公司經理人是否操弄盈餘以達到盈餘門檻？同組門檻內及跨門檻之比較[*]

陳美惠
國防大學財務管理學系

彭火樹[**]
國立臺北大學會計學系

Mike Gengrinovich
Stern School of Business, New York University

摘要

　　本研究測試經理人是否操弄盈餘以達到年度盈餘門檻，即避免列報損失、盈餘較去年度衰退及未符合分析師預期。本研究不僅測試此三種盈餘門檻之八種不同組合情境，亦測試正好符合或正好未符合此三種盈餘門檻的盈餘管理程度。除進行同組門檻內之比較外，亦作跨門檻之比較。研究結果顯示，針對三種盈餘門檻之八種不同組合情境，無證據顯示經理人員對任何一種組合情境有盈餘管理現象；在某些情境下，經理人員甚至操弄盈餘向下。而跨組合情境之比較結果顯示：(a)達到三門檻相較於未達到三門檻，(b)達到三門檻相較於報導損失，以及(c)避免報導損失相較於未達到三門檻有增額盈餘管理之傾向。另外，針對正好符合或正好未符合此三種盈餘門檻情境（縮減樣本）之測試結果顯示，其盈餘管理程度依序為：(1)符合分析師預期，(2)避免盈餘較去年度衰退，以及(3)避免列報損失。

關鍵詞：盈餘門檻、零盈餘、盈餘改變、分析師預期盈餘

Do Managers Manipulate Earnings to Meet Earnings Thresholds? Comparison Within and Across Thresholds[*]

Mei-Hui Chen
Departmant of Finance

National Defense University

Huoshu Peng[**]
Department of Accountancy

National Taipei University

Mike Gengrinovich
Stern School of Business

New York University

Abstract

This paper examines whether managers manipulate annual earnings to meet earnings thresholds, i.e. zero earnings, prior year's earnings, and analysts' expectations. For the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, the results show no evidence that managers manipulate earnings upwards to exclusively meet/miss an individual threshold, even in some situations they manipulate earnings downwards. However, the comparison across thresholds shows that incremental earnings management exists in the following cases: (a) meeting all three goals versus missing all three goals; (b) meeting all three goals versus reporting losses; and (c) avoiding losses versus missing all three goals. Furthermore, we examine a reduced sample where companies just meet/miss the goals. In this reduced sample, we find that the most earnings management is done to meet analysts' earnings expectations, followed by avoiding earnings decreases, and then to avoid showing losses.

Keywords: *Earnings thresholds*, *Zero earnings*, *Earnings changes*, *Analysts' expectations*.

1. INTRODUCTION

Managers may manipulate annual earnings to meet earnings thresholds. Among the three earnings thresholds, i.e. zero earnings, prior year's earnings, and analysts' expectations, the desire of managers to manipulate earnings may vary. While prior research examines the frequency distribution around zero of scaled earnings, earnings changes, and earnings surprises looking for indirect evidence of earnings management (Hayn 1995; Burgstahler and Dichev 1997; DeGeorge, Patel and Zeckhauser 1999; Brown 2001; Beatty, Ke and Petroni 2002; Burgstahler and Eames 2003; Holland and Ramsay 2003; Phillips, Pincus, Rego and Wan 2004; Burgstahler and Eames 2006; Frank and Rego 2006; Roychowdhury 2006; Beaver, McNichols and Nelson 2007; Jacob and Jorgensen 2007; Kerstein and Rai 2007; Habib and Hossain 2008), this study uses accrual-based and real earnings management metrics to directly measure whether companies manipulate earnings to report desired results.

Brown and Caylor (2005) construct eight (2×2×2) mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds and examine the valuation consequences of them. The eight situations are $(T1^- \ T2^- \ T3^-)$, $(T1^+ \ T2^- \ T3^-)$, $(T1^- \ T2^+ \ T3^-)$, $(T1^- \ T2^- \ T3^+)$, $(T1^+ \ T2^+ \ T3^-)$, $(T1^+ \ T2^- \ T3^+)$, $(T1^- \ T2^+ \ T3^+)$ and $(T1^+ \ T2^+ \ T3^+)$, where $T1$, $T2$, and $T3$ denote the thresholds of avoiding losses, earnings decreases, and negative earnings surprises, respectively; and the superscripts, $+/-$, designate if a threshold has been met/missed. They focus on the incremental valuation consequences of avoiding (reporting) losses, earnings decreases, and negative earnings surprises. For example, the incremental valuation consequences of avoiding losses equal to the difference in valuation consequences between $(T1^+ \ T2^- \ T3^-)$ and $(T1^- \ T2^- \ T3^-)$, and those for reporting losses equal to the difference in valuation consequences between $(T1^+ \ T2^+ \ T3^+)$ and $(T1^- \ T2^+ \ T3^+)$.[1] They find that, since, but not earlier than, mid-1990s, the market rewarded (penalized) firms more that met (missed) analysts' forecasts than those that met (missed) the other two thresholds.

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[1] Brown and Caylor (2005) estimate the following regression model to examine the valuation consequences of achieving thresholds:

"$CAR = \Sigma \ Category \ dummy + \beta_1 * (T1^- \ T2^- \ T3^-)*UE + \beta_2*(T1^+ \ T2^- \ T3^-)*UE$
$+ \beta_3*(T1^- \ T2^+ \ T3^-) *UE + \beta_4*(T1^- \ T2^- \ T3^+)*UE + \beta_5*(T1^+ \ T2^+ \ T3^-)*UE$
$+ \beta_6*(T1^+ \ T2^- \ T3^+)*UE + \beta_7*(T1^- \ T2^+ \ T3^+) *UE + \beta_8*(T1^+ \ T2^+ \ T3^+)*UE + u,$"

where CAR is the three-day market-adjusted cumulative abnormal returns around quarterly earnings announcements on the thresholds, and UE is the unexpected earnings which equals actual earnings minus the consensus analyst forecast. For example, the positive incremental valuation consequences for avoiding the loss threshold when no threshold has been met are obtained by subtracting ((dummy variable for $(T1^- \ T2^- \ T3^-)$ + β_1*Mean UE) from ((dummy variable for $(T1^+ \ T2^- \ T3^-)$ + β_2*Mean UE). Others are constructed in a similar manner.

While Brown and Caylor (2005) document the valuation consequences to the eight situations of meeting/missing the three quarterly earnings thresholds from investors' perspective, this study examines whether managers manipulate annual earnings to meet those thresholds from mangers' perspective.[2] That is, we test earnings management for each of them. Furthermore, we compare earnings management among them. A company may meet (miss) all three thresholds or avoid (report) a specific threshold. Avoiding (reporting) one specific threshold means that firms meet (miss) that threshold while missing (meeting) the other two.

Furthermore, this study adopts a reduced sample of just-meeting/just-missing the three earnings thresholds to examine the managers' earnings management behavior when facing those situations, both within and across thresholds.[3] Prior studies provide evidence showing a disproportionately large number of firms that barely meet or beat earnings thresholds relative to the number of firms that just miss those thresholds and suggest that managers manipulate earnings in those situations (Hayn 1995; Burgstahler and Dichev 1997; Jacob and Jorgensen 2007; Habib and Hossain 2008). McVay, Nagar and Tang (2006) find that managers manipulate earnings prior to just meeting the threshold of analysts' forecasts and sell their shares. While prior studies deal with earnings management for only one or at most two earnings thresholds, this study compares earnings management for the three earnings thresholds concurrently.

For comparison within thresholds, we compare the earnings management of the just-meeting case with that of the just-missing for a specific threshold. For comparison across thresholds, we compare the earnings management of just-meeting/just-missing one threshold with that of the other two. For example, we compare the earnings management of just-meeting/just-missing cases of avoiding losses with that of avoiding earnings decreases and negative earnings surprises.

Our results show that, for the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, there is no evidence showing that managers manipulate earnings to meet/miss thresholds, which is contrary to the findings of Burgstahler and Dichev (1997) and Burgstahler and Eames (2003). Both of these papers document that firms manage earnings to avoid losses and earnings decreases,

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[2] We use annual data, instead of quarterly data, to test the earnings management of meeting/missing earnings thresholds because quarterly data in Compustat cause many missing observations in identifying real earnings management.

[3] For a reduced sample, we test earnings management for just-meeting/just-missing the three thresholds. While just-meeting a specific threshold may coincide with just-meeting/just-missing the other thresholds, we delete the observations of such coincidence. Therefore, the reduced sample consists of six just-meeting/just-missing the thresholds of zero earnings, earnings changes, and analysts' expectations and is not a subsample of the eight mutually exclusive and collectively exhaustive situations identified by Brown and Caylor (2005).

however they use the frequencies of meeting/missing earnings thresholds to indirectly measure the phenomenon of earnings management. Durtschi and Easton (2009) suggest that inferring earnings management based on earnings frequency distributions may lead to erroneous conclusions. This study therefore uses accrual-based (*AM*) and real earnings management (*RM*) metrics to directly measure whether companies manipulate earnings to report desired results. The comparison across thresholds shows that, when measured using *AM*, incremental earnings management exists in the following cases: (a) meeting all three goals versus missing all three goals; (b) meeting all three goals versus reporting earnings decreases or negative earnings surprises; and (c) avoiding losses, earnings decreases, or negative earnings surprises versus missing all three goals. When measured using *RM*, incremental earnings management exists in the following cases: (a) meeting all three goals versus missing all three goals; (b) meeting all three goals versus reporting losses; and (c) avoiding losses versus missing all three goals.

For the just-meeting/just-missing cases, the results are mixed for individual thresholds. However, we find that the magnitude of earnings management, whether measured by *AM* or *RM* for the just-meeting as well as the just-missing cases, in descending order is as follows: first goes the threshold of earnings surprises, followed by the threshold of earnings changes, and then the threshold of zero earnings. This reveals that managers put the most emphasis on meeting the analysts' expectations.

This study contributes to the related literature in several aspects. First, while Brown and Caylor (2005) document the market reactions to the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three quarterly earnings thresholds, this study examines whether managers manipulate annual earnings to meet those thresholds. Second, while prior research work uses frequency distributions around zero of scaled earnings, earnings changes, and earnings surprises to indirectly examine whether companies manipulate earnings to report desired results, this study uses accrual-based and real earnings management metrics instead, which are direct measures of earnings management. Third, while prior studies document earnings management for either one or at most two earnings thresholds, this study compares earnings management for the three earnings thresholds concurrently and comprehensively. Finally, in addition to the test for the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, this study also examines earnings management for the just-meeting/just-missing cases, both within and across the three earnings thresholds.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 presents the research questions. Section 4 describes our methodology and data. Section 5 shows the empirical results. Section 6 presents further discussions and sensitivity analysis. Section 7 concludes.

