

THE EFFECT OF SARBANES-OXLEY ON EARNINGS MANAGEMENT BEHAVIOR

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This paper investigates the impact of Sarbanes-Oxley (SOX) on managers' earnings management choices (i.e., accrual management and real earnings management). Specifically, I investigate whether firms reduce their use of accrual management and increase their use of real earnings management post-SOX. SOX likely increases the cost of engaging in accrual management because of increased legal liability, greater auditor independence, and increased public awareness of aggressive accounting treatments. An increased cost of accrual management is likely to lead managers to use other methods to manage earnings (e.g., real earnings management through sales manipulation, reduction of discretionary expenditures, and overproduction). Consistent with this expectation, I find an increased association between certain types of real earnings management (overproduction and sales manipulation) and the propensity to beat the profit and earnings change benchmarks. Results also indicate that the associations between abnormal accruals and beating the profit and earnings change benchmarks do not change post-SOX.

JEL Codes: M41, M48, G11 and G14 (Accounting Track)

1. INTRODUCTION

It is well documented that managers have strong capital market incentives (Myers et al. 2007; Barth et al. 1999; Skinner and Sloan 2000) to manage reported earnings. The vast majority of prior earnings management literature has focused managers' use of accruals to manage earnings (see Healy and Wahlen, 1999; Dechow and Skinner, 2000; Beneish, 2001; Fields et al., 2001 for survey). However, managers also have the option to manage earnings through real earnings management (i.e., sales manipulation, reduction of discretionary expenditures, and overproduction). Roychowdhury (2006) provides evidence that suggests managers do in fact use real earnings management (hereafter REM) to beat earnings benchmarks. Specifically, Roychowdhury (2006) finds that firms who just meet/beat the profit and earnings change benchmarks exhibit higher levels of abnormal production costs and lower levels of discretionary expenses when compared to other firms across the distribution of earnings. Graham, Harvey, and Rajgopal (2005) survey 401 financial executives and find that executives prefer to use REM to manage earnings rather than accruals management. This evidence is puzzling because manipulating real activities to meet short-term earnings benchmarks represents a sacrifice of economic value to the extent that the manipulated activities deviate from long-term optimal actions. Consistent with this view, Gunny (2010) documents that engaging in REM negatively impacts operating performance in

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subsequent years. Unlike REM, accruals management has no implications for cash flows or long-term performance, and it reverses in subsequent periods. Therefore, accrual management appears to be a less costly form of earnings management when compared to REM.

Although REM may be more costly than accruals management, several recent papers suggest that managers' preference for engaging in REM may be increasing in recent years. Ewert and Wangerhofer (2005) analytically demonstrate that tightening accounting standards increases the marginal benefit of REM. Similarly, Graham et al. (2005) suggest that recent accounting scandals and the passage of the Sarbanes-Oxley Act (SOX) may have altered managers' preference for using REM versus accruals management to ease stakeholder concerns. In support of this assertion, one interviewed executive reports a desire to "...go out of their way to assure stakeholders that there is no accounting based earnings management in their books." In addition to avoiding the perception of being an "accounting manipulator," managers may avoid using aggressive accounting methods to limit their own legal liability since SOX imposes significant criminal and civil penalties on executives who knowingly file false financial reports. Furthermore, accruals management, unlike REM, is subject to auditor scrutiny. While auditors can disallow aggressive accounting methods, they do not have the ability to alter managers' operational choices. Thus, given that SOX increases the risk of engaging in accruals management, firms may choose to use other forms of earnings management that do not bear increased risk under SOX.

Recent evidence in Cohen, Dey, and Lys (2008) suggests that earnings management behavior changed following SOX passage. In particular, they create a composite measure of earnings management using abnormal accrual proxies utilized in prior research and other accounting ratios. Post-SOX, they find a sharp decline in their earnings management measure. Their evidence suggests that, on average, firms decreased earnings management post-SOX. Given firms' ability to use both accruals management and REM to manage earnings, a decline in earnings management post-SOX does not necessarily imply that all types of earnings management activity declined, nor does it imply a decrease in earnings management for firms with the strongest incentives to manage earnings – e.g., those firms that absent earnings management would just-miss earnings benchmarks. This study investigates whether managers' use of accrual manipulations and REM to beat earnings benchmarks changed in the wake of recent accounting scandals and the passage of SOX.

To identify firms with stronger incentives to manage earnings, I focus on firms with earnings around the three common earnings benchmarks – profit, earnings change, and analysts' forecasted earnings. My sample includes firm-year observations for these just-miss and just-beat firms from 1987 to 2004. I divide the sample into pre-SOX (1987

– 2001) and post-SOX periods (2003-2004) and eliminate observations from 2002 since SOX was effective the third-quarter of 2002.¹

To provide evidence on the change in earnings management following SOX, I estimate a probit regression that relates a firm's probability of beating an earnings benchmark with the firm's abnormal accruals, abnormal production costs, and abnormal discretionary expenses. I use the Jones (1991) model to estimate discretionary accruals and linear models presented by Roychowdhury (2006) to estimate REM measures for production costs and discretionary expenses. I interact measures of abnormal accruals, abnormal production costs, and abnormal discretionary expenses with an indicator variable for post-SOX firm-years to measure the incremental effect of SOX on the use of accrual management and REM to beat earnings benchmarks. If REM increases post-SOX, then I expect to find a positive and significant coefficient on the interactions of REM measures with the post-SOX indicator variable. Similarly, if accruals management declines post-SOX, I expect to find a significant negative coefficient on the interaction of abnormal accruals with the post-SOX indicator variable.

Results indicate that the associations between abnormal accruals and beating the profit, earnings change, and analysts' forecast benchmarks do not change post-SOX. In contrast to Cohen et al. (2008), who conclude that earnings management, on average, declined post-SOX, this evidence suggests that SOX had no significant effect on the use of accrual management to beat earnings benchmarks. Regarding the use of REM to beat earnings benchmarks, results indicate an increased association between REM and the propensity to beat the profit and earnings change benchmarks. I find no change in the association between REM and the propensity to beat the analysts' forecast benchmark. In sum, results indicate a relative shift to REM for benchmark beaters post-SOX, but that earnings management, on average, has not declined for firms with strong incentives to manage earnings.

