THE “NUMBERS GAME” IN THE PRE-AND POST-SARBANES-OXLEY ERAS*

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ABSTRACT

We document a decline in the frequency of just meeting/beating analysts’ earnings expectations in the aftermath of the 2001-2002 accounting scandals and the passage of the 2002 Sarbanes-Oxley Act (SOX). The primary purpose of this study is to explain this observed pattern. We hypothesize and provide empirical evidence that the drop in the frequency of just meeting/beating is associated with both (1) a decline in the use of downward earnings expectations management and upward accrual-based earning management in the Post-SOX period relative to the preceding seven-year period and (2) an increase in upward real earnings management activities.

Keywords: Earnings management; Real Earnings Management; Analysts’ Forecasts; Expectations Management; Sarbanes-Oxley Act.

JEL Classification: M4; M41; M48; G10

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I. INTRODUCTION

The accounting literature has documented that missing earnings expectations is costly to companies, and that managing earnings and/or earnings expectations to meet or beat analyst earnings expectations--a phenomenon often referred to as the “numbers games” (Levitt 1998)--is widespread (see, e.g., DeGeorge et al 1999, Bartov et al. 2002). Earnings management may be in the form of an accounting action, also known as accrual-based earnings management (e.g., Dhaliwal et al. 2004) in which certain accruals are manipulated with no direct cash flow effect. Examples of accrual-based earnings management include under-accruing of expenses such as bad debt, delaying an asset write down, or recognizing revenues prematurely. Earnings management may also be in the form of a real economic action, also known as real or transaction-based earnings management that does affect cash flows (e.g., Roychowdury 2006). This activity is defined as management actions with respect to real operating and investing activities that deviate from normal business practices, where the primary objective is to achieve certain reporting objectives. Examples include cutting discretionary expenses, overproducing or providing price discounts and lenient credit terms in order to boost reported income in the short term. Earnings expectations management concerns walking down analyst earnings expectations so as to transform an otherwise negative earnings surprise into a positive one (e.g., Bartov et al. 2002).

The purpose of this study is to examine two research questions left unanswered by prior research in this area. The first is to test for a change in the prevalence of analyst
expectations management to meet/beat earnings targets following the major accounting scandals of 2001-2002 at Enron, WorldCom, and Global Crossing, to name just a few, and the new requirements introduced by the 2002 Sarbanes Oxley Act (SOX). We expect the prevalence of expectations management to decline in the Post-SOX Period for two reasons. First, it may decrease as a result of the significant attention earnings expectations management received from the academic literature (e.g., Bartov et al. 2002, Jensen et al. 2004), the financial press (e.g., McGee 1997), and regulators (e.g., Levitt 1998, Johnson 1999) in the period surrounding the passage of SOX. Second, corporate governance improvements introduced by SOX may limit firms’ ability to manage analyst expectations. Still, it is arguable that expectations management may increase due to a substitution effect (e.g., Zang 2006). That is, firms may substitute accrual-based earnings management with expectations management in the post-SOX Period to meet/beat certain performance benchmarks.

The second objective of this study is to explain any observed change in the frequency of meeting/beating earnings expectations in the Post-SOX Period. To that end, we test for a relation between the frequency of meeting/beating earnings expectations and the prevalence of the three mechanisms used for meeting or beating analyst earnings targets: accrual-based earnings management, real earnings management, and earnings expectations management.

The aftermath of the passage of the Sarbanes-Oxley Act on July 30, 2002, changed the financial reporting environment significantly. Specifically, Section 201 of SOX prohibits outside auditors from providing nine nonaudit services to their audit clients (e.g., bookkeeping, appraisals, actuarial services, and investment-advisory work),
and requires that other nonaudit services (e.g., tax services) be approved in advance by the audit committee. These measures should increase auditors’ independence and thus result in higher quality of the audit reports. In addition, companies must provide in their annual reports an assessment of the effectiveness of internal controls for financial reporting (Section 404), and CEOs/CFOs must certify under oath annual and quarterly reports (Section 302) and are subject to significant penalties for false certification (Section 906). These measures should further deter management from fraudulent financial reporting. Given these expected effects of SOX on auditors and management, we predict that accrual earnings management in general and to meet/beat analysts’ earnings expectations in particular to decline in the Post-SOX period.1

With respect to changes in real earnings management our prediction is not straightforward. It might be argued that real earnings management to meet/beat analyst earnings expectations is not expected to decline in the Post-SOX period because auditors are unlikely to question this type of activity. For example, according to CFOs interviewed by Graham et al. (2005, p. 36), auditors “cannot readily challenge real economic actions to meet earnings targets that are taken in ordinary course of action.” Should we expect an increase in real earnings management in the Post-SOX period? The answer to this question is largely empirical as two conflicting forces may be at work, and it is not clear which one dominates. On one hand, the substitution effect (e.g., Cohen et al. 2008) suggests real earnings management will increase to compensate for the decreases in expectations management and accrual management. On the other hand, according to Zang (2006), managers employ earnings management strategies

1 Two points to note: (1) Statement on Auditing Standard No. 99 guides auditors to consider the frequency a firm meets earnings expectations when evaluating the risks of fraudulent financial reporting; (2) throughout the paper we use the term Post-Scandal Period and Post-SOX Period interchangeably.
sequentially, i.e., they select real manipulation before resorting to accrual manipulation. This raises the possibility that real manipulation opportunities might have been exhausted in the Pre-SOX period, and thus no increase in that activity should be expected in the Post-SOX period notwithstanding the decreases in earnings and expectations management.

We find that the frequency of just meeting/beating analyst earnings expectations diminished in the Post-SOX period and similar to Cohen et al. (2008) and Lobo and Zhou (2006) we find that accrual-based earnings management has increased over time prior to the passage of SOX and decreased significantly thereafter. More important, we find what has not been documented before. First, the propensity to manage analyst earnings expectations to meet/beat their earnings forecasts, which has increased over time prior to SOX, has significantly decreased in the Post-SOX period. Second, we demonstrate that this new finding, together with the findings of declined accrual management and increased real earnings management, explain the drop in the tendency to meet/beat analyst earnings expectations in the Post-SOX period.

Our findings make two contributions. First, they contribute to the extant academic literature on the earnings expectations/guidance game. Our results suggest that expectations management as well as the propensity of just meeting/beating analysts’ expectations have both decreased significantly in the Post-SOX period. Second and more important, we are the first to provide an explanation for these findings. Specifically, by being the first to simultaneously consider all three mechanisms used to just meet/beat analysts’ expectations while controlling for varying economic activities, we show that the drop in the frequency of just meeting/beating is related to a blend shift in the three
mechanisms used to meet/beat this earnings benchmark: accrual-based earnings management and expectations management have both significantly declined, while real earnings management activities increased. One implication of this finding is that in the Post-SOX period investors and other capital market participants should pay more attention to real earnings management activities used to meet certain earnings targets than in the Pre-SOX period.

The next section surveys extant literature on mechanisms used to meet/beat analyst earnings expectations and contrasts it with our work. Section III outlines the sample selection procedure, defines the variables, and describes the data. Section IV outlines the empirical tests and reports the results. The final section summarizes our main findings and states our conclusions.

II. BACKGROUND AND MOTIVATION

Earnings management to influence accounting appearances and meet or beat certain benchmarks has been drawing substantial attention from accounting researchers for decades. While early studies have sought to document the existence of real earnings management in specific settings (e.g., Hand 1989, Bartov 1993) recent research provides large sample evidence on real earnings management activities (e.g., Gunny 2006, Roychowdhury 2006, and Zang 2006). In addition, while accrual-based earnings management has received significant attention in the literature, more recent studies analyze a new tool used to meet or beat analysts’ earnings forecasts, an important benchmark: earnings expectations management (e.g., Bartov et al. 2002, Matsumoto 2002). Taken as a whole, these studies demonstrate that companies use all three
mechanisms to meet certain earnings benchmarks.

Recent studies also investigate a possible substitution effect between accrual-based earnings management and real earnings management. Zang (2006) examines whether managers use real and accrual manipulations in managing earnings as substitutes, and also the sequence in which these mechanisms are employed. She documents a substitution effect between the two and suggests that managers employ these strategies sequentially, i.e., they select real earnings manipulation before resorting to accrual manipulation. Cohen et al. (2008) document that accrual earnings management increased steadily in the Pre-SOX period, but decreased significantly thereafter, while real earnings management declined in the Pre-SOX period and increased significantly in the Post-SOX period. They interpret their results as suggesting that firms switched from accrual to real earnings management in the Post-SOX period, a behavior consistent with the substitution effect found by Zang (2006).

In a recent survey, Graham et al. (2005), report “strong evidence” that managers engage in real management activities to meet accounting targets. In particular, 80% of survey participants report that they would decrease discretionary spending on R&D, advertising, and maintenance to meet an earnings benchmark. More than half state that they would delay starting a new project to meet an earnings target, even if such a delay entailed a small sacrifice in value. They observe that (p. 36) “the aftermath of accounting scandals at Enron and WorldCom and the certification requirements imposed by the Sarbanes–Oxley Act may have changed managers’ preferences for the mix between taking accounting versus real actions to manage earnings,” but provide little empirical evidence to support this statement.
In this paper, we address two related research questions left unanswered by prior studies. First, we test for a change in the prevalence of expectations management to meet or beat analysts’ earnings expectations between the Pre- and Post-SOX periods (our first hypothesis). Academic research (e.g., Cohen et al. 2008, Lobo and Zhou 2006) as well as the popular press has argued that it became more costly for managers to engage in earnings management activities in the Post-SOX period due to increased regulatory and auditing scrutiny as well as more stringent enforcement for securities regulation violations. Given that earnings management has become more costly in the Post-SOX era, a substitution effect will lead to an increase in expectations management to meet or beat analysts’ forecasts. However, an important assumption underlying this prediction is that managers’ aspirations and thus efforts to meet or beat analysts’ expectations have not declined between the Pre- and Post-SOX periods. If management efforts to meet or beat expectations have declined in the Post-Sox period, the overall frequency of meeting or beating is likely to decline as well, and thus, ceteris paribus, the prevalence of expectations management will decrease (our first hypothesis). By carefully measuring expectations management and by dividing our sample period into four subperiods, we document that the frequency of just meeting/beating analysts’ expectations decreased significantly in the Post-SOX period and that expectations management decreased rather than increased in the Post-SOX period.

