# EVIDENCE ON CONTAGION IN EARNINGS MANAGEMENT

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*Editor's Note : Accepted by Gregory Miller*
Submitted January 2012
Accepted February 2015

*Corresponding author. We thank Gregory Miller (Editor), two anonymous referees, Dan Collins, Rosemond Desir, Vicki Dickinson, David Hirshleifer, Gerald Holberg, Christian Leuz, Bill Tayler, Hongping Tan, Siew-Hong Teoh, Greg Waymire and workshop participants at the 2011 American Finance Association (AFA) meeting, 2011 American Accounting Association (AAA) annual meeting, 2012 Financial Accounting and Reporting Section (FARS) midyear meeting, University of Arizona, Emory University and Southern Methodist University for their comments. We acknowledge financial support from our respective schools, The Whitcomb Center at Rutgers Business School, Nanyang Business School (Singapore Ministry of Education Academic Research Fund Tier 1), and the Goizueta Business School.

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**Abstract:** We examine contagion in earnings management using 2,376 restatements announced during the years 1997-2008. Controlling for industry and firm characteristics, firms are more likely to begin managing earnings after the public announcement of a restatement by another firm in their industry or neighborhood. Such contagion is absent when the restating firm is disciplined by the SEC or class action lawsuits, suggesting deterrent effects of enforcement activity. Contagion among peers is observed (i) in the same account as the one restated by the target firm; or (ii) when larger target firms restate or the restatement in prominently disclosed; or (iii) when the target firm's restatement is less severe. Contagion stops during the years 2003-2005, possibly due to the enforcement associated with the Sarbanes-Oxley (SOX) Act but reappears during 2006-2008, perhaps because the sting associated with SOX has worn off. In sum, peers' actions appear to affect a firm's earnings management decisions.

**Keywords:** Earnings Management; Restatements; Contagion; Sarbanes-Oxley Act

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## I. INTRODUCTION

The last few years have witnessed a remarkable increase in news about corporate misconduct including fraudulent financial reporting at companies such as Enron, WorldCom, and Tyco, the collapse of Arthur Andersen on allegations of lax or corrupt audit work, tax shelters structured by KPMG to assist clients in minimizing tax obligations, and the revelation of the $50 billion Ponzi scheme run by Bernie Madoff. Given such frequent exposure to corporate misconduct, an important question relates to the impact of such encounters, if any, on managers of peer firms. Does such exposure deter misconduct among managers of peer firms? Or, does it encourage peer firms to also engage in questionable behavior?



Announcement of misconduct by other firms, and the consequences they face, is likely to enable peer firms to learn about (i) the details of the misconduct (for instance, the use of early revenue recognition or the nature of the restating firm), and (ii) the costs of engaging in questionable accounting practices. If the target restating firm, upon discovery of misrepresentation, faces little or no regulatory enforcement then a peer firm is likely to conclude that the costs of managing earnings are low. Lower expected cost of misconduct implies that managers of peer firms may rationally choose to adopt these practices as the benefits of such behavior outweigh the costs (Becker 1968). Such a spread of misconduct to peer firms from the target firm is referred to as contagion in this paper.[1] However, contagion is only likely to arise if the perceived costs borne by the misreporting firm are low. If the misreporting firm is subject to





[1] In our setting, contagion refers to follow-along actions whereby peer firms begin earnings management after observing a target firm engage in managing earnings. The use of term "contagion" here is different from the usage in information transfer studies (e.g. Gleason, Jenkins and Johnson 2008) where contagion is interpreted as the change in the market price of peer firms in the financial securities market.

litigation or SEC enforcement, peer firms are likely to shun questionable practices, leading to the phenomenon we refer to as deterrence.

Though contagion and deterrence arise in rational models of misconduct, as discussed above, social-norms based explanations can also explain peer firm behavior upon learning of misconduct at the target firm. Contagion can occur if social norms lead dishonest behavior to be condoned by the managers' peer group (Kohlberg 1984; Cialdini and Trost 1998; Fischer and Huddart 2008). However, exposure to news about discovered earnings management can lead to deterrence as well. Psychology based explanations by Gino, Ayal and Ariely (2009) suggest that exposure to a dishonest act increases its saliency and makes managers pay attention to their own standards of honesty, which in turn, decreases their tendency to act dishonestly. In this paper, we study peer firm behavior to ascertain (i) whether exposure to financial misrepresentation fuels similar behavior or deters it among peer firms; and (ii) what factors increase or decrease the likelihood of contagion?



These questions are likely to be of interest to the Securities and Exchange Commission (SEC) as one of the central objectives of the agency is to discourage other firms from engaging in questionable reporting behavior. Knowledge of the channels through which earnings management spreads will allow the SEC to implement policy that effectively deters such behavior. Spread of earnings management is also of relevance to investors, stakeholders and markets as such evidence predicts clustering of earnings management that is otherwise difficult to extract from models that treat the manager's decision to manage earnings as independent of the actions of peer managers and the regulator.

We investigate whether peer firms choose to engage in misrepresentation when target firms in their industry or geographical location publicly reveal misrepresentation through a

restatement during the years 1997-2008. A concern with documenting contagion is that economic factors that lead the target firm to manage earnings may also influence earnings management at the peer firms, leading thus to *contemporaneous* adoption, rather than contagion of earnings management. We control for such contemporaneous adoption of earnings management in our research design.

An average period of 2.6 years elapses between the beginning of misrepresentation and its public revelation through a restatement announcement in our sample. If the peer firm begins earnings management during this period, when there is no public knowledge of misconduct at the target firm, it is likely due to similar economic pressures to misrepresent or from private knowledge of such practices. Private information about earnings management could be obtained from a common lax auditor's office (Francis and Michas 2013) or common board member (see Bizjak, Lemmon and Whitby [2009] and Chiu, Teoh and Tian [2013]). One would expect that the public acknowledgement of non-GAAP accounting practices in the restatement announcement would lead to cessation of misreporting among peer firms. Hence, we rely on a significant increase in the likelihood that a peer firm begins misrepresenting after the announcement of a restatement by the target firm as evidence consistent with the contagion hypothesis.

The stock price reaction of peer firms to a restatement announcement can also be informative about the behavior of peer firms. Gleason et al. (2008) and Akhigbe and Madura (2008) document that industry peers suffer a negative stock price reaction when a target firm announces a restatement. These authors interpret such reactions as investors' skepticism about the quality of financial reporting at the peer firms. However, negative stock price reactions at peers, *per se,* do not necessarily constitute evidence of contagion for two reasons. First,

investors' beliefs that the poor reporting quality at peer firms assumes that common economic forces influence earnings management at both the target and the peer firms in the past. This is precisely what we control for with the inclusion of contemporaneous adoption in our research design. Our focus, in contrast, is on the future contagious behavior of peer firms. We document that peer firms choose to begin misrepresentation after revelation of misconduct at the target firm.

Second, the negative stock price reaction of peer firms can also be due to negative information that has little to do with their accounting practices. Specifically, fraudulent reporting by the target firms will lead to higher estimates of industry profitability and likely mislead peer firms into overinvesting. The revelation of misconduct at the target firm will lead to a reduction in the market value of peer firms due to their overinvestment and lower industry profitability consistent with Durnev and Magnen (2009), Sadka (2006) and Beatty, Liao, and Yu (2013). In summary, the reduction in the stock price of peer firms is either due to potential overinvestment or a higher likelihood that they also engaged in past earnings management. However, it is not informative about how the restatement influences the future adoption of earnings management at peer firms, i.e., contagion, which is the focus of this paper. Further, in this paper we also study factors, especially public and private enforcement, that likely decrease the likelihood of contagion.

To focus on-restatements deemed to be substantial and are more likely to be imitated, we eliminate restatements that involve an increase in net income. That is, we only include restatements that involve inflated net income during the violation period. To ensure access to a long time series of restatements, our sample comes from two sources: (i) 179 income-increasing restatements over the period 1997-1999 obtained from the General Accounting Office list

(GAO); and (ii) 2,197 income-increasing restatements for the period 2000-2008 from the Audit Analytics database. We measure contemporaneous adoption as the start of earnings management by peers after the beginning date of the target firm's violation period but before its public announcement of the restatement. Our measure of contagion captures peer firms that begin managing earnings after the public announcement of the restatement by the target firm.

Given the significant changes in capital markets during our sample period, most notably the passage of the Sarbanes Oxley (SOX) act in 2002, we analyze three year sub-samples of our data. In the pre-SOX period of 1997-1999 (GAO sample) and the 2000-2002 (Audit Analytics sample) we find that a firm has a significantly higher probability of beginning earnings management if a higher fraction of its industry and its geographical neighborhood, measured as the metropolitan statistical area (MSA) the firm is located in, has already revealed they managed earnings via a public restatement announcement in the prior year. This evidence of contagion within industry and MSA explains a significant portion of variation in the peer firm's decision to begin managing earnings.



However, such contagion, both at the industry and the MSA level, disappears in the three year period following the passage of SOX (2003-5) presumably because of the implementation of a stricter regulatory framework. Thus, there is evidence consistent with the deterrence hypothesis in the post-SOX period. Interestingly, there is some evidence that industry-level contagion reappears in the 2005-8 period. We conjecture that questionable reporting practices resurface after the initial sting associated with post SOX regulatory regime has abated.

We also study the channels that increase or decrease the likelihood of contagion. We begin by documenting that contagion among peer firms is more likely to be observed in the same account as the one restated by the target firm. Peer firms learn not only about the costs of

misconduct but also about the specific accounting principle and its application within the industry. We test for potential contagion in similar accounting practices by examining restatements that involve revenue manipulation, expense accounts and asset, inventory or restructuring. We find that restatements that involve these specific accounts are associated with earnings management among the industry peers in the same accounts suggesting that similar accounting treatments potentially diffuse among peer firms.

Moreover, we exploit three sources of cross-sectional variation in the nature of the restatements to better understand the forces that impact contagion. First, we look at both the public enforcement through SEC investigations and private enforcement though class action litigations. The presence of public and private enforcement actions increases the cost of managing earnings for the restating firms and is likely to discourage peers and therefore should not be associated with contagion. Consistent with our conjecture, we find that restatement announcement accompanied by SEC enforcement actions or class action litigations are not associated with contagion in earnings management. Such deterrent effects are observed for both industry and MSA peers.



Second, we study the characteristics of the restatement. Extreme restatements involve substantial manipulation and are likely to be perceived as too severe for peer firms to imitate. Hence, we expect extreme restatements to be associated with no contagion. We classify restatements as severe if they fall in the lowest quartile of restated negative net income scaled by total assets. As expected, there is little evidence of contagion following severe restatements.

Lastly, we look at the characteristics of the restating or the target firm. In particular, large and visible firms are more likely to cause peer firms to adopt such practices or lead to contagion. Consistent with this conjecture, we find evidence of significant contagion when the

target firm is above the median size in the industry. Along similar lines, we find that disclosure prominence also impacts contagion. Restatements made via a press release are more likely to be associated with contagion, among both industry and MSA peers.

One alternate explanation for the results is that they pick up some omitted industry factor that is correlated with payoffs to earnings management. Three sets of findings negate such a possibility. First, our results are robust to (i) explicit controls for industry overvaluation and industry structure; and (ii) the inclusion of *contemporaneous* adoption, or the adoption of similar practices prior to the public disclosure, that capture any residual industry level trends in earnings management practices. Second, evidence of significant contagion at the MSA level, not just at the industry level, also points against the results being entirely attributable to omitted industry factors. Third, contagion varies within an industry and an MSA depending on the presence or absence of enforcement and several predictable characteristics of the restating firm and the restatement itself. Such within industry or MSA variation in contagion is also not consistent with an omitted industry or MSA variable driving the results. Earnings management is likely to be pro cyclical and another possibility is that our results reflect economy wide or macro trends in the adoption of aggressive accounting practices. As our results are robust to the inclusion of year effects as well as stock returns for the firm and the industry's book-to-market ratio, it is unlikely that our findings are entirely due to correlation of earnings management with business cycles.

Our paper makes several contributions. First, Hirshleifer and Teoh (2009) point out that the extant literature in financial economics seems to rely almost exclusively on market price as the mechanism via which market participants learn from each other. In reality, individuals learn from each other through conversations, observation of others' actions or the consequences of such actions. Such a channel of personal learning and the resultant contagion is under-

emphasized in the study of capital markets. We are among the first to document public contagion in aggressive reporting practices. In particular, our identification strategy of linking the beginning of earnings management in the peer firm, based on the beginning date of the violation period, with the target's announcement of the restatement is novel to the literature. On a related note, most extant work on financial misreporting (e.g., Burns and Kedia 2006; Bergstresser and Philippon 2006; Cheng and Warfield 2005; Karpoff, Lee and Martin 2008a, 2008b) implicitly assumes that a manager narrowly considers his expected benefits such as job security, or compensation before deciding to misreport. We provide evidence that the decision to manage earnings is not made in isolation. The choices of other firms and the regulator's reaction to such choices are important factors affecting an individual manager's proclivity to begin managing earnings.

Second, the existence of contagion in earnings management after an initiator announces a restatement and the factors that seem to encourage (e.g., same accounts, if the initiator is a larger firm, prominent disclosure of the initiating firm's announcement) and deter such contagion (e.g., SEC action or a lawsuit against the initiator) are new to the accounting and the financial economics literatures. In particular, these results could interest enforcement agencies such as the SEC. For example, evidence on contagion in aggressive corporate reporting potentially implies large differences across industries and geographical areas in the marginal productivity of enforcement spending by the SEC. We are also among the first to document that SEC enforcement and class action lawsuits deter earnings management. Finally, we are perhaps the first paper to raise the possibility that earnings management resumes once the sting associated with the vigorous SOX related enforcement wears off in the 2005-8 period.