2. RELATED LITERATURE

Prior studies document evidence of discontinuity around zero in the distribution of scaled earnings, earnings changes, and earnings surprises (Hayn 1995; Burgstahler and Dichev 1997; DeGeorge et al. 1999; Brown 2001; Beatty et al. 2002; Burgstahler and Eames 2003; Holland and Ramsay 2003; Phillips et al. 2004; Brown and Caylor 2005; Burgstahler and Eames 2006; Frank and Rego 2006; Roychowdhury 2006; Beaver et al. 2007; Jacob and Jorgensen 2007; Kerstein and Rai 2007; Habib and Hossain 2008). However, Durtschi and Easton (2009) suggest that inferring earnings management based on earnings frequency distributions may lead to erroneous conclusions.

Prior papers also document the market reactions to meeting/missing earnings thresholds. For example, DeAngelo, DeAngelo and Skinner (1996) provide evidence that when failing to sustain earnings growth firms experience an average of -13.96% annual abnormal stock returns over the event year. Barth, Elliot and Finn (1999) suggest that firms with patterns of increasing earnings have higher price-earnings multiples after controlling for growth and risk. Lopez and Rees (2002) also find that firms meeting or beating earnings expectations have higher earnings multiples than failing firms. Kasznik and McNichols (2002) document that firms meeting earnings expectations achieve higher abnormal returns. Bartov, Givoly and Hayn (2002) document that the average return of meeting/beating quarterly earnings surprises cases is 3.2% higher than that of failing cases. Brown and Caylor (2005) provide empirical evidence for the eight mutually exclusive and collectively exhaustive combinations of meeting/missing the three quarterly earnings thresholds and find that, since, but not earlier than, mid-1990s, the market rewarded (penalized) firms more that met (missed) analysts' forecasts than those that met (missed) the other two thresholds.

For the literature regarding earnings management for meeting/missing earnings thresholds, Burgstahler and Dichev (1997) document unusually low frequencies of small losses and small decreases in earnings and unusually high frequencies of small positive income and small increases in earnings, suggesting that firms manage earnings to avoid losses and earnings decreases. They also show that firms manipulate cash flows from operations and changes in working capital to achieve their goals. Burgstahler and Eames (2003) also find that firms manage earnings to avoid losses and earnings decreases. Burgstahler and Eames (2006) suggest that firms guide analysts' forecasts downward in order to achieve zero and small positive earnings surprises. McVay et al. (2006) find that the case of just-meeting the analysts' forecasts is highly correlated with subsequently managerial stock sales. They also find that managers manipulate earnings in this situation. Habib and Hossain (2008) find no evidence that Australia managers manage earnings to 'just meet or beat' analysts' forecasts. Das, Shroff and Zhang (2009) suggest that firms for

which the sign of earnings changes observed in interim quarters exhibit earnings reversals in the fourth quarter. They also find that firms reporting small annual profits or EPS increases have similar phenomena. This study continues this vein of research and compares the earnings management for the three earnings thresholds concurrently and comprehensively, instead of focusing on either only one or at most two earnings thresholds, aiming at filling the gap of the related literature.

3. RESEARCH QUESTIONS

While Brown and Caylor (2005) examine the valuation consequences of the eight mutually exclusive and collectively exhaustive situations of meeting/missing quarterly earnings thresholds, this study tests the earnings management instead for them, using annual data. Our first research question is:

RQ$_1$: Is there any earnings management for each of the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds?

Following Brown and Caylor (2005), the eight mutually exclusive and collectively exhaustive situations are $(T1^- \ T2^- \ T3^-)$, $(T1^+ \ T2^- \ T3^-)$, $(T1^- \ T2^+ \ T3^-)$, $(T1^- \ T2^- \ T3^+)$, $(T1^+ \ T2^+ \ T3^-)$, $(T1^+ \ T2^- \ T3^+)$, $(T1^- \ T2^+ \ T3^+)$ and $(T1^+ \ T2^+ \ T3^+)$, where $T1$, $T2$, and $T3$ denote the thresholds of avoiding losses, earnings decreases, and negative earnings surprises, respectively; and the superscripts, $+/-$, designate if a threshold has been met/missed. For example, $(T1^- \ T2^- \ T3^-)/(T1^+ \ T2^+ \ T3^+)$ denote missing/meeting all three thresholds. Others are constructed in a similar manner.

While a firm which meets all three thresholds $(T1^+ \ T2^+ \ T3^+)$ may conduct earnings management, one which misses all three thresholds $(T1^- \ T2^- \ T3^-)$ may take a big bath. The differences in the earnings management among the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds may reveal managers' inclination and priority in earnings management when facing different thresholds. Our second research question is:

RQ$_2$: What are the differences in the earnings management among the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds?

Besides the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds, this study also investigates, for a reduced sample, the earnings management of firms that barely meet or miss the three earnings thresholds. Furthermore, for comparison within thresholds, we compare the earnings management of just-meeting a specific threshold with that of just-missing. Our third research question is:

RQ₃: What is the earnings management of just-meeting/just-missing a specific threshold? What is the difference in earnings management between just-meeting and just-missing cases of that threshold?

For comparison across thresholds, we further compare the earnings management of just-meeting/just-missing one threshold with that of the other two. For example, we compare the earnings management of just-meeting/just-missing cases of avoiding losses with that of avoiding earnings decreases or negative earnings surprises. Our fourth research question is:

RQ₄: Are there any differences in earnings management of just-meeting/just-missing cases across the three earnings thresholds?

4. METHODOLOGY AND DATA

4.1 MODEL FOR TESTING THE EARNINGS MANAGEMENT OF THE EIGHT MUTUALLY EXCLUSIVE AND COLLECTIVELY EXCHAUSTIVE SITUATIONS OF MEETING/MISSING THE THREE EARNINGS THRESHOLDS

For the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds as adopted by Brown and Caylor (2005), we use annual data to test if earnings management exists in each situation. The model is as follows:

$$EM_{j,t} = \alpha_1(T1^-T2^-T3^-)_{j,t} + \alpha_2(T1^+T2^-T3^-)_{j,t} + \alpha_3(T1^-T2^+T3^-)_{j,t} + \alpha_4(T1^-T2^-T3^+)_{j,t}$$
$$+ \alpha_5(T1^+T2^+T3^-)_{j,t} + \alpha_6(T1^+T2^-T3^+)_{j,t} + \alpha_7(T1^-T2^+T3^+)_{j,t} + \alpha_8(T1^+T2^+T3^+)_{j,t}$$
$$+ \beta_1 BM_{j,t} + \beta_2 SIZE_{j,t} + \beta_3 DEBT_{j,t} + \sum_t \gamma_t YEAR_t + \sum_k \delta_k IND_{j,k} + \xi_{j,t}, \tag{1}$$

where *T1*, *T2*, and *T3* denote the thresholds of avoiding losses, earnings decreases, and negative earnings surprises, respectively; the superscripts, $+/-$, designate if a threshold has been met/missed. The superscripts, *j*, *t*, and *k*, represent firm, year, and industry identifications, respectively. We measure *T1*, *T2*, and *T3* as E_t/M_{t-1}, $[(E_t-E_{t-1})/M_{t-2}]$, and $[(E_t-F_{last})/M_{t-1}]$, where E_t and E_{t-1} represent earnings before extraordinary items and discontinued operations (annual Compustat data item *IB*) of years *t* and *t-1*, respectively; M_{t-1} and M_{t-2} represent market values of common equity (annual Compustat data item *PRCC_F* × annual Compustat data item *CSHO*) at the end of years *t-1* and *t-2*, respectively; F_{last} denotes the last analysts' earnings forecast (I/B/E/S Detail History-Unadjusted file (*detu_EPSUS*) measure = 'EPS' × Compustat data item *CSHPRI*

(common shares used to calculate *EPS-Basic*))[4] at the time of the earnings announcement of year *t*, but its release date must precede the earnings release date by at least three days. If F_{last} has more than one analyst forecasts, we take the mean of those forecasts. For example, if a firm misses all three thresholds, i.e. $E_t/M_{t-1}<0$, $[(E_t-E_{t-1})/M_{t-2}]<0$, and $[(E_t-F_{last})/M_{t-1}]<0$, then the dummy variable ($T1^- \ T2^- \ T3^-$) equals 1, and 0 otherwise. Likewise, if a firm meets all three thresholds, i.e. $E_t/M_{t-1}\geq0$, $[(E_t-E_{t-1})/M_{t-2}]\geq0$, and $[(E_t-F_{last})/M_{t-1}]\geq0$, then the dummy variable ($T1^+ \ T2^+ \ T3^+$) equals 1, and 0 otherwise. Others are constructed in a similar way. *BM* represents book-to-market ratio (Compustat data item *CEQ* / (Compustat data item *PRCC_F* × Compustat data item *CSHO*)), adding to control firms' growth. *SIZE* is the logarithm of the total assets (Compustat data item *AT*) at the end of year *t*. *DEBT* is debt ratio (Compustat data item *LT*/ Compustat data item *AT*) at the end of year *t*. To control for omitted time- and industry- specific effects, we add year- and industry- dummies. *EM* represents earnings management of the year *t* as defined below.

4.2 MODEL FOR TESTING THE EARNINGS MANAGEMENT OF THE JUST-MEETING/JUST-MISSING CASES OF THE THREE EARNINGS THRESHOLDS

For the just-meeting/just-missing cases of the three earnings thresholds, we use the following model to test if the earnings management exists in each situation:

$$EM_{j,t} = \alpha_{-1} L_{j,t}^{-1} + \alpha_{+1} L_{j,t}^{+1} + \beta_{-1} C_{j,t}^{-1} + \beta_{+1} C_{j,t}^{+1} + \gamma_{-1} F_{j,t}^{-1} + \gamma_{+1} F_{j,t}^{+1} + \theta_1 BM_{j,t}$$
$$+ \theta_2 SIZE_{j,t} + \theta_3 DEBT_{j,t} + \sum_t \phi_t YEAR_t + \sum_k \delta_k IND_{j,k} + \varepsilon_{j,t}, \qquad (2)$$

where *L, C,* and *F* denote the thresholds of avoiding losses, earnings decreases, and negative earnings surprises, respectively; the superscripts, ＋1/－1, designate if a threshold has been just-met/just-missed. The superscripts, *j, t,* and *k,* represent firm, year, and industry identifications, respectively. That is, L^{-1} equals 1 if a firm's earnings belong to the interval of $-0.0025\leq E_t/M_{t-1}<0$, and 0 otherwise. L^{+1} equals 1 if a firm's earnings belong to the interval of $0\leq E_t/M_{t-1}<0.0025$, and 0 otherwise. C^{-1} equals 1 if the change in a firm's annual earnings is in the interval of $-0.0025\leq[(E_t-E_{t-1})/M_{t-2}]<0$, and 0 otherwise. C^{+1} equals 1 if the change in a firm's annual earnings falls within the interval of

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[4] If the last analysts' earnings forecast is denoted as fully diluted, then it would be measured as (I/B/E/S Detail History-Unadjusted file (*detu_EPSUS*) measure = 'EPS' × Compustat data item *CSHFD* (common shares used to calculate EPS-Fully Diluted)).

