

An Empirical Analysis of Revenue Manipulation *

Yuan Zhang

Assistant Professor of Accounting
Columbia Business School
611 Uris, 3022 Broadway
New York, NY 10023
Email: yz2113@columbia.edu

April 12, 2006

Preliminary Draft

Abstract:

This study seeks to examine the determinants of revenue manipulation by focusing on factors that have unique implications for revenue. Based on a sample of financial restatements arising from aggressive accounting, I control for general earnings management incentives by comparing revenue restatement firms with non-revenue restatement firms. I predict and find that firms with (i) higher growth perspectives, (ii) higher operating margins, (iii) outstanding analyst sales forecasts, or (iv) higher accounting flexibility in revenue recognition are more likely to manipulate revenue as opposed to other earnings components. However, I do not find lack of value relevance of earnings significantly affects the probability of revenue manipulation.

* I thank Bugra Ozel for research assistance. I am grateful to I/B/E/S for providing analyst sales forecast data.

An Empirical Analysis of Revenue Manipulation

1. Introduction

This study seeks to examine the determinants of revenue manipulation by focusing on factors that have unique implications for revenue. Based on a sample of financial restatements arising from aggressive accounting, I control for general earnings management incentives by comparing revenue restatement firms with non-revenue restatement firms. I predict and find that firms with (i) higher growth perspectives, (ii) higher operating margins, (iii) outstanding analyst sales forecasts, or (iv) higher accounting flexibility in revenue recognition are more likely to manipulate revenue as opposed to other earnings components. However, I do not find lack of value relevance of earnings significantly affects the probability of revenue manipulation.

Anecdotal evidence shows that a significant proportion of earnings management cases take the form of revenue manipulation. For example, in a recent report by the General Accounting Office (GAO) on financial restatements, revenue recognition-related restatements account for about 37% of the 919 restatement announced during 1997-2002 (GAO 2003). Similarly, Dechow and Schrand (2004) indicate that over 70% of the 294 SEC Accounting and Auditing Enforcement Releases they examine involve overstated revenue.¹ This evidence of consistently high frequency of revenue manipulation appears to suggest that firms have unique incentives and/or opportunities related to revenue manipulation above and beyond those related to general earnings management. However, despite the extensive literature on

¹ Evidence for similarly high frequency of revenue manipulation can also be found in Dechow et al. (1996), Turner et al. (2000), PricewaterhouseCoopers (2001), and Anderson and Yohn (2002), among others.

earnings management, relatively little research has specifically examined the determinants of revenue manipulation.

Plummer and Mest (2001), Altamuro et al. (2005), and Caylor (2006) document that firms adopt aggressive revenue recognition practices to meet earnings benchmarks. Bowen et al. (2002) and Altamuro et al. (2005) examine economic factors that influence managers' decisions to adopt aggressive revenue-recognition policies. However, firms can manage any components of earnings to meet earnings benchmarks; similarly, the determinants examined in Bowen et al. (2002) and Altamuro et al. (2005) can be applied to any earnings management methods and are not specific to revenue recognition.² Thus, the above mentioned evidence does not particularly shed light on the uniqueness of revenue manipulation and does not help accounting information users understand the high frequency of revenue manipulation.

Some recent research starts to focus on factors that are specifically related to revenue. Plummer and Mest (2001) find that high operating margins are associated with an increased likelihood that a firm uses sales to manage earnings. Stubben (2006) shows that firms manage accounts receivable accruals to meet not only earnings forecasts, but also sales forecasts. He further shows that such revenue manipulation behavior is more significant for growth firms whose valuation is hypothesized to depend more on revenues than on earnings. Based on similar reasons, Marquardt and Weidman (2004) predict and find that firms issuing equity, who are often growth firms, are more likely to manage earnings using accounts receivables as

² For example, Altamuro et al. (2005) focus on weak corporate governance and the existence of financial covenants. Bowen et al. (2002) find that shorter time before needing additional external financing, more active individual investor interest in the firm's stock, more active pursuit of growth via acquisitions, and greater use of stock options in employee compensation are determinants of using aggressive revenue recognition methods. Most, if not all, of the factors examined in these studies are applicable to any earnings management method. It should be noted, however, that Bowen et al. (2002) focus on the Internet firms which presumably have stronger incentives to manipulate revenues than other firms.

opposed to other earnings management methods. In addition, Callen et al. (2005) provide evidence that loss firms are more likely to over-invest in accounts receivables and restate revenues because earnings are a poor indicator of future performances for such firms.

I extend this recent research by providing a more comprehensive and systematic analysis of the determinants of revenue manipulation. I am particularly interested in determinants that have implications for choosing between revenue manipulation and other earnings management methods. I first focus on the incentives for revenue manipulation. Since prior research suggests that investors place a higher weight on revenue for firms with lower earnings quality or higher growth perspectives, I hypothesize that firms with higher earnings volatility, higher loss frequency, lower book-to-market ratio, or higher research and development (R&D) intensity are more likely to manipulate revenue. I also predict that firms with higher operating margins have greater incentives to manipulate revenue because such firms' operating performances are more likely driven by revenue and thus investors may value revenue more for these firms. In addition, I conjecture that firms with higher gross margins have greater incentives to manipulate revenue because they reap greater benefits for every dollar of manipulated revenue. Finally, I predict that firms with analysts issuing sales forecasts are more likely to manipulate revenue given the incentives to meet such forecasts.

I use the Financial Statement Restatement Database compiled by the GAO to identify revenue manipulation and other aggressive accounting (e.g., Desai et al. 2006). As explained in more detail in Section 2, the GAO database focuses on financial restatements resulting from accounting irregularities and excludes those from business transactions such as mergers and acquisitions and those from general accounting changes or bookkeeping errors, making it a cleaner sample for earnings management. The advantage of using this database to identify

earnings management is that it avoids the limitations associated with estimation procedures such as the Jones (1991) model (e.g., Fields et al. 2001).³

To test my hypotheses, I compare the revenue restatement sample with the non-revenue restatement sample. This comparison controls for the incentives for general earnings management and focuses on the unique incentives related to revenue manipulation relative to earnings management using other accounting methods.

As expected, I find that firms with lower book-to-market ratios, higher operating margins, and outstanding analyst sales forecasts are more likely to manipulate revenue. However, I find no evidence that value relevance of earnings, whether measured as earnings volatility or loss frequency, R&D intensity, or gross margins are significantly related to the probability of revenue manipulation.

The earnings management literature posits that for firms to be able to manage earnings (including revenue), there must exist opportunities, in addition to incentives, to do so. There is a general consensus that the judgment and flexibility allowed in accrual accounting provides opportunities to manage earnings (e.g., Healy and Wahlen 1999). While there is extensive literature that focuses specifically on accrual management and the corresponding incentives, little empirical research has provided evidence that the existence or the magnitude of accounting flexibility is associated with earnings management. Accordingly, I further examine whether revenue manipulation is associated with the accounting flexibility in revenue recognition.

³ The studies mentioned above (Marquardt and Weidman 2004, Callen et al. 2005, Caylor 2006 and Stubben 2006) are all based on some estimation models for accounts receivable accruals or unearned revenue accruals, although Stubben validates his estimates using financial restatement data and Callen et al. use restatements to identify aggressive revenue recognition in addition to using their models of accounts receivable investments.

Specifically, I hypothesize that firms with higher accounts receivable accruals as a percentage of revenues, and firms who have sales transactions that require revenue deferrals under GAAP have higher accounting flexibility in revenue recognition, and hence, are more likely to manipulate revenue. I find evidence supporting both hypotheses, suggesting that accounting flexibility in revenue recognition does provide opportunities for revenue manipulation.

Finally, I provide some preliminary evidence regarding the consequences of revenue manipulation for my sample. Consistent with prior research (e.g., Anderson and Yohn 2002), I find restatement announcements involving revenue result in significantly more negative market reactions at the time of the announcements than other restatement announcements. However, I do not find that revenue restatements are more likely to trigger CEO turnovers than other types of restatements.

This paper contributes to the earnings management literature in the following ways. First, Healy and Wahlen (1999) suggest focusing on specific accounts to provide further insights regarding earnings management. Accordingly, this study examines a specific and important method of earnings management, namely, revenue manipulation, and provides a set of economic characteristics that motivate or provide opportunities for revenue manipulation.