The remainder of the paper is organized as follows. Section II discusses the background, hypotheses and the empirical strategy adopted to provide evidence related to the hypotheses. In Section III we discuss empirical findings. In Section IV, we examine the factors affecting contagion, and finally in Section V, we conclude.

## II. BACKGROUND, HYPOTHESES AND EMPIRICAL STRATEGY

There are three potential reasons why public news about questionable behavior among peer managers may change an otherwise undetected manager's perceived cost of managing earnings and therefore his propensity to embark on aggressive reporting: (i) a rational crime based explanation; (ii) a social-norms based explanation; and (iii) a psychological explanation related to saliency.

Becker (1968) pioneered the rational theory of crime wherein a potential criminal chooses to commit a crime if the benefit of doing so is greater than the associated costs. Sah (1991) points out that often the perceived costs associated with crime are subjective and based on the experiences of the individual manager. Exposure to the dishonesty of others could lead managers to change their subjective estimate of the benefits and/or the cost of committing a crime. Although the literature we draw the intuition from is couched in terms of crime, the economic principles underlying that literature continue to hold in our setting. Consider a case where the restating firm is not subject to SEC enforcement action or a class action lawsuit. Such inaction might lead peer firms to reduce their expectations about the cost of misreporting and therefore increase their likelihood of initiating aggressive reporting themselves.[2]

[2] Existing literature suggests that the ex-ante probability of eventually being detected is small. Dyck, Morse and Zingales (2010) estimate that about 7% of firms in the economy commit fraud every year. Only 2.4% of firms were subject to class action law suits over the 1997 to 2008 time period (Stanford Class Action Lawsuit Database).

A sociological explanation for contagion relies on the idea that observing others cheat changes an individual's understanding of the social norms related to dishonesty (Cialdini and Trost 1998). Early evidence on the imitation of behavior and social learning was provided by Bandura (1965) and Bandura, Ross, and Ross (1961, 1963). In these studies, children exposed to an aggressive model were considerably more aggressive toward a Bobo doll relative to children who were not exposed to the aggressive model. Moreover, children demonstrated more aggressive behavior when an adult did not comment on the aggressive model's actions (or when an adult was not present in the room) than when the adult disapproved of those actions using negative comments (Hicks 1968; Siegel and Kohn 1959). Similar results related to social learning have been documented for adults as well. For instance, Cialdini, Reno, and Kallgren (1990) find that participants in their experiment who saw others litter a clean environment subsequently littered more than those who did not see others litter. In sum, the social norms explanation suggests that when individuals identify strongly with a social group (such as peer firms), the behaviors of others in that social group will have a large influence on the observers' social norms. Thus, managers might interpret news about restatements by their peer managers, especially when such news is unaccompanied by punitive action such as an SEC investigation or a class action lawsuit, as evidence that social norms in capital markets condone aggressive accounting practices.



In contrast, a psychology based explanation proposed by Gino et al. (2009) argues against contagion in corporate misbehavior. They suggest that observing others' dishonest behavior may affect one's own dishonesty by enhancing the saliency of ethicality at the moment one is considering a particular behavior, especially if such behavior is framed as undesirable behavior (Ariely, Loewenstein and Prelec 2006). Becker and Murphy (2000, 4) argue that behaviors

"most subject to strong social pressures from peers and others are those that take place publicly." Thus, the saliency hypothesis states that when people observe someone behaving dishonestly and such behavior is framed as bad behavior, perhaps due to reputational loss associated with an SEC investigation or a class action lawsuit, the saliency of this act increases, which, in turn, makes them pay attention to their own standards of honesty, and, hence decreases their tendency to engage in dishonest acts. This line of reasoning argues for deterrence in that managers who are likely to manage earnings might actually stop doing so when negative news about another firm's restatement is made public.

In summary, all the three models imply that (i) observing others engage in earnings management changes the perceived cost of engaging in similar behavior; and (ii) the response of enforcement agencies and the plaintiff bar can deter earnings management. We examine each of these implications next.



**Public Contagion, Specific Accounts and other Factors**

As discussed above, on observing the restatement announcement, peer firms learn about two things: (i) specific accounts and strategies used for misreporting; and (ii) costs of misreporting. In this study, we focus on contagion that arises from learning about both the costs of earnings management and specific accounts used to do so.

We test for potential contagion in similar accounting practices by examining restatements that involve manipulation in the same account as the one restated by the target firm. Learning about the realized costs of earnings management can happen only after the public disclosure of a restatement and an evaluation of the severity of the response of enforcement agencies. Beside the channel related to the same accounting method, we examine contagion via four other empirical strategies: (i) we investigate the impact of several time periods, especially the stricter

regulatory regime after the passage of the Sarbanes Oxley Act (SOX); (ii) we examine the role of enforcement agents, in particular, SEC enforcement actions and class action litigation; (iii) we investigate contagion for industry peers, as well as location peers; and (iv) we exploit cross-sectional variation in the characteristics of restatements and the restating firms. We discuss each of these identification strategies in greater detail below.

As discussed above, we control for potential contemporaneous adoption of earning management. As economic forces and industry conditions may make earnings management attractive for all firms, peer firms' adoption of misreporting may have little to do with learning about specific accounts or costs of earnings management but simply due to common economic conditions in the industry. Alternately, it is possible that peer firms learn about earnings management through shared auditors and board members (see Francis and Michas [2013], Bizjak et al. [2009] and Chiu et al. [2013]). We measure potential contemporaneous adoption and private contagion as the fraction of the industry that begins earnings management prior to the public announcement of such practices by the target firm. This variable, referred to as *contemporaneous* adoption, is discussed in detail later.



**Time Periods**

Our restatement data comes from two sources, GAO restatements and Audit Analytics and spans the years 1997-2008. These years witnessed significant changes in capital markets beginning with the internet boom during 1997-2000 that culminated in a series of reporting frauds such as Enron and Worldcom and the demise of a major accounting firm, Arthur Andersen, during the 2001-2 period. The Sarbanes-Oxley Act (SOX) was passed in 2002 with (i) an emphasis on internal controls (section 404); (ii) greater managerial accountability requiring certification of financial statements by the CEO and the CFO; and (iii) heightened scrutiny of

accounting practices by auditors (Graham, Harvey and Rajgopal 2005). SOX and the developments accompanying that legislation substantially increased the costs of engaging in earnings management.

Given the nature of changes in the reporting environment in our sample period, we analyze our data in three year sub-periods around the passage of SOX. For the pre-SOX period we analyze the GAO restatements over the three year period 1997-1999 and Audit Analytics restatements over 2000-2002.[3] For the post-SOX period, we have only Audit Analytics data and we analyze them over the two three year periods of 2003-2005 and 2006-2008. We expect the stricter enforcement regime around SOX to deter earnings management and hence expect to observe stronger evidence of contagion prior to SOX.[4]



**Enforcement Agents: SEC and Litigation**

An important aspect of our study is to examine how actions taken by enforcement agents affect the perception of the cost of misreporting for peer firms and hence contagion. We study the role of public enforcement via SEC enforcement actions and of private enforcement via class action litigation. The SEC is the primary regulator overseeing financial disclosure by public firms. A public enforcement action by the SEC against a target firm is important news to peers because the SEC does not publicize either the names of firms subject to informal investigations



[3] We do not combine these datasets as they are collected by different entities (the GAO and a private vendor, Audit Analytics) and hence likely to be subject to different errors of omission and commission in the data gathering process. Because we draw the restatement data from two very different sources, we do not feel comfortable with presenting the results pooled across all time periods (pre- and post- SOX).

[4] For simplicity, we label these periods as pre and post SOX. We do not intend to suggest that SOX by itself was responsible for deterring earnings management. Obviously, concurrent with the passage of SOX, the SEC got a much bigger enforcement budget, class action lawsuits for accounting related violations become more commonplace and auditors could enforce GAAP more rigorously in light of the reporting scandals preceding SOX such as Enron and Worldcom.

or the specific reporting issues being investigated. We expect low or no contagion following restatement announcements that are accompanied by SEC enforcement actions.

Coffee (2006) reports that private class action litigation in the aggregate imposes financial penalties that overshadow those levied by federal and state authorities and by self-regulatory organizations. Moreover, the total amount of damages awarded in securities class actions has soared in recent years making such cases very costly for firms that are sued. As class action lawsuits can impose significant costs to the restating firm, we expect them to deter earnings management among peer firms. To study the role of enforcement agents we investigate whether the propensity of peer firms to begin managing earnings after a restatement announcement varies with the presence of an SEC enforcement action and a class action lawsuit against the restating firm.[5]



**Industry and MSA Contagion**



We examine contagion for two sets of peer firms, industry and location. Firms in the same industry are natural peers as they face the same economic and competitive pressures and perhaps even have common analyst following. Firms in an industry are also benchmarked to each other by the capital markets and analysts. Firms located in the same geographic area, defined as a Metropolitan Statistical Area (MSA), can also be regarded as peers. Several prior studies document that geographic proximity is associated with informational advantages in portfolio decisions (see Coval and Moskowitz 2001), in the forecasting accuracy of analysts (see Malloy 2005), and in compensation decisions (see Kedia and Rajgopal 2009) among others.



[5] Our study complements Kedia and Rajgopal (2011) who find that geographical distance between the firm and the SEC's office explains firm's propensity to misreport. In this paper, we investigate the temporal dimension and study how aggressive reporting spreads over time and the role of SEC in mitigating such time-based contagion. The results in this paper, along with the evidence in Kedia and Rajgopal (2011), address different aspects of the SEC's influence on earnings management.

Further, firms in the MSA are likely to be covered extensively in local newspapers, making them aware of each others' activities.

Whereas both firms in the same industry and the same MSA are peers and ideal for the study of contagion, they capture important differences. As firms in an industry face similar economic pressures and challenges, they are likely to be interested in similar accounting practices. Firm in an industry will therefore find similar mechanisms of earnings management relevant and also face similar incentives to manage earnings. In contrast, firms located in the same MSA belong to diverse industries, face different economic challenges, and may find several practices of their peers, especially the mechanisms of earnings management to be less relevant to their situation. Contagion in MSA peers is therefore more likely to arise from learning about the costs of earnings management rather than about specific mechanisms or correlated incentives for managing earnings. Hence, a finding of public contagion at the MSA level is more robust evidence that one of the important drivers of such public contagion is learning about the costs of managing earnings.



**Nature of Restatements and Public Contagion**

Contagion likely differs based on the severity of the restatements. Extreme restatements may use practices to which many peers may respond by saying "we would never do this." In other words, when exposed to frequent speeding and violations of traffic rules, many may respond by speeding themselves. However, they are unlikely to take to murder when exposed to it. Hence, we expect that contagion should be seen mostly in less extreme practices and not in the severe ones. Consequently, we report tests separately for extreme and the non-extreme restatements.

The characteristics of the firm that announces a restatement can also potentially impact the spread of earnings management. In particular, the more visible and the more established the restating firm, the greater the likelihood that peer firms will imitate. Files, Swanson, and Tse (2009) find that disclosure prominence is negatively associated with announcement date returns and with the possibility of a lawsuit. Therefore, we also study whether restatements by target firms that are highlighted via a press release are more likely to be imitated by peer firms.

## III. EMPIRICAL FINDINGS

### Sample

We combine two data sources to obtain our restatement data. We obtain an initial sample of: (i) 369 restatements made during the calendar years 1997-1999 from the General Accounting Office (GAO) list; and (ii) 3,220 restatements for the calendar years 2000-2008 from Audit Analytics as the basis of this study. Note that the GAO list specifically excludes routine restatements.[6] The GAO (2002) sample has been found to be associated with an average stock market reaction of –9.5% over day -1 to +1 around the restatement announcement and has been studied by Hribar and Jenkins (2004), Agrawal and Chadha (2005), Srinivasan (2005), Desai, Hogan and Wilkins (2006), Agrawal and Cooper (2006, 2007), Burns and Kedia (2006), Kedia and Philippon (2009) and Badertscher, Hribar and Jenkins (2011), among others.

To ensure that we use a sample of restatements deemed to be substantial and more likely to be imitated, we only retain restatements that involve a zero or lower restated negative income

[6] In particular, the GAO excludes restatements due to 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. The list also excludes restatements resulting from accounting policy changes because they did not necessarily reveal previously undisclosed, economically meaningful data to market participants.

(i.e., income was overstated in the violation period).[7] We include zero income impact restatements as they are likely to involve restatements that accelerate income or delay expenses across quarters. To construct this measure, we hand collect data on the sign and amount of income restated for the GAO sample.[8] The amount restated is available for the Audit Analytics dataset. Exclusion of restatements with a positive value of income restated results in removing 510 firms or 14% of the sample. Moreover, we require availability of the period over which the firm was managing earnings and the restatement announcement date. Lastly, firms were required to report at least one year of sales over the period 1997 to 2008. There are 2,376 firms that announce a restatement, as reported in column (1) of Table 1. Of these, 127 firms had started managing their books before 1/1/97, the first restatement announcement date covered by the GAO (2002) dataset. As we focus on the firm's decision to begin misreporting after target firms announce restatements, we do not include these 127 firms in our analysis. The sample of restatements used for the analysis of contagion is 2,249 firms (see column 2 of Table 1). As a baseline, we first report evidence of public contagion in the full sample of restatements. We then study how differences in enforcement and the characteristics of the restating firms and restatements impact contagion.



[7] We acknowledge that this classification of substantial restatements might potentially be contaminated by innocent reporting innovations. However, empirically getting to the manager's intent behind aggressive accounting, even ex-post after the earnings management is revealed, let alone ex-ante when the manager is deciding to report aggressively, is difficult. The distinction between "innovative reporting" versus "misconduct" is a subjective determination and firms can sometime spend several months or years in court or with the SEC and still not reach a consensus on whether their aggressive accounting practice was just a benign reporting innovation or an attempt to systematically mislead investors.