This paper contributes to the earnings management literature in two ways. First, prior research suggests that managers use several earnings management methods to beat earnings benchmarks. This study demonstrates how regulatory intervention influences how firms' beat earnings benchmarks. In particular, results suggest that post-SOX the associations between abnormal production costs and beating earnings benchmarks increase relative to the association between abnormal accruals and beating earnings benchmarks. Second, SOX was designed to limit opportunistic behavior by managers. Since REM represents a sacrifice of future economic benefit to improve short-term financial reporting, investors have incentives to identify and limit managers' use of REM. To date, the effects of SOX on financial reporting decisions and managers' actions are still largely unknown. This paper suggests that SOX resulted in an increase of REM, arguably a more costly and less attractive method to beat benchmarks.

¹ The actual year deleted varies depending on each firm's month of fiscal year-end. For firms with fiscal years ending from January to June and October to December, I delete fiscal year 2002. For firms with fiscal years ending in July or August, I delete fiscal year 2003.

The remainder of the paper is organized as follows: Section two reviews related literature and Section three develops testable hypotheses and models. In Section four, I describe the sample selection and research method. I present results in Section five and discuss conclusions and implications for future research in Section six.

2. Related Literature

The vast majority of prior studies on earnings management focus on the opportunistic use of accruals. Of the relatively few studies investigating REM, most focus on managers' opportunistic use of R&D to meet certain reporting goals. For example, Baber et al. (1991) find that managers decrease R&D spending when they face the prospect of reporting a small loss or decreased earnings. Similarly, Bushee (1998) provides evidence that managers reduce R&D expenses to avoid an earnings decline. Dechow and Sloan (1991) investigate the link between CEO horizon and R&D spending. They find that CEOs spend less on R&D during their final years with the firm to improve short-term performance. This evidence suggests that CEOs myopically managing earnings to maximize personal wealth.

While most of the prior literature on REM focuses on R&D expenses, a few papers provide evidence on other REM methods. Thomas and Zhang (2002) investigate the relation between inventory changes and the market inefficiency documented by Sloan (1996). Their results suggest that managers overproduce with the intention of lowering COGS and thus increasing earnings. Gunny (2010) investigates the subsequent performance of firms that engage in REM and finds these firms have lower return on assets and lower cash flows in future years. This evidence suggests that managers trade long-term performance for short-term gains.

Roychowdhury (2006) documents that managers engage in REM to avoid reporting annual losses and annual earnings decreases. Specifically, he finds that firms suspected of engaging in REM to cross the profit and earnings change benchmarks exhibit abnormally high production costs, abnormally low discretionary expenses, and abnormally low cash flows from operations compared to other firms in the earnings distribution. This evidence is consistent with managers overproducing, offering aggressive price discounts, and cutting discretionary expenses to beat the profit and earnings increase benchmarks.

Congress passed SOX in July 2002 in response to a litany of accounting scandals that had occurred over the previous year. While SOX specifically targets fraudulent financial reporting, it also likely impacts other aggressive accounting choices. SOX increases the cost of engaging in accruals management, and thus lowers the cost of REM relative to accruals management in three specific ways. First, SOX requires CEOs and CFOs to personally certify the correctness of their public financial statements, and SOX significantly increases the criminal and civil penalties for executives who knowingly file false statements. This increased legal risk may discourage managers from engaging in aggressive accruals management. Unlike accruals management, REM is unlikely to result in criminal or civil penalties because REM is an intervention into a firm's internal

operational process rather than an intervention into a firm's external financial reporting process. Second, SOX seeks to increase monitoring by severely restricting the types of non-audit work that a firm's audit company may perform and requiring audit committees to approve other non-audit work. Additionally, financial statements filed with the SEC must include a report of independent accountants verifying that there has been no impairment of auditor independence. This heightened focus on auditor independence is likely to lead to more auditor scrutiny of questionable accounting choices. Since auditors have the ability to limit managers' use of accruals management, increased auditor independence increases the risk that auditors will disallow accounting choices aimed at increasing earnings (i.e., accruals management). However, auditors have little or no authority to challenge managers' operational choices. Thus, the increased risk of auditors disallowing aggressive accounting treatments (i.e., accrual management techniques) may lead managers to increase REM.

Third, Graham et al. (2005) provide anecdotal evidence that managers engage in REM to avoid being viewed by shareholders as an accounting manipulator. The flurry of accounting scandals from late 2001 through 2002 along with the passage of SOX has led to an increase in public awareness of aggressive accounting methods. This heightened shareholder scrutiny of accounting choices also increases the advantages of REM since operational choices are largely seen as separate from accounting choices.

Two recent studies provide evidence that suggests that earnings management may have decreased post-SOX. Cohen et al. (2008) use factor analysis to create an earnings management measure based on three variations of the modified Jones model, the ratio of the absolute value of accruals to the absolute value of cash flows from operations, the ratio of the change in accounts receivables to change in sales, the ratio of change in inventory to the change in sales, and the frequency of special items reported for the period. They report an upward trend in their earnings management proxy in the pre-SOX period, followed by a significant decline post-SOX. They conclude that, on average, earnings management declined after SOX.

Lobo and Zhou (2006) investigate whether SOX affects conservatism in financial reporting. They focus on whether firms exhibit more reporting conservatism in the initial year of required CEO/CFO certification of financial reports and find that firms report lower discretionary accruals post-SOX. They also find that negative security returns are more quickly incorporated into financial statement net income than positive security returns in the post-SOX period. They interpret their results as providing preliminary evidence that managers are more conservative post-SOX.

