Camouflaged Earnings Management*

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Abstract

In recent years, there has been increased scrutiny of financial reporting and greater analysts and investors attention to indicators of potential earnings management, in particular, to cash and accruals relative to earnings and revenues. We assert that, in response, firms have increased their focus on cash management aimed at aligning these variables, which has resulted in camouflaged earnings management. Analytically, we develop indicators of camouflaged earnings management and use them empirically to test whether the alignment of cash and earnings has intensified following the legislation of the Sarbanes-Oxley Act. The empirical results are all in line with, and reinforce, our assertion. This suggests that any comprehensive investigation of earnings management should also consider the option of camouflaging.

Camouflaged Earnings Management

1. Introduction

The practice of earnings management has been discussed and documented extensively in both the academic and practitioner's literatures. The academic literature has studied earnings management through the manipulation of discretionary accruals (e.g., Jones [1991], Dechow, Sloan, and Sweeny [1995], Dechow and Dichev [2002], Kothari, Leone, and Wasley [2005], Daniel, Dennis and Naveen [2008], Dechow, Hutton, Kim, and Sloan [2010]), real transactions (e.g., Bartov [1993], Gunny [2009], Graham, Harvey, and Rajgopal [2005], Roychowdhury [2006]), or both (e.g., Zhang [2006], Cohen, Dey, and Lys [2008], Fairfield, Pinkowitz, and Tang [2008], Bartov and Cohen [2009], Cohen and Zarowin [2010]).[1] Two related indicators of earnings management, frequently referred to, are: (i) cash does not follow earnings and/or revenues (see, for example, Dechow, Kothari, and Watts [1998], Roychowdhury [2006], Call [2008]), and (ii) accruals do not correspond to earnings and/or revenues (see, for example, Jones [1991], Dechow et al. [1995], Kothari et al. [2005], Daniel et al. [2008]).

Following the highly publicized corporate failures of 2001-2002 and the subsequent passage of the Sarbanes-Oxley Act (SOX), financial reporting has fallen under greater scrutiny (e.g., Lobo and Zhou [2006], Cohen et al. [2008]). Consequently, an important strand of literature has emerged examining the impact of this stricter enforcement of regulations on the practice of earnings management (e.g., Cohen et al. [2008], Koh, Matsumoto, and Rajgopal [2008], Bartov and Cohen [2009], Cohen and Zarowin [2010]). This literature argues that, post-SOX, firms have faced stronger incentives to avoid the detection of earnings management due to the higher-quality audit reports and the higher

[1] Earnings management typically has a negative connotation, though, in certain cases, it might be an activity that is rewarded by investors. A special case of earnings management is income smoothing; some practices of income smoothing have been argued to be desirable (see, for example, Dye [1988], Fudenberg and Tirole [1995], Kirschenheiter and Melumad [2002], Tucker and Zarowin [2006]).

cost of detected earnings management. The general conclusion is that following SOX firms have switched from earnings management through accruals manipulation to the costlier earnings management through real activities because the latter is more difficult to detect.

If indeed the incentives to avoid detection of earnings management have increased post-SOX, then another available option (in addition to switching to real earnings management) is the masking of earnings management by assuring that: (i) changes in operating cash flows closely follow changes in earnings/revenues, and (ii) accruals are closely associated with changes in earnings/revenues. One means of achieving that is the conversion of accruals into cash to mimic the cash and accruals impact of a true sales increase or expense decrease.[2] We label such activity as accruals conversion (AC) cash management.

Of course, prudent cash management and, in particular, the alignment of cash and earnings are also common management practices. Such activities may be an appropriate response to the significant changes in the economic environment during the period considered (including the burst of the internet bubble, the higher frequency of losses for public firms, the attacks of September 11, and the world-wide recession), rather than an address of market concerns regarding the quality of reported earnings. Further, in recent years, investors have assigned greater weight on cash and thus created a stronger incentive for firms to manage cash (see, for example, DeFond and Hung [2003], Call [2008], Call, Chen, and Tong [2009], Lee [2009], Frankel, Levi, and

[2] For ease of discussion and analysis we consider earnings-increasing earnings management and the accompanying cash management of converting accruals into cash. It is important to note that our discussion is equally applicable to earning-decreasing earnings management; in that case the accompanying cash management converts cash into accruals.

Shalev [2010]).[3] Even so, such increased cash management activities may (intentionally or unintentionally) affect the indicators of earnings management and decrease its transparency.

In this paper, we assert that, in response to increased scrutiny and greater attention to cash versus earnings, firms increase their focus on cash management. The corporate failures of 2001/2002 and the subsequent SOX have resulted in much greater scrutiny of financial disclosures compared with earlier periods. As such, SOX constitutes an appealing means of testing our assertion. Specifically, our research hypothesis is that, post-SOX, firms have increased AC cash management aimed at aligning cash with earnings, resulting in camouflaged earnings management.

An example of an AC cash management transaction is the factoring of receivables (also securitization and discounting). Examining factoring of receivables is appealing because it is a transaction regularly used by many firms (e.g., Klapper [2006], Levi [2010]). Prior studies have only occasionally discussed the impact of factoring/ securitization on the transparency of earnings management. McNichols [2000] points out that firms factoring/securitizing receivables end up having a lower estimate of discretionary accruals; Melumad and Nissim [2008] note that factoring/securitizing receivables reduces the information on revenue management implicit in the receivables to sales ratio.[4] Interestingly, the potential use of factoring receivables to camouflage earnings management was noted more than 15 years ago in a BusinessWeek article on Baush & Lomb.[5]

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[3] McInnis and Collins [2010] further argue that analysts' cash flow forecasts increase the transparency and costs of accrual manipulations. Givoly, Hayn, and Lehavy (2009) offer an opposite perspective and argue that analysts' cash flow forecasts are a straightforward extension of their earnings forecasts.

[4] Dechow and Shakespeare [2009] and Dechow, Myers, and Shakespeare [2010] argue that the securitization of receivables serves as an earnings management tool.

[5] "According to internal B&L financial documents obtained by BusinessWeek ... B&L's internal financial documents clearly show the strain of efforts to pump up sales. Receivables rose about 25% in 1993 to hit $506 million. That equaled 90 days of sales, which accounting experts say is higher than the 45 to 60 days they'd expect. But in B&L's annual report, receivables were shown at just $385 million. Why? B&L

AC cash management is usually unobservable in the period performed. For example, firms exercise discretion on whether to disclose nonrecourse factoring activity (based on materiality). At times, some firms voluntarily disclose information about transactions involving AC cash management (especially when the amount involved is viewed as material). But such disclosure is not consistently applied and it usually involves aggregate information, making it difficult to determine the amount attributable to AC cash management. Revsine, Collins, and Johnson [2004] observe that "*The main issue [regarding factoring] is the level of disclosure in statement footnotes ... When the transfer is with recourse … SFAS No. 5 requires footnote disclosure of the contingent liability.* ***But there is no similar unequivocal disclosure requirement when receivables are sold without recourse*** *[emphasis in the original].*"[6] Even when there is a disclosure regarding factoring, it is only with respect to aggregate annual data without quarterly breakdown.

The unobservability of AC cash management leads us to analyze its observable delayed effect on financial performance. Specifically, we examine the forward variation of cash flow from operating activities relative to sales, the forward variation of normal accruals, and the forward variation of discretionary accruals. Normal and discretionary accruals are measured using the modified Jones model (Jones [1991] and Dechow et al. [1995]).

While earnings management coupled with AC cash management may be impossible to trace, we analytically illustrate that it increases the forward variation of cash to sales

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"factored" $105 million worth of receivables, selling them to a third party to raise cash. B&L argues this is a normal practice that doesn't require disclosure." (BusinessWeek, October 23, 1995).

[6]Anecdotal evidence of hiding factoring is the case of SEC V. Delphi: "From 2003 to 2004, Delphi hid up to $325 million in factoring, or sales of accounts receivable, in order to improperly boost non-GAAP pro forma measures of Delphi's financial performance that were relied upon by investors, analysts and rating agencies. Hiding this factoring allowed Delphi to overstate materially its 'Street Net Liquidity'… Delphi settled the charges, without admitting or denying the Commission's allegations." [Litigation Release No. 19891 (Oct. 30, 2006)]

and the forward variation of normal accruals, and decreases the forward variation of discretionary accruals. These three indicators later serve as proxies for AC cash management in our empirical analysis. Our analytical analysis includes three settings: (1) real earnings management through pulling in of sales, which impacts the level of (net) sales, (2) accrual-based earnings management through the manipulation of allowance of sales returns, which impacts the level of (net) sales, and (3) accrual-based earnings management through the manipulation of accrued liability, which impacts the level of expenses. For each of these three settings we present three scenarios: (a) a benchmark of a true improvement in earnings, (b) an earnings management scenario mimicking the benchmark's true improvement in earnings, and (c) the earnings management of Scenario 2, coupled with camouflaging earnings management through AC cash management. Then, for each setting, we compare Scenario (c) with Scenario (b), illustrating that earnings management coupled with AC cash management increases the forward variation of cash to sales and the forward variation of normal accruals, while it decreases the forward variation of discretionary accruals.