[8] Data on the amount of income restated is collected from the restatement announcement when available. For firms that do not announce the impact of the restatement on income, data is obtained from the amended 10-Ks filed with the SEC. Data on the size of the restatement could not be obtained for some firms due to several reasons. Some firms did not report the impact of the restatement on net income. Certain firms included events (such as restructuring charges, one-time charges) other than restatements in the amended earnings, making it difficult to isolate the impact of the restatement on income. Other firms did not file an amended 10-K. We also exclude outlier observations for which the size of the restatement was more than 200% of the restated net income.

Before we proceed, two important caveats about restatements as a somewhat noisy proxy for earnings management deserve mention. First, we cannot convincingly observe undetected earnings management. Hence, we attempt to assess whether imitators, who are eventually caught, begin managing earnings after they observe earnings management by a restating firm. Thus, our sample consists of imitating firms and early adopters, both of whom are eventually caught for managing earnings. We exploit the timing of the restatement announcement and the imitating firm's beginning of the earnings management period or the violation period to document public contagion. We assume that earnings management begins on the first day of the violation period identified in the restatement announcement or in the SEC enforcement action or the class action lawsuit.

Second, several papers claim that SEC enforcement and class action lawsuits are better proxies for accounting fraud relative to earnings restatements (Karpoff et al. 2008a, 2008b; Dyck et al. 2010). The objective of this study is not to isolate the most egregious instances of earnings management. Rather, it is to understand how both egregious and mild infractions, along with the regulators' response to these infractions, impact peer firms. Moreover, restricting the sample to cases involving only SEC enforcement and/or class action lawsuits would make it impossible to pursue one of the main goals of this study, i.e., investigating how the behavior of peers changes when the SEC and lawyers get involved after a restatement announcement. Hennes, Leone, and Miller (2008) suggest a classification scheme that separates what they label as errors from irregularities in the GAO restatement data. However, the screens used by Hennes et al. (2008) to classify restatements as irregular are heavily based on the involvement of the SEC and class action litigation and hence essentially restricts the sample to restating firms that overlap with SEC enforcements and litigation. This filter would again prevent us from investigating the role

of SEC or class action litigation in stemming or facilitating contagion.[9] More importantly, we would not be able to exploit the rich cross-sectional variation in contagion stemming from the presence of extreme restatements.

One potential concern with our tests relates to the validity of the maintained assumption in the paper that earnings management begins in the period identified in the restatement announcement or in the SEC enforcement action. That is, the choice of these dates may involve a cost-benefit tradeoff such that in choosing to come clean, firms may trade-off the cost of full truthfulness (e.g., revealing accurately when they started earnings management) with the probability of being caught if they are not truthful.

While this concern deserves consideration, it is not clear why firms will deliberately disclose only part of the problem at the restatement announcement only to have the correct beginning of the earnings management period unearthed later at a greater reputational cost. Moreover, misstated violation periods are less likely to be found in cases where external investigators are involved such as when the SEC issued an enforcement action or lawyers designated a class action period because a detailed investigation by these monitors is more likely to have uncovered the truth. Hence, potentially understated violation periods are more likely to occur for restatements that do not involve outside intervention, assuming, of course, that the auditors are either complicit or negligent in allowing the firm to understate violation periods. However, if there exists a firm that began managing earnings before the disclosed beginning of



[9] Relatedly, one can argue that our results are not due to contagion but due to the easier detection of particular mechanisms of earnings management. However, peers are likely to take this fact into consideration when they begin managing earnings. If a particular mechanism is easier to detect and the resulting probability of getting caught using such a mechanism is higher, then one would expect firms, in equilibrium, to stop using this mechanism. Therefore, this argument is unlikely to fully account for our results. Moreover, this type of contagion is due to learning about mechanisms of earnings management and about the costs of earnings management. As a sensitivity check, we deleted restatements, classified as clerical errors by the Audit Analytics. Untabulated results after such deletion are consistent with those reported.

the such period, our results on the factors that influence the beginning of earnings management should be reinterpreted as factors that determine the continuation of earnings management rather than its cessation.[10]

**Empirical Specification**

We focus on the dichotomous choice facing hitherto undetected firms of whether or not to begin managing earnings after observing others publicly announce restatements. Besides this important point, several aspects of the empirical specification deserve mention.

First, we study whether managers imitate other firms in their industry. To examine industry contagion, we create a variable for each firm *i* labeled as *PUBLIC_IND%* and defined as the percentage of the industry at the two digit SIC level that has announced a restatement in the year prior to the beginning date of the firm's violation period.[11] The idea behind these measurement dates is to allow contagion to causally affect the otherwise undetected firm's decision to misreport. *PUBLIC_IND%* is a cumulative estimate of all industry restatements for a year till the beginning date of violation period of each managing firm *i*'s violation period because (i) aggressive reporting may impact the decision of otherwise undetected managers over a longer period of time; and (ii) an otherwise undetected manager may be influenced by the fraction of the industry that has adopted such practices.



[10] A skeptic might argue that the follower firm starts manipulating earnings before the target firm announces a restatement but the magnitude was deemed immaterial. This is possible but unverifiable from the data we have. Understated violation periods, in general, impact several of our variables (defined in detail in Section III Empirical Specification). First, the dependent variable, *BEGIN_MANAGE*, would be likely coded 0 (instead of 1) for years that the firm managed earnings but did not declare such earnings management. Second, *CONTEMP_IND%* and *CONTEMP_MSA%,* which capture the fraction of the industry that has started manage earnings but did not publicly restate, are likely to be less populated if the true beginning of the violation period is earlier than that reported. Note that *PUBLIC_IND%* and *PUBLIC_MSA%* should not be mis-measured as these variables capture the number of firms that have announced a restatement in the same industry or the MSA.

[11] The one year restriction ensures that *BEGIN_MANAGE* and *PUBLIC_IND%* or *PUBLIC_MSA%* are not mechanically associated purely due to time trends. Un-tabulated results show that relaxing the cumulative time window to three years does not affect the results. To further rule out the influence of time trends, we analyze the data in three year windows, as discussed. In un-tabulated analyses, we insert year dummies for each of the three year windows and find our reported inferences to be unchanged.

Similarly, to study contagion through geographical proximity, we calculate for each firm *i*, *PUBLIC_MSA%* defined as the percentage of firms located in the same MSA that have announced a restatement in the year prior to the beginning of the firm's violation period. It is important to reiterate that we are not modeling a firm's restatement announcement following similar such restatement announcements by peer firms. We would naturally expect restatement announcement dates to cluster in industries following authoritative guidance on an accounting issue such as a Staff Accounting Bulletin (SAB) by the SEC. Instead, we consider whether firms start managing their books after observing other firms announce restatements.

The above two measures capture public contagion in that they are measures of contagion following publicly announced restatements. As discussed earlier, we control for the possibility that managers may contemporaneously manage earnings. As we know the beginning and the end date of earnings management as well as the announcement date of the restatement, we are able to control for such contemporaneous adoption. For each firm *i*, we create a variable labeled *CONTEMP_IND%* to capture the percentage of the industry that has begun managing earnings in the year prior to firm *i*'s beginning date of the violation period but has not yet publicly announced a restatement. In other words, if a peer firm begins earnings management prior to the public discovery of misconduct at the target firm it could either (i) face similar pressures to engage in earnings management; or (ii) have learnt about earnings management practices at other firms via private channels. Once the target firm publicly announces a restatement the target firm ceases to be a source of contemporaneous adoption in our dataset and is instead treated as a source of public contagion. Figure 1 depicts a timeline that clarifies the definitions of contemporaneous adoption and public contagion.

[Insert Figure 1]

Analogous to *CONTEMP_IND%*, we create *CONTEMP_MSA%* defined as the percentage of the MSA that began managing earnings in the year prior to the beginning date of firm *i*'s violation period but has not yet announced a restatement. Having defined our measures of contagion, we can now discuss the decision to manage earnings by firm *i* in year t. Let us label this decision as $BEGIN\_MANAGE_{it}$ which is an indicator variable set to one if the firm *i* begins managing earnings in year t and zero otherwise. In particular, we model the probability of beginning to manage earnings as follows:

$$BEGIN\_MANAGE_{it} = \lambda_1 PUBLIC\_IND\%_{it} + \lambda_2 CONTEMP\_IND\%_{it} + bx_{it}^{o} + cx^{ind}_{it} + e_{it} \quad (1)$$

We also estimate a similar equation with MSA contagion, instead of industry contagion. If public contagion in earnings management exists, then otherwise undetected managers in industries and/or geographical areas (MSAs), where earnings managers are prevalent, will be more likely to start managing financial statements leading to $\lambda_1 > 0$. Undetected firms serve as a control sample and consist of all firms on COMPUSTAT with available data that did not announce a restatement over the years 1997-2008. For firms that restate multiple times, only the first restatement is considered in our analysis because our model captures the decision to initiate earnings management. Moreover, we delete the initiating firms from the sample after their appearance in the first initiating year as they can no longer classified as undetected firms.[12] This empirical specification is similar in spirit to the Goolsbee and Klenow (2002) study of the diffusion in the use of personal computers. Goolsbee and Klenow (2002) rely on (i)

[12] In Table 3, the dependent variable *BEGIN_MANAGE* is coded = 1 for firms that begin to manage earnings in that year. For example, let's say firm X begins to manage earnings in 1999. Firm X is included for firm-years 1997 and 1998 (coded as *BEGIN_MANAGE* = 0) and in 1999 (coded as *BEGIN_MANAGE* = 1). Because we want to model the decision to begin managing earnings and not the continuation of earnings management, firm X is removed from the sample from 2000 onwards. Now, assume firm Y never restates earnings. Firm Y is included from 1997 to 2008 with *BEGIN_MANAGE* coded as zero. Hence the control sample includes firm X (for the years 1997 and 1998) and firm Y (for the years 1997 to 2008) and they are coded as *BEGIN_MANAGE* =0. The appendix contains greater details on the coding process followed for both the dependent variable and the independent variables.

epidemiology models in which an infectious disease spreads more quickly the larger the fraction of the population infected; and (ii) the Bass (1969) model in marketing which models the rate at which new products are adopted by consumers.

The $X^o$ terms in equation (1) are firm-level observables. In the basic specification, these are market-to-book ratio, leverage, firm size as captured by the natural logarithm of total assets, prior year's ROA, earnings volatility, and contemporaneous 12-month stock returns. Previous work documents that the expected benefits from initiating earnings management are high when (i) growth opportunities, as captured by their market to book ratio, are high (Povel, Singh and Winton (2007) ; (ii) leverage is high and firms may want to manage earnings to avoid tripping their debt covenants (Richardson, Tuna and Wu 2003); (iii) the firm's stock returns are high and firms might face pressure to manage earnings to sustain overvaluation of their firms (Cheng and Warfield 2005; Johnson, Ryan and Tian 2009), and (iv) firm profitability, as captured by ROA, and earnings volatility is high (Johnson et al. 2009).

Finally, the $X^{ind}$ terms represent industry level variables. As already documented in the literature, we find industry concentration in earnings management over our sample period. Of particular concern is that some of the contagion we observe via a significant positive coefficient on *PUBLIC_IND%* and *PUBLIC_MSA%* might simply be attributable to industry characteristics that are positively associated with aggressive reporting. We introduce two industry-level variables to control for these industry characteristics. First, we include industry-level market to book ratio as a proxy for expected growth opportunities in the industry. As discussed in Povel et al. (2007), the higher the growth opportunities in the industry, the greater are likely to be the gains from earnings management. This ratio is computed as the ratio of the sum of all book

values in the two-digit SIC code to the sum of market values in the same two-digit SIC code. [13] The second variable is the industry Herfindahl index, a proxy for product market concentration. As discussed in Wang and Winton (2012), the greater the competition in the product market, the greater is the pressure on firms (by analysts and markets) to deliver performance in line with their nearest competitor's performance and the likelihood that undetected firms manage earnings. Herfindahl index is computed as the sum of the squares of the market shares (firm sales / industry sales) of the firms in the industry.

**Descriptive Statistics**

Relative to the restatement announcement or discovery of earnings management, adoption of earnings management is highest in the year 2002 (315 initiations in column 2 of Table 1). Of the 315 firms that began managing earnings in 2002, 112 firms (column 3) already had an industry peer announce a restatement and 107 firms (column 4) had a local peer announce a restatement. We only include firms that announce a restatement by the end of calendar year 2008 so that firms that begin managing earnings in 2007 and 2008 (and therefore will be discovered later in 2010 and 2011) are reflected in the data.[14]



It is important to note that Table 1 only captures broad annual trends in public contagion. The actual variables, used in estimating equation (1), namely *PUBLIC_IND%* and *CONTEMP_IND%* (and their MSA equivalents) are computed for every firm-year in the sample as detailed in the appendix. Descriptive data on these variables can be found in panel A of Table 2. The mean for *PUBLIC_IND%* (*PUBLIC_MSA%)* is 1.7% (1.6%) implying that an average

[13] As a sensitivity check, we also used a simple average of market to book with qualitatively similar results.

[14] Implicitly, this assumes that if a firm begins managing earnings in 2007 or before, it will be detected within three years. We made this assumption because the average period of time that elapses from the beginning of the violation to the announcement of the restatement in our sample is 2.6 years.

undetected manager would find that 1.7% (1.6%) of its industry (MSA) had announced a restatement in the year prior. The mean of *CONTEMP_IND%* (*CONTEMP_MSA%*) is 1.2% (1.2%), suggesting that, on average, an undetected manager can privately learn that 1.2% (1.2%) of his industry (MSA) has begun managing earnings although news of such activity has not yet been made public. The other descriptive statistic worth noting is that the average for our dependent indicator variable, BEGIN_MANAGE, is only 2.4%. That is, only 2.4% of the firms in the sample are known to start managing earnings in an average year. Untabulated correlation between *PUBLIC_IND%* and *CONTEMP_IND%* is high (Spearman $\rho = 0.299$, Pearson $\rho = 0.156$) but not crippling enough for contemporaneous adoption to swamp public contagion.