In general, the extant literature indicates that managers engage in REM to beat earnings targets even though future performance may suffer. In addition, Ewert and Wagenhofer (2005) show analytically that tighter accounting standards lead to an increase in REM due to an increase in the marginal benefits of engaging in earnings management. Schipper (2003) also suggests that tightening accounting standards will lead to a substitution effect between accrual manipulation and REM. This study

investigates whether tightening accounting standards via SOX leads to an increase in REM and a decrease in accruals management. Relative to prior research investigating the use of REM to manage earnings and the change in earnings management post-SOX, this study makes two important innovations. First, prior studies suggest that, on average, earnings management declined post-SOX. I investigate how SOX affects the earnings management behavior of firms with strong incentives to manage earnings (i.e., firms with earnings located around the earnings benchmarks). Second, I test whether the preferences for accruals management and REM change post-SOX. This is particularly important since REM is likely a more costly form of earnings management in terms of future firm performance.

3. HYPOTHESES AND MODELS

Prior literature finds that, on average, accruals management declines and accounting conservatism increases post-SOX (Cohen et al. 2008, Lobo and Zhou 2006). Given these findings and the increased cost of engaging in accrual management post-SOX (e.g., increased executive liability, increased monitoring, and increased investor awareness), I expect that accrual management for benchmark firms will decrease post-SOX. This leads to my first testable hypothesis:

Hypothesis 1: The use of accrual management to beat earnings benchmarks declines following SOX.

A decline in the use of accrual management does not necessarily imply that all types of earnings management will decline post-SOX. Roychowdhury (2006) and Gunny (2010) document that managers are willing to engage in REM prior to SOX. Given firms' willingness to engage in REM to beat earnings benchmarks, an increase in the cost of engaging in accrual management may simply result in a shift to REM. This forms my second hypothesis.

Hypothesis 2: The use of real earnings management to beat earnings benchmarks increases following SOX.

To investigate the effect of SOX on earnings management behavior, I estimate abnormal accruals and REM proxies for a sample of firms from 1987 – 2004. I examine three types of REM – overproduction, sales manipulation, and discretionary expense manipulation investigated in prior literature (e.g., Roychowdhury 2006, Gunny 2010). Managers have the option of cutting discretionary expenses such as sales, general, and administrative expense (SG&A), research and development expenses (R&D), and advertising expense to manage earnings. Although SG&A is not entirely discretionary, many discretionary items such as employee training expense, travel expenses, and certain types of maintenance are commonly included in SG&A. Cutting these discretionary expenses increases cash flows from operations (CFO) and operating income in the current period. In addition to reducing discretionary expenses, managers of manufacturing firms may choose to overproduce to manage earnings upward. Increased production levels spread fixed costs across more units, thus lowering cost of

goods sold and increasing gross margin and net income. While reported net income increases in the current period because of overproduction, cash flows from operations decrease since the firm incurs increased production and holding costs for the additional units produced. This results in lower than normal cash flows from operations at a given level of sales and higher production costs relative to sales.

Managers may also seek to manage earnings by artificially boosting sales through aggressive price discounts. Aggressive price discounts (i.e., discounts more extensive than those offered in the normal course of business) accelerate sales into the current period and thus increase sales revenue and net income. Using this strategy, sales revenue per unit would be lower than normal, whereas production costs relative to sales would be higher than normal.

I focus on firms with relatively stronger incentives to manage earnings by restricting my sample to firms with earnings around three common earnings benchmarks – profit, earnings change, and analysts' forecasted earnings. Specifically, to determine whether SOX has an effect on earning management choices, I use the following probit regression that relates a firm's probability of meeting/beating a given earnings benchmark with the firm's abnormal accruals, abnormal production costs, and abnormal discretionary expenses in the pre-SOX and post-SOX periods.

$$\begin{aligned}
 BM = & a + b_1 AbAccr + b_2 Abprod + b_3 AbDisc + b_4 SOX + \\
 & b_5 AbAccr * SOX + b_6 Abprod * SOX + b_7 AbDisc * SOX + \\
 & b_8 CFO + b_9 NOA + E
 \end{aligned} \tag{1}$$

where:

Profit Benchmark: **BM** equals one for firm-years with scaled earnings (NI_t / TA_{t-1}) greater than or equal to 0 but less than 0.01, and **BM** equals zero for firm-years with scaled earnings greater than or equal to -0.01 but less than 0.

Earnings Change Benchmark: **BM** equals one for firm-years with scaled earnings changes ($(NI_t - NI_{t-1}) / TA_{t-1}$) greater than or equal to 0 but less than 0.005, and **BM** equals zero for firm-years with scaled earnings changes greater than or equal to -0.005 but less than 0.

Analysts' Forecast Benchmark: **BM** equals one for firm-years with ($EPS - \text{forecasted EPS}$) greater than or equal to 0 but less than 0.01, and **BM** equals zero for firm-years with ($EPS - \text{forecasted EPS}$) greater than or equal to -0.01 but less than 0. Forecasted EPS is defined as the most recent analyst forecast prior to the announcement of annual earnings.

AbAccr (abnormal accruals) is the difference between total accruals and estimated expected accruals using the Jones (1991) model.

AbProd (abnormal production costs) is the difference between a firm's actual production costs (Costs of goods sold + Change in inventory) and estimated expected production costs (discussed below).

AbDisc (abnormal discretionary costs) is the difference between a firm's actual discretionary costs (SG&A + R&D + Advertising expenses) and estimated expected discretionary costs (discussed below).

SOX equals one for Post-Sox years (i.e., 2003-2004), and zero otherwise.

CFO is cash flow from operations (Compustat Data #308).

ΔCFO is the change in cash flow from operations from year $t-1$ to year t .

ΔCFO replaces CFO for analyses using the earnings change benchmark.

NOA is net operating assets defined as total shareholder's equity – cash and short-term investments + total debt.

I estimate a firm's expected level of accruals using the Jones (1991) model.²

$$\text{Accruals}_t / A_{t-1} = \alpha_0 + \alpha_1 * (1 / A_{t-1}) + \beta_1 * (\Delta S_t / A_{t-1}) + \beta_2 * (\text{PPE}_t / A_{t-1}) + \varepsilon_t \quad (2)$$

where:

Accruals_t is total accruals for year t , and

A_{t-1} is total assets at the end of period $t-1$, and

ΔS_t is the change in sales from period $t-1$ to period t , and

PPE_t is property, plant, and equipment at the end of period t .