In our empirical analysis we use the above three proxies for AC cash management as the dependent variables. Similar to recent studies looking at the effect of SOX on earnings management, our primary explanatory variables include a trend variable, a scandal period indicator variable, and a post-SOX period indicator variable. We test our hypothesis using both pooled and time-series regressions. Running firm-by-firm time-series regressions improves our ability to analyze the behavior of forward variation over time, because forward variation patterns (like earnings management and cash management) may vary across firms. The empirical results establish that both cash to sales forward variation and normal accruals forward variation have significantly increased post-SOX, while discretionary accruals forward variation has significantly

decreased post-SOX.[7] These results are all in line with, and support, our hypothesis that firms have increased their AC cash management post-SOX. We further examine our hypothesis using three subsamples of firms attempting to meet an earnings target, which prior literature has shown are more likely to engage in earnings management. These include firms attempting to avoid reporting an earnings loss, firms attempting to avoid reporting a negative change in earnings and firms attempting to meet or beat analyst forecasts.[8] To control for bad news, we examine sub-samples of firm-quarters with and without negative earnings and earnings decrease. Generally, the results for the different sub-samples are qualitatively the same as those for the full sample, reinforcing our assertion.

The main contributions of our study are as follows. We propose that on top of switching from accrual-based to real earnings management in response to SOX (as suggested by the extant literature), firms have also attempted to camouflage earnings management through AC cash management. We develop new proxies for AC cash management that we use to test our assertion. An important implication of our study is that a comprehensive investigation of earnings management (and not necessarily one with respect to SOX) should consider the possibility of camouflaged earnings management through cash management. Ignoring this option may amount to the omission of an important correlated variable, and thus could result in misleading inferences.

The remainder of the study is organized as follows: Section 2 presents the analytical analysis. Section 3 describes the empirical design. Section 4 discusses the sample and

[7] We also show that cash to sales forward variation has significantly decreased over the sample period with acceleration during the scandal period of 2001-2002. According to our analytical analysis, the decrease could be driven by earnings management activity, which is consistent with previous studies (e.g., Cohen et al. [2008] and Bartov and Cohen [2009]).

[8] For important criticism of that literature see Durtschi and Easton [2005, 2009].

provides descriptive statistics on the main variables. Section 5 presents and discusses the empirical results, while Section 6 concludes the study.

2. Analytical Analysis

We examine the impact of earnings management and cash management on key financial metrics by using the following parametric setting. Let S_{ij} denote the "normal" level of sales for month *j* of quarter *i*, (*j*=1,2,3 and *i*=1,2,3,4), and let $S_i \equiv S_{i1} + S_{i2} + S_{i3}$.[9] Unless otherwise noted, sales growth is assumed to be zero. Standard credit terms for both customers and vendors are 60 days. The firm holds an inventory level corresponding to next month's expected sales.[10] For simplicity, we assume the cost of goods sold (COGS) is variable, the selling, general and administrative expense (SG&A) is fixed, the firm has no property, plant, and equipment (PP&E) (e.g., all assets/facilities are rented/leased), there are no taxes, and income is distributed as dividend at year end.[11] Formally, we let *v* denote the (constant) COGS per dollar of sales and *F* denotes the total fixed SG&A.

From the above assumptions and notation it follows that the net income in quarter *i* (Q_i) is $NI_i = S_i(1-v) - F$. The change in NI in quarter *i* relative to the previous quarter is $\Delta NI_i = NI_i - NI_{i-1}$. Similarly, ΔREC_i, ΔINV_i and ΔPAY_i denote the (quarter-over-quarter) change in receivables, inventories and payables, respectively. Therefore, the total accrual in Q_i is $ACC_i = \Delta REC_i + \Delta INV_i - \Delta PAY_i$. The cash from operating activities is $CFO_i = NI_i - ACC_i$, while $\Delta CFO_i = CFO_i - CFO_{i-1}$. Following the accounting literature (e.g., Jones [1991] and Dechow et al. [1995]), we distinguish between Normal Accrual (NA) and Discretionary Accrual (DA), where

[9] That is, $S_{ij} = S_{km}$ and $S_i = S_k$ for all *i, j, k,* and *m*. The reason we maintain the subscript notation is to allow for easy reference to origin and consequence of changes in monthly sales.

[10] Our analysis immediately generalizes to alternative assumptions regarding the credit terms and inventory policy.

[11] We replicated the analysis of this section for the more general case that allows for PP&E, taxes, fixed manufacturing costs and increase in retained earnings. This complicates the notation considerably without affecting the qualitative insights.

$$\mathbf{NA} = \alpha_1 \frac{1}{Assets} + \alpha_2 \frac{\Delta Sales - \Delta REC}{Assets} + \alpha_3 \frac{PPE}{Assets}$$

$$\equiv \gamma + \alpha_2'(\Delta Sales - \Delta REC), \text{ where } \gamma \equiv \alpha_1 \frac{1}{Assets} + \alpha_3 \frac{PPE}{Assets} \text{ and } DA = ACC - NA.$$

We study three settings. The first setting considers *real earnings management through the pulling in of sales*. The second setting examines *accrual based earnings management through the manipulation of allowance of sales returns*. Both types of manipulation impact the level of (net) sales. The third setting examines *accrual-based earnings management through the manipulation of accrued liability*. This type of manipulation impacts the level of expenses rather than the level of sales. For each setting we present three scenarios – (i) a benchmark of a <u>true</u> improvement in either sales or expenses, (ii) an earnings management scenario attempting to mimic the benchmark's true improvement in earnings, and (iii) a scenario involving the earnings management of scenario (ii) coupled with camouflaging of that earnings management using *accrual conversion (AC) cash management* (such as factoring of receivables).

2.1 SETTING 1 – REAL EARNINGS MANAGEMENT THROUGH THE PULLING IN OF SALES

We first consider the benchmark Scenario 1.1. We assume a one-time increase, δ, in Q1 sales. It is common knowledge that the sales increase is transitory and thus there is no increase in inventory.[12] This leads to an immediate increase in NI and a partial increase in CFO in Q1 and a delayed increase in CFO in Q2 (due to the assumed credit terms). We assume, without loss of generality, that the sales increase is uniform throughout the quarter. The impact of this sales increase on the different financial metrics is presented in detail in Setting Summary 1.1 below.

[Setting Summary 1.1 about here]

[12] Our analysis remains qualitatively unchanged when it is not common knowledge that the increase in sales is transitory and the inventory level changes.

In Scenario 1.2, the firm pulls in sales to Q1's third month from the first month of Q2 to increase sales and NI. We let β denote the percentage of S_{21} pulled into S_{13}. To mimic the true increase in sales and NI of Scenario 1.1, $\beta S_{21} = \delta$. For simplicity, we assume the increase in sales (above the "normal" S_1) comes out of inventory, and no change in production is necessary. We also assume the firm provides (extended) 90-day credit terms to those customers enticed into purchasing early.[13] The increase in Q1's sales and NI is offset by a similar decrease in next month's performance. By Q3, sales and NI return to normal levels. Note that this leads to increased variation in both sales and NI relative to the benchmark scenario, whereas the CFO level remains unchanged. Indeed, the discrepancy between the changes in NI and CFO is often viewed by the market as a red flag for potential earnings management and is sometimes used as a proxy for "earnings quality." Even more relevant for our study is the observation that the three-quarter forward variation ratio of CFO to sales decreases, and compared with Scenario 1.1, the forward variation of DA increases.[14] The impact of this sales manipulation on the different financial metrics is presented in detail in Setting Summary 1.2 below.

[Setting Summary 1.2 about here]

In Scenario 1.3, the firm attempts to mask its earnings management through AC cash management. For concreteness, we assume the firm factors receivables to replicate the cash impact of the true sales increase presented in Scenario 1.1.[15] Specifically, it pulls in βS_{21} and factors receivables in the amount of $\frac{1}{3}\beta S_{21}(1-v)$, replicating in Q1 the performance of a true transitory increase of βS_{21} in sales. As in Scenario 1.2, the increase

[13] To assess robustness, we examined a number of other variations including: (i) more generalized pull-in assumptions, (ii) a scenario of no inventory where any increase in sales requires increased production/ purchases, (iii) discounts for early purchases. The qualitative results remain the same.