Most prior earnings management research focusing on a specific account⁴ implicitly assumes that the likelihood of managing that specific account is large enough that researchers are able to detect the earnings management. However, firms may have different costs and benefits, and hence, different incentives, to manage different components of earnings (e.g., Marquardt and Weidman 2004). The fact that revenue recognition is consistently the most

⁴ For example, McNichols and Wilson (1998) examine the bad debt provisions.

frequently used method to manage earnings also confirms differential preferences over different accounts. By focusing on the uniqueness of revenue, this study sheds light on the different incentives and opportunities to manage revenues in the cross-section; thus, it provides a better understanding of the high frequency of revenue manipulation documented both empirically and anecdotally.

Second, the literature has long recognized one necessary condition for earnings management is the opportunity to manage earnings. Indeed, a commonly viewed cost of accrual accounting is its requirement for managerial judgment provides opportunities for earnings management. However, little empirical research has directly linked earnings management with the availability and/or the magnitude of accounting flexibility. This study provides such evidence in the context of revenue recognition. Specifically, it shows that when accounts receivable accruals account for a higher proportion of revenue or when the firms' business model requires deferral of revenue, both of which give rise to higher accounting flexibility in revenue recognition, the firm has higher probability to manipulate revenue.

Finally, the results of this study suggest that to identify potential revenue manipulation, it is important to examine both accounts receivable and unearned revenue accruals.⁵ Most of prior studies that focus on revenue manipulation only examine accounts receivable accruals (e.g., Marquardt and Weidman 2004; Stubben 2006), with the exception of Caylor (2006). This study suggests that unearned revenue also plays an important role in revenue manipulation. This is also consistent with Rountree (2006) who finds that a majority of firms affected by SAB 101 prematurely recognized revenues that should have been deferred.

⁵ Technically, unearned revenues are deferrals rather than accruals. However, throughout the paper, I label unearned revenues as accruals and do not distinguish between accruals and deferrals.

In addition to the above contributions to the earnings management literature, this study also suggests a potential unintended consequence of analysts' activities. Analysts are widely viewed as information intermediaries that facilitate the market efficiency (e.g., Gleason and Lee 2003). However, this study shows that when analysts provide sales forecasts, the firm is more likely to manipulate revenue, even after controlling for factors that are associated with analysts' incentives to issue sales forecasts.⁶ Subject to the possibility that this result is due to some uncontrolled-for factors of the importance of revenue, it suggests analysts' activities could potentially lead to inefficient capital allocation.

The rest of the paper proceeds as follows. Section 2 develops hypotheses and describes research design. Section 3 discusses the sample. Section 4 provides empirical results. Section 5 concludes.

2. Hypothesis Development and Research Design

2.1. Incentives to Manipulate Revenue

Anderson and Yohn (2002) find that restatements of revenues are associated with significantly more negative stock returns than other restatements. Palmrose and Scholz (2004) find that the likelihood of litigation after a restatement is higher when revenues are involved. Thus, it appears that among different earnings management methods, revenue manipulation is one of the most costly.

Given the higher cost associated with (detected) revenue manipulation, it is curious why a significant portion of firms choose to manage revenue as opposed to other earnings

⁶ Note that this result is different from the evidence in Plummer and Mest (2001) and Stubben (2006) that firms manipulate revenue to meet analysts' sales forecasts. Specifically, these studies do not compare the revenue manipulation behavior between the firms with and without analysts' sales forecasts, and thus do not examine the effects of analysts' sales forecasts on the probability of revenue manipulation.

components. There must be earnings management incentives that are specifically related to revenue, such that the benefit from manipulating revenue is higher than the corresponding cost. I discuss these incentives below and develop testable hypotheses.

Low value relevance of earnings

Prior literature suggests a major incentive for managing earnings is the capital market motivation (e.g., Healy and Wahlen 1999). Accordingly, I predict that firms are more likely to manipulate revenue as opposed to other components of earnings when the firms' valuation is more contingent on revenue than on earnings. The first economic characteristic that I examine is the value relevance of earnings. Low value-relevance of earnings creates a demand for additional information to help market participants assess the firms' current and future performance. Given the relatively high persistence of revenue information (e.g., Ertimur et al. 2003), when earnings are of low value relevance, market participants are more likely to place high weights on revenue when valuing the securities, giving rise to the incentive to manipulate revenue.

A potential indicator of the value relevance of earnings is earnings volatility. For example, Standard and Poor's uses "earnings stability", which is essentially the inverse of earnings volatility as a measure for its earnings quality rank model (Bos 2000). Ertimur and Stubben (2005) predict and find that analysts are more likely to issue sales forecasts for firms with higher earnings volatility, consistent with the importance of revenue in valuing stocks with volatile earnings.

I also examine another potential indicator of low value relevance of earnings, namely, the frequency of loss reporting. Hayn (1995) posits that losses are not expected to persist due to investors' liquidation options and hence are poor indicators of future performance.

Consistently, she finds that the losses have lower value relevance than profits. More specifically related to the importance of revenue, Kama (2004) and Callen et al. (2005) provide evidence that when firms report losses, revenues are value relevant while earnings are not.⁷ Consistent with the importance of revenue in valuing loss firms, Ertimur and Stubben (2005) also find that analysts are more likely to issue sales forecasts for firms reporting losses. In addition, Callen et al. document that firms reporting losses more aggressively invest in accounts receivables and are more likely to restate revenues.

In summary, my first set of hypotheses is as follows (in alternative form):

H1a: Ceteris paribus, a firm is more likely to manipulate revenue when it has higher earnings volatility.

H1b: Ceteris paribus, a firm is more likely to manipulate revenue when it reports loss more frequently.

Growth perspectives

Ertimur et al. (2003) show that investors value revenues of growth firms significantly more highly than value firms. Consistent with the importance of revenue for growth firms, Ertimur and Stubben (2005) document analysts are more likely to issue sales forecasts for firms with higher growth perspectives. To the extent that reporting strong revenues is more important for growth firms in securities valuation, these firms have greater incentives to manipulate revenue. In support of this conjecture, Stubben (2006) finds that growth firms are more likely to use discretionary accounts receivable accruals to manipulate revenues.

Following Ertimur et al. (2003), I use book-to-market ratio to measure growth perspectives. As an additional measure of growth perspective, I also examine R&D intensity

⁷ Kama (2004) is a short-window study that focuses on market reactions to earnings surprises and revenue surprises while Callen et al. (2005) document the value relevance by regressing market value on earnings and revenue.

since growth firms tend to have high R&D investment. Kama (2004) shows that when firms have higher R&D expenditures, the market reacts more to the revenue surprises than to the earnings surprises, which creates incentives for revenue manipulation. Thus, my second set of hypotheses is as follows (in alternative form):

H2a: Ceteris paribus, a firm is more likely to manipulate revenue when it has lower book-to-market ratio.

H2b: Ceteris paribus, a firm is more likely to manipulate revenue when it has higher R&D expenditures.

Importance of revenue in determining earnings

I next predict firms whose revenues are more important in determining earnings have greater incentives to manipulate revenue. I am specifically interested in firms with high operating margin and gross margin ratios. For example, for firms with higher operating margins, profitability is likely to be driven by sales. Therefore market participants' reactions to sales growth are likely to be stronger for these firms, which creates possible revenue manipulation incentives. While the same market-based reasoning can be applied to firms with higher gross margin (probably to a less extent), firms with higher gross margins have an additional incentive to manipulate revenue. That is, they reap larger benefits from every dollar of fraudulent revenue because of a higher effect on earnings. Prior research provides evidence consistent with both conjectures. For example, Plummer and Mest (2001) document that firms with higher operating margins are more likely to report higher sales surprises relative to analyst sales forecasts, potentially consistent with revenue manipulation. Stubben (2006) finds some evidence that firms with higher gross margins have significantly positive discretionary accounts receivable accruals.

Thus, my next set of hypotheses is (in alternative form):

H3a: Ceteris paribus, a firm with higher operating margin is more likely to manipulate revenue.

