

**Corporate Governance Consequences of Accounting Scandals:
Evidence from Top Management, CFO and Auditor Turnover**

Anup Agrawal and Tommy Cooper*

Forthcoming, *Quarterly Journal of Finance*, 2016

* Both authors: Culverhouse College of Commerce, University of Alabama, Tuscaloosa, AL 35487-0224; Agrawal: aagraval@cba.ua.edu, (205) 348-8970. Cooper: tcooper@cba.ua.edu , (205) 348-8969. We thank Cindy Alexander, Jeff Coles, Doug Cook, Ayla Kayhan, Simi Kedia, Chuck Knoeber, Anzhela Knyazeva, Bill Lane, Gemma Lee, Jim Ligon, Paul Pecorino, Gary Sanger, Harris Schlesinger, Wei-Lin Song, Cliff Stephens, participants of the 2009 AFA, 2008 CRSP Forum and CFEA at UT-Austin, and 2007 CELS-NYU conferences, and seminar participants at Louisiana State University and University of Alabama for helpful comments. Didem Kurt and Xing Lu provided able research assistance. Agrawal acknowledges financial support from the William A. Powell, Jr. Chair in Finance and Banking.

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Abstract

This paper examines the consequences of accounting scandals to top management, top financial officers, and outside auditors. We examine a sample of 518 U.S. public companies that announced earnings-decreasing restatements during the 1997-2002 period and an industry-size matched sample of control firms. Using logistic regressions that control for other determinants of management turnover, we find strong evidence of greater turnover of CEOs, top management and CFOs of restating firms compared to the control sample. Over the three years surrounding the year of restatement announcement, CEOs and CFOs, respectively, face a 14% and 10% greater probability of being replaced in restating firms than in control firms, after controlling for other factors. These represent increases of about 42% and 23%, respectively, compared to the usual turnover probabilities. The magnitudes of these effects are even larger for restatements that are more serious, have worse effects on stock prices, result in negative restated earnings, are initiated by outside parties, are accompanied by AAERs, or trigger securities class action lawsuits. We find little systematic evidence that auditor turnover is higher in restating firms. Our paper provides evidence of effective functioning of internal governance mechanisms following accounting scandals.

JEL classification: G34, M43, K22

Keywords: Management turnover, CFO turnover, Auditor turnover, Accounting scandals, Earnings manipulation, Earnings restatements, Financial restatements

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1. Introduction

The revelations of serious accounting problems around the turn of the millennium at several prominent companies such as Enron, Worldcom, Tyco and Healthsouth have been watershed events. Following these scandals, a number of other companies admitted to having accounting problems of their own. Most experienced large stock price declines upon announcing that misstated financial reports would be restated (see, e.g., Palmrose, Richardson and Scholz (2004) and Agrawal and Chadha (2005)). A number of companies acknowledging misstatements, including Enron and Worldcom, were forced into bankruptcy. Many were defendants in lawsuits filed by investors, customers, suppliers, and employees (see, e.g., Palmrose and Scholz (2004)).

Lawmakers have responded to these scandals by adopting the Sarbanes-Oxley Act of 2002, whose tough corporate governance rules apply to all companies with stock listed in the U.S. In addition, the New York Stock Exchange (NYSE), Nasdaq, and American Stock Exchange (AMEX) have adopted new corporate governance rules as part of their listing requirements. These scandals have also resulted in significant changes in the audit industry. The Arthur Andersen partnership dissolved after its criminal indictment on charges of obstructing the federal investigation of the Enron scandal. And several large audit firms have divested their consulting businesses to eliminate potential conflicts of interest that could undermine their credibility as auditors.

In addition to the consequences to restating companies, these scandals can have significant consequences to top management (i.e., the Chief Executive Officer (CEO), Chairman, and President) and outside directors (see, e.g., Desai, Hogan and Wilkins (2006) and Srinivasan (2005)). However, there is yet no systematic evidence on the consequences to the two parties closest to the financial reporting process, namely top financial managers and external auditors. This paper attempts to fill this gap in the literature. In addition, we extend Desai, et al.'s evidence on top management turnover by

examining a larger sample of restatements. Finally, we analyze sub-samples where restatements are likely to have greater consequences. Our study focuses on two important outcomes of the functioning of internal governance mechanisms, namely management and auditor turnover, during a time of intense corporate turmoil.

Anecdotal evidence is mixed on whether an accounting scandal leads to greater management and auditor turnover. In certain high-profile cases, top management, the CFO, and outside auditors all lost their positions following the scandals. For example, Enron's CEO, Jeffrey Skilling, unexpectedly resigned in August 2001, less than three months before the company's accounting problems were publicly revealed. Enron's CFO, Andrew Fastow, was ousted in October 2001. Kenneth Lay, who resumed the CEO position when Skilling left, resigned in February 2002. Enron's long-time auditor, the Big 5 accounting firm Arthur Andersen, dissolved after criminal indictment. Worldcom CEO, Bernard Ebbers, resigned shortly after his firm's \$3.8 billion accounting fraud became public. In addition, Worldcom fired its CFO, Scott Sullivan, and its auditor, Arthur Andersen. Similarly, Healthsouth's board voted unanimously to fire its chairman and CEO, Richard Scrushy, less than two weeks after the company revealed a massive accounting fraud. Healthsouth also fired its CFO and its auditor, Ernst & Young. These departures received extensive media coverage. Less known are the numerous other scandals that did not prompt any changes in management or auditors. For example, First USA Inc., 3Com, Boston Scientific, and Bausch & Lomb did not replace their CEOs, CFOs or auditors after revealing accounting problems.

As these examples show, the consequences to top management, top financial officers and external auditors of firms involved in accounting scandals can be dramatically different. In this paper, we provide systematic evidence on this issue. In doing so, we seek to shed some light on competing theoretical arguments about these consequences.

Managerial changes entail significant costs and benefits for a firm. One would expect a firm to replace management if the benefits exceed the costs. Agrawal, Jaffe and Karpoff (1999) discuss several reasons for greater management turnover in firms accused of fraud. These reasons also apply to accounting scandals. First, restating firms may be more inclined to replace top management and top financial officers in order to re-gain or

re-establish reputational capital that is often lost when accounting scandals occur. Second, restating firms face greater risk of securities class action lawsuits from shareholders; replacing managers can help firms limit their liability exposure following restatement. Third, top management turnover increases following poor stock price performance (see, e.g., Warner, Watts, and Wruck (1988)). A substantial decline in market value upon restatement announcement can also trigger management turnover. Fourth, along similar lines, firms experiencing financial distress tend to have high management turnover (see, e.g. Gilson (1989)). The higher incidence of delisting or bankruptcy in restating firms (see Palmrose and Scholz (2004)) can also lead to greater management turnover.

On the other hand, there are also reasons why an earnings restatement may not lead to greater management turnover. First, the cost of replacing a fired manager's accumulated firm-specific human capital may be prohibitive. Second, the level of internal controls needed to *eliminate* any possibility of accounting problems may be sub-optimal for a firm. Because the direct and indirect costs (such as lost business) of such controls may be prohibitive, the revelation of accounting problems may not prompt the board to change managers, unless the problems are directly linked to those individuals. Third, while restatements generally are bad news for firms, some restating firms may not lose significant reputational capital because they did not have great reputations to begin with. In such cases, the net benefits from replacing managers can be small. Finally, a firm's internal governance mechanisms may not be strong enough to prompt management turnover (see, e.g., Jensen (1993)). So even though a restatement of earnings implies that management caused, ignored or failed to detect material misstatements, the restatement may not lead to greater managerial turnover.