$0 \leqq [(E_t\text{-}E_{t\text{-}1})/M_{t\text{-}2}] < 0.0025$, and 0 otherwise. F^{-1} equals 1 if a firm's earnings surprise is within the interval of $-0.0025 \leqq [(E_t\text{-}F_{last})/ M_{t\text{-}1}] < 0$, and 0 otherwise. F^{+1} equals 1 if a firm's earnings surprise is in the interval of $0 \leqq [(E_t\text{-}F_{last})/ M_{t\text{-}1}] < 0.0025$, and 0 otherwise. *EM*, *BM*, *SIZE*, *DEBT*, *YEAR*, and *IND* are the same with those of Eq. (1).

4.3 EARNINGS MANAGEMENT METRICS

To measure earnings management, this study adopts two different measures: one is accrual-based and the other is real earnings management.

4.3.1 Accrual-based Earnings Management

To measure the accrual-based earnings management, we follow Cohen and Zarowin (2010) and use a cross-sectional model to calculate discretionary accruals, where for each year we estimate the model for each 2-digit SIC grouping with at least 8 observations. The model is as follows:

$$\left(ACC_{j,t}\big/ASSET_{j,t-1}\right) = \alpha_{0,t}\left(1\big/ASSET_{j,t-1}\right) + \alpha_{1,t}\left(\Delta SALES_{j,t}\big/ASSET_{j,t-1}\right)$$
$$+ \alpha_{2,t}\left(PPE_{j,t}\big/ASSET_{j,t-1}\right) + \varepsilon_{j,t}, \tag{3}$$

where

$ACC_{j,t}$ =   *j* firm's accounting accruals of year *t*, which equals net income (Annual Compustat data item *IBC*) minus cash flows from operations (annual Compustat data item *OANCF* – annual Compustat data item *XIDOC*) ;

$ASSET_{j,t-1}$ =   *j* firm's total assets at the end of year *t-1* (annual Compustat data item *AT*) ;

$\Delta SALES_{j,t}$ =   *j* firm's revenues in year *t* less revenues in year *t-1* (annual Compustat data item $SALE_t\text{-}SALE_{t\text{-}1}$) ;

$PPE_{j,t}$ =   *j* firm's gross property plant and equipment in year *t* (annual Compustat data item *PPEGT*).

The accrual-based earnings management is measured as the difference between the actual accruals and the fitted normal accruals estimated by Eq. (3).

4.3.2 Real Earnings Management

Prior studies provide evidence that managers cut discretionary spending to achieve earnings targets. Following Cohen and Zarowin (2010), we develop three proxies to measure real earnings management, and then combine them into two comprehensive metrics to capture the total effects of real earnings management.

The three proxies of real earnings management are abnormal cash flows from operations, production costs, and discretionary expenses. Following Dechow, Kothari and Watts (1998) and Roychowdhury (2006), we estimate the normal level of cash flows from operations (*CFO*) each year using the following cross-sectional model for each 2-digit SIC grouping with at least 8 observations:

$$
\begin{aligned}
\left(CFO_{j,t}/ASSET_{j,t-1}\right) &= k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) \\
&\quad + k_3\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},
\end{aligned}
\tag{4}
$$

where

$CFO_{j,t}$ =   *j* firm's cash flows from operations of year *t* (annual Compustat data item *OANCF* – annual Compustat data item *XIDOC*).

To estimate the abnormal production costs, following Dechow et al. (1998), we define the production costs as the sum of Costs of Goods Sold (*COGS*) and the Change in Inventory (*ΔINV*). Firstly, the normal level of *COGS* is estimated as follows:

$$
\left(COGS_{j,t}/ASSET_{j,t-1}\right) = k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},
\tag{5}
$$

where

$COGS_{j,t}$ = *j* firm's cost of goods sold of year *t* (annual Compustat data item *COGS_t*).

Secondly, the normal level of *ΔINV* is estimated as follows:

$$
\begin{aligned}
\left(\Delta INV_{j,t}/ASSET_{j,t-1}\right) &= k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) \\
&\quad + k_3\left(\Delta SALES_{j,t-1}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},
\end{aligned}
\tag{6}
$$

where

$\Delta INV_{j,t}$ = *j* firm's change in inventory of year *t* (annual Compustat data item $INVT_t$-$INVT_{t-1}$).

Combining Eq. (5) and Eq. (6), we then estimate the normal production costs as follows:

$$
\begin{aligned}
\left(PROD_{j,t}/ASSET_{j,t-1}\right) &= k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) \\
&\quad + k_3\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) + k_4\left(\Delta SALES_{j,t-1}/ASSET_{j,t-1}\right) \\
&\quad + \varepsilon_{j,t},
\end{aligned}
\tag{7}
$$

where

$PROD_{j,t}$ = the sum of *j* firm's cost of goods sold and change in inventory of year *t* (annual Compustat data item $COGS_t + \Delta INVT_t$).

Similarly, the normal level of discretionary expenses can be estimated using the following industry-year regression:

$$\left(DISX_{j,t} / ASSET_{j,t-1}\right) = k_1\left(1 / ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t} / ASSET_{j,t-1}\right) + \varepsilon_{j,t}, \tag{8}$$

where

$DISX_{j,t}$ = the sum of j firm's advertising expenses, $R\&D$ expenses, and $SG\&A$ of year t (annual Compustat data item $XAD_t + XRD_t + XSGA_t$, as long as $SG\&A$ is available, and advertising expenses and $R\&D$ expenses are set to zero if they are missing).

The abnormal CFO, $PROD$, and $DISX$ are computed as the difference between the realized values and the normal levels estimated from Eqs. (4), (7), and (8), respectively. After controlling for sales levels, both abnormal CFO and $DISX$ are unusually low for firms that manage earnings upwards. On the contrary, firms with higher abnormal $PROD$ manipulate earnings upwards. Following Zang (2012), we multiply abnormal CFO and $DISX$ by negative one, so that the higher these amounts the more likely managers are engaging in sales manipulation and cutting discretionary expenditures to boost up earnings.

Finally, we adopt two comprehensive metrics of real earnings management activities to capture the total effects of real earnings management. For the first measure, RM_1, abnormal $DISX$ is multiplied by negative one and added to abnormal $PROD$, so that firms with higher RM_1 are more likely to engage in earnings management. For the second measure, RM_2, both abnormal CFO and $DISX$ are multiplied by negative one and then aggregated, so that firms with higher RM_2 are more likely to engage in sales manipulation and cutting discretionary expenditures to manage reported earnings upwards.

4.4 DATA AND SAMPLE DESCRIPTION

We obtain analyst forecasts of annual earnings and their forecast dates from I/B/E/S Detail History-Unadjusted file and actual earnings and their announcement dates from I/B/E/S Detail History-Actual Unadjusted file. Annual financial data are retrieved from Compustat. The sample period spans from 1988 to 2009, while the data of 1988 and 1989 are only used for lag operation, so our study period is 20 years, 1990-2009. Our initial sample consists of 87,358 firm-years. We delete firm-years with SIC codes 4400-5000 (regulated industries) and 6000-6500 (financial institutions). We also delete firm-years due to requiring at least 8 observations in each 2-digit SIC grouping per year and missing values. Our final sample for testing the earnings management of the eight mutually and collectively exhaustive exclusive situations of meeting/missing the three earnings thresholds consists of 35,414 firm-years, of which 8,523 firm-years are used to test the earnings management of the just-meeting/just-missing cases of the three earnings thresholds. To control for the effect of outliers, each variable except dummy variable used

in regression models has been winsorized at the 1st and 99th percentiles. Table 1 shows the sample selection process.

　　Table 2 reports the descriptive statistics of our research variables in Eqs. (1) and (2). For every industry-year with at least 8 firms in each 2-digit SIC grouping, Eqs. (3), (4), (7), and (8) are estimated cross-sectionally over the period from 1990 to 2009. Panel A shows the results for the full sample used in estimating Eq. (1), while Panel B presents the results for the just-meeting/just-missing sample used in estimating Eq. (2). Cohen and Zarowin (2010) suggest that abnormal cash flows from operations, abnormal production costs, and abnormal discretionary expenses may have different implications in earnings management. Any results using aggregate real earnings management measures composed of these three variables may capture the aggregate effect of two minor individual measures. We thus report the results of the two aggregate measures (*RM_1* and *RM_2*) as well as the three individual real earnings management proxies (abnormal *CFO*, abnormal *PROD*, and abnormal *DISX*).

TABLE 1　Sample Selection

	Firm-Years	Firms
Initial sample retrieved from Compustat/IBES over the period 1988-2009	87,358	12,283
Deleting Utility (SIC codes 4400-5000) and Finance (SIC codes 6000-6500) Industries' observations	22,146	3,134
Observations deleted due to taking lag variables and missing values	28,500	3,371
Observations deleted due to requiring at least 8 observations in each 2-digit SIC grouping per year	1,298	147
Final sample for the period 1990-2009	35,414	5,631
Observations which are not just-meeting/ just-missing cases	26,891	2,539
Just-meeting/ just-missing sample	8,523	3,092

　　As shown in Table 2 Panel A, for the full sample, the means and medians of the accrual-based earnings management (*AM*), the three individual real earnings management proxies (abnormal_*CFO**(-1), abnormal_*PROD*, and abnormal_*DISX**(-1)), and the two aggregate real earnings management measures (*RM_1* and *RM_2*) are close to zero. The sample proportions of meeting all three thresholds and reporting negative surprises are highest among the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, at 27.2% and 23.6%, respectively, followed

by avoiding losses (17.2%), missing all three thresholds (16.5%), reporting earnings decreases (5.7%), avoiding earnings declines (5.6%), reporting losses (2.3%), and avoiding negative earnings surprises (1.8%).

