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# PARABLES, MYTHS AND RISKS

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# CONTENTS

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# INTERNAL CONTROL MATERIAL WEAKNESS AND REAL EARNINGS MANAGEMENT

Nana Y. Amoah, Anthony Anderson, Isaac Bonaparte and Alex P. Tang

## ABSTRACT

*This study examines the relation between internal control material weakness (ICMW) under Section 404 of the Sarbanes-Oxley Act (SOX) and real earnings management. Our measures of real earnings management are abnormal cash flow from operations (ABCFOs), abnormal discretionary expenses (ABDISEXP), and abnormal production cost (ABPROD). We use a sample of 1,824 manufacturing firms over the period 2004–2011 to run regressions of ABCFO, ABDISEXP, and ABPROD on ICMW and other independent variables. We find that ICMW is negatively associated with ABCFOs. Another result that emerges from this study is a positive relation between ICMW and ABPROD. Our results imply that manufacturing firms with materially weak internal controls predominantly use overproduction and excessive price discounts to manage operational activities to achieve earnings targets. As SOX Section 404 is designed to reduce the instances of firms having ICMW, our finding that ICMW firms engage in real earnings management suggests that the use of real earnings management could be reduced as SOX Section 404 succeeds in reducing ICMW.*

**Keywords:** Real earnings management; internal control material weakness; SOX

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## INTRODUCTION

Extant literature documents the use of not only accrual earnings management, but also real earnings management by firms to achieve earnings targets. Roychowdhury (2006) defines real earnings management as "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations."

Real earnings management appears to have gained greater acceptability among managers as auditors and regulators cannot readily challenge real economic actions to meet earnings targets that are taken in the normal course of business. Graham, Harvey, and Rajgopal (2005) note that as a result of the stigma attached to accounting frauds following the Enron and other accounting scandals, managers appear to prefer real earnings management over accrual earnings management.

A number of studies report that the use of real earnings management has increased after the SOX. For example, Cohen, Dey, and Lys (2008) report higher levels of real earnings management and lower levels of accrual earnings management in the post-SOX period, which suggests that managers may have switched to real earnings management due to the greater scrutiny of accrual earnings management after SOX.

One of the key requirements of SOX is Section 404 which mandates management to report on the effectiveness of internal control over financial reporting and the auditor to issue a report on management's assessment of internal control.[1] The disclosure of ICMW is necessary when there is a significant deficiency or combination of significant deficiencies which makes it more than remotely likely that a material misstatement of the financial statements will not be prevented or detected.

We examine the relation between real earnings management and ICMW under Section 404 of SOX as it enables us to consider the effect of internal control on management's earnings management decisions in a post-SOX environment where there is heightened scrutiny of accrual earnings management and a preference for real earnings management.

Consistent with prior studies such as Roychowdhury (2006) and Cohen et al. (2008), we focus on the following real earnings management tools: overproduction, management of sales through excessive price discounts and reduction of discretionary expenditures. We use 1,824 firm observations over the period 2004–2011 to investigate the association between ICMW and our measures of real earnings management, which are ABPROD, ABCFOs, and ABDISEXPs.

Our study focuses on manufacturing industry firms (Standard Industry Classification (SIC) codes between 2000 and 3999) and we find that the disclosure of ICMW is negatively associated with ABCFO, which suggests that ICMW firms manage earnings by granting excessive price discounts.[2] Our

finding of a positive relation between ICMW and ABPROD implies that ICMW firms engage in overproduction to achieve earnings targets. Accordingly, our findings indicate that managers of manufacturing firms that have materially weak internal controls largely use overproduction and excessive price discounts to manage operational activities to achieve their earnings targets.[3]

While many critics of the SOX, such as SEC registrants and business associations, have cited the huge costs associated with the implementation of the internal control reporting requirements of Section 404 (Raghunandan & Rama, 2006; Solomon, 2005; Xu & Tang, 2012), others including Don Nicolaisen, former Chief Accountant of the US Securities and Exchange Commission (SEC), have argued that the benefits of the SOX internal control reporting requirements outweigh the costs of implementation and, therefore, Section 404 should not be amended.[4] Our study contributes to the debate on the usefulness of SOX Section 404 given that SOX Section 404 is designed to reduce the instances of firms having ICMW and our finding that ICMW firms engage in real earnings management implies that real earnings management could be reduced as SOX Section 404 succeeds in reducing ICMW.

The remainder of the paper proceeds as follows. The next section discusses the related literature and our research objectives. In the section "Research Methodology," we describe the research methodology. The empirical results are presented in the section "Empirical Results." In the section "Robustness Check," we test the robustness of our results to selection bias. The final section presents the conclusion.

## LITERATURE REVIEW AND RESEARCH OBJECTIVES

We first discuss related literature, and then we state our research objectives using the available body of evidence. Extant literature documents the management of production, discretionary expenditure and sales to attain earnings targets. For example, Roychowdhury (2006) finds that firms avoid reporting losses through cuts to discretionary expenditure, overproduction, and temporary boosts to sales.

Real earnings management could be achieved through the granting of excessive price discounts to temporarily boost sales. Roychowdhury (2006) notes that such excessive price discounts could negatively impact operating cash flows in the current period due to the decline in profit margins and the increased production costs relative to sales as a result of overproduction.

In the case of overproduction as a real earnings management tool, manufacturing firms could deliberately produce more goods than is necessary to meet expected demand. Under absorption costing, which is a GAAPs (Generally Accepted Accounting Principles) requirement, such overproduction will reduce the production cost per unit as the fixed overhead costs will be

spread over the large number of units produced. Total cost per unit should decrease provided that the effect of the reduction in fixed cost per unit is not equalized by any increase in the marginal cost per unit. Consequently, cost of goods sold will be reduced, which in turn increases operating profits.

