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ARTICLE INFO	Juo-Lien Wang, Her-Jiun Sheu and Huimin Chung (2011). Corporate governance reform and earnings management. <i>Investment Management and Financial Innovations</i> , 8(4)
RELEASED ON	Friday, 20 January 2012
JOURNAL	"Investment Management and Financial Innovations"
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

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Corporate governance reform and earnings management

Abstract

This paper explores whether the Sarbanes-Oxley Act (the SOX Act) of 2002 is associated with the incidence of earnings management in the US. The results reveal significant reductions in abnormal accruals after the implementation of the SOX Act. Furthermore, following the implementation of the SOX Act, the authors find an association between firms with high pre-managed earnings and fewer incidences of income-reducing earnings management behavior. In contrast, there is no evidence to suggest that the SOX Act has succeeded in restraining income-increasing manipulation by firms with poor pre-management earnings. Our findings suggest that the SOX Act has contributed significantly to the integrity of financial statements; however, for those firms with high incentives to achieve earnings benchmarks, the effect is limited.

Keywords: earnings management, Sarbanes-Oxley Act, discretionary accruals.

JEL Classification: G01, G30, M40.

Introduction

High-profile failures in the US corporate financial reporting have raised concerns regarding the integrity of public financial information, prompting the introduction of the Sarbanes-Oxley Act (the SOX Act) of 2002 as a direct result of the erosion of investor confidence (Jain et al., 2008). These corporate scandals have demonstrated that aggressive earnings management, indicated by lower quality accounting information, is accompanied by serious shareholder losses. Consequently, earnings management can provide an important signal showing that, in pursuing private benefits, managers are sacrificing shareholder wealth.

The SOX Act was designed to reform corporate governance, increase the accuracy and reliability of corporate disclosure and reduce the likelihood of misstatements in financial reporting. For example, to reinforce the responsibilities of Chief Executive Officers (CEOs) and Chief Financial Officers (CFOs), the SEC adopted Section 302 of the SOX Act, which mandates that CEOs and CFOs of companies reporting to the SEC should provide personal certifications in each of their quarterly and annual reports. These certifications should affirm that the signing officer has reviewed the report, and it is fair and free of material misstatements. The SOX Act thus is expected to alter managerial behavior in accounting transparency and earnings management.

Li et al. (2008) suggest that investors anticipated that the more firms had previously managed their earnings, the more the Act would limit earnings management and increase the quality of financial statement information. However, Li et al. (2008) don't estimate firm earnings management for the years after the SOX Act. This study explores one of the fundamental goals of the Act: whether the en-

forcement of the SOX Act is associated with a decline in firm earnings manipulation, particularly for firms with a high incentive to manage earnings. If the SOX Act have improved financial reporting accuracy and reliability, considerably less earnings management would be observed following its implementation.

This study concentrates on the effect of the announcement of the SOX Act on discretionary accruals. To directly capture the extent to which discretionary accruals relating to firm prior performance are managed, this study employs a time-series modified-Jones model (Jones, 1991) to estimate the degree of earnings management, doing so by comparing the abnormal accruals between different periods within individual firms.

Cohen et al. (2008) find that firm management of earnings peaked around the passage of the SOX Act, followed by a significant decline; however, their study differs from the present study in terms of both its focus and the methodology adopted for measuring earnings management. The methodology adopted in this study for measuring earnings management (the time-series modified-Jones model) focuses more on detecting manipulation variations within an individual company. Besides, in contrast to Cohen et al. (2008) study, this study explores variations in the effect of earnings management across firm size, and focuses on firms with high earnings manipulation incentives by examining upward and downward manipulations.

When pre-management earnings are low, firms tend to manage earnings upwards for psychological perspective and to avoid high cost of capital. Furthermore, firms with extremely high pre-managed earnings also have incentives to manage earnings downwards (Degeorge et al., 1999). This study thus investigates the robustness of the results by considering two of the most frequently considered objectives:

avoiding losses, and meeting prior period earnings (Degeorge et al., 1999; and Bartov et al., 2002). This study examines not only the link between the introduction of the SOX Act and income-increasing earnings management when pre-managed earnings are less than the threshold target, but also tests whether the SOX Act influenced downwards manipulation of earnings under circumstances of high pre-managed earnings.

The findings reveal a significant reduction in US corporate earnings management following the SOX Act, consistent with the widely-held view that the Act contributed to improvements in the quality of accounting information. The effect of the Act on improving financial transparency is both for small firms and large ones, essentially because the SOX Act comes into force for all listed firms. This study also identifies an association between firms with high pre-managed earnings and fewer incidences of income-reducing earnings management behavior; however, there is no evidence that the SOX Act has successfully limited income-increasing manipulation by firms with poor pre-management earnings.

Several studies have examined the impact of and market responses to the SOX Act in specific areas, with some identifying a variety of positive effects (Li et al., 2008; Jain et al., 2008; Kalelkar and Nwaeze, 2011), whilst others have revealed several negative effects (Leuz et al., 2008; Chhaochharia and Grinstein, 2007). The study thus potentially contributes to the policy implications of corporate governance regulations.