The descriptive statistics for the overall sample, although presented above for completeness, can be difficult to interpret because they pool data for both leaders and followers.[15] Hence, panel B compares the characteristics of the industry leaders with those of the industry followers. Descriptive data for the industry leader group includes firm-year observations in the year they announced a restatement whereas data for the industry follower group relates to firm-years prior to their beginning earnings management. As can be seen, relative to the leaders, the followers are firms that (i) are smaller (t-statistic of the difference in means for *LNASSETS*= 3.24 in panel A); (ii) have higher book-to-market ratios (t-statistic of the difference in means for *BMR*= -2.26); and report higher return performance (t-statistic of the difference in means for *RET*= -3.94). Inferences from panel C that tabulates these statistics for geographical leaders and followers, are similar. Recall that we model the beginning of earnings management by a restating firm, as opposed to the act of the restatement. Hence, the reported data seem intuitive in that followers are smaller and less closely scrutinized by stakeholders,

[15] Given that only 2.4% of all firms in our sample begin managing earnings, as per Table 1, many industry peers do not follow the industry leaders in earnings management. That is, restatements themselves are a rare phenomenon.

might want to report strong accounting results and hence begin to manage earnings to preserve their recent return performance.

**Base Results**

Table 3 presents the results from estimating a cross-sectional version of equation (1) estimated over the four time windows discussed earlier (1997-9, 2000-2, 2003-5 and 2006-8). This specification is designed to test whether there is a statistical association between a firm's decision to begin managing earnings and the percentage of peer firms (industry or MSA) that have already announced a restatement. This specification relies on all restatements for which we have usable data. As the regressions are estimated with pooled data, all p-values reported in the paper are calculated after clustering the standard errors by firm.

Column (1) of panel A shows that a peer firm is significantly more likely to start managing its books after other firms in the same industry have revealed management of their financial statements. This finding holds for both the pre-SOX periods. In particular, the coefficient on *PUBLIC_IND%* is 13.337 (p-value < 0.01) in column (1) for the 1997-9 period and is 5.297 (p-value < 0.01) in column (2) for the 2000-2 period. In terms of economic impact, the marginal effect of moving from the 25th percentile to 75th percentile of *PUBLIC_IND%* is associated with a change of 15% and 11% in the likelihood of beginning earnings management for the two time periods respectively.[16] In other words, the larger the fraction of industry that has announced a restatement, the greater is the likelihood that a peer firm chooses to begin managing earnings in the pre-SOX period.[17]

[16] To illustrate the first calculation, note that the marginal effect of 0.129 reported in column (1) of panel A of Table 3 for *PUBLIC_IND%* is multiplied by the inter-quartile range for *PUBLIC_IND%* in Table 2 of 0.027. This yields 0.0034 which when divided by the mean value of *BEGIN_MANAGE* of 0.024 yields 15%.

[17] Year effects are likely to control for any economy wide or macro trends in the adoption of earnings management. Contagion within industry is robust to the inclusion of year effects. These results are not tabulated for brevity.

However, as expected, the coefficient on *PUBLIC_IND%* becomes insignificant for the post-SOX period of 2003-8 (column (3)) attributable to the potential deterrent effect of SOX and other developments such as more rigorous audits after the revelation of the accounting scandals. Interestingly, when the post SOX period is split into two, we find that the deterrence effect of SOX is restricted to the three year period immediately following SOX. Specifically, the coefficient on *PUBLIC_IND%* is 2.681 (p-value = 0.15) in column (4) for the 2003-5 period. The coefficient on *PUBLIC_IND%* reacquires significance in column (5) for the 2006-8 period (coefficient = 3.093, p-value = 0.01) suggesting that once the enforcement related sting wears off, firms have a tendency to go back to their old ways.

There is also significant evidence of contagion at the MSA level and the inter-temporal patterns of contagion and deterrence seem similar to those observed for industries. As displayed in panel B of Table 3, the coefficient of *PUBLIC_MSA%* is positive and significant at the 1% level for both the pre SOX periods of 1997-9 and 2000-2. Consistent with the evidence for industry contagion, the coefficient on *PUBLIC_MSA%* becomes insignificant in the post SOX period (2003-8) and in the individual sub-periods (2003-5 and 2005-8), suggesting the deterrent impact of SOX and related developments. It is worth reiterating that as MSA peers belong to different industries with different economic pressures, evidence of contagion within MSAs is stronger indication that contagion arises from peers learning about the costs of earnings management that influence their decision to engage in earnings management.

Turning to the control variables, three variables are statistically significant in most specifications. A firm's proclivity to begin managing earnings increases with its leverage, past stock return performance and decreases with the industry's book-to-market ratio. These associations seem intuitive as earnings management is perhaps directed towards overcoming

reporting constraints imposed by debt covenants or to sustain an overvalued stock price and when the industry, as a whole, is overvalued. The control variable, *CONTEMP_IND%* is significant for the 2000-2002 period in panel A. The analogous, *CONTEMP_MSA%* is significant in two instances, for the 2000-2002 period and the second post SOX period, 2006-8 in panel B. In all these cases, the coefficient is positive suggesting that the firm is more likely to begin earnings management if other peers have already started doing so without having publicly disclosed that they are manipulating earnings. As discussed earlier, the underlying private channels could be several such as overlapping members of the board of directors, common auditors, common legal counsel or employee turnover across companies (see Chiu et al. [2013] and Francis and Michas [2013] for some of these channels).

The pseudo R-squareds, in Table 3, range between 0.67% and 2.33%. Unlike a conventional R-squared, pseudo R-squareds cannot be interpreted as the proportion of variation in the dependent variable explained by the regression covariates (Long 1997). Hence, we also report the Area under ROC curve (denoted as AUC) statistic. The AUC statistic provides a measure of the model's ability to discriminate and the Hosmer-Lemeshow (2000) test indicates that AUC above 0.70 provides acceptable discrimination in logistic models. In Table 3, the AUC statistics range from 0.686 to 0.740. As a point of comparison, Kim and Skinner (2012) report AUC statistics ranging from 0.547 to 0.842 related to their models of detecting litigation risk.



## IV. FACTORS AFFECTING CONTAGION

Significant coefficients on *PUBLIC_IND%* and *PUBLIC_MSA%* documented thus far suggest that peer firms are more likely to begin managing earnings if other firms in their industry or MSA announce that they restated their financial statements. In this section, we explore factors

that are likely to facilitate or mitigate public contagion. In particular, we examine whether contagion is observed in the same accounts as the one manipulated by the target firm, how SEC enforcement, class action lawsuits, firm size, the extreme nature of some restatements and their mode of disclosure influence the contagion of earnings management. Another important purpose behind the tests to follow is to reassure readers that the contagion we document does not necessarily arise from some unobserved common traits related to industry membership or the imitator's location. Note that the unobserved common traits associated with industry membership or location should be the same for all firms in the industry or in that location.[18] Hence, if we are able to identify differences in contagion within an industry/location, we are more likely to have found potentially causal, as opposed to spurious, factors driving public contagion. Further, differences in public contagion in the presence and absence of these enforcement agents also imply that learning about the costs of earnings management is a significant source of public contagion.



**Same Accounts**

We begin by studying whether firms in the same industry will imitate the same accounting practices. Hence, we examine whether contagion occurs in the same account within a particular industry. To evaluate this question, we focus on the following categories of accounts in which earnings restatements are commonly observed: (i) revenue; (ii) a broad category covering all restatements that do not relate to revenue; and (iii) finer partitions such as restatement in expense accounts and ones related to assets, restructuring or inventory issues.

[18] For instance, one could argue that when the stock price is high, every firm's incentives to manage earnings are potentially higher. Because stock prices within industries are correlated, the identification of the "earnings management contagion" could potentially be criticized as identifying a state of the world in which the payoff to inflating equity prices is high for that industry. Hence, the need to demonstrate within industry differences in contagion based on the differential presence of SEC enforcement, litigation and media coverage of firms. Note that we have also controlled for firm level stock returns and industry-level market to book ratios to account for incentives to manage financial reports to sustain over-valued stock prices.

Panel A of Table 4 reports the numbers of restatements in these specific accounts. Of the total of 2376 restatements, 647 relate to expense items, 559 to revenue and 545 to asset, restructuring or inventory related issues. Panel B reports the detailed year by year descriptive data on the specific accounts in which firms begin to manage earnings during the sample period while panel C reports data on the industry's followers, that is the number of firms that begin to engage in earnings management after a peer firm in the industry has previously announced a restatement within a year. Following revenue restatements as an illustration from panel A, panel B shows that 461 firms begin to manage revenue during our sample period. However, 241 of them begin managing revenue after a peer firm in their industry had previously announced a revenue restatement within a year. As summarized in panel D, 52.28% of the firms that begin to manage revenue in our sample period are considered as industry followers managing revenue.

Table 5 repeats the analysis of contagion reported in Table 3, except that we focus only on specific accounts here. To increase power, we delete firms that restate transactions other than the specific account when we analyze contagion in that account. For instance, when analyzing revenue restatements, the non-revenue restatements are deleted. Moreover, the variable *BEGIN_MANAGE* is set to one in each of these sub-analyses reported in panels A-D respectively, if the firm manages earnings in that specific account i.e., (i) revenue, (ii) all non-revenue, (iii) expenses, and (iv) assets, restructuring or inventory. Similarly, the treatment variable, *PUBLIC_IND%*, captures the percentage of the industry that announced a restatement related to the specific account corresponding to the dependent variable. The same measurement method applies to the control variable, *CONTEMP_IND%*. For example, when revenue restatements are analyzed, *BEGIN_MANAGE* is set to one when the peer firm starts managing revenue, *PUBLIC_IND%* captures the proportion of the industry that has already announced a

revenue restatement and *CONTEMP_IND%* is the proportion of the industry that has stealthily started managing revenue without publicly announcing that development to the stock market.[19]

The results reveal that account specific restatements announced by the initiating firm are accompanied by contagious management of earnings via that specific account among the peers. In fact, contagion for all the four categories of accounts examined, in panels A-D, reveals patterns similar to Table 3. That is, we find contagion in earnings management related to specific accounts in the pre-SOX periods (1997-9, and 2000-2) but not in three year window following SOX (2003-5). However, in line with results in in Table 3, account specific contagion is significant in the 2006-8 period when the enforcement climate associated with SOX is relaxed.

**Impact of SEC Enforcement**

To examine whether contagion of earnings management is impacted by the involvement of the SEC, we decompose *PUBLIC_IND%* into those restatement announcements that were associated with a SEC enforcement and those that were not. Thus, *PUBLIC_IND_1%* (*PUBLIC_IND_0%*) is the fraction of the industry that has been restated and was subject to (not subject to) an SEC enforcement prior to an imitating firm's beginning of its violation period. While constructing *PUBLIC_IND_1%*, we ensure that the public announcement of an SEC investigation of a violator is made before the beginning of the following firm *i*'s violation period.[20] That is, we try to make sure that the SEC's involvement can actually deter firm *i*'s

[19] The following example illustrates the coding. The dependent variable *BEGIN_MANAGE* is coded = 1 for firms that begin to manage earnings related to revenue recognition issues. For firm A that begins managing earnings via revenue recognition in 1999, we code *BEGIN_MANAGE* = 0 for 1997 and 1998 and *BEGIN_MANAGE* = 1 in 1999. For firm B that never restates earnings, we code *BEGIN_MANAGE* = 0 from 1997 to 2008. We have removed observations for *BEGIN_MANAGE* = 0 for those firms that begin to manage earnings related to other issues. Therefore, the sample in each period is reduced.

[20] We thank Jonathan Karpoff, Scott Lee and Jerry Martin for sharing their data on SEC enforcement actions. This data, collected from SEC filings, has been analyzed in Karpoff et al. (2008a and 2008b). The authors carefully collect and record the first date on which the SEC's involvement in an investigation is made public.

decision to begin managing earnings. Similarly, we decompose the contagion within an MSA into contagion from restatements that were accompanied with SEC enforcement and those restatements that were not accompanied by SEC enforcement actions.[21]

Table 6 tabulates yearly frequencies of the number of firms announcing restatements that were subject to SEC enforcement. As is obvious from column (2), the SEC investigates very few restating firms. For instance, in 2001, the SEC pursued only 19 out of 110 announcers. Given that the SEC does not and cannot investigate all firms, it is crucial that the firms that they do target deter other errant firms. Somewhat more surprising is the fact that the fraction of firms that are subject to class action litigation is also not very high. In particular, in 1998 only 18 out of the 53 firms (or about 34%) are subject to class action litigation.

As seen in panel A of Table 7, restatement announcements where the SEC is not involved are associated with public contagion within industry which is significant at 1% for the pre-SOX period (1997-9 and 2000-2). This suggests significant evidence of contagion when the SEC is not involved but none when it is involved. Similar evidence of deterrence of SEC investigations at the MSA level is seen for the pre SOX period in panel A of Table 8. Not surprising, for the post SOX period, there is no evidence of contagion in either sample consistent with the overall lack of evidence of contagion in this period. In summary, the results suggest that peers are less likely to imitate earnings management when the SEC is involved.