<div align="center">TABLE 2   Descriptive Statistics</div>

Panel A: Full Sample for the Period 1990-2009 (n=35,414)

Variables	Mean	Std.	Q1	Median	Q3
Dependent Variables					
AM	-0.010	0.094	-0.045	-0.003	0.036
Abnormal CFO*(-1)	-0.009	0.109	-0.067	-0.012	0.043
Abnormal PROD	-0.030	0.208	-0.139	-0.030	0.071
Abnormal DISX*(-1)	-0.036	0.236	-0.146	-0.015	0.080
RM_1	-0.066	0.411	-0.273	-0.053	0.137
RM_2	-0.045	0.257	-0.174	-0.036	0.085
Independent Variables					
$(T1^- T2^- T3^-)$	0.165	0.371	0.000	0.000	0.000
$(T1^+ T2^- T3^-)$	0.172	0.378	0.000	0.000	0.000
$(T1^- T2^+ T3^-)$	0.056	0.231	0.000	0.000	0.000
$(T1^- T2^- T3^+)$	0.018	0.134	0.000	0.000	0.000
$(T1^+ T2^+ T3^-)$	0.236	0.425	0.000	0.000	0.000
$(T1^+ T2^- T3^+)$	0.057	0.233	0.000	0.000	0.000
$(T1^- T2^+ T3^+)$	0.023	0.149	0.000	0.000	0.000
$(T1^+ T2^+ T3^+)$	0.272	0.445	0.000	0.000	1.000
Control Variables					
BM	0.575	0.562	0.273	0.457	0.731
SIZE	6.248	1.756	4.973	6.117	7.404
DEBT	0.479	0.371	0.304	0.478	0.624

Panel B: Just-meeting / just-missing Sample (n=8,523)

Variables	Mean	Std.	Q1	Median	Q3
Dependent Variables					
AM	0.005	0.067	-0.029	0.004	0.038
Abnormal CFO*(-1)	-0.030	0.101	-0.084	-0.030	0.022
Abnormal PROD	-0.054	0.214	-0.172	-0.052	0.055
Abnormal DISX*(-1)	-0.027	0.229	-0.139	-0.013	0.088
RM_1	-0.082	0.415	-0.297	-0.069	0.131
RM_2	-0.058	0.258	-0.196	-0.050	0.075

TABLE 2　Descriptive Statistics (continued)

Panel B: Just-meeting / just-missing Sample (n=8,523)

Variables	Mean	Std.	Q1	Median	Q3
Independent Variables					
L^{-1}	0.015	0.123	0.000	0.000	0.000
L^{+1}	0.026	0.160	0.000	0.000	0.000
C^{-1}	0.041	0.199	0.000	0.000	0.000
C^{+1}	0.048	0.214	0.000	0.000	0.000
F^{-1}	0.381	0.486	0.000	0.000	1.000
F^{+1}	0.488	0.500	0.000	0.000	1.000
Control Variables					
BM	0.447	0.343	0.234	0.371	0.570
SIZE	6.441	1.668	5.239	6.313	7.516
DEBT	0.436	0.206	0.271	0.437	0.575

Variable Definitions:

Dependent variables:

AM = Accrual-based earnings management for a particular firm-year, which is the residual estimated from the following industry-year regression of Jones Model (Jones 1991) as adopted by Cohen and Zarowin (2010),

$$\left(ACC_{j,t}/ASSET_{j,t-1}\right) = \alpha_{0,t}\left(1/ASSET_{j,t-1}\right) + \alpha_{1,t}\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) + \alpha_{2,t}\left(PPE_{j,t}/ASSET_{j,t-1}\right) + \varepsilon_{j,t};$$

Abnormal_CFO = Abnormal cash flows from operations for a particular firm-year, which are the residuals estimated from the following industry-year regression as implemented by Cohen and Zarowin (2010):

$$\left(CFO_{j,t}/ASSET_{j,t-1}\right) = k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) + k_3\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},$$

where CFO is cash flows from operations (annual Compustat data item OANCF – annual Compustat data item XIDOC). Abnormal CFO is multiplied by negative one, so that firms with higher abnormal_CFO*(-1) are more likely to manage reported earnings upwards;

Abnormal_PROD = Abnormal production costs for a particular firm-year, which are the residuals estimated from the following industry-year regression as implemented by Cohen and Zarowin (2010):

$$\left(PROD_{j,t}/ASSET_{j,t-1}\right) = k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) + k_3\left(\Delta SALES_{j,t}/ASSET_{j,t-1}\right) + k_4\left(\Delta SALES_{j,t-1}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},$$

Abnormal_DISX = Abnormal discretionary expenses for a particular firm-year, which are the residuals estimated from the following industry-year regression as implemented by Cohen and Zarowin (2010):

$$\left(DISX_{j,t}/ASSET_{j,t-1}\right) = k_1\left(1/ASSET_{j,t-1}\right) + k_2\left(SALES_{j,t}/ASSET_{j,t-1}\right) + \varepsilon_{j,t},$$

where DISX is the discretionary expenses during the year, defined as the sum of advertising expenses (annual Compustat data item XAD), R&D expenses (annual Compustat data item XRD) and SG&A (annual Compustat data item XSGA). Abnormal DISX is multiplied by negative one, so that firms with higher abnormal_DISX*(-1) are more likely to manage reported earnings upwards;

RM_1 = The first aggregate measure of real earnings management activities and is calculated as the sum of abnormal_DISX*(-1) and abnormal_PROD as implemented by Cohen and Zarowin (2010);

RM_2 = The second aggregate measure of real earnings management activities and is equal to the sum of abnormal_CFO*(-1) and abnormal_DISX*(-1) as implemented by Cohen and Zarowin (2010).

Variable Definitions:

Independent variables:

$(T1^- \; T2^- \; T3^-)$ = 1, if a firm misses all three thresholds, i.e., $E_t/M_{t-1}<0$, $[(E_t-E_{t-1})/M_{t-2}]<0$, and $[(E_t-F_{last})/M_{t-1}]<0$, and 0 otherwise. Where E_t and E_{t-1} represent total earnings of years t and t-1, respectively; M_{t-1} and M_{t-2} represent market value of common equity (i.e. Compustat data item PRCC_F × Compustat data item CSHO) at the end of years t-1 and t-2, respectively. F_{last} denotes the last analysts' earnings forecast at the time of the earnings announcement of year t, but its release date must precede the earnings release date by at least three days;

TABLE 2   Descriptive Statistics (continued)

Variable Definitions:

   Independent variables:

$(T1^+ T2^- T3^-) = 1$, if a firm's situation is subject to: $E_t/M_{t-1} \geqq 0$, $[(E_t-E_{t-1})/M_{t-2}]<0$, and $[(E_t-F_{last})/ M_{t-1}]<0$, and 0 otherwise;

$(T1^- T2^+ T3^-) = 1$, if a firm's situation is subject to: $E_t/M_{t-1}<0$, $[(E_t-E_{t-1})/M_{t-2}]\geqq 0$, and $[(E_t-F_{last})/ M_{t-1}]<0$, and 0 otherwise;

$(T1^- T2^- T3^+) = 1$ if a firm's situation is subject to: $E_t/M_{t-1}<0$, $[(E_t-E_{t-1})/M_{t-2}]<0$, and $[(E_t-F_{last})/M_{t-1}]\geqq 0$, and 0 otherwise;

$(T1^+ T2^+ T3^-) = 1$ if a firm's situation is subject to: $E_t/M_{t-1}\geqq 0$, $[(Et-E_{t-1})/M_{t-2}]\geqq 0$, and $[(E_t-F_{last})/ M_{t-1}]<0$, and 0 otherwise;

$(T1^+ T2^- T3^+) = 1$ if a f firm's situation is subject to: $E_t/M_{t-1}\geqq 0$, $[(E_t-E_{t-1})/M_{t-2}]<0$, and $[(E_t-F_{last})/ M_{t-1}]\geqq 0$, and 0 otherwise;

$(T1^- T2^+ T3^+) = 1$ if a firm's situation is subject to: $E_t/M_{t-1}<0$, $[(E_t-E_{t-1})/M_{t-2}]\geqq 0$, and $[(E_t-F_{last})/ M_{t-1}]\geqq 0$, and 0 otherwise;

$(T1^+ T2^+ T3^+) = 1$ if a firm's situation is subject to: $E_t/M_{t-1}\geqq 0$, $[(E_t-E_{t-1})/M_{t-2}]\geqq 0$, and $[(E_t-F_{last})/ M_{t-1}]\geqq 0$, and 0 otherwise;

$L^{-1} = 1$ if a firm's annual earnings belong to the interval of $-0.0025 \leqq E_t/M_{t-1}<0$, and 0 otherwise;

$L^{+1} = 1$ if a firm's annual earnings belong to the interval of $0 \leqq E_t/M_{t-1}<0.0025$, and 0 otherwise;

$C^{-1} = 1$ if the change in a firm's annual earnings is in the interval of $-0.0025 \leqq [(E_t-E_{t-1})/M_{t-2}]<0$, and 0 otherwise;

$C^{+1} = 1$ if the change in a firm's annual earnings is in the interval of $0 \leqq [(E_t-E_{t-1})/M_{t-2}]<0.0025$, and 0 otherwise;

$F^{-1} = 1$ if a firm's earnings surprise is in the interval of $-0.0025 \leqq [(E_t-F_{last})/M_{t-1}]<0$, and 0 otherwise;

$F^{+1} = 1$ if a firm's earnings surprise is in the interval of $0 \leqq [(E_t-F_{last})/M_{t-1}]<0.0025$, and 0 otherwise.

   Control Variables:

BM = Book-to-market ratio (Compustat data item *CEQ* / (Compustat data item *PRCC_F* × Compustat data item *CSHO*));

$SIZE$ = The logarithm of the total assets (Compustat data item *AT*) at the end of year *t*;

$DEBT$ = The debt ratio (Compustat data item *LT*/ Compustat data item *AT*) at the end of year *t*.

As shown in Table 2 Panel B, for the just-meeting/just-missing sample, the means and medians of the accrual-based earnings management (*AM*), the three individual real earnings management proxies (abnormal_*CFO**(-1), abnormal_*PROD*, and abnormal_*DISX**(-1)), and the two aggregate real earnings management measures (*RM_1* and *RM_2*) are also close to zero. 48.8% of this sample consists of companies that just meet earnings expectations, and 38.1% consists of companies that just miss earnings expectations.

Table 3 reports the correlations between the various proxies of earnings management. The correlations between accrual-based earnings management (*AM*) and various proxies of real earnings management are low (less than 30%, Pearson), indicating that accrual-based and real earnings management measures may capture different earnings manipulation behaviors. The correlations among the three individual real earnings management measures are moderate except that the correlation between the abnormal cash flows from operations and the abnormal discretionary expenses is relatively low (-3.3%, Pearson), indicating that further investigation individually for them may be worthwhile. The correlation between the two aggregate real earnings management measures is high (over 90%, Pearson).