The remainder of this paper is organized as follows. Section 1 discusses the extant literature on investor protection and earnings management, followed in section 2 by a description of the data used, an explanation of the research design and presentation of the methods used to identify earnings management. The empirical results are presented in section 3. The final section presents the conclusions.

1. Related literature and hypothesis

Earnings management involves the alteration, or manipulation, of firm reported economic performance by insiders, either to mislead certain stakeholders or to influence contractual outcomes (Healy and Wahlen, 1999). Prior studies have suggested that aggressive earnings management increases information asymmetry between insiders and outsiders, has the potential to reduce shareholder wealth, and demonstrates lower accounting quality (Teoh et al., 1998). The evidence of Dechow and Dichev (2002) also show that high earnings management signified lower quality and less persistent earnings.

Previous studies have suggested that whilst insiders are likely to engage in aggressive earnings man-

agement to divert firm resources to themselves, effective laws and strong enforcement may reduce such insider incentives and mitigate such behavior (Leuz et al., 2003; Burgstahler et al., 2006). The SOX Act aims to protect investors by reinforcing corporate governance and improving the accuracy and reliability of corporate disclosure. Li et al. (2008) suggest that investors anticipated that the SOX Act would limit earnings management and enhance financial statement information quality. This work focuses on the role of the Act in constraining earnings management and hypothesizes that earnings management should prove to be far less pervasive as a result of the implementation of the SOX Act. If the SOX Act really improved the financial disclosure accuracy, this study predicts that earnings management would reduce following the introduction of the Act.

Burgstahler and Dichev (1997) find that when firms face slight decrease or negative pre-management earnings, executives tend to manage earnings upwards to avoid earnings decreases and losses. This work thus further explores whether the SOX Act has introduced processes that can effectively reduce the incidence of earnings management in cases where firms have undesirable performance and the incentives for earnings manipulation are high. Earnings management is not restricted solely to income-increasing behavior; for example, managers may be unwilling to report substantial gains in earnings because they instinctively know that this will increase their future performance targets. Consequently, firms with either extremely high or unwillingly low pre-managed earnings may have incentives to manage earnings downward.

On the basis of the above discussion, this study predicts that executives tend to manage earnings upward (downward) when facing extremely low (high) pre-managed earnings and performing earnings manipulation. However, manage earnings upward or downward is what the SOX Act wants to restrict to. The SOX Act aims to reduce firm incentives to conceal their real operating performance and may reduce earnings management for firms with undesirable pre-managed earnings.

This study tests the incentives for earnings management by comparing pre-managed earnings with target earnings levels and employs two objective benchmarks: (1) zero and (2) earnings reported in the previous year. If the SOX Act does have an association with current earnings management, the ability to detect such a relationship should be the greatest at close proximity to the threshold points. The research hypothesizes that the SOX Act really achieves the purpose of improving financial disclosure accuracy, even for firms with high incentives to manage earnings, and predicts that upward and downward

manipulation decline following the SOX Act. We investigate that whether the SOX Act limits income-increasing (income-decreasing) earnings management when pre-managed earnings undershoot (significantly exceeds) these threshold points. Both upward and downward manipulations are explicitly examined. Because the benefits associated with overstating earnings exceed those associated with understating them, this study anticipates asymmetry with regard to upward and downward manipulations and thus hypothesizes that managerial incentives to increase earnings exceed their incentives to decrease them.

2. Data source and methodology

2.1. Measuring earnings management. This study mainly examines whether earnings management has declined following the implementation of the SOX Act. Although Bartov et al. (2000) and Shaw (2003) suggest that the cross-sectional version of the modified-Jones model is superior to its time-series counterpart, their tests evaluate the ability of discretionary accrual models to identify firms engaging in extreme forms of earnings management, under the caveat that the results may not be generalized to firms engaging in moderate levels of earnings management within “generally accepted accounting principles” (GAAP). This study aims to detect ear-

nings management in general firms observing GAAP, rather than in those engaging in excessive earnings fraud. Furthermore, the cross-sectional version of the modified-Jones model, which focuses on comparing discretionary accruals within the same industry period, does not match the overall objectives of this investigation. For example, large earnings management proxy of the cross-sectional version indicates that a firm manages earnings more than other firms within the same industry period. If the proxy decreases during the next period, the accruals declines compared to other companies within the same industry period, but not compared to firm historical data. The hypotheses of this study call for direct measurement of managerial engagement in discretionary accruals related to historical performance of the firm, as well as the use of a time-series modified Jones model (Jones, 1991) to estimate the extent of earnings management by comparing abnormal accruals between different periods within individual firms.