The use of discretionary expenses to manage earnings is widely reported by many studies. For example, Baber, Fairfield, and Haggard (1991) and Bushee (1998) document that managers reduce investments in research and development (R&D) expenses to meet earnings benchmarks. Gunny (2010) documents the reduction of selling, general and administrative expense items such as employee training, maintenance, and travel expenses to increase reported income.

Real earnings management tools, such as discretionary expenditure cuts, excessive price discounts, and overproduction, could adversely impact future cash flows and long-term firm value (Chi et al., 2011; Cohen & Zarowin, 2010; Cohen et al., 2008; Roychowdhury, 2006). Cuts to discretionary expenditures such as R&D could limit a firm's future competitiveness and harm long-run firm value. Chi et al. (2011) note that excessive price discounts and overproduction could impose long-term costs due to a possible decline in the profit margin on future sales and a buildup of unwanted inventory together with an increase in holding costs.

Evidence of managerial opportunism and the long-term cost of real earnings management are documented by studies such as Mizik and Jacobson (2007), Gupta, Pevzner, and Seethamraju (2010), and Kim and Sohn (2013). Consistent with real earnings management imposing long-term costs, Mizik and Jacobson (2007) document the opportunistic reduction of marketing expenditures by managers around seasoned equity offerings (SEOs), which results in a short-term increase in reported earnings and stock prices around the SEO and a long-term decline in stock price performance. Moreover, Kim and Sohn (2013) report a positive relation between cost of capital and real earnings management, which is driven by opportunistic behavior. In addition, Gupta et al. (2010) report that firms with high fixed manufacturing overhead cost (FMO) have a greater incentive for opportunistic overproduction which results in high operating performance (return on assets (ROA)) in the current year and a decline in operating performance (ROA) in the subsequent year.

We note, however, that not all overproduction, price discounts, and discretionary expenditure cuts are driven by managerial opportunism. For example, overproduction may not be opportunistic when a firm experiences a drop in demand for its products and the firm is unable to adjust production levels at short notice (Gupta et al., 2010). Moreover, a short-term reduction in discretionary expenses such as R&D expense during an economic downturn may be motivated by the intent to ensure the firm's short-term solvency until a period of recovery.

Consistent with the view that real earnings management is not opportunistic in some settings, Gunny (2010) documents stronger future operating performance by firms that manage real activities to just meet earnings targets, which suggests that the real earnings management of such firms is not opportunistic but rather a signal of firm value.

Though there is no consensus in the literature about whether real earnings management is opportunistic, there appears to be a general consensus that real earnings management has gained greater acceptability among managers. A survey of 400 managers of the US firms by Graham et al. (2005) indicates that managers are inclined to use real earnings management tools to achieve earnings targets.

Compared to accrual earnings management, the use of real earnings management appears to have increased after SOX as it generally does not attract scrutiny from auditors and regulators. Cohen et al. (2008) report that real earnings management increased while accruals earnings management declined in the post-SOX period. Franz, HassabElnaby, and Lobo (2014) find that in the post-SOX period, firms with a greater incentive to avoid debt covenant violation employ more earnings management as a whole, less accrual earnings management and more real earnings management. The finding of an increase (a decrease) in real earnings management (accrual earnings management) in the post-SOX period appears to be consistent with Zang (2012) which reports that accrual earnings management and real earnings management are substitutes.

One of the important reporting requirements under SOX is Section 404 which mandates management to issue an assessment of the effectiveness of internal control over financial reporting and the auditor to attest to management's assessment of internal control. Disclosure of ICMW under SOX Section 404 is warranted when a significant deficiency or combination of significant deficiencies results in more than a remote likelihood that a material misstatement of the financial statements will not be prevented or detected.

A number of studies highlight some of the ramifications of the presence of ICMW on firms. For example, Ashbaugh-Skaife, Collins, and Kinney (2007) report that ICMW firms have smaller amounts of resources for internal control, higher incidences of auditor resignations, and higher accounting risk. Lopez, Vandervelde, and Wu (2009) document a higher likelihood of financial statement restatement, less transparent financial statements, higher cost of capital, and lower earnings predictability among firms with ICMW. Rezee, Espahbodi, Espahbodi, and Espahbodi (2012) find more negative stock returns for firms that report ICMW compared to firms with effective internal control. ICMW firms also appear to be more prone to litigation based on the findings of Hogan, Lambert, and Schmidt (2013) which indicates a higher probability of restatement-related litigation among firms that report ICMW.

Given that the results of prior studies suggest that ICMW firms are characterized by weak monitoring of management and a greater risk of material misstatement of the financial statements, we consider the possible impact of ICMW on the earnings management decisions of managers. On one hand, weak monitoring of management could provide opportunity for a higher level of total earnings management among ICMW firms compared to non-ICMW firms. Consistent with management's preference for real earnings management in the post-SOX period, a higher level of real earnings management could be observed among ICMW firms if management choices result in a higher level of

total earnings management. We also note the possibility of a higher level of accrual earnings management among ICMW firms due to the weak monitoring of management.

On the other hand, if the presence of ICMW does not result in more total earnings management, a higher level of real earnings management may not be observed for ICMW firms. If earnings management as a whole does not increase due to the presence of ICMW, the ICMW firms could employ more accrual earnings management due to the lax monitoring of management and we may observe a lower level of real earnings management.

Accordingly, our research objective is to investigate the association between ICMW and real earnings management and we specifically focus on overproduction, granting of excessive price discounts to manage sales and the cutting of discretionary expenses as the tools of real earnings management.

