothari et al. [2001] presents a model that controls for the impact of firm performance on *DA*.

$$CFO_{it} = CM_{it} \cdot REV_{it} - FC_{it} - TA_{it}, \tag{3.2}$$

where TA denotes total accruals explained in eq. (2.3). Working capital total accruals (WTA), presented by Chan et al. [2000], are used to accurately clarify the structure of CFO as funds. Then WTA is defined simply as the change of accounts receivable, plus change of inventories, less change of accounts payable, less depreciation and amortization expense.

In eq. (3.1), REV is defined as BEP when EAR is set equal to 0; when volume of CFO is expressed as eq. (3.2) and CFO is set equal to 0, then REV is defined as $CFBEP$. As a result, the following two expressions of break-even points are given, respectively, as:

$$BEP_{it} = \frac{FC_{it}}{CM_{it}}, \tag{3.3}$$

$$CFBEP_{it} = \frac{FC_{it} + TA_{it}}{CM_{it}}. \tag{3.4}$$

Therein, BEP indicates the point of REV at which expenses and revenues balance. In a similar manner, $CFBEP$ indicates REV at a break-even point based on cash flows, at which time cash inflows and outflows balance. Indeed, these two financial indicators can represent a benchmark that reflects the minimum level of continuous operation from the viewpoint of earnings and cash flows.

For eq. (3.4), TA can be divided in two components: AA and NDA. Because NDA is presumed to be influenced by various external factors out of firms' control (e.g. economic events such as recession) aside from managers' discretion, Jones-type models assign REV and PPE to independent variables in each regression model. In particular, REV can actually be influenced by firms' external factors. Therefore NDA is presumed to be generated in proportion to REV; thereby, CFO of eq. (3.2) can be shown as

$$CFO_{it} = (CM_{it} - RNR_{it})REV_{it} - FC_{it} - AA_{it}, \tag{3.5}$$

where RNR denotes the NDA-to-REV ratio: NDA/REV.

The assumption that NDA is simply proportional to sales revenues is problematic because NDA can be considered to be affected by various factors aside from REV. However, this assumption is made because NDA is defined as a statistical expectation and offers the greatest possibility to contain the component affected by firms' external factors that are beyond managers' discretion. Actually, only sales revenues and accounts receivable in the modified Jones model can be considered to serve as factors that are affected directly by

external economic events. Then the influence of discretionary accruals upon $CFBEP$ can be obtained as the following expression:

$$CFBEP_{it} = \frac{FC_{it} + AA_{it}}{CM_{it} - RNR_{it}}. \tag{3.6}$$

AA is included in eq. (3.6) as a proxy of discretionary accruals and affects the position of $CFBEP$. Therefore the following expression of $CFBEP$ excluding managers' discretion can be given as

$$NCFBEP_{it} = \frac{FC_{it}}{CM_{it} - RNR_{it}}, \tag{3.7}$$

where $NCFBEP$ denotes the nondiscretionary cash flows break-even point and is given by eq. (3.5), excluding AA. Thereby, the position of $NCFBEP$ can be isolated as a cash flow break-even point under the condition that managers' discretion has been eliminated. Its value could indicate a benchmark showing whether managers have made discretionary accounting decisions or not. Applying these indicators, the influence of managers' discretion can be captured as the change of the position of $CFBEP$.

3.2 Indicator of accrual-based risk reduction

An indicator of risk exposure is assigned to show an indicator to transform AA as a proxy of accrual-based risk reduction. The margin of safety ratio (MSR) may serve this purpose. It is computed as:

$$MSR_{it} = \frac{REV_{it} - BEP_{it}}{REV_{it}}. \tag{3.8}$$

If MSR increases, the reciprocal of MSR decreases. For that reason, the reciprocal of MSR can serve as a measure of risk exposure. Moreover, the reciprocal of MSR equals the elasticity of operating income for sales revenues. Therefore, risk exposure based on MSR can be expressed as:

$$\frac{1}{MSR_{it}} = DOL_{it} = \frac{dEAR_{it}}{dREV_{it}} \Big/ \frac{EAR_{it}}{REV_{it}}, \tag{3.9}$$

where DOL denotes the degree of operating leverage and shows the elasticity of EAR for REV, i.e., the percentage change in operating income associated with a given percentage change in sales revenue. Therefore, DOL should be viewed as a measure of potential risk;

that risk magnifies the impact of variability or uncertainty of sales revenues and production costs. Consequently, DOL becomes active only in the presence of sales revenues and production cost variability.

Further, MSR and DOL can be extended to the risk indicators provided by $CFBEP$, those which can be expressed as the margin of safety ratio based on cash flows $(MSRC)$, and the degree of operating leverage based on cash flows $(DOLC)$[6]. The definition and the result of computation of $DOLC$ can be expressed as:

$$DOLC_{it} = \frac{dCFO_{it}}{dREV_{it}} \Big/ \frac{CFO_{it}}{REV_{it}} = \frac{(CM_{it} - RNR_{it})REV_{it}}{(CM_{it} - RNR_{it})REV_{it} - FC_{it} - AA_{it}}. \tag{3.10}$$

As described in eq. (3.9), $DOLC$ is defined as elasticity of CFO for REV, or it shows the ratio of percentage change of CFO over the percentage change of REV. Thus, the change of $DOLC$ shows the fluctuation of CFO leveraged or magnified by variability of REV. For example, when REV grows by 1.0%, the change of CFO shows 2.0% under the condition that the value of $DOLC$ is 2.0. Therefore $DOLC$ can indicate firms' risk exposure based on variability of operating cash flows caused by the change of sales revenues.