To estimate “non-discretionary accruals”, this study regresses the accruals on the changes in revenues and the levels of property, plant and equipment and estimates the parameters of the following modified-Jones model, which is a time-series ordinary least squared (OLS) regression model:

$$\frac{Accruals_{i,t-s}}{TA_{i,t-s-1}} = \alpha_{i,t} \frac{1}{TA_{i,t-s-1}} + \beta_{i,t} \frac{\Delta Sales_{i,t-s}}{TA_{i,t-s-1}} + \gamma_{i,t} \frac{PPE_{i,t-s}}{TA_{i,t-s-1}} + \varepsilon_{i,t}, \quad (1)$$

$s = 1$ to 9 for each firm i in year t ,

where $Accruals_{i,t}$ denotes the total accruals for firm i in year t , measured as the net income before extraordinary items minus cash flow from operations; $\Delta Sales_{i,t}$ represents the change in sales for firm i in year t ; $PPE_{i,t}$ is gross property, plant and equipment in year t ; $TA_{i,t-1}$ denotes the book value of total assets for firm i from the previous year; and $\alpha_{i,t}$, $\beta_{i,t}$ and $\gamma_{i,t}$ are firm-specific parameters for sample year t . The regression equation

is deflated by lagged total assets to reduce heteroskedasticity. Following Dechow et al. (1995), firms with fewer than nine observations for parameter estimation are excluded from the sample.

The coefficient estimates from equation (1) are used to estimate the firm-specific non-discretionary accruals ($NDA_{i,t}$) for each firm:

$$NDA_{i,t} = \hat{\alpha}_{i,t} \frac{1}{TA_{i,t-1}} + \hat{\beta}_{i,t} \frac{(\Delta SALES_{i,t} - \Delta TR_{i,t})}{TA_{i,t-1}} + \hat{\gamma}_{i,t} \frac{PPE_{i,t}}{TA_{i,t-1}}, \quad (2)$$

where $\hat{\alpha}_{i,t}$, $\hat{\beta}_{i,t}$ and $\hat{\gamma}_{i,t}$ are OLS estimates for the regression parameters in equation (1), and $\Delta TR_{i,t}$ denotes the change in trade receivables, subtracted to permit the possibility of credit sales management by the company (Dechow et al., 1995). Discretionary accruals ($DA_{i,t}$) is then the remaining portion of the total accruals:

$$DA_{i,t} = \frac{Accruals_{i,t}}{TA_{i,t-1}} - NDA_{i,t}. \quad (3)$$

Accruals reverse over time, and the management of earnings either upwards or downwards are hypothesized to be earnings management. Following Leuz et

al. (2003), the hypothesis of this study does not rely on the direction of the discretionary accruals, but rather on the magnitude; thus, the test statistics are based on the value of the “absolute discretionary accruals” (ADA). In order to eliminate operational variation, which can cause unreasonable variations in total accruals, firms with $ADA > 1$ are excluded from the sample¹.

¹ $ADA > 1$ means the accounting discretionary accruals is greater than firm's lagged total assets and is supposed to be unreasonable. There are 22 firm-years in such case during the sample period. This study also considered the criteria 0.9 and 0.8; however, these alternative limits produced qualitatively similar results.

Recent studies focus on the effect of individual firm behavior on earnings management and compare accruals within a single industry period. In contrast, this work focuses on the general effect of the SOX Act on the US business environment. If the substantive reforms associated with the Act in 2002 have improved the reliability of financial reporting and reduced discretionary accruals while maintaining non-discretionary accruals, the dependent variables (total accruals) in equation (1) will be decreased while the independent variables maintain their usual level. The estimated parameters in equation (1) may automatically be diminished and the estimated $NDA_{i,t}$ in equation (2) might also be underestimated. This violates the assumption of this investigation that non-discretionary accruals are holding out. As a result, discretionary accruals ($DA_{i,t}$) may exhibit estimation error. Any error in estimating non-discretionary accruals will lead to equal error in estimating discretionary accruals, possibly causing an assumed relationship of earnings management between the pre- and post-SOX Act periods. In the untabulated sensitivity test, this study also adopts the cross-sectional modified Jones model to estimate discretionary accruals and obtain similar results. However, owing to possible error, this study still features in time-series version of the modified Jones model.

2.2. Data and sample selection. To some extent, earnings management is an overall accounting arrangement, and time is required for adjustments to discretionary accruals to feed through. If managers manipulate earnings, the effects of such manipulation will ultimately unwind and eventually be reversed at the same amount, albeit coming into play during subsequent years. On the implementation of the SOX Act, accounting officers would have needed time to react to the change in the accounting

environment. This study thus adopts a pre-SOX sample period comprising 1999 to 2001 to ensure a sufficiently large sample, as well as a post-SOX sample period covering 2002-2004.

The data was obtained from the COMPUSTAT database for the period of 1989-2004 to obtain finance data to estimate earnings management proxy. Sample firms must have all of the necessary related financial data. This restriction introduces a survivorship bias to the sample resulting from larger and more successful entrepreneurs. Firms closed during the sample period are excluded from the sample. Many of these firms may confront financial difficulty before termination and attempt to manage earnings aggressively, and therefore the earnings management measures of these firms may be much larger than those of other firms and become the extremely values of the sample. We expect that this survivorship bias reduces the variation in earnings management measures, making it a conservative test of the research question.