## RESEARCH METHODOLOGY

### *Regression Model*

The general form of the regression model for investigating the relation between real earnings management and ICMW is:

$$\begin{aligned} Y_{i,t} = {} & \alpha_0 + \beta_1(\text{ICMW})_{i,t} + \beta_2(\text{SIZE})_{i,t} + \beta_3(\text{MTB})_{i,t} + \beta_4(\text{ROA})_{i,t} \\ & + \beta_5(\text{INDVARM})_{i,t} + \beta_6(\text{LSDEBTN})_{i,t} + \beta_7(\text{LCTN})_{i,t} + \beta_8(\text{BIG6})_{i,t} \\ & + \beta_9(\text{SINVRECN})_{i,t} + \beta_{10}(\text{INVTURN})_{i,t} + \beta_{11}(\text{RECTURN})_{i,t} \\ & + \beta_{12}(\text{ABSDA})_{i,t} + \varepsilon_t \end{aligned}$$

where $Y_{i,t}$ represents the real earnings management measures. We run separate regressions for our three real earnings measures which are ABCFOs, ABPROD, and ABDISEXPs.

Similar to Roychowdhury (2006), we estimate the normal cash flow from operations (NCFO), the normal production cost (NPROD) and the normal discretionary expenses (NDISEXP) as the first step in our determination of ABCFOs, ABPROD, and ABDISEXPs, respectively.

To estimate the model for NCFOs, we run the following cross-sectional regression for each industry and year:

$$\text{CFO}_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \varepsilon_t \qquad (1)$$

where $A_{t-1}$ is the total assets at the end of period $t-1$, $\text{S}_t$ is the sales during period $t$ and $\Delta\text{S}_t = \text{S}_t - \text{S}_{t-1}$. For every firm-year, normal CFO is calculated using estimated coefficients from the corresponding industry-year model and

the firm's sales and lagged assets. ABCFO is then determined by subtracting the NCFO from the actual cash flow from operations (ACFO).

To develop the model for NPROD, we first estimate the following models for normal cost of goods sold ($COGS_t$) and the normal inventory growth ($\Delta INV_t$):

$$COGS_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta(S_t/A_{t-1}) + \varepsilon_t \quad (2)$$

$$\Delta INV_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(\Delta S_t/A_{t-1}) + \beta_2(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \quad (3)$$

Given that production cost ($PROD_t$) = $COGS_t$ + $\Delta INV_t$, we then estimate NPRODs using Eqs. (2) and (3) as follows:

$$\begin{aligned} PROD_t/A_{t-1} = {} & \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) \\ & + \beta_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \end{aligned} \quad (4)$$

Abnormal production cost ($ABPROD_t$) for each firm-year is determined from actual production cost ($PROD_t$) minus normal production cost ($NPROD_t$), which is calculated using the estimated coefficients from the industry-year regression model.

To estimate NDISEXP, we estimate the following regression model for each industry and year:

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

For each firm-year, the ABDISEXP is calculated as actual discretionary expense (ADISEXP) minus NDISEXP, which is determined using the estimated coefficients from the industry-year regression model.

ICMW, our test variable, is an indicator variable coded one if the firm disclosed an ICMW in year t and 0 otherwise. We also control for the audit quality using BIG 6, which is an indicator variable equal to one if the firm is audited by a BIG 6 auditor, 0, otherwise.[5] We use Big 6 audit firms instead of Big 4 because after the passage of SOX, the big audit firms have been continuously calling for more protection to reduce their litigation risk.[6] This call is not only restricted to Big 4 audit firms, namely KPMG, Deloitte, Ernst and Young, PricewaterhouseCoopers, but also extends to BDO Seidman and Grant Thornton (Blokdijk, Drieenhuizen, Simunic, & Stein, 2006), which are second-tier audit firms and arguably provide quality audit services at a lower cost relative to the Big 4 firms. According to Turner (2010), the "BIG 4" audit firms rejected risky firms post-SOX, and these risky firms selected the next two largest audit firms. Thus, the next two largest firms experienced an increase in litigation risk related to internal control deficiency reporting following the significant increase in their clients post-SOX.

Similar to Roychowdhury (2006), we capture the motivation of firms reporting small annual profits to manipulate earnings by including an indicator

variable (INDVARM), which is equal to one if ROAs is between 0 and 0.005, and 0 otherwise.

Consistent with Cohen et al. (2008), we consider the effect of accrual earnings manipulation in the model and also use the absolute value of discretionary accruals (ABSDA) as our measure of accrual manipulation. ABSDA is included in the model based on the expectation that firms may use both accrual earnings management and real earnings management as the reliance on accrual earnings management alone might be risky (Graham et al., 2005).

We compute discretionary accruals using the modified cross-sectional Jones model (Cohen et al., 2008; Dechow, Sloan, & Sweeney, 1995), which is estimated for each two-digit SIC-year grouping as follows:

$$\begin{aligned} \mathrm{TA}_{i,t}/\mathrm{Assets}_{i,t-1} = {} & K_1(1/\mathrm{Assets}_{i,t-1}) + K_2(\Delta\mathrm{REV}_{i,t})/\mathrm{Assets}_{i,t-1} \\ & + K_3\mathrm{PPE}/\mathrm{Assets}_{i,t-1} + \varepsilon_t \end{aligned} \tag{6}$$

where $\mathrm{TA}_{i,t} = \mathrm{IB}_{i,t} - \mathrm{CFO}_{i,t}$ (TA represents total accruals; IB is the earnings before extraordinary items and CFO is the cash flow from operations); $\mathrm{Assets}_{i,t-1}$ = Total assets; $\Delta\mathrm{REV}_{i,t}$ = Change in revenues from the preceding year; PPE = Gross value of property, plant, and equipment.