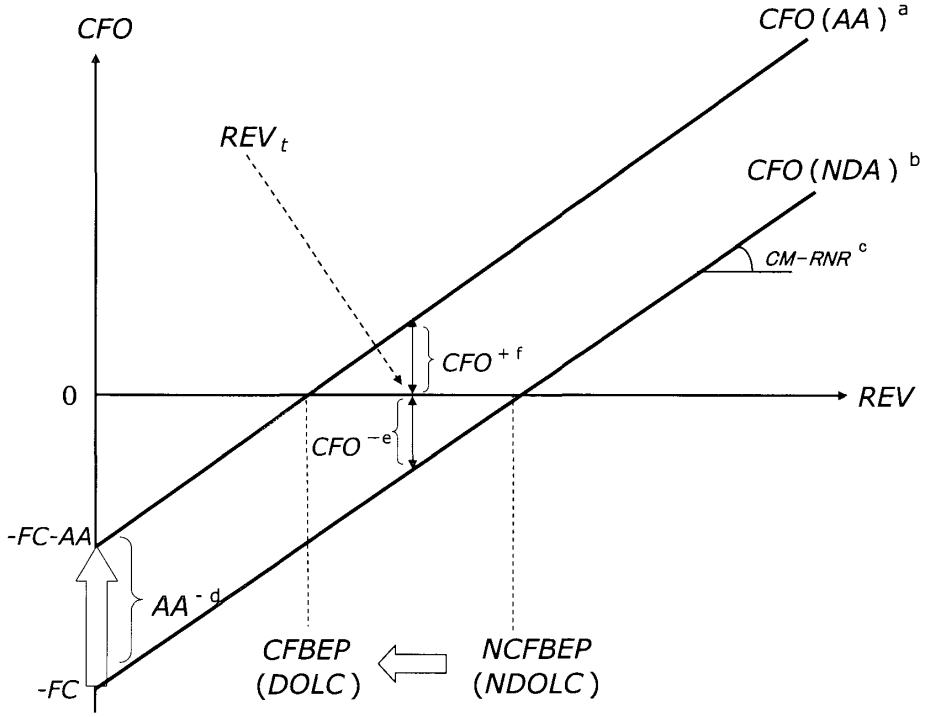
From eq. (3.10), negative (positive) AA decreases (increase) the value of $DOLC$, meaning that risk exposure shown by $DOLC$ is decreased (increased) by negative AA. Likewise, $NCFBEP$ in eq. (3.7) can indicate firms' risk under the condition that managers' discretionary behavior is neither observed nor eliminated. $NCFBEP$ is modified to show the nondiscretionary degree of leverage based on operating cash flows $(NDOLC)$. It is given as:

$$NDOLC_{it} = \frac{dNCFO_{it}}{dREV_{it}} \Big/ \frac{NCFO_{it}}{REV_{it}} = \frac{(CM_{it} - RNS_{it})REV_{it}}{(CM_{it} - RNS_{it})REV_{it} - FC_{it}}. \tag{3.11}$$

6) Kato [1987] expanded the discussion on *CFBEP* into *MSRC*, whereas Sato and Sato [2002] introduced *DOLC* as an indicator of risk exposure provided by cash flow information.

FIGURE 1

Risk Reduction Explained by the Position of CFBEP and NCFBEP



[a] *CFO*(*AA*) denotes cash flows from operating activity including abnormal accruals.

[b] *CFO*(*NDA*) denotes cash flows from operating activity excluding abnormal accruals.

[c] *CM* and *RNR* denote contribution margin and *NDA*·*REV* ratio, respectively.

[d] The arrow of AA^- shows that observed negative abnormal accruals makes *CFO*(*NDA*) line shifted toward the *CFO*(*AA*) line.

[e] CFO^- denotes net operating cash flows: it shows negative value under current *REV*.

[f] CFO^+ denotes positive net cash flows provided from operating activities and gives the condition to reduce accrual-based risk.

Therein, $NCFO$ is defined as operating cash flows' eliminated nondiscretionary component, which is given by excluding AA from eq. (3.5); $NDOLC$ can be computed as the elasticity of $NCFO$ for REV. The same result can be obtained by excluding AA from eq. (3.10). $NDOLC$ can be used as an indicator of risk exposure under the condition that managers' discretionary behavior (AA) is neither observed nor eliminated.

Figure 1 presents the association between REV and CFO. Therein, $CFO(AA)$ denotes operating cash flows expressed by eq. (3.5), whereas $CFO(NDA)$ denotes operating cash flows from which AA is eliminated. By observing AA as managers' discretions, $CFO(NDA)$ shifts to $CFO(AA)$ and $NCFBEP$ moves to $CFBEP$ simultaneously. As a result of this shift, net operating cash flows remains positive (CFO^+), and then $NDOLC$ changes to $DOLC$.

From eq. (3.10) and (3.11), negative AA decreases $DOLC$ to less than $NDOLC$,

provided that $\{(CM_{it}-RNR_{it})REV_{it}-FC_{it}\} \geq 0$. This movement, then, shows that negative AA engenders positive net cash flows (CFO^{+}) and decreases risk exposure caused by $DOLC$ less than $NDOLC$.

Therefore, the $DOLC$-$NDOLC$ ratio (RDN) is assigned as the indicator of accrual-based risk reduction brought by negative AA (downward earnings management). The following expression is given as RDN:

$$RDN_{it} = \frac{DOLC_{it}}{NDOLC_{it}} = 1 + \frac{1}{CFO_{it}} AA_{it}. \tag{3.12}$$

Accrual-based risk reduction indicates that negative AA is observed not only as a result of income-decreasing management. It shows the effects of managers' rational behavior, which can be recognized as risk reduction using discretionary accruals.

Dechow et al. [1995] and Guay et al. [1996] indicate the insufficiency of discretionary accrual models to provide evidence of earnings management because the Jones type models compute a proxy of DA as a residual of its own estimation process of NDA. Therefore testing for emergence of earnings management by this type of regression model could yield biased results if measurement error in a proxy were caused by a failure to identify economically determined accruals as a nondiscretionary component (Kasznik [1999]).