[14] When comparing DA variations, we assume $\alpha_2' << 0.5$; previous studies (e.g., Dechow, Richardson, and Tuna [2003]) provide strong support for this assumption.

[15] Examining factoring of receivables is appealing because it is a transaction regularly used by many firms (see, for example, Klapper [2006], Levi [2010]). Our notion of AC cash management is in line with Lee [2009] timing-based cash management.

in Q1's sales and NI is offset by a similar decrease in next month's performance. Unlike Scenario 1.2, the CFO in Q1 replicates the CFO of the true sales increase of Scenario 1.1. Most importantly, the three-quarter forward variation ratio of CFO to sales substantially increases compared with Scenario 1.2 (and even compared with Scenario 1.1). Finally, there is an identifiable impact on the forward variation of DA and NA. The forward variation of DA decreases compared with Scenario 1.2, whereas the forward variation of NA increases due to the factoring. The impact that this combination of sales manipulation and factoring has on the different financial metrics is presented in Setting Summary 1.3.

[Setting Summary 1.3 about here]

2.2 SETTING 2 – ACCRUAL BASED EARNINGS MANAGEMENT THROUGH THE MANIPULATION OF ALLOWANCE OF SALES RETURNS

We have replicated the above analysis for the setting of *accrual based earnings management through the manipulation of allowance of sales returns*. The results are essentially identical to those reported for *real earnings management through the pulling in of sales* and are therefore not reported here.

2.3 SETTING 3 – ACCRUAL BASED EARNINGS MANAGEMENT THROUGH THE MANIPULATION OF ACCRUED LIABILITY

In the benchmark Scenario 3.1, we assume a one-time decrease, δ, in Q1's SG&A. This leads to an immediate increase in NI and CFO in Q1. Setting Summary 3.1 details the impact this expense decrease has on the different financial metrics.

[Setting Summary 3.1 about here]

In Scenario 3.2, the firm manipulates the provision to reduce SG&A and increase NI. We let δ denote the decrease in accrued liability and the related SG&A expense, leading to a δ increase in NI.[16] We further assume these changes reverse in the following

[16] To simplify notation, we include accrued liability in PAY.

quarter[17] and by Q3 expenses and NI return to their normal levels. This creates increased variation in expenses and NI relative to the benchmark scenario, whereas the CFO level remains unchanged. The forward variation of DA increases compared with the benchmark scenario. The effect this sales manipulation has on the different financial metrics is presented in detail in Setting Summary 3.2.

[Setting Summary 3.2 about here]

In Scenario 3.3, the firm attempts to camouflage its earnings management by factoring receivables to replicate the net cash impact of the true expense decrease of Scenario 3.1. Specifically, it factors the amount δ, replicating in Q1 the performance of a true transitory decrease δ in SG&A. As in Scenario 3.2, Q1's decrease in expenses and increase in NI reverses the following month. However, unlike Scenario 3.2, the CFO in Q1 replicates the Q1's CFO of the true expense decrease of Scenario 3.1. Most importantly, the three-quarter forward variation of CFO increases compared with Scenario 3.2 (and even compared with Scenario 3.1). As before, there is an identifiable impact on the variation of DA and NA. The forward variation of DA decreases compared with Scenario 3.2, whereas the forward variation of NA increases due to factoring. The combined impact of the SG&A manipulation and factoring on the different financial metrics is presented in detail in Setting Summary 3.3.

[Setting Summary 3.3 about here]

In our analysis, we examine AC cash management through factoring; however, any other type of timing-based cash management will yield the same results (e.g., current assets securitization, working capital management). While our discussion focuses on earnings-increasing earnings management and the accompanying cash management of

[17] This assumption is made solely for ease of exposition. Relaxing it has no qualitative impact on our results.

converting accruals into cash, our analysis and inferences apply equally to earning-decreasing earnings management (and the accompanying cash management of converting cash into accruals).

To summarize, our analytical analysis illustrates the effect of AC cash management on the three-quarter forward variation of cash to sales, normal accruals, and discretionary accruals. While earnings management coupled with AC cash management may be difficult to trace, this combined activity leads to an increase in cash-to-sales and normal accruals forward variation, and a decrease in discretionary accruals forward variation compared with engaging in earnings management alone without attempting to mask it. Note if cash management is performed without a parallel earnings management, then cash-to-sales forward variation will still rise but the discretionary accruals forward variation will increase rather than decrease. If accrual-based earnings management declines without a related change in cash management, cash-to-sales forward variation will remain unchanged rather than increase.

3. Empirical Design

Our main research hypothesis is that post-SOX firms have increased their use of AC cash management, resulting in camouflaged earnings management. However, AC cash management, designed to mimic real revenue-increasing (or expense-decreasing) transactions, is usually unobservable in the period performed. We therefore analyze the delayed effect of AC cash management on the forward variation of certain financial variables. Specifically, the analytical analysis detailed in Section 2 above examines the effect of AC cash management on: (i) the three-quarter cash-to-sales forward variation ratio (CTS), (ii) the three-quarter normal accruals forward variation [(FV(NA)], and (iii) the three-quarter discretionary accruals forward variation [(FV(DA)]. It establishes that AC cash management increases CTS and FV(NA) while decreasing FV(DA).

To examine whether AC cash management has indeed increased significantly post-SOX, we use our proxies for AC cash management [CTS, FV(NA) or FV(DA)] as the dependent variable in the regression analysis described below. In line with recent studies examining the effect of SOX on earnings management (e.g., Cohen et al. [2008]), we include as part of the explanatory variables a trend variable (TIME), a scandal period indicator variable (SCA) and a post-SOX period indicator variable (SOX). TIME is a trend variable equal to the difference between the current-year quarter and the first quarter of 1989. SCA is a dummy variable that takes on the value of 1 if the observation falls between the third quarter of 2001 and the second quarter of 2002, and zero otherwise. SOX is a dummy variable that equals 1 if the observation falls after the second quarter of 2002, and zero otherwise. The definition of the scandal and the post-SOX periods is consistent with Bartov and Cohen [2009], who also use quarterly data.[18]

In our robustness tests, we also examine our hypothesis using three earnings targets sub-samples: firms attempting to avoid earnings losses, firms attempting to avoid negative change in earnings, and a meet-or-beat analyst forecast sample. Prior studies argue that firms tend to manage earnings to meet these three earnings targets (see, for example, Burgstahler and Dichev [1997], Roychowdhury [2006]). We define (i) T1 as a dummy variable equal to 1 if quarterly earnings deflated by market capitalization of shareholders equity at prior quarter end is in the interval [0, 0.0025], and 0 otherwise; (ii) T2 as a dummy variable equal to 1 if the change in quarterly earnings deflated by market capitalization of shareholders equity at prior quarter end is in the interval [0, 0.0025], and 0 otherwise; and (iii) T3 as a dummy variable equal to 1 if the difference between actual earnings per share and consensus analyst forecast is in the interval [0, 0.01], and 0 otherwise.

[18] To test for robustness, we repeat our analysis without SCA as an explanatory variable. We also divide SOX into two sub-periods after the end of the second quarter of 2002. Results (not tabulated) are qualitatively the same.

3.1 FORWARD VARIATION RATIO OF CASH TO SALES

The first proxy we use for AC cash management is cash-to-sales forward variation ratio (CTS). We use the ratio of CFO forward variation to sales forward variation to capture the strong economic association between these two variables and to control for changes in the variation of CFO caused by changes in the variation of sales.[19] We define CTS as the three-quarter cash to sales forward variation ratio, CTS ≡ FCV(CFO)/FCV(sales), where FCV(CFO) is the three-quarter forward coefficient of variation (CV) of CFO; FCV(CFO)= FSTD(CFO)/Absolute[FMean(CFO)]; $FSTD(CFO)_t$= STD(CFO_t,CFO_{t+1},CFO_{t+2}); $FMean(CFO)_t$= Mean (CFO_t,CFO_{t+1},CFO_{t+2}). FCV(Sales) is the three-quarter forward coefficient of variation (CV) of sales and is measured similarly to FCV(CFO).