The coefficient estimates from Eq. (6) are used to estimate the firm-specific nondiscretionary accruals ($\mathrm{NA}_{i,t}$) for the sample firms as follows:

$$\mathrm{NA}_{i,t} = K_1(1/\mathrm{Assets}_{i,t-1}) + K_2(\Delta\mathrm{REV}_{i,t} - \Delta\mathrm{AR}_{i,t})/\mathrm{Assets}_{i,t-1} + K_3\mathrm{PPE}/\mathrm{Assets}_{i,t-1} \tag{7}$$

where $\Delta\mathrm{AR}_{i,t}$ is the change in accounts receivable from the preceding year. We then measure the discretionary accruals as:

$$\mathrm{DA} = (\mathrm{TA}_{i,t}/\mathrm{Assets}_{i,t-1}) - \mathrm{NA}_{i,t} \tag{8}$$

The following control variables are included in the real earnings management model:

| | |
|---|---|
| SIZE | = Log of the market value of equity |
| MTB | = Ratio of the market value of equity to book value of equity |
| ROA | = Income before extraordinary item scaled by lagged total assets |
| LSDEBTN | = Long and short-term debt normalized by lagged assets |
| LCTN | = Current Liability minus short-term debt divided by lagged assets |
| SINVRECN | = Sum of Inventory and Receivables scaled by lagged assets |
| INVTURN | = Inventory Turnover Ratio (computed as COGS/Average Inventory) |
| RECTURN | = Receivables Turnover Ratio (computed as Sales/Average Receivables) |

Size is defined as the log of the market value of equity. We include Size as a control variable based on the finding of a systematic variation in ABCFOs, ABPRODs, and ABDISEXPs, respectively, with the size of firms (Gunny, 2010; Roychowdhury, 2006).

We control for growth (MTB) in our analyses as the pressure to maintain growth could make firms more prone to real earnings management. Our measure of growth (MTB) is defined as the market value of common equity divided by the book value of common equity.

We also include ROA in our model to control for firm performance consistent with the finding of an association between firm performance and earnings management (Dechow, Kothari, & Watts, 1998; Gunny, 2010).

Consistent with Roychowdhury (2006), we control for the effects of debt, current liabilities, receivables, and inventory on real earnings management using the following measures: LSDEBTN (long-term and short-term debt normalized by lagged assets), LCTN (current liability minus short-term debt divided by lagged assets), SINVRECN (sum of inventory and receivables scaled by lagged assets), INVTURN (inventory turnover ratio), and RECTURN (receivables turnover ratio). We include LSDEBTN in the model based on the expectation that firms with higher debt levels may have a greater motivation to manage operational activities to avert tighter debt covenants or debt covenant violation.[7] LCTN is included in the model to control for current liabilities as firms with higher levels of current liabilities may have a greater incentive to manage operational activities to avoid tighter credit terms from suppliers. We also include SINVRECN, INVTURN, and RECTURN in the model consistent with the expectation that firms customarily maintaining high stocks of inventory and offering substantial credit sales to customers in the normal course of operations could engage in more real earnings management compared to their counterparts without such flexibility (Roychowdhury, 2006).

## *Data/Sample*

We begin with 26,953 firm-year observations from the COMPUSTAT database for the period 2004−2011. We delete firm-year observations with missing data. As in Roychowdhury (2006), we also delete firms in industries with less than 15 observations within a 2-digit SIC code. Next, we extract Section 404 internal control disclosure data over the period 2004−2011 from the Audit Analytics database. We concentrate on the auditor's assessment of the effectiveness of the internal controls. For the firms with multiple firm-year observations of ICMWs, we select the first year in which material weaknesses in internal control is reported. We then merge the COMPUSTAT data with Section 404 internal control data to obtain our full sample. The full sample consists of 407 ICMW firms (test group) reporting at least one material weakness in internal control

under Section 404 and 1,417 non-ICMW firms (control group) that do not report material weakness in internal control from 2004 to 2011. The selection procedure is depicted in Table 1.

## EMPIRICAL RESULTS

### *Descriptive Statistics*

Table 2 presents the descriptive statistics of the categorical variables (Panel A) and the continuous variables (Panel B). Panel A of Table 2 shows that within the full sample of 1,824 firms, 1,373 firms (75.3%) are audited by a BIG 6 auditor and 21 firms (1.2%) report ROA between 0 and 0.005.[8] As noted earlier, 407 firms (22.3%) out of the 1,824 sample firms disclose ICMW.

Panel B of Table 2 shows that the means of LSDEBTN for the ICMW firms and non-ICMW firms are 0.246 and 0.218, respectively. The difference in means is significant at the 10% level. Furthermore, the means of LCTN for the ICMW firms and non-ICMW firms are 0.308 and 0.262, respectively, and the difference in the means is significant at the 1% level.