To overcome this deficiency, addition of RDN can improve the ability to detect managers' discretion. Whether RDN can serve precisely as an indicator to transform AA into a proxy of accrual-based risk reduction is investigated next. In eq. (3.12), if AA shows a negative (positive) sign, RDN takes a value of less (more) than unity, provided that CFO remains positive. Association between AA and RDN can be expressed as the following.

$$\begin{cases} AA_{it} < 0 \Rightarrow RDN_{it} < 1 \\ AA_{it} \geq 0 \Rightarrow RDN_{it} \geq 1 \end{cases} \tag{3.13}$$

Equation (3.13) designates the value of AA as having a positive correlation to the value of RDN under the condition that CFO remains positive. This condition of CFO is shown in Fig. 1, where the $CFO(AA)$-line shift is restricted in the extent to which CFO is positive (CFO^{+}). On the contrary, if CFO is negative, the manager can be considered to be unconcerned about risk exposure related to the change of CFO.

Therefore, RDN can be considered to be an indicator to transform AA into accrual-based risk reduction caused by managers' discretionary behaviors. Accordingly, RDN is proposed as an indicator of accrual-based risk reduction. By applying RDN, working hypotheses on earnings management are tested in the next section more precisely than by the preceding test

based on the sign of AA.

4. HYPOTHESIS DEVELOPMENT AND RESEARCH DESIGN

4.1 Signal of financial distress

To test for earnings management, McNichols and Wilson [1988] divided their cross sectional samples into partitions where discretionary behaviors are predicted by various earnings management hypotheses. That study classified sample firm-years into financially distressed firms and others to test the hypothesis regarding big bath accounting. Lau [1987] showed several stages of financial distress that can be identified depending on the severity of financial difficulties. That study classified states of financial distress: (0) stability, (1) omitting or reducing dividend payment, (3) prediction under the Bankruptcy Act, (4) bankruptcy or liquidation of a firm's assets.

Although firms omitting or reducing dividend payment (Lau's state 1) are considered to be in the early stages of financial distress (Jaggie and Lee, [2002]), the present study specifically addresses omission and reduction in dividend payments as a signal of financial distress.

Some regulations and social rules in Japanese capital markets influence managers' behaviors[7]. For instance, the Japanese Commercial Code provides an upper limit to the extent of profit available for dividend and delegates authority to decide the amount of dividend payment to the meeting of shareholders. In addition, some market rules define listing conditions and standards of initial public offering of stocks and bonds. They also restrict the lower limit of dividend payment amounts in capital markets.

Until the early 1990s, restriction of the lowest dividend payment has been fixed on a level called the '10% rule', meaning the dividend-to-face value ratio. Generally, this lowest restriction has prompted managers to adopt a low and stable dividend policy because this restriction is imposed at a sufficiently low level that firms can achieve it without difficulty. Under these circumstances, reduction under the lowest restriction or omission of dividend payment seems to be extremely bad news. Although this lowest restriction of dividend payment is merely a social rule and not legalized, dividend policy sentiment based on this restriction is disseminated widely in the market and obedience by managers is strongly suggested.

As noted above, the Commercial Code restricts the extent of profit available for dividends. Firms facing financial difficulties usually need to omit or reduce dividend payment. As a result, firms in financial difficulties can not achieve the lowest restriction of

7) Discussion of indexes of financial distress provided in this subsection chiefly relies on Okabe ([1994], pp.117-139).

dividend payment as a market rule; they are likely to pay particularly close attention to these minimum dividend restrictions.

For those reasons, if managers of financially distressed firms remain inclined to respond to the above peculiarity of Japanese capital markets, the events of omission and reduction of dividend payments are inferred as signals of financial distress in Japanese capital markets.

4.2 Incentives of downward earnings management and risk reduction

First, the hypothesis of big bath accounting is examined to find whether the estimated AAs of financially distressed firms differ significantly from those of other firms using the modified Jones model (Dechow et al. [1995]).

In prior accounting literature, managers' incentives to use income-decreasing accounting choice are explained by setting various hypotheses: bonus plans (Healy [1985]; McNichols and Wilson [1988]), management buyouts (DeAngelo [1986]), change of management (Strong and Meyer [1987]; DeAngelo [1988]), debt covenant violation (Healy and Palepu [1990]), and import relief (Jones [1991]). In particular, DeAngelo et al. [1994a] examined the influence of persistent losses and dividend reductions based on DA on a sample of financially troubled firms. Their finding is that the managers of firms with and without binding dividend covenants engage in many acts of negative AA[8].

The hypothesis presented by DeAngelo et al. [1994a] is supported markedly in some Japanese literature (Nakajo [1999]; and Enomoto [2001]). Therefore, the following hypothesis on earnings management was set and tested.

> $H1$: Managers of financially distressed firms are more likely to use income-decreasing accounting choice by managing the component of total accruals.

Hypothesis $H1$ states that financial distress is likely to correlate with AA as a proxy for downward earnings management, which subsumes that, if firms are financially distressed, then they are more likely to show negative AA. The accrual-based test of earnings management described by hypothesis $H1$ can be expressed in terms of the following regression model (McNichols and Wilson [1988]):

$$AA = \alpha + \beta PART + \varepsilon \tag{4.1}$$

8) In contrast to DeAngelo et al. [1994a], DeFond and Jiambalvo [1994] found that managers of financially troubled firms use positive discretionary accruals to avoid debt covenant violations.

where $PART$ is an indicator variable that partitions the data into two classes for which big bath accounting predictions are specified. In eq. (4.1), α is the average value of DA in the class of non-distressed firms; $\alpha+\beta$ is the average value of DA of distressed firms. The null hypothesis of no earnings management would be rejected if the coefficient on the independent variable β were shown to be negative and statistically significant at conventional levels.

Moreover, two samples are proposed: the sample of negative abnormal accruals comprises downward earnings management firms; the sample of positive abnormal accruals comprises upward earnings management firms. Thereby, the sign of AA is more meaningful than the value of AA to specify whether the manager selects downward or upward earnings management. Then the following logit model examines hypothesis $H1$:

$$\text{Prob}(NEGAA = 1) = F(\alpha+\beta PART+\varepsilon), \tag{4.2}$$

where $NEGAA$ denotes a dichotomous variable set equal to one if abnormal accruals are negative, and zero otherwise. In addition, a proxy of financial distress is substituted for $PART$ to examine hypothesis $H1$ in a subsequent section.