H3b: Ceteris paribus, a firm with higher gross margin is more likely to manipulate revenue.

Meeting analyst sales forecasts

Plummer and Mest (2001) document a discontinuity in the sales forecast error distribution, where the forecast error is measured using analyst sales forecasts. This evidence suggests that in addition to managing earnings to meet analysts' earnings forecasts (e.g., Degeorge et al. 1999), managers also manage sales to meet analysts' sales forecasts. Stubben (2006) also shows that managers manage accounts receivables to meet analysts' sales forecasts.

However, not all analysts issue sales forecasts.⁸ It is likely that analysts' issuing sales forecasts itself provides an incentive for managers to manipulate revenue. Graham et al. (2005) document that executives believe that meeting benchmarks leads to credibility in the market and higher stock prices. More specifically related to analyst sales forecasts, Magrath and Weld (2002) argue that the pressure to meet sales forecasts is particularly intense (as compared to pressure to meet earnings forecasts) and may be the primary catalyst leading to "questionable, improper, or fraudulent revenue-recognition practices." Thus, when there are analyst sales forecasts outstanding, managers have an incentive to meet these forecasts to avoid loss in credibility.⁹ This leads to the following hypothesis in alternative form:

H4: Ceteris paribus, when a firm has outstanding analyst sales forecasts, it is more likely to manipulate revenue than when the firm has no such forecasts.

⁸ Ertimur and Stubben (2005) examine analysts' incentives to issue sales forecasts.

⁹ The existence of analysts' sales forecasts may indicate the importance of revenues for the particular firm, which also creates incentives for revenue manipulation. I discuss this issue in Section 2.3.

2.2. Opportunities to Manipulate Revenue

The primary role of accruals is to overcome timing and matching problems associated with cash flows-based performance measures (e.g., Dechow 1994). For financial reports to convey managers' information about their firms' performance, accounting standards must allow managers to exercise judgment in financial reporting. However, because auditing is imperfect, the judgment and the resulting flexibility allowed in accrual accounting also create opportunities for earnings management (Healy and Wahlen 1999). This probably explains why the earnings management literature has largely focused on accrual management. However, relatively little research has directly linked the degree of accounting flexibility available to a firm with the likelihood that it manages the accruals. Accordingly, I next examine the roles of accounting flexibility in revenue manipulation.

In revenue recognition, because managers have to make judgment regarding whether and when the revenue is "earned" and "realized or realizable" (the "revenue recognition principle," Financial Accounting Standards Board 1984), they have the flexibility to decide for which accounting period the revenue should be recognized. This flexibility involves the accounts receivable accruals and unearned revenue accruals, which I discuss next respectively.

Accounts receivable accruals

Since almost all U.S. firms have credit sales,¹⁰ accounts receivable accruals are almost a necessary accrual component of revenue. Accounts receivable is commonly used to manipulate earnings through techniques such as trade-loading and premature revenue recognition (Dechow et al. 1996). I argue that firms whose accounts receivable accruals

¹⁰ For example, for all Compustat firms with a greater-than-zero total assets balance in 2002, 94% of them have a greater-than-zero accounts receivable balance; only 6% of them have a zero or missing accounts receivable balance. For the 513 firm-years in the restatement sample, all have greater-than-zero accounts receivable balances.

account for a higher percentage of the reported sales¹¹ have higher opportunities and hence higher probabilities to manipulate revenue. This measure is similar to the ratio of the magnitude of accruals relative to the magnitude of operating cash flows applied in Burgstahler et al. (2006). However, unlike Burgstahler et al. who interpret this ratio as the extent of exercise of reporting discretion and use it as a direct indicator of earnings management, I use it as a proxy for discretion available to a company and thus a proxy for opportunity to manipulate revenue.¹² This is because for firms with higher accounts receivable accruals relative to sales, sales are less (more) supported by cash flows (accruals), providing higher flexibility in the accrual process. Further, when firms manipulate accounts receivable for the same amount, the effect is likely less noticeable for these firms than for other firms.

Thus, my hypothesis regarding the opportunity to manipulate revenue in terms of accounts receivable accruals is (in alternative form):

H5a: Ceteris paribus, the higher the accounts receivable accruals as a percentage of sales, the more likely a firm manipulates revenue.

Unearned revenue accruals

While similar logic discussed about accounts receivable accruals could be applied to unearned revenue accruals, I focus on the existence, as opposed to the magnitude, of unearned revenues accruals. This is because a significant portion of U.S. companies do not have deferred revenue accruals given their business model.¹³ When firms have sales transactions

¹¹ This higher percentage of accounts receivable accruals could arise from the firm's credit policy or growth.

¹² It is possible that revenue manipulation results in the higher accounts receivable accruals as a percentage of sales. I discuss in Section 2.3 for research design choices that mitigate this concern over the direction of causality.

¹³ For example, for all Compustat firms with a greater-than-zero total assets balance in 2002, only 27% (in contrast to 94% for accounts receivable balance, see footnote 10) of them have a greater-than-zero unearned revenue balance. Similarly, for the 513 firm-years in the restatement sample, only 28% have greater-than-zero unearned revenue balances.

that require deferring unearned revenue under GAAP, the managers have to exercise judgment regarding whether a specific sales transaction should be recognized as revenue immediately or deferred into future periods. This provides higher flexibility and hence opportunity for recognizing revenue prematurely (i.e. before it is earned). Rountree (2006) finds that a majority of firms affected by SAB 101 were recognizing cash revenue prematurely. In other words, for revenues that should have been deferred as deferred revenues, these firms chose to recognize revenue immediately, which is inconsistent with GAAP. In light of the above reasoning and the evidence in Rountree (2006), I have the following hypothesis regarding the existence of unearned revenue accruals (in alternative form):

H5b: Ceteris paribus, when the firm has sales transactions that give rise to unearned revenue accruals, it is more likely to manipulate revenue.

2.3. Research Design

I use the Financial Statement Restatement Database compiled by the United States General Accounting Office (GAO 2003) to identify revenue manipulation and other earnings management cases. Not all accounting restatements are indicative of earnings management. The GAO database focuses on financial restatements resulting from accounting irregularities. The database excludes restatements resulting from mergers and acquisitions, discontinued operations, stock splits, issuance of stock dividends, currency-related issues, changes in business segment definitions, changes due to transfers of management, changes made for presentation purposes, general accounting changes under GAAP, litigation settlements, and arithmetic and general bookkeeping errors. GAO specifies in the report that it also excludes restatements resulting from accounting policy changes, with the exception of restatements due to Staff Accounting Bulletin No. 101 (SAB 101). The basis for inclusion of SAB 101 related

restatements is SEC officials' belief that SAB 101 represents a clarification of existing guidance, and that any restatement made in response to the bulletin would have been to correct a previous misstatement of financial reports. This is consistent with prior research that uses SAB 101 restatements to identify firms with aggressive revenue recognition practices (e.g., Altamuro et al. 2005).¹⁴

Thus this database includes restatements that are more likely due to earnings management or aggressive accounting (e.g., Desai et al. 2006). The advantage of using this sample is that it avoids the limitations associated with procedures that require estimating the unobservable discretionary accruals as a proxy for earnings management. The literature has identified specification and power issues with using discretionary models such as the Jones (1991) model. For example, Fields et al. (2001) warn that relying on existing accruals models may result in serious inference problems and that what is labeled accruals management may in fact be evidence of actual performance.

The revenue recognition-related restatement firm-years are considered as my treatment sample. I use the non-revenue restatement firm-years as my control sample. Since revenue manipulation by definition is a form of earnings management, comparing firm-years that use revenue to manage earnings (or revenue alone) with firm-years that use other earnings management methods controls for the general incentives to manage earnings, and provides insights regarding the unique incentives to manipulate revenue as opposed to other earnings components.