Second and more important, we test for a relation between the decline in the observed frequency of just meeting/beating expectations in the Post-SOX period and a

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2 In a recent study, Koh et al. (2007) find that the stock market premium to meeting or just beating analyst expectations has disappeared in the Post-Sox period and that managers rely less on income-increasing discretionary accruals and more on earnings guidance to meet or beat analysts’ forecasts in the Post-SOX world. However, Koh et al. (2007) do not explore the role of real earnings management activities to meet or beat analysts’ earnings forecasts in the Pre-and Post-SOX periods.
shift in the mix among the three mechanisms used to just meet or beat analysts’ expectations: accrual earnings management, real earnings management, and earnings expectations management. We hypothesize that the decline in the frequency of just meeting/beating is related to decreases in accrual-based earnings management and expectations management while real earnings management may have remained unchanged or increased between the Pre and Post-SOX periods (our second hypothesis). By being the first to consider all three mechanisms simultaneously while controlling for changes in economic activities, we are able to explain the observed decline in the tendency of just meeting/beating analysts’ expectations observed in the Post-SOX period.

III. DATA

Sample Selection

We obtain our data from the COMPUSTAT quarterly files and the I/B/E/S detail files. In order to be included in our sample, a firm-quarter observation must first satisfy the following three criteria:

1. There exist at least two individual earnings forecasts (not necessarily by the same individual analyst) for the quarter, which are at least 20 trading days apart.

2. The release date of the first earnings forecast we use occurs at least three trading days after the release of the previous quarter’s earnings report.

3. The release date of the second earnings forecast we use precedes the release of the current quarter’s earnings report by at least three trading days.

The first criterion ensures that there is an initial forecast and a subsequent forecast

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3 These selection criteria are consistent with previous research (e.g., Bartov et al. 2002).
revision. These are required to be separated in time by at least 20 days so that the second forecast is more likely to represent a true revision reflecting news arriving to the market after the initial forecast was issued. The purpose of the second criterion is to prevent ‘‘stale’’ forecasts (i.e., those that are not revised following the previous quarter’s earnings announcement) from being included in the analysis. The third criterion ensures that the latest forecast is not ‘‘contaminated’’ by knowledge of the actual earnings number. The total number of firm-quarter observations meeting the above three criteria is 262,754 spanning the period from January 1987 to December 2006, representing 10,874 distinct firms. We refer to this sample as the I/B/E/S Sample.

Tests in the second part of our analysis concerning accruals earnings management and real earnings management require financial statement information in addition to the I/B/E/S data. For these tests we impose on our sample firms three more restrictions:

1. The required financial statement information is available on the quarterly COMPUSTAT database.

2. The firm does not belong to one of the following three industries: financial institutions (SIC codes 6000-6999), utilities (SIC codes 4800-4999), or other regulated industries (SIC codes 4000-4499).

3. The quarterly earnings surprise relative to the latest analyst earnings forecast is non-negative.

Similar to previous studies, we imposed the second and third criteria, respectively, because the empirical models we use to estimate accruals and real earnings management do not apply to firms in these industries and because the second set of tests focuses on firms that meet or beat analysts’ earnings forecasts. The intersection of these criteria
Variable Definitions

In order to measure the revision in the analyst earnings forecasts, $REV$, we identify the first forecast and the last forecast for the quarter. The earliest earnings forecast for the quarter, $F_{earliest}$, is the first forecast for the quarter made subsequent to the announcement of the previous quarter’s earnings.\(^4\) The latest forecast for the quarter, $F_{latest}$, is the last forecast for the quarter made prior to the release of the earnings announcement for that quarter. $REV$ is the difference between the latest earnings forecast and the earliest earnings forecast. The earnings surprise for the quarter, $SURP$, is defined as the difference between the actual earnings per share number and the latest forecast for the quarter, $\text{EPS} - F_{latest}$, both taken from I/B/E/S. Earnings forecast error for the quarter is the difference between the actual earnings per share number and the earliest forecast for the quarter, $\text{EPS} - F_{earliest}$. To avoid classification errors, we used the unadjusted (for stock dividends and split) analyst earnings forecast per share and unadjusted reported earnings per share to compute the earnings surprise and earnings forecast error, both taken from I/B/E/S.

Meeting/beating analyst earnings expectations is defined as a zero or positive (non-negative) earnings surprise, which is the difference between the actual earnings and the latest forecast for the quarter, $SURP = \text{EPS} - F_{latest} \geq 0$. Just meeting/beating analyst earnings expectations are firm-quarters observations for which the earnings surprise

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\(^4\) We did not consider earnings forecasts for the current quarter made prior to the release of the previous quarter’s earnings report since their subsequent revision is likely to be correlated with the content of this report rather than with new information about the current quarter’s results.
exceeds analysts’ expectations by a cent per share or less, i.e., $0.00 \leq SURP \leq 0.01$.

**Accrual Management Proxy**

We use a cross-sectional model of discretionary accruals, where for each quarter we estimate the model for every industry classified by its two-digit SIC code. We estimate the model cross-sectionally to control for industry-wide changes in economic conditions that affect total accruals and in order to allow the coefficients to vary across time (Kasznik 1999, DeFond and Jiambalvo 1994).

Our primary model is the modified cross-sectional Jones model (Jones 1991) as described in Dechow et al. (1995), applied for quarterly data. The modified Jones model is estimated for each two digit SIC-quarter grouping as follows:

\[
\frac{TA_{j,q}}{Asset_{j,q-1}} = \alpha_0 \frac{1}{Asset_{j,q-1}} + \beta_1 \frac{(\Delta Sales_{j,q})}{Asset_{j,q-1}} + \beta_2 \frac{PPE_{j,q}}{Asset_{j,q-1}} + \epsilon_{j,q}
\]

Where:

- \( TA_{j,q} \) total accruals, defined as earnings minus cash flow for firm \( j \) in quarter \( q \);
- \( A_{j,q} \) total assets for firm \( j \) in quarter \( q \);
- \( \Delta Sales_{j,q} \) change in sales for firm \( j \) in quarter \( q \);
- \( \Delta AR_{j,q} \) change in accounts receivables for firm \( j \) in quarter \( q \);
- \( PPE_{j,q} \) gross property, plant, and equipment for firm \( j \) in quarter \( q \);

We use current cash flows from operations, excluding extraordinary items and discontinued operations (CFO), to calculate accruals. The industry-quarter specific parameters obtained from equation (1) are used to estimate firm-quarter specific nondiscretionary accruals (NDA) as a percent of lagged total assets, adjusting for the
change in receivables, $\Delta AR_{jq}$, (Dechow et al. 1995):

$$NDA_{jq} = \alpha_0 \frac{1}{Asset_{jq-1}} + \hat{\beta}_1 \frac{\Delta Sales_{jq} - \Delta AR_{jq}}{Asset_{jq-1}} + \hat{\beta}_2 \frac{PPE_{jq}}{Asset_{jq-1}}$$  \hspace{1cm} (2)$$

Our measure of discretionary accruals, $DA$, is the difference between $T\frac{A_{jq}}{Asset_{jq-1}}$ and $NDA_{jq}$.

**Real Earnings Management Proxies**

We build on prior studies (Gunny 2006, Roychowdhury 2006, and Zang 2006) to develop our proxies for real earnings management. We consider three metrics: the abnormal levels of cash flow from operations ($CFO$), production costs, and SG&A expenses (selling, general and administrative) as measures of real activities manipulation tools.\(^5\)

Firms can accelerate the timing of sales through increased price discounts or by providing more lenient credit terms. These activities will temporarily increase sales volumes, which are likely to disappear once the firm reverts to the old prices. Assuming that the margins are positive, these additional sales will boost current period reported earnings. However, for a given sales volume, both price discounts and more lenient credit terms will result in lower cash flows from operations in the current period. We first generate the normal levels of $CFO$ using the model developed by Dechow et al. (1998) as implemented in Roychowdhury (2006) for quarterly data. We express normal $CFO$ as a

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\(^5\) Roychowdhury (2006) uses overall discretionary expenses at the annual level as one of the three proxies for real activities manipulations. Since we are using quarterly data, we cannot use Compustat to construct this aggregate measure thus we focus on SG&A expenses that are available on a quarterly basis.
linear function of sales and change in sales. To estimate this model, we run the following cross-sectional regression for each industry and quarter:

$$\frac{CFO_{j,q}}{Assets_{j,q-1}} = k_1 \frac{1}{Assets_{j,q-1}} + k_2 \frac{Sales_{j,q}}{Assets_{j,q-1}} + k_3 \frac{\Delta Sales_{j,q}}{Assets_{j,q-1}} + \varepsilon_{j,q}$$

(3)

Abnormal $CFO$ ($A_{CFO}$) is actual $CFO$ minus the normal level of $CFO$ calculated using the estimated coefficients from (3).

Our second proxy for real earnings management is abnormal production costs. Managers can increase production more than necessary in order to increase earnings. When managers produce more units, they can spread the fixed overhead costs over a larger number of units, thus lowering fixed costs per unit. As long as the reduction in fixed costs per unit is not offset by any increase in marginal cost per unit, total cost per unit declines. This decreases reported $COGS$ and the firm can report higher operating margins. However, the firm will still incur other production and holding costs that will lead to higher annual production costs relative to sales, and lower cash flows from operations given sales levels.

Production costs are defined as the sum of cost of goods sold ($COGS$) and change in inventory during the year. We estimate the normal level of production costs as:

$$\frac{PROD_{j,q}}{Asset_{j,q-1}} = \delta_{j,q} + \alpha_0 \frac{1}{Asset_{j,q-1}} + \beta_1 \frac{\Delta Sales_{j,q}}{Asset_{j,q-1}} + \beta_2 \frac{SALES_{j,q}}{Asset_{j,q-1}} + \varepsilon_{j,q}$$

(4)

Abnormal level of production costs ($A_{PROD}$) is defined as the residual from the above cross-sectional regression (equation 4) estimated quarterly for each two-digit SIC code.