If managers of financially distressed firms, those reducing or omitting dividends, select the big bath accounting management, they are exposed to the downward risk caused by income-decreasing accounting decisions. However, they are likely to be short of surplus cash flows under financial distress. Therefore they intend to avoid financial difficulties based on the shortage of cash flows. Accordingly, they would prefer an incentive to decrease risk exposure of operating cash flows by management of total accruals. In other words, they give priority to reducing the risk exposure caused by changing cash flows rather than to risk exposure caused by the change of reported earnings. They are likely to decrease the risk exposure measured by RDN rather than the decrease of DOL. The preceding argument is formalized in the following hypothesis:

$H2$: Managers of the financially distressed firms are more likely to adopt accrual-based risk reduction.

Prior studies of big bath accounting show that managers of financially distressed firms have an incentive to manipulate reported earnings downward to clear the performance of preceding periods and start proceeding business afresh. However, financially distressed firms (those firms omitting or reducing dividends) can not always have sufficient financial power to endure the difficulties of downward earnings management. Rather, their managers would seek to reduce risk exposure based on the shortage of cash flows.

Managers must have some reason (incentive) for practicing downward earnings management. Hypothesis $H2$ states that managers' incentives for big bath accounting are shown in their behaviors of accrual-based risk reduction. Therefore, the following logit regression model is used to examine $H2$:

$$\text{Prob}(RDN = 1) = F(\alpha + \beta PART + \varepsilon). \tag{4.3}$$

where RDN denotes a dichotomous variable equal to one if the value of RDN is less than one, zero otherwise.

This logit model examines whether $PART$ serves as a proxy of managers' incentives for accrual-based risk reduction. If a proxy of financial distress is substituted for $PART$, the model can examine whether managers of financially distressed firms are more likely to conduct accrual-based risk reduction measured by RDN.

Hypotheses $H1$ and $H2$, then, states that managers of financially distressed firms are more likely to practice income-decreasing management $(AA<0)$; then they succeed in accrual-based risk reduction $(RDN<1)$. If these two hypotheses are supported simultaneously, managers' discretionary behaviors observed as negative abnormal accruals can be interpreted as their own aggressive accounting behaviors, namely accrual-based risk reduction. Therefore, the value of RDN can be used as an important indicator of managers' discretionary behaviors of financially distressed firms in addition to the sign of AA.

As a result of tests of hypotheses $H1$ and $H2$, we can capture the managers' behaviors of risk reduction correlated with downward earnings management measured by RDN as an indicator to distinguish whether managers' discretionary behaviors emerge or not.

4.3 Research design

To test appropriateness of dividend policy (omission or reduction of dividend payment) as a signal of financial distress, the associations linking dividend payment and the change of ordinary income; dividend payment and the change of sales revenues are examined respectively[9].

Subsequently, hypothesis $H1$ is tested for all sample firm-years using the proxy of dividend policy and the sign of AA. Logit regression analyses provided by eq. (4.2) are performed. The proxy of dividend policy is used as the dependent variable, whereas the sign

9) Okabe [1994] and Otomasa [1997] provide the findings that financially distressed firms are more likely to report extraordinary income and losses. However, this paper examines firms' operating activities to investigate accrual-based downward earnings management. Then, the association between dividend policy as a proxy of financial distress and some financial indices showing results of firms' operating activities should be empirically examined.

of AA is used as the independent variable.

Next, RDN is introduced to the test of hypothesis $H2$. A good result on this would allow use of RDN as an indicator to transform AA into a proxy of accrual-based risk reduction recognized as emergence of managers' discretionary behaviors. That is, risk reduction using AA can be observed as evidence of downward earnings management. This test is conducted by another logit model presented by eq. (4.3). Further, not only all sample firm-years are tested, but also those subsample firm-years which comprise big bath accounting firms whose dividends are omitted or reduced $(REDIV)$ and AA are negative $(NEGAA)$. The sign of AA as a proxy of income-decreasing management cannot be used in the latter test; therefore the value of AA is used to investigate the emergence of accrual-based risk reduction measured by RDN. If both hypotheses 1 and 2 are supported, RDN can be considered to be an indicator to transform AA into a proxy of accrual-based risk reduction as representative of managers' discretionary behaviors.

5. DESCRIPTIVE STATISTICS AND SIGNAL OF FINANCIAL DISTRESS

5.1 Sample selection

The following empirical analysis formally tests the hypothesis presented in the prior section: 6,320 firm-years listed on first and second section of the Tokyo Stock Exchange during 1998-2002 fiscal years were selected as the sample. These firms' accounting data were obtained from annual financial statements compiled by the 'Nikkei Financial Data for Listed Companies'. These sample firm-years comprise panel data restricted within manufacturing industries. Samples of non-manufacturing industries were eliminated because calculations of BEP and $CFBEP$ of manufacturing firms are strictly different from those of non-manufacturing firms.

In addition, samples with insufficient data (changing fiscal year, lacking data of five estimated years) and those for which BEP or $CFBEP$ show a negative sign were excluded as discordant values. The resultant sample size consists of 5,970 firm-years as reported in Table 1.

5.2 Descriptive statistics

To overcome a disadvantage of the cross-sectional approach, which assumes that coefficients are the same for all samples within the estimation periods, all samples are divided into 20 industries following the standard categories of Nikkei Financial Data for Listed Companies. The NDA is estimated in every industry using the modified Jones model expressed in eq. (2.4). The center column of Table 1 reports results of estimations for each industry. Table 2 provides descriptive statistics for estimates of all industries. It shows that the coefficient of change in sales revenues, b_1, is likely to be positive (mean value = 0.032),

but not significantly so (t-statistic =1.185). Whereas the coefficient of property, plant and equipment, b_2, is significantly negative (t-statistic = -13.624). The mean (median) adjusted R^2, whose value is 0.455 (0.470), shows that the model explains a significant portion of the variation in TA.