We also examine the effect of an earnings restatement on subsequent changes in the outside auditor. As in the case of top management, there are significant costs and benefits associated with replacing the auditor. Replacing the auditor may be beneficial, if the change will help the firm regain its reputational capital or limit its liability exposure. But the cost of replacing auditors can be large. First, new auditors often face steep learning curves. Second, the audit firm also may be providing other services to the company such as tax, computer systems or management consulting, which may have

synergies with auditing. These synergies are lost if the firm replaces the auditor. Third, the company may face a limited choice of audit firms that specialize in its industry, have the necessary scale and have offices near its headquarters. Significant replacement costs may explain why auditor turnover is rare.

We examine a sample of 518 U.S. public companies that announced earnings-decreasing restatements during the 1997-2002 period and an industry-size matched sample of control firms. We focus on restatements announced pre-SOX. Post-SOX, a large number of companies restated to ‘clean house’; consequently, these cases tend to be less serious, as evidenced by negligible average stock price reactions to their announcements (see, e.g., Agrawal and Cooper (2010)). We find strong evidence that restating firms have greater turnover of CEOs, top management and CFOs than control firms. The magnitudes of these effects are quite large. During the three-year period (-1, +1), restating (control) CEOs, CFOs and top management experience turnover rates of 53% (34%), 65% (43%), and 85% (59%), respectively, where 0 is the year of restatement announcement. Using logistic regressions that control for other determinants of management turnover over the years (-1, +1), CEOs, CFOs and top management of restating firms face a 14%, 10% and 9% greater probability, respectively, of being replaced than those of control firms. Compared to the usual turnover probabilities in non-restating firms over this window, these represent increases of about 42%, 23% and 20%, respectively. The magnitudes of these effects are even larger for restatements that are more serious, have worse effects on stock prices, result in negative restated earnings, are initiated by outside parties, are accompanied by AAERs, or trigger securities class action lawsuits. We find little systematic evidence that auditor turnover is higher in restating firms.

Our paper complements the literature on the consequences to managers of enforcement actions by the U.S. Securities and Exchange Commission (SEC) or Department of Justice (DOJ) for earnings manipulation or financial misrepresentation (see, e.g., Beneish (1999) and Karpoff, Lee and Martin (2008a)). As discussed by Agrawal and Chadha (2005), most earnings misstatements differ from cases where regulators issue enforcement actions. Staff and resource constraints prevent regulators from pursuing all cases of earnings manipulation. To have the greatest deterrent effect,

regulators target egregious violators and cases likely to generate greater media coverage (see, e.g., Feroz, Park and Pastena (1991), Dechow, Sloan and Sweeney (1996), and Agrawal and Chadha (2005)). While less serious than cases warranting enforcement actions, earnings misstatements permit larger sample sizes and avoid issues of selection by regulators. Related studies examine the consequences to managers and directors of corporate fraud accusations and securities class action lawsuits (see, e.g., Agrawal, Jaffe and Karpoff (1999), Niehaus and Roth (1999), Helland (2006) and Fich and Shivdasani (2007)). Our study also contributes to the broader literature on managerial disciplining surrounding other times of major corporate turmoil such as bankruptcy and corporate control events.¹

The remainder of this paper is organized as follows. Section 2 briefly reviews the literature on the causes and consequences of accounting manipulation, corporate fraud, and other crimes. Section 3 describes our sample and data. Section 4 presents our empirical results for the full sample, and section 5 reports the results for a number of subsamples where the restatement may have greater effects. Section 6 concludes.

2. Prior studies on the causes and consequences of accounting manipulation and corporate fraud

Previous studies have examined the causes and consequences of three types of accounting manipulations. In decreasing degrees of seriousness, these are: earnings manipulation where the SEC brought enforcement action, restatements to correct financial misstatements, and earnings management.² Other studies have investigated a variety of corporate frauds and crimes. We briefly review the literature on the causes and consequences of these four types of infractions.

¹See, e.g., Gilson (1989) for bankruptcies, Martin and McConnell (1991) and Agrawal and Walking (1994) for takeovers, DeAngelo and DeAngelo (1989) for proxy contests, and Klein and Rosenfeld (1988) for greenmail. Related work analyzes the interaction between internal and external governance mechanisms (see, e.g., Agrawal and Knoeber (1996), Hadlock and Lumer (1997), Mikkelsen and Partch (1997), and Huson, Parrino and Starks (2001)).

²See Agrawal and Chadha (2005, pp. 373-374) for a discussion of their relative seriousness.

2.1 Causes

2.1.1 SEC accounting enforcement actions

A seminal paper by Dechow, Sloan and Sweeney (1996) examines the motives and causes of earnings manipulation that resulted in SEC enforcement actions. The SEC announces these actions via Accounting and Auditing Enforcement Releases (AAER). Dechow, et al. find that firms with weak corporate governance are more likely to manipulate earnings to lower the cost of external financing. Beasley (1996) also finds evidence of governance weaknesses in firms subject to SEC enforcement. Beneish (1999) finds evidence of another motive for earnings manipulation in these firms, namely managers' desire to sell overpriced stock and option holdings. While Erickson, Hanlon and Maydew (2006) find no consistent evidence that the likelihood of fraud in these firms is related to managers' equity incentives, Johnson, Ryan and Tian (2009) find that this likelihood is positively related to the size of managers' stockholdings.

2.1.2 Financial misstatements

Agrawal and Chadha (2005) find that the probability of restating earnings is lower when boards and audit committees have financial expertise. Burns and Kedia (2006) find that firms whose CEOs have large option holdings are more likely to misreport. Top executives also engage in abnormally large amounts of stock sales and option exercises during misstated periods (see Agrawal and Cooper (2013) and Burns and Kedia (2008)). Kedia and Philippon (2009) show theoretically and empirically that firms hire and invest excessively during misreported periods to exaggerate their growth prospects.

2.1.3 Earnings management

Prior research finds more earnings management at firms with less independent boards and audit committees (see Klein (2002)) and in firms where CEO compensation is more closely tied to the value of stock and option holdings (see Bergstresser and Philippon (2006)). The latter paper also finds that during periods of high accruals, CEOs exercise unusually large amounts of stock options, and CEOs and other insiders sell large amounts of stock.

2.1.4 Corporate fraud and other crimes

Alexander and Cohen (1999) examine a sample of 78 public companies involved in corporate crimes such as contract breaches, bribes, kickbacks, and regulatory violations. They find lower incidence of crime among firms where management owns more equity. Niehaus and Roth (1999) find no evidence of abnormal stock sales by officers and directors in a sample of firms that settle securities class action lawsuits. Povel, Singh and Winton (2007) explain theoretically why corporate frauds increase in good times, peak toward the end of a boom, and are revealed in the ensuing bust.