In addition to using TIME, SCA and SOX as explanatory variables, we control for earnings (IB), accruals (ACC), book-to-market ratio (BM), market value (LMV), and capital expenditures. IB is the three-quarter forward mean income before extraordinary items (IBXI); IB_t=Mean ($IBXI_t$,$IBXI_{t+1}$,$IBXI_{t+2}$). ACC is the three-quarter forward mean accruals to total assets; ACC_t =Mean ($Accruals_t$/Total $Assets_{t-1}$,$Accruals_{t+1}$/Total $Assets_t$,$Accruals_{t+2}$/Total $Assets_{t+1}$). BM is the three-quarter forward mean book-to-market ratio; BM_t =Mean (book-to-$market_t$, book-to-$market_{t+1}$, book-to-$market_{t+2}$). LMV is the log of the market value of common equity at quarter end. Control variables for industry-specific effects and quarter-specific effects are also included.[20]

The pooled regression model is:

$$CTS = \alpha_0 + \alpha_1 TIME + \alpha_2 SCA + \alpha_3 SOX + Control\ Variables + \varepsilon \qquad (1)$$

[19] See Huang [2009] and Albrecht and Richardson [1990].
[20] We control for potential industry-specific effects using Kenneth French's 12-industry classification: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

The analytical analysis shows that AC cash management increases CTS. Our hypothesis is that AC cash management has increased significantly post-SOX, i.e., $\alpha_3 > 0$. In addition, we show that earnings management decreases CTS. Prior studies argue that earnings management increased until the legislation of SOX – implying $\alpha_1 < 0$, and accelerated during the scandal period – implying $\alpha_2 < 0$.

In addition to the pooled regression described in Equation (1), we run time series firm-by-firm regressions and calculate mean coefficients in a manner similar to Fama and MacBeth [1973]. Running firm-by-firm regressions improves our ability to analyze the behavior of CTS over time, because the CTS pattern (like earnings management and AC cash management) may vary across firms.

The time-series regression model is:

$$CTS_{it} = \alpha_{0t} + \alpha_{1t}TIME_{it} + \alpha_{2t}SCA_{it} + \alpha_{3t}SOX_{it} + \text{Control Variables} + \omega_{it} \quad (2)$$

Note that for firm-by-firm regressions we do not need to include industry-specific effects as part of the control variables.

3.2 NORMAL ACCRUALS FORWARD VARIATION

The analytical analysis illustrates that AC cash management increases the forward variation of normal accruals [FV(NA)]. We define FV(NA) as the three-quarter forward variation of normal accruals. Consistent with recent studies (e.g., Cohen et al. [2008], Bartov and Cohen [2009], and Cohen and Zarowin [2010]), normal accruals (NA) and discretionary accruals (DA) are measured using the cross-sectional modified Jones model (Jones [1991] and Dechow et al. [1995]). FV(NA) is measured as the forward coefficient of variation of NA: $FV(NA)_t = STD(NA_t, NA_{t+1}, NA_{t+2}) / Absolute[Mean(NA, NA_{+1}, NA_{+2})]$.

We run the following regression model:

$$FV(NA) = \beta_0 + \beta_1 TIME + \beta_2 SCA + \beta_3 SOX + \text{Control Variables} + \eta \quad (3)$$

where our hypothesis is $\beta_3 > 0$. Time, SCA and SOX are explanatory variables as defined above. The control variables include FCV(CFO), FCV(sales), IB, ACC, BM, LMV, mean capital expenditures divided by total assets, industry-specific effects and quarter-specific effects.

3.3 DISCRETIONARY ACCRUALS FORWARD VARIATION

The analytical analysis illustrates that AC cash management decreases the forward variation of discretionary accruals [FV(DA)]. We define FV(DA) as the three-quarter forward variation of discretionary accruals (DA). FV(DA) is measured as the forward standard deviation of DA; $FV(DA)_t=STD(DA_t,DA_{t+1},DA_{t+2})$. Note that DA is normalized to zero by construction and therefore STD(DA) is not normalized by the absolute mean.

The explanatory variables are identical to those defined in Equation (3). The regression model is:

$$FV(DA) = \gamma_0 + \gamma_1 TIME + \gamma_2 SCA + \gamma_3 SOX + Control\ Variables + \varphi \qquad (4)$$

where our hypothesis is that $\gamma_3 < 0$.

4. Sample Selection and Descriptive Statistics

The full sample used in this study consists of all firms with available financial data on Compustat. We exclude financial institutions (1-digit SIC = 6) and public utilities (2-digit SIC = 49). We require that firms have a market value of equity above $10 million, share price above $1 at quarter end, and a fiscal year-end on December 31. For each quarter, we rank the sample according to the variables in the regression models and remove extreme observations. To better investigate the effect of SOX we also define a reduced sample that includes firms with sufficient information on Compustat pre- and post-SOX. Specifically, the reduced sample includes firms with information available on Compustat for: (i) at least half of the quarters between January 1, 1989 and June 30, 2001 (i.e., at least 25 quarterly observations), (ii) at least half of the quarters between January 1, 1994

and June 30, 2001 (i.e., at least 15 quarterly observations), (iii) all quarters between July 1, 2001 and June 30, 2002 (i.e., 4 quarterly observations), and (iv) at least half of the quarters between July 1, 2002 and December 31, 2008 (i.e., at least 13 quarterly observations).[21] Table 1 presents the number of observations for each year. The full and the reduced samples include 120,941 and 22,712 firm-quarter observations for 6,142 and 350 distinct firms, respectively.

[Table 1 about here]

Table 2 contains descriptive statistics for the main sample (Panel A) and the reduced sample (Panel B). The distribution of cash from operating activities (CFO) and sales are skewed to the right, as the means are larger than the medians in both samples. In both samples, the three-quarter forward coefficient of variation of CFO [FCV(CFO)] is higher than the three-quarter forward coefficient of variation of sales [FCV(sales)], indicating a higher variation of CFO. The differences in variation are presumably due to the differences between the accrual and the cash methods. The three-quarter forward variation ratio of CFO to sales (CTS) is also skewed to the right (as both the numerator and the denominator are right-skewed) and the means and medians are similar for the full and the reduced samples.

Normal accruals (NA) and discretionary accruals (DA) are calculated using the cross-sectional modified Jones model only for the full sample due to data constraints.[22] The mean and median discretionary accruals (DA) are equal to zero, by construction. Consistent with prior studies, the mean DA in absolute terms [ABS (DA)] equals 0.02.

[21] To test for robustness, we also use less restricted sample selection criteria, allowing the reduced sample to include firms with at least a third of the quarters before and after SOX. The empirical results (not reported) are qualitatively the same.

[22] Following prior studies (e.g., Jones [1991] and Dechow et al. [1995]), NA and DA are calculated using gross PPE, thus significantly restricting the number of available firm-quarter observations. To test for robustness, we repeat our analysis using net PPE instead of gross PPE (net PPE is highly correlated with gross PPE; Spearman correlation = 0.92), thereby more than doubling the sample. Results (not reported) are qualitatively the same.

The three-quarter forward variation of normal accruals [FV(NA)] and discretionary accruals [FV(DA)] are skewed to the right as the means (1.50, 0.03) are larger than the medians (0.85, 0.02).

Consistent with prior studies, the distribution of the book-to-market ratios (BM) is skewed to the right as the means (0.60, 0.56) are larger than the medians (0.47, 0.47) in the full sample and the reduced sample, respectively. Firm size, on average, is smaller in the full sample than in the reduced sample, possibly due to survivorship bias. Also in line with prior studies, 4% of the full sample are suspect firm-quarters with an incentive to avoid losses (T1), 12% are suspect firm-quarters with an incentive to avoid earnings decreases (T2), and 22% are suspect firm-quarters with an incentive to meet-or-beat analyst forecast (T3).

[Table 2 about here]

Table 3 presents the Spearman and Pearson correlations for the main variables. As expected, there is a high correlation between CFO and sales (Pearson = 0.75; Spearman = 0.68). The correlation between FCV(CFO) and FCV(sales) is also high (Spearman = 0.27), though lower than the correlation between CFO and sales; this presumably reflects the differences between the cash and the accrual methods, and is consistent with the different magnitudes of CV(CFO) and CV(sales) described in Table 2. The relatively high correlation between CFO [FCV(CFO)] and sales [FCV(sales)] underlines the importance of examining the ratio between the two variables.

The correlation between CTS and ACC is positive (Spearman = 0.22) because higher accruals result in higher CFO forward variation; the Spearman correlation between FCV(CFO) and ACC is 0.25. As for size effect, the log market value (LMV) is negatively correlated with FCV(sales) and FCV(CFO), as larger firms tend to be more stable; the Spearman correlation of LMV with FCV(CFO) and FCV(sales) is -0.28 and -0.20,

respectively. As expected, the correlation between the forward variation of normal accruals [(FV(NA)] and the forward variation of discretionary accruals [(FV(DA)] is positive (Spearman = 0.20). The correlation of FV(DA) with CFO and sales is similar and negative (Spearman is about -0.3), due to the size effect. DA variation is positively correlated with CFO and sales variation; the Spearman correlation of FV(DA) with FCV(CFO) and FCV(sales) is 0.44 and 0.22, respectively. Again, size is negatively correlated with variation as the correlation between FV(DA) and LMV equals -0.29.