Table 3 reports univariate statistics for TA, NDA, and AA; they are scaled by lagged total assets for all 5,970 firm-years. Means of TA, NDA, and AA are significantly negative (p <0.01), irrespective of each sample's financial condition.

However, these samples should be categorized into firms adopting big bath accounting and others on the basis of the sign of AA and dividend policy to clarify the lucidity of managers' discretion. The right side of Table 1 and panel B of Table 3 report descriptive statistics for 1,693 big bath accounting firm-years whose dividends were omitted or reduced and signs of AA were negative.

Earnings management at the discretion of managers of big bath accounting firms in panel B cannot be explained solely by the sign of AA even if they practice income-decreasing management. Therefore another indicator, i.e. RDN, which can support above mentioned defect of AA, is necessary to test the hypothesis for this subsample.

6. Empirical Results

6.1 Financial distress and dividend policy

Okabe [1994, chap. 6] reports the findings that firms omitting dividends are more likely to increase extraordinary losses in every stock exchange of Japan. In contrast, the present study investigates the association between abnormal accruals based on firms' ordinary operation and big bath accounting. Therefore, dividend policy is examined to obtain evidence that can serve as a signal of financial distress. The geometric mean of the ordinary income through five fiscal years and the rate of sales revenue change in adjacent fiscal years are examined. The former is the index showing the durability of profitability and the latter indicates the growth of sales revenue. Therefore, the lowest class of each variable can provide an indicator showing financial distress.

Panel A in Table 4 displays a contingency table showing: the relation between firms that omit and reduce dividend payments ($REDIV$) and other firms; and the relation between firms that the geometric mean of ordinary income through five fiscal years is extremely low ($LOWEST$) and others. Further, panel A in Table 5 provides another contingency table showing: the relation between $REDIV$ and other firms; and the relation between firms for which the rate of sales revenues changes in consecutive fiscal years ($GROWTH$) is extremely negative and other firms.

The $REDIV$, $LOWEST$, and $GROWTH$ variables are dichotomous: $REDIV$ is set equal to one if a firm omits or reduces dividend payment, two otherwise; $LOWEST$ is set

TABLE 1

Descriptive Statistics for Ordinary Least Squares Estimation of Accruals Model for Respective Industry of 5,970 Firm-Years during 1998-2002

Modified Jones Model: $TA_{it} = \alpha_1 (1/A_{t-1}) + \beta_2 (\Delta REV_{it} - \Delta AR_{it}) + \beta_3 (PPE_{it}) + \varepsilon_{it}$

	All Sample Firm-Years		Estimates of Modified Jones Model [a]				Big Bath Firm-Years [b]	
	N	% of Total	a	b_1	b_2	Adj. R^2	*N*	% of Total
Foods	473	7.9					102	1.7
Coefficient Estimate			0.020	-0.015	-0.150	0.600		
p-Value [c]			0.520	0.413	0.000			
Textile Products	245	4.1					93	1.6
Coefficient Estimate			0.051	0.087	-0.159	0.472		
p-Value [c]			0.759	0.003	0.000			
Pulp & Paper	77	1.3					20	0.3
Coefficient Estimate			-0.035	0.009	-0.131	0.789		
p-Value [c]			0.786	0.874	0.000			
Chemicals	681	11.4					169	2.8
Coefficient Estimate			0.107	0.005	-0.168	0.640		
p-Value [c]			0.019	0.798	0.000			
Pharmaceuticals	196	3.3					35	0.6
Coefficient Estimate			-0.027	0.127	-0.130	0.229		
p-Value [c]			0.409	0.034	0.000			
Petroleum	45	0.8					8	0.1
Coefficient Estimate			0.077	0.361	-0.133	0.592		
p-Value [c]			0.310	0.000	0.021			
Rubber Products	101	1.7					34	0.6
Coefficient Estimate			0.467	-0.043	-0.201	0.789		
p-Value [c]			0.000	0.434	0.000			
Stone, Clay & Glass Products	165	2.8					44	0.7
Coefficient Estimate			0.136	-0.007	-0.152	0.433		
p-Value [c]			0.292	0.843	0.000			
Iron & Steel	230	3.9					82	1.4
Coefficient Estimate			0.034	0.101	-0.160	0.560		
p-Value [c]			0.736	0.018	0.000			
Non ferrous metal & Metal Products	405	6.8					117	2.0
Coefficient Estimate			0.123	0.031	-0.183	0.467		
p-Value [c]			0.044	0.183	0.000			

TABLE 1 (continued)

	All Sample Firm-Years		Estimates of Modified Jones Model [a]				Big Bath Firm-Years [b]	
	N	% of Total	a	b_1	b_2	Adj. R^2	*N*	% of Total
Machinery	778	13.0					256	4.3
Coefficient Estimate			0.170	0.023	-0.172	0.204		
p-Value [c]			0.000	0.274	0.000			
Electric & Electronic Equipment	941	15.8					276	4.6
Coefficient Estimate			0.142	0.062	-0.207	0.322		
p-Value [c]			0.000	0.000	0.000			
Shipbuilding & Repairing	25	0.4					9	0.2
Coefficient Estimate			-0.226	-0.377	-0.213	0.237		
p-Value [c]			0.388	0.032	0.024			
Motor Vehicles & Auto Parts	289	4.8					69	1.2
Coefficient Estimate			-0.060	-0.021	-0.210	0.692		
p-Value [c]			0.011	0.259	0.000			
Transportation Equipment	77	1.3					26	0.4
Coefficient Estimate			-0.066	-0.117	-0.176	0.211		
p-Value [c]			0.720	0.204	0.000			
Precision Equipment	174	2.9					51	0.9
Coefficient Estimate			-0.036	0.031	-0.189	0.233		
p-Value [c]			0.557	0.312	0.000			
Other Manufacturing	283	4.7					64	1.1
Coefficient Estimate			0.002	0.030	-0.174	0.488		
p-Value [c]			0.965	0.163	0.000			
Fish & Marine Products	31	0.5					6	0.1
Coefficient Estimate			0.048	0.194	-0.116	0.499		
p-Value [c]			0.839	0.005	0.000			
Mining	37	0.6					12	0.2
Coefficient Estimate			-0.120	0.209	-0.114	0.457		
p-Value [c]			0.181	0.000	0.000			
Constriction	717	12.0					220	3.7
Coefficient Estimate			-0.023	-0.035	-0.339	0.179		
p-Value [c]			0.578	0.094	0.000			
Total	5,970	100.0					1,693	28.4