I estimate equation (2) by industry and year and include an unscaled intercept, α_0 , to force the mean abnormal accruals for each industry-year to be zero. I use the parameter estimates from equation (2) to estimate the firm's expected accruals. I then estimate abnormal accruals as the difference between the firm's actual accruals and expected accruals as follows:

$$\text{AbAccr}_t = \text{Accruals}_t / A_{t-1} - [\alpha_0 + \alpha_1 * (1 / A_{t-1}) + \beta_1 * (\Delta S_t / A_{t-1}) + \beta_2 * (\text{PPE}_t / A_{t-1})] \quad (3)$$

To the extent that firms use discretionary accruals to beat earnings benchmarks, I expect to find a positive coefficient on *AbAccr*.

Following Dechow et al. (1998) and Roychowdhury (2006), I estimate the expected level of production costs using the following model:

$$\text{PROD}_t / A_{t-1} = \alpha_0 + \alpha_1 * (1 / A_{t-1}) + \beta_1 * (S_t / A_{t-1}) + \beta_2 * (\Delta S_t / A_{t-1}) + \beta_3 * (\Delta S_{t-1} / A_{t-1}) + \varepsilon_t \quad (4)$$

where:

PROD_t is total production costs for period t , and

S_t is sales revenue for time period t (Compustat Data #12), and

ΔS_{t-1} is the change in sales revenue from period $t-2$ to period $t-1$.

All other terms the same as defined in equation 2.

² Results using the modified Jones model (Dechow et al., 1995) are nearly identical to results when using the Jones model.

I estimate equation (4) by industry and year and use the parameter estimates from equation (4) to determine the firm's expected production costs. I then calculate *AbProd* as the difference between the firm's actual production costs (i.e., the sum of Cost of goods sold and Change in inventory) and its expected production costs. *AbProd* represents a firm's abnormal production costs relative to other firms in the same industry. Concurrent literature (Roychowdhury 2006, Gunny 2010) suggests that managers engage in REM to beat earnings benchmarks. To the extent that managers are willing to engage in overproduction and sales manipulation to beat earnings benchmarks, I expect the coefficient on *AbProd* to be positive.

I estimate discretionary expenses using the following model by industry and year (Roychowdhury, 2006):

$$DISEXP_t / A_{t-1} = \alpha_0 + \alpha_1 * (1 / A_{t-1}) + \beta_1 * (S_{t-1} / A_{t-1}) + \varepsilon_t \quad (5)$$

where:

DISEXP_t is discretionary expenses for period t, and

S_{t-1} is sales revenue for time period t-1.

All other terms are as defined in equation 2.

Using lagged sales rather than current sales to estimate discretionary expenses mitigates one potentially complicating issue. If firms opt to manage earnings by increasing sales in a given year, then discretionary expenses would appear abnormally low even if they have not been managed. Using lagged sales alleviates this problem to the extent that firms are not located around an earnings benchmark in successive years. I expect to find a negative coefficient on *AbDisc*, since lowering expenses in the current period results in higher current period income.

SOX denotes whether a firm-year occurs before or after the passage of the Sarbanes-Oxley Act, and thus, represents the incremental propensity for a firm to beat a benchmark post-SOX. Cohen et al. (2008) document a sharp decline in earnings management, on average, post-SOX. Additionally, Lobo and Zhou (2006) find an increase in accounting conservatism post-SOX. To the extent that (1) SOX inhibited firms' abilities to beat benchmarks using accrual management and (2) REM was not a viable method for a subset of firms to beat benchmarks, I anticipate a negative coefficient for SOX.

Hypothesis 1 predicts that post-SOX firms decreased their use of accruals management to meet/beat earnings benchmarks. If firms decreased their use of accrual management to meet/beat earnings benchmarks post-SOX, the coefficient on *AbAccr * SOX* should be negative. Hypothesis 2 predicts that SOX caused firms to increase their use of REM to meet or beat earnings benchmarks. If firms engaged in more REM through increased use of overproduction and/or sales manipulations, then the coefficient on *Abprod * SOX*, should be positive. Likewise, if firms engage in more discretionary expenses manipulation following SOX, then the coefficient on

*AbDisc** *SOX* should be negative. I include either cash flows or change in cash flows in my model to control for the effect of a firm's cash flow on the firm's need to use accrual management or REM to meet or beat a benchmark (Phillips et al. 2003). I expect that the coefficient on *CFO* (Δ *CFO*) will be positive, since firms with higher cash flows should be more likely to beat benchmarks. Finally I include net operating assets (NOA) to control for a firm's level of accrual flexibility. The higher a firm's net operating assets, the lower their ability to manage accruals to beat earnings benchmarks (Barton and Simko 2004). However, given a firm's ability to use REM to beat benchmarks and to walk-down analysts' forecasts, I make no prediction about the sign of NOA.

4. SAMPLE SELECTION AND DESCRIPTION

I collect financial data from Compustat and analyst forecast data from I/B/E/S. I require that cash flows from operations are available from the Statement of Cash Flows, which restricts the sample to post-1986 firm-years. I also require sample firm-years to have sufficient data available to compute the necessary variables used for estimations of expected accruals, production costs, and discretionary expenses. Since SOX applies to domestically traded firms, I exclude foreign firms from the sample. I also exclude regulated industries (SIC codes 4400 through 4999) and banks and financial institutions (SIC codes 6000 through 6999). These firms operate in a different regulatory environment than other firms and likely have different earnings management incentives. Thus, I would expect SOX to affect regulated firms differently than other firms. I use two-digit SIC codes to assign each firm's industry.

The modal industry represented in the profit benchmark sample is Electrical and Other Electrical Equipment (SIC code 36) with 379 firm-year observations. Measuring Instruments, Photo Goods, and Watches (SIC code 38) has the second highest number of observations with 322 firm-years. The twenty industries with the highest representation account for 83.3% of all observations in the profit benchmark sample.