2.2 Consequences

2.2.1 SEC and DOJ enforcement actions

Dechow, Sloan and Sweeney (1996) find that firms subject to SEC AAERs (see section 2.1.1) for manipulating earnings experience significant increases in their costs of capital. Beneish (1999) finds no evidence of abnormal management turnover in these firms. Chen, et al. (2005) present univariate evidence of greater CEO and auditor turnover surrounding enforcement actions for securities fraud in China. Karpoff, Lee and Martin (2008a) examine the consequences of financial misrepresentation to managers of firms subject to SEC and DOJ enforcement actions under the Securities Exchange Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977. They find that about 93% of the managers identified by regulators as culpable lose their jobs during the violation or enforcement periods; about 28% of them face criminal prosecutions and 31% are barred from serving as officer or director of a public company.³ Karpoff, Lee and Martin (2008b) find that the reputational penalties to companies (i.e., the drop in market

³Karpoff, et al. assume that regulators know the identities of the individual perpetrators of each fraud and argue that event-based studies of executive turnover commit Type I and Type II errors. While examining the consequences to managers charged by regulators is obviously of interest, the identification of individual perpetrators by regulators is not foolproof. The SEC and DOJ have significant leverage during a formal investigation; they can threaten to charge the entire company, a step that would seriously hurt the company's viability. Given their repeated dealings with regulators, companies have strong incentives to cooperate during an investigation. A company can help railroad *select* perpetrators to satisfy regulators and bring quick resolution to an investigation. Often, in an attempt to reduce the legal-defense resources of identified perpetrators, regulators demand that the individuals be fired (see, e.g., *Wall Street Journal* (2007)). Even if regulators identify the wrong individuals as perpetrators, the company is likely to terminate these individuals because they have become 'damaged goods'.

capitalization) for financial misrepresentation far exceed the legal penalties (both private and regulatory).

2.2.2 Financial misstatements

Desai, Hogan and Wilkins (2006) examine a sample of 146 firms that announce earnings restatements during 1997-98. They find that the top management (CEO, Chairman, and President) of these firms experiences abnormally large turnover and diminished job prospects following restatements. Srinivasan (2005) finds that outside directors of restating firms experience abnormally large turnover and loss of other board seats. This effect is greater for audit committee members and for more severe restatements.

Collins, Masli, Reitenga, and Sanchez (2009) analyze involuntary CFO turnover following announcements of earnings-decreasing restatements made by 167 firms during 1997-99 (pre-SOX sample) and 196 firms during 2002-03 (post-SOX sample). They find that for both pre- and post-SOX restatements, the CFO turnover rates in restating firms are higher than those in control samples. While the increase in the probability of CFO turnover is similar pre- vs. post-SOX, CFOs of restating firms are penalized more severely in the labor market post-SOX.

Leone and Liu (2010) study CEO and CFO turnover in a sample of 96 firms that revealed accounting irregularities within eight years of their IPOs, and in a control sample. They find that after newly public firms reveal accounting irregularities, the probability of CEO (CFO) turnover is lower (higher), on average, when CEOs are founders. Within their sample of newly public firms that reveal accounting irregularities, they find an average turnover rate for founder (non-founder) CEOs of (29%) 49%. Huang and Scholz (2012) study auditor resignations during the period 2003-2007. They find that the frequency of auditor resignations is 19% in their sample of restating firms compared to 1% in a sample of matched control firms.

For a sample of 177 Canadian firms that announce restatements during the period 1997-2006, Kryzanowski and Zhang (2013) find that CEO, CFO, top executive, and auditor turnover rates subsequent to restatement announcements are significantly higher in the sample of restating firms than in a control sample.

We add to the evidence on top management, CFO and auditor turnover by examining a larger sample of restatements that are likely more serious. We also examine a number of sub-samples where the restatements are likely to have greater effects.

2.2.3 Earnings management

Bradshaw, Richardson and Sloan (2001) find no evidence of greater turnover of auditors following higher levels of accruals. Hazarika, Karpoff, and Nahata (2012) study CEO turnover following earnings management during 1992-2004. They find that the probability of forced CEO turnover is positively related to a firm's absolute performance-adjusted discretionary accruals in the previous year. This finding persists when they control for restatements and enforcement actions.

2.2.4 Corporate fraud and other crimes

Agrawal, Jaffe, and Karpoff (1999) examine a sample of firms facing a variety of fraud accusations from investors, customers, suppliers, employees or governments, regulatory violations, and 12 cases of financial reporting fraud. They find greater turnover of inside directors, but little systematic evidence of greater turnover of top managers and outside directors, following fraud revelations. Niehaus and Roth (1999) find abnormally high CEO turnover in a sample of firms that settle securities class action lawsuits, especially in suits with more merit. Helland (2006) finds that directors of firms facing such lawsuits do not suffer a net loss of their board seats, except for cases in the top quartile of settlements or where the SEC initiates a case. Fich and Shivdasani (2007) find no evidence of abnormal turnover of outside directors in firms facing such lawsuits, but find a significant decline in their other board seats.

3. Sample and data

Section 3.1 details our sample selection procedure and describes the sample of restating firms. Section 3.2 deals with the selection of our control sample and compares the restating and control samples. Section 3.3 describes the stock price reaction to the

restatement announcements, and section 3.4 examines the operating performance of the two samples.

3.1 Sample of restating firms

Our sample of restating firms is obtained from the United States General Accounting Office (GAO, 2002), which lists 919 restatements of financial statements announced by 832 publicly traded firms during the period January 1, 1997 to June 30, 2002. These restatements correct prior misstatements, i.e., GAAP violations. Most of the restatements correct quarterly or annual financial statements filed with the SEC.⁴ The GAO database excludes routine or technical restatements prompted by mergers and acquisitions, discontinued operations, stock splits, accounting rule changes, and changes in accounting method. We consider the seriousness of restatements in our sample in section 5.1 below.

Table 1 summarizes our sample selection procedure. Starting with the 919 restatements in the GAO database, we omit 87 cases of repeat restatements by sample firms.⁵ In order to obtain a control sample and to construct several control variables (see sections 3.2 and 4.2 below), we require that a restating firm be listed on the Center for Research in Security Prices (CRSP) database of the University of Chicago starting at least nine months before the restatement announcement. We also require sample firms to have at least two-thirds of the daily stock returns available over the one-year period prior to the announcement date. A total of 88 (= 47 + 13 + 5 + 23) firms do not satisfy these requirements. We omit an additional 62 cases where the restating firm is a real estate investment trust, exchange-traded fund, or is incorporated outside of the U.S. We also omit two cases where our review of news reports and SEC filings indicates that a misstatement did not occur. Finally, we omit 162 cases where the restatement did not decrease net income because auditors and investors appear to view such restatements as

⁴Fifteen cases in our sample are restatements of earnings releases and do not result in restatement of quarterly or annual financial statements. Omitting these cases does not change any of our results.