Banks and financial institutions (SIC codes 6000-6999) were excluded from the sample because of their different accrual procedures. To control for the possible influence of extreme observations, this study winsorizes all observations below the 1st and above the 99th percentile of observations. After implementing these filters, the sample comprises 1,149 firms (6,894 firm-years) with the presence of 66 separate two-digit SIC codes, indicating a particularly wide selection of industries.

2.3. The models. This study first tests the impact of the SOX Act on the pervasiveness of earnings management by estimating the following pooled OLS regression:

$$ADA_{i,t} = \beta_0 + \beta_1 SOX_{i,t} + \beta_2 ROA_{i,t} + \beta_3 LTA_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 MB_{i,t} + \beta_6 OPP_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $ADA_{i,t}$ is the proxy of earnings management explained above, and $SOX_{i,t}$ is a dummy variable that equals to 1 for all post-SOX periods, otherwise 0.

If earnings management becomes less pervasive after the implementation of the SOX Act, this study predicts that the SOX coefficient will be significantly negative. Equation (4) also includes proxies for other factors that might affect earnings manipulation.

In many companies, the stock price and managers' compensation are tied to earnings performance, this may motivate managers to engage in earnings manipulation. A positive relationship between discretionary accruals and firm profitability is found by Lee et al. (2006); however, a negative relationship is also found by Chung et al. (2009). Following that, this study adopts return on assets (ROA) as a proxy to capture firm performance but no direction is predicted.

Managers of large firms may have greater incentives to manipulate earnings in order to reduce costs; on the other hand, since they are actively followed by outside capital markets, such firms may be less able to hide earnings management behavior. This study thus uses the logarithm of total assets (LTA) as a proxy to capture firm size and information environment; however, no direction is predicted.

Given that it is much more difficult to scrutinize the activities of rapidly-growing firms, it is much easier for rapidly-growing firms to manage their earnings than slower-growing firms. Dechow et al. (1996) demonstrate that firms which are alleged to have violated GAAP by overstating their reported earnings have higher market-to-book ratios vis-à-vis a control group, and suggest that investors expect these firms to have higher growth opportunities.

Park and Shin (2004) also find earnings management to be positively correlated with firm growth opportunities. Although market-to-book ratio and sales growth both measure firm growth opportunities, there is little difference between them. For firms considered to have high profit growth in the near future, while their realized revenue does not increase, their market-to-book ratio indicates high revenue growth. This study thus measures the current and future growth opportunities using net revenue growth (*GROWTH*) and market-to-book ratio (*MB*), respectively. The estimated coefficients of the control variable for *GROWTH* and *MB* are positive.

Burgstahler and Dichev (1997) also argue that firms with high levels of current assets and current liabilities were likely to find it relatively cheaper to manage earnings; this variable is termed “manipulation

opportunity” (*OPP*) and calculated as follows: current assets plus current liabilities less cash at the end of year $t - 1$, scaled by lagged assets. This study predicts that the estimated coefficient for *OPP* is positive.

Next, this study attempts to isolate incentives for earnings management by comparing pre-managed earnings and target earnings. To avoid the “backing-out” problem (Peasnell et al., 2005), this work uses cash flow from operations as the instrument for pre-managed earnings ($PME_{i,t}$). This work investigates whether the introduction of the SOX Act influenced the likelihood of upward (downward) earnings management when $PME_{i,t}$ under-shoots (considerably exceeds) the targets, by separately estimating the following pooled OLS regression for both earnings thresholds:

$$DA_{i,t} = \beta_0 + \beta_1 BELOW_{i,t} + \beta_2 HIGH_{i,t} + \beta_3 SOX_{i,t} + \beta_4 SOX_{i,t} \times BELOW_{i,t} + \beta_5 SOX_{i,t} \times HIGH_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LTA_{i,t} + \beta_8 GROWTH_{i,t} + \beta_9 BM_{i,t} + \beta_{10} OPP_{i,t} + \varepsilon_{i,t}. \quad (5)$$

The absolute value of discretionary accruals (*ADA*) does not contain the information on upward or downward manipulation of reported earnings investigated in equation (5). This study thus uses the original discretionary accruals proxy, $DA_{i,t}$, for this test. $HIGH_{i,t}$ and $BELOW_{i,t}$ are dummy variables. Equation (5) has two benchmarks: zero and reported earnings for the previous year ($EARN_{i,t-1}$). Therefore, both $HIGH_{i,t}$ and $BELOW_{i,t}$ have two definitions:

1. For the regressions where pre-managed earnings ($PME_{i,t}$) is benchmarked against zero, $HIGH_{i,t}$ is 1 if

$PME_{i,t}$ scaled by total assets $\left(\frac{PME_{i,t}}{Total\ assets_{i,t}} \right)$ for

firm i in period t exceeds the 3rd quartile of the distribution of positive $PME_{i,t}$ scaled by total assets

$\left(\frac{PME_{i,t}}{Total\ assets_{i,t}} \right)$ in the industry, and 0 otherwise.