The earnings change benchmark sample has a similar distribution to the profit benchmark sample. Like the profit benchmark sample, Electrical and Other Electrical Equipment (SIC code 36) is the modal industry with 473 firm-year observations. Industrial and Commercial Machinery and Computer Equipment (SIC code 35) is the second highest represented industry with 471 observations. The twenty industries with the highest representation account for 82.1% of all earnings benchmark sample observations.

Like the profit and earnings change samples, Electrical and Other Electrical Equipment (SIC code 36) is the modal industry for the analysts' forecast benchmark sample with 940 firm-year observations. Measuring Instruments, Photo Goods, and Watches (SIC code 38) has the second highest number of observations with 794 firm-years. The twenty industries with the highest number of observations account for 87.1% of the entire analysts' forecast benchmark sample.

5. RESULTS

Table 2 presents descriptive statistics for each of the three benchmark samples. Imposing all of the data requirements results in a sample of 3,434 firm-years around the profit benchmark. 2,235 firm-years just meet/beat (i.e., $.00 \leq E_{it} < .01$) the profit benchmark, and 1,199 firm-years just miss (i.e., $-.01 \leq E_{it} < .00$) the benchmark. I further separate the sample into Pre-SOX and Post-SOX periods to examine changes over time. Panel A indicates that there is no statistical difference in the means between the just miss abnormal production levels and the just beat abnormal production levels pre-SOX. However, there is a statistically significant difference in the mean abnormal production levels post-SOX ($p = 0.0446$). This is consistent with firms increasing their management of production costs to beat the profit benchmark post-SOX. There is no statistical difference in the pre-SOX or post-SOX means for abnormal accruals or abnormal discretionary expenses. However, univariate are a weaker test than multivariate probit analyses since the univariate analyses do not control for cash flows or the effect of the various earnings management techniques on one another.

Panel B presents descriptive statistics for the 5,397 firm-years located around the earnings change benchmark. 3,208 firm-years just meet/ beat (i.e., $.00 \leq \Delta E_{it} < .010$) the earnings change benchmark, and 2,189 firm-years just miss (i.e., $-.010 \leq \Delta E_{it} < .00$) the benchmark. Again, I separate the sample in pre-SOX and post-SOX periods. The earnings change benchmark exhibits the same pattern for mean abnormal production levels as the profit benchmark. There is no statistical difference in the mean abnormal production levels pre-SOX ($p = 0.3643$), but there is a statistically significant difference post-SOX ($p = 0.0829$). This is consistent with firms increasing their management of production costs to beat the earnings change benchmark post-SOX. Similar to the profit benchmark, there is no statistical difference in the pre-SOX or post-SOX means for abnormal accruals or abnormal discretionary expenses.

Panel C presents the descriptive statistics for the analysts' forecasted earnings benchmark. 3,751 firms just meet or beat (i.e., $.00 \leq EPS_{it} < .01$) the benchmark, and 2,934 firms just miss (i.e., $-.01 \leq EPS_{it} < .00$) the benchmark. Unlike the profit and earnings change benchmarks, mean abnormal production levels pre-SOX and post-SOX show a significant decline across the analysts' forecast benchmark. Thus, univariate analyses provide no evidence that firms engage in REM to beat the analysts' forecasted earnings benchmark. Again, there is no statistical difference in the pre-SOX or post-SOX means for abnormal accruals or in the pre-SOX means for abnormal discretionary expenses. However, there is a statistical difference ($p = 0.0645$) between the means in the post-SOX samples. This indicates that post-SOX, firms that just beat the analysts' forecast benchmark have higher discretionary expenses than firms that just miss the analysts' forecast benchmark. This result is not consistent with firms opportunistically managing discretionary expenses.

Table 2
Univariate Analysis

Panel A

Firms that just miss or just meet/beat the profit benchmark.

	Pre-SOX				Post-SOX		
	<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>		<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>
	Mean <i>Median</i>	Mean <i>Median</i>	t-stat <i>(p-value)</i>		Mean <i>Median</i>	Mean <i>Median</i>	t-stat <i>(p-value)</i>
CFO	2.77 1.08	3.48 2.46	2.47** (0.0135)		4.76 4.87	4.71 5.02	-0.05 (0.9597)
Abnormal Accruals	1.58 1.33	1.82 1.50	0.76 (0.4469)		0.89 0.48	2.02 1.28	1.22 (0.2227)
Abnormal Prod Cost	6.26 4.35	4.18 4.90	-1.27 (0.2027)		-2.36 -1.16	3.02 2.49	2.02** (0.0446)
Abnormal Disc Exp	-5.12 -4.76	-4.50 -5.01	0.81 (0.4156)		-0.65 -1.69	-3.68 -4.39	-1.00 (0.3194)
N	1,084	2,056			115	179	

* Significant at the 0.10 level (two-tail) **Significant at the 0.05 level (two-tail)

Panel B

Firms that just miss or just meet/beat the earnings change benchmark.

	Pre-SOX				Post-SOX		
	<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>		<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>
	Mean <i>Median</i>	Mean <i>Median</i>	t-stat <i>(p-value)</i>		Mean <i>Median</i>	Mean <i>Median</i>	t-stat <i>(p-value)</i>
CFO	7.44 7.92	8.93 9.30	5.52** (<0.0001)		7.91 7.87	9.41 9.17	2.35** (0.0188)
Ab Accruals	0.95 0.64	1.01 0.76	0.32 (0.7503)		0.27 0.37	0.67 0.71	1.04 (0.2991)
Ab Prod Cost	1.02 2.08	0.46 1.06	-0.91 (0.3643)		0.45 0.44	1.91 3.10	1.74* (0.0829)
Ab Disc Exp	-1.37 -2.95	-1.48 -2.34	-0.18 (0.8561)		-1.83 -3.46	-0.83 -2.82	0.68 (0.4983)
N	1,897	2,819			292	389	