[Table 3 about here]

5. *Empirical Results*

5.1 SOX AND THE FORWARD VARIATION RATIO OF CASH TO SALES

Table 4 presents the effect of SOX on the forward variation ratio of cash to sales (CTS) in the full sample, the reduced sample, and the three earnings-target sub-samples. The three earnings targets sub-samples are: (i) firms attempting to avoid earnings losses, for which the indicator variable T1 is equal to 1, (ii) firms attempting to avoid negative change in earnings, for which the indicator variable T2 is equal to 1, and (iii) the meet-or-beat analyst forecast sample, for which the indicator variable T3 is equal to 1. We estimate the effect of SOX on CTS using the following regression equation:

$$\mathrm{CTS} = \alpha_0 + \alpha_1 \mathrm{TIME} + \alpha_2 \mathrm{SCA} + \alpha_3 \mathrm{SOX} + \mathrm{Control\ Variables} + \varepsilon \qquad (1)$$

In general, the results are similar for all samples, except the meet-or-beat analyst forecast sample. The coefficient on TIME is negative and significantly different from zero at the 0.01 level. That is, CTS has significantly decreased over the sample period. As discussed in the analytical analysis, an increase in earnings management activity reduces CTS, and thus the documented decrease in CTS could be attributed to an increase in earnings management activity. Furthermore, in both the full and reduced samples the coefficient on SCA is negative and significantly different from zero at the 0.01 level. This

result indicates that the decrease in CTS accelerated during the scandal period of 2001-2002. Indeed, prior studies (e.g., Cohen et al. [2008] and Bartov and Cohen [2009]) show that accrual-based earnings management increased until 2002 and then intensified during the scandal period.

The coefficient on SOX is positive and significantly different from zero at the 0.01 level. That is, CTS significantly increased post-SOX. In the analytical analysis we show that AC cash management increases CTS. Therefore, the documented increase in CTS is consistent with our assertion that post-SOX firms have increased AC cash management, leading to camouflaged earnings management. As a robustness test, we repeat our analysis for a sub-sample of firm-quarters with bad news (negative earnings and earnings decrease) and a sub-sample of firms with no bad news. For both sub-samples, the results (not tabulated) are qualitatively similar to those of the full sample.

[Table 4 about here]

To better understand the effect of SOX on CTS, we investigate CTS on a firm-by-firm basis. Running the regression on a firm-by-firm basis allows coefficients to vary across firms, thus capturing firm-specific attributes. We run the following firm-by-firm time-series regressions and report regression coefficients and t-statistics in a similar manner to Fama and MacBeth [1973]:

$$\mathrm{CTS}_{it} = \alpha_{0t} + \alpha_{1t}\mathrm{TIME}_{it} + \alpha_{2t}\mathrm{SCA}_{it} + \alpha_{3t}\mathrm{SOX}_{it} + \text{Control Variables} + \omega_{it} \quad (2)$$

Table 5 presents the distribution of the firm-by-firm regression coefficients for the reduced sample and for the following three sub-samples of the reduced sample: (i) firms with a record for avoiding earnings losses, (ii) firms with a record for avoiding negative changes in earnings, and (iii) firms with a meet-or-beat analyst forecast record. A firm with a record for avoiding earnings losses is defined as one with at least one instance of loss avoidance; a firm with a record for avoiding negative changes in earnings is defined

as one with at least 5% of its observations being cases of earnings decrease avoidance, whereas a firm with a meet-or-beat analyst forecast record is defined as one with at least 5% of its observations being cases of meet or beat analyst forecast.[23] Note that for the firms identified in each of the three sub-samples we consider all available observations. We use these sub-samples to check for robustness because they potentially distinguish among firms based on differences in managerial incentives to engage in earnings management.

Results for all samples indicate that the coefficient on SOX is positive and significantly different from zero (at the 0.05 level or higher). Thus, they further support our conjecture regarding the increase in CTS post-SOX.[24] Together, the results in Table 4 and Table 5 strongly support our assertion that post-SOX firms have increased AC cash management.

[Table 5 about here]

5.2 SOX AND THE FORWARD VARIATION OF NORMAL ACCRUALS

Table 6 presents the effect of SOX on the forward variation of normal accruals [FV(NA)] for the full sample and the three earnings targets sub-samples: (i) avoid loss (T1=1), (ii) avoid earnings decrease (T2=1), and (iii) meet-or-beat analyst forecast (T3=1). We estimate the effect of SOX on [FV(NA)] using the following regression equation:

$$FV(NA) = \beta_0 + \beta_1 TIME + \beta_2 SCA + \beta_3 SOX + Control\ Variables + \eta \qquad (3)$$

For all samples (except the avoid-loss sample), the coefficient on SOX is positive and significantly different from zero at the 0.01 level. This result indicates that the forward

[23] The cut-off of the sub-samples is arbitrary. It is used to allow for differentiation between the reduced sample and the corresponding sub-samples while maintaining sufficient number of firms.

[24] Interestingly, prior studies (e.g., Cohen et al. [2008], Bartov and Cohen [2008]) argue that real earnings management activity has increased since SOX, but found inconclusive results regarding the change in abnormal CFO, attributing it to offsetting effects. Our analysis suggests that the inconclusive results could have been due to increased cash to sales volatility associated with increased AC cash manipulation.

variation of NA has increased post-SOX, and is consistent with our analytical analysis where we argue that AC cash management increases the forward variation of NA. These results support our hypothesis that firms have increased their AC cash management post-SOX.

[Table 6 about here]

5.3 SOX AND THE FORWARD VARIATION OF DISCRETIONARY ACCRUALS

Our analytical analysis also predicts that AC cash management is associated with a smaller forward variation of discretionary accruals FV(DA). We investigate the effect of SOX on [FV(DA)] using the following regression model:

$$\mathrm{FV(DA)} = \gamma_0 + \gamma_1 \mathrm{TIME} + \gamma_2 \mathrm{SCA} + \gamma_3 \mathrm{SOX} + \mathrm{Control\ \ Variables} + \varphi \qquad (4)$$

In Table 7, we present results for the full sample and the three earnings targets sub-samples (avoid loss, avoid earnings decrease, and meet-or-beat analyst forecast). We also test for robustness by considering two additional sub-samples with positive DA and negative DA. According to the Jones model (e.g., Jones [1991] and Dechow et al. [1995]), positive (negative) DA is associated with earnings management activity aimed at inflating (deflating) earnings.

All samples indicate that the coefficient on SOX is negative and significantly different from zero at the 0.01 level. That is, the regression results indicate a lower forward variation of discretionary accruals post-SOX, which is consistent with our assertion regarding higher AC cash management post-SOX.

[Table 7 about here]

The empirical results presented in Tables 4 and 5 for the forward variation ratio of CFO to sales, in Table 6 for the normal accruals forward variation, and in Table 7 for the discretionary accruals forward variation are all in line with and reinforce our hypothesis that earnings management post-SOX was coupled with AC cash management. Also, in

line with the analytical analysis, the combined changes in CTS and FV(DA) is inconsistent with the possible argument that post-SOX cash management increased independent of earnings management, or that earnings management has decreased without a related change in cash management.

The implications are twofold. First, in addition to the response to SOX, suggested by previous studies, of switching from accrual based to real earnings management, firms have also used the option of masking earnings management through AC cash management. Second, any comprehensive analysis of earnings management (and not necessarily one with respect to SOX) should incorporate this option firms have for camouflaging earnings management. Ignoring this option may amount to omitting an important correlated variable that could affect analysis and inference.

6. Concluding Remarks

We argue that cash management that converts accruals into cash (or vice versa) often reduces the transparency of possible earnings management. We assert that, in response to the increased scrutiny and greater attention to cash versus earnings, firms have increased their focus on cash management aimed at aligning cash with earnings, which has resulted in camouflaged earnings management. The increased scrutiny following the Sarbanes-Oxley Act provides an appealing means of testing our assertion. The empirical results reinforce our assertion suggesting that post-SOX firms have indeed attempted to camouflage earnings management through cash management. We acknowledge it may be difficult to disentangle the SOX effect from the effects of other economic events that have occurred during the same period.[25] The increased focus on cash management could have been a response to such economic events rather than a response to the increased scrutiny. But irrespective of the motivation, our results suggest that increased cash

[25] Note the same potential concern applies to Lobo and Zhou [2006], Cohen et al. [2008], Koh et al. [2008], and Bartov and Cohen [2009].

management activities have (intentionally or unintentionally) camouflaged earnings management.