The third empirical proxy for real earnings management is abnormal SG&A expenses ($A_{SGA}$), defined as the residual from the following cross-sectional regression estimated quarterly for each two-digit SIC code:
\[
\frac{SGA_{j,q}}{\text{Asset}_{j,q-1}} = \delta_{j,q} + \alpha_0 \frac{1}{\text{Asset}_{j,q-1}} + \beta_1 \frac{\Delta \text{Sales}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_2 \frac{\text{SALES}_{j,q}}{\text{Asset}_{j,q-1}} + \sigma_{j,q} \quad (5)
\]

Reducing such expenses will boost current period earnings. It could also lead to higher current period cash flows (at the risk of lower future cash flows) if the firm generally paid for such expenses in cash.

In order to capture the total effects of real earnings management, we combine the above three individual tools to compute two comprehensive measures of real earnings management activities. For our first measure, RM1, consistent with Zang (2006), we first multiply abnormal SG&A expenses by negative one (so that the higher amount, the more likely it is that the firm is cutting SG&A expenses) and add it to abnormal production costs.\(^6\) The higher the amount of this aggregate measure, the more likely the firm engaged in real earnings management activities. For the second measure, RM2, again consistent with Zang (2006), we first multiply abnormal cash flows from operations and abnormal SG&A expenses by negative one and then aggregate them into one measure. As for RM2, we multiply the corresponding components by negative one, so that the higher these amounts the more likely that the firm is engaging in sales manipulations and cutting discretionary expenditures to manage reported earnings upwards.

We acknowledge that the three individual variables underlying RM1 and RM2 may have different implications for reported earnings which may dilute any results using these aggregated measures. We thus report results corresponding to both the aggregate

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\(^6\) We do not multiply \(R_{\text{PROD}}\) by negative one since higher production costs, as noted earlier, is indicative of overproduction to reduce cost of goods sold. We do not combine abnormal production costs and abnormal CFO (\(A_{\text{CFO}}\)), because in Roychowdhury (2006), the same activities that lead to abnormally high production costs also lead to abnormally low CFO; thus, adding these two amounts leads to double counting.
measures as well as the three individual real earnings management proxies ($A_{CFO}$, $A_{PROD}$ and $A_{SGA}$).

**Descriptive Statistics**

Table 1 presents descriptive statistics for the I/B/E/S Sample (Panel A) and for the Merged Sample (Panel B). Similar to findings in previous studies, the results in Panel A show that our sample firms are more likely to deliver a positive earnings surprise than a negative one. Specifically, while 64.7 percent of firm-quarters meet or beat analysts’ earnings expectations, only 35.2 percent miss expectations. In addition, firms are more likely to exhibit a negative forecast error (41.3 percent of firm-quarters) than a negative earnings surprise (35.2 percent). Such difference is an indication of earnings expectations management, as it is likely achieved by walking-down expectations. The observed negative forecast revision (mean = -0.118) is a further indication of earnings expectations management, as in the absence of such activity the average revision is expected to be zero, not negative. The results also show that the mean, median, 25 percentile, and 75 percentile of firm-size (market capitalization) are, respectively (in $million), 2,728.27, 367.28, 128.35 and 1,396.37. This indicates that our I/B/E/S sample contains a wide range of firm sizes.

Like the results in Panel A, the results in Panel B show that the Merged Sample is also well diversified in terms of firm-size, and that the two samples are quite similar in terms of this variable. The results also demonstrate that the variables underlying the estimation of our earnings management proxies, discretionary accruals, change in inventory, and SG&A, all scaled by lagged total assets, posses well-behaved properties.
That is, their distributions are symmetric around the mean and an outlying-observations problem is not a serious problem.

IV. TESTS AND RESULTS

Subperiod Analyzed

We partition our sample period into four subperiods (see figure 1). The first subperiod analyzed is the Early Pre-Accounting Scandal period extending from the beginning of the sample period (January 1987) through the end of 1993. The second subperiod is the Late Pre-Accounting Scandal period from the beginning of 1994 through the second quarter of 2001. The third subperiod is the Scandal period, from the beginning of third quarter of 2001 through the second quarter of 2002, and the fourth subperiod is the Post-SOX (Post-Scandal) period, from the beginning of the third quarter of 2002 through the end of our sample period (December 2006).

We partition the Pre-Scandal Period into two periods, the Early and Late Pre-Scandal periods, because findings in prior research (e.g., Bartov et al. 2002, and Brown and Caylor 2005), as well as anecdotal evidence, suggest there was a substantial increase in the use of analysts’ estimates as a benchmark for firm performance and in the prevalence of the “expectations game” in the mid-1990s. For the purpose of testing our two hypotheses, the two subperiods of interest are thus the Late Pre-Scandal period and the Post-SOX period.

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7 Several sources began providing earnings benchmarks based on analysts’ forecasts on the Internet only in the mid-1990s. Perhaps the best known, First Call, introduced its service to the web in 1994.
Changes in Frequency of Just Meeting/Beating Analyst Earnings Expectations

Before testing our two hypotheses, we examine changes in the frequency of just meeting/beating analysts’ earnings expectations between the Late Pre-Scandal period and the Post-SOX period. Based on arguments advanced recently (e.g., Graham et al. 2005, Jensen et al. 2004), we expect the frequency of just meeting/beating analysts’ expectation to decline in the Post-SOX Period. Figure 2 plots the percentage of firms meeting/beating analysts’ earnings forecasts by a cent per share or less over the period spanning the first quarter of 1987 throughout the fourth quarter of 2006. The figure suggests a decline in the percentage of firms that just meet/beat analysts’ earnings forecasts, especially since the early 2000s.

Next, we use both univariate and regression analysis to statistically test for temporal changes in the frequency of just meeting/beating analysts’ earnings forecasts. The univariate tests concerns comparing the quarterly frequency of firms that meet or just beat analysts’ expectations across our four sample periods. The results in Panel A of Table 2 show that the frequency of just meeting/beating increased between the Early and Late Pre-Scandal periods, from 18.12 percent to 26.81 percent, and that this increase of 8.69 percent is significant at the one percent significance level. This result is consistent with findings in Bartov et al. (2002) and further highlights that the overall Pre-Scandal period (1987 - 2001) is not homogeneous and thus must be disaggregated into the two subperiods. Turning to our prediction, there is a substantial decline in the frequency of just meeting/beating analysts’ earnings expectations between the Late Pre-Scandal period and the Post-SOX (Post-Scandal) period, from 26.81 percent to 17.23 percent, and this decline of 9.58 percent is significant at the one percent significance level.
The regression tests for changes in the frequency of just meeting/beating analysts’ earnings expectations between the four sample subperiods involve estimating the following model:

Model: $FREQ_t = \beta_0 + \beta_1 PRE94_t + \beta_2 SCAN_t + \beta_3 POST_t + \epsilon_t$ \hspace{1cm} (5)

Where:

- $FREQ_t$, the dependent variable, is the frequency of firms just meeting/beating analysts’ earnings expectations in quarter $t$;
- $PRE94_t$ is a dummy variable which takes the value of one if quarter $t$ is before the first quarter of 1994 and zero otherwise;
- $SCAN_t$ is a dummy variable which takes the value of one if quarter $t$ falls within the second quarter of 2001 and the second quarter of 2002, and zero otherwise;
- $POST_t$ is a dummy variable, which takes the value of one if quarter $t$ is after the third quarter of 2002, and zero otherwise.

In terms of equation (5), the intercept, $\beta_0$, measures the frequency of just meeting/beating analysts’ earnings expectations in the Late Pre-Scandal period, and the slope coefficients, $\beta_1$, $\beta_2$, and $\beta_3$ measure the difference in frequency between the Late Pre-Scandal period, and the Early Pre-Scandal period, the Scandal period, and the Post-SOX period, respectively. We expect a decline in the frequency between the Late Pre-Scandal period and the Post-SOX period, i.e., $\beta_3 < 0$. We estimate equation (5) over our full sample period, the 19 years spanning from January 1987 through December 2006, and thus use 80 quarterly observations. The results displayed in Panel B of Table 2 are similar to those of the univariate tests reported in Panel A. Specifically, as predicted, the coefficient on $POST$ is negative, -0.096, and highly significant ($t$-statistic = -8.52) indicating a decline in the frequency of just meeting/beating analysts’ earnings expectations in the Post-SOX period relative to the Late Pre-Scandal period. Like the
univariate results, the regression results also show an increase in the frequency of just meeting/beating analysts’ expectations between the Early and Late Pre-Scandal periods indicated by a significantly negative coefficient (−0.086) on PRE94. Overall, the results in Table 2 are consistent with the prediction that in the Post-SOX (Post-Scandal) period the propensity of just meeting/beating analysts’ expectations declined relative to the Late Pre-Scandal period.

Changes in Expectations Management

Our second set of tests for a decline in the prevalence of earnings expectations management between the Pre- and Post-SOX periods (our first hypothesis) concerns examining the role interim analyst forecast revisions play in affecting the sign of the end-of-quarter earnings surprise. To increase power, we restrict the analysis to a subsample consisting of firm-quarters that are most likely or least likely to be affected by expectations management. Specifically, we compare the observed sign of an earnings surprise with the sign of the earnings surprise that would have resulted in the absence of an interim forecast revision. In the absence of an interim revision, the sign of the quarterly earnings surprise would be the same as the sign of the quarterly forecast error. Observing a negative forecast error that turns into a positive earnings surprise is thus consistent with expectations management (walking-down expectations), as it must result from an excessive downward forecast revision. Likewise, a zero or positive forecast error that turns into a negative earnings surprise (due to an excessive upward forecast revision) is inconsistent with expectations management. In the absence of management intervention, the proportion of observations in which the interim forecast revision offsets
the sign of the earnings surprise should be identical between cases with negative errors and cases with positive errors.

Tables 3, 4, and 5 display the results from tests for a change in earnings expectations management in the Post-SOX period. Consider the results in Table 3 first. The percentage of negative earnings surprises over the entire sample, 35.24 percent, is significantly smaller at the one percent significance level than the percentage of negative forecast errors, 41.35 percent. This result is consistent with expectations management during the whole sample period whereby analyst earnings forecasts are dampened during the quarter so as to increase the likelihood of a positive earnings surprise.