TABLE 3　　Correlation Analyses

Panel A: Full sample for the period 1990-2009 (n=35,414)

	AM	Abnormal *CFO*(-1)*	Abnormal *PROD*	Abnormal *DISX*(-1)*	*RM_1*	*RM_2*
AM	1.000	**0.247**	**0.090**	**0.186**	**0.154**	**0.276**
Abnormal *CFO*(-1)*	**0.307**	1.000	**0.436**	**-0.033**	**0.202**	**0.394**
Abnormal *PROD*	**0.124**	**0.455**	1.000	**0.706**	**0.914**	**0.835**
Abnormal *DISX*(-1)*	**0.180**	**0.038**	**0.703**	1.000	**0.933**	**0.905**
RM_1	**0.170**	**0.237**	**0.899**	**0.929**	1.000	**0.944**
RM_2	**0.294**	**0.427**	**0.828**	**0.884**	**0.931**	1.000

Panel B: Just-meeting / just-missing sample (n=8,523)

	AM	Abnormal *CFO*(-1)*	Abnormal *PROD*	Abnormal *DISX*(-1)*	*RM_1*	*RM_2*
AM	1.000	**0.450**	**0.167**	**0.165**	**0.177**	**0.322**
Abnormal *CFO*(-1)*	**0.439**	1.000	**0.502**	**0.086**	**0.307**	**0.468**
Abnormal *PROD*	**0.176**	**0.523**	1.000	**0.754**	**0.932**	**0.865**
Abnormal *DISX*(-1)*	**0.155**	**0.140**	**0.745**	1.000	**0.940**	**0.921**
RM_1	**0.178**	**0.335**	**0.920**	**0.935**	1.000	**0.954**
RM_2	**0.315**	**0.497**	**0.863**	**0.899**	**0.945**	1.000

This table reports Pearson (above the diagonal) and Spearman (below the diagonal) correlation coefficients for the described sample. Correlation coefficients which are significant at the 1% level are marked in bold. For variable definitions, refer to Table 2.

5. EMPIRICAL RESULTS

5.1 EARNINGS MANAGEMENT FOR THE EIGHT MUTUALLY EXCLUSIVE AND COLLECTIVELY EXHAUSTIVE SITUATIONS OF MEETING/MISSING ANNUAL EARNINGS THRESHOLDS

To test earnings management for the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, we estimate Eq. (1) using the accrual-based earnings management (*AM*) and the two aggregate measures of real earnings management (*RM_1* and *RM_2*) as dependent variables. In addition, we include *SIZE* to control for the size effect, *BM* to control for growth opportunities, and *DEBT* to control for the leverage effect. We also introduce year and industry dummies to control for time- and industry-specific effects.

Our first research question investigates whether there exists any earnings management for each situation of $(T1^- T2^- T3^-)$, $(T1^+ T2^- T3^-)$, $(T1^- T2^+ T3^-)$, $(T1^- T2^- T3^+)$, $(T1^+ T2^+ T3^-)$, $(T1^+ T2^- T3^+)$, $(T1^- T2^+ T3^+)$ and $(T1^+ T2^+ T3^+)$. If firms manage

earnings upwards by increasing accruals, we expect abnormal discretionary accruals to be positively correlated with situations of meeting/missing earnings thresholds. Table 4 Panel A shows, when measured using accrual-based earnings management metrics, the abnormal discretionary accruals for the case of missing all three thresholds ($T1^- T2^- T3^-$) are negatively significant, indicating that managers in this situation may decide to take a 'big bath'. Aside from that, there is no evidence that firms' meeting/missing other thresholds is related to the accrual-based earnings management.

Alternatively, when measured using real earnings management metrics, we also expect *RM_1* and *RM_2* to be positively correlated with situations of meeting/missing earnings thresholds. The results show that the case of avoiding negative earnings surprises ($T1^- T2^- T3^+$) has significantly negative abnormal measures (for *RM_1*, coefficient=-25.0%, t=-1.75; for *RM_2*, coefficient=-15.0%, t=-1.70), indicating that when firms report negative earnings and commit earnings decline, and meanwhile analysts also expect firms' earnings to be negative, therefore firms may decide to take a big bath. The insignificant coefficients of other cases reveal that firms' meeting/missing other earnings thresholds is not related to the real earnings management.

Our second research question investigates whether there are differences in earnings management among the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds. The results, shown in Table 4 Panel B, indicate that, when measured using *AM*, the increments of avoiding losses ($T1^+ T2^- T3^-$), earnings decreases ($T1^- T2^+ T3^-$), or negative earnings surprises ($T1^- T2^- T3^+$) over missing all three thresholds ($T1^- T2^- T3^-$) are significantly positive, revealing that managers put more efforts to manipulate earnings upwards in those cases relative to those of missing all three thresholds. Similarly, as expected, the increment of meeting all three thresholds ($T1^+ T2^+ T3^+$) over missing all three thresholds ($T1^- T2^- T3^-$) is significantly positive. Furthermore, the increments of meeting all three thresholds ($T1^+ T2^+ T3^+$) over reporting negative earnings surprises ($T1^+ T2^+ T3^-$) or earnings decreases ($T1^+ T2^- T3^+$) are significantly positive, indicating that managers put more efforts to manipulate earnings upwards in the case of meeting all three thresholds relative to those of meeting two of the three thresholds.

TABLE 4　Regression Results for Testing the Earnings Management for the Eight Mutually Exclusive and Collectively Exhaustive Situations of Meeting/Missing the Three Earnings Thresholds

$$EM_{j,t} = \alpha_1 (T1^- T2^- T3^-)_{j,t} + \alpha_2 (T1^+ T2^- T3^-)_{j,t} + \alpha_3 (T1^- T2^+ T3^-)_{j,t} + \alpha_4 (T1^- T2^- T3^+)_{j,t}$$

$$+ \alpha_5 (T1^+ T2^+ T3^-)_{j,t} + \alpha_6 (T1^+ T2^- T3^+)_{j,t} + \alpha_7 (T1^- T2^+ T3^+)_{j,t} + \alpha_8 (T1^+ T2^+ T3^+)_{j,t}$$

$$+ \beta_1 BM_{j,t} + \beta_2 SIZE_{j,t} + \beta_3 DEBT_{j,t} + \sum_t \gamma_t YEAR_t + \sum_k \delta_k IND_{j,k} + \xi_{j,t}.$$

Panel A: Testing the Earnings Management for Each Situation

Variables	AM	RM_1	RM_2
Missing all three thresholds $(T1^- T2^- T3^-)$: α_1	-0.064** (-2.06)	-0.194 (-1.36)	-0.127 (-1.44)
Avoiding losses $(T1^+ T2^- T3^-)$: α_2	0.026 (0.83)	-0.105 (-0.74)	-0.074 (-0.84)
Avoiding earnings decreases $(T1^- T2^+ T3^-)$: α_3	-0.012 (-0.40)	-0.226 (-1.59)	-0.129 (-1.47)
Avoiding negative surprises $(T1^- T2^- T3^+)$: α_4	-0.003 (-0.08)	-0.250* (-1.75)	-0.150* (-1.70)
Reporting negative surprises $(T1^+ T2^+ T3^-)$: α_5	0.030 (0.98)	-0.101 (-0.71)	-0.070 (-0.79)
Reporting earnings decreases $(T1^+ T2^- T3^+)$: α_6	0.035 (1.13)	-0.076 (-0.54)	-0.063 (-0.72)
Reporting losses $(T1^- T2^+ T3^+)$: α_7	0.037 (1.20)	-0.222 (-1.56)	-0.110 (-1.25)
Meeting all three thresholds $(T1^+ T2^+ T3^+)$: α_8	0.041 (1.31)	-0.085 (-0.60)	0.065 (-0.73)
BM	0.013*** (14.50)	0.139*** (33.31)	0.087*** (33.53)
SIZE	-0.004*** (-11.37)	-0.030*** (-20.25)	-0.023*** (-24.90)
DEBT	-0.010*** (-4.12)	0.297*** (27.56)	0.240*** (35.85)
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Adj. R^2	0.162	0.086	0.103

TABLE 4   Regression Results for Testing the Earnings Management for the Eight Mutually Exclusive and Collectively Exhaustive Situations of Meeting/Missing the Three Earnings Thresholds (continued)

Panel B: Differences in the Earnings Management among the Eight Mutually Exclusive and Collectively Exhaustive Situations of Meeting/Missing Earnings Thresholds

Variables	*AM*	*RM_1*	*RM_2*
Increment of avoiding losses over missing all three thresholds			
$\alpha_2 - \alpha_1$	0.089***	0.088***	0.053***
	(54.21)	(11.65)	(11.32)
Increment of avoiding earnings decreases over missing all three thresholds			
$\alpha_3 - \alpha_1$	0.051***	-0.033***	-0.002
	(22.59)	(-3.09)	(-0.37)
Increment of avoiding negative surprises over missing all three thresholds			
$\alpha_4 - \alpha_1$	0.061***	-0.057***	-0.024**
	(16.90)	(-3.42)	(-2.29)
Increment of meeting all three thresholds over reporting negative surprises			
$\alpha_8 - \alpha_5$	0.010***	0.017***	0.005
	(7.79)	(2.80)	(1.44)
Increment of meeting all three thresholds over reporting earnings decreases			
$\alpha_8 - \alpha_6$	0.006***	-0.008	-0.001
	(2.66)	(-0.85)	(-0.17)
Increment of meeting all three thresholds over reporting losses			
$\alpha_8 - \alpha_7$	0.003	0.137***	0.046***
	(1.05)	(9.18)	(4.91)
Increment of meeting all three thresholds over missing all three thresholds			
$\alpha_8 - \alpha_1$	0.104***	0.109***	0.062***
	(67.79)	(15.42)	(14.22)

*, **, *** indicate the coefficient estimate is significantly different from zero at the 0.10, 0.05, and 0.01 levels, using a two-sided test. The sample consists of 35,414 firm-years from 1990 to 2009. Each column in Panel A presents the results of the above regression for a different dependent variable, whose name appears at the top of the respective column. The regression equations include untabulated year- and industry-specific intercepts. T-statistics are calculated and reported in parentheses. Panel B presents the results of testing the differences in the earnings management among the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds. For variable definitions, refer to Table 2.

When measured using aggregate real earnings management metrics (*RM_1* and *RM_2*), we find mixed results. The increments of meeting all three thresholds over missing all three thresholds, meeting all three thresholds over reporting losses, meeting all three thresholds over earnings surprises (only for *RM_1*), and avoiding losses over missing all three thresholds are significantly positive, consistent with those measured by accrual-based earnings management metrics. On the other hand, others are negative and contradictory to those measured by accrual-based earnings management metrics, which may suggest that, as Zang (2012) documents, managers may use accrual-based earnings management and real activities manipulation as substitutes.

Overall, for the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, we find no evidence that managers manipulate earnings upwards to meet/miss these thresholds, and in some situations they even manipulate earnings downwards. Because this is the first paper to investigate the earnings management for the eight individual situations identified by Brown and Caylor (2005), we provide new evidence to the related literature. Furthermore, we compare earnings management among the eight situations. We do find incremental earnings management among them. For example, the earnings management of meeting all three goals is greater than that of missing all three goals, indicating that managers may have a tendency to manipulate earnings in some situations. Further investigation to situations that have strong incentives to manipulate earnings, i.e. offering IPOs, exercising employee stock options, and approaching defaults of debt, may corroborate our findings.