One implication of our analysis is that any comprehensive investigation of earnings management should consider the possibility of camouflaging. Methodologically, we introduce new proxies for AC cash management that results in camouflaged earnings management. Incorporating these proxies in future research may be prudent, as ignoring the possibility of camouflaged earnings management may amount to omitting an important correlated variable, and result in misleading inferences.

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Setting Summary 1.1 – Real and transitory revenues growth

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	$S_1+\delta$	S_2	S_3	S_4
ΔSales	δ	$-\delta$	0	0
NI	$S_1(1-v) + \delta(1-v) - F$	$S_2(1-v) - F$	$S_3(1-v) - F$	$S_4(1-v) - F$
ΔNI	$\delta(1-v)$	$-\delta(1-v)$	0	0
Receivables	$S_{12}+S_{13}+\frac{2}{3}\delta$	$S_{22}+S_{23}$	$S_{32}+S_{33}$	$S_{42}+S_{43}$
ΔReceivables	$\frac{2}{3}\delta$	$-\frac{2}{3}\delta$	0	0
Inventory	$S_{21}v$	vS_{31}	vS_{41}	vS_{51}
ΔInventory	0	0	0	0
Payable	$(S_{22}+S_{23})v + \frac{2}{3}\delta v$	$(S_{22}+S_{23})v$	$(S_{32}+S_{33})v$	$(S_{42}+S_{43})v$
Δ Payable	$\frac{2}{3}\delta v$	$-\frac{2}{3}\delta v$	0	0
ACC	$\frac{2}{3}\delta(1-v)$	$-\frac{2}{3}\delta(1-v)$	0	0
CFO	$S_1(1-v) + \frac{1}{3}\delta(1-v) - F$	$S_2(1-v) + \frac{2}{3}\delta(1-v) - F$	$S_3(1-v) - F$	$S_4(1-v) - F$
ΔCFO	$\frac{1}{3}\delta(1-v)$	$\frac{1}{3}\delta(1-v)$	$-\frac{2}{3}\delta(1-v)$	0
NA	$\gamma+\alpha_2'\frac{1}{3}\delta$	$\gamma-\alpha_2'\frac{1}{3}\delta$	γ	0
DA	$[\frac{2}{3}(1-v)-\alpha_2'\frac{1}{3}]\delta-\gamma$	$[\frac{2}{3}(1-v)+\alpha_2'\frac{1}{3}]\delta-\gamma$	$-\gamma$	0

Setting Summary 1.2 – Real earnings management (sales pull in)

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	$S_{11}+S_{12}+(S_{13}+\beta S_{21})$	$(1-\beta)S_{21}+ S_{22}+S_{23}$	$S_{31}+ S_{32}+S_{33}$	$S_{41}+ S_{42}+S_{43}$
ΔSales	βS_{21}	$-2\beta S_{21}$	βS_{21}	0
NI	$(S_1+ \beta S_{21})(1-v) - F$	$(S_2- \beta S_{21})(1-v) - F$	$S_3(1-v) - F$	$S_4(1-v) - F$
ΔNI	$\beta S_{21}(1-v)$	$-2\beta S_{21}(1-v)$	$\beta S_{21}(1-v)$	0
Receivables	$S_{12}+(S_{13}+\beta S_{21})$	$S_{22}+S_{23}$	$S_{32}+S_{33}$	$S_{42}+S_{43}$
ΔReceivables	βS_{21}	$- \beta S_{21}$	0	0
Inventory	$(1-\beta)S_{21}v$	$S_{31}v$	$S_{41}v$	$S_{51}v$
ΔInventory	$-\beta S_{21}v$	$v\beta S_{21}$	0	0
Payable	$(S_{12}+S_{13})v$	$v(S_{22}+S_{23})$	$(S_{32}+S_{33})v$	$(S_{42}+S_{43})v$
Δ Payable	0	0	0	0
ACC	$\beta S_{21}(1-v)$	$-\beta S_{21}(1-v)$	0	0
CFO	$S_1(1-v) - F$	$S_2(1-v) - F$	$S_3(1-v) - F$	$S_4(1-v) - F$
ΔCFO	0	0	0	0
NA	γ	$\gamma-\alpha_2'\beta S_{21}$	$\gamma+\alpha_2' \beta S_{21}$	0
DA	$\beta S_{21}(1-v)- \gamma$	$-(1-v-\alpha_2') \beta S_{21}- \gamma$	$- \alpha_2' \beta S_{21}- \gamma$	0

Setting Summary 1.3 – Real earnings management (sales pull in) + factoring

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	$S_{11}+S_{12}+(S_{13}+\beta S_{21})$	$(1-\beta)S_{21}+ S_{22}+S_{23}$	$S_{31}+ S_{32}+S_{33}$	$S_{41}+ S_{42}+S_{43}$
ΔSales	βS_{21}	$-2\beta S_{21}$	βS_{21}	0
NI	$(S_1+ \beta S_{21})(1-v) – F$	$(S_2- \beta S_{21})(1-v) – F$	$S_3(1-v) – F$	$S_4(1-v) – F$
ΔNI	$\beta S_{21} (1-v)$	$-2\beta S_{21}(1-v)$	$\beta S_{21}(1-v)$	0
Receivables	$S_{12}+S_{13}+\beta S_{21}- \frac{1}{3} \beta S_{21}(1-v)$	$S_{22}+S_{23}$	$S_{32}+S_{33}$	$S_{42}+S_{43}$
ΔReceivables	$\beta S_{21} - \frac{1}{3} \beta S_{21}(1-v)$	$-[\beta S_{21} - \frac{1}{3} \beta S_{21}(1-v)]$	0	0
Inventory	$(1-\beta)S_{21}v$	$S_{31}v$	$S_{41}v$	$S_{51}v$
ΔInventory	$-\beta S_{21}v$	$\beta S_{21}v$	0	0
Payable	$(S_{12}+S_{13})v$	$(S_{22}+S_{23})v$	$(S_{32}+S_{33})v$	$(S_{42}+S_{43})v$
Δ Payable	0	0	0	0
ACC	$\frac{2}{3} \beta S_{21}(1-v)$	$- \frac{2}{3} \beta S_{21}(1-v)$	0	0
CFO	$S_1(1-v) – F+ \frac{1}{3} \beta S_{21}(1-v)$	$S_2(1-v) - F- \frac{1}{3} \beta S_{21}(1-v)$	$S_3(1-v) – F$	$S_4(1-v) – F$
ΔCFO	$\frac{1}{3} \beta S_{21}(1-v)$	$- \frac{2}{3} \beta S_{21}(1-v)$	$\frac{1}{3} \beta S_{21}(1-v)$	0
NA	$\gamma+\alpha_2' \frac{1}{3} \beta S_{21}(1-v)$	$\gamma- \alpha_2' \beta S_{21}(\frac{4}{3} - \frac{1}{3} v)$	$\gamma+\alpha_2' \beta S_{21}$	γ
DA	$(\frac{2}{3} - \alpha_2' \frac{1}{3})\beta S_{21}(1-v)- \gamma$	$- \frac{2}{3} [1-v- \alpha_2'(2- \frac{1}{2} v)]\beta S_{21}- \gamma$	$- \alpha_2' \beta S_{21}- \gamma$	$- \gamma$

Setting Summary 3.1 – Real and transitory expense decrease

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	S_1	S_2	S_3	S_4
ΔSales	0	0	0	0
SG&A	F - δ	F	F	F
Δ SG&A	- δ	Δ	0	0
NI	$S_1(1-v)-(F-\delta)$	$S_2(1-v)-F$	$S_3(1-v)-F$	$S_4(1-v)-F$
ΔNI	δ	-δ	0	0
ΔReceivables	0	0	0	0
ΔInventory	0	0	0	0
ΔPayable	0	0	0	0
ACC	0	0	0	0
CFO	$S_1(1-v)-F+\delta$	$S_2(1-v)-F$	$S_3(1-v)-F$	$S_4(1-v)-F$
ΔCFO	δ	-δ	0	0
NA	γ	Γ	γ	γ
DA	-γ	-γ	-γ	-γ

Setting Summary 3.2 – Accrual-based earnings management (decrease provisions)

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	S_1	S_2	S_3	S_4
ΔSales	0	0	0	0
SG&A	F - δ	F +δ	F	F
Δ SG&A	- δ	2δ	0	0
NI	S_1(1-v)-(F-δ)	S_2(1-v)-(F+δ)	S_3(1-v)-F	S_4(1-v)-F
ΔNI	δ	-2δ	δ	0
ΔReceivables	0	0	0	0
ΔInventory	0	0	0	0
ΔPayable	-δ	δ	0	0
ACC	δ	-δ	0	0
CFO	S_1(1-v)-F	S_2(1-v)-F	S_3(1-v)-F	S_4(1-v)-F
ΔCFO	0	0	0	0
NA	γ	γ	γ	γ
DA	δ- γ	-δ-γ	-γ	-γ