Examining the change in the frequency of negative earnings surprises across our sample subperiods, we note a monotonic increase in the excess of negative earnings errors over negative earnings surprises in the first three subperiods: from 3.52 percent in the Early Pre-Scandal period, to 7.51 percent in the Late Pre-Scandal period, and to 8.42 percent in the Scandal period. However, this trend reverses in the Post-Scandal period, where the excess percentage of negative forecast errors over negative earnings surprises percentage declines, not increases, to 4.99 percent from 8.42 percent in the Scandal period. Tests for statistical significance show that the differences in the excess of negative earnings errors over negative earnings surprises between each two consecutive subperiods (3.99 percent, 0.91 percent, and -3.43 percent), as well as between the Post-Scandal period and the Late Pre-Scandal period (-3.54 percent), are all highly significant (significance level better than 1 percent). This observed pattern in the excess of negative earnings errors over negative earnings surprises over our sample period is consistent with the hypothesis that earnings expectations management has become less prevalent in the
Post-SOX period.

The results in Table 4 corroborate our inference of declined expectations management in the Post-SOX period. In this table, we determine the proportion of firm-quarters with a negative forecast error that end with a positive or zero earnings surprise, and the proportion of firm-quarter observations with a positive or zero forecast error that end with a negative earnings surprise. Observations that belong to the first group are more likely to result from expectations management than those in the second group. To test for a decline in expectations management, we examine the difference between these two proportions. Similar to the pattern observed in Table 3, the difference in proportions increases in the first three subperiods and decreases in the fourth. More specifically, in the Late Pre-Scandal period 37.03 percent of the firm-quarters with a negative forecast error ended with a positive earnings surprise (as a result of an excessive downward revision in earnings forecasts). In contrast, only 8.50 percent of observations with a positive or zero forecast error ended with a negative earnings surprise (due to an excessively positive forecast revision that “spoiled” what otherwise would have been a positive earnings surprise). The statistically significant difference between the two of 28.53 percent, shown in the rightmost column, suggests the presence of expectations management in the Late Pre-Scandal period. In the Post-SOX period forecast revisions are also more likely to turn a negative forecast error into a positive or zero surprise than to turn a positive or zero forecast error into a negative earnings surprise (30.54 percent vis-à-vis 11.09 percent). However, the difference between the two is only 19.45 percent, lower by 9.08 percent than the 28.53 percent difference observed for the Late Pre-Scandal period. The last line of the rightmost column shows that this 9.08 percent
decline is statistically significant at the one percent level. Thus, similar to the results displayed in Table 3, the results in Table 4 also suggest a lower propensity to manage analysts’ expectations in the Post-SOX period.

An important point emerges from analyzing the evidence in Table 4. Recall that we divide the Pre-Scandal period into two subperiods and compare the Post-SOX period to the latter rather than to the whole Pre-Scandal period. We made this choice since, as discussed above, the Early and Late Pre-Scandal periods are inherently different (Bartov et al. 2002, Brown and Caylor 2005). To see this, note that the percentage of cases likely to be affected by expectations management has declined between the Late Pre-Scandal period and the Post-SOX period, from 37.03 percent to 30.54 percent, consistent with a decline in expectations management. However, this percentage has increased, not decreased, between the Early Pre-Scandal period (22.41 percent) and the Post-SOX period (30.54). Similarly, the percentage of cases less likely to be affected by expectations management has decreased from 13.72 to 11.09 percent, not increased, between the Early Pre-Scandal Period and the Post-SOX period. Given these differences between the Early and Late Pre-Scandal periods, combining the two together and then comparing them to the Post-SOX period should lead to the inference that expectations management has increased in the Post-SOX period, rather than decreased. This intuition is confirmed by the numbers displayed in the last two lines of the rightmost column. While the difference in the proportions is significantly negative (-9.08 percent) when the Late Pre-Scandal period is compared to the Post-SOX period, it is significantly positive (0.80 percent) when the Pre-Scandal period as a whole is compared to the Post-SOX period. This analysis highlights the importance of dividing the Pre-Scandal period into
two subperiods to avoid contamination by low expectations management frequency in the Early Pre-Scandal period, where the use of analyst estimates as a benchmark for firm performance and the “expectations game,” were both at their infancy.

To further test for a decline in expectations management, we estimate the following regression model:

$$EXP_M_{it} = \alpha_0 + \beta_1 PRE94_t + \beta_2 SCAN_t + \beta_3 POST_t + \varepsilon_t$$

(6)

Where:

$EXP_M_{it}$, the dependent variable, is the proportion of firm-quarters likely to be affected by expectations management in quarter $t$; $PRE94_t$ is a dummy variable which takes the value of one if quarter $t$ falls before the first quarter of 1994 (i.e., within the Early Pre-Scandal period), and zero otherwise; $SCAN_t$ is a dummy variable which takes the value of one if quarter $t$ falls within the second quarter of 2001 through the second quarter of 2002 (i.e., within the Scandal period), and zero otherwise; $POST_t$ is a dummy variable which takes the value of one if the quarter $t$ is after the third quarter of 2002 (i.e., within the Post-SOX period).

In terms of Equation (6), the intercept, $\alpha_0$, measures the proportion of firm-quarters likely to be affected by expectations management in the Late Pre-Scandal period, and the slop coefficients, $\beta_1$, $\beta_2$, and $\beta_3$, measure the difference in proportion between the Late Pre-Scandal period, and the Early Pre-Scandal period, the Scandal period, and the Post-SOX period, respectively. The hypothesis of a decline in expectations management in the Post-SOX period relative to the Late Pre-Scandal period implies: $\beta_3 < 0$.

The regression results are reported in Table 5. Note that the dependent variable is measured in three alternative ways. For consistency across tables, $EXP_M_{it}$ is similar to
our definition of the percentage of cases likely to be affected by expectation management in the previous table (Table 4). In addition, we consider two alternative measures, \( EXP_M_1 \), where the deflator is the total number of quarterly observations, rather than total number of quarterly observations with negative forecast errors, and \( EXP_M_3 \), which is defined as the percentage of firm-quarters with a zero or positive earnings surprise and a negative forecast revision, relative to total number of quarterly observations. We estimate equation (6) over our full sample period that spans the 19-year period, January 1987 through December 2006, and thus used 80 quarterly observations. The results in Table 5 reinforce the results from the univariate results in Tables 3 and 4. As hypothesized, \( \beta_3 \), the coefficient on \( POST \), is significantly negative for all three specifications of the dependent variable.

In summary, the results in Tables 3, 4, and 5 are all consistent with earnings expectations being managed so as to result in positive earnings surprises in both the Late Pre-Scandal period and the Post-SOX period. In particular, downward revisions are encouraged when, in their absence, the earnings surprise is expected to be negative, while upward revisions are discouraged if they might lead to a negative earnings surprise. More important, the results in all three tables are consistent with our first hypothesis of a significant decline in expectations management in the Post-SOX period relative to the Late Pre-Scandal period.

**Changes in the Blend among the Three Mechanisms to Just Meet/Beat Analysts’ Expectations**

What may explain the overall observed decline in the frequency to just meet/beat analysts’ expectations? Our second hypothesis predicts that the decline in the frequency
of just meeting/beating analysts’ expectations mirrors a mix shift among the mechanisms used to meet or just beat analysts’ earnings expectations. In the next section, we explicitly test this hypothesis by simultaneously considering three mechanisms: accrual-based earnings management, expectations management, and real earnings management.

To test our second hypothesis, we estimate the following Logit model:

\[
Pr(\text{JUSTBEAT} = 1) = \alpha + \beta_1 \text{PRE94}_t + \beta_2 \text{SCAN}_t + \beta_3 \text{POST}_t + \beta_4 \text{DA}_t + \beta_5 \text{EXP}_M \text{PRE94}_t + \\
\beta_6 \text{REAL}_M \text{EM}_t + \beta_7 \text{DA} \times \text{PRE94}_t + \beta_8 \text{DA} \times \text{SCAN}_t + \beta_9 \text{DA} \times \text{POST}_t + \beta_{10} \text{EXP}_M \times \text{PRE94}_t + \\
\beta_{11} \text{EXP}_M \times \text{SCAN}_t + \beta_{12} \text{EXP}_M \times \text{POST}_t + \beta_{13} \text{REAL}_M \times \text{EM}_t \times \text{PRE94}_t + \\
\beta_{14} \text{REAL}_M \times \text{EM}_t + \beta_{15} \text{REAL}_M \times \text{POST}_t + \epsilon
\]  

(7)

Where:

\text{JUSTBEAT}, the dependent variable, is a binary variable taking the value of one if the firm-quarter observation beats/meets analyst earnings expectations by a cent per share or less, and zero otherwise; \text{PRE94}_t is a dummy variable which takes the value of one if quarter \(t\) falls before the first quarter of 1994 (i.e., within the Early Pre-Scandal period), and zero otherwise; \text{SCAN}_t is a dummy variable which takes the value of one if quarter \(t\) falls within the second quarter of 2001 through the second quarter of 2002 (i.e., within the Scandal period), and zero otherwise; \text{POST}_t is a dummy variable which takes the value of one if the quarter \(t\) is after the end of the second quarter of 2002 (i.e., in the Post-SOX period); \text{DA} is discretionary accruals calculated using the modified Jones-model; \text{EXP}_M is a dummy variable taking the value of one if earnings surprise for the quarter is zero or positive and analyst earnings forecast revision is negative, and zero otherwise, where earnings surprise is the difference between the actual earnings number and the latest earnings forecast for the quarter, and forecast revision is the difference between the last earnings forecast and the first earnings forecast for the quarter; \text{REAL}_EM is a proxy for real earnings management and is either: \text{A\_CFO}, \text{A\_PROD}, \text{A\_SGA}, \text{RM1}, or \text{RM2}.
where $A_{CFO}$ are abnormal cash flow from operations, $A_{PROD}$ are abnormal production costs, $A_{SGA}$ are abnormal SG&A expenses, and $RM1$ and $RM2$ are the aggregate proxies for real earnings management activities. Dummy variables for fiscal quarters $Q1, Q2, Q3$ are included (not tabulated) in each of the estimated models.