The mean SIZE of the ICMW (non-ICMW) firms as measured by the log of the market value of equity is 6.074 (6.867), while the median SIZE of the ICMW (non-ICMW) firms is 5.915 (6.576). The mean SIZE of ICMW firms is significantly smaller than that of non-ICMW firms. Mean of the SINVRECN for the ICMW (non-ICMW) firms is 0.356 (0.322) and the median of SINVRECN for the ICMW (non-ICMW) firms is 0.312 (0.292). We find that,

***Table 1.*** Sample Selection Procedure.

| Item | Firm-Year Observation |
|---|---|
| Total manufacturing firms selected from the COMPUSTAT database for the period 2004–2011 | 26,953 |
| Delete observations with missing data in COMPUSTAT Database | 11,658 |
| Manufacturing firms after the deletion of observations with missing COMPUSTAT data | 15,295 |
| Deleted industry-year observations with less than 15 observations in a 2-digit SIC Code | 108 |
| Manufacturing industry-year obs. after deleting industry-year observations with less than 15 records | 15,187 |
| Deleted observations with missing Audit Analytics data | 6,133 |
| Number of firm-year observations after merging with Audit Analytics Database | 9,054 |
| Deleted observations with multiple occurrences | 7,230 |
| Number of firm observations after deleting multiple occurrences | 1,824 |

***Table 2.*** Descriptive Statistics of the Categorical Variables (Panel A) and the Continuous Variables (Panel B).

Panel A

| Variable | Number of firms | Percentage |
|---|---|---|
| BIG 6 | 1,373 | 75.3 |
| INDVARM | 21 | 1.2 |
| ICMW | 407 | 22.3 |

Panel B

| Variables | ICMW firms (ICMW = 1) | | | | | Non-ICMW firms (ICMW = 0) | | | | | Difference in means *t*-test |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Median | Min | Max | Std. | Mean | Median | Min | Max | Std. | |
| LSDEBTN | 0.246 | 0.176 | 0.000 | 5.582 | 0.378 | 0.218 | 0.144 | 0.000 | 6.880 | 0.329 | 0.028* |
| LCTN | 0.308 | 0.235 | 0.044 | 1.597 | 0.243 | 0.262 | 0.222 | 0.010 | 9.455 | 0.336 | 0.046*** |
| SIZE | 6.074 | 5.915 | −0.451 | 10.923 | 1.533 | 6.867 | 6.576 | 0.783 | 12.750 | 1.803 | −0.793*** |
| SINVRECN | 0.356 | 0.312 | 0.006 | 2.424 | 0.253 | 0.322 | 0.292 | 0.000 | 4.583 | 0.239 | 0.034*** |
| MTB | 3.540 | 2.116 | −148.6 | 142.5 | 15.2 | 3.418 | 2.379 | −51.6 | 142.0 | 6.908 | 0.122* |
| INVTURN | 7.334 | 4.107 | 0.097 | 247.7 | 15.9 | 6.755 | 4.664 | 0.000 | 200.671 | 9.858 | 0.579 |
| RECTURN | 8.277 | 6.342 | 0.133 | 92.600 | 8.610 | 8.334 | 6.693 | 0.000 | 144.269 | 8.526 | −0.057 |
| ROA | −0.024 | 0.009 | −3.345 | 1.151 | 0.347 | 0.007 | 0.063 | −27.023 | 0.947 | 0.778 | −0.031 |

Table 2 presents descriptive statistics for 1,824 sample firms over the period 2004−2011. Panel A reports the descriptive statistics for the binary independent variables. BIG 6 is an indicator variable coded 1 if the auditor is a BIG 6 auditor; 0, otherwise. INDVARM equals 1 if ROA is between 0 and 0.005, 0, otherwise. ICMW is an indicator variable coded 1 if internal control material weakness is reported under Section 404, 0, otherwise. Panel B reports the descriptive statistics for the continuous independent variables across the ICMW firms (ICMW = 1) and non-ICMW firms (ICMW = 0). LSDEBTN equals long-term and short-term debt outstanding normalized by lagged total asset. LCTN equals the variable for current liabilities excluding short-term debt scaled by total assets. SIZE is the log of the market value of equity. SINVRECN equals the variable for the sum of Inventories and Receivables normalized by total assets. MTB equals the ratio of market value of equity divided by book value of equity. INVTURN equals inventory turnover ratio. RECTURN equals the receivables turnover ratio. ROA equals income before extraordinary item scaled by lagged total assets.
Statistical significance at the 1% and 10% levels is denoted by *** and *, respectively.

on average, ICMW firms have more scaled inventories and receivables than non-ICMW firms.

The mean of the ratio of market value of equity to book value of equity (MTB) for the ICMW (non-ICMW) firms is 3.540 (3.418), while the median of MTB for the ICMW (non-ICMW) firms is 2.116 (2.379). On an average, ICMW firms have higher MTB ratio than non-ICMW firms. The means of the INVTURN, RECTURN, and ROA for the ICMW and non-ICMW firms are not significantly different.

Table 3 reports the univariate results for the 407 ICMW firms and 1,417 non-ICMW firms across ABCFOs, ABPROD, and ABDISEXPs over the period 2004−2011.

The results show that ICMW firms have a lower ABCFOs and a higher ABPROD compared to non-ICMW firms.

Specifically, the *t*-test (Wilcoxon test) results indicate a difference in the mean (median) ABCFOs across the ICMW and non-ICMW firms of −0.097 (−0.045), which is significant at the 1% level. The *t*-test of the difference between the mean (median) ABPRODs across the ICMW and non-ICMW firms of 0.060 (0.041) is also significant at the 1% level. The significant results of the univariate tests suggest that ICMW firms manage sales through increased price discounts. In addition, the univariate results imply that ICMW firms engage in real earnings management through overproduction. Thus, the evidence from the univariate tests provides a preliminary indication that ICMW firms engage in real earnings management.