⁵Our final sample of 518 restating firms includes 50 firms that announced multiple restatements during the sample period. Second and subsequent restatements by these 50 firms are not included in our sample. Furthermore, our results are qualitatively similar when we omit these 50 repeat violators from the sample.

less serious (see, e.g., Agrawal and Chadha (2005)).⁶ Our final sample consists of 518 firms that announce earnings-decreasing restatements.^{7,8} For each restatement in our sample, we collect data on the original earnings, restated earnings, and the quarters restated by reading news reports and the original and amending 10-Qs and 10-Ks filed with the SEC.^{9,10} We obtain news reports from the ProQuest Newspapers database, Lexis-Nexis News Wires database, and press releases attached to 8-Ks filed with the SEC. Finally, we obtain stock prices and returns from CRSP, and financial data from Compustat.

Table 2 describes our sample of 518 restating firms. Panel A summarizes the distribution of our sample by the identity of the initiator and by the nature of accounts restated. About 79% of the restatements in our sample are initiated by the company itself,¹¹ and about 7% by the outside auditor. Most of the remaining restatements are

⁶Consistent with this idea, the stock price reaction to such announcements, although statistically significant, is much smaller than to earnings-decreasing restatements. Over the window of days (-1, +1) around the announcement, the average cumulative abnormal return for the two samples is -3.3% and -10.3%, respectively; the corresponding values over the (-20, +1) window are -6.6% and -17.7%. Nevertheless, for completeness, we separately analyze the sample of non-earnings-decreasing restatements. We find marginally significant evidence of greater CEO turnover in these firms, but no evidence of greater turnover among top management, CFOs, top financial managers, or outside auditors. To save space, we do not present these results in a table.

⁷Our sample includes 16 firms that were dissolved or terminated their registration with the SEC after the announcement but before any restatement.

⁸In a few instances, a firm listed in the GAO database restated its financial statements because the financial statements of a newly acquired subsidiary were misstated for fiscal years or quarters ending prior to the acquisition date. In such cases, we replace the acquiring firm with the subsidiary.

⁹In several instances, news reports and SEC filings indicate that the restatement was announced before the announcement date listed in the GAO database. Because we use the earlier announcement date in such cases, eight firms in our sample have announcement dates prior to January 1, 1997, the beginning date of the GAO database.

¹⁰In determining the beginning date of the misstated period, we take into account any adjustments made to retained earnings for prior periods. In addition, if a firm restates its financials for, say, the fiscal year ending December 2000, but the amended 10-K indicates that the restatement relates only to the last two quarters of the year, we define the beginning date of the misstatement as July 1, 2000.

¹¹Following Palmrose, et al. (2004), this category includes cases where the identity of the initiator is not identified in the GAO database.

initiated by the SEC. About 63% of the cases involve only core accounts, about 21% involve only non-core accounts, and the remaining cases involve both.¹²

Panel B provides descriptive statistics of firm age and the magnitude of the change in earnings due to restatement. The median firm has been listed on CRSP (i.e., on NYSE, AMEX or Nasdaq) for about 6.5 years. The median change in earnings¹³ is about -33%. The mean change is much larger, about -234%. The median firm restated 4 quarters of earnings, and the median length of the misstated period is 586 days.

Panel C of Table 2 shows the distribution of the number of quarters restated. About 20% of the sample firms restate a single quarter's financial statements (not tabulated). About 55% of the firms restate four or fewer quarters, 19% restate five to eight quarters, and the remaining 26% restate nine or more quarters. Approximately 3% of the sample firms restate more than 20 quarters.

Panel D shows the industry distribution of the sample based on the first two digits of a firm's primary SIC code, using Song and Walkling's (1993) industry classification. For comparison, we also show the corresponding distribution for the active CRSP population as of December 31, 2002. Of our sample of 518 restating firms (CRSP population), 26% (20%) are in services; 15% (13%) in machinery; 12% (20%) in finance, insurance and real estate; 8% (7%) in transport, communications and utilities; 7% (7%) in chemical industry; and 7% (6%) in retail trade. The remaining 25% (27%) of the firms are distributed over 12 (14) different industries.

Panel E of Table 2 shows the distribution of the sample by the year of restatement announcement. There is a sharp increase in the number of restatements announced starting in 1999. The data for 2002 is for the first half of the year. About 41% of the restatements in the sample were announced during 1996-99, and the remaining 59% were announced during 2000-02.

¹²We classify as core restatements cases involving routine accounts such as sales revenue, cost of sales, selling, general and administrative expenses, accounts receivable, inventory, accounts payable, and certain accrued liabilities (e.g., accrued workers' compensation expense). We classify cases involving non-routine accounts and one-time or special items as non-core restatements. For restatements that affect income statement accounts, our definition of core restatements is very similar to that of Palmrose, et al. (2004).

¹³Change in earnings is defined as $(\text{Restated earnings} - \text{Original earnings}) / |\text{Original earnings}|$.

3.2 Control sample

We compare management and auditor turnover in restating firms to that in a control group. The restating and control firms are matched by size and industry one year before the announcement date.¹⁴ We match each restating firm with a control firm that has the same two-digit primary SIC industry code, is the closest in size, and did not announce a restatement during the period January 1, 1995 to June 30, 2002. Size is defined as the market capitalization of common stockholders' equity and equals the number of common shares outstanding times the closing share price reported by CRSP on the matching date.¹⁵ The pool of potential matching control firms excludes firms incorporated outside of the U.S. Each control firm is matched to a single restating firm.

Panel A of Table 3 shows characteristics of our samples of restating and control firms. All dollar values reported in the paper are in inflation-adjusted 2005 dollars. All variables in Table 3 are measured for the last fiscal year ending before the restatement announcement date. The typical restating firm in our sample is relatively small compared to the typical firm traded on the major U.S. stock markets. For the sample of restating (control) firms, the median values of *Total assets*, *Net sales*, and *Number of employees* are about \$236 million (\$243 million), \$153 million (\$173 million), and 900 (1,000) people, respectively.

The two groups of firms appear to have similar growth opportunities, as measured by the ratio of firm value to total assets and the five year sales growth rate.¹⁶ The two groups also have similar financial leverage ratios. For example, the median ratio of long-term debt to firm value for each group is about 7%.

Panel B of Table 3 shows certain board characteristics observed one year before the year of announcement using the *S&P Register of Corporations, Directors and Executives*. The median board consists of 7 members, about 71% of whom are outsiders

¹⁴Some restating firms were not listed in CRSP one year prior to the announcement date. For these firms, the matching date is the restating firm's first trading day in CRSP. We exclude restating firms whose beginning date in CRSP is less than nine months before the announcement date.

¹⁵All publicly traded common share classes are included when calculating market capitalization.

¹⁶Firm value is defined as the book value of total assets minus the book value of equity plus the market value of equity.

in each group of firms. About 65% (62%) of the CEOs of restating (control) firms chair the board.