5.2 EARNINGS MANAGEMENT FOR THE JUST-MEETING/JUST-MISSING ANNUAL EARNINGS THRESHOLDS

Besides the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds, we further test, for a reduced sample, whether earnings management exists in the just-meeting/just-missing cases of the three earnings thresholds. Our third research question aims at earnings management for the just-meeting/just-missing cases of a specific threshold and the difference in earnings management within that specific threshold. The results, shown in Table 5, indicate that, when measured by *AM*, the case of just-missing the threshold of zero earnings has significantly negative abnormal measures, consistent with the conjecture of taking a big bath. The case of just-meeting the threshold of zero earnings also has significantly negative abnormal measures, indicating that firms with just-meeting zero earnings even manage earnings downwards. Furthermore, the earnings management of just-meeting the threshold of zero earnings over that of just-missing is positive but insignificant.

The cases of just-meeting and just-missing the threshold of earnings changes both have insignificantly positive abnormal measures, and we find no differences in earnings management between them. The cases of just-meeting and just-missing the threshold of earnings surprises have significantly positive abnormal measures, indicating that firms with just-meeting/just-missing earnings expectations are more likely to manage earnings upwards. Furthermore, we find that the earnings management of just-meeting the threshold of earnings surprises over that of just-missing is significantly negative. Overall, it seems that managers put more attention on meeting the threshold of earnings surprises, even in the case of missing it they still manage earnings upwards to not go far away from the goal.

When measured by *RM_1* and *RM_2*, the coefficients on the six situations of just-meeting/just-missing earnings thresholds are significantly negative. That is, we find no evidence that firms that just-meet/just-miss the earnings thresholds commit real earnings management. Furthermore, we find no evidence that the increment of earnings management of just-meeting a specific threshold over that of just-missing is significant.

TABLE 5　Regression Results for Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

$$EM_{j,t} = \alpha_{-1}L_{j,t}^{-1} + \alpha_{+1}L_{j,t}^{+1} + \beta_{-1}C_{j,t}^{-1} + \beta_{+1}C_{j,t}^{+1} + \gamma_{-1}F_{j,t}^{-1} + \gamma_{+1}F_{j,t}^{+1} + \theta_1 BM_{j,t} + \theta_2 SIZE_{j,t}$$

$$+ \theta_3 DEBT_{j,t} + \sum_t \phi_t YEAR_t + \sum_k \delta_k IND_{j,k} + \varepsilon_{j,t}.$$

Panel A: Testing the Earnings Management for The Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

Variables	AM	RM_1	RM_2
Just-missing the threshold of zero earnings			
L^-	-0.013[*]	-0.390[***]	-0.257[***]
: α_{-1}	(-1.67)	(-8.41)	(-8.97)
Just-meeting the threshold of zero earnings			
L^+	-0.011[*]	-0.345[***]	-0.233[***]
: α_{+1}	(-1.67)	(-8.58)	(-9.40)
Just-missing the threshold of earnings changes			
C^-	0.004	-0.287[***]	-0.183[***]
: β_{-1}	(0.61)	(-7.72)	(-8.00)
Just-meeting the threshold of earnings changes			
C^+	0.004	-0.298[***]	-0.199[***]
: β_{+1}	(0.68)	(-8.27)	(-8.94)
Just-missing the threshold of earnings surprises			
F^-	0.022[***]	-0.240[***]	-0.157[***]
: γ_{-1}	(4.45)	(-8.00)	(-8.48)
Just-meeting the threshold of earnings surprises			
BM	0.012[***]	0.254[***]	0.164[***]
	(5.73)	(19.15)	(19.98)
SIZE	-0.004[***]	-0.023[***]	-0.019[***]
	(-7.17)	(-7.56)	(-10.38)
DEBT	-0.007[*]	0.287[***]	0.229[***]
	(-1.73)	(12.11)	(15.66)
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Adj. R^2	0.039	0.095	0.118

TABLE 5　Regression Results for Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds (continued)

Panel B: Testing the Differences in the Earnings Management Across the Three Thresholds for a Just-Meeting or Just-Missing Case

Variables	*AM*	*RM_1*	*RM_2*
Increment of just-meeting over just-missing of the threshold of zero earnings			
$\alpha_{+1}-\alpha_{-1}$	0.002	0.046	0.024
	(0.25)	(1.03)	(0.87)
Increment of a just-meeting over just-missing of the threshold of earnings decreases			
$\beta_{+1}-\beta_{-1}$	0.000	-0.011	-0.015
	(0.00)	(-0.37)	(-0.83)
Increment of just-meeting over just-missing of the threshold of earnings surprises			
$\gamma_{+1}-\gamma_{-1}$	-0.003**	0.013	0.006
	(-2.21)	(1.41)	(0.99)
Increment of just-missing of the threshold of earnings decreases over that of zero earnings			
$\beta_{-1}-\alpha_{-1}$	0.016***	0.104**	0.073***
	(2.44)	(2.52)	(2.89)
Increment of just-missing of the threshold of earnings surprises over that of zero earnings			
$\gamma_{-1}-\alpha_{-1}$	0.035****	0.151***	0.100***
	(5.88)	(4.20)	(4.52)
Increment of just-missing of the threshold of earnings surprises over that of earnings decreases			
$\gamma_{-1}-\beta_{-1}$	0.018***	0.047**	0.027*
	(4.86)	(2.06)	(1.89)
Increment of just-meeting of the threshold of earnings decreases over that of zero earnings			
$\beta_{+1}-\alpha_{+1}$	0.015***	0.047	0.035*
	(2.72)	(1.40)	(1.67)
Increment of just-meeting of the threshold of earnings surprises over that of zero earnings			
$\gamma_{+1}-\alpha_{+1}$	0.029***	0.118***	0.082***
	(6.44)	(4.24)	(4.77)
Increment of just-meeting of the threshold of earnings surprises over that of earnings decreases			
$\gamma_{+1}-\beta_{+1}$	0.014***	0.071***	0.047***
	(4.21)	(3.40)	(3.67)

*, **, *** indicate the coefficient estimate is significantly different from zero at the 0.10, 0.05, and 0.01 levels, using a two-sided test. The sample consists of 8,523 firm-years from 1990 to 2009. Each column in Panel A presents the results of the above regression for a different dependent variable, whose name appears at the top of the respective column. The regression equations include untabulated year- and industry-specific intercepts. T-statistics are calculated and reported in parentheses. Panel B presents the results of testing the differences in the earnings management across the three thresholds for a just-meeting or just-missing case. For variable definitions, refer to Table 2.

Our fourth research question examines whether there are any differences in earnings management of just-meeting/just-missing cases across the three thresholds. The results, shown in Table 5 Panel B, indicate that, no matter whether measured by *AM*, *RM_1* or *RM_2*, the magnitude of earnings management, for just-meeting as well as just-missing cases, in descending order is as follows: first goes the threshold of earnings surprises, followed by the threshold of earnings changes, and then the threshold of zero earnings, revealing that managers put more emphasis on meeting the threshold of earnings surprises.

Overall, when testing the earnings management for the six individual just-meeting/just-missing cases, the results of *AM* and *RM* are mixed. However, the results of *AM* do show a pattern, that is, the cases of just-missing/just-meeting the threshold of zero earnings have significantly negative earnings management measures, whereas the cases of just-missing/just-meeting the threshold of earnings surprises have significantly positive earnings management measures, revealing that managers may put more efforts in meeting analysts' forecasts. This conjecture is confirmed by the comparison of earnings management among the six just-meeting/just-missing cases. The results show that, whether measured by *AM* or *RM*, the most earnings management is done to meet analysts' earnings expectations, followed by avoiding earnings decreases, and then to avoid showing losses.

6. FURTHER DISCUSSIONS AND SENSITIVITY ANALYSIS

6.1 TESTS FOR INDIVIDUAL REAL EARNINGS MANAGEMENT

In the main analysis, we use two aggregate real earnings management metrics (*RM_1* and *RM_2*) to test whether firms' meeting/missing earnings thresholds is related to real earnings management. It is worthwhile to examine Eqs. (1) and (2) for the three real earnings management metrics (abnormal_*CFO**(-1), abnormal_*PROD*, and abnormal_*DISX**(-1)) individually to see if managers have preferences in choosing real earnings management methods.

For the tests of the eight mutually exclusive and collectively exhaustive situations of meeting/missing the three earnings thresholds, Table 6 shows that the model for abnormal_*CFO**(-1) has the highest explanatory power (Adj. R^2= 16.5%), followed by abnormal_*DISX**(-1) (Adj. R^2= 9.3%), and then abnormal_*PROD* (Adj. R^2= 9.1%). The signs of coefficients and their significance are similar to those of aggregate real earnings management (*RM_1* and *RM_2*) in Table 4 with minor differences. Among them, the results of abnormal_*DISX**(-1) model are more consistent with those of the aggregate real earnings management models.

TABLE 6　Regression Results for Testing the Real Earnings Management for the Eight Mutually Exclusive and Collectively Exhaustive Situations of Meeting/Missing the Three Earnings Thresholds

$$EM_{j,t} = \alpha_1(T1^-T2^-T3^-)_{j,t} + \alpha_2(T1^+T2^-T3^-)_{j,t} + \alpha_3(T1^-T2^+T3^-)_{j,t} + \alpha_4(T1^-T2^-T3^+)_{j,t}$$
$$+ \alpha_5(T1^+T2^+T3^-)_{j,t} + \alpha_6(T1^+T2^-T3^+)_{j,t} + \alpha_7(T1^-T2^+T3^+)_{j,t} + \alpha_8(T1^+T2^+T3^+)_{j,t} + \beta_1 BM_{j,t}$$
$$+ \beta_2 SIZE_{j,t} + \beta_3 DEBT_{j,t} + \sum_t \gamma_t YEAR_t + \sum_k \delta_k IND_{j,k} + \xi_{j,t}.$$