Meanwhile, $BELOW_{i,t}$ takes the value 1 if $PME_{i,t}$ is negative, and 0 otherwise.

2. For the regressions where $PME_{i,t}$ is benchmarked against $EARN_{i,t-1}$, this study defines $HIGH_{i,t}$ as 1 if $PME_{i,t}$ minus $EARN_{i,t-1}$, scaled by total assets

$\left(\frac{PME_{i,t} - EARN_{i,t-1}}{Total\ assets_{i,t}} \right)$ for firm i in period t , exceeds

the 3rd quartile of the distribution of positive pre-managed earnings changes $\left(\frac{PME_{i,t} - EARN_{i,t-1}}{Total\ assets_{i,t}} \right)$ in

the industry, and otherwise as 0. Meanwhile, $BELOW_{i,t}$ takes a value of 1 if $PME_{i,t} < EARN_{i,t-1}$, and 0 otherwise.

If firms really manage earnings upward (downward) when pre-management earnings are extremely low (high), the coefficient of $BELOW_{i,t}$ ($HIGH_{i,t}$) would be significantly positive (negative). Moreover, if the Act successfully improves financial disclosure accuracy, then even for firms with strong incentives to manage earnings, this study predicts that upwards and downwards manipulation would be declined after the introduction of the SOX Act and the coefficient of $SOX_{i,t} \times BELOW_{i,t}$ ($SOX_{i,t} \times HIGH_{i,t}$) would be significantly negative (positive).

3. Empirical results

3.1. Descriptive statistics. Table 1 lists the summary statistics for the absolute value of discretionary accruals (*ADA*) and other financial variables, with Panel A including the descriptive statistics for the entire sample, and Panels B and C respectively listing the descriptive statistics for the pre- and post-SOX periods. Consistent with Cohen et al. (2008), *ADA* represents approximately 7.44 percent of total assets, and ranges between 97.9 percent and 0.0004 percent, whilst the mean absolute discretionary accruals are 7.95 percent of total assets for the pre-SOX period, and 6.92 percent of total assets for the post-SOX period.

In general, the firm characteristics of the two periods appear to be different. To test this, we perform t-tests and Wilcoxon rank sum tests (two-tailed) of the equality of the variables. The test results find that the earnings management degree of the pre-SOX observations significantly exceed their post-SOX counterparts at the 1 percent level and initially verify that earnings management declined

after the enforcement of the SOX Act. It also shows that companies of the post-SOX period has significantly larger firm size (*LTA*) and has a significantly smaller profitability (*ROA*), revenue growth (*GROWTH*), market-to-book ratio (*MB*) and earnings manipulation opportunity (*OPP*). It might be because firm grows up over the years, and the firm size becomes larger. In addition, the SOX Act and other economic situations at that time make these variables structurally changed.

Pearson and Spearman correlation coefficients are conducted and listed in Table 2, thereby providing some basic analysis of the correlation between variables. The correlation coefficients reveal that *ADA* is negatively correlated with profitability (*ROA*), firm size (*LTA*) and revenue growth (*GROWTH*), and positively correlated with market-to-book ratio (*MB*) and manipulation opportunity (*OPP*). In some degree, it initially fits in with the estimated relationship between earnings management and controlled variables.

Table 1. Descriptive statistics of the variables

Variables ^a	Mean	Median	Max.	Min.
Panel A. Total sample (6,894 firm-years) ^b				
<i>ADA</i> (%)	7.442	4.647	97.999	4×10^{-4}
<i>ROA</i> (%)	3.188	4.293	61.926	-125.609
<i>LTA</i>	5.987	6.140	10.733	-0.248
<i>GROWTH</i>	0.089	0.064	2.921	-0.778
<i>MB</i>	2.591	1.831	34.146	-20.305
<i>OPP</i>	0.594	0.578	4.212	0.042
Panel B. Pre-SOX sample (3,447 firm-years) ^c				
<i>ADA</i> (%)	7.955	4.997	97.999	4×10^{-4}
<i>ROA</i> (%)	3.536	4.555	61.926	-125.609
<i>LTA</i>	5.918	6.043	10.477	0.028
<i>GROWTH</i>	0.101	0.063	2.921	-0.737
<i>MB</i>	2.728	1.762	34.129	-12.921
<i>OPP</i>	0.611	0.603	1.722	0.042
Panel C. Post-SOX sample (3,447 firm-years) ^c				
<i>ADA</i> (%)	6.929	4.359	94.432	0.002
<i>ROA</i> (%)	2.840	4.063	61.345	-99.708
<i>LTA</i>	6.055	6.237	10.733	-0.248
<i>GROWTH</i>	0.077	0.064	1.796	-0.778
<i>MB</i>	2.452	1.881	34.146	-20.305
<i>OPP</i>	0.577	0.555	4.212	0.052

Notes: ^a *ADA* is the absolute value of the time-series version of the modified Jones model of discretionary accruals; *ROA* is the return on assets; *LTA* represents the natural log of total assets at the end of the year; *GROWTH* refers to net revenue growth; *MB* is the market-to-book ratio; *OPP* is the current assets plus current liabilities less cash at the end of year $t-1$ scaled by lagged assets. ^b The total sample comprises of 1,149 listed firms (6,894 firm-year observations) covering the period from 1999 to 2004. ^c The pre-SOX sub-sample contains observations for the period of 1999-2001, whilst the post-SOX sub-sample contains observations for the period of 2002-2004.