[21] In this and subsequent subsections, we continue to use the same set of restatements employed earlier for the main tests discussed in Section III Base Results and Table 3. Hence, the coding of the dependent variable *BEGIN_MANAGE* and the sample size remains the same for each period examined as in Table 3. In Table 3, *PUBLIC_IND%* (*PUBLIC_MSA%*) is the percentage of the industry (MSA) that has announced a restatement within a year prior to the firm beginning its violation period. The key difference between Table 7 and Table 3 is the computation of the public (industry and MSA) contagion variables. In Table 7 Panel A that looks at the impact of SEC enforcement action, *PUBLIC_IND%* is separated into two variables *PUBLIC_IND_1%* and *PUBLIC_IND_0%*. *PUBLIC_IND_1%* (*IND_0%*) is the percentage of the industry that announced a restatement within a year prior to the firm beginning to manage earnings and the restatement is (is not) associated with SEC enforcement.

**Contagion following a Class Action Lawsuit**

To test whether class action lawsuit curb contagion, we examine the extent of contagion separately for restatements that were accompanied by class action litigation and those that were not. We decompose MSA level contagion in a similar manner. This empirical strategy is similar to that of the previous section where we examine the effect of SEC enforcement on contagion.

Partial results related to the effect of class action litigation on industry contagion are displayed in panel B of Table 7. Restatement announcements that are accompanied by class action litigation have no significant effect on the decision of other firms to manage earnings. In contrast, restatement announcements that are not accompanied by class action litigation are associated with significant contagion in the pre-SOX periods in panel B of Table 7 (coefficient = 12.424, p-value = 0.02 for 1997-9 and 5.443, p-value < 0.01 for 2000-2). The results for the effect of class action litigation on MSA level contagion are displayed in panel B of Table 8. Similar to contagion in the industry, we observe contagion only when restatement announcements are not followed by class action lawsuits. The post SOX years are associated with no evidence of contagion. Litigation against restating firms deters significant imitation of earnings management practices by others in the industry and MSA for the pre SOX period.



**Contagion following Larger Firms' Restatements and more prominent Restatements**

The characteristics of the firm announcing a restatement can also impact contagion. In particular, we expect peers to imitate the actions of large, visible and hence influential firms. To investigate this conjecture, we identify large target firms announcing restatements based on the median total assets for all firms in their industry for the year. Consistent with expectations, we find evidence that peers are significantly more likely to imitate if the firm announcing a restatement is large. Moreover, this significant contagion arising from large restaters is not

limited to the pre-SOX period as seen in the tests above but is also seen in the post SOX period (panel C, Table 7). Restatement announcements by small firms are not associated with imitation by peer firms. Size of the restating firm is also important for MSA contagion. Large restating firms are likely to spawn significantly higher imitation as seen in panel C of Table 8. However, this effect of firm size is observed only in the pre SOX period.

Along similar lines, we find that disclosure prominence also appears to affect contagion. Restatements made via a press release are more likely to be associated with contagion, among both industry and MSA peers, as can be seen in panel D of Table 7 and Table 8.[22]

**Severity of Restatements and Contagion**

In this section, we test whether the effect of contagion varies with the severity of the restatement as discussed in Section II Industry and MSA contagion. Restatements are classified as severe if the negative restated net income scaled by total assets falls in the bottom quartile of such restated ROAs. As seen in panel E of Table 7, the extreme restatements are not associated with industry contagion in any sub-period. The same result is seen for MSAs in panel E of Table 8. Hence, extreme restatements seem to elicit a "we would never do that" response from peer firms. In such cases we expect no contagion in these practices, both at the industry and at the MSA level.



## V. CONCLUSIONS

Our paper is perhaps the first to document that peer firms begin managing earnings after an earnings restatement is announced by target firms in their industry or in their MSA. In particular, firms are more likely to begin managing earnings when a higher fraction of their

[22] Restatements disclosed via a press release do not appear to overlap with the other cuts discussed here. In particular, the correlation between the disclosure choice as a press release and (i) SEC action is 0.09; and (ii) litigation is 0.13; and (iii) extreme restatement, as defined in this paper, is 0.07; and (iv) big firms is 0.08.

industry or their MSA has already announced a restatement. Such public contagion is unlikely to be explained by common unobserved traits related to industry or MSA membership as we are able to document systematic variation in contagion within the industry or within the MSA. It is important to note that contagion is more common among the accounts that have been announced as restated by the target firm. Moreover, we document that intra-industry and intra-MSA public contagion in earnings management is curbed if the restating target firm is subject to a class action lawsuit or SEC enforcement. Contagion is also mitigated when (i) the restatement is extreme; (ii) less prominently disclosed by the restating firm; and when (iii) the restating firm is not large.

The impact of enforcement agents on the likelihood of peer firm's adoption of aggressive accounting practices implies that learning about the costs of earnings management is likely to be at least one of the significant sources of public contagion. The variation in contagion by the severity of restatements as well as the characteristics of the restating firms points to the potential for enforcement agents to tailor their efforts to mitigate contagion more effectively. The presence of public contagion in earnings management also suggests that the cumulative impact of enforcement and policing will be significantly greater than the immediate impact of regulatory effort.

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## APPENDIX 1: Coding of Contemporaneous Adoption and Public Contagion Variables in the Data

### Computing CONTEMP_IND% and PUBLIC_IND%

Consider three firms, X, Y and Z. Firm X is the initiator, firm Y is the follower and firm Z stays undetected throughout the sample period. If firm Y starts managing earnings after the beginning of firm X's violation period but before X's restatement announcement, firm Y is considered to be affected by contemporaneous adoption. However, if firm Y starts managing its books after firm X's restatement announcement, then firm Y is considered to be affected by public contagion. Firm Z is a firm that is undetected in a calendar year and serves as a control sample.

The numerator in firm Y's CONTEMP_IND% (our measure of contemporaneous adoption) is the cumulative number of other firms in the same industry as Y that have begun managing earnings within a year prior to the beginning of firm Y's violation period, but have not announced a restatement. The numerator in firm Y's PUBLIC_IND% (our measure of public contagion) is the cumulative number of other firms in the same industry as Y that have announced a restatement within a year prior to the beginning of firm Y's violation period. For both CONTEMP_IND% and PUBLIC_IND%, the counts would be based on the beginning and the end dates of the violation periods and restatement dates of the sample.

Defining CONTEMP_IND% and PUBLIC_IND% for the undetected firm Z gets complicated by the absence of a violation period and a restatement announcement date for Z. Hence, we generate a random pseudo start date of the violation period. Undetected firms are assigned a violation month based on the distribution of starting months for restating firms in our sample. The violation period is assumed to begin on the 1st of the month. For example, out of the restating firms, we find that 50% of the firms began their earnings management in January while 5% of the firms began their earnings management in February and so forth. We then randomly assign 50% (5%) of the undetected firms to have a pseudo violation date beginning in January (February) and so on. Once we have the randomly generated beginning date of the violation period, the numerator in firm Z's CONTEMP_IND% is the cumulative number of firms whose violation periods begin within a year before such a pseudo random start date but without a restatement announcement. Similarly, the numerator in firm Z's PUBLIC_IND% is the cumulative number of firms that have announced a restatement within a year before such a pseudo random start date.

The denominator for PUBLIC_IND% and CONTEMP_IND% for firm Y (Z) is the number of firms in Y's (Z's) industry, i.e., two digit SIC code, at the end of the calendar year. The procedure described above is repeated when MSA, instead of IND, is the unit of analysis.

**Example: Coding of CONTEMP_IND% and PUBLIC_IND%**

Consider the case of the following firms, A-J. We discuss how the dependent variable, BEGIN_MANAGE, and the contemporaneous adoption and public contagion variables are coded for two firms, A and G.

| Firm | SIC code | MSA# | Restatement Announcement Date | Beginning of Violation Period |
|---|---|---|---|---|
| A | 10 | 41860 | 10/31/01 | 1/1/00 |
| B | 13 | 31100 | 5/23/97 | 1/1/96 |
| C | 13 | 26420 | 5/16/99 | 7/1/96 |
| D | 13 | 19100 | 8/12/00 | 1/1/97 |
| E | 13 | 36420 | 2/8/00 | 4/1/99 |
| F | 13 | 19740 | 5/6/02 | 1/1/01 |
| G | 13 | 26420 | 12/31/01 | 1/1/01 |
| H | 13 | 33260 | 11/14/01 | 1/1/01 |
| I | 13 | 26420 | 4/1/02 | 4/1/01 |
| J | 13 | 26420 | 1/29/02 | 9/1/00 |



***Coding for Firm A***

In calendar year 1999, the dependent variable BEGIN_MANAGE is set to 0 because firm A is undetected in 1999. As A is undetected in 1999, we generate a pseudo-earnings management date to compute the numerator for the variables PUBLIC_IND%, PUBLIC_MSA%, CONTEMP_ IND%, CONTEMP_MSA% related to Firm A.

Let's assume that the pseudo beginning date of the violation period for Firm A in 1999 is 7/1/1999. We then look at the number of restatements from 7/1/1998 to 6/30/1999. Hence, the numerator for PUBLIC_IND% specific to firm A is 0 because no firm in SIC code 10 has announced a restatement before 7/1/1999. Similarly, the numerator in CONTEMP_IND%, PUBLIC_MSA% and CONTEMP_MSA% specific to firm A will also be 0 because no other firm in A's industry or MSA has either announced a restatement or begun managing earnings before 7/1/99. Note that the denominator for both PUBLIC_IND% and CONTEMP_IND% (PUBLIC_MSA% and CONTEMP_MSA%) for every year the firm is in the sample is the number of firms in A's SIC code 10 (MSA no. 41860) during that calendar year.

In calendar year 2000, the dependent variable, BEGIN_MANAGE, is set to 1 for firm A because firm A has begun managing its earnings on 1/1/00. However, the numerator for each of PUBLIC_IND%, CONTEMP_IND%, PUBLIC_MSA% and CONTEMP_MSA% specific to firm A for 2000 will continue to be coded as 0 because no other firm in A's industry (SIC code 10) or MSA (MSA no. 41860) has either announced a restatement or begun managing earnings from 1/1/1999 to 12/31/1999.

In calendar year 2001 and beyond, firm A is excluded from the dataset because we model the decision to begin earnings management as opposed to the continuation of earnings management.

***Coding for Firm G***

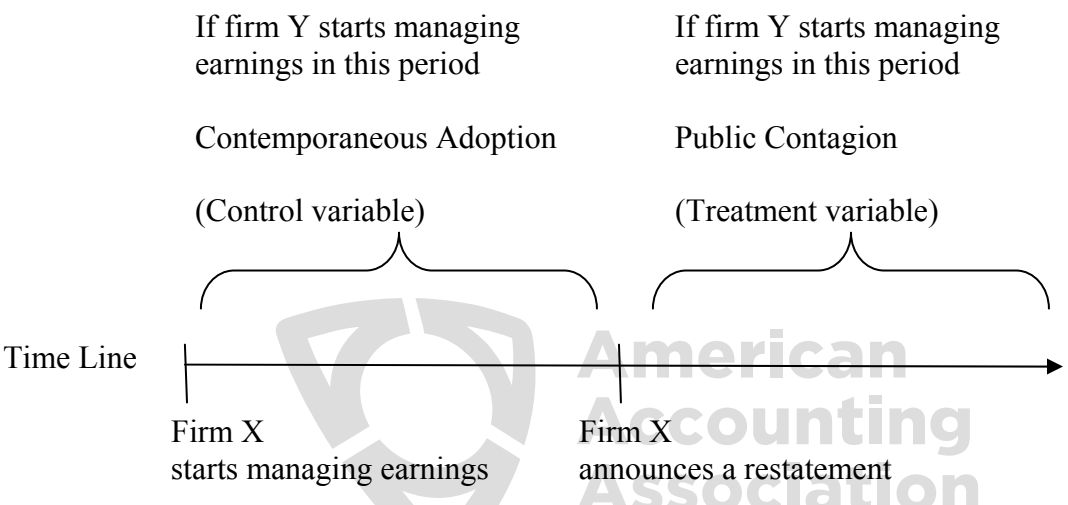
Now, let's consider the case of firm G in calendar year 2000. The dependent variable, BEGIN_MANAGE, is set to 0 as G did not manage earnings in 2000. Consequently, we generate a pseudo-start date for earnings management, which is say 1/1/00. The numerator for PUBLIC_IND% would be 1 as firm C belong to the same industry as G (SIC code 13) and have announced a restatement between 1/1/1999 to 12/31/1999. The numerator for CONTEMP_IND% would be 1 as firm E belongs to the same industry as G (SIC code 13) and has begun managing earnings between 1/1/1999 to 12/31/1999, although it has not yet announced its earnings restatement. The numerator for PUBLIC_MSA% would be 1 since firm C belongs to the same city as G (MSA no. 26420) and has announced a between 1/1/1999 to 12/31/1999. The numerator for CONTEMP_MSA% would be 0 because no firms in the same city (MSA no. 26420) have begun managing earnings between 1/1/1999 to 12/31/1999 but have not made a restatement announcement.

In the calendar year 2001, the dependent variable, BEGIN_MANAGE, is set to 1 because G starts managing earnings on 1/1/01. The numerator for PUBLIC_IND% would be 1 as firms D belong to the same industry as G (SIC code 13) and have announced a restatement between 1/1/2000 to 12/31/2000. The numerator for CONTEMP_IND% would be zero because no firms belonging to the same industry as G (SIC code 13) have begun managing earnings between 1/1/2000 to 12/31/2000 but not announce restatement before 1/1/01.

The numerator for PUBLIC_MSA% would be 0 since no firm belongs to the same city as G (MSA no. 26420) and have announced a restatement between 1/1/2000 to 12/31/2000. For CONTEMP_MSA%, the numerator would be 1 because firm J, located in G's MSA (no. 26420) has begun managing earnings on 9/1/00 (i.e. between 1/1/2000 to 12/31/2000) but not announced its earnings restatement before 1/1/01.

As discussed before, the denominator for both PUBLIC_IND% and CONTEMP_IND% (PUBLIC_MSA% and CONTEMP_MSA%) for 2001 would be the number of firms in G's SIC code 13 (MSA no. 26420) during the calendar year 2001. In calendar year 2002 and beyond, G will be excluded from the sample as discussed before.