To test my hypotheses, I estimate the following logit model (firm-year subscripts omitted):

¹⁴ In the 215 revenue restatement firm-years in my sample, 48 (22%) are related to SAB 101.

$$Prob(RM = 1) = f(b_0 + b_1EVOL + b_2LOSS + b_3BM + b_4RDX + b_5PM + b_6GM + b_7FCAST + b_8USEAR + b_9USEUR + b_{10}LOGMV + e) \quad (1)$$

RM is an indicator variable that equals to one for the revenue restatement sample, and zero for the non-revenue restatement sample. All independent variables except for *FCAST* and *USEUR* (see below) are measured prior to the event year, i.e. the year in which the firm applies aggressive accounting that results in the restatement, to ensure that the incentive and opportunity variables are measured before the earnings management. In general, stock variables (*BM* and *LOGMV*) are measured at the beginning of the event year, and all other, flow variables (*EVOL*, *LOSS*, *RDX*, *PM*, *GM*, *USEAR*) are measured as the average over the six years prior to the event year, with a minimum of three years data requirement (hereafter, “measurement period”).

Specifically, *EVOL* and *LOSS* are used to test hypotheses H1a and H1b respectively. *EVOL* is the earnings volatility, measured as the standard deviation of earnings (data18) deflated by the absolute value of the mean (Ertimur and Stubben 2005). The standard deviation and the mean are measured over the measurement period. A positive coefficient on *EVOL* is consistent with H1a. *LOSS* measures the frequency (as a percentage) of loss reporting (data18<0) in the measurement period and is expected to have a positive coefficient to be consistent with H1b.

BM and *RDX* test H2a and H2b respectively. *BM* is the book to market ratio, measured as the book value of equity (data60) deflated by the market value of the firm (data25xdata199) at the beginning of the event year. *RDX* is the average value of R&D expense (data45) deflated by sales (data12) over the measurement period. When the R&D expense is missing from Compustat, it is set as zero. *BM* is expected to have a negative coefficient while *RDX* is expected to have a positive coefficient.

PM, used to test H3a, is the operating margin and measured as operating profit before depreciation (data43) deflated by sales (data12).¹⁵ *GM* is the gross margin measured as one minus cost of goods sold (data43) deflated by sales (data12). Again, both of them are averaged over the measurement period. Both *PM* and *GM* are expected to have a positive coefficient.

FCAST is an indicator variable that equals to one if the firm has at least one consensus sales forecasts calculated by the I/B/E/S since the beginning of the fiscal year, and zero otherwise. If analyst sales forecast creates incentives for revenue manipulation (H4), *FCAST* is expected to have a positive coefficient.

It is important to note that analysts may self select to issue sales forecasts. Specifically, analysts may issue sales forecasts only for firms whose sales information is important in valuation, and these firms may have incentives to manipulate revenue even in the absence of analyst sales forecasts. For example, Ertimur and Stubben (2005) find that analysts tend to issue sales forecasts when earnings are less informative and when the firm has high growth perspectives. Since my model includes proxies for both value relevance of earnings and growth perspectives, to the extent that these variables effectively control for the incentives for analysts to issue sales forecasts, the *FCAST* variable captures the incentives for revenue manipulation arising from the forecasts themselves as opposed to the importance of revenue.

USEAR is accounts receivable accruals (-data302, from the cash flow statement) as a percentage of sales (data12), averaged over the measurement period. It is possible that it is the revenue manipulation that leads to the high accounts receivable accruals as a percentage of sales (i.e. the causality reverses). However, I measure the average percentage over the years

¹⁵ The results are not sensitive when I use profit margin defined as net income (data18) deflated by sales (data12).

prior to the restatement year to ensure the appropriate lead-lag structure. Further, to the extent that revenues are not manipulated in the prior years and that even when they are, the effects of the manipulation are mitigated by taking the average,¹⁶ my measure of *USEAR* mitigates the concern over the direction of the causality. The coefficient on *USEAR* is expected to be positive to be consistent with H5a.

As explained above, to test H5b, I focus on the existence of sales transactions that give rise to unearned revenues. I use the existence of a greater-than-zero unearned revenue balance to identify the existence of such transactions. Accordingly, *USEUR* is an indicator variable that equals to one if the firm has a greater-than-zero current unearned revenue balance (data356) or a greater-than-zero long-term unearned revenue balance (data397), and zero otherwise. Because Compustat does not report unearned revenue (extensively) until 2001 (2002), *USEUR* is measured using Compustat information in year 2002. This is based on the assumption that a firm's business model that affects the use of an unearned revenue account remains relatively constant over the sample period. To the extent that this measure captures the accounting flexibility arising from transactions that require revenue deferral, I expect the coefficient on *USEUR* to be positive.

Finally, *LOGMV* is a control variable that controls for firm size. It is measured as the log of market value (data25xdata199) at the beginning of the event year.

¹⁶ This is because earnings management (including revenue manipulation) has to be reversed overtime by definition.

3. Sample Description

The GAO database includes 919 restatement announcements by 845 firms from January 1, 1997 to June 30, 2002. The majority of the GAO database is compiled using the Lexis-Nexis “Power Search” command and the “U.S. News, Combined” database, with the keyword of “restate,” “restated,” “restated,” “restating,” or “restatement” within 50 words of “financial statement” or “earnings.” The database also includes some restatements identified through other sources, such as the SEC.

As described in Table 1, I first match the GAO sample with Compustat firm identifications based on company name or ticker symbol and find 759 matches.¹⁷ The GAO database includes only the date of the restatement announcements, not the fiscal period for which the financial statements are restated. To identify the event year, I search the Lexis-Nexis database for the original restatement announcements. When the announcements indicate there are multiple years’ financial statements restated, I use the earliest fiscal year as the event year to ensure my measurement period is not contaminated by the earnings management. When there is no specific restatement period mentioned in the announcements or no announcements found in the Lexis-Nexis database, I use the most recent fiscal year that ends at least three months before the announcements to ensure the original financial statements to have been filed with the SEC.

¹⁷ To align the time period between the GAO sample and the Compustat data, I require the firm have non-missing sales information from Compustat in the latest fiscal year that ends at least three months prior to the restatement announcement date provided by the GAO database.

Some firms made multiple announcements for financial restatements for the same year.¹⁸ Because my empirical analyses are at the firm-year level, I retain only one observation for each firm-year. This reduces the sample to 734 firm-years. Finally, missing variables required in estimating model (1) loses additional 221 observations, yielding a final restatement sample of 513 firm-years.

If a firm-year has any revenue recognition-related restatement, regardless of the existence of any other account related restatements (in the same announcement or in separate announcements), I include the firm-year in the revenue restatement sample. Among the 513 firm-years, 215 (42%) have revenue recognition-related restatements and are included in my treatment sample. The remaining 298 (58%) GAO restatement firm-years constitute my control sample.¹⁹ The relatively high percentage (42%) of revenue-related restatements is consistent with prior anecdotal and empirical evidence.

Table 2 describes restatement samples by industry (Panel A), event year (Panel B), party of initiation (Panel C), and stock exchange (Panel D). In Panel A, the 48-industry classification is based on Fama and French (1997). Almost all industries are represented in the sample except for the industries of aircraft, agriculture, coal, ship building and railroad equipment, tobacco product, and candy and soda. Within the 42 industries represented in the sample, five of them have no revenue restatements (defend, alcoholic beverages, shipping containers, nonmetallic mining, and textiles), while all industries have non-revenue restatements.

¹⁸ Most of the multiple announcements relate to the same restatements. For example, the first announcement indicates the possibility to restate previous financial statements and the second provides detailed information about the restatements.

¹⁹ The most frequent reasons for non-revenue restatements are cost or expense related, restructuring, assets or inventory related, and securities related.

In general, the industries of business services, retails, computers, electronic equipment, pharmaceutical products, machinery, and wholesales have the highest revenue restatement frequencies, as well as the highest restatement frequencies. Specifically, these seven industries each have more than 20 restatement firm-years and no less than 10 revenue restatement firm-years. Among them, the retails industry has the highest relative frequency of revenue-related restatements (58%), followed by the electronic equipment industry (55%) and the pharmaceutical products industry (52%).

In terms of the distribution over time, one restatement goes as back as year 1992 and four restatements are for 1994. Most of the restatements, however, apply to financial statements in 1995-2002. For each year during 1997-2001, there are more than 20 revenue restatements, and more than 60 restatements of any type. Year 2000 has the highest revenue restatement frequency (75 cases) and restatement frequency (129 cases), probably because SAB 101, which requires retroactive application, became effective in 2001. The most frequent non-revenue restatements occur in 1998 (62 cases) and 1999 (61 cases). However, because of the relatively short sample period and the time lag between the restatement year and the announcement year, the description in Panel B is inadequate to assess the overtime trend of restatements in general or revenue restatements in particular.