[a] a_1, b_1, and b_2 denote estimated coefficients α, β_1, and β_2 estimated by the modified Jones model, respectively.

[b] Big bath firms are defined as the firm-years whose *AA* are negative and dividends are omitted or reduced.

[c] Two-tail *p*-value of a *t*-test for the prediction that the mean is zero.

TABLE 2

Descriptive Statistics for Estimated Coefficients of the Modified Jones Model for Respective Manufacturing Industry during 1998-2002

Modified Jones Model: $TA_{it} = \alpha_1(1/A_{t-1}) + \beta_2(\Delta REV_{it} - \Delta AR_{it}) + \beta_3(PPE_{it}) + \varepsilon_{it}$

	Sample Firm-Years: 5,970								
	N [a]	Mean	Std.Dev.	Min.	Max.	1st Quartile	Median	3rd Quartile	% Positive
a_1 [b]	20	0.039	0.141	-0.230	0.470	-0.040	0.025	0.118	60
t-statistic	20	0.783	2.182	-2.560	6.476	-0.580	0.256	1.779	
b_1 [b]	20	0.032	0.144	-0.380	0.360	-0.020	0.025	0.098	65
t-statistic	20	1.185	2.482	-2.296	8.205	-0.811	1.054	2.827	
b_2 [b]	20	-0.174	0.050	-0.340	-0.110	-0.198	-0.170	-0.135	0
t-statistic	20	-13.624	8.464	-33.783	-2.392	-17.618	-13.334	-5.870	
Adj. R^2	20	0.455	0.196	0.179	0.789	0.234	0.470	0.598	

[a] N denotes the number of industries.

[b] a_1, b_1, and b_3 denote estimates of coefficients estimated by the modified Jones model respectively.

TABLE 3

Descriptive Statistics for Total Accruals and Abnormal and Nondiscretionary Accruals for Sample of Firm-Years during 1998-2002 [a]

	N	Mean	Std.Dev.	Min.	Max.	1st Quartile	Median	3rd Quartile
Panel A: 5,970 firm-years								
Total Accruals [b]	5,970	-0.037	0.048	-0.265	0.684	-0.061	-0.038	-0.015
p-Value[c]		< 0.01						
Nondiscretionary Accruals[d]	5,970	-0.033	0.020	-0.187	0.425	-0.043	-0.031	-0.020
p-Value[c]		< 0.01						
Abnormal Accruals[e]	5,970	-0.004	0.047	-0.244	0.549	-0.026	-0.005	0.016
p-Value[c]		< 0.01						
Panel B: 1,693 big bath accounting firm-years								
Total Accruals[b]	1,693	-0.065	0.035	-0.265	0.010	-0.081	-0.059	-0.041
p-Value[c]		< 0.01						
Nondiscretionary Accruals[d]	1,693	-0.030	0.018	-0.120	0.049	-0.040	-0.028	-0.018
p-Value[c]		< 0.01						
Abnormal Accrualsd[e]	1,693	-0.035	0.033	-0.244	0.000	-0.048	-0.025	-0.011
p-Value[c]		< 0.01						

[a] See TABLE 1 for sample descriptive.

[b] Total accruals are computed as the difference between operating earnings and cash flow from operations, deflated by total assets at the beginning of the year.

[c] Two-tail *p*-value of a *t*-test for the prediction that the mean is zero.

[d] Nondiscretionary accruals are estimated for each firm-year in every industry as predicted values of accruals.

[e] Abnormal accruals denotes the prediction error as the proxy of discretionary accruals, i.e. the difference between total accruals and estimated nondiscretionary accruals.

TABLE 4

Loglinear Analysis for the Association between Dividend Policy and Mean of Ordinary Income

Panel A: *Contingency Table Classifying the Firms Omitting or Reducing Dividend Payments or Otherwise, and the geometric mean of the change of ordinary income.*

	Lowest= 1 [a]	*Others* = 0	
REDIV = 1 [b]	229 11.74%	1,721 88.26%	1,950
REDIV = 0	235 8.67%	2,476 91.33%	2,711
	464	4,197	

Panel B: *Result of loglinear analysis for above contingency table.*

Parameter Estimate [c]	Standard Error	Z-value	Asymptotic 95% CI [d]	
			Lower	Upper
0.338	0.10	3.45	0.15 (1.162)	0.53 (1.699)

[a] *Lowest* shows firm-years whose geometric mean of the change of ordinary income is classified into the lowest 10th decile.

[b] *REDIV*=1 denotes firms omitting or reducing cash dividends and *REDIV*=0 otherwise.

[c] Parameter estimate shows the coefficient of *(LOWEST)*(REDIV)* in the loglinear model.

[d] The value of logit in asymptotic 95% confidence interval is between 0.150 and 0.530 and the number in the parenthesis corresponds to the odds ratio.

equal to one if a firm is included in the 10th percentile of mean ordinary income through five fiscal years, two otherwise; *GROWTH* is set equal to one if a firm is included in the 10th percentile of the rate of sales revenues changes in adjacent fiscal years, two otherwise.