***Table 3.*** Univariate Results for Real Earnings Management across ICMW and Non-ICMW Reporting Firms.

| Variable | ICMW = 1 ($N$ = 407) | | ICMW = 0 ($N$ = 1,417) | | Difference in Means *t*-Test | Difference in Medians Wilcoxon Test |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | | |
| ABCFO | −0.108 | −0.014 | −0.011 | 0.031 | −0.097*** | −0.045*** |
| ABPROD | 0.057 | 0.025 | −0.003 | −0.016 | 0.060*** | 0.041*** |
| ABDISEXP | −0.017 | −0.073 | −0.03 | −0.064 | 0.013 | −0.009 |

This table presents the univariate results for 407 ICMW and 1,417 non-ICMW firms across the real earnings managements measures (abnormal cash flow from operations (ABCFO), abnormal production cost (ABPROD), and abnormal discretionary expenses (ABDISEXP)) over the period 2004−2011. ICMW is an indicator variable coded 1 if internal control material weakness is reported under Section 404, 0, otherwise. ABCFO equals the deviations from the predicted values from the corresponding industry-year regression for the normal or expected cash flow from operations. ABPROD equals the deviations from the predicted values from the corresponding industry-year regression for normal production cost. ABDISEXP equals the deviations from the predicted values from the corresponding industry-year regression for normal discretionary expenses.
Statistical significance at the 1% level is denoted by ***.

Table 4 shows the results of the regressions of the ABCFOs, ABPROD, and ABDISEXPs on ICMW, audit quality (BIG 6), motivation for real earnings management (INDVARM), absolute discretionary accruals (ABSDA) and other variables.

We find that the estimated coefficient of ICMW in the ABCFO regression (Column 1) is negative and significant at the 5% level. We also find that the

***Table 4.*** Regressions of ABCFO, ABPROD, and ABDISEXP.

| Variable | ABCFO Coefficient estimate (*t*-statistic) | ABPROD Coefficient estimate (*t*-statistic) | ABDISEXP Coefficient estimate (*t*-statistic) |
|---|---|---|---|
| Intercept | 0.176*** (2.98) | −0.085** (−2.38) | −0.410*** (−4.09) |
| ICMW | −0.060** (−2.08) | 0.041** (2.33) | −0.032 (−0.66) |
| SIZE | −0.012 (−1.58) | 0.002 (0.45) | 0.014 (1.10) |
| MTB | −0.005*** (−3.85) | −0.001 (−1.17) | 0.005** (2.46) |
| ROA | 0.409*** (9.09) | −0.154*** (−5.65) | −0.334*** (−4.37) |
| INDVARM | −0.065 (−0.58) | 0.032 (0.48) | −0.005 (−0.03) |
| LSDEBTN | −0.051 (−1.17) | 0.079*** (3.02) | −0.136* (−1.86) |
| LCTN | −0.055 (−0.63) | 0.032 (0.61) | 0.436*** (2.97) |
| BIG 6 | 0.030 (1.04) | −0.012 (−0.68) | 0.065 (1.33) |
| SINVRECN | −0.182** (−2.53) | 0.225*** (5.15) | 0.079 (0.65) |
| INVTURN | 0.000 (0.90) | −0.000 (−0.29) | −0.000 (−1.64) |
| RECTURN | −0.005*** (−3.20) | −0.002* (−1.80) | 0.012*** (4.88) |
| ABSDA | −0.027 (−0.48) | −0.008 (−0.24) | 0.574*** (6.09) |
| Adj. $R^2$ | 0.0752 | 0.0608 | 0.0544 |
| *F*-value | 12.95 | 10.51 | 9.45 |
| *P*-value | <0.0001 | <0.0001 | <0.0001 |

This Table presents regressions of the abnormal cash flow from operations (ABCFO) in Column 1, abnormal production cost (ABPROD) in Column 2, and abnormal discretionary expenses (ABDISEXP) in Column 3. ABCFO equals the deviations from the predicted values from the corresponding industry-year regression for the normal or expected cash flow from operations. ABPROD equals the deviations from the predicted values from the corresponding industry-year regression for normal production cost. ABDISEXP equals the deviations from the predicted values from the corresponding industry-year regression for normal discretionary expenses. ICMW is an indicator variable coded 1 if internal control material weakness is reported under Section 404, 0, otherwise. SIZE is the log of the market value of equity. MTB equals the ratio of market value of equity divided by book value of equity. ROA equals income before extraordinary item scaled by lagged total assets. INDVARM equals 1 if ROA is between 0 and 0.005, 0, otherwise. LSDEBTN equals long-term and short-term debt outstanding normalized by lagged total asset. LCTN equals the variable for current liabilities excluding short-term debt scaled by total assets. BIG 6 is an indicator variable coded 1 if the auditor is a BIG 6 auditor; 0, otherwise. SINVRECN equals the variable for the sum of Inventories and Receivables normalized by total assets. INVTURN equals inventory turnover ratio. RECTURN equals the receivables turnover ratio. ABSDA is the absolute discretionary accruals. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, ** and *, respectively.

estimated coefficient of ICMW in the ABPROD regression (Column 2) is positive and significant at the 5% level.

Consistent with the expectation that firms under pressure to sustain growth grant excessive price discounts to manage sales, we find that the coefficient estimate of MTB (market to book value of equity) in the ABCFO regression (Column 1) is negative and significant at the 1% level. The coefficient estimate of LSDEBTN is positive and significant at the 1% level in the ABPROD regression and negative and significant at the 10% level in the ABDISEXPs regression. Accordingly, the results for the estimates of LSDEBTN provide evidence that firms with higher debt levels use overproduction and the reduction of discretionary expenses as real earnings management tools to avoid tighter debt covenants.