Panel C reports the restatements by party of initiation. Among the 513 restatements, about 36% have no identified party of initiation. 44% are initiated by the company, 13% by the SEC, 6% by the auditor, and the remaining 1% by other parties such as external party or stock exchange. The relative distribution between revenue and non-revenue restatements is

similar for auditor initiated (47% are revenue related) or company initiated (45%). However, among the SEC-initiated restatements, only 20% are revenue restatements.²⁰

Finally, Panel D lists the restatements by stock exchange. Consistent with the expectations that smaller, growth firms are more likely to manage earnings and/or revenue, Nasdaq firms have the highest restatement frequency (281, 54% of the 513 restatements) as well as the highest revenue restatement frequency (131, 61% of the 215 revenue restatements). They also have the highest relative frequency of revenue restatements; 47% of the 281 restatements by Nasdaq firms involve revenue. NYSE firms also have relatively high frequency of revenue and non-revenue related restatements.

4. Empirical Results

4.1. Descriptive Statistics and Univariate Tests

Panel A of Table 3 presents descriptive statistics of the sample. All continuous variables are winzorized at the 1% and 99% of the variables distribution. The mean earnings volatility is 3.29 while the median is 1.02, suggesting right skewness in the variable's distribution. The standard deviation is also relatively higher (7.85). On average (at the median), the sample firms report losses 33% (20%) of the time in the six years prior to the event year. The book-to-market ratio has a mean (median) of 0.52 (0.38); the R&D accounts for 33% of sales on average for the sample, although the median is only 1%. The average profit margin is -0.42 and the median is 0.09, suggesting left skewness of the variable. Similarly, the average gross margin is 0.10 and the median is 0.35. Only 50% of the sample

²⁰ This appears inconsistent with prior literature that revenue related cases account for a considerable percentage of SEC Accounting and Auditing Enforcement Releases (e.g., Dechow and Schrand 2004). However, it is possible that many of the SEC AAERs are not *initiated* by the SEC.

firms have analyst sales forecasts outstanding for the event year, consistent with the conjecture that analysts do not pervasively issue sales forecasts during the sample period. Regarding the revenue recognition accruals, the average (median) firms' accounts receivable accruals account for only 4% (2%) of the sales. In addition, only 28% of the sample firms have unearned revenue accounts, consistent with the assumption that only a small portion of U.S. firms have business transactions that require revenue deferral. Finally, log of market capital has a mean of 5.52 and a median of 5.47.

Panel B reports the Pearson correlation matrix. Of particular interest are the correlations between *RM* and the incentive and opportunity variables. The correlations are generally low (magnitude < 0.20). As expected, *RM* is significantly and negatively correlated with *BM*, and significantly and positively correlated with *FCAST*, *USEAR*, and *USEUR*. However, *RM* is not statistically correlated with *EVOL*, *LOSS*, *RDX*, *PM*, and *GM*. The correlation between *RM* and *LOGMV* is also significantly positive.

Table 4 presents univariate analyses for the hypotheses. Inconsistent with the prediction, the revenue restatement sample has earnings volatility lower than that of the control sample. The mean (median) for revenue restatements firms are 2.74 (0.98), in comparison to 3.68 (1.09) for non-revenue restatement firms, although the differences are insignificantly different from zero. Similar inferences can be drawn from the loss frequency as well. Specifically, both the treatment and the control samples report losses 33% of the time on average, and the medians are 20% and 25% respectively. Thus, the univariate results are inconsistent with H1a and H1b that firms with lower value relevance of earnings are more likely to manipulate revenue.

Consistent with expectations regarding book-to-market ratios, revenue restatement sample has significantly lower book-to-market ratios for both the mean and the median (0.43, 0.29) than the non-revenue restatement sample (0.58 and 0.42) respectively. However, the difference for R&D intensity, although in the predicted direction, is not statistically significant.

Regarding the operating margins, revenue and non-revenue restatement samples have means of -0.32 and -0.51 respectively and medians of 0.09 and 0.10 respectively; the differences are not statistically significant. For gross margins, the differences in both the means (0.11 vs. 0.09) and the medians (0.38 vs. 0.32) are in the predicted direction, although only that in the median is statistically significant. For the revenue restatement sample, 60% of the firm-years have outstanding analyst sales forecasts, in comparison to only 43% for the non-revenue restatement sample. The difference is significantly different for both the means and medians. This is consistent with the revenue manipulation incentive that arises from analysts' activities.

Turning to the accounting flexibility measures, as expected, the revenue-restatement sample has significantly higher accounts receivable accruals as a percentage of sales (mean of 0.05 and median of 0.03) than the non-revenue restatement sample (mean of 0.04 and median of 0.02). In terms of unearned revenues, 36% of the revenue restatement sample has greater-than-zero unearned revenue account balance, in comparison to 22% for the non-revenue restatement sample. The difference is again statistically significant. Both sets of evidence are consistent with the effects of accounting flexibility on revenue manipulation.

Finally, for completeness, I also report the univariate difference for *LOGMV* between the treatment and the control sample. The revenue restatement sample is significantly larger than the non-revenue restatement sample, for both the means and the medians.

4.2. Logit Analyses

Table 5 presents the logit analyses for my hypotheses. Panel A is based on estimation of model (1) using the raw data after winzORIZATION at the 1st and 99th percentiles for all continuous variables. Consistent with univariate tests and inconsistent with H1a and H1b, the coefficients on *EVOL* and *LOSS* are insignificant, although *LOSS* has the expected sign. Thus, the earnings volatility and loss frequency do not seem to affect the probability of revenue manipulation relative to other earnings management methods. One possible explanation is that when firms have volatile earnings or frequently report losses, they also have incentives to smooth earnings (Trueman and Titman 1988) or to avoid reporting losses (e.g., Burgstahler and Dichev 1997) by earnings management. Such incentives to manage earnings are not dominated by the incentives to manipulate revenue.

Consistent with univariate test and H2a, book-to-market ratio has the expected negative coefficient of -0.39 and the coefficient is significant at the 0.07 level. The marginal effect is also of reasonable size; for one standard deviation change in *BM*, the probability of revenue manipulation is increased by 4.7%. This result suggests that firms with higher growth perspectives as measured by book-to-market ratios are more likely to manipulate revenue. On the other hand, *RDX* has the expected positive coefficient but the coefficient is indistinguishable from zero, inconsistent with H2b.

Operating margin has a significantly positive coefficient of 0.22, supporting H3a. It also has the highest marginal effects on the probability of revenue manipulation. For one standard deviation change in *PM*, there is an increase of 13.3% in the likelihood of revenue manipulation. In contrast, *GM* has a negative coefficient of -0.20, inconsistent with both the univariate test and H3b. This is also inconsistent with Stubben (2006) who finds that firms with higher gross margins are more likely to manipulate accounts receivable accruals to meet analyst earnings forecasts or sales forecasts.

In support of H4, *FCAST* has a positive and significant coefficient of 0.51, suggesting that even after controlling for value relevance of earnings and growth perspectives, firms with outstanding analyst sales forecasts are significantly more likely to manipulate revenue. Specifically, the marginal effect suggests that all else equal, a firm with analyst sales forecasts outstanding is 11.7% more likely to manipulate revenue than a firm without such forecasts. This supports Magrath and Weld's (2002) conjecture that analyst sales forecasts provide an incentive for aggressive, fraudulent revenue recognition practices. However, this result should be interpreted with caution because despite the controls for value relevance of earnings and growth, the existence of analyst sales forecasts may still represent the importance of revenue.

The coefficient on *USEAR* is positive as predicted, but only significant at the 0.17 level. In contrast, *USEUR* has a positive coefficient of 0.52 that is significant at the 0.01 level, consistent with H5b.²¹ The marginal effect of *USEUR* suggests that *ceteris paribus*, when a firm has sales transactions that give rise to unearned revenues, the probability to manipulate revenue is increased by 12%. Finally, the coefficient on *LOGMV* is insignificantly positive.