**FIGURE 1: Timeline clarifying the definitions of Contemporaneous Adoption and Public Contagion**



## TABLE 1: Descriptive Statistics

This table reports summary statistics on the number of firms that begin earnings management and announce a restatement deemed to be substantial, i.e. those with early revenue recognition or income decreasing restatements. Restatement data from 1997 to 1999 are from the GAO report. The announcement dates are from the GAO report and data on the beginning of the violation period for firms are hand collected. Restatement data from 2000 to 2008 are from Audit Analytics. For firms that restate multiple times, only the first restatement is considered in our analysis. Column 1 is the total number of firms that announce a restatement in the year. This is the public disclosure of earnings management. Column 2 is the total number of firms that begin earnings management in the year. Column 3 displays the number of firms that begin managing earnings but after a peer firm in the industry announces a restatement within a year. Column 4 is the number of firms that begin managing earnings in the year but after a peer firm in the MSA announces a restatement within a year.

| Calendar Year | No. of firms announcing restatements | No. of firms beginning to manage earnings | No. of firms that had a peer firm in the industry announce a restatement before beginning earnings management | No. of firms that had a peer firm in the MSA announce a restatement before beginning earnings management |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1997 | 53 | 76 | 33 | 22 |
| 1998 | 53 | 82 | 57 | 44 |
| 1999 | 73 | 91 | 68 | 50 |
| 2000 | 105 | 181 | 71 | 56 |
| 2001 | 110 | 281 | 101 | 84 |
| 2002 | 184 | 315 | 112 | 107 |
| 2003 | 231 | 275 | 176 | 135 |
| 2004 | 266 | 257 | 147 | 139 |
| 2005 | 445 | 241 | 153 | 137 |
| 2006 | 419 | 198 | 137 | 116 |
| 2007 | 273 | 148 | 104 | 93 |
| 2008 | 164 | 104 | 70 | 51 |
| SUM | 2376 | 2249 | 1229 | 1034 |

**TABLE 2: Firm Characteristics**

*Panel A: Descriptive Characteristics of Combined Sample Variables*

BEGIN_MANAGE is a dummy variable that is 0 if the firm does not manage its earnings in the year and one otherwise. For firms that restate multiple times, only the first restatement is considered in our analysis. The sample includes all undetected firms and firms that announce a restatement over the period 1997-2008. PUBLIC_IND% is the percentage of the two digit industry that has announced a restatement within a year prior to the firm's beginning its violation period. CONTEMP_IND% is the percentage of the industry that has started managing its books but has not announced a restatement within a year prior to the firm's beginning its violation period. PUBLIC_MSA% is the percentage of the MSA that has announced a restatement prior to the firm's beginning its violation period. CONTEMP _MSA% is the percentage of the MSA that has started managing earnings but has not announced a restatement prior to the firm's beginning its violation period. See the Appendix for details on the coding of BEGIN_MANAGE and the contagion variables. BMR is the book-to-market ratio. LEVERAGE is the ratio of long-term debt to total assets. LNASSETS is the natural logarithm of total assets. ROA refers to return-on-assets, computed as the ratio of earnings before extraordinary items to beginning-of-year total assets. EARNVOL is earnings volatility, computed as the standard deviation of earnings before extraordinary items for the 12 quarters ending with the year of observation. RET is the contemporaneous 12-month buy-and-hold returns. HERFINDEX refers to the Herfindahl index for the firm's two-digit SIC industry, computed as the sum of the squares of the market shares (firm sales / industry sales) of the firms in the industry. IND_BMR refers to the industry-level book-to-market ratio, computed by dividing the sum of all book values in the two-digit SIC code by the sum of market values in the same two digit SIC code.



| Variable | No. of Obs | Mean | Median | Standard Deviation | 25th Percentile | 75th Percentile |
|---|---|---|---|---|---|---|
| BEGIN_MANAGE | 57288 | 0.024 | 0.000 | 0.152 | 0.000 | 0.000 |
| PUBLIC_IND% | 57288 | 0.017 | 0.005 | 0.026 | 0.000 | 0.027 |
| CONTEMP_IND% | 57288 | 0.012 | 0.008 | 0.016 | 0.001 | 0.016 |
| PUBLIC_MSA% | 57288 | 0.016 | 0.000 | 0.031 | 0.000 | 0.024 |
| CONTEMP_MSA% | 57288 | 0.012 | 0.005 | 0.022 | 0.000 | 0.016 |
| BMR | 57288 | 0.678 | 0.510 | 0.667 | 0.284 | 0.828 |
| LEVERAGE | 57288 | 0.151 | 0.079 | 0.179 | 0.001 | 0.253 |
| LNASSETS | 57288 | 5.311 | 5.294 | 2.348 | 3.657 | 6.860 |
| ROA | 57288 | -0.117 | 0.018 | 0.867 | -0.039 | 0.074 |
| EARNVOL | 57288 | 0.072 | 0.015 | 0.441 | 0.005 | 0.044 |
| RET | 57288 | 0.116 | -0.005 | 0.797 | -0.318 | 0.320 |
| HERFINDEX | 57288 | 0.062 | 0.045 | 0.053 | 0.030 | 0.071 |
| IND_BMR | 57288 | 0.374 | 0.361 | 0.152 | 0.258 | 0.488 |

**TABLE 2: Firm Characteristics Differences in Firm Characteristics between Leaders and Followers**

*Panel B: Comparison of Firm Characteristics of Industry Leaders and Industry Followers*

This table reports separate statistics on the industry leader and industry follower firms that announce a restatement deemed to be substantial, i.e. those with early revenue recognition or income decreasing restatements. For firms that restate multiple times, only the first restatement is considered in our analysis. All variables are from COMPUSTAT with available data that are previously defined in Table 2. Industry leader group include firm-year observations when they announced a restatement, and are followed subsequently by industry peers who begin earnings management within a year of the industry leader firms announcing the restatement. The industry follower group includes firm-years prior to the firms beginning earnings management deemed to be substantial, when they observe an industry leader announcing a restatement. *, **, *** indicates significance level (2-tailed) at 10%, 5% and 1% respectively.

| | Industry Leaders n = 1860 | | | Industry Followers n = 1229 | | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Median** | **Standard Deviation** | **Mean** | **Median** | **Standard Deviation** | **t-stats for Mean Difference** | **Wilcoxon Test for Median Difference** |
| BMR | 0.622 | 0.484 | 0.612 | 0.679 | 0.527 | 0.684 | (-2.26)** | (-2.26)** |
| LEVERAGE | 0.153 | 0.081 | 0.180 | 0.154 | 0.085 | 0.181 | (-0.24) | (-0.49) |
| LNASSETS | 5.828 | 5.876 | 2.088 | 5.552 | 5.593 | 2.196 | (3.24)*** | (3.20)*** |
| ROA | -0.143 | 0.016 | 1.240 | -0.187 | 0.013 | 1.378 | (0.87) | (1.66) |
| EARNVOL | 0.082 | 0.017 | 0.656 | 0.135 | 0.016 | 1.068 | (-1.58) | (0.69) |
| RET | 0.123 | -0.022 | 0.897 | 0.290 | 0.009 | 1.271 | (-3.94)*** | (-2.06)** |
| HERFINDEX | 0.059 | 0.044 | 0.046 | 0.058 | 0.044 | 0.046 | (0.24) | (0.95) |
| IND_BMR | 0.397 | 0.367 | 0.163 | 0.400 | 0.367 | 0.169 | (-0.52) | (0.16) |

*Panel C: Comparison of Firm Characteristics for MSA Leaders and MSA Followers*

This table reports separate statistics on the MSA leader and MSA follower firms that announce a restatement deemed to be substantial, i.e. those with early revenue recognition or income decreasing restatements. For firms that restate multiple times, only the first restatement is considered in our analysis. All variables are from COMPUSTAT with available data that are previously defined in Table 2. MSA leader group include firm-year observations when they announced a restatement, and are followed subsequently by MSA peers who begin earnings management within a year of the MSA leader firms announcing earnings. MSA follower group includes are those firm-years prior to the firms beginning earnings management deemed to be substantial, when they observe a MSA leader announcing a restatement. *, **, *** indicates significance level (2-tailed) at 10%, 5% and 1% respectively.

| | MSA Leaders n = 1579 | | | MSA Followers n = 1034 | | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Median** | **Standard Deviation** | **Mean** | **Median** | **Standard Deviation** | **t-stats for Mean Difference** | **Wilcoxon Test for Median Difference** |
| BMR | 0.606 | 0.467 | 0.595 | 0.680 | 0.496 | 0.705 | (-2.62)*** | (-1.91)* |
| LEVERAGE | 0.163 | 0.088 | 0.188 | 0.156 | 0.084 | 0.183 | (0.91) | (0.71) |
| LNASSETS | 5.857 | 5.851 | 2.056 | 5.502 | 5.519 | 2.192 | (3.83)*** | (3.71)*** |
| ROA | -0.125 | 0.019 | 1.092 | -0.213 | 0.015 | 1.507 | (1.58) | (1.69)* |
| EARNVOL | 0.076 | 0.018 | 0.557 | 0.135 | 0.018 | 1.038 | (-1.72)* | (0.02) |
| RET | 0.118 | -0.030 | 0.861 | 0.337 | 0.029 | 1.336 | (-4.64)*** | (-2.90)*** |
| HERFINDEX | 0.067 | 0.047 | 0.055 | 0.065 | 0.046 | 0.053 | (1.03) | (1.73)* |
| IND_BMR | 0.392 | 0.363 | 0.151 | 0.394 | 0.361 | 0.163 | (-0.35) | (0.26) |

**TABLE 3: Propensity to Imitate Earnings Management**

*Panel A: Industry Contagion*

This table displays results of a pooled logit regression where the dependent variable, BEGIN_MANAGE, takes the value 1 if the firm begins managing earnings in the year and zero otherwise. PUBLIC_IND% is the percentage of the industry that has announced a restatement within a year prior to the firm beginning its violation period. CONTEMP _IND% is the percentage of the industry that has started managing its books but has not announced a restatement within a year prior to the firm beginning its violation period. All other variables are previously defined in Table 2. The p values, corrected for firm level clustering, are reported in parenthesis and the marginal effects are in brackets. *, **, *** indicates significance level at 10%, 5% and 1% respectively.

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| INTERCEPT | -4.020*** | -4.497*** | -3.287*** | -3.207*** | -3.443*** |
| | (<0.01) | (<0.01) | (<0.01) | (<0.01) | (<0.01) |
| PUBLIC_IND% | 13.337*** | 5.297*** | 1.681 | 2.681 | 3.093*** |
| | (<0.01) | (<0.01) | (0.16) | (0.15) | (0.01) |
| | [0.129] | [0.102] | [0.050] | [0.089] | [0.081] |
| CONTEMP_IND% | -6.198 | 14.167*** | 1.353 | 1.554 | -3.729 |
| | (0.57) | (<0.01) | (0.61) | (0.64) | (0.40) |
| | [-0.060] | [0.272] | [0.041] | [0.051] | [-0.093] |
| BMR | -0.641*** | 0.029 | 0.050 | 0.014 | 0.172 |
| | (<0.01) | (0.44) | (0.45) | (0.85) | (0.23) |
| | [-0.006] | [0.001] | [0.001] | [0.000] | [0.001] |
| LEVERAGE | 0.331 | 0.520*** | 0.985*** | 1.057*** | 0.862** |
| | (0.36) | (<0.01) | (<0.01) | (<0.01) | (0.02) |
| | [0.003] | [0.010] | [0.029] | [0.035] | [0.022] |
| LNASSETS | 0.004 | 0.076*** | -0.015 | 0.001 | -0.026 |
| | (0.89) | (<0.01) | (0.35) | (0.98) | (0.32) |
| | [0.000] | [0.001] | [0.000] | [0.000] | [-0.001] |
| ROA | 0.190 | -0.013 | 0.005 | -0.042 | 0.067 |
| | (0.35) | (0.79) | (0.92) | (0.41) | (0.38) |
| | [0.002] | [0.000] | [0.000] | [-0.001] | [0.002] |
| EARNVOL | -0.674 | 0.055 | 0.006 | -0.062 | 0.082 |
| | (0.32) | (0.56) | (0.93) | (0.26) | (0.58) |
| | [-0.007] | [0.001] | [0.000] | [-0.002] | [0.002] |
| RET | 0.014 | 0.125*** | 0.135*** | 0.121*** | 0.056 |
| | (0.88) | (<0.01) | (<0.01) | (<0.01) | (0.66) |
| | [0.000] | [0.002] | [0.004] | [0.004] | [0.001] |
| HERFINDEX | 1.591 | -0.403 | -0.855 | -0.172 | -1.774 |
| | (0.21) | (0.43) | (0.26) | (0.86) | (0.17) |
| | [0.015] | [-0.008] | [-0.026] | [-0.006] | [-0.045] |
| IND_BMR | -1.017* | -0.407** | -0.730** | -1.041*** | -0.545 |
| | (0.08) | (0.02) | (0.03) | (0.01) | (0.38) |
| | [-0.010] | [-0.008] | [-0.021] | [-0.034] | [-0.010] |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden)% | 1.17 | 2.33 | 0.71 | 0.96 | 0.67 |
| Area under ROC Curve | 0.719 | 0.740 | 0.698 | 0.710 | 0.686 |

**TABLE 3: Propensity to Imitate Earnings Management (continued)**

*PANEL B: MSA Contagion*

This table displays results of a pooled logit regression where the dependent variable, BEGIN_MANAGE, takes the value 1 if the firm begins managing earnings in the year and zero otherwise. PUBLIC_MSA% is the percentage of the MSA that has announced a restatement within one year prior to the firm beginning its violation period. CONTEMP_MSA% is the percentage of the MSA that has started managing its books but has not announced a restatement within one year prior to the firm beginning its violation period. All other variables are previously defined in Table 2. The p values, corrected for firm level clustering, are reported in parenthesis and the marginal effects are in brackets. *, **, *** indicates significance level at 10%, 5% and 1% respectively.