The coefficient estimates of SINVRECN are significant and negative (positive) in the ABCFO (ABPROD) regressions, implying that firms, which customarily maintain high stocks of inventory and offer substantial credit sales to customers in the normal course of operations, grant excessive price discounts and overproduce to manage earnings. The variance inflation factors of all the regressions are between 1.04 and 1.98, which implies that multicollinearity is not an issue.

## ROBUSTNESS CHECK

### *Self-Selection of Internal Control Material Weakness*

There exists the possibility of selection bias in our study as firms can choose the quality of their internal controls, their efforts to discover weaknesses and the disclosure of any known weaknesses (Ashbaugh-Skaife et al., 2008). We econometrically test for self-selection bias by using the Heckman (1979) two-stage approach. We follow Sartori (2003) by formulating a selection equation that is different from the outcome equation. The first stage model is a probit regression of ICMW on the determinants of material weakness and the variables we employ as the determinants of selection are presented in Table 5.

We next use the parameters from the first stage selection model to compute an Inverse Mills Ratio (IMR) for our real earnings management models: ABCFOs, ABDISEXPs, and ABPROD. In the second stage, we include the IMR in each of our real earnings management regressions.

As shown in Table 6, the IMR Coefficients in the prediction models are not statistically significant as the *t*-values are −0.946, 0.234, and 0.542, respectively, while the *p*-values are 0.344, 0.815, and 0.588, respectively. Accordingly, we conclude that there is no indication of selection bias.

***Table 5.*** Determinants of Material Weaknesses – First-Stage Estimation.

| Variable | Predicted Sign | Dependent Variable = Material Weakness (ICMW) | |
|---|---|---|---|
| | | Coefficient Estimate | *p*-Value |
| Intercept | | 0.129 | 0.461 |
| SIZE | – | −0.184 | 0.000*** |
| MTB | + | 0.003 | 0.454 |
| ROA | + | 0.007 | 0.956 |
| INDVARM | + | 0.489 | 0.093* |
| LSDEBTN | + | 0.147 | 0.242 |
| LCTN | + | 0.967 | 0.000*** |
| BIG 6 | – | −0.107 | 0.201 |
| SINVRECN | – | −0.254 | 0.216 |
| INVTURN | – | −0.001 | 0.906 |
| RECTURN | – | −0.000 | 0.963 |
| FOREIGN CURRENCY | + | 0.224 | 0.005*** |
| ABSDA | + | 0.223 | 0.125 |

This table presents the (first-stage Heckman model) probit regression of ICMW on the determinants of material weaknesses. ICMW is an indicator variable coded 1 if internal control material weakness is reported under Section 404, 0, otherwise. SIZE is the log of the market value of equity. MTB equals the ratio of market value of equity divided by book value of equity. ROA equals income before extraordinary item scaled by lagged total assets. INDVARM equals 1 if ROA is between 0 and 0.005, 0, otherwise. LSDEBTN equals long-term and short-term debt outstanding normalized by lagged total asset. LCTN equals the variable for current liabilities excluding short-term debt scaled by total assets. BIG 6 is an indicator variable coded 1 if the auditor is a BIG 6 auditor; 0, otherwise. SINVRECN equals the variable for the sum of Inventories and Receivables normalized by total assets. INVTURN equals inventory turnover ratio. RECTURN equals the receivables turnover ratio. FOREIGN CURRENCY is an indicator variable coded one if the foreign currency translation dollar amount is greater than 0, and 0 otherwise. ABSDA is the absolute discretionary accruals. Statistical significance at the 1% and 10% levels is denoted by *** and *, respectively.

***Table 6.*** Determinants of Self-Selection Bias – Second-Stage Outcomes.

| Dependent Variable | IMR | *t* Value | *p*-Value |
|---|---|---|---|
| ABCFO | −0.1528 | −0.946 | 0.344 |
| ABPROD | 0.0202 | 0.234 | 0.815 |
| ABDISEXP | 0.1401 | 0.542 | 0.588 |

This table presents the second-stage Heckman model. ABCFO equals the deviations from the predicted values from the corresponding industry-year regression for the normal or expected cash flow from operations. ABPROD equals the deviations from the predicted values from the corresponding industry-year regression for normal production cost. ABDISEXP equals the deviations from the predicted values from the corresponding industry-year regression for normal discretionary expenses. IMR is the Inverse Mills Ratio.

## CONCLUSION

In this study, we examine the relation between firms reporting material weakness in internal control (ICMW) under Section 404 of SOX and real earnings management. Our findings suggest that to achieve earnings targets, ICMW firms manage sales by granting excessive price discounts. Another result that emerges from the study is that ICMW firms engage in overproduction to attain earnings targets.

We find that highly financially leveraged firms as well as firms with large stocks of inventories and receivables engage in overproduction to manage earnings. In addition, we report that firms with high growth opportunities and firms with large stocks of inventories and receivables manage earnings by granting excessive price discounts to boost sales. The reported relations between real earnings management and financial leverage, growth opportunities, and the stocks of inventories and receivables are consistent with the findings of Roychowdhury (2006).

Given that we focus on manufacturing industry firms, our results imply that manufacturing firms with ICMW appear to predominantly use overproduction and excessive price discounts to accomplish real earnings management. Our finding of an association between ICMW and ABPRODs is noteworthy as Roychowdhury (2006) notes that overproduction as an earnings management strategy is only available to manufacturing firms.

As SOX Section 404 is designed to reduce the instances of firms having ICMW, our finding that ICMW firms engage in real earnings management implies that real earnings management could be reduced as SOX Section 404 succeeds in reducing ICMW.