In testing for a mix shift among the three mechanisms used to meet or just beat analysts’ earnings expectations between the Late Pre-Scandal period and Post-SOX period, the variables of interests in terms of equation (7) are: $\beta_9$, the coefficient on $DA*POST$, $\beta_{12}$, the coefficient on $EXP_M*POST$, and $\beta_{15}$, the coefficient on $REAL_EM*POST$. Our second hypothesis predicts: $\beta_9 < 0$, $\beta_{12} < 0$, and $\beta_{15} \geq 0$.

Table 6 documents the estimation results for the logistic model specified in equation (7). Since a firm can enter our sample numerous times, there might be some within firm auto correlation of the errors terms. To address this concern, we estimate equation (7) using a generalized linear model to correct for time dependence errors within firms based on Liang and Zeger (1986). Reading across Table 6 we note three salient points. First, the results reported in all five columns are similar indicating they are robust to the proxy used for real earnings management. Second, the coefficients on $DA$ ($\beta_4$), $EXP_M$ ($\beta_5$), and $REAL EM$ ($\beta_6$) are all significant in the predicted direction with the exception of the coefficient estimate on abnormal cash flows from operations (column 1, p-value of 0.116). This suggests that in the Late Pre-Scandal period all three mechanisms, accrual-based earnings management, expectations management, and real earnings management were used to just meet/beat analysts’ earnings expectations. This implies that these tools to just meet or beat analysts’ forecasts are used as complements. Third, as

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8 Our conclusions remain the same once we use standard logistic regressions.
predicted, the coefficient $\beta_9 (DA*POST)$, ranging from -1.249 to -1.391 depending on the proxy used for real earnings management, and the coefficient $\beta_{12} (EXP_M*POST)$, ranging from -0.157 to -0.172, are both statistically significantly negative, and $\beta_{15} (REAL_EM*POST)$ is significant for increasing abnormal production costs and cutting SG&A expenses, as well as for the two aggregate real earnings management proxies. These results suggest that consistent with our second hypothesis the drop in the frequency of just meeting/beating in the Post-SOX period relative to the preceding seven-year period is associated with an overall decline in the use of earnings expectations management and accrual-based earnings management, while real earnings management increased as manifested in higher abnormal production costs and decreasing SG&A expenses.9

Overall, the reported evidence is consistent with a substitution between accrual-based, real earnings management activities and downwards earnings guidance used to meet or beat an important quarterly benchmark such as analysts’ forecasts in the Post-SOX period.

Robustness Tests

In this section we assess the reliability of our findings by considering two types of sensitivity tests. First, a criticism of discretionary accruals models is their classification of nondiscretionary accruals as discretionary. To address this concern, we assess the

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9 Although we find abnormal cash flows from operations to be negatively associated with the probability of just meeting/beating analysts’ forecasts, the coefficient estimate is not statistically significant at conventional levels. One explanation might be that some real activities manipulations, such as channel stuffing, might be captured by discretionary accruals. When we run a specification in which we exclude discretionary accruals as an explanatory variable and include only abnormal cash flows as an independent variable we find it to load significantly in the predicted direction consistent with this explanation.
sensitivity of our findings in Table 6 after computing discretionary accruals using two alternative models. First, previous research has shown that measures of unexpected accruals are more likely to be mis-specified for firms with extreme levels of performance. In particular, Dechow et al. (1995) and Kasznik (1999) document that estimated discretionary accruals are negative for firms with low earnings and positive for firms with high earnings. To address this concern, we adjust the modified Jones model by including a measure of current operating performance, i.e., the current cash flows from operations excluding extraordinary items, as a control variable. Our discretionary accrual model becomes:

\[
\frac{T\text{A}_{j,q}}{\text{Asset}_{j,q-1}} = \alpha_0 \frac{1}{\text{Asset}_{j,q-1}} + \beta_1 \frac{\Delta \text{Sales}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_2 \frac{\text{PPE}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_3 \frac{\text{CFO}_{j,q}}{\text{Asset}_{j,q-1}} + \varepsilon_{j,q}
\]  

(8)

A second alternative builds on the discussion in McNichols (2002), Dechow et al. (2003), and Larcker and Richardson (2003). Since accruals are changes in working capital accounts, one would expect fast growing firms to have larger accruals (McNichols 2002). In line with this prediction, we include the book-to-market ratio \((BM)\) as a proxy for expected growth in firm’s operations. \(BM\) is measured as the ratio of the book value of common equity to the market value of common equity:

\[
\frac{T\text{A}_{j,q}}{\text{Asset}_{j,q-1}} = \alpha_0 \frac{1}{\text{Asset}_{j,q-1}} + \beta_1 \frac{\Delta \text{Sales}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_2 \frac{\text{PPE}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_3 \frac{\text{CFO}_{j,q}}{\text{Asset}_{j,q-1}} + \beta_4 BM_{j,q} + \varepsilon_{j,q}
\]  

(9)

The industry-quarter specific parameters obtained from equations (8) and (9), respectively, are used to estimate firm-quarter specific nondiscretionary accruals as a percent of lagged total assets, as in the first model specified in equation (1), which we used throughout the analysis. The results of these sensitivity checks (not tabulated for parsimony) show that the results in Table 6 are robust to alternative measures of
Our second sensitivity test assesses the effect of varying macro economic conditions on our findings. Along the lines of Cohen et al. (2008) and Koh et al. (2007), we replicate the results reported in Table 6 after adding two variables, \( GDP \) and \( IND\_ROA \), to control for varying real economic activity, which may affect earnings management and expectation management strategies. While some of our measures of earnings management adjust for changes in real activity by construction (e.g., discretionary accruals), others do not. As a result, what might be classified as opportunistic earnings management may in fact be a consequence of changing economic conditions, either because the metric itself has not been adjusted for real activity, or because the adjustment was not adequate. In other words, discretionary accruals, write-offs, etc. may also reflect firms’ responses to and representations of changes in economic conditions. If this were true, then changes in earnings management metrics will coincide with changes in measures of economic activity such as operating cash flows, revenues, prior stock returns, industry performance, changes in gross domestic product, etc.

\( GDP \) is the percentage change in seasonally adjusted Gross Domestic Products over the previous quarter (a proxy of overall economic activity); and \( IND\_ROA_{iq} \) is the average return on assets of firm \( i \)’s two-digit industry (a proxy for industry-specific economic activity), computed after excluding the return on assets of firm \( i \). Guenther and Young (2000) provide evidence of a high association between \( ROA \) and economic growth rate, indicating that \( ROA \) reflects real economic activity in a timely manner. We exclude the firm in calculating the average industry \( ROA \) in order to avoid any mechanical associations among the variables in the regression.
Table 7 reports the results from this sensitivity test. Reading across Table 7, we notice two salient points. First, the two control variables, $GDP$ and $IND_{ROA}$, are significant for all five specifications (the only exception is $IND_{ROA}$, which is only marginally significant in the third column). Second, the results are not sensitive to the inclusion of controls for time-varying macro economic effects. Specifically, in testing for a mix shift among the three mechanisms used to meet or just beat analysts’ earnings expectations in the Post-SOX period, the variables of interests in terms of the equation tested in Table 7 are: $\beta_{11}$, the coefficient on $DA^*POST$, $\beta_{14}$, the coefficient on $EXP_M^*POST$, and $\beta_{17}$, the coefficient on $REAL_EM^*POST$. Our second hypothesis predicts: $\beta_{11} < 0$, $\beta_{14} < 0$, and $\beta_{17} \geq 0$. Other than the non-significant coefficient estimate on abnormal cash flow from operations, the results in Table 7 support these predictions and are consistent with the findings documented in Table 6.

V. CONCLUSION

In this study we test for a change in the frequency of expectation management to meet/beat analysts’ earnings forecasts following the major accounting scandals of 2001-2002 and the regulatory reforms introduced by the SOX Act of 2002. We find that the overall frequency of just meeting/beating analysts’ earnings expectation has declined in the Post-SOX period. We also report new evidence that has not been documented before. First, we document a significant decline in expectations management in the Post-SOX period compared to the late 1990’s. This suggests that managers have reduced their reliance on such a mechanism to just meet or beat analysts’ earnings expectations.

Second, we provide an explanation for the observed decline in the tendency to just
meet/beat analysts’ expectations. We acknowledge that managers can simultaneously use a mix of actions to just meet/beat analysts’ earnings expectations, namely accruals management, expectation management, and real earnings management. In fact, one feature underlying our research design that distinguishes our work from related studies is our use of an empirical specification that considers simultaneously these three different mechanisms. Our results suggest that while all three mechanisms are used to just meet/beat earnings expectations, the decline in the frequency of just meeting/beat between the Post-SOX period and the Late-Pre-Scandal period is related to a relative decline in both accruals management and expectations management, whereas real earnings management seems to have overall increased.

Our findings make two main contributions to the existing literature. First, they contribute to the extant academic literature on the earnings expectations game by showing that expectations management as well as the propensity of just meeting/beat analysts’ expectations has decreased significantly in recent years, namely in the Post-SOX period. Second and more important, our results explain the observed decline in the frequency of just meeting/beat analysts’ expectations in the Post-SOX period. Specifically, by being the first to simultaneously consider all three mechanisms used to meet/beat analysts’ earnings expectations while controlling for varying economic activities, we show that the drop in the frequency of just meeting/beat is related to a blend shift in the three mechanisms used to meet/beat analysts’ earnings expectations. One implication of our evidence is that in the Post-SOX period investors and other capital market participants should pay more attention to real earnings management activities than in the Pre-SOX period.
References


Figure 1: Timeline of Sample Subperiods Analyzed

Notes to Figure 1: The sample period begins in January 1987 and ends in December 2006.