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| INTERCEPT | -4.016*** | -4.434*** | -3.223*** | -3.106*** | -3.409*** |
| | (<0.01) | (<0.01) | (<0.01) | (<0.01) | (<0.01) |
| PUBLIC_MSA% | 6.051** | 3.491*** | 0.387 | 1.237 | 0.766 |
| | (0.04) | (<0.01) | (0.66) | (0.26) | (0.51) |
| | [0.059] | [0.069] | [0.011] | [0.041] | [0.020] |
| CONTEMP_MSA% | 0.441 | 6.218*** | 1.265 | -0.886 | 2.790** |
| | (0.94) | (<0.01) | (0.24) | (0.61) | (0.04) |
| | [0.004] | [0.123] | [0.038] | [-0.029] | [0.071] |
| BMR | -0.635*** | 0.045 | 0.049 | 0.017 | 0.180 |
| | (<0.01) | (0.21) | (0.45) | (0.82) | (0.21) |
| | [-0.006] | [0.001] | [0.001] | [0.001] | [0.001] |
| LEVERAGE | 0.322 | 0.465*** | 0.988*** | 1.078*** | 0.855** |
| | (0.37) | (<0.01) | (<0.01) | (<0.01) | (0.02) |
| | [0.003] | [0.009] | [0.030] | [0.036] | [0.022] |
| LNASSETS | 0.001 | 0.085*** | -0.014 | 0.000 | -0.026 |
| | (0.98) | (<0.01) | (0.38) | (0.99) | (0.32) |
| | [0.000] | [0.002] | [0.000] | [0.000] | [-0.001] |
| ROA | 0.190 | -0.011 | 0.005 | -0.041 | 0.067 |
| | (0.35) | (0.83) | (0.91) | (0.42) | (0.39) |
| | [0.002] | [0.000] | [0.000] | [-0.001] | [0.002] |
| EARNVOL | -0.690 | 0.056 | 0.005 | -0.064 | 0.077 |
| | (0.31) | (0.54) | (0.94) | (0.25) | (0.59) |
| | [-0.007] | [0.001] | [0.000] | [-0.002] | [0.002] |
| RET | 0.012 | 0.129*** | 0.132*** | 0.121*** | 0.069 |
| | (0.89) | (<0.01) | (<0.01) | (0.01) | (0.57) |
| | [0.000] | [0.003] | [0.004] | [0.004] | [0.001] |
| HERFINDEX | 1.751 | 0.386 | -0.819 | -0.157 | -1.664 |
| | (0.15) | (0.40) | (0.28) | (0.87) | (0.19) |
| | [0.017] | [0.008] | [-0.024] | [-0.006] | [-0.042] |
| IND_BMR | -1.003* | -0.451*** | -0.770** | -1.066*** | -0.553 |
| | (0.08) | (0.01) | (0.02) | (<0.01) | (0.36) |
| | [-0.010] | [-0.009] | [-0.022] | [-0.035] | [-0.010] |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden)% | 1.12 | 1.49 | 0.69 | 0.93 | 0.56 |
| Area under ROC Curve | 0.713 | 0.729 | 0.699 | 0.706 | 0.687 |

## TABLE 4: Descriptive Data on Types of Restatements

This table provides descriptive data on the type of restatements and earnings management. Panel A reports yearly frequencies of the number of firms announcing various restatements and whether they are related to revenue recognition issues, only non-revenue recognition issues, expense related issues and issues related to assets, restructuring, or inventory. Panel B reports yearly frequencies of the number of firms beginning to manage earnings and whether they are related to revenue recognition issues, only non-revenue recognition issues, expense related issues and issues related to assets, restructuring, or inventory. Panel C reports yearly frequencies of the numbers of firms beginning to manage earnings *related to* related to revenue recognition issues, only non-revenue recognition issues, expense related issues and issues related to assets, restructuring, or inventory after peer firm in the industry announce restatements related to similar specific issues within a year. Panel D summarizes the percentage of firms that had a peer firm in the industry announce a restatement related to specific issues before beginning earnings management related to similar specific issues. The restatement sample is deemed to be substantial, i.e. those with early revenue recognition or income decreasing restatements. Restatement data from 1997 to 1999 are from the GAO report while restatement data from 2000 to 2008 are from Audit Analytics.

*PANEL A. Restatement announcement related to specific issues*

| Calendar Year | No. of Firms Announcing Restatement (1) | No. of Firms Announcing Restatement related to Revenue Recognition Issues (2) | No. of Firms Announcing Restatement related to only Non-Revenue Recognition Issues (3) | No. of Firms Announcing Restatement related to Expense Issues (4) | No. of Firms Announcing Restatement related to Assets, Restructuring, or Inventory Issues (5) |
|---|---|---|---|---|---|
| 1997 | 53 | 15 | 38 | 21 | 9 |
| 1998 | 53 | 19 | 34 | 12 | 6 |
| 1999 | 73 | 28 | 45 | 15 | 17 |
| 2000 | 105 | 53 | 52 | 30 | 19 |
| 2001 | 110 | 63 | 47 | 17 | 5 |
| 2002 | 184 | 44 | 140 | 51 | 44 |
| 2003 | 231 | 63 | 168 | 54 | 61 |
| 2004 | 266 | 62 | 204 | 66 | 72 |
| 2005 | 445 | 70 | 375 | 185 | 178 |
| 2006 | 419 | 58 | 361 | 90 | 68 |
| 2007 | 273 | 61 | 212 | 57 | 42 |
| 2008 | 164 | 23 | 141 | 49 | 24 |
| SUM | 2376 | 559 | 1817 | 647 | 545 |

*PANEL B. Earnings management related to specific issues*

| Calendar Year | No. of Firms beginning to manage earnings (1) | No. of Firms beginning to manage earnings related to Revenue Recognition Issues (2) | No. of Firms beginning to manage earnings related to only Non-Revenue Recognition Issues (3) | No. of Firms beginning to manage earnings related to Expense Issues (4) | No. of Firms beginning to manage earnings related to Assets, Restructuring, or Inventory Issues (5) |
|---|---|---|---|---|---|
| 1997 | 76 | 22 | 54 | 21 | 13 |
| 1998 | 82 | 39 | 43 | 21 | 17 |
| 1999 | 91 | 42 | 49 | 20 | 10 |
| 2000 | 181 | 52 | 129 | 68 | 60 |
| 2001 | 281 | 74 | 207 | 88 | 94 |
| 2002 | 315 | 55 | 260 | 93 | 88 |
| 2003 | 275 | 50 | 225 | 74 | 71 |
| 2004 | 257 | 40 | 217 | 55 | 56 |
| 2005 | 241 | 35 | 206 | 60 | 38 |
| 2006 | 198 | 25 | 173 | 61 | 36 |
| 2007 | 148 | 18 | 130 | 37 | 22 |
| 2008 | 104 | 9 | 95 | 21 | 14 |
| SUM | 2249 | 461 | 1788 | 619 | 519 |

**TABLE 4: Descriptive Data on Types of Restatements (continued)**

*PANEL C: Earnings Management related to specific issues after peer firm in the industry announce restatements related to similar specific issues*

| Calendar Year | No. of Firms that had a peer firm in the industry announce a restatement before beginning earnings management (1) | No. of Firms that had a peer firm in the industry announce a restatement related to revenue recognition issues before beginning earnings management related to Revenue Recognition Issues (2) | No. of Firms that had a peer firm in the industry announce a restatement related to only Non-Revenue Recognition Issues before beginning earnings management related to Non-Revenue Recognition Issues (3) | No. of Firms that had a peer firm in the industry announce a restatement related to Expense Issues before beginning earnings management related to Expense Issues (4) | No. of Firms that had a peer firm in the industry announce a restatement related to Assets, Restructuring, or Inventory Issues before beginning earnings management related to Assets, Restructuring, or Inventory Issues (5) |
|---|---|---|---|---|---|
| 1997 | 33 | 9 | 24 | 4 | 1 |
| 1998 | 57 | 28 | 29 | 5 | 6 |
| 1999 | 68 | 29 | 39 | 4 | 4 |
| 2000 | 71 | 40 | 31 | 10 | 10 |
| 2001 | 101 | 20 | 81 | 12 | 11 |
| 2002 | 112 | 19 | 93 | 14 | 19 |
| 2003 | 176 | 22 | 154 | 36 | 35 |
| 2004 | 147 | 19 | 128 | 34 | 30 |
| 2005 | 153 | 21 | 132 | 28 | 20 |
| 2006 | 137 | 14 | 123 | 40 | 23 |
| 2007 | 104 | 12 | 92 | 23 | 15 |
| 2008 | 70 | 8 | 62 | 14 | 8 |
| SUM | 1229 | 241 | 988 | 224 | 182 |

*PANEL D: Summary statistics on restatements by specific issues*

| Specific Issues in Restatement | No. of Firms Announcing Restatement related to specific Issues (1) | No. of Firms beginning to manage earnings related to specific Issues (2) | No. of Firms that had a peer firm in the industry announce a restatement related to specific issues before beginning earnings management related to similar specific Issues (3) | Percentage of Firms that had a peer firm in the industry announce a restatement related to specific issues before beginning earnings management related to similar specific Issues (4) |
|---|---|---|---|---|
| All Restatements Issues | 2376 | 2249 | 1229 | 54.65% |
| Revenue Recognition Issues | 559 | 461 | 241 | 52.28% |
| All Non-Revenue Recognition Issues | 1817 | 1788 | 988 | 55.26% |
| Expense Issues | 647 | 619 | 224 | 36.19% |
| Assets, Restructuring, or Inventory Issues | 545 | 519 | 182 | 35.07% |

**TABLE 5: Propensity to Imitate Earnings Management related to Different Types of Restatements among Industry Peers**

This table displays results of a pooled logit regression where the dependent variable, BEGIN_MANAGE, takes the value 1 if the firm begins managing earnings related to specific types of restatement in the year and zero otherwise. In each Panel, PUBLIC_IND% is the percentage of the industry that announced a restatement related to specific types of restatement within a year prior to the firm beginning its violation period. CONTEMP _IND% is the percentage of the industry that has started managing its books but has not announced a restatement related to specific types of restatement within a year prior to the firm beginning its violation period. All other variables are previously defined in Table 2. For brevity, all other control variables are not included in the partial tables. The p values, corrected for firm level clustering, are reported in parenthesis. *, **, *** indicates significance level at 10%, 5% and 1% respectively.

*Panel A Restatements related to Revenue Recognition Issues (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND% | 29.046** | 4.438*** | 2.991 | 4.428 | 4.059** |
| | (0.03) | (<0.01) | (0.23) | (0.71) | (0.02) |
| CONTEMP_IND% | -19.486 | 15.561*** | -9.263 | -35.664 | 13.246 |
| | (0.34) | (<0.01) | (0.53) | (0.19) | (0.51) |
| No. of obs | 19834 | 15847 | 20517 | 11283 | 9234 |
| Pseudo $R^2$ (McFadden) % | 2.72 | 1.79 | 1.79 | 2.34 | 2.28 |
| Area under ROC Curve | 0.704 | 0.701 | 0.703 | 0.713 | 0.720 |

*Panel B Restatements related to only Non-Revenue Recognition Issues (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND% | 12.726** | 4.892*** | 1.207 | 1.535 | 2.843** |
| | (0.02) | (<0.01) | (0.38) | (0.51) | (0.03) |
| CONTEMP_IND% | -20.175 | 14.310*** | 1.643 | 4.265 | -5.375 |
| | (0.36) | (<0.01) | (0.38) | (0.20) | (0.25) |
| No. of obs | 19893 | 16139 | 20998 | 11570 | 9428 |
| Pseudo $R^2$ (McFadden) % | 0.84 | 2.24 | 0.55 | 0.83 | 0.72 |
| Area under ROC Curve | 0.689 | 0.740 | 0.693 | 0.706 | 0.693 |

**TABLE 5: Propensity to Imitate Earnings Management related to Different Types of Restatements among Industry Peers (continued)**

*Panel C Restatements related to Expense Issues (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND% | 18.174* | 5.114*** | 3.771 | -0.463 | 5.152** |
| | (0.09) | (0.01) | (0.18) | (0.92) | (0.05) |
| CONTEMP_IND% | -26.522 | 23.494*** | 20.872*** | 21.787*** | -1.178 |
| | (0.59) | (<0.01) | (<0.01) | (<0.01) | (0.93) |
| No. of obs | 19795 | 15914 | 20585 | 11319 | 9266 |
| Pseudo $R^2$ (McFadden) % | 2.54 | 3.24 | 2.33 | 3.22 | 1.49 |
| Area under ROC Curve | 0.724 | 0.721 | 0.726 | 0.721 | 0.705 |

*Panel D Restatements related to Assets, Restructuring, or Inventory Issues (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND% | 5.455* | 3.407* | 3.385 | -2.681 | 4.784** |
| | (0.07) | (0.07) | (0.15) | (0.65) | (0.03) |
| CONTEMP_IND% | -39.240 | 23.595*** | 22.493*** | 21.410*** | -28.756 |
| | (0.63) | (<0.01) | (<0.01) | (<0.01) | (0.26) |
| No. of obs | 19796 | 15926 | 20558 | 11309 | 9249 |
| Pseudo $R^2$ (McFadden) % | 2.45 | 4.80 | 3.28 | 3.16 | 5.48 |
| Area under ROC Curve | 0.710 | 0.748 | 0.720 | 0.718 | 0.743 |