Given that our finding of an association between ICMW and real earnings management suggests that the management of real activities by ICMW firms may be opportunistic, we note the possibility that our findings may not be driven by managerial opportunism. We accept the possibility that overproduction combined with the granting of price discounts to boost sales could be consistent with reaching optimal production quantity and an effective strategy to increase firm value, especially by the management of manufacturing firms with high FMO.

Accordingly, to shed more light on whether managers of ICMW firms engage in opportunistic real earnings management, we suggest that future studies examine whether ICMW firms engage in real earnings management to improve current performance at the expense of future operating and stock price performance. Finally, we note that additional insights on the role of ICMW in management's earnings management decisions could be obtained from an investigation of the relation between the remediation of ICMW and real earnings management. We leave this as an additional direction for future research.

# NOTES

1. We focus on the auditor's assessment of the effectiveness of internal control.
2. We note that the reduction of operating cash flows can be attributed to other real activities such as overproduction and the relaxation of credit terms to customers.
3. While we acknowledge that the use of a manufacturing firm sample may limit the generalizability of our results, the restriction of our sample to manufacturing firms provides important evidence on the association between ICMW and real earnings manipulation, particularly among manufacturing firms. Roychowdhury (2006) notes that both manufacturing and nonmanufacturing firms can offer price discounts to boost sales but overproduction as an earnings management strategy is only available to manufacturing firms. Accordingly, our finding of an association between ICMW and ABPROD is noteworthy as it is based on a sample of manufacturing firms.
4. In a Speech on the developments within the SEC and PCAOB at the 2004 AICPA National Conference in Washington, DC on December 6, 2004, Don Nicolaisen, former Chief Accountant of the US SEC emphasized that the primary objective of the SOX is to enhance financial reporting to better serve the needs of investors. Investors, he noted, expect organizations to have effective processes and strong internal controls to enhance the credibility and integrity of financial reporting. He noted that despite the huge cost associated with its implementation, the SOX is necessary to protect capital markets, which thrive on faith and trust. He noted that investor confidence waned significantly after the financial scandals, making it necessary for the stringent controls under the SOX (PCAOB, 2004).
5. According to Beasley and Salterio (2001), the attestation of the internal controls of firms by auditors implies that they can be considered as an integral component of an organization's corporate governance mechanism.
6. Ashbaugh-Skaife et al. (2007) justify the inclusion of Grant Thornton and BDO Seidman as part of the largest six audit firms as follows: "We classify BDO Seidman, Deloitte and Touche, Ernst and Young, Grant Thornton, KPMG, and PricewaterhouseCoopers as the dominant audit suppliers. We include BDO Seidman and Grant Thornton in the dominant auditor classification because these two firms acquired a significant number of SEC reporting clients following the demise of Arthur Andersen, which resulted in these firms facing additional litigation risk related to internal control deficiency reporting."
7. Roychowdhury (2006) finds that firms with high debt are more likely to engage in real earnings management to avoid tighter debt covenants from lenders.
8. For a full sample of 21,758 firm-years, Roychowdhury (2006) reports 503 firm-years with ROA between 0 and 0.005 which represents 2.3% of the total firm-years.

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# APPENDIX

Variable descriptions

| | |
|---|---|
| ICMW | An indicator variable coded one if the firm has disclosed internal control material weakness under Section 404 in year t and 0 otherwise |
| BIG 6 | An indicator variable coded one if the auditor is a BIG 6 auditor, 0 otherwise |
| MVOE | The market value of equity extracted from the COMPUSTAT database |
| A | Total Assets from the COMPUSTAT database |
| BVOE | The book value of equity from the COMPUSTAT database |
| IBEI | Income before extraordinary items from the COMPUSTAT database |
| CFO | Cash flow from operations from the COMPUSTAT database |
| ACCRUAL | IBEI − CFO |
| COGS | Cost of goods sold from the COMPUSTAT database |
| Production costs (PROD) | COGS + Change in inventory from the COMPUSTAT database normalized by lagged assets |
| Discretionary expenses (DISEXP) | R&D + Advertising + Selling, General, and Administrative expenses. If SG&A is present, advertising and R&D are set to zero if they are missing. All the three variables are from the COMPUSTAT database. The figure is normalized by lagged assets |
| S | Sales from the COMPUSTAT database |
| ΔS | Change in sales |
| ROA | Net income divided by lagged of total assets |
| INDVARM | Indicator variable for motive to engage in real earnings management. Dummy variable of 1 if ROA is between 0 and 0.005, and 0 otherwise |
| INVTURN | COGS/Average Inventory. Average inventory is (Beginning Inventory + Ending Inventory)/2 |
| RECTURN | Sales/Average Receivables. Average receivables is (Beginning gross receivables + Ending gross receivables)/2 |
| ABCFO | Abnormal cash flow from operations measured as the deviations from the predicted values from the corresponding industry-year regression for CFON |
| ABPROD | Abnormal production cost measured as deviations from the predicted values from the corresponding industry-year regression for PRODN |
| ABDISEXP | Abnormal discretionary expenses, measured as deviations from the predicted values from the corresponding industry-year regression for DISEXPN |
| IMR | Inverse Mills ratio |
| NI | Income before extraordinary items (IBEI) scaled by lagged total assets (A) |
| SIZE | Logarithm of the MVOE |
| MTB | The ratio of MVOE divided by BVOE |

(*Continued*)

| | |
|---|---|
| LSDEBTN | Long-term and short-term debt outstanding normalized by lagged total asset |
| LCTN | Current Liabilities excluding short-term debt scaled by total assets |
| SINVRECN | The sum of Inventories and Receivables expressed as a percentage of total assets |
| FOREIGN CURRENCY | An indicator variable coded one if the foreign currency translation dollar amount is greater than zero, and zero otherwise |