* Significant at the 0.10 level (two-tail) **Significant at the 0.05 level (two-tail)

Panel C

Firms that just miss or just meet/beat the analysts' forecasted earnings benchmark

	Pre-SOX			Post-SOX		
	<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>	<u>Just Miss</u>	<u>Just Beat</u>	<u>Difference in Means</u>
	Mean Median	Mean Median	t-stat (p-value)	Mean Median	Mean Median	t-stat (p-value)
CFO	10.32 10.26	12.81 11.54	4.45** (<0.0001)	9.29 10.92	9.91 10.46	0.64 (0.5223)
Abnormal Accruals	0.95 0.79	0.98 0.72	0.15 (0.8841)	-0.14 -0.09	0.40 -0.14	1.22 (0.2228)
Abnormal Prod Cost	-4.31 -2.76	-8.59 -4.32	-1.87* (0.0612)	-2.52 -1.57	-4.95 -2.84	-1.76* (0.0794)
Abnormal Disc Exp	3.51 0.07	4.66 0.62	1.25 (0.2095)	1.91 -0.37	4.91 0.72	1.85* (0.0645)
N	2,449	3,246		485	505	

* Significant at the 0.10 level (two-tail) **Significant at the 0.05 level (two-tail)

Table 3 presents the results for estimating equation (1) for firms that just meet or beat versus firms that just miss the three common earnings benchmarks. The coefficient on *AbAccr*, the measure of abnormal accruals pre-SOX, is positive and significant for all three earnings benchmarks. The positive coefficient on *AbAccr* is consistent with firms managing accruals to cross the earnings benchmarks. The coefficient on *Abprod*, the measure of abnormal production costs pre-SOX, is not significantly different than zero for any of the three benchmarks with ($p = .7160$) for the zero benchmark, ($p = .1724$) for the earnings change benchmark, and ($p = .9076$) for the analysts' forecast benchmark.³ The insignificant coefficients on *Abprod* suggest that abnormal production costs had no significant effect on the likelihood of beating the earnings benchmarks pre-SOX. These results are inconsistent with Roychowdhury (2006) who finds that firms who just meet or beat the profit benchmark⁴ exhibit higher levels of abnormal production costs compared to other firms across the earnings distribution.⁵ He concludes that firms who just meet or beat the profit benchmark manipulate their production operations to cross the benchmark threshold. Prior literature (Burgstahler and Dichev 1997, Burgstahler and Eames 2006, Phillips et al. 2003, Skinner and Sloan 2001, Kasznik and McNichols 2002) documents that firms around the earnings benchmarks have strong incentives to manage earnings to beat benchmarks have to manage earnings (e.g., income

³ All p-values are reported as one-tail values.

⁴ Roychowdhury (2005) also finds weaker results suggesting firms use production cost manipulations to meet/beat the earnings change benchmark. However, his main results are for the profit benchmark.

⁵ Roychowdhury (2005) does not specifically compare just miss to just beat firms. Instead, he compared firms who just beat earnings benchmarks to firms in the 29 surrounding earnings bins.

Table 3
Comparison of Just Meet/Beat Firm-Years with Just Miss Firm Years

		Profit	Earnings Change	Analyst Forecast
	Predicted Sign	Estimate (Pr > χ^2)	Estimate (Pr > χ^2)	Estimate (Pr > χ^2)
Intercept	?	0.2964 (<0.0001)**	0.2097 (<0.0001)**	0.1004 (<0.0001)**
AbAccr	+	1.6090 (<0.0001)**	0.7542 (0.0104)**	0.4755 (0.0112)**
AbProd	+	-0.0313 (0.7160)	0.1248 (0.1724)	-0.0385 (0.9076)
AbDisc	-	0.0703 (0.7207)	-0.1060 (0.2027)	0.0448 (0.7631)
SOX	-	-0.1819 (0.0118)**	-0.0629 (0.1156)	-0.1432 (0.0006)**
AbAccr*SOX	-	1.3764 (0.9064)	1.2096 (0.8813)	0.6412 (0.8519)
AbProd*SOX	+	0.8396 (0.0321)**	0.7965 (0.0477)**	0.1346 (0.3136)
AbDisc*SOX	-	0.0542 (0.5544)	-0.3558 (0.7928)	0.3868 (0.9465)
CFO	+	2.1111 (<0.0001)**		
ΔCFO	+		1.0510 (<0.0001)**	0.5415 (<0.0001)**
NOA	?	0.2058 (0.0010)**	0.1425 (0.0009)**	0.0163 (0.5963)
N		3,434	5,397	6,685

* Significant at the 0.10 level (one-tail) **Significant at the 0.05 level (one-tail)

smoothing; taking a big bath). Thus, it is difficult to draw conclusions regarding earnings management to beat earning benchmarks when comparing the abnormal production costs of firms that just-beat earnings benchmarks to all other firms. Comparing just-beat and just-miss firms focuses the analysis on firms with similar earning management incentives and earnings properties. Thus, my tests are less susceptible to alternative interpretations.

To reconcile my results with Roychowdhury (2006) I partially replicate his analysis using my sample. I present my results in Table 4. First in panel A, I replicate his results for the use of production cost management to beat the profit benchmark by using OLS regression on the following regression equation:

$$Abprod = a + b_1 Suspect + b_2 AbMTB + b_3 AbSize + b_4 AbNI + E \quad (6)$$

where:

AbProd (abnormal production costs) is defined as the difference between a firm's actual production costs and expected production costs. Expected production costs are estimated using the industry-year regression: $Prod_t = a_0 + a_1*(1/A_{t-1}) + b_1*Sales_t + b_2*\Delta Sales_t + b_3*\Delta Sales_{t-1} + \varepsilon_t$

All terms are scaled by total assets at the end of year t-1.

Suspect is an indicator variable taking on the value of 1 if the firm-year observations has scaled earnings ($EBEI_t / TA_{t-1}$) greater than or equal to 0 but less than 0.01.

AbMTB (abnormal market-to-book) is the firm MTB subtracted from the industry mean MTB.