3.3 Stock price reaction

We next examine the stock price reaction to restatement announcements. We compute the abnormal return for stock i on day t as:

$$e_{it} = r_{it} - r_{mt}, \quad (1)$$

where r_i and r_m are the stock returns for firm i and the market, respectively. The market return is defined as the return on the CRSP (i.e., NYSE, AMEX and Nasdaq) equal-weighted stock index. The cumulative abnormal return for firm i over days (t_1, t_2) is measured as

$$CAR_{t_1, t_2}^i = \sum_{t=t_1}^{t_2} e_{it}. \quad (2)$$

Table 4 shows the mean and median values of CARs for our full sample of restating firms and for a number of sub-samples over five windows covering trading days $(-1, +1)$, $(-5, +1)$, $(-5, +5)$, $(-20, +1)$ and $(-20, +20)$ around the announcement date (day 0). Restatement announcements have large effects on stock prices. The mean CAR for restating firms ranges from -10.3% over days $(-1, +1)$ to as much as -20.9% over days $(-20, +20)$. Mean and median CARs for all five windows are significantly different from zero at the 1% level. The announcement effects are even more negative for the sub-samples of more serious restatements (discussed in section 6.1 below), cases where the restated earnings are negative, cases where the restatement leads to a large drop in reported earnings (large restatements), and cases with more restated quarters. For comparison, the abnormal returns for non-restating firms (not shown in the table) are small and statistically insignificant over all five windows.

3.4 Operating performance

We next examine the operating performance of our samples of restating and control firms over the years $(-3, +3)$, where 0 is the fiscal year that ends closest to the restatement announcement date. We use two measures: operating performance to assets (OPA) and operating performance to sales (OPS). OPA (OPS) equals operating income

before depreciation as a percentage of the firm's total assets (net sales). We compute average OPA or OPS values over multiple years by summing a firm's ratios over the relevant years and averaging these sums across firms. Table 5 shows that the average (both mean and median) OPA and OPS for the two groups of firms are statistically indistinguishable in year -3. Starting in year -2 (0), the OPA (OPS) for the median restating firm is lower than that for its control firm.¹⁷ This pattern persists until year +3. For example, the median OPA in year 0 for restating (control) firms is 4.1% (10.8%). These differences are both statistically and economically significant.

4. Management and auditor turnover: Full sample results

We discuss univariate results on management and auditor turnover in section 4.1, and results of the logistic regressions in section 4.2.

4.1 Univariate results

Table 6 presents mean turnover rates and the percentage of firms with turnover of management and outside auditor. The first two columns show mean turnover rates for CEOs in matched samples of restating (R) and control (C) firms. The next two columns report two-tailed p-values from matched pairs t-tests for differences in means and Wilcoxon signed rank tests for differences in medians. Column 5 shows sample size. The next four sets of five columns each show corresponding values for top management (CEO, Chairman, and President), CFO, top financial officers (CFO, Controller, and Treasurer), and outside auditor. For a given year, turnover for a firm equals 1 if the group of officers or auditor listed in the *S&P Register* differs from the previous year's listing; it equals 0 otherwise.¹⁸ The table shows turnover for years -1 to +2, where 0 is the year of announcement. Turnover values for individual years are summed to compute turnover for multiple-year periods. P-values are computed from two-tailed matched pairs

¹⁷Young technology firms with sizeable losses and minimal revenues cause mean OPS values to be very negative in some years.

¹⁸In cases where a firm listed in the *S&P Register* in the prior year is not listed in the current year, we attempt to identify the reason for the non-listing (e.g., name change, merger, privatization, or bankruptcy) using the listings under 'Additional Companies Formerly Included' in the *S&P Register* and by consulting the *Directory of Obsolete Securities*.

t-tests for differences in means and Wilcoxon signed rank tests for differences in medians.

Table 6 shows significantly greater turnover of CEOs, top management, and CFOs of restating firms relative to control firms in each of years 0 through +2 and for all five multi-year periods. The magnitudes of these differences are substantial. For example, in year 0, the CEO (CFO) turnover in restating firms is 20% (27%); the corresponding rate for control firms is only 9% (11%). Over the window of years (-1, +1), the CEO (CFO) turnover rate in restating firms is 53% (65%), while the rate for control firms is only 34% (43%). There is also evidence of abnormally large turnover for the group of top financial officers in restating firms in years +1, (0, +1), and (+1, +2). The table also shows abnormally large turnover rates for the outside auditors of restating firms in year +1 and in several multi-year periods.

4.2 Correlations

Table 7 shows Pearson correlation coefficients for management and auditor turnover and explanatory variables. RESTATE is a dummy variable equal to 1 if the firm is a restating firm; it equals 0 otherwise. LSALES is the natural logarithm of net sales. V/A equals firm value divided by total assets. D/A equals total debt divided by total assets. OUTSIDER equals the number of outside directors divided by board size. BOSS equals 1 if the CEO chairs the board; it equals 0 otherwise. Data availability reduces the sample size to 600 firms (i.e., 300 matched pairs).

Table 7 shows several noteworthy relations. First, consistent with the univariate results in Table 6, the turnover of CEOs, top management, and CFOs over several time windows is positively related to the RESTATE variable. Second, CEO and top management turnover are lower when the CEO chairs the board. This is not surprising, given that a CEO-Chairman wields more power. Third, the turnover of CFOs is positively related to the turnover of both CEOs and auditors. The positive correlation between CFO and CEO turnover is consistent with Mian (2001). The positive correlation between the turnover of CFOs and auditors suggests that their fortunes are linked in the aftermath of a restatement. Fourth, larger firms (LSALES) have higher debt ratios (D/A), consistent with higher debt capacity and greater access to public debt markets. Finally, larger firms

have larger boards, with a higher proportion of outside directors. The positive relation between firm size and board size is consistent with the notion that larger firms are more complex and so need more expertise on the board, requiring more board members (see, e.g., Agrawal and Knoeber (1996)). The positive relation between firm size and the proportion of outsiders on the board is consistent with the greater pressure during our sample period on large public firms to have more independent boards (see, e.g., NYSE and Nasdaq (1999)). All of these relations are statistically significant at the 5% level in two-tailed tests.

4.3 Cross-sectional regressions

We next examine whether management and auditor turnover following the revelation of accounting problems is higher than control firms, after controlling for other determinants of the level of turnover. We discuss the regression specification, management turnover results, and auditor turnover results in sections 4.3.1, 4.3.2 and 4.3.3, respectively.

4.3.1 Regression specification

We estimate separate logistic regression models for the turnover of the CEO, top management, CFO, top financial officers, and auditors. We estimate these models for each of five time windows around the year of the restatement announcement (i.e., year 0): years (-1, 0), (+1, +2), (0, +1), (-1, +1), and (-1, +2). The dependent variable is TURNOVER, which equals 1 if there was a change of the officer or auditor during the time window according to the *S&P Register*; it equals 0 otherwise. The main explanatory variable is RESTATE, which equals 1 for restating firms and 0 for control firms. Prior research and several arguments suggest that management and auditor turnover can also be affected by a number of variables, such as the proportion of outsiders on the board, board size, the separation of the CEO and chairman positions, the valuation effects of the restatement, firm size, firm valuation, prior operating performance, and financial leverage. We control for these variables in the logistic regressions.¹⁹ We briefly discuss

¹⁹Our choice of the control variables largely follows Agrawal, Jaffe and Karpoff (1999).

each variable and its measurement below. Board data are for the year before the announcement year using the *S&P Register*. Financial variables are for the last fiscal year ended before the announcement year.