Early Pre-Scandal | Late Pre-Scandal | Scandal | Post-Scandal (Post-SOX)
Quarter 1, 1987 | Quarter 4, 1993 | Quarter 2, 2001 | Quarter 2, 2002 | Quarter 4, 2006

Figure 2: Percentage of Firms Meeting/Beating Analysts' Forecasts by a Cent per Share or Less over Time

Notes to Figure 2: The figure represents the percentage of firms just meeting or beating analysts’ earnings forecasts over time. The figure plots the frequency of JUSTBEAT, a dummy variable that takes the value of one if the firm-quarter observation beats/meets analysts’ expectations by a cent per share or less ($0.00 \leq \text{EPS-Flatest} \leq 0.01$).
### Table 1
Summary Statistics of Sample Firms

#### Panel A: Summary Statistics, I/B/E/S Sample

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
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</thead>
<tbody>
<tr>
<td>NEG_SURP</td>
<td>262,754</td>
<td>0.352</td>
<td>0.474</td>
<td>0</td>
<td>0.449</td>
<td>1</td>
</tr>
<tr>
<td>NEG_FE</td>
<td>262,754</td>
<td>0.413</td>
<td>0.471</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
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<tr>
<td>REV</td>
<td>262,754</td>
<td>-0.118</td>
<td>34.121</td>
<td>-0.023</td>
<td>0</td>
<td>0.006</td>
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<tr>
<td>MBE</td>
<td>262,754</td>
<td>0.647</td>
<td>0.423</td>
<td>0</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>JUSTBEAT</td>
<td>262,754</td>
<td>0.218</td>
<td>0.404</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MKTVL</td>
<td>262,754</td>
<td>2728.27</td>
<td>21754.36</td>
<td>128.35</td>
<td>367.28</td>
<td>1396.37</td>
</tr>
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</table>

#### Panel B: Summary Statistics, Merged Sample (I/B/E/S and COMPUSTAT)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>25%</th>
<th>Median</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRUALS</td>
<td>87,697</td>
<td>-0.011</td>
<td>0.063</td>
<td>-0.026</td>
<td>-0.013</td>
<td>0.006</td>
</tr>
<tr>
<td>DA</td>
<td>87,697</td>
<td>0.002</td>
<td>0.043</td>
<td>0.007</td>
<td>0.005</td>
<td>0.016</td>
</tr>
<tr>
<td>ABS_DA</td>
<td>87,697</td>
<td>0.019</td>
<td>0.031</td>
<td>0.005</td>
<td>0.011</td>
<td>0.025</td>
</tr>
<tr>
<td>C_INV</td>
<td>87,697</td>
<td>0.004</td>
<td>0.033</td>
<td>-0.003</td>
<td>0</td>
<td>0.013</td>
</tr>
<tr>
<td>MKTVL</td>
<td>87,697</td>
<td>2917.37</td>
<td>15967.24</td>
<td>137.69</td>
<td>374.67</td>
<td>1397.67</td>
</tr>
<tr>
<td>SGA_A</td>
<td>87,697</td>
<td>0.067</td>
<td>0.059</td>
<td>0.036</td>
<td>0.058</td>
<td>0.117</td>
</tr>
</tbody>
</table>

Notes to Table 1:
- NEG_SURP is a dummy variable which takes the value of one if earnings surprise for the quarter is negative, and zero otherwise.
- NEG_FE is a dummy variable which takes the value of one if forecast error is negative, and zero otherwise.
- REV is forecast revision defined as the difference between the last earnings forecast and the first earnings forecast for the quarter, FLatest - FEarliest.
- MBE is a dummy variable which takes the value of one if the firm meets and/or beats analysts’ expectations (SURP ≥ 0), and zero otherwise.
- JUSTBEAT is a dummy variable which takes the value of one if the firm beats analysts’ expectations by a cent per share or less ($0.00 ≤ EPS-FLatest ≤ $0.01), and zero otherwise.
- MKTVL is the market value of equity calculated as the share price times the number of shares outstanding.
- ACCRUALS are defined as the difference between income before extraordinary items and cash flows from operations, adjusted for extraordinary items and discontinued operations.
- DA is discretionary accruals, calculated using the modified Jones model.
- ABS_DA is the absolute value of discretionary accruals.
- C_INV is the change in inventory, scaled by lagged total assets.
- SGA_A are SG&A expenses scaled by lagged total assets.
TABLE 2
Temporal Analysis of Frequency of Firms Meeting/Beating Analyst Expectations by One Cent per Share or Less (1987 - 2006)

Panel A: Univariate Analysis of Frequencies

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just Meet/Beat</td>
<td>18.12</td>
<td>26.81</td>
<td>25.22</td>
<td>17.23</td>
</tr>
<tr>
<td>Differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) – (A)</td>
<td>8.69%*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C) – (B)</td>
<td>-1.59%*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D) – (C)</td>
<td>-7.99%*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D) – (B)</td>
<td>-9.58%*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Regression Analysis of the Frequencies

Model: \( FREQ_i = \beta_0 + \beta_1 PRE94_i + \beta_2 SCAN_i + \beta_3 POST_i + \varepsilon_i \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate (t-statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.268 (53.07)</td>
</tr>
<tr>
<td>PRE94</td>
<td>-0.086 (-13.08)</td>
</tr>
<tr>
<td>SCAN</td>
<td>-0.018 (-4.56)</td>
</tr>
<tr>
<td>POST</td>
<td>-0.096 (-8.52)</td>
</tr>
<tr>
<td>N (Quarters)</td>
<td>80</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.89</td>
</tr>
</tbody>
</table>
Notes to Table 2:

*Significant at the 1% level, using the test of proportions.

FREQ is the frequency of firms beating analysts’ expectations by a cent per share or less, i.e.,

$0.00 \leq \text{EPS} - \text{F_{latest}} \leq $0.01

PRE94 is a dummy variable which takes the value of one if the observation is before the first quarter of 1994, and zero otherwise.

SCAN is a dummy variable which takes the value of one if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise.

POST is a dummy variable which takes the value of one if the observation is after the end of the second quarter of 2002, and zero otherwise.
TABLE 3
Relative frequency of negative forecast errors and negative earnings surprises
(1987 - 2006)

<table>
<thead>
<tr>
<th></th>
<th>Percentage of negative earnings surprises (%)</th>
<th>Percentage of negative forecast errors (%)</th>
<th>Excess of negative earnings errors over negative surprise cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All years</td>
<td>(A)</td>
<td>(B)</td>
<td>(C) = (B) - (A)</td>
</tr>
<tr>
<td></td>
<td>35.24</td>
<td>41.35</td>
<td>6.11*</td>
</tr>
<tr>
<td>By Sub-periods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987:Q1 – 1993:Q4 (1)</td>
<td>48.11</td>
<td>51.63</td>
<td>3.52*</td>
</tr>
<tr>
<td>1994:Q1 – 2001:Q2 (2)</td>
<td>32.36</td>
<td>39.87</td>
<td>7.51*</td>
</tr>
<tr>
<td>2001:Q3 - 2002:Q2 (3)</td>
<td>28.64</td>
<td>37.06</td>
<td>8.42*</td>
</tr>
<tr>
<td>Differences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) – (1)</td>
<td>-15.75*</td>
<td>-11.76*</td>
<td>3.99*</td>
</tr>
<tr>
<td>(3) – (2)</td>
<td>-3.72*</td>
<td>-2.81*</td>
<td>0.91*</td>
</tr>
<tr>
<td>(4) – (3)</td>
<td>3.21*</td>
<td>-0.22</td>
<td>-3.43*</td>
</tr>
<tr>
<td>(4) – (2)</td>
<td>-0.51</td>
<td>-3.03*</td>
<td>-3.54*</td>
</tr>
</tbody>
</table>

Notes to Table 3:
* Significant at the 1% level, using the test of proportions; ** Significant at the 5% level, using the test of proportions. The sample consists of 267,547 firm-quarter observations for 1987-2006.
Earnings surprise is the difference between the actual earnings and the latest forecast for the quarter, EPS - F_{latest}.
Forecast error is the difference between the actual earnings and the earliest forecast for the quarter, EPS - F_{earliest}.
### TABLE 4
Expectation Management: Frequency of Selected Expectations paths, by Period
(1987 - 2006)

<table>
<thead>
<tr>
<th></th>
<th>Cases likely to be affected by expectations management (%)</th>
<th>Cases less likely to be affected by expectations management (%)</th>
<th>Difference in proportions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All years</td>
<td>29.87</td>
<td>11.23</td>
<td>18.64*</td>
</tr>
<tr>
<td>By Subperiod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987:Q1 – 1993:Q4</td>
<td>22.41</td>
<td>13.72</td>
<td>8.69*</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994:Q1 – 2001:Q2</td>
<td>37.03</td>
<td>8.50</td>
<td>28.53*</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001:Q3 - 2002:Q2</td>
<td>42.07</td>
<td>8.16</td>
<td>33.91*</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) – (1)</td>
<td>14.62*</td>
<td>-5.22*</td>
<td>19.84*</td>
</tr>
<tr>
<td>(3) – (2)</td>
<td>5.04*</td>
<td>-0.34</td>
<td>5.38*</td>
</tr>
<tr>
<td>(4) – (3)</td>
<td>-11.53*</td>
<td>2.93*</td>
<td>-14.46*</td>
</tr>
<tr>
<td>(4) – (2)</td>
<td>-6.49*</td>
<td>2.59*</td>
<td>-9.08</td>
</tr>
<tr>
<td>(4) – (1+2)</td>
<td>0.82*</td>
<td>0.02</td>
<td>0.80*</td>
</tr>
</tbody>
</table>

Notes to Table 4:
* Significant at the 1% level, using the test of proportions; ** Significant at the 5% level, using the test of proportions. The sample consists of 267,547 firm-quarter observations for 1987 - 2006.

Cases likely to be affected by expectation management are cases where the forecast revision turns a negative forecast error into a positive or zero earnings surprise, scaled by all cases with a negative forecast error.

Cases less likely to be affected by expectation management are cases where the forecast revision turns a positive or zero forecast error into a negative earnings surprise, scaled by all cases with a positive or zero-forecast error.

The forecast revision is the difference between the latest forecast and the earlier forecast for the quarter, \( F_{\text{latest}} - F_{\text{earliest}} \).

The earnings surprise is the difference between the actual earnings and the latest forecast for the period, \( \text{EPS} - F_{\text{latest}} \).