AbSize (abnormal size) is the logarithm of market value of equity subtracted from the industry mean logarithm of market value of equity.

AbNI (abnormal net income) is the scaled income before extraordinary items subtracted from the industry mean scaled income before extraordinary items.

The sample includes 18,546 observations with earnings before extraordinary items between -7.5% and 7.5% of beginning of the year total assets. Like Roychowdhury, I find that firms that just meet/beat the profit benchmark exhibit significantly higher abnormal production costs (t-stat = 2.53, p-value = 0.0115) compared to the much larger distribution of firms (i.e., not only the just-miss firms). Accordingly, the contrary conclusions in Roychowdhury (2006) appear to be attributable to the comparison of just-beat firms to a larger comparison group of firms rather than those firms that just-miss the earnings benchmark. I conclude that the differences in results are not due to unique characteristics of my sample.

I predict that the coefficient on *AbDisc*, the measure of abnormal discretionary expenses, will be negative to the extent that firms manage discretionary expenses opportunistically. The coefficient on *AbDisc* is not statistically significant for the profit (p= 0.7207), earnings change (p = .2027), or analysts' forecast (p = 0.7631) benchmarks.

Table 4
Comparison of Real Earnings Management Levels Between Suspect Firms and Non-Suspect Firms

Panel A

N = 18,546	Coefficient	t-Stat	p-value
Intercept	0.0245	10.27	<.0001**
Suspect	0.0213	2.53	0.0115**
AbMTB	-0.0002	-2.82	0.0018**
AbSize	0.0068	5.81	<.0001**
AbNI	-0.0029	-5.19	<.0001**

* Significant at the 0.10 level **Significant at the 0.05 level (two-tail)

Panel B

N = 18,546	Coefficient	t-Stat	p-value
Intercept	-0.0597	-33.19	<.0001**
Suspect	-0.2557	-3.69	0.0002**
AbMTB	-0.0001	-0.21	0.8319
AbSize	0.0066	6.87	<.0001**
AbNI	-0.0006	6.26	<.0001**

* Significant at the 0.10 level **Significant at the 0.05 level (two-tail)

This evidence is also inconsistent with Roychowdhury (2006) who concludes that firms manage discretionary expenses downward to meet/beat the profit benchmark. I again partially replicate Roychowdhury's analysis. In panel B of Table 4, I present results of an OLS regression on the following regression equation:

$$AbDisc = a + b_1 Suspect + b_2 AbMTB + b_3 AbSize + b_4 AbNI + E \quad (7)$$

where:

AbDisc (abnormal discretionary costs) is defined as the difference between a firm's actual discretionary costs and expected discretionary costs. Expected discretionary costs are estimated using the industry-year regression:

$$Disc_t = a_0 + a_1 * (1/A_{t-1}) + b_1 * Sales_{t-1} + \varepsilon_t$$

All other terms are defined as described for equation (6).

I use the same 18,546 firm-year observation sample described above for equation (6). Similar to Roychowdhury, I find that firms who just meet/beat the profit benchmark exhibit lower levels of abnormal discretionary expenses. The coefficient on *Suspect* is negative and significant (t-stat = -3.69, p-value = 0.0002). I conclude that the differing

results are attributable to differences in method and not a result of unique characteristics in my sample.

Returning to Table 3, the coefficient on SOX is negative for all three benchmarks, and is significant for the profit ($p = .0118$) and analysts' forecast benchmark ($p = .0006$). The coefficient for the earnings change benchmark ($p = .1156$) benchmark only approaches conventional significance levels. This evidence suggests that firms are less likely to beat the earnings benchmarks post-SOX. This is consistent with Lobo and Zhou (2006) who find that accounting conservatism has increased following SOX.

Hypothesis 1 predicts that firms decreased their use of accrual management to meet or beat earnings benchmarks following SOX. Results do not support this hypothesis. The coefficient on $AbAccr * SOX$ is insignificant for the profit benchmark ($p = 0.9064$), the earnings change benchmark ($p = 0.8813$), and the analysts' forecast benchmark ($p = 0.8519$). These results indicate that SOX had little effect on the use of accrual manipulations for these firms to meet or beat earnings benchmarks.

These results are inconsistent with evidence presented by Cohen et al. (2008), who find that the level of earnings management, including discretionary accruals, declines post-SOX. However, they focus on a broad cross-section of firms across the entire earnings distribution, while I focus on firms with strong incentives to manage earnings (i.e., firms around the earnings benchmarks). To reconcile my results with Cohen et al. (2008), I examine whether the time-series properties of my abnormal accrual measure is similar to the time-series properties of the earnings management metric used by Cohen et al. (2008).⁶ I tabulate my results in Table 5.

Despite the fact that I use annual data while they use quarterly data, I find a significantly positive time trend ($t\text{-stat} = 6.75$, $p\text{-value} = <.0001$) indicating a rise in the use of accrual management from the beginning of my sample in 1987 until the passage of SOX. Post-SOX, I find, on average, a statistically significant decline in abnormal accruals ($t\text{-stat} = -3.08$, $p\text{-value} = 0.0021$). This evidence indicates that the use of discretionary accruals has declined overall post-SOX, but my other analysis indicates that accrual management has not declined for firms with strong incentives to manage earnings (i.e., firms close to the earnings benchmarks).

Hypothesis 2 predicts that firms increased their use of REM to meet or beat earnings benchmarks. Consistent with this hypothesis, the coefficient on $Abprod * SOX$ in table 3 is positive and significant for the profit ($p = .0321$) and earnings change ($p = .0477$) benchmarks, indicating an increase in the use of overproduction and/or sales manipulations to beat these benchmarks following SOX. For the analysts' forecast

⁶ Cohen et al. (2008) construct an earnings management measure based on several discretionary accruals models and financial ratios. Using quarterly data, they find a significant decline in earnings management post-SOX.