Proportion of outsiders on the board (OUTSIDER): Jensen (1993) argues that outside directors facilitate the removal of top executives. This argument implies that OUTSIDER should be positively related to management turnover. Outside directors can also prevent auditors from being fired for questioning management, implying that OUTSIDER should be negatively related to auditor turnover.

Board size (BDSIZE): Jensen (1993) and Yermack (1996) argue that larger boards are less effective monitors. This argument implies that management (auditor) turnover should be negatively (positively) related to the number of directors on the board (BDSIZE).

Does the CEO chair the board? (BOSS): Jensen (1993) argues that the board's monitoring ability is curtailed when the CEO chairs the board. We define a variable BOSS, which equals 1 if the CEO chairs the board, and 0 otherwise. Jensen's argument implies that top management (auditor) turnover should be negatively (positively) related to BOSS.

Valuation effects of the restatement (CAR(-5,+5)): Accounting scandals that are more costly to a firm are likely to have greater consequences to managers and auditors. We measure the valuation effect of a scandal by the stock price reaction upon its announcement. $CAR(-5,+5)$ is the cumulative abnormal return over days (-5, +5) around the restatement announcement (day 0), measured as described in section 3.3. We expect $CAR(-5,+5)$ to be negatively related to both management and auditor turnover, i.e., the worse the announcement effect, the greater the turnover.

Firm size (LSALES): An accounting scandal may have greater consequences to managers and auditors of larger firms because such firms are subject to more scrutiny from analysts

and the media. We measure firm size as the natural logarithm of net sales, denoted LSALES, and expect it to be positively related to both management and auditor turnover.

Firm valuation (V/A): One would expect firms with higher valuations to have lower turnover of executives and auditors. We measure firm valuation as firm value divided by the book value of total assets, V/A. We estimate firm value as the book value of total assets minus the book value of equity plus the market value of equity.

Prior operating performance (OPA): Prior studies (e.g., Weisbach (1988) and Murphy and Zimmerman (1993); see Murphy (1999) for a review) find that executive turnover increases following poor operating performance. Similarly, auditor turnover may also be higher following poor performance. We measure operating performance as OPA, defined as operating income before depreciation divided by total assets, and expect it to be negatively related to management and auditor turnover.

Financial leverage (D/A): Jensen (1986) argues that corporate debt has a disciplinary effect on managers. So we control for a potential effect of financial leverage on management turnover. We measure leverage as D/A, the ratio of total debt to total assets. Total debt (D) equals long-term debt plus short-term debt in current liabilities.

We estimate the following logistic model:

$$(1) \quad \text{TURNOVER} = F(\text{RESTATE}, \text{OUTSIDER}, \text{BDSIZE}, \text{BOSS}, \text{CAR}(-5, +5), \text{LSALES}, \text{V/A}, \text{OPA}, \text{D/A})$$

4.3.2 Management turnover

Panel A in Table 7 reports the results from logistic regressions of CEO, top management, CFO, top financial management, and auditor turnover for the full sample during years (-1,+1). For each regression in Panel A, we report the marginal effects (dy/dx) of all explanatory variables, the corresponding z-statistics, and the percentage increase in the estimated probability of turnover if a firm announces a restatement. Panel

B in Table 7 reports the results from logistic regressions for all five turnover windows: years (-1, 0), (+1, +2), (0, +1), (-1, +1), and (-1, +2). For regressions in Panel B, we only report the marginal effect of RESTATE, the corresponding z-statistic, and the percentage increase in the estimated probability of turnover if a firm announces a restatement.

The results in Panels A and B in Table 7 show the significant impact that restatements have on the probability of CEO, top management, and CFO turnover. For all five windows examined, the marginal effect of RESTATE is positive and statistically significant in the regressions of CEO, top management, and CFO turnover. The magnitude of the effect of a restatement on the probability of turnover is quite substantial. After controlling for other determinants of management turnover, the probability of turnover for CEOs (CFOs) of restating firms is about 14% (10%) higher than for control firms during years (-1, +1). As shown in the last row in Panel A, the estimated marginal effect of RESTATE represents an increase of about 42% (23%) over the usual probability of turnover for CEOs (CFOs) of non-restating firms over this window.²⁰ For top financial officers in Panel B, the probability of turnover in restating firms is about 23% higher than for control firms during years (+1, +2); this difference is an increase of 73% relative to the usual turnover probability for non-restating firms over this window. The results for several of the control variables are also noteworthy. Consistent with our expectation, in partly untabulated results, the turnover rates for the CEOs and top management are significantly lower, on average, for most time windows when CEOs chair their firms' boards. The results in Panel A indicate that firms whose boards have a greater proportion of outside directors experience greater turnover of CEOs and top management; in both cases, the estimated marginal effect of OUTSIDER is positive and statistically significant at the 5% level. Firms for which announcements of accounting problems have worse valuation effects also experience greater CEO and top management turnover; in both regressions, the estimated marginal effect of CAR(-5,+5) is negative and statistically significant at the 5% level. As expected, the probability of CEO and top management turnover is higher in firms with worse operating performance; the estimated marginal effect of OPA on CEO (top management) turnover is negative and statistically significant

²⁰The percentage increase in the probability of turnover upon restatement is computed as $100 \times [p(\text{TURNOVER}=1 | \text{RESTATE}=1) / p(\text{TURNOVER}=1 | \text{RESTATE}=0) - 1]$, where the probabilities are predicted values from the logistic model evaluated at the means of other independent variables.

at the 1% (5%) level. Our results do not appear to be caused by industry or year effects: our main results are essentially unchanged when we add industry or year dummies to the regressions.

4.3.3 Auditor turnover

The last column in Panels A and B in Table 7 presents the results for auditor turnover. The evidence of greater turnover of the outside auditors of restating firms that we find in univariate tests disappears after we control for other determinants of auditor turnover via logistic regressions. The results for two of the control variables are noteworthy. Consistent with our expectation, auditor turnover tends to be higher for firms with boards that have a lower proportion of outside directors, and for firms whose restatements have worse valuation effects.

5. Sub-sample results

We next examine a number of sub-samples where the consequences of restatements may be greater. These sub-samples include restatements that correct more serious misstatements, have worse announcement effects, result in negative restated earnings, involve more restated quarters, and result in large percentage changes in earnings. We also examine subsamples of restatements that are announced by large firms, initiated by other parties, accompanied by AAERs, and followed by securities class action lawsuits. To save space, we report results for turnover over years (-1, +1). These results are generally quite similar to those for each of the other four windows shown in Table 7.

5.1 More serious misstatements

As discussed in section 3.1, our sample consists of firms that announced restatements to correct financial misstatements resulting from GAAP violations. Because the financial reporting boundaries set by GAAP are wide, and a violation is deemed a misstatement only when material, the restatements in our sample represent serious infractions (see, e.g., Palmrose and Scholz (2004)). Nevertheless, our sample includes

some cases where firms restated due to technical, and arguably less serious, reasons. One such group of less serious restatements was triggered by the SEC's adoption of revenue recognition rules under Staff Accounting Bulletin (SAB) 101.²¹ Our sample of 518 restating firms contains 61 firms that attribute their restatements to SAB 101. The sample contains one additional restatement prompted by guidance issued by the Emerging Issues Task Force (EITF) of the Financial Accounting Standards Board (FASB). The EITF periodically identifies emerging accounting issues and releases guidelines to establish a uniform set of accounting practices before divergent methods arise and become widespread.²² As noted in section 3.1 above, our sample includes 15 firms that restate earnings releases and not financial statements issued in 10-K or 10-Q filings. Finally, restatements involving non-core accounts, used to record non-routine transactions and one-time or special items, tend to be less serious than restatements involving core accounts. Our sample includes an additional 103 cases of restatements that involve only non-core accounts. We next examine whether omitting these 180 (=61+1+15+103) cases from the sample alters our main results in Table 7.