Table 2. Correlation coefficients ^{ac}

Variables ^b	<i>ADA</i>		<i>ROA</i>		<i>LTA</i>		<i>GROWTH</i>		<i>MB</i>		<i>OPP</i>	
<i>ADA</i>			-0.228	***	-0.259	***	0.015		0.039	***	0.188	***
<i>ROA</i>	-0.127	***			0.231	***	0.248	***	0.077	***	-0.007	
<i>LTA</i>	-0.270	***	0.152	***			0.055	***	0.148	***	-0.217	***
<i>GROWTH</i>	-0.048	***	0.358	***	0.096	***			0.130	***	-0.074	***
<i>MB</i>	-0.050	*	0.415	***	0.300	***	0.260	***			-0.017	
<i>OPP</i>	0.212	***	0.050	***	-0.201	***	-0.060	***	-0.046	***		

Notes: ^a The sample comprises of 1,149 listed firms (6,894 firm-year observations) covering the period of 1999-2004. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level (two-tail test). ^b *ADA* is the absolute value of the time-series version of the modified Jones model of discretionary accruals; *ROA* is the return on assets; *LTA* represents the natural log of total assets at the end of the year; *GROWTH* refers to net revenue growth; *MB* is the market-to-book ratio; *OPP* is the current assets plus current liabilities less cash at the end of year $t-1$ scaled by lagged assets. ^c Pearson correlations are presented below the diagonal and Spearman correlations are presented above the diagonal.

3.2. Effects of the SOX Act. 3.2.1. *Test of earnings management surrounding the SOX Act.* The effects of the SOX Act vary with firm size (Chhaochharia

and Grinstein, 2007). To test whether the SOX Act works well on earnings management for both large firms and small firms, this study thus sorts the 1,149

sample firms by total assets in the year 1999 into four quartiles, and labels the quartile of firms with the largest (smallest) total assets as the “large” (“small”) firms. Both the “large” and “small” sub-samples contain 287 firms (1,722 firm-years). The regression results of equation (4), for all, large and small firms, are presented in Table 3.

The variance inflation factors (VIFs) measure the extent to which multicollinearity exists in the selected explanatory variables. The VIFs of all the independent variables are below 2, indicating that the multicollinearity problem does not exist. This study also follows the regression diagnostic suggested by Belsley et al. (1980) to explore the collinearity of the independent variables and compute the condition indexes (*CI*). The largest *CI* in the empirical results presented in this study was 10.30,

well below the rule of thumb of $CI = 30$. Consequently, the above results indicate that the high collinearity problem does not exist¹.

The significantly negative coefficient estimate on *SOX* of total sample in Table 3 is consistent with the hypothesis that the passage of the SOX Act is associated with reduced earnings management and is insensitive to the inclusion of control variables designed to measure other aspects of firm governance structures. Consistent with prior studies (Park and Shin, 2004; and Burgstahler et al., 2006), this study finds that greater earnings management may be associated with poor profitability, small size or rapid growth. The coefficient on *OPP* is significantly positive, suggesting that firms with greater current assets and current liabilities have higher levels of absolute discretionary accruals.

Table 3. OLS regression results of the absolute discretionary accruals on the passage of SOX^a

Variables ^c	Predicted sign	Total sample			Large firms			Small firms		
		Coefficient		t-value ^b	Coefficient		t-value ^b	Coefficient		t-value ^b
Intercept	+/-	9.456	***	19.96	8.132	***	4.36	9.218	***	7.13
<i>SOX</i>	-	-0.755	***	-3.80	-0.757	***	-2.55	-1.391	***	-2.55
<i>ROA</i> (%)	+/-	-0.164	***	-8.43	-0.219	***	-3.63	-0.123	***	-4.54
<i>LTA</i>	+/-	-0.775	***	-13.90	-0.479	**	-2.33	-0.462		-1.46
<i>GROWTH</i>	+	2.688	***	3.62	2.423	**	2.01	1.895		1.27
<i>MB</i>	+	0.226	***	4.18	0.355	***	3.84	0.205	**	2.10
<i>OPP</i>	+	4.554	***	11.13	2.474	***	3.49	4.895	***	5.80
<i>F</i> value		175.30			19.46			20.69		
Adj. R ² (%)		13.25			6.37			6.75		
Total No. of firm-years ^b		6,894			1,722			1,722		

Notes: ^a We report one-tailed tests for the variables with predicted signs; two-tailed for those with no prediction. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level. ^b All *t*-values of coefficient are calculated using White (1980) robust standard errors to correct for heteroscedasticity. ^c *ADA* is the absolute value of the time-series version of the modified Jones model of discretionary accruals; *ROA* is the return on assets; *LTA* represents the natural log of total assets at the end of the year; *GROWTH* refers to net revenue growth; *MB* is the market-to-book ratio; *OPP* is the current assets plus current liabilities less cash at the end of year *t*-1 scaled by lagged assets.