²¹ Further analysis indicates that the effect of *USEUR* is driven by current unearned revenues, probability because the reversal would occur in the short-term, decreasing the probability of detection.

Panel B reports the model estimation using industry-adjusted data. Specifically, for each of the continuous variable (i.e., all variables except for *RM*, *FCAST*, and *USEUR*), I adjust the variable by the median of all Compustat firms of the same industry and year. The results are generally consistent with those reported in Panel A, except that *USEAR* now becomes significantly positive at the 0.09 level. This result regarding *USEAR* is consistent with H5a and with the univariate test reported in Table 4. The marginal effect suggests that for one standard deviation change in *USEAR*, the probability to manipulate revenue is increased by 3.8%.

In summary, results from the logit analysis provide evidence regarding both incentives and opportunities that are specifically related to revenue manipulation. Specifically, firms are more likely to manipulate revenue when they have higher growth perspectives, have higher operating margins, or have analyst sales forecasts outstanding. The flexibility given rise from high accounts receivable accruals as a percentage of sales and from sales transactions that require revenue deferrals also provide opportunities to manipulate revenue, significantly increasing the probability of revenue manipulation. Taken together, these results suggest the uniqueness of revenue manipulation in earnings management and provide some of the first explanations why revenue manipulation has been consistently found to be the most frequent earnings management method.

4.3. Additional Analyses

As discussed earlier, prior literature suggests higher cost associated with revenue manipulation than other types of earnings management methods. In this subsection, I provide

some preliminary analyses of the consequences of revenue manipulation by examining the market reactions to the restatement announcements and the subsequent CEO turnovers.

Market reactions to restatement announcements

For the 759 restatement announcements²² that I am able to find identification matches on Compustat, I merge them with CRSP database to obtain return information. This process results in 616 announcements that have returns information available for the three days around the announcement date. 261 (42%) of the 616 announcements involve revenue, which I classify as the revenue restatement sample. The remaining 355 announcements are included in the non-revenue restatement sample.

In general, consistent with prior studies (Anderson and Yohn 2002; Palmrose et al. 2005), financial restatement announcements trigger significantly negative market reactions. The average market reaction over the 3-day window (i.e., trading day -1 through +1) around the restatement announcement date is -7.50% and the median is -3.61%, both significantly lower than zero at the 0.01 level or better (not tabulated). Panel A of Table 6 presents the raw returns (*RAW*) and the size-adjusted returns (*SAR*) conditional on the nature of the restatements. The mean (median) raw returns for the revenue restatement sample is -9.74% (-4.79%), compared with -5.86% (-2.26%) for the non-revenue restatement sample. The difference is significant at the 0.01 level or better for both the means and the medians. The implications based on the size-adjusted returns are similar. Thus, consistent with prior literature (Anderson and Yohn 2002), the revenue-related restatement announcements do trigger more negative market reactions and are hence more costly to the restating firms. The more negative market reactions to the revenue-restatement announcements are probably due

²² Note that this analysis is at the firm-announcement rather than the firm-year level (as in the previous sections).

to the important implications of revenue information for future growth, which is perhaps particularly true for the revenue-restatement sample as show in the main results.

CEO turnover after restatement announcements

Desai et al. (2006) find that 60% of the restating firms experience a turnover of at least one top manager within 24 months of the restatement compared to 35% among age-, size-, and industry-matched firms. Thus, top managers bear significant reputational costs for aggressive accounting. Given the significantly more negative market reactions to revenue-related restatements documented above and the significantly higher probability of litigations associated with revenue-related restatements (Palmrose and Scholz 2004), it appears that CEOs should bear higher reputational cost for revenue-related restatements. Accordingly, I examine the effects of revenue restatements on CEO turnover next.

Specifically, I merge the sample with the ExecComp database from Compustat and examine the CEO turnover. I am able to obtain a sample of 186 firm-years, 88 (47%) of which are revenue restatement firm-years. Consistent with Desai et al. (2006), I focus on the year of the announcements and two subsequent years. *TURNOVER* equals to one if the firm has a CEO change over this period, and zero otherwise. When the exiting CEO is at least 65 years old, *TURNOVER* is set to zero. Out of the 186 restatements, 80 (43%) have CEO turnovers over the period of consideration (not tabulated).²³ Panel B of Table 6 presents CEO turnover results conditional on the nature of the restatements. 45% of the revenue restatement firms have replaced their CEOs over the period considered, in comparison to 41% for the non-revenue restatement firms. While in the expected direction, the different is not statistically significant.

²³ This is lower than the 60% of turnover rates in Desai et al. (2006). However, this study focuses exclusively on CEO turnovers while Desai et al. focus on top management turnovers including CEO, Chairman, and President.

In summary, although corporate boards appear to impose significant penalties on managers for violating GAAP (Desai et al. 2006), the boards do not appear to distinguish between revenue related and non-revenue related aggressive accounting. This is somewhat surprising given the significantly more negative effects of revenue manipulation on cost of equity as shown above and the significantly higher litigation cost (Palmrose and Scholz 2004). However, a comprehensive analysis of this issue is beyond the scope of this study.

5. Concluding Remarks

This study examines incentives and opportunities for revenue manipulation. By focusing on economic characteristics that have specific implications for revenues, I find that growth perspectives, operating margins, and analysts' sales forecasting activities are significantly related to the probabilities of revenue manipulation. In addition, the probability of revenue manipulation also increases in the accounting flexibility in deciding when to accrual accounts receivables and when to defer revenues.

The results in this study imply that different earnings management methods are not equivalent to each other. Because of the unique role of revenues in valuations, managers have preferences in manipulating revenues over other earnings management methods given particular incentives and/or opportunities. Thus, this paper provides some of the first explanations for the high frequency of revenue manipulation among different types of earnings management. Such results have implications for investors, analysts, standard setters, or researchers who want to identify specific contexts where firms are more likely to manipulate revenue.

References

- Altamuro, J., A. L. Beatty, and J. Weber. 2005. The Effects of accelerated revenue recognition on earnings management and earnings informativeness: Evidence from SEC Staff Accounting Bulletin No. 101. *The Accounting Review* 80 (April): 373-401.
- Anderson, K. L., and T. L. Yohn. 2002. The effect of 10-K restatements on firm value, information asymmetries, and investors' reliance on earnings. Working paper, Georgetown University.
- Bos, R. 2000. An overview of Standard & Poor's earnings and dividend quality rank model. Standard & Poor's, New York, NY.
- Bowen R. M., A. K. Davis, and S. Rajgopal. 2002. Determinants of revenue-reporting practices for internet firms. *Contemporary Accounting Research* 19 (Winter): 523-562.
- Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24 (1): 99-126.
- Burgstahler, D., L. Hail, and C. Leuz. 2006. The importance of reporting incentives: Earnings management in European private and public firms. *The Accounting Review*: Forthcoming.
- Callen, J. L., S. W. Robb, and D. Segal. 2005. Revenue manipulation and restatements by loss firms. Working paper: Toronto University.
- Caylor, M. 2006. Strategic revenue recognition around earnings benchmarks. Working paper: Georgia State University.
- Desai, H., C. E. Hogan, and M. S. Wilkins. 2006. The reputational penalty for aggressive accounting: Earnings restatements and management turnover. *The Accounting Review* 81 (January): 83-112.
- Dechow, P. 1994. Accounting earnings and cash flows as measures of firm performance. *Journal of Accounting and Economics* 18 (1): 3-42
- Dechow, P., and C. Schrand. 2004. Earnings quality. The Research Foundation of CFA Institute. Charlottesville, Virginia.
- Dechow, P., R. Sloan, and A. Sweeney. 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13: 1-36.
- Degeorge, F., J. Patel, and R. Zeckhauser. 1999. Earnings management to exceed thresholds. *Journal of Business* 72 (January): 1-33.

Ertimur, Y., J. Livnat, and M. Martikainen. 2003. Differential market reactions to revenue and expense surprises. *Review of Accounting Studies* 8: 185-211.

Ertimur, Y., and S. Stubben. 2005. Analysts' incentives to issue revenue and cash flow forecasts. Working paper: Stanford University.

Fama E., and K. R. French . 1997. Industry costs of equity. *Journal of Financial Economics* 43(February): 153-193.