Row 2 of Table 8 shows the estimates of logistic model (1) for this sub-sample. To save space, we only report the marginal effects and z-statistics of the main explanatory variable of interest, RESTATE, for the (-1, +1) window. Accordingly, for each group (e.g., CEOs), the first two columns in this table are the same as in Table 7; we add a third column that shows the relative increase in the probability of turnover upon restatement compared to the usual turnover probability for non-restating firms. The CEOs, top management and CFOs of restating firms experience significantly greater turnover in this sub-sample compared to the control firms, after controlling for other determinants of executive turnover. Furthermore, consistent with the idea that the restatements in this sub-sample represent more serious accounting problems, all three groups of managers of restating firms experience greater turnover in this sub-sample compared to the full sample, shown in the first row of Table 8. This effect is particularly

²¹Although SAB 101 restatements are viewed as less serious, Rountree (2003) finds that on average, stock price reactions to such announcements are negative.

²²See <http://www.investopedia.com>. Both SAB 101 and EITFs represent clarifications of, rather than changes to, GAAP.

pronounced for the CEOs of restating firms, who experience a 16% greater probability of turnover in this sub-sample than non-restating firms, after controlling for other factors. Compared to the usual turnover probability for CEOs of non-restating firms over this window, this represents a whopping 50% increase!

5.2 Restatements with worse valuation effects

The revelation of accounting problems should have greater consequences for managers and auditors if the announcement leads to a greater drop in the stock price. To examine this issue, we estimate equation (1) for the sub-sample of firms in the bottom 40% based on the cumulative abnormal return over days -5 to +5 around the announcement date.²³ Row 3 in Table 8 shows that the CEOs, top management, and top financial officers of such restating firms all face significantly higher probabilities of turnover relative to control firms, after controlling for other determinants of turnover. The increases in turnover probabilities for these groups of restating managers are also substantially greater than those shown in row 1 of the table for the full sample. For example, a restatement leads to an increase in the turnover probability for the CEOs (Top management) of firms with worse announcement returns by about 22% (20%) over years (-1, +1), after controlling for other factors. Compared to the usual turnover probability for CEOs (Top management) of non-restating firms over this window, this represents an increase of about 71% (46%).

5.3 Negative restated earnings

While the announcement of any restatement is bad news because it damages the credibility of management, the news tends to be more detrimental if the restated earnings are negative (see Agrawal and Cooper (2013)). The average abnormal return around the announcement in our sample is nearly twice as negative when the restated earnings are negative than when they are positive. To examine whether managers and auditors suffer worse consequences in the former case, we estimate equation (1) for the sub-sample of firms with negative restated earnings. Row 4 of Table 8 shows that the probability of

²³Forty percent is an arbitrary cutoff. Results are similar when medians are used to partition the sample in section 5.

turnover is significantly higher for CEOs, CFOs and top management in this sub-sample of restating firms compared to control firms, after controlling for other factors. The magnitude of this effect is substantially greater in this subsample compared to the full sample, shown in row 1 of the table. For example, CEOs (CFOs) of this sub-sample of restating firms face an 18% (15%) greater probability of losing their jobs relative to the control sample. This represents an increase of about 50% (35%) relative to the usual turnover probability for CEOs (CFOs) of non-restating firms.

5.4 Restatements with more quarters restated

We next examine a subsample of firms whose restatements correct a large number of quarters because restatements that correct longer misstated periods are arguably more serious. We use the median number of quarters restated, four, to distinguish between long and short misstated periods (see Table 2, Panels B and C). Row 5 of Table 8 shows that for this subsample, the marginal effect of `RESTATE` on CFO turnover is 17%. Consistent with the idea that restatements in this subsample are more serious, CFOs of restating firms experience a greater probability of turnover relative to control firms in this subsample than in the full sample (shown in row 1), after controlling for other factors. The incremental probability of CFO turnover in the subsample and full sample are 17% and 10%, respectively. However, CEOs of restating firms in the two groups display the opposite pattern, with the incremental probabilities of 11% and 14%, respectively. The estimated marginal effect that restating more than four quarters has on the probability of auditor turnover is 10%, which represents a 49.3% increase over the usual probability of turnover for auditors of non-restating firms in this subsample.

5.5 Large restatements

We next examine the possibility that larger restatements have greater consequences for managers and auditors. In our sample, announcements of larger restatements lead to greater stock price declines. Accordingly, we sort the sample by the absolute percentage change in reported earnings, and estimate equation (1) for the subsample of firms in the top 40% by the size of the restatement. Row 6 in Table 8 shows the results for this sub-sample. Consistent with the idea that larger restatements lead to

greater consequences, larger restatements lead to an increase in the probability of turnover for top management by 15% in this sub-sample compared to 9% in the full sample (see row 1 in Table 8). But the turnover rate for CEOs is similar in the two groups.

5.6 Restatements by large firms

We next examine the possibility that the consequences of a restatement to managers and auditors depend on firm size. The relation between turnover and firm size is not clear *a priori*. Large firms receive more scrutiny from analysts and the media, implying greater consequences to their managers upon the revelation of accounting problems. But equity ownership is likely to be more diffuse in large firms, so investors face greater free-rider problems in disciplining managers. To address this issue, we sort the sample by market capitalization of the restating firm at the end of the last fiscal year prior to the restatement announcement. We estimate equation (1) using the subsample of restating firms whose market capitalizations rank in the top 40%. Row 7 in Table 8 shows the estimated marginal effect of RESTATE for this subsample. The consequences of a restatement are lower for CEOs in this subsample than in the full sample. The probability of turnover for CEOs of large restating firms is 11% higher than that for control firms, after controlling for other factors; the corresponding marginal effect for the full sample is 14%.

5.7 Restatements not initiated by the company

We examine whether turnover consequences are more severe in cases in which the restatement is initiated by a party other than the restating firm, for example the SEC or the external auditor. We create two subsamples that separate restatements initiated by the restating firms and those initiated by other parties. The regression results for these two subsamples are shown in rows 8 and 9 of Table 8. After controlling for other factors, we find that firms in the subsample of restatements initiated by other parties experience significantly higher CEO, top management, and CFO turnover. For example, CEOs (CFOs) of this sub-sample of restating firms face an 18% (15%) greater probability of

exiting their firms relative to the control sample. This represents an increase of about 57% (37%) relative to the usual turnover probability for CEOs (CFOs) of non-restating firms. At firms whose restatements are initiated by other parties, there is a 20% greater probability of turnover among top management relative to the control sample. This represents an increase of about 49% relative to the usual turnover probability for top management at non-restating firms.