Setting Summary 3.3 – Accrual-based earnings management (decrease provisions) + Factoring

	Quarter$_i$			
	i=1	**i=2**	**i=3**	**i=4**
Sales	S_1	S_2	S_3	S_4
ΔSales	0	0	0	0
SG&A	F - δ	F +δ	F	F
Δ SG&A	- δ	2δ	0	0
NI	S_1(1-v) - (F-δ)	S_2(1-v)-(F+δ)	S_3(1-v)-F	S_4(1-v)-F
ΔNI	δ	-2δ	δ	0
ΔReceivables	-δ	δ	0	0
ΔInventory	0	0	0	0
ΔPayable	-δ	δ	0	0
ACC	0	0	0	0
CFO	S_1(1-v)-F+δ	S_2(1-v)-F-δ	S_3(1-v)-F	S_4(1-v)-F
ΔCFO	δ	-2δ	δ	0
NA	α_2'δ+γ	-α_2'δ+γ	γ	γ
DA	- α_2'δ -γ	α_2'δ -γ	-γ	-γ

TABLE 1

*Sample Selection**

	Full Sample	Reduced Sample
Year	N	N
1989	3,123	601
1990	3,574	757
1991	3,849	840
1992	4,382	904
1993	4,937	1,045
1994	5,545	1,192
1995	6,038	1,227
1996	6,909	1,246
1997	7,535	1,239
1998	7,238	1,255
1999	7,061	1,262
2000	6,841	1,295
2001	6,473	1,356
2002	6,054	1,348
2003	6,590	1,276
2004	7,035	1,260
2005	7,087	1,261
2006	7,240	1,189
2007	7,068	1,125
2008	6,362	1,034
Observations	120,941	22,712
Firms	6,142	350

*Note: The full sample includes all firms with complete financial data available on Compustat with market value of equity over $10 million, minimum share price of $1 at quarter end and a December 31 fiscal year end. We exclude financial institutions (1-digit SIC = 6) and public utilities (2-digit SIC = 49). We also remove the extreme observations for each variable. The reduced sample includes firms with sufficient information on Compustat before and after the Sarbanes-Oxley (SOX) Act (at least 25 quarterly observations before June 30, 2001, four quarterly observations between July 1, 2001 and June 30, 2002 and at least 13 quarterly observations after July 1, 2002).

TABLE 2

*Descriptive Statistics**

Panel A: Full Sample

Variable	N	Mean	Std Dev	25th Pctl	Median	75th Pctl
CFO	120,941	43.46	144.94	-0.11	4.30	25.64
Sales	120,941	352.44	940.27	16.13	60.01	242.58
FCV(CFO)	120,941	1.47	2.37	0.38	0.75	1.56
FCV(Sales)	120,941	0.13	0.13	0.05	0.09	0.16
CTS	120,941	16.35	18.72	4.12	9.27	20.73
DA	56,924	0.00	0.03	-0.02	0.00	0.02
ABS(DA)	56,924	0.02	0.02	0.01	0.02	0.03
FV(NA)	56.924	1.50	2.18	0.47	0.85	1.54
FV(DA)	56,924	0.03	0.02	0.01	0.02	0.04
IB	120,941	19.69	82.97	-0.43	1.93	11.57
ACC	120,941	-0.02	0.03	-0.03	-0.01	-0.00
BM	120,941	0.60	0.52	0.28	0.47	0.75
LMV	121,057	5.78	1.81	4.39	5.67	7.01
T1	120,941	0.04	0.20	0.00	0.00	0.00
T2	110,037	0.12	0.34	0.00	0.00	0.00
T3	71,433	0.22	0.41	0.00	0.00	0.00

Panel B: Reduced Sample

Variable	N	Mean	Std Dev	25th Pctl	Median	75th Pctl
CFO	22,712	64.44	150.94	2.53	14.89	58.68
Sales	22,712	532.42	1,005.47	55.14	175.98	523.74
FCV(CFO)	22,712	1.14	1.78	0.35	0.63	1.21
FCV(Sales)	22,712	0.10	0.10	0.04	0.07	0.12
CTS	22,712	15.92	17.36	4.74	9.68	20.05
IB	22,712	33.41	87.05	1.56	7.74	29.70
ACC	22,712	-0.01	0.02	-0.02	-0.01	-0.00
BM	22,712	0.56	0.41	0.31	0.47	0.69
LMV	22,712	6.51	1.75	5.24	6.53	7.81
T1	22,712	0.03	0.18	0.00	0.00	0.00
T2	20,982	0.18	0.39	0.00	0.00	0.00
T3	12,422	0.25	0.43	0.00	0.00	0.00

*Notes:

1. The table presents descriptive statistics for the full sample (Panel A) and the reduced sample (Panel B).

2. Definitions of variables:

- CFO – cash from operating activities
- Sales – sales (net)
- FCV(CFO) – three-quarter forward coefficient of variation (CV) of CFO;
  FCV(CFO)=FSTD(CFO)/Absolute[FMean(CFO)];
  $FSTD(CFO)_t=STD(CFO_t,CFO_{t+1},CFO_{t+2})$;
  $FMean(CFO)_t=Mean\ (CFO_t,CFO_{t+1},CFO_{t+2})$
- FCV(Sales) – three-quarter forward coefficient of variation (CV) of sales; measured similarly to FCV(CFO)
- CTS – three-quarter forward variation ratio of cash to sales, measured as FCV(CFO) divided by FCV(sales)
- DA – discretionary accruals, using the cross-sectional modified Jones model
- ABS (DA) – DA in absolute terms
- FV(NA) – three-quarter forward variation of normal accruals (NA); NA measured using the cross-sectional modified Jones model; FV(NA) measured as the forward coefficient of variation of NA;
  $FV(NA)_t=STD(NA_t,NA_{t+1},NA_{t+2})/Absolute[Mean(NA,NA_{+1},NA_{+2})]$
- FV(DA) – three-quarter forward variation of discretionary accruals (DA), $FV(DA)_t$ measured as $STD(DA_t, DA_{t+1},DA_{t+2})$
- IB – three-quarter forward mean income before extraordinary items (IBXI); $IB_t=Mean\ (IBXI_t,IBXI_{t+1},IBXI_{t+2})$
- ACC – three-quarter forward mean of accruals to total assets; $ACC_t=$ $Mean(Accruals_t/Total\ Assets_{t-1},Accruals_{t+1}/Total\ Assets_t,Accruals_{t+2}/Total\ Assets_{t+1})$
- BM – three-quarter forward mean book-to-market ratio; BM_t = Mean (book-to-$market_t$, book-to-market $_{t+1}$, book-to-market $_{t+2}$)
- LMV – log of market value of common equity at quarter end
- T1 – a dummy variable that equals 1 if quarterly earnings deflated by market capitalization of shareholders equity at prior quarter end is in the interval [0, 0.0025], and 0 otherwise
- T2 – a dummy variable that equals 1 if the change in quarterly earnings deflated by market capitalization of shareholders equity at prior quarter end is in the interval [0, 0.0025], and 0 otherwise
- T3 – a dummy variable that equals 1 if the difference between actual earnings per share and consensus analyst forecast is in the interval [0, 0.01], and 0 otherwise

3. See Table 1 for sample selection.

TABLE 3

*Correlations**

		1	2	3	4	5	6	7	8	9	10	11
1.	CFO		0.75	-0.10	-0.09	-0.08	-0.04	0.69	-0.07	0.52	-0.05	-0.13
2.	Sales	0.68		-0.08	-0.11	-0.03	0.02	0.62	-0.05	0.56	-0.02	-0.14
3.	FCV(CFO)	-0.35	-0.13		0.26	0.54	0.14	-0.08	0.08	-0.18	0.08	0.20
4.	FCV(Sales)	-0.29	-0.30	0.27		-0.27	-0.01	-0.08	0.00	-0.17	0.09	0.21
5.	CTS	-0.11	0.10	0.68	-0.47		0.15	-0.06	0.10	-0.12	0.03	0.09
6.	ACC	-0.21	0.01	0.25	0.03	0.22		0.07	-0.07	0.01	0.17	-0.09
7.	IB	0.63	0.67	-0.23	-0.26	-0.02	0.15		-0.11	0.43	-0.01	-0.15
8.	BM	-0.05	0.05	0.16	-0.03	0.15	-0.05	-0.15		-0.31	-0.00	-0.03
9.	LMV	0.62	0.78	-0.28	-0.20	-0.10	0.01	0.63	-0.32		-0.11	-0.27
10.	FV(NA)	-0.20	-0.10	0.25	0.12	0.13	0.28	-0.06	-0.01	-0.16		0.12
11.	FV(DA)	-0.29	-0.27	0.44	0.22	0.22	-0.03	-0.28	-0.05	-0.29	0.20	

*Note: The table presents average quarterly Pearson (above diagonal) and Spearman (below diagonal) correlations. See Table 2 for definition of variables.