Fields, T. D., T. Z. Lys, and L. Vincent. 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31 (September): 255-307.

Financial Accounting Standards Board. 1984. Statement of financial accounting concepts No. 5, Recognition and measurement in financial statements of business enterprises. FASB, Norwalk, CT.

General Accounting Office. 2003. Financial Statement Restatement Database. Report GAO-03-395R (January).

Gleason, C. A., and C. M.C. Lee. 2003. Analyst forecast revisions and market price discovery. *The Accounting Review* 78 (1): 193-225.

Graham, J., C. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40: 3-73.

Hayn, C. 1995. The information content of losses. *Journal of Accounting & Economics* 20: 155-192.

Healy, P. M., and J. M. Wahlen. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13 (4): 365-383.

Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29: 193-228.

Kama, I. 2004. Revenue and earnings as key value drivers in various contexts: Implications for financial management and statement analysis. Working paper: London Business School.

Magrath, L., and L. Weld. 2002. Abusive earnings management and early warning signs. *The CPA Journal* (August).

Marquardt, C., and C. Wiedman. 2004. How are earnings managed? An examination of specific accruals. *Contemporary Accounting Research* 21: 461-491.

McNichols, M., and P. Wilson. 1988. Evidence of earnings management from the provision for bad debts. *Journal of Accounting Research* 26: 1-31.

Palmrose, Z.-V., and S. Scholz. 2004. The circumstances and legal consequences of non-GAAP reporting: evidence from restatements. *Contemporary Accounting Research* 21 (1), 139-180.

Palmrose, Z.-V., V. Richardson, and S. Scholz. 2004. Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics* 37:1-32.

Plummer, E., and D. Mest. 2001. Evidence on the management of earnings components. *Journal of Accounting, Auditing & Finance* 16: 301-323.

PricewaterhouseCoopers. 2001. Revenue is revenue, right? Under SAB No. 101, the answer is not always apparent. *Deal Flash* 11.

Rountree, B. 2006. Mandatory accounting changes and firms' financial reporting environments. Working paper: Rice University.

Stubben, S. 2006. Do firms use discretionary revenues to meet earnings and revenue targets? Working paper: Stanford University.

Trueman, B., and S. Titman. 1988. An explanation for accounting income smoothing. *Journal of Accounting Research* 26: 127-139.

Turner, L., J. R. Dietrich, K. Anderson, and A. Bailey. 2001. Accounting restatements. Working paper: Colorado State University.

Table 1: Sample Selection

Initial GAO restatement sample	919	
Reasons for sample reduction:		
No matching Compustat firm identifications	(160)	
Multiple restatement firm-years	(25)	
Missing data required for estimating model (1)	(221)	
Final Sample (restatement firm-years)	513	100%
Revenue restatement (treatment) sample	215	42%
Non-revenue restatement (control) sample	298	58%

Table 2: Description of Restatements

Panel A: By industry ^a

<u>Industry</u>	<u>Revenue Restatements</u>		<u>Non-Revenue Restatements</u>		<u>All Restatements</u>	
Business Services	43	46%	51	54%	94	19%
Retails	22	58%	16	42%	38	8%
Computers	18	49%	19	51%	37	7%
Electronic Equipments	12	55%	10	45%	22	5%
Pharmaceutical Products	11	52%	10	48%	21	4%
Machinery	10	45%	12	55%	22	4%
Wholesale	10	45%	12	55%	22	4%
Measuring and Control Equipments	9	60%	6	40%	15	3%
Insurance	6	55%	5	45%	11	3%
Medical Equipment	6	32%	13	68%	19	3%
Entertainment	6	67%	3	33%	9	2%
Personal Services	6	60%	4	40%	10	2%
Apparel	5	50%	5	50%	10	2%
Consumer Goods	4	31%	9	69%	13	2%
Miscellaneous	4	22%	14	78%	18	3%
Food Products	4	33%	8	67%	12	2%
Trading	3	33%	6	67%	9	2%
Construction Materials	3	50%	3	50%	6	1%
Electrical Equipment	3	50%	3	50%	6	1%
Petroleum and Natural Gas	3	23%	10	77%	13	3%
Telecommunications	3	25%	9	75%	12	2%

Transportation	2	40%	3	60%	5	1%
Automobiles and Trucks	2	18%	9	82%	11	2%
Printing and Publishing	2	67%	1	33%	3	1%
Chemicals	2	40%	3	60%	5	1%
Construction	2	29%	5	71%	7	1%
Business Supplies	2	25%	6	75%	8	2%
Rubber and Plastic Products	2	40%	3	60%	5	1%
Steel Works, etc.	2	29%	5	71%	7	1%
Banking	1	25%	3	75%	4	1%
Fabricated Products	1	50%	1	50%	2	0%
Precious Metals	1	33%	2	67%	3	1%
Healthcare	1	13%	7	88%	8	2%
Restaurants, Hotel, Motel	1	20%	4	80%	5	1%
Real Estate	1	50%	1	50%	2	1%
Recreational Products	1	50%	1	50%	2	0%
Utilities	1	10%	9	90%	10	2%
Defense	0	0%	3	100%	3	1%
Alcoholic Beverages	0	0%	1	100%	1	0%
Shipping Containers	0	0%	1	100%	1	0%
Nonmetallic Mining	0	0%	1	100%	1	0%
Textiles	0	0%	1	100%	1	0%
Total	215	42%	298	58%	513	100%

Panel B: By event year

<u>Event Year</u>	<u>Revenue Restatements</u>		<u>Non-Revenue Restatements</u>		<u>All Restatements</u>	
1992	0	0%	1	100%	1	0%
1994	2	50%	2	50%	4	1%
1995	1	10%	9	90%	10	2%
1996	12	34%	23	66%	35	7%
1997	21	31%	46	69%	67	13%
1998	29	32%	62	68%	91	18%
1999	42	41%	61	59%	103	20%
2000	75	58%	54	42%	129	25%
2001	33	51%	32	49%	65	13%
2002	0	0%	8	100%	8	2%
Total	215	42%	296	58%	513	100%

Panel C: By party of initiation

<u>Party of Initiation</u>	<u>Revenue Restatements</u>		<u>Non-Revenue Restatements</u>		<u>All Restatements</u>	
Company	101	45%	124	55%	225	43%
Auditor	14	47%	16	53%	30	6%
SEC	14	20%	55	80%	69	13%
Unidentified	85	46%	100	54%	185	36%
Other	1	25%	3	75%	4	1%
Total	215	42%	298	58%	513	100%

Panel D: By exchange

<u>Exchange</u>	<u>Revenue Restatements</u>		<u>Non-Revenue Restatements</u>		<u>All Restatements</u>	
Nasdaq	131	47%	150	53%	281	54%
NYSE	69	40%	104	60%	173	33%
American Exchange	8	31%	18	69%	26	5%
OTC	7	21%	26	79%	33	6%
Total	215	42%	298	58%	513	100%

^a The 48-industry classification is based on Fama and French (1997). The listing is in the order of the frequency of revenue restatement firm-years.

^b Event year is the earliest year restated according to the restatement announcement. When there is no restatement year mentioned in the announcement, the most recent fiscal year that ends at least three months prior to the announcement is used.