Panel A: Testing the Real Earnings Management for Each Situation

Variables	Abnormal $CFO^*(-1)$	Abnormal $PROD$	Abnormal $DISX^*(-1)$
Missing all three thresholds			
$(T1^- T2^- T3^-)$	0.005	-0.062	-0.131
: α_1	(0.13)	(-0.87)	(-1.62)
Avoiding losses			
$(T1^+ T2^- T3^-)$	-0.042	-0.074	-0.031
: α_2	(-1.19)	(-1.04)	(-0.39)
Avoiding earnings decreases			
$(T1^- T2^+ T3^-)$	0.016	-0.081	-0.145[*]
: α_3	(0.45)	(-1.12)	(-1.79)
Avoiding negative surprises			
$(T1^- T2^- T3^+)$	0.034	-0.066	-0.184[**]
: α_4	(0.94)	(-0.92)	(-2.26)
Reporting negative surprises			
$(T1^+ T2^+ T3^-)$	-0.053	-0.085	-0.017
: α_5	(-1.49)	(-1.18)	(-0.21)
Reporting earnings decreases			
$(T1^+ T2^- T3^+)$	-0.051	-0.064	-0.013
: α_6	(-1.42)	(-0.89)	(-0.16)
Reporting losses			
$(T1^- T2^+ T3^+)$	0.041	-0.071	-0.151[*]
: α_7	(1.13)	(-0.99)	(-1.85)
Meeting all three thresholds			
$(T1^+ T2^+ T3^+)$	-0.059	-0.079	-0.006
: α_8	(-1.64)	(-1.10)	(-0.07)
BM	0.015[***]	0.067[***]	0.071[***]
	(14.62)	(32.03)	(29.98)
$SIZE$	-0.007[***]	-0.014[***]	-0.016[***]
	(-17.87)	(-18.38)	(-19.18)
$DEBT$	0.110[***]	0.167[***]	0.130[***]
	(40.40)	(30.63)	(21.16)
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Adj. R^2	0.165	0.091	0.093

Panel B: Differences in the Real Earnings Management among the Eight Mutually Exclusive and Collectively Exhaustive Situations of Meeting/Missing Earnings Thresholds (continued)

Variables	Abnormal CFO^*(-1)	Abnormal $PROD$	Abnormal $DISX^*$(-1)
Increment of avoiding losses over missing all three thresholds			
α_2-α_1	-0.047***	-0.012***	0.100***
	(-24.75)	(-3.17)	(23.17)
Increment of avoiding earnings decreases over missing all three thresholds			
α_3-α_1	0.011***	-0.019***	-0.014**
	(4.34)	(-3.50)	(-2.31)
Increment of avoiding negative surprises over missing all three thresholds			
α_4-α_1	0.029***	-0.004	-0.053***
	(6.98)	(-0.48)	(-5.55)
Increment of meeting all three thresholds over reporting negative surprises			
α_8-α_5	-0.005***	0.006**	0.011***
	(-3.59)	(2.00)	(3.14)
Increment of meeting all three thresholds over reporting earnings decreases			
α_8-α_6	-0.008***	-0.015***	0.007
	(-3.18)	(-3.05)	(1.21)
Increment of meeting all three thresholds over reporting losses			
α_8-α_7	-0.099***	-0.007	0.145***
	(-26.36)	(-0.98)	(16.92)
Increment of meeting all three thresholds over missing all three thresholds			
α_8-α_1	-0.063***	-0.017***	0.125***
	(-35.59)	(-4.66)	(31.09)

*, **, *** indicate the coefficient estimate is significantly different from zero at the 0.10, 0.05, and 0.01 levels, using a two-sided test. The sample consists of 35,414 firm-years from 1990 to 2009. Each column in Panel A presents the results of the above regression for a different dependent variable, whose name appears at the top of the respective column. The regression equations include untabulated year- and industry-specific intercepts. T-statistics are calculated and reported in parentheses. Panel B presents the results of testing the differences in the earnings management among the eight mutually exclusive and collectively exhaustive situations of meeting/missing earnings thresholds. For variable definitions, refer to Table 2.

For the tests of the just-meeting/just-missing cases of the three earnings thresholds, Table 7 shows that the model for abnormal_CFO^*(-1) has the highest explanatory power (Adj. R^2= 17.8%), followed by abnormal_$PROD$ (Adj. R^2= 13.8%), and then abnormal_$DISX^*$(-1) (Adj. R^2= 4.9%). The signs of coefficients and their significance are similar to those of aggregate real earnings management (*RM_1* and *RM_2*) in Table 5 with minor differences. Among them, the results of abnormal_$DISX^*$(-1) model are more consistent with those of the aggregate real earnings management models even though its model's explanatory power is the lowest.

TABLE 7　Regression Results for Testing the Real Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

$$EM_{j,t} = \alpha_{-1} L_{j,t}^{-1} + \alpha_{+1} L_{j,t}^{+1} + \beta_{-1} C_{j,t}^{-1} + \beta_{+1} C_{j,t}^{+1} + \gamma_{-1} F_{j,t}^{-1} + \gamma_{+1} F_{j,t}^{+1}$$

$$+ \theta_1 BM_{j,t} + \theta_2 SIZE_{j,t} + \theta_3 DEBT_{j,t} + \sum_t \phi_t YEAR_t + \sum_k \delta_k IND_{j,k} + \varepsilon_{j,t}.$$

Panel A: Testing the Real Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

Variables	Abnormal *CFO**(-1)	Abnormal *PROD*	Abnormal *DISX**(-1)
Just-missing the threshold of zero earnings			
L^-	-0.069***	-0.203***	-0.187***
: α_{-1}	(-6.29)	(-8.57)	(-7.23)
Just-meeting the threshold of zero earnings			
L^+	-0.070***	-0.181***	-0.163***
: α_{+1}	(-7.30)	(-8.84)	(-7.28)
Just-missing the threshold of earnings decreases			
C^-	-0.070***	-0.173***	-0.113***
: β_{-1}	(-7.94)	(-9.15)	(-5.46)
Just-meeting the threshold of earnings decreases			
C^+	-0.077***	-0.176***	-0.122***
: β_{+1}	(-8.96)	(-9.58)	(-6.06)
Just-missing the threshold of earnings surprises			
F^-	-0.075***	-0.157***	-0.082***
: γ_{-1}	(-10.47)	(-10.30)	(-4.91)
Just-meeting the threshold of earnings surprises			
F^+	-0.078***	-0.153***	-0.073***
: γ_{+1}	(-11.04)	(-10.10)	(-4.37)
BM	0.058***	0.148***	0.106***
	(18.33)	(21.92)	(14.26)
$SIZE$	-0.009***	-0.012***	-0.010***
	(-12.70)	(-8.17)	(-6.06)
$DEBT$	0.140***	0.198***	0.089***
	(24.81)	(16.35)	(6.74)
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Adj. R^2	0.178	0.138	0.049

TABLE 7   Regression Results for Testing the Real Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds (continued)

Panel B: Testing the Differences in the Real Earnings Management Across the Three Thresholds for a Just-Meeting or Just-Missing Case

Variables	Abnormal *CFO**(-1)	Abnormal *PROD*	Abnormal *DISX**(-1)
Increment of just-meeting over just-missing of the threshold of zero earnings			
$\alpha_{+1}-\alpha_{-1}$	-0.000	0.022	0.024
	(-0.00)	(0.95)	(0.98)
Increment of a just-meeting over just-missing of the threshold of earnings decreases			
$\beta_{+1}-\beta_{-1}$	-0.007	-0.003	-0.009
	(-0.93)	(-0.17)	(-0.52)
Increment of just-meeting over just-missing of the threshold of earnings surprises			
$\gamma_{+1}-\gamma_{-1}$	-0.004	0.004	0.009[*]
	(-1.59)	(0.82)	(1.78)
Increment of just-missing of the threshold of earnings decreases over that of zero earnings			
$\beta_{-1}-\alpha_{-1}$	-0.001	0.030	0.074[***]
	(-0.10)	(1.40)	(3.22)
Increment of just-missing of the threshold of earnings surprises over that of zero earnings			
$\gamma_{-1}-\alpha_{-1}$	-0.005	0.045[**]	0.105[***]
	(-0.61)	(2.48)	(5.25)
Increment of just-missing of the threshold of earnings surprises over that of earnings decreases			
$\gamma_{-1}-\beta_{-1}$	-0.004	0.016	0.031[**]
	(-0.82)	(1.36)	(2.44)
Increment of just-meeting of the threshold of earnings decreases over that of zero earnings			
$\beta_{+1}-\alpha_{+1}$	-0.007	0.005	0.042[**]
	(-0.87)	(0.32)	(2.21)
Increment of just-meeting of the threshold of earnings surprises over that of zero earnings			
$\gamma_{+1}-\alpha_{+1}$	-0.008	0.028[*]	0.091[***]
	(-1.27)	(1.95)	(5.81)
Increment of just-meeting of the threshold of earnings surprises over that of earnings decreases			
$\gamma_{+1}-\beta_{+1}$	-0.002	0.022[**]	0.049[***]
	(-0.30)	(2.08)	(4.19)

*, **, *** indicate the coefficient estimate is significantly different from zero at the 0.10, 0.05, and 0.01 levels, using a two-sided test. The sample consists of 8,523 firm-years from 1990 to 2009. Each column in Panel A presents the results of the above regression for a different dependent variable, whose name appears at the top of the respective column. The regression equations include untabulated year- and industry-specific intercepts. T-statistics are calculated and reported in parentheses. Panel B presents the results of testing the differences in the earnings management across the three thresholds for a just-meeting or just-missing case. For variable definitions, refer to Table 2.

6.2 SENSITIVITY AND ROBUSTNESS ANALYSIS

In the main analysis, shown in Tables 5 and 7, the interval of just-meeting/just-missing a threshold has been set at ±0.0025, which is the first interval as adopted by Burgstahler and Dichev (1997). For the sake of sensitivity analysis, the interval is set to ±0.005, which includes the second interval as adopted by Burgstahler and Dichev (1997), to test whether the earnings management behavior changes as the just-meeting/just-missing interval widened. The results, shown in Table 8, are similar to those in Tables 5 and 7.[5]

Prior research documents that the discontinuities at earnings thresholds are indicative of earnings management to avoid losses, earnings decreases, or negative earnings surprises (Burgstahler and Dichev 1997; Burgstahler and Eames 2003). As far as this study is concerned, we assume that firms are likely to give the same relative importance to different earnings thresholds, and the intervals of these three just-meeting/just-missing thresholds are equal. However, regarding sensitivity analysis, we conduct further analyses to verify the robustness of our results. By setting the intervals of thresholds at 0.0025 or 0.005 for the just-meeting/just-missing cases interchangeably, there are eight scenarios that could be considered. That is, the interval for the threshold of zero earnings may set at 0.0025, whereas the interval for the threshold of earnings changes or earnings surprises may set at 0.0025 or 0.005. Our main analysis (shown in Tables 5 and 7) and sensitivity analysis (shown in Table 8) are two special cases of them. Following Kama and Weiss (2013), we also set the interval of thresholds at 0.01 for just-meeting/just-missing cases, and obtain similar results to those in Tables 5 and 7, indicating that our main analyses are robust to different intervals of thresholds.