The forecast error is the difference between the actual earnings and the earliest forecast for the quarter, \( \text{EPS} - F_{\text{earliest}} \).
TABLE 5
Temporal Analysis of Expectations Management
(1987 - 2006)

Model: \( \text{EXP}_M I_t = \alpha_0 + \beta_1 \text{PRE94}_t + \beta_2 \text{SCAN}_t + \beta_3 \text{POST}_t + \varepsilon_t \)

<table>
<thead>
<tr>
<th></th>
<th>EXP_M_1</th>
<th>EXP_M_2</th>
<th>EXP_M_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.151</td>
<td>0.353</td>
<td>0.268</td>
</tr>
<tr>
<td></td>
<td>(35.62)</td>
<td>(43.25)</td>
<td>(58.64)</td>
</tr>
<tr>
<td>PRE94</td>
<td>-0.024</td>
<td>-0.134</td>
<td>-0.052</td>
</tr>
<tr>
<td></td>
<td>(-4.72)</td>
<td>(-12.49)</td>
<td>(-9.32)</td>
</tr>
<tr>
<td>SCAN</td>
<td>0.022</td>
<td>0.059</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(3.18)</td>
<td>(5.03)</td>
</tr>
<tr>
<td>POST</td>
<td>-0.031</td>
<td>-0.042</td>
<td>-0.028</td>
</tr>
<tr>
<td></td>
<td>(-8.35)</td>
<td>(-4.65)</td>
<td>(-3.65)</td>
</tr>
<tr>
<td>N (Quarters)</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.63</td>
<td>0.88</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Notes to Table 5:
t-statistics are reported in parentheses.
EXP_M1 is the percentage of firm-quarters with a zero or positive earnings surprise and a negative forecast error, relative to total number of quarterly observations.
EXP_M2 is the percentage of firm-quarters with a zero or positive earnings surprise and a negative forecast error, relative to total number of quarterly observations with negative forecast errors.
EXP_M3 is the percentage of firm-quarters with a zero or positive earnings surprise and a negative forecast revision, relative to total number of quarterly observations.
Earnings surprise is the difference between the actual earnings and the latest forecast for the quarter, \( \text{EPS} - \text{Flatest} \).
Forecast error is the difference between the actual earnings and the earliest forecast for the quarter, \( \text{EPS} - \text{Fearliest} \).
Forecast revision is the difference between the last earnings forecast and the first earnings forecast for the quarter, \( \text{Flatest} - \text{Fearliest} \).
PRE94 is a dummy variable which takes the value of one if the observation is before the first quarter of 1994, and zero otherwise.
SCAN is a dummy variable which takes the value of one if the observation falls within the period, third quarter of 2001 through the second quarter of 2002, and zero otherwise.
POST is a dummy variable which takes the value of one if the observation is after the end of the second quarter of 2002, and zero otherwise.
**TABLE 6**
Logit Analysis of firms that Just Meet/Beat Analyst Expectations (1987 - 2006)

\[
\Pr (\text{JUSTBEAT } = 1) = F (\alpha + \beta_1 \text{PRE94}_a + \beta_2 \text{SCAN}_a + \beta_3 \text{POST}_a + \beta_4 \text{DA}_a + \beta_5 \text{EXP}_a \text{ M}_a + \\
+ \beta_6 \text{REAL}_a \text{ EM}_a + \beta_7 \text{DA}_a \text{ PRE94}_a + \beta_8 \text{DA}_a \text{ SCAN}_a + \beta_9 \text{DA}_a \text{ POST}_a + \beta_{10} \text{EXP}_a \text{ M}_a \text{ PRE94}_a \\
+ \beta_{11} \text{EXP}_a \text{ M}_a \text{ SCAN}_a + \beta_{12} \text{EXP}_a \text{ M}_a \text{ POST}_a + \beta_{13} \text{REAL}_a \text{ EM}_a \text{ PRE94}_a \\
+ \beta_{14} \text{REAL}_a \text{ EM}_a \text{ SCAN}_a + \beta_{15} \text{REAL}_a \text{ EM}_a \text{ POST}_a + \epsilon)
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>A_CFO</th>
<th>A_PROD</th>
<th>A_SGA</th>
<th>RM_1</th>
<th>RM_2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.321</td>
<td>0.342</td>
<td>0.298</td>
<td>0.273</td>
<td>0.279</td>
</tr>
<tr>
<td>(0.0001)</td>
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<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>PRE94</td>
<td>-0.098</td>
<td>-0.089</td>
<td>-0.093</td>
<td>-0.082</td>
<td>-0.084</td>
</tr>
<tr>
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<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
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</tr>
<tr>
<td>SCAN</td>
<td>-0.008</td>
<td>-0.006</td>
<td>-0.007</td>
<td>-0.006</td>
<td>-0.007</td>
</tr>
<tr>
<td>(0.124)</td>
<td></td>
<td>(0.109)</td>
<td></td>
<td>(0.113)</td>
<td></td>
</tr>
<tr>
<td>POST</td>
<td>-0.016</td>
<td>-0.019</td>
<td>-0.016</td>
<td>-0.015</td>
<td>-0.013</td>
</tr>
<tr>
<td>(0.032)</td>
<td></td>
<td>(0.021)</td>
<td></td>
<td>(0.024)</td>
<td></td>
</tr>
<tr>
<td>DA</td>
<td>2.079</td>
<td>2.087</td>
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<td>2.101</td>
<td>2.106</td>
</tr>
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<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
</tr>
<tr>
<td>EXP_M</td>
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<td>0.275</td>
<td>0.282</td>
<td>0.286</td>
<td>0.273</td>
</tr>
<tr>
<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>REAL_EM</td>
<td>-0.068</td>
<td>0.423</td>
<td>-0.113</td>
<td>0.212</td>
<td>0.141</td>
</tr>
<tr>
<td>(0.116)</td>
<td></td>
<td>(0.004)</td>
<td></td>
<td>(0.082)</td>
<td></td>
</tr>
<tr>
<td>DA*PRE94</td>
<td>1.567</td>
<td>1.612</td>
<td>1.047</td>
<td>1.502</td>
<td>1.492</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
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<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
</tr>
<tr>
<td>DA*SCAN</td>
<td>-0.813</td>
<td>-0.914</td>
<td>-0.857</td>
<td>-0.848</td>
<td>-0.833</td>
</tr>
<tr>
<td>(0.0001)</td>
<td></td>
<td>(0.035)</td>
<td></td>
<td>(0.042)</td>
<td></td>
</tr>
<tr>
<td>DA*POST</td>
<td>-1.297</td>
<td>-1.391</td>
<td>-1.387</td>
<td>-1.232</td>
<td>-1.249</td>
</tr>
<tr>
<td>(0.024)</td>
<td></td>
<td>(0.021)</td>
<td></td>
<td>(0.029)</td>
<td></td>
</tr>
<tr>
<td>EXP_M*PRE94</td>
<td>-0.140</td>
<td>-0.161</td>
<td>-0.154</td>
<td>-0.164</td>
<td>-0.159</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0001)</td>
<td></td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>EXP_M*SCAN</td>
<td>0.208</td>
<td>0.217</td>
<td>0.204</td>
<td>0.268</td>
<td>0.257</td>
</tr>
<tr>
<td>(0.003)</td>
<td></td>
<td>(0.001)</td>
<td></td>
<td>(0.004)</td>
<td></td>
</tr>
<tr>
<td>EXP_M*POST</td>
<td>-0.157</td>
<td>-0.162</td>
<td>-0.169</td>
<td>-0.172</td>
<td>-0.168</td>
</tr>
<tr>
<td>(0.004)</td>
<td></td>
<td>(0.005)</td>
<td></td>
<td>(0.003)</td>
<td></td>
</tr>
<tr>
<td>REAL_EM*PRE94</td>
<td>0.027</td>
<td>0.014</td>
<td>-0.087</td>
<td>0.053</td>
<td>0.021</td>
</tr>
<tr>
<td>(0.324)</td>
<td></td>
<td>(0.559)</td>
<td></td>
<td>(0.365)</td>
<td></td>
</tr>
<tr>
<td>REAL_EM*SCAN</td>
<td>0.019</td>
<td>0.051</td>
<td>-0.223</td>
<td>0.042</td>
<td>0.059</td>
</tr>
<tr>
<td>(0.406)</td>
<td></td>
<td>(0.349)</td>
<td></td>
<td>(0.249)</td>
<td></td>
</tr>
<tr>
<td>REAL_EM*POST</td>
<td>-0.127</td>
<td>0.217</td>
<td>-0.436</td>
<td>0.216</td>
<td>0.179</td>
</tr>
<tr>
<td>(0.128)</td>
<td></td>
<td>(0.056)</td>
<td></td>
<td>(0.046)</td>
<td></td>
</tr>
</tbody>
</table>

No. of Observations: 87,697
Log-Likelihood Ratio: 2379.39
Notes to Table 6:
The logistic model is estimated using the generalized linear model method to correct for within-firm time dependence. P-values are reported in parentheses.
JUSTBEAT, the dependent variable is a binary variable taking the value of one if the firm-quarter observation beats/meets analysts’ expectations by a cent per share or less ($0.00 ≤ EPS_{\text{Flatest}} ≤ $0.01).
PRE94 is a dummy variable which takes the value of one if the observation is before the first quarter of 1994, and zero otherwise.
SCAN is a dummy variable which takes the value of one if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise.
POST is a dummy variable which takes the value of one if the observation is after the end of the second quarter of 2002, and zero otherwise.
DA is defined as discretionary accruals calculated using the modified Jones-model.
EXP_M is a dummy variable taking the value of one if earnings surprise for the quarter is zero or positive and analysts’ forecast revision is negative.
Earnings surprise is the difference between the actual earnings and the latest forecast for the quarter, EPS-Flatest.
Forecast error is the difference between the actual earnings and the earliest forecast for the quarter, EPS-Fearliest.
Forecast revision is the difference between the last earnings forecast and the first earnings forecast for the quarter, Flatest - Fearliest.
REAL_EM is a proxy for real earnings management activities and is either: A_CFO, A_PROD, A_SGA, RM1, or RM2.