In Table 3, the coefficients of *SOX* of both large and small firms are significantly negative, which means that the degree of earnings management is reduced after the implementation of the SOX Act. The earnings management proxies for large firms (5.80 and 4.70 percent for pre- and post-SOX, respectively) are, on the whole, less than those for small firms (11.97 and 10.33 percent for pre- and post-SOX, respectively). A similar case is also shown in Teoh et al. (1998), with the smallest absolute discretionary current accruals quartile tending to contain larger firms. Untabulated regression is performed to test if the impact of the SOX Act on earnings management of the large firms is different from which of the small firms. However, no evidence shows that size effect exists. The effect of the Act on improving financial transparency is both for small firms and large ones, essentially because the SOX Act comes into force for all listed firms.

3.2.2. Beating the benchmarks. Our basic model for capturing the impact of the SOX Act on abnormal accrual activity is provided by equation (5), from which we conduct three tests of accruals management around the benchmark zero and prior earnings. The results are reported in Table 4 and Table 5, respectively. The first test (T11 in Table 4 and T21 in Table 5) considers all observations to investigate whether firms manage their earnings upwards (downwards) when pre-management earnings are pretty low (high). This test reveals the positive (negative) and significant coefficient estimates on *BELOW* (*HIGH*) in T11 and T21.

¹ Belsley et al. (1980) propose that a *CI* of 30 to 100 indicates moderate to strong collinearity.

Table 4. OLS regression results of the discretionary accruals on the passage of SOX, testing earnings against the benchmark zero^a

Variables ^b	Predicted sign	(T11) All observations			(T12) All observations without those with PME < last period earnings			(T13) Observations where prior period earnings failed to meet zero		
		Coefficient		t-value ^c	Coefficient		t-value ^c	Coefficient		t-value ^c
Intercept		-1.717	***	2.89	-1.719	***	-2.74	0.218		0.13
BELOW	+	8.949	***	11.74	8.580	***	5.93	6.606	***	4.59
HIGH	-	-6.579	***	-15.54	-6.054	***	-13.81	-7.162	***	-4.34
SOX	-	0.790		2.86	0.853		2.87	0.345		0.39
SOX × BELOW	-	0.142		0.13	2.093		1.11	1.707		0.96
SOX × HIGH	+	1.562	***	2.89	1.469	***	2.66	1.363		0.66
ROA (%)	+/-	0.641	***	24.52	0.619	***	19.91	0.720	***	14.56
LTA	+/-	0.010		0.16	0.050		0.69	0.044		0.26
GROWTH	+	-3.786		-2.43	-4.140		-2.23	-3.002		-1.86
MB	+	-0.093		-1.42	-0.099		-1.39	-0.156		-1.09
OPP	+	-1.234		-2.49	-2.185		-3.95	-0.016		-0.01
F value		183.90			134.15			47.97		
Adj. R ² (%)		22.13			20.14			25.86		
Total Obs. of firm-years		6,480			5,329			1,386		
Obs. where BELOW = 1		620			224			305		
Obs. where HIGH = 1		1,470			1,430			172		

Notes: ^a We report one-tailed tests for the variables with predicted signs; two-tailed for those with no prediction. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level. ^b *DA* is the value of the time-series modified-Jones model of discretionary accruals; *SOX* is a dummy variable which is equal to 1 for all post-SOX periods, otherwise 0; *BELOW* is an indicator variable taking the value of 1 if pre-managed earnings (proxied by operating cash flow) are below zero (otherwise 0); *HIGH* is an indicator variable taking the value of 1 if pre-managed earnings (proxied by operating cash flow) exceed zero by a large margin (otherwise 0); *ROA* is the return on assets; *LTA* represents the natural log of total assets at the end of the year; *GROWTH* refers to net revenue growth; *MB* is the market-to-book ratio; *OPP* is the current assets plus current liabilities less cash at the end of year *t*-1 scaled by lagged assets. ^c All *t*-value of coefficient are calculated using White (1980) robust standard errors to correct for heteroscedasticity.

Table 5. OLS regression results of the discretionary accruals on the passage of SOX, testing benchmark prior-period earnings^a