7. CONCLUSIONS

This paper examines whether managers manipulate annual earnings to meet earnings thresholds. Of the three earnings thresholds, i.e. avoiding losses, earnings decreases, and negative earnings surprises, the desire of managers to manipulate earnings to meet thresholds may vary. First, we test whether there is earnings management for the eight mutually exclusive and collectively exhaustive situations of meeting/missing annual earnings thresholds identified by Brown and Caylor (2005). When measured using accrual-based earnings management metrics, the results show that the coefficients of each situation are either negatively significant or positively insignificant, indicating that there is

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[5] The results in Table 8 are based on the sample of 8,416 firm-year observations where the just-meeting/just-missing interval is set to ±0.005. The untabulated results show that the relative frequency of the six situations of just-meeting/just-missing earnings thresholds is similar to that of using the interval ±0.0025. Furthermore, we use different just-meeting/just-missing intervals for different thresholds at the same time and obtain similar results.

no evidence of accrual-based earnings management used by firms to achieve meeting earnings thresholds. Specifically, the abnormal discretionary accruals for the case of missing all three thresholds are negatively significant, indicating that managers in this situation may commit to taking a 'big bath'. These findings are contrary to those of prior research using the distribution of earnings around thresholds as a measure of earnings management. Because Durtschi and Easton (2009) point out that inferring earnings management based on earnings frequency distributions may lead to erroneous conclusions, our findings provide new evidence for the earnings management of the three earnings thresholds.

TABLE 8   Regression Results for Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds – Sensitivity Analysis

$$EM_{j,t} = \alpha_{-1}L_{j,t}^{-1} + \alpha_{+1}L_{j,t}^{+1} + \beta_{-1}C_{j,t}^{-1} + \beta_{+1}C_{j,t}^{+1} + \gamma_{-1}F_{j,t}^{-1} + \gamma_{+1}F_{j,t}^{+1} + \theta_1 BM_{j,t} + \theta_2 SIZE_{j,t}$$
$$+ \theta_3 DEBT_{j,t} + \sum_t \phi_t YEAR_t + \sum_k \delta_k IND_{j,k} + \varepsilon_{j,t}.$$

Panel A: Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

Variables	*AM*	*RM_1*	*RM_2*	Abnormal CFO*(-1)	Abnormal PROD	Abnormal DISX*(-1)
Just-missing the threshold of zero earnings						
L^-	-0.010	-0.293***	-0.192***	-0.048***	-0.150***	-0.143***
: α_{-1}	(-1.50)	(-7.33)	(-7.77)	(-4.95)	(-7.35)	(-6.40)
Just-meeting the threshold of zero earnings						
L^+	-0.010*	-0.287***	-0.193***	-0.052***	-0.147***	-0.141***
: α_{+1}	(-1.66)	(-7.97)	(-8.66)	(-5.89)	(-7.98)	(-6.97)
Just-missing the threshold of earnings decreases						
C^-	-0.003	-0.265***	-0.171***	-0.053***	-0.148***	-0.117***
: β_{-1}	(-0.55)	(-7.70)	(-8.03)	(-6.33)	(-8.44)	(-6.08)
Just-meeting the threshold of earnings decreases						
C^+	-0.003	-0.297***	-0.194***	-0.062***	-0.165***	-0.133***
: β_{+1}	(-0.46)	(-8.96)	(-9.48)	(-7.61)	(-9.74)	(-7.12)
Just-missing the threshold of earnings surprises						
F^-	0.020***	-0.194***	-0.126***	-0.056***	-0.123***	-0.070***
: γ_{-1}	(4.22)	(-6.91)	(-7.31)	(-8.17)	(-8.65)	(-4.48)
F^+	0.018***	-0.193***	-0.128***	-0.064***	-0.128***	-0.065***
: γ_{+1}	(3.78)	(-6.95)	(-7.47)	(-9.34)	(-9.09)	(-4.15)
BM	0.012***	0.206***	0.134***	0.045***	0.117***	0.089***
	(6.09)	(18.37)	(19.34)	(16.52)	(20.55)	(14.09)

TABLE 8　Regression Results for Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds - Sensitivity Analysis (continued)

Panel A: Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds

Variables	*AM*	*RM_1*	*RM_2*	Abnormal *CFO**(-1)	Abnormal *PROD*	Abnormal *DISX**(-1)
Just-meeting the threshold of earnings surprises						
SIZE	-0.004***	-0.023***	-0.020***	-0.010***	-0.013***	-0.009***
	(-7.49)	(-8.21)	(-11.54)	(-15.43)	(-9.55)	(-5.97)
DEBT	-0.002	0.291***	0.236***	0.149***	0.203***	0.087***
	(-0.62)	(13.17)	(17.37)	(27.59)	(18.07)	(7.07)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.036	0.072	0.093	0.144	0.105	0.038

Panel B: Testing the Differences in the Earnings Management Across the Three Thresholds for a Just-Meeting or Just-Missing Case

Variables	*AM*	*RM_1*	*RM_2*	Abnormal *CFO**(-1)	Abnormal *PROD*	Abnormal *DISX**(-1)
Increment of just-meeting over just-missing of the threshold of zero earnings						
$\alpha_{+1}-\alpha_{-1}$	0.000	0.006	-0.001	-0.004	0.003	0.003
	(0.00)	(0.14)	(-0.00)	(-0.40)	(0.17)	(0.14)
Increment of a just-meeting over just-missing of the threshold of earnings decreases						
$\beta_{+1}-\beta_{-1}$	0.001	-0.032	-0.024	-0.008	-0.017	-0.015
	(0.14)	(-1.18)	(-1.42)	(-1.28)	(-1.22)	(-1.00)
Increment of just-meeting over just-missing of the threshold of earnings surprises						
$\gamma_{+1}-\gamma_{-1}$	-0.002	0.001	-0.002	-0.007***	-0.005	0.006
	(-1.48)	(0.10)	(-0.30)	(-3.41)	(-1.13)	(1.16)
Increment of just-missing of the threshold of earnings decreases over that of zero earnings						
$\beta_{-1}-\alpha_{-1}$	0.007	0.028	0.021	-0.005	0.002	0.026
	(1.19)	(0.80)	(0.98)	(-0.59)	(0.10)	(1.34)
Increment of just-missing of the threshold of earnings surprises over that of zero earnings						
$\gamma_{-1}-\alpha_{-1}$	0.031***	0.099***	0.065***	-0.008	0.026*	0.073***
	(6.10)	(3.41)	(3.63)	(-1.06)	(1.77)	(4.47)
Increment of just-missing of the threshold of earnings surprises over that of earnings decreases						
$\gamma_{-1}-\beta_{-1}$	0.024***	0.073***	0.044***	-0.003	0.025**	0.047***
	(6.51)	(3.41)	(3.42)	(-0.50)	(2.31)	(3.99)

TABLE 8 Regression Results for Testing the Earnings Management for the Just-Meeting or Just-Missing Cases of the Three Earnings Thresholds - Sensitivity Analysis (continued)

Variables	*AM*	*RM_1*	*RM_2*	Abnormal CFO*(-1)	Abnormal PROD	Abnormal DISX*(-1)
Increment of just-meeting of the threshold of earnings decreases over that of zero earnings						
β_{+1}-α_{+1}	0.008	-0.010	-0.002	-0.010	-0.018	0.008
	(1.54)	(-0.32)	(-0.10)	(-1.38)	(-1.22)	(0.51)
Increment of just-meeting of the threshold of earnings surprises over that of zero earnings						
γ_{+1}-α_{+1}	0.028***	0.094***	0.065***	-0.011**	0.018	0.076***
	(7.00)	(4.02)	(4.47)	(-1.98)	(1.51)	(5.79)
Increment of just-meeting of the threshold of earnings surprises over that of earnings decreases						
γ_{+1}-β_{+1}	0.021***	0.104***	0.066***	-0.002	0.036***	0.068***
	(6.26)	(5.44)	(5.60)	(-0.35)	(3.71)	(6.32)

*, **, *** indicate the coefficient estimate is significantly different from zero at the 0.10, 0.05, and 0.01 levels, using a two-sided test. The sample consists of 8,416 firm-years from 1990 to 2009. Each column in Panel A presents the results of the above regression for a different dependent variable, whose name appears at the top of the respective column. The regression equations include untabulated year- and industry-specific intercepts. T-statistics are calculated and reported in parentheses. Panel B presents the results of testing the differences in the earnings management across the three thresholds for a just-meeting or just-missing case. For variable definitions, refer to Table 2, except that the interval of just-meeting/just-missing a threshold ($\pm$0.0025) is replaced by $\pm$0.005.

The comparison across thresholds indicates that, showing the consensus results of *AM* and *RM*, incremental earnings management exists in the following cases: (a) meeting all three goals versus missing all three goals; (b) meeting all three goals versus reporting losses; and (c) avoiding losses versus missing all three goals.

Alternatively, when measured using aggregate real earnings management metrics (*RM_1* and *RM_2*), the increments of meeting all three thresholds over missing all three thresholds, reporting losses, or reporting earnings surprises (only for *RM_1*), and avoiding losses over missing all three thresholds are significantly positive, consistent with those measured by accrual-based earnings management metrics. On the other hand, others are negative and contradictory to those measured by accrual-based earnings management metrics, which may suggest that, as Zang (2012) documents, managers may use accrual-based earnings management and real activities manipulation as substitutes.

In this paper, not only do we test the eight mutually exclusive and collectively exhaustive instances of meeting/missing earnings thresholds, we further test whether there is earnings management for the just-meeting/just-missing cases of the three earnings thresholds. The results show that, when measured using accrual-based earnings management metrics (*AM*), the cases of just-missing/just-meeting the threshold of zero earnings all have significantly negative abnormal measures. Whereas the finding of the just-missing case may be consistent with the conjecture of taking a big bath, that of the

just-meeting is contrary to the findings of prior research. Our results show that managers do not necessarily manipulate earnings upward to avoid reporting losses, furthermore they may even manage earnings downwards.

The cases of just-meeting and just-missing the threshold of earnings surprises have significantly positive abnormal measures, indicating that firms with just-meeting/just-missing earnings expectations are more likely to manage their earnings upwards. On the contrary, when measured using aggregate real earnings management metrics (*RM_1* and *RM_2*), the coefficients on the six situations of just-meeting/just-missing earnings thresholds are negative and significant. Surprisingly, we find no evidence that firms which just-meet/just-miss the earnings thresholds commit real earnings management.

Furthermore, for comparison within thresholds, the results do not support the expectation that firms which just-meet earnings thresholds engage in more earnings manipulation than those that just miss. The results are similar for the three thresholds individually and for the different measures of earnings management (accrual-based and real earnings management).

When we conduct analysis across thresholds, we find that the magnitude of earnings manipulation, in descending order, is as follows: companies seek to avoid missing earnings expectations the most, followed by desire to avoid earnings decreases, and the least manipulation is done to avoid reporting losses.

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