TABLE 4

*SOX and the Forward Variation Ratio of Cash to Sales (CTS)***

Sample	Time	SCA	SOX	Adj-R^2 N
Full sample	-2.43*** -5.26	-82.10*** -3.09	96.97*** 4.58	0.06 120,941
Reduced sample	-2.65*** -2.77	-144.42*** -2.77	214.76*** 4.89	0.10 22,712
Avoid loss (T1=1)	-7.04*** -3.38	3.81 0.04	270.81*** 3.03	0.07 4,920
Avoid earnings decrease (T2=1)	-4.15*** -6.12	-75.37* -1.76	81.07*** 2.57	0.10 12,984
Meet or beat analyst forecast (T3=1)	0.02 1.62	-78.32 -1.20	-66.18 -1.19	0.07 15,581

*Notes:

1. The table presents results of estimating the effect of SOX on the three-quarter forward variation ratio of cash to sales for the full sample, the reduced sample, and three earnings targets sub-samples. It presents coefficients and associated t-statistics for Equation 1:

$$CTS = \alpha_0 + \alpha_1 TIME + \alpha_2 SCA + \alpha_3 SOX + \text{Control Variables} + \varepsilon \quad (1)$$

2. Definitions of variables:

- TIME – a trend variable equal to the difference between the current year quarter and the first quarter of 1989
- SCA – a dummy variable that equals 1 if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise
- SOX – a dummy variable that equals 1 if the observation is after the end of the second quarter of 2002, and zero otherwise

3. Control variables include: IB, ACC, BM, LMV, mean capital expenditures divided by total assets, industry-specific effects and quarter-specific effects

4. See Table 1 for sample selection and Table 2 for the definitions of other variables

5. *, **. *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

TABLE 5

*SOX and CTS - firm-by-firm analysis***

Sample	Variable	Mean	t-value	Median	Std Dev
	Time	2.93	0.97	2.85	56.48
Reduced sample	SCA	-134.52**	-1.97	-92.23	1,274.86
(350 firms)	SOX	211.76***	2.71	174.07	1,460.07
	Adj-R^2	0.23	27.68	0.22	0.15
	Time	0.87	0.24	2.42	57.13
Firms with avoid loss record	SCA	-108.61	-1.35	-117.65	1,267.57
(250 firms)	SOX	271.43***	2.85	188.33	1,508.05
	Adj-R^2	0.22	23.47	0.22	0.15
	Time	2.59	0.75	2.66	59.32
Firms with avoid earnings decrease record	SCA	-130.39*	-1.87	-63.15	1,195.11
(294 firms)	SOX	200.52**	2.35	121.52	1,463.34
	Adj-R^2	0.24	25.02	0.23	0.16
	Time	2.46	0.50	7.77	70.51
Firms with meet or beat analyst forecast record	SCA	-181.56**	-2.39	-60.39	1,076.42
(201 firms)	SOX	193.19**	1.95	200.41	1,405.96
	Adj-R^2	0.25	21.54	0.25	0.17

*Notes:

1. The table presents the distribution of coefficients for firm-by-firm regressions in estimating the effect of SOX on the three-quarter forward variation ratio of cash to sales (CTS). The first sample is the reduced sample. The second sample includes all available information for firms with a loss avoidance record, the third sample includes all available information for firms with an earnings decrease avoidance record, and the fourth sample includes all available information for firms with a meeting or beating analyst forecast record. A firm with a record for avoiding earnings losses is defined as one with at least one instance of loss avoidance; a firm with a record for avoiding negative changes in earnings is defined as one with at least 5% of its observations being cases of earnings decrease avoidance, whereas a firm with a meet-or-beat analyst forecast record is defined as one with at least 5% of its observations being cases of meet or beat analyst forecast. The sample includes firms with sufficient information on Compustat before and after the Sarbanes-Oxley (SOX) Act. The model is:

$$CTS_{it} = \alpha_{0t} + \alpha_{1t} TIME_{it} + \alpha_{2t} SCA_{it} + \alpha_{3t} SOX_{it} + \text{Control Variables} + \omega_{it} \qquad (2)$$

2. Definitions of variables:

- TIME – a trend variable equal to the difference between the current year quarter and the first quarter of 1989
- SCA – a dummy variable that equals of 1 if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise
- SOX – a dummy variable that equals 1 if the observation is after the end of the second quarter of 2002, and zero otherwise

3. Control variables include: IB, ACC, BM, LMV, mean capital expenditures divided by total assets, and quarter-specific effects

4. See Table 1 for sample selection and Table 2 for the definitions of other variables

TABLE 6

*SOX and the Forward Variation of Normal Accruals (NA)**

Sample	Time	SCA	SOX	Adj-R^2 N
Full Sample	-0.30*** -3.91	-31.93*** -6.21	17.30*** 4.82	0.09 56,924
Avoid loss (T1=1)	0.38 0.96	-45.07** -2.16	1.13 0.06	0.10 2,308
Avoid earnings decrease (T2=1)	-0.53*** -2.75	-25.07* -1.71	25.94*** 2.83	0.09 7,347
Meet or beat analyst forecast (T3=1)	-1.00*** 2.99	-9.24 -0.74	32.12*** 2.76	0.08 6,583

*Notes:

1. The table presents results of estimating the effect of SOX on the three-quarter forward variation of normal accruals [FV(NA)] for the full sample and various earnings targets sub-samples. It presents coefficients and associated t-statistics for Equation 3 :

$$FV(NA) = \beta_0 + \beta_1 TIME + \beta_2 SCA + \beta_3 SOX + \text{Control Variables} + \eta \qquad (3)$$

2. Definitions of variables:

- TIME – a trend variable equal to the difference between the current year quarter and the first quarter of 1989
- SCA – a dummy variable that equals1 if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise
- SOX – a dummy variable that equals 1 if the observation is after the end of the second quarter of 2002, and zero otherwise

3. Control variables include: FCV(CFO), FCV(sales), IB, ACC, BM, LMV, mean capital expenditures divided by total assets

4. See Table 1 for sample selection and Table 2 for the definitions of other variables

5. *, **. *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

TABLE 7

*SOX and the Forward Variation of Discretionary Accruals (DA)**

Sample	Time	SCA	SOX	Adj-R^2 N
Full Sample	0.01*** 17.82	-0.49*** -10.27	-0.65*** -19.59	0.18 56,924
Avoid loss (T1=1)	0.01*** 2.30	-0.50** -2.53	-0.67*** -3.95	0.19 2,308
Avoid earnings decrease (T2=1)	0.01*** 6.04	-0.27** -1.95	-0.62*** -7.25	0.18 7,347
Meet or beat analyst forecast (T3=1)	0.00 1.25	-0.14 -1.36	-0.46*** -4.09	0.16 6,583
Positive discretionary accruals (DA>0)	0.01*** 11.81	-0.53*** -7.78	-0.59*** -12.85	0.19 28,903
Negative discretionary accruals (DA < 0)	0.01*** 14.15	-0.50*** -7.37	-0.75*** -15.60	0.19 28,021

*Notes:

1. The table presents results of estimating the effect of SOX on the three-quarter forward variation of discretionary accruals [FV(DA)] for the full sample and various earnings targets sub-samples. It presents coefficients and associated t-statistics for Equation 4:

$$FV(DA) = \gamma_0 + \gamma_1 TIME + \gamma_2 SCA + \gamma_3 SOX + Control\ Variables + \varphi \qquad (4)$$

2. Definitions of variables:

- TIME – a trend variable equal to the difference between the current year quarter and the first quarter of 1989
- SCA – a dummy variable that equals 1 if the observation falls within the third quarter of 2001 through the second quarter of 2002, and zero otherwise
- SOX – a dummy variable that equals 1 if the observation is after the end of the second quarter of 2002, and zero otherwise

3. Control variables includes: FCV(CFO), FCV(sales), IB, ACC, BM, LMV, mean capital expenditures divided by total assets

4. See Table 1 for sample selection and Table 2 for the definitions of other variables

5. *, **. *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.