A_CFO is abnormal cash flow from operations, measured as the deviations from the predicted values from the corresponding industry-quarter regression:

\[
\frac{CFO_{j,q}}{Assets_{j,q-1}} = k_1, \frac{1}{Assets_{j,q-1}} + k_2, \frac{Sales_{j,q}}{Assets_{j,q-1}} + k_3, \frac{\Delta Sales_{j,q}}{Assets_{j,q-1}} + \epsilon_{j,q}
\]

A_PROD is abnormal production costs, measured as the deviations from the predicted values from the corresponding industry-quarter regression:

\[
\frac{PROD_{j,q}}{Asset_{j,q-1}} = \delta_{j,q} + \alpha, \frac{1}{Asset_{j,q-1}} + \beta_1, (\Delta Sales_{j,q}) + \beta_2, \frac{SALES_{j,q}}{Asset_{j,q-1}} + \epsilon_{j,q}
\]

A_SGA is abnormal Sales, General and Admin. expense measured as deviations from the predicted values from the corresponding industry-quarter regression:

\[
\frac{SGA_{j,q}}{Asset_{j,q-1}} = \delta_{j,q} + \alpha, \frac{1}{Asset_{j,q-1}} + \beta_1, (\Delta Sales_{j,q}) + \beta_2, \frac{SALES_{j,q}}{Asset_{j,q-1}} + \epsilon_{j,q}
\]

RM1 is an aggregate measure of real earning management activities and is calculated as the sum of abnormal SG&A expenses multiplied by negative one and abnormal production costs.
RM2 is an aggregate measure of real earnings management activities and is the sum of abnormal cash flows and abnormal SG&A expenses, both multiplied by negative one.

Dummy variables for fiscal quarters Q1, Q2, Q3 are included (not tabulated) in each of the estimated models.
TABLE 7

Pr \(ob(JUSTBEAT = 1) = F(\alpha_0 + \beta_j PRE94_a + \beta_s SCAN_a + \beta_f POST_a + \beta_g GDP_a + \beta_h IND_roa_a + \beta_a DA_a + \beta_j EXP_M_a + \beta_h REAL_EM_a + \beta_g DA * PRE94_a + \beta_{10} DA * SCAN_a + \beta_{11} DA * POST_a + \beta_{13} EXP_M * PRE94_a + \beta_{12} EXP_M * SCAN_a + \beta_{14} EXP_M * POST_a + \beta_{15} REAL_EM * PRE94_a + \beta_{16} REAL_EM * SCAN_a + \beta_{17} REAL_EM * POST_a + \varepsilon_a)\)

<table>
<thead>
<tr>
<th>Variable</th>
<th>A_CFO</th>
<th>A_PROD</th>
<th>A_SGA</th>
<th>RM1</th>
<th>RM2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.283</td>
<td>0.274</td>
<td>0.282</td>
<td>0.262</td>
<td>0.273</td>
</tr>
<tr>
<td></td>
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<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>PRE94</td>
<td>-0.095</td>
<td>-0.093</td>
<td>-0.096</td>
<td>-0.089</td>
<td>-0.087</td>
</tr>
<tr>
<td></td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(0.016)</td>
<td>(&lt;0.0001)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>SCAN</td>
<td>-0.007</td>
<td>-0.007</td>
<td>-0.008</td>
<td>-0.005</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td>(0.124)</td>
<td>(0.128)</td>
<td>(0.119)</td>
<td>(0.126)</td>
</tr>
<tr>
<td>POST</td>
<td>-0.018</td>
<td>-0.017</td>
<td>-0.018</td>
<td>-0.019</td>
<td>-0.015</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.024)</td>
<td>(0.028)</td>
<td>(0.021)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>GDP</td>
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<td>0.013</td>
<td>0.012</td>
<td>0.012</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
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<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>IND_ROA</td>
<td>0.234</td>
<td>0.243</td>
<td>0.219</td>
<td>0.241</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.098)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>DA</td>
<td>2.064</td>
<td>2.092</td>
<td>2.079</td>
<td>2.084</td>
<td>2.082</td>
</tr>
<tr>
<td></td>
<td>(&lt;0.0001)</td>
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<td>EXP_M</td>
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<td>0.267</td>
<td>0.271</td>
<td>0.269</td>
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<tr>
<td>REAL_EM</td>
<td>-0.065</td>
<td>0.417</td>
<td>-0.127</td>
<td>0.204</td>
<td>0.186</td>
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<tr>
<td></td>
<td>(0.127)</td>
<td>(0.002)</td>
<td>(0.074)</td>
<td>(0.087)</td>
<td>(0.059)</td>
</tr>
<tr>
<td>DA*PRE94</td>
<td>1.463</td>
<td>1.549</td>
<td>1.428</td>
<td>1.531</td>
<td>1.487</td>
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<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>DA*SCAN</td>
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<td>-0.843</td>
<td>-0.837</td>
<td>-0.837</td>
<td>-0.827</td>
</tr>
<tr>
<td></td>
<td>(&lt;0.0001)</td>
<td>(0.029)</td>
<td>(0.004)</td>
<td>(0.036)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>DA*POST</td>
<td>-1.106</td>
<td>1.208</td>
<td>1.227</td>
<td>1.217</td>
<td>1.237</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.018)</td>
<td>(0.006)</td>
<td>(0.024)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>EXP_M*PRE94</td>
<td>-0.128</td>
<td>-0.143</td>
<td>-0.149</td>
<td>-0.157</td>
<td>-0.152</td>
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<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>EXP_M*SCAN</td>
<td>0.215</td>
<td>0.207</td>
<td>0.217</td>
<td>0.216</td>
<td>0.211</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.002)</td>
<td>(0.006)</td>
<td>(0.004)</td>
<td>(0.008)</td>
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<tr>
<td>EXP_M*POST</td>
<td>-0.146</td>
<td>-0.157</td>
<td>-0.163</td>
<td>-0.164</td>
<td>-0.159</td>
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<tr>
<td></td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>REAL_EM*PRE94</td>
<td>0.029</td>
<td>0.021</td>
<td>-0.043</td>
<td>0.047</td>
<td>0.029</td>
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<td>(0.341)</td>
<td>(0.507)</td>
<td>(0.241)</td>
<td>(0.209)</td>
<td>(0.374)</td>
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<tr>
<td>REAL_EM*SCAN</td>
<td>0.016</td>
<td>0.034</td>
<td>-0.109</td>
<td>0.046</td>
<td>0.079</td>
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<tr>
<td></td>
<td>(0.308)</td>
<td>(0.234)</td>
<td>(0.327)</td>
<td>(0.197)</td>
<td>(0.238)</td>
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<tr>
<td>REAL_EM*POST</td>
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<td>-0.397</td>
<td>0.189</td>
<td>0.106</td>
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<tr>
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<td>(0.129)</td>
<td>(0.043)</td>
<td>(0.052)</td>
<td>(0.028)</td>
<td>(0.039)</td>
</tr>
</tbody>
</table>

| No. of Observations | 87,697 | 87,697 | 82,274 | 82,274 | 82,274 |
| Log-Likelihood Ratio | 2168.36 | 2206.49 | 2004.39 | 2367.69 | 2496.37 |
Notes to Table 7:
The logistic model is estimated using the generalized linear model method to correct for within-firm time
dependence. P-values are reported in parentheses.
JUSTBEAT, the dependent variable is a binary variable taking the value of one if the firm-quarter
observation beats/meets analysts’ expectations by a cent per share or less ($0.00 \leq EPS_{\text{Flatest}} \leq $0.01).
PRE94 is a dummy variable which takes the value of one if the observation is before the first quarter of
1994, and zero otherwise.
SCAN is a dummy variable which takes the value of one if the observation falls within the third quarter of
2001 through the second quarter of 2002, and zero otherwise.
POST is a dummy variable which takes the value of one if the observation is after the end of the second
quarter of 2002, and zero otherwise.
GDP is percentage change in seasonally adjusted GDP over the previous quarter.
IND_ROA is the industry average ROA for the quarter, calculated for each two-digit SIC code.
DA is defined as discretionary accruals calculated using the modified Jones-model.
EXP_M is a dummy variable taking the value of one if earnings surprise for the quarter is zero or positive
and analysts’ forecast revision is negative.
Earnings surprise is the difference between the actual earnings and the latest forecast for the quarter, EPS-
$F_{\text{latest}}$.
Forecast error is the difference between the actual earnings and the earliest forecast for the quarter, EPS-
$F_{\text{earliest}}$.
Forecast revision is the difference between the last earnings forecast and the first earnings forecast for the
quarter, $F_{\text{latest}} - F_{\text{earliest}}$.
REAL_EM is a proxy for real earnings management activities and is either: A_CFO, A_PROD, A_SGA,
RM1, or RM2.

A_CFO is abnormal cash flow from operations, measured as the deviations from the predicted values from
the corresponding industry-quarter regression:

$$\frac{CFO_{jq}}{Assets_{jq-1}} = k_1 \frac{1}{Assets_{jq-1}} + k_2 \frac{Sales_{jq}}{Assets_{jq-1}} + k_3 \frac{\Delta Sales_{jq}}{Assets_{jq-1}} + \varepsilon_{jq}$$

A_PROD is abnormal production costs, measured as the deviations from the predicted values from the
corresponding industry-quarter regression:

$$\frac{PROD_{jq}}{Assets_{jq-1}} = \delta_{jq} + \alpha_1 \frac{1}{Assets_{jq-1}} + \beta_1 \frac{(\Delta Sales_{jq})}{Assets_{jq-1}} + \beta_2 \frac{SALES_{jq}}{Assets_{jq-1}} + \varepsilon_{jq}$$

A_SGA is abnormal Sales, General and Admin. expense measured as deviations from the predicted values
from the corresponding industry-quarter regression:

$$\frac{SGA_{jq}}{Assets_{jq-1}} = \delta_{jq} + \alpha_2 \frac{1}{Assets_{jq-1}} + \beta_1 \frac{(\Delta Sales_{jq})}{Assets_{jq-1}} + \beta_2 \frac{SALES_{jq}}{Assets_{jq-1}} + \varepsilon_{jq}$$

RM1 is an aggregate measure of real earning management activities and is calculated as the sum of
abnormal SG&A expenses multiplied by negative one and abnormal production costs.

RM2 is an aggregate measure of real earnings management activities and is the sum of abnormal cash flows
and abnormal SG&A expenses, both multiplied by negative one.

Dummy variables for fiscal quarters Q1, Q2, Q3 are included (not tabulated) in each of the estimated models.