Panels B of Tables 4 and 5 report that the estimated parameter of interaction of *REDIV* and *LOWEST* ; *REDIV* and *GROWTH* is 0.338 (Z-value=3.45) and 0.658 (Z-value=7.42) respectively. These results provide evidence that *REDIV* can serve as a significant indicator of the condition showing financial distress[10].

10) DeAngelo et al. [1994b] examined the association between dividend omission and losses of firms listed New York Stock Exchange. They find that an annual loss is essentially a necessary, but not a sufficient, condition for dividend reductions.

TABLE 5

Loglinear Analysis for the Association between Dividend Policy and Change of Sales Revenues

Panel A: *Contingency Table Classifying the Firms Omitting or Reducing Dividend Payments or Otherwise, and the change of sales revenues.*

	GROWTH = 1 [a]	*Others* = 0	
REDIV = 1 [b]	353 12.99%	2,365 87.01%	2,718
REDIV = 0	233 7.17%	3,016 92.83%	3,249
	586	5,381	

Panel B: *Result of loglinear analysis for above contingency table.*

Parameter Estimate [c]	Standard Error	Z-value	Asymptotic 95% CI [d]	
			Lower	Upper
0.658	0.09	7.42	0.48 (1.616)	0.83 (2.293)

[a] *Lowest* shows firm-years whose change of sales revenues is classified into the lowest 10th decile.

[b] *REDIV*=1 denotes firms omitting or reducing cash dividends and *REDIV*=0 otherwise.

[c] Parameter estimate shows the coefficient of (*GROWTH*)*(*REDIV*) in the loglinear model.

[d] The value of logit in asymptotic 95% confidence interval is between 0.48 and 0.83 and the number in the parenthesis corresponds to the odds ratio.

6.2 Logit regression for an incentive of big bath accounting

To test hypothesis $H1$, all sample firm-years are classified into two classes based on the dividend change. One class comprises extremely distressed firm-years where dividends were omitted or reduced $(REDIV)$.

Moreover, all samples are divided again by the sign of AA, which has been estimated by the modified Jones model. The preceding section explains that a negative sign of AA suggests the existence of income-decreasing management. The big bath accounting premise states that the tested firm is financially distressed.

$REDIV$, as an independent variable of financially distressed firms, is substituted for $PART$; the other control variables are added to eq. (4.2). The following is a logit regression

TABLE 6

Logit Regression Analysis of the Association Between Incentives to Adopt Big Bath Accounting and Negative Abnormal Accruals Proxy for Earnings Management [a]

Model: $\text{Prob}(NEGAA_{it} = 1) = F(\alpha + \beta_1 REDIV_{it} + \beta_2 LNA_{it-1} + \beta_3 LEV_{it} + \beta_4 FINST_{it} + \varepsilon_{it})$

Variables	N	Predicted sign	Coefficient	p-Value
intercept	4,760	n/a	-2.239	0.000
REDIV [b]		+	0.433	0.000
LNA [c]		+	0.209	0.000
LEV [d]		−	0.000	0.349
FINST [e]		−	-1.808	0.723
Log Likelihood	7,913			
Chi-square	1.761			
p-value	0.987			

[a] *NEGAA* is a dichotomous variable set to one if the sign of abnormal accruals is negative, zero otherwise.

[b] *REDIV* denotes dummy variable set to one if firm omits or reduces dividend payment, zero otherwise.

[c] *LNA* denotes natural logarithms of total assets in the beginning of current period, t-1.

[d] *LEV* denotes debt/equity ratio (leverage).

[e] *FINST*means the ratio of shares holded by financial institutes.

model of negative abnormal accruals: it is a dichotomous variable equal to one if the sign of observed AA is negative, zero otherwise.

$$\text{Prob}(NEGAA_{it} = 1) = F(\beta_0 + \beta_1 REDIV_{it} + \beta_2 LNA_{it-1} + \beta_3 LEV_{it} + \beta_4 FINST_{it} + \varepsilon_{it}). \quad (7.1)$$

Therein,

$$F(\beta' X) = \frac{e^{\beta' X}}{1 + e^{\beta' X}},$$

and

$REDIV$ = dummy variable set to one if a firm omits or reduces dividend payment, otherwise zero;

LNA = natural logarithms of total assets in the beginning of current period, t-1;

LEV = debt-equity ratio (leverage);

$FINST$ = ratio of shares held by financial institutions to issued number of shares;

ε = error term.

Panel A in Table 6 provides descriptive statistics for variables used in the regression model examined in this subsection. The positive sign of the estimated coefficient on $REDIV$ indicates the emergence of big bath accounting significantly ($p < 0.000$).

Subsequently, the other explanatory variables are set to control for the effect of changes in firms' financial circumstances. First, LNA is input to control for the effect of firm size: the larger the firm, the more likely the manager is to choose accounting procedures that defer reported earnings from current to future periods (Watt and Zimmerman, [1986], p.235). The estimated coefficient on LNA shows a significant positive sign ($p < 0.000$), which is consistent with the prediction and provides statistical evidence of the size hypothesis.

Next, LEV is input to control for leverage effects: the larger a firm's debt-equity ratio (leverage), the more likely the firm's manager is to select accounting procedures that shift reported earnings from future periods to the current periods (Watt and Zimmerman, [1986], p.216). The sign of the estimated coefficient on LEV is positive, thus the debt/equity hypothesis is not supported ($p = 0.349$).

Further, the predicted coefficient on $FINST$ is expected to be negative because the stricter the financial institutions monitoring firms' performance, the more likely the manager is to intend to increase or smooth the firm's reported earnings. The estimated coefficient on $FINST$ is consistent with this prediction, but the result is not statically significant ($p = 0.723$). As a result of the logit regression analysis, evidence supporting hypothesis $H1$ can be provided significantly[11].