**TABLE 6: Descriptive Data on Factors that Affect Public Contagion**

This table provides yearly frequencies of the number of firms announcing restatements and whether they have been subjected to SEC enforcement, class action litigation lawsuit, restatements reported by large firms (defined as firm size above industry-median), restatement that are severe (defined as the most negative quartile of all income restated scaled by total assets), and restatements made via press release. The sample restatement deemed to be substantial, i.e. those with early revenue recognition or income decreasing restatements. Restatement data from 1997 to 1999 are from the GAO report while restatement data from 2000 to 2008 are from Audit Analytics. For firms that restate multiple times, only the first restatement is considered in our analysis.

| Calendar Year | No. of Firms Announcing Restatement (1) | No. of Restating Firms that also face SEC enforcement (2) | No. of Restating Firms that also face Class Action Litigation (3) | No. of Restating Firms that are large firms (4) | No. of Restating Firms that report severe restatements (5) | No. of Restating Firms that have Press Release (6) |
|---|---|---|---|---|---|---|
| 1997 | 53 | 10 | 8 | 26 | 15 | 43 |
| 1998 | 53 | 11 | 18 | 22 | 20 | 43 |
| 1999 | 73 | 19 | 18 | 40 | 15 | 63 |
| 2000 | 105 | 24 | 41 | 54 | 22 | 12 |
| 2001 | 110 | 19 | 32 | 64 | 18 | 12 |
| 2002 | 184 | 24 | 53 | 120 | 52 | 18 |
| 2003 | 231 | 24 | 63 | 151 | 59 | 31 |
| 2004 | 266 | 29 | 58 | 160 | 59 | 34 |
| 2005 | 445 | 49 | 72 | 245 | 108 | 67 |
| 2006 | 419 | 55 | 73 | 202 | 106 | 59 |
| 2007 | 273 | 23 | 45 | 105 | 51 | 22 |
| 2008 | 164 | 4 | 26 | 73 | 32 | 23 |
| SUM | 2376 | 291 | 507 | 1262 | 557 | 427 |

## TABLE 7: Sources of Public Contagion within Industry

This table displays results of a logit regression where the dependent variable, BEGIN_MANAGE, takes the value 1 if the firm begins managing earnings in the year and zero otherwise. In SEC enforcement (Panel A) PUBLIC_IND_1% (IND_0%) is the percentage of the industry that announced a restatement within a year prior to the firm beginning its violation period and is also (not) associated with SEC enforcement. In Class Litigation (Panel B) PUBLIC_IND_1% (IND_0%) is the percentage of the industry that announced a restatement within a year prior to the firm beginning its violation period and is also (not) subject to class action litigation. For Large Firms (Panel C) PUBLIC_IND_1% (IND_0%) is the percentage of the industry that announced a restatement within a year prior to the firm beginning its violation period and is also a large (small) firm. A large firm is one with assets greater than the median assets for the industry in that year. In Press Release (Panel D) PUBLIC_IND_1% (IND_0%) is the percentage of the industry that announced a restatement within a year prior to the firm beginning its violation period and via (not via) press release. For severe restatements (Panel E), PUBLIC_IND_1% (IND_0%) is the percentage of the industry that announced a restatement within a year prior to the firm beginning its violation period and the income restated is severe (not severe). Severe restatement is defined as the most negative quartile of all income restated scaled by total assets. CONTEMP _IND% is the percentage of the industry that started managing but not announced a restatement within a year prior to the firm beginning its violation period. For brevity, all other control variables are not included in the partial tables. The p values, corrected for firm level clustering, are reported in parenthesis. *, **, *** indicates significance level at 10%, 5% and 1% respectively.

*Panel A SEC Enforcement (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND_1% | 29.495<br>(0.33) | 4.255<br>(0.20) | 6.027<br>(0.20) | 7.828<br>(0.25) | 7.791<br>(0.18) |
| PUBLIC_IND_0% | 12.727***<br>(0.01) | 5.442***<br>(<0.01) | 0.941<br>(0.50) | 1.921<br>(0.40) | 2.442*<br>(0.08) |
| CONTEMP_IND% | -6.847<br>(0.55) | 14.177***<br>(<0.01) | 1.315<br>(0.62) | 1.476<br>(0.65) | -3.753<br>(0.40) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.18 | 2.33 | 0.74 | 0.98 | 0.72 |
| Area under ROC Curve | 0.700 | 0.744 | 0.699 | 0.710 | 0.686 |

*Panel B Class Litigation (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_IND_1% | 29.546<br>(0.20) | 4.292<br>(0.19) | 5.897<br>(0.21) | 7.613<br>(0.27) | 7.461<br>(0.20) |
| PUBLIC_IND_0% | 12.424**<br>(0.02) | 5.443***<br>(<0.01) | 0.921<br>(0.52) | 1.865<br>(0.42) | 2.460*<br>(0.08) |
| CONTEMP_IND% | -6.586<br>(0.56) | 14.176***<br>(<0.01) | 1.327<br>(0.61) | 1.496<br>(0.65) | -3.723<br>(0.40) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.18 | 2.33 | 0.74 | 0.98 | 0.71 |
| Area under ROC Curve | 0.701 | 0.744 | 0.699 | 0.710 | 0.686 |

**TABLE 7: Sources of Public Contagion within Industry (continued)**

*Panel C Large Firms (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_IND_1% | 12.740*** (0.01) | 9.658** (0.02) | 12.343** (0.02) | 18.910** (0.03) | 10.091** (0.02) |
| PUBLIC_IND_0% | 38.152 (0.19) | 4.911 (0.20) | 0.482 (0.75) | 0.977 (0.65) | 1.106 (0.49) |
| CONTEMP_IND% | -5.965 (0.59) | 14.112*** (<0.01) | 1.165 (0.65) | 1.277 (0.69) | -3.731 (0.30) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.19 | 2.34 | 0.78 | 1.05 | 1.02 |
| Area under ROC Curve | 0.700 | 0.743 | 0.700 | 0.709 | 0.709 |

*Panel D Press Release (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_IND_1% | 12.426** (0.02) | 14.436*** (<0.01) | 34.023*** (<0.01) | 37.174*** (0.01) | 34.081*** (<0.01) |
| PUBLIC_IND_0% | 29.451 (0.20) | 4.999 (0.11) | 0.223 (0.87) | 1.086 (0.61) | 1.928 (0.17) |
| CONTEMP_IND% | -6.584 (0.56) | 14.092*** (<0.01) | 0.565 (0.83) | 0.829 (0.79) | -4.619 (0.32) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.18 | 2.34 | 0.92 | 1.10 | 0.94 |
| Area under ROC Curve | 0.701 | 0.743 | 0.700 | 0.713 | 0.682 |

*Panel E Severe Restatement (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_IND_1% | 46.492 (0.13) | -3.937 (0.67) | -14.387 (0.29) | -2.987 (0.88) | -21.643 (0.13) |
| PUBLIC_IND_0% | 12.416*** (0.01) | 5.600*** (<0.01) | 2.217* (0.07) | 2.853 (0.15) | 2.712** (0.03) |
| CONTEMP_IND% | -6.706 (0.55) | 14.149*** (<0.01) | 1.264 (0.63) | 1.530 (0.64) | -3.878 (0.28) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.20 | 2.34 | 0.75 | 0.97 | 1.05 |
| Area under ROC Curve | 0.702 | 0.743 | 0.702 | 0.709 | 0.712 |

**TABLE 8: Sources of Public Contagion within MSA**

This table displays results of a logit regression where the dependent variable, BEGIN_MANAGE, takes the value 1 if the firm begins managing earnings in the year and zero otherwise. In SEC enforcement (Panel A) PUBLIC_MSA_1% (MSA_0%) is the percentage of the MSA that announced a restatement within a year prior to the firm beginning its violation period and is also (not) associated with SEC enforcement. In Class Litigation (Panel B) PUBLIC_MSA_1% (MSA_0%) is the percentage of the MSA that announced a restatement within a year prior to the firm beginning its violation period and is also (not) subject to class action litigation. For Large Firms (Panel C) PUBLIC_MSA_1% (MSA_0%) is the percentage of the MSA that announced a restatement within a year prior to the firm beginning its violation period and is also a large (small) firm. A large firm is one with assets greater than the median assets for the MSA in that year. In Press Release (Panel D) PUBLIC_MSA_1% (MSA_0%) is the percentage of the MSA that announced a restatement within a year prior to the firm beginning its violation period and via (not via) press release. For severe restatements (Panel E), PUBLIC_MSA_1% (MSA_0%) is the percentage of the MSA that announced a restatement within a year prior to the firm beginning its violation period and the income restated is severe (not severe). Severe restatement is defined as the most negative quartile of all income restated scaled by total assets. CONTEMP_MSA% is the percentage of the MSA that started managing but not announced a restatement within a year prior to the firm beginning its violation period. For brevity, all other control variables are not included in the partial tables. The p values, corrected for firm level clustering, are reported in parenthesis. *, **, *** indicates significance level at 10%, 5% and 1% respectively.



*Panel A SEC Enforcement (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_MSA_1% | -41.441<br>(0.29) | 3.911<br>(0.21) | 2.742<br>(0.34) | 3.796<br>(0.35) | 2.690<br>(0.33) |
| PUBLIC_MSA_0% | 6.349**<br>(0.02) | 3.452***<br>(<0.01) | 0.097<br>(0.92) | 0.956<br>(0.41) | 0.518<br>(0.68) |
| CONTEMP_MSA% | 0.282<br>(0.96) | 6.219***<br>(<0.01) | 1.276<br>(0.24) | -0.861<br>(0.62) | 2.787**<br>(0.04) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.17 | 1.49 | 0.70 | 0.95 | 0.57 |
| Area under ROC Curve | 0.696 | 0.721 | 0.702 | 0.709 | 0.691 |



*Panel B Class Litigation (Partial Tables)*

| | **Pre-SOX-1 1997 to 1999 (1)** | **Pre-SOX-2 2000 to 2002 (2)** | **Post-SOX 2003 to 2008 (3)** | **Post-SOX-1 2003 to 2005 (4)** | **Post-SOX-2 2006 to 2008 (5)** |
|---|---|---|---|---|---|
| PUBLIC_MSA_1% | -9.333<br>(0.67) | 3.958<br>(0.20) | 2.824<br>(0.32) | 3.767<br>(0.36) | 2.903<br>(0.27) |
| PUBLIC_MSA_0% | 6.306**<br>(0.03) | 3.447***<br>(<0.01) | 0.076<br>(0.94) | 0.955<br>(0.41) | 0.475<br>(0.71) |
| CONTEMP_MSA% | 0.339<br>(0.95) | 6.219***<br>(<0.01) | 1.273<br>(0.24) | -0.868<br>(0.61) | 2.785**<br>(0.04) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.13 | 1.49 | 0.71 | 0.95 | 0.57 |
| Area under ROC Curve | 0.694 | 0.721 | 0.698 | 0.705 | 0.689 |

**TABLE 8: Sources of Public Contagion within MSA (continued)**

*Panel C Big Firms (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_MSA_1% | 6.194** | 3.426*** | 3.685 | 2.472 | 5.001 |
| | (0.03) | (<0.01) | (0.21) | (0.65) | (0.14) |
| PUBLIC_MSA_0% | -5.497 | 4.900 | 0.215 | 1.191 | 0.484 |
| | (0.81) | (0.15) | (0.82) | (0.29) | (0.70) |
| CONTEMP_MSA% | 0.382 | 6.220*** | 1.260 | -0.883 | 2.757** |
| | (0.95) | (<0.01) | (0.24) | (0.61) | (0.05) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.12 | 1.49 | 0.70 | 0.94 | 0.59 |
| Area under ROC Curve | 0.694 | 0.721 | 0.698 | 0.706 | 0.686 |

*Panel D Press Release (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_MSA_1% | 6.318** | 7.714** | 6.136 | 7.186* | 1.621 |
| | (0.03) | (0.02) | (0.11) | (0.06) | (0.85) |
| PUBLIC_MSA_0% | -10.378 | 3.403*** | 0.143 | 0.833 | 0.799 |
| | (0.65) | (<0.01) | (0.87) | (0.47) | (0.49) |
| CONTEMP_MSA% | 0.335 | 6.225*** | 1.286 | -0.801 | 2.792** |
| | (0.95) | (<0.01) | (0.23) | (0.64) | (0.04) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.14 | 1.50 | 0.73 | 1.00 | 0.56 |
| Area under ROC Curve | 0.695 | 0.721 | 0.699 | 0.706 | 0.687 |

*Panel E Severe Restatement (Partial Tables)*

| | Pre-SOX-1 1997 to 1999 (1) | Pre-SOX-2 2000 to 2002 (2) | Post-SOX 2003 to 2008 (3) | Post-SOX-1 2003 to 2005 (4) | Post-SOX-2 2006 to 2008 (5) |
|---|---|---|---|---|---|
| PUBLIC_MSA_1% | 14.096 | -0.436 | -8.374 | -15.981 | 0.249 |
| | (0.52) | (0.95) | (0.47) | (0.38) | (0.98) |
| PUBLIC_MSA_0% | 5.968** | 3.553*** | 0.581 | 1.364 | 0.784 |
| | (0.04) | (<0.01) | (0.50) | (0.20) | (0.49) |
| CONTEMP_MSA% | 0.462 | 6.216*** | 1.250 | -0.849 | 2.789** |
| | (0.93) | (<0.01) | (0.25) | (0.62) | (0.04) |
| No. of obs | 19968 | 16234 | 21086 | 11629 | 9457 |
| Pseudo $R^2$ (McFadden) % | 1.12 | 1.49 | 0.71 | 0.97 | 0.56 |
| Area under ROC Curve | 0.694 | 0.721 | 0.700 | 0.707 | 0.686 |