Variables ^b	Predicted sign	(T21) All observations			(T22) All observations without those with PME < zero			(T23) Observations where prior period earnings failed to meet the benchmark		
		Coefficient		t-value ^c	Coefficient		t-value ^c	Coefficient		t-value ^c
Intercept		-2.555	***	-4.34	-3.007	***	-5.1	-1.189		-1.33
BELOW	+	5.068	***	10.24	3.194	***	6.09	5.267	***	5.82
HIGH	-	-1.022	**	-1.84	-1.308	***	-2.37	0.104		0.13
SOX	-	1.143		4.33	1.003		3.86	0.451		1.07
SOX × BELOW	-	0.127		0.18	0.698		0.93	0.442		0.35
SOX × HIGH	+	1.358	**	1.82	1.201	**	1.66	0.589		0.58
ROA(%)	+/-	0.461	***	19.52	0.503	***	17.98	0.497	***	13.31
LTA	+/-	-0.040		-0.58	0.098		1.39	-0.041		-0.40
GROWTH	+	-1.968		-2.27	-2.532		-2.75	-2.850		-2.20
MB	+	-0.148		-2.16	-0.235		-3.46	-0.113		-1.11
OPP	+	-0.695		-1.36	-1.653		3.10	-2.571		-3.11
F value		112.39			98.82			51.07		
Adj. R ² (%)		14.80			14.31			15.55		
Total Obs. of firm-years		6,480			5,860			2,784		
Obs. where BELOW = 1		1,151			755			343		
Obs. where HIGH = 1		1,359			1,273			814		

Notes: ^a We report one-tailed tests for the variables with predicted signs; two-tailed for those with no prediction. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level. ^b *DA* is the value of the time-series modified Jones model of discretionary accruals; *SOX* is a dummy variable which is equal to 1 for all post-SOX periods, otherwise 0; *BELOW* is the indicator variable taking the value of 1 if pre-managed earnings (proxied by operating cash flow) are below zero (otherwise 0); *HIGH* is an indicator variable taking the value of 1 if pre-managed earnings (proxied by operating cash flow) exceed prior-period earnings by a large margin (otherwise 0). ^c All *t*-value of coefficient are calculated using White (1980) robust standard errors to correct for heteroscedasticity.

The results are consistent with the prediction that managers manipulate earnings upwards (downwards) when pre-managed earnings are less than benchmarks (significantly exceed benchmarks). The estimated coefficient for the interaction term $SOX \times BELOW$ is not significant at conventional levels, which suggests no evidence of firms with poor pre-managed earnings reducing their income-increasing earnings manipulation with the enforcement of the SOX Act. In contrast, the estimated coefficients on the $SOX \times HIGH$ interaction term are positive and significant, suggesting that income-decreasing earnings management behavior is reduced after the introduction of the SOX Act.

The above test of all observations might be confounded by manager attempts to meet another benchmark. For example, T11 is designed to test whether firms manage their earnings upwards (downwards) when pre-management earnings against the benchmark 'zero' are very low (high). The test results might be confounded by firms with pre-management earnings failing to achieve another benchmark 'prior-period earnings'. To account for such potential confounding, this study excludes observations where pre-managed earnings (PME) are below prior-period earnings in the second test T12 in Table 4. Similarly, this study excludes observations where pre-managed earnings (PME) are below zero in T22 in Table 5. The results listed in T12 and T22 are consistent with the first estimation, the coefficients on $BELOW$ ($HIGH$) are significantly positive (negative), with the coefficient on $SOX \times BELOW$ being insignificant, whilst the $SOX \times HIGH$ interaction term is positive and significant.

Burgstahler and Dichev (1997) demonstrate that incentives to avoid losses or reduced earnings increase when firms fail to meet the benchmarks in the prior period. Therefore, in the third test (T13) listed in Table 4, this study explores the impact of the SOX Act on firm earnings management following a period of negative earnings, and focuses on those observations with poor prior-period earnings. Identically, this study examines the impact of the SOX on the extent of earnings man-

agement by firms following a period of earnings decreases in T23 in Table 5. The results show that the coefficients on both $SOX_{it} \times BELOW_{it}$ and $SOX_{it} \times HIGH_{it}$ are insignificant and suggest that for firms with poor prior earnings, there was no evidence to show that the manipulation of earnings had been constrained by the SOX Act.

According to Tables 4 and 5, the coefficients of $SOX_{it} \times BELOW_{it}$ are all insignificant, while several coefficients of $SOX_{it} \times HIGH_{it}$ are significantly positive. These figures prove the prediction that the effect of diminishing earnings manipulation for firms with abnormally low pre-managed earnings may be less than that for firms with abnormally high pre-managed earnings after the SOX Act.

Conclusion

The purpose of the SOX Act was to reinforce corporate governance and reduce the likelihood of misstatements. To the extent that earnings manipulation imposes costs on market participants, this study predicts that the SOX Act should aim to constrain such management. The empirical results suggest that the pervasiveness of earnings manipulation has significant reductions after the SOX Act. This study also finds that firms with high pre-managed earnings had reduced their income-decreasing earnings management behavior after the SOX Act. In contrast, we find no evidence to suggest that the SOX Act has constrained income-increasing manipulation for firms with poor pre-managed earnings. Finally, we find no evidence to show that the SOX Act has reduced the upward or downward earnings management of those firms with greater pressure to present positive and/or increased profits. It might imply that firms tend to manage earnings upward (downward) when the pre-managed earning is extraordinarily poor (good). Thus, after the enforcement of the Act, the firms with poor pre-managed earning still tend to engage in income-increasing behavior while the firms with good pre-managed earnings desist from income-decreasing.

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