6.3 Logit regression for accrual-based risk reduction

This subsection presents tests of the second hypothesis, $H2$. Hypothesis $H2$ states that an incentive to accrual-based risk reduction is given by financial distress. Logit regression analysis examines all sample firm-years using the following logit model:

$$\begin{aligned} \text{Prob}(RDN_{it} = 1) = F(&\alpha + \beta_1 REDIV_{it} + \beta_2 LNA_{it} + \beta_3 LEV_{it} \\ &+ \beta_4 FINST_{it} + \varepsilon_{it}), \end{aligned} \tag{7.2}$$

where RDN denotes the $DOLC$-to-$NDOLC$ ratio. Section 4 explained that the logit model of (7.2) is given by substituting $REDIV$ for $PART$ to investigate the behaviors of financially distressed firms' managers. Table 7 reports that the estimated coefficient of AA in the model is significant and positive ($p < 0.000$). This supports the hypothesis that

11) Pearson's correlation among LNA, LEV, and FINST are each less than 0.1; therefore, the problem of multicollinearity does not influence every regression model presented in this section.

TABLE 7

Logit Regression Analysis of the Association Between Incentives of Big Bath Accounting and Accrual-based Risk Reduction[a]

Model: $\text{Prob}(RDN_{it} = 1) = F(\alpha + \beta_1 REDIV_{it} + \beta_2 LNA_{it} + \beta_3 LEV_{it} + \beta_4 FINST_{it} + \varepsilon_{it})$

Variables	N	Predicted sign	Coefficient	p-Value
intercept	5,905	n/a	-1.119	0.000
REDIV [a]		+	0.458	0.000
LNA		+	0.132	0.000
LEV		−	0.000	0.254
FINST		−	-3.332	0.507
Log Likelihood	7,642			
Chi-square	3.630			
p-value	0.889			

See Table 6 to identify independent variables of the model.

[a] *RDN* is a dichotomous variable set to one if it takes a value of less than unity, zero otherwise.

financially distressed firms are more likely to practice accrual-based risk reduction.

If income-decreasing management is, at most, no more than an incentive of big bath accounting, then some firms which actually adopt income-decreasing management can be classified into the another category of earnings management, e.g., income-smoothing management.

To elucidate this point, 5,970 sample firm-years were divided into two classes following the definition of big bath accounting; then 1,693 firm-years were extracted as the big bath accounting firms, whose dividend payments were omitted or reduced and those AA were negative:

$$\text{Prob}(RDN_{it} = 1) = F(\alpha + \beta_1 AA_{it} + \beta_2 LNA_{it} + \beta_3 LEV_{it} + \beta_4 FINST_{it} + \varepsilon_{it}), \tag{7.3}$$

where AA denotes the value of abnormal accrual observed as residual by the modified Jones model. Indeed, the effect of RDN can be tested for hypothesis $H2$ without stimulation of the sign of AA. Table 8 shows summary statistics for the logit model estimated coefficients of AA is significant and negative ($p < 0.019$).

In addition, other controlled variables show similar results as the preceding analyses. The probability of accrual-based risk presented as hypothesis $H2$ is supported empirically. This supposition of hypothesis $H2$ shows that the managers of financially distressed firms are not

TABEL 8

Logit Regression Analysis of the Association between the Big Bath Accounting Firms and Accrual-based Risk Reduction Firms

Model: $\text{Prob}(RDN_{it} = 1) = F(\alpha + \beta_1 AA_{it} + \beta_2 LNA_{it} + \beta_3 LEV_{it} + \beta_4 FINST_{it} + \varepsilon_{it})$

Variables	N	Predicted sign	Coefficient	p-Value
intercept	1,693	n/a	-3.033	0.010
AA [a]		−	-12.593	0.019
LNA		+	0.558	0.000
LEV		−	0.000	0.153
$FINST$		−	-5.705	0.898
Log Likelihood	485			
Chi-square	11.876			
p-value	0.157			

[a] AA denotes observed abnormal accruals as residuals estimated by the modified Jones model.

only likely to select income-decreasing management, but that they do so to reduce risk exposure as a result of their discretionary behaviors. In particular, the result of the last logit regression suggests that RDN can fulfill its function as an indicator to transform AA into accrual-based risk reduction as a proxy for real discretionary accruals.

7. CONCLUSION

This paper provides evidence supporting the big bath accounting hypothesis by introducing an indicator (RDN) which provides a proxy of managers' discretionary risk reduction (accrual-based risk reduction). In particular, RDN is useful in testing a subsample for which the sign of AA is fixed at negative or positive. This fixed sign test gives confirming evidence and implication concerning the vector of earnings management.

Regression analysis for accrual-based earnings management could yield biased results if measurement error in the proxy were caused by failure to identify economically determined accruals as a nondiscretionary component. Therefore RDN was proposed as an explanatory variable to avoid such biased results. Results show that the implication of RDN being representative of managers' discretionary behaviors as an indicator of accrual-based risk reduction can mitigate measurement errors caused by statistical methods as in Jones-type models.

Two hypotheses presented were significantly supported in this paper. They state that managers of financially distressed firms are more likely to adopt income-decreasing accounting policies to conduct accrual-based risk reduction through income-decreasing

management conducted by financially distressed firms' managers called big bath accounting. This paper provides the finding that their downward managements are based on incentives to obtain an effect of accrual-based risk reduction measured by RDN. Then, RDN gives us the probability to distinguish whether abnormal accruals result from managers' discretionary behaviors.

However, these findings were obtained by examining only downward earnings management (big bath accounting hypothesis). This study tested for income-decreasing earnings management of firms whose financial circumstances are distressed.

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Abstract

This paper examines an indicator to transform abnormal accruals into a proxy for accrual-based risk reduction caused by managers' discretionary behaviors. A break-even point based on operating cash flows is introduced to derive the indicator. The sign of abnormal accruals is used as a signal of earnings management in prior studies. However, this study proposes the addition of the above indicator as another proxy of managers' discretion. This study tests the big bath accounting hypothesis for firms whose abnormal accruals are restricted to be negative to examine the significance of the indicator. Results suggest that the indicator can serve as a proxy supporting the function of abnormal accruals, or give a threshold to identify abnormal accruals as a proxy of managers' discretionary behaviors.