Table 3: Descriptive Statistics ^{a, b}

Panel A: Descriptive Statistics

	<u>Mean</u>	<u>Median</u>	<u>Std Dev</u>	<u>P25</u>	<u>P75</u>
<i>RM</i>	0.42	0.00	0.49	0.00	1.00
<i>EVOL</i>	3.29	1.02	7.85	0.57	2.50
<i>LOSS</i>	0.33	0.20	0.33	0.00	0.50
<i>BM</i>	0.52	0.38	0.53	0.19	0.70
<i>RDX</i>	0.33	0.01	1.68	0.00	0.09
<i>PM</i>	-0.42	0.09	2.65	0.03	0.16
<i>GM</i>	0.10	0.35	1.77	0.21	0.49
<i>FCAST</i>	0.50	0.00	0.50	0.00	1.00
<i>USEAR</i>	0.04	0.02	0.07	0.01	0.06
<i>USEUR</i>	0.28	0.00	0.45	0.00	1.00
<i>LOGMV</i>	5.52	5.47	2.13	3.85	6.90

Panel B: Correlation Matrix ^c

	<i>EVOL</i>	<i>LOSS</i>	<i>BM</i>	<i>RDX</i>	<i>PM</i>	<i>GM</i>	<i>FCAST</i>	<i>USEAR</i>	<i>USEUR</i>	<i>LOGMV</i>
<i>RM</i>	-0.06	0.00	-0.13	0.00	0.04	0.01	0.16	<i>0.07</i>	0.15	0.12
<i>EVOL</i>		0.02	0.04	-0.05	0.05	0.04	<i>-0.08</i>	0.06	-0.01	<i>-0.09</i>
<i>LOSS</i>			-0.13	0.33	-0.39	-0.29	-0.21	0.18	-0.01	-0.36
<i>BM</i>				-0.13	0.15	<i>0.08</i>	-0.22	-0.15	-0.10	-0.32
<i>RDX</i>					-0.90	-0.93	-0.06	0.13	0.02	-0.09
<i>PM</i>						0.87	0.09	-0.16	0.04	0.14
<i>GM</i>							<i>0.09</i>	-0.05	0.02	0.09
<i>FCAST</i>								0.04	0.13	0.51
<i>USEAR</i>									0.09	-0.01
<i>USEUR</i>										0.15

^a Variable Definition:

- RM* = 1 for the revenue restatement sample, and 0 for the non-restatement sample.
- EVOL* = the standard deviation of earnings (data18) deflated by the absolute value of the mean, where the standard deviation and the mean are measured over the six years prior to the event year, with a minimum of three years data requirement (“the measurement period”).
- LOSS* = 1 if the firm reports a loss (Compustat annual data18<0) in the event year, and 0 otherwise.
- BM* = the book value of equity (data60) deflated by the market value (data25xdata199) at the beginning of the event year.
- RDX* = R&D expense (data45) deflated by sales (data12), averaged over the measurement period.
- PM* = operating profit before depreciation (data43) deflated by sales (data12), averaged over the measurement period.
- GM* = 1 minus cost of goods sold (data43) deflated by sales (data12), averaged over the measurement period.
- FCAST* = 1 if the firm has at least one consensus sales forecasts calculated by the I/B/E/S since the beginning of the event year, and 0 otherwise.
- USEAR* = accounts receivable accruals (-data302) as a percentage of sales (data12), averaged over the measurement period.
- USEUR* = 1 if the firm has a greater-than-zero current unearned revenue balance (data356) or a greater-than-zero long-term unearned revenue balance (data397) in 2002, and zero otherwise.
- LOGMV* = log of market value (data25xdata199) at the beginning of the event year.

^b All continuous variables are winzorized at the 1st and 99th percentile. There are 513 observations.

^c Panel B presents Pearson correlation matrix. Correlations that are significant at 0.05 (0.10) level or better are in bold (italic).

Table 4: Univariate Analyses ^{a, b}

Variable	Mean			Median		
	Revenue Restatement	Non-Revenue Restatement	p-value	Revenue Restatement	Non-Revenue Restatement	p-value
<i>EVOL</i>	2.74	3.68	0.17	0.98	1.09	0.48
<i>LOSS</i>	0.33	0.33	0.93	0.20	0.25	0.86
<i>BM</i>	0.43	0.58	0.00	0.29	0.42	0.00
<i>RDX</i>	0.34	0.33	0.99	0.01	0.00	0.21
<i>PM</i>	-0.32	-0.51	0.40	0.09	0.10	0.77
<i>GM</i>	0.11	0.09	0.89	0.38	0.32	0.04
<i>FCAST</i>	0.60	0.43	0.00	1.00	0.00	0.00
<i>USEAR</i>	0.05	0.04	0.10	0.03	0.02	0.01
<i>USEUR</i>	0.36	0.22	0.00	0.00	0.00	0.00
<i>LOGMV</i>	5.83	5.30	0.01	5.61	5.30	0.09

^a See notes to Table 3 for variable definitions. All continuous variables are winzorized at the 1st and 99th percentile.

^b P-values are two sided. For means, it is from t-test; for medians, it is from Wilcoxon test.

Table 5: Logit Analyses ^{a, b}**Panel A: Raw Value**

		Predicted Sign	Estimate	χ^2	p-value	Marginal Effect
Intercept			-0.67	2.60	(0.11)	
<i>EVOL</i>	H1a	+	-0.02	1.48	(0.22)	2.8%
<i>LOSS</i>	H1b	+	0.29	0.76	(0.38)	2.2%
<i>BM</i>	H2a	-	-0.39	3.32	(0.07)	4.7%
<i>RDX</i>	H2b	+	0.06	0.08	(0.78)	2.4%
<i>PM</i>	H3a	+	0.22	3.10	(0.08)	13.3%
<i>GM</i>	H3b	+	-0.20	1.06	(0.30)	8.3%
<i>FCAST</i>	H4	+	0.51	5.57	(0.02)	11.7%
<i>USEAR</i>	H5a	+	1.98	1.86	(0.17)	3.1%
<i>USEUR</i>	H5b	+	0.52	6.22	(0.01)	12.0%
<i>LOGMV</i>		?	0.01	0.06	(0.80)	0.7%

Panel B: Industry Adjusted Value ^c

		Predicted Sign	Estimate	χ^2	p-value	Marginal Effect
Intercept			-0.73	21.57	(0.00)	
<i>EVOL_{adj}</i>	H1a	+	-0.02	1.50	(0.22)	2.8%
<i>LOSS_{adj}</i>	H1b	+	0.31	0.83	(0.36)	2.2%
<i>BM_{adj}</i>	H2a	-	-0.40	3.26	(0.07)	4.7%
<i>RDX_{adj}</i>	H2b	+	0.03	0.01	(0.92)	0.1%
<i>PM_{adj}</i>	H3a	+	0.24	3.36	(0.07)	14.2%
<i>GM_{adj}</i>	H3b	+	-0.28	1.59	(0.21)	11.1%
<i>FCAST</i>	H4	+	0.46	4.75	(0.03)	10.6%
<i>USEAR_{adj}</i>	H5a	+	2.54	2.88	(0.09)	3.8%
<i>USEUR</i>	H5b	+	0.55	6.86	(0.01)	12.6%
<i>LOGMV_{adj}</i>		?	0.04	0.57	(0.45)	2.1%

^a Dependent variable is *RM*. See notes to Table 3 for variable definitions. All continuous variables are winzORIZED at the 1st and 99th percentile. There are 513 observations.

^b Marginal effects are estimated at the means of all variables. For continuous variables, the marginal effect reflects that for one standard deviation change in the corresponding variable. For indicator variables, the marginal effect reflects that for change from zero to one in the corresponding variable.

^c Panel B presents logit estimations based on industry-adjusted values. Specifically, all continuous variables are adjusted (as subscripted *adj*) by the median of all non-restatement firms in Compustat for the same industry and year.

Table 6: Consequences of Restatement Announcements

Panel A: Market Reactions to the Restatement Announcements ^a

Variable	Mean			Median		
	Revenue Restatement	Non-Revenue Restatement	p-value	Revenue Restatement	Non-Revenue Restatement	p-value
N	261	355				
<i>RAW</i>	-9.74%	-5.86%	(0.01)	-4.79%	-2.26%	(0.00)
<i>SAR</i>	-9.61%	-5.81%	(0.01)	-4.54%	-2.61%	(0.01)

Panel B: CEO Turnover Subsequent to the Restatement Announcements ^b

Variable	Mean			Median		
	Revenue Restatement	Non-Revenue Restatement	p-value	Revenue Restatement	Non-Revenue Restatement	p-value
N	88	98				
<i>TURNOVER</i>	0.45	0.41	(0.53)	0	0	(0.52)

^a *RAW* is the cumulative raw return over the (-1, 1) window relative to the restatement announcement date. *SAR* is the cumulative size-adjusted returns over the same window. P-values are two sided. For means, it is from t-test; for medians, it is from Wilcoxon test.

^b *TURNOVER* is an indicator variable that equals to one if the firm replaces its CEO in the year of or the two years following the restatement announcements, and zero otherwise.