Table 5
Time Trends in Accrual Management

N = 43,786	Coefficient	t-stat	p-value
Intercept	-0.0163	-5.42	<.0001**
TIME	0.0022	6.75	<.0001**
SOX	-0.0139	-3.08	0.0021**

* Significant at the 0.10 level **Significant at the 0.05 level (two-tail)

benchmark, *Abprod* * *SOX* is positive as predicted but not significant ($p = .3136$). It is not surprising that results for the analysts' forecast benchmark are weaker than the other benchmarks. Unlike accrual manipulations, production levels and sales cannot be easily or quickly adjusted at the end of the year to meet the analysts' earnings forecast. Instead, they must be adjusted during the year. Thus, analysts have the opportunity to adjust their forecasts to incorporate changes in production levels and sales. The profit and earnings change benchmarks are static targets that do not change during the year. Therefore, managers should be better able to use REM to meet/beat these two benchmarks.⁷

Hypothesis 2 also predicts that firms will increase their use of discretionary expenses manipulation to meet or beat earnings benchmarks following SOX. My results do not support this hypothesis. For all three earnings benchmarks, the coefficient for *AbDisc* * *SOX* is insignificant. The coefficients on the profit, earnings change, and analysts' forecast benchmarks have p-values of 0.5544, 0.7928, and 0.9465 respectively. These results indicate that SOX has no significant effect on the use of discretionary expenses manipulation to meet/beat earnings benchmarks.

Consistent with prior literature, the coefficients on *CFO*, the control variables for firm cash flows, are positive and significant for the profit ($p = <.0001$) and analysts' forecast ($p = <.0001$) benchmarks. Likewise the coefficient on Δ *CFO* is positive and significant ($p = <.0001$) for the earnings change benchmark. Finally, the coefficients on *NOA*, the control variable for accrual flexibility, are positive for all three benchmarks. However, they are only significant for the profit ($p = .0010$) and earnings change ($p = .0009$) benchmarks. This result seems to indicate that higher levels of net operating assets increase the probability of beating the profit and earnings change benchmarks. The *NOA* coefficient for the analysts' forecast benchmark is insignificant ($p = .5963$) indicating that the level of net operating assets has no significant effect on a firm's probability of beating the analysts' forecast benchmark.

⁷ Firms also have the option to walk down analysts' forecasts (Richardson et al. 2004), which is likely to be much less costly than engaging in REM.

6. CONCLUSIONS

This study investigates whether managers alter their earnings management behavior following SOX. Specifically, I test whether REM (overproduction, sales manipulation, and discretionary expenses manipulation) increased and whether accrual manipulation decreased post-SOX. I focus on firms with high incentives to manage earnings by limiting my sample to firms located around three common earnings benchmarks – profit, earnings change, and analysts' forecasted earnings. Focusing on these firms allows for a powerful test of earnings management behavior, since firms around the earnings benchmarks have clear incentives to manage earnings to meet/beat those earnings benchmarks.

I use a probit regression that relates a firm's probability of meeting/beating an earnings benchmark with the firm's abnormal accruals, abnormal production costs, and abnormal discretionary expenses in the pre-SOX and post-SOX periods. Results indicate that managers increase their use of production cost manipulation to meet/beat the profit and earnings change benchmarks post-SOX. However, results also indicate that SOX has no significant effect on the use of accrual manipulations or discretionary expense manipulations to meet/beat earnings benchmarks.

This paper contributes to the earnings management literature in two ways. First, this study documents how new accounting regulation influences how firms' beat earnings benchmarks. In particular, results suggest that post-SOX the associations between abnormal production costs and beating earnings benchmarks increase while the association between abnormal accruals and beating earnings benchmarks remain unchanged. Second, SOX was intended to limit opportunistic behavior by managers. Since REM represents a sacrifice of future economic benefit to improve short-term financial reporting, investors have incentive to identify and limit managers' use of REM. Additionally, these results should be of interest of regulators who have an obligation to understand the consequences, both intended and unintended, of new accounting regulations. To date, the effects of SOX on financial reporting decisions and managers' actions are still largely unknown. This paper suggests that SOX resulted in an increase of REM, arguably a more costly/less attractive method to beat benchmarks.

This study should be interpreted in light of the following limitations. First, it is difficult to discern whether managers have altered their use of REM due to SOX or due to increased investor awareness of accounting choices resulting from the rash of accounting scandals that preceded SOX. I acknowledge that it is difficult to disentangle the effect of the accounting scandals that preceded SOX from the effects of SOX itself. Second, prior studies have documented that discretionary accruals models, such as the Jones model and modified Jones model, do a relatively poor job of detecting earnings management (Dechow et al. 1995, Thomas and Zhang 1999, McNichols 2000). To the extent that the inherent noise in abnormal accrual measures does not change cross-temporally, this study's analyses may be less susceptible to the concerns associated with these measures.

This study is part of an emerging stream of research investigating the use of real earnings management. Since this line of research is still largely in its infancy, there are many fertile areas for continuing research. This paper tests only a few of the numerous types of real earnings techniques available to managers. Future research may extend the list of real earnings techniques beyond those currently being reviewed in the accounting literature.

Future researchers may also choose to investigate the impact of real earnings management on a firm's cost of capital. Managers often engage in real earnings management for the short-term benefits associated with beating benchmarks. However, concurrent literature documents that there are long-term performance penalties for engaging in real earnings management. This dichotomy of short-term gains versus long-term penalties creates a natural question in regard to how supplies of equity capital and debt capital will react to real earnings management.

Lastly, I document an increase in certain types of real earnings management following the implementation of Sarbanes-Oxley. However, it is unclear whether this increase is permanent or temporary in nature. If the increase in real earnings management is in response to Sarbanes-Oxley, then I would expect the increase to be permanent. On the other hand, if the increase is in response to the rash of accounting scandals that gave rise to Sarbanes-Oxley, then I would expect the increase to last only as long as investors remain focused on accounting-based manipulations. Given more time to accumulate data, future research should be able to answer whether this is a permanent consequence of Sarbanes-Oxley or just a temporary reaction to the rash of accounting scandals prior to Sarbanes-Oxley.

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