5.8 Restatements accompanied by AAERs

We next examine the subsample of restating firms whose misstatements prompted the SEC to issue AAERs. After controlling for other factors, we find that firms in the subsample of restatements that were accompanied by AAERs experience significantly higher CEO, top management, and CFO turnover. For example, row 10 of Table 8 shows that CEOs (CFOs) in this sub-sample of restating firms face a 25% (20%) greater probability of leaving their firms relative to the control sample. This represents an increase of about 73% (48%) relative to the usual turnover probability for CEOs (CFOs) of non-restating firms.

5.9 Restatements prompting securities class action lawsuits

Finally, we examine the subsample of restating firms whose restatement announcements prompted securities class action lawsuits. After controlling for other factors, we find that firms in the subsample of restatements that prompted securities class action lawsuits experience significantly higher CEO, top management, and CFO turnover. For example, row 11 of Table 8 shows that CEOs (top managers) in this sub-sample of restating firms face a 31% (29%) greater probability of leaving their firms relative to the control sample. This represents an increase of about 109% (74%) relative to the usual turnover probability for CEOs (top managers) of non-restating firms.

6. Summary and conclusions

U.S. stock markets have been roiled by the revelation of accounting problems at numerous companies around the turn of the millennium. Many of the resulting scandals,

such as those involving Wall Street icons like Enron, Worldcom and HealthSouth, had enormous consequences. Revelations of accounting problems usually result in large drops in stock prices, and often are followed by bankruptcy filings and lawsuits. These scandals were the impetus behind passage of the Sarbanes-Oxley Act of 2002, adoption of new corporate governance requirements by major U.S. stock markets, and significant restructuring of the audit industry.

This paper examines the consequences of accounting scandals to top management (CEO, Chairman, and President), top financial officers (CFO, Controller, and Treasurer), and outside auditors of restating firms. Top management bears ultimate responsibility for a firm's activities, including financial reporting. Top financial managers and external auditors are directly involved in the financial reporting process. Whether these groups suffer consequences when financial reports are misstated is therefore a natural question. Having credible financial reports is important to investors, analysts and regulators, who rely on financial statements to monitor firm performance and operations.

We examine a sample of 518 U.S. public companies that announced earnings-decreasing restatements during the 1997-2002 period and an industry-size matched sample of control firms. Using logistic regressions that control for other determinants of management turnover, we find strong evidence of greater turnover of CEOs, top management and CFOs of restating firms compared to the control sample. The magnitudes of these effects are quite large. After controlling for other factors, restating CEOs, CFOs and top management face, respectively, a 14%, 10% and 9% greater probability of being replaced during years (-1, +1) than control firms, where 0 is the year of restatement announcement. Compared to the usual turnover probabilities in non-restating firms over this window, these represent increases of about 42%, 23% and 20%, respectively. The magnitudes of these effects are even larger for restatements that are more serious, have worse effects on stock prices, result in negative restated earnings, are initiated by outside parties, are accompanied by AAERs, or trigger securities class action lawsuits. We find little systematic evidence that auditor turnover is higher in restating firms.

In sum, our paper provides evidence of effective functioning of internal governance mechanisms following accounting scandals. The study adds to the literature

on consequences of accounting manipulation, corporate fraud and crime, and complements the literature on motives and causes of such corporate activities.

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Table 1

Sample Selection

The table shows sample selection out of the 919 restatements listed in *Financial Statement Restatements: Trends, Market Impacts, Regulatory Responses, and Remaining Challenges* (Washington, D.C.: GAO-03-138), a database of restatements, announced during the period January 1, 1997 to June 30, 2002, to correct GAAP violations.

| | Number of firms |
|--|----------------------------|
| Total number of restatements in GAO database | 919 |
| Exclude: | |
| Repeat restatements | 87 |
| Firms not listed on CRSP | 47 |
| Firms delisted from CRSP more than one year before the restatement announcement | 13 |
| Firms with incomplete CRSP coverage | 5 |
| Firms whose listing on CRSP began less than nine months before the restatement announcement | 23 |
| Real estate investment trusts, exchange traded funds, and firms incorporated outside of the U.S. | 62 |
| Cases where a misstatement did not occur | 2 |
| Firms whose restatements did not decrease net income | 162 |
| Number of restating firms in the final sample | 518 |

Table 2

Frequency Distribution and Descriptive Statistics of Restating Firms

Panels A through E show the frequency distribution, descriptive statistics, distribution of the number of quarters restated, industry distribution, and time distribution of the sample, respectively. The sample consists of publicly traded U.S. companies that announced earnings-decreasing financial statement restatements during the period January 1, 1997 to June 30, 2002. The list of restating firms was obtained from *Financial Statement Restatements: Trends, Market Impacts, Regulatory Responses, and Remaining Challenges* (Washington, D.C.: GAO-03-138).

| Panel A: Frequency distribution¹ | | | | | | | | | | |
|--|------------------------|-------------------|--|-------------------|----------------------------|-------------------|------------------------|-------------------|-------------------------|-------------------|
| Accounts restated | Total | | Number of restatements initiated by | | | | | | | |
| | Number of firms | % of total | Auditor | | Company² | | Regulators | | Multiple parties | |
| | | | Number of firms | % of total | Number of firms | % of total | Number of firms | % of total | Number of firms | % of total |
| Core | 325 | 62.7 | 24 | 63.2 | 250 | 61.1 | 43 | 72.9 | 8 | 66.7 |
| Non-core | 85 | 16.4 | 6 | 15.8 | 70 | 17.1 | 7 | 11.9 | 2 | 16.7 |
| Mixed | 108 | 20.8 | 8 | 21.1 | 89 | 21.8 | 9 | 15.3 | 2 | 16.7 |
| Total | 518 | 100.0 | 38 | 100.0 | 409 | 100.0 | 59 | 100.0 | 12 | 100.0 |

| Panel B: Descriptive statistics | | | |
|--|-------------|---------------|--------------------|
| | Mean | Median | Sample size |
| Firm age since CRSP listing (years) | 10.7 | 6.5 | 518 |
| Original earnings ³ (\$million) | 103.3 | 2.0 | 518 |
| Restated earnings ³ (\$million) | -57.1 | -1.0 | 502 |
| Change in earnings ⁴ (%) | -234.1 | -32.7 | 502 |
| Number of quarters restated | 6.3 | 4 | 518 |
| Length of misstated period (days) | 734 | 586 | 518 |

Table 2 (cont.)

| Panel C: Distribution of number of quarters restated⁵ | | | | | | | | | | |
|---|--|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------|
| Number of quarters restated | Number of restatements initiated by | | | | | | | | | |
| | Total | | Auditor | | Company² | | Regulators | | Multiple parties | |
| | Number of firms | % of total | Number of firms | % of total | Number of firms | % of total | Number of firms | % of total | Number of firms | % of total |
| 1-4 | 286 | 55.2 | 17 | 44.7 | 223 | 54.5 | 40 | 67.8 | 6 | 50.0 |
| 5-8 | 96 | 18.5 | 11 | 28.9 | 74 | 18.1 | 10 | 16.9 | 1 | 8.3 |
| 9-12 | 58 | 11.2 | 4 | 10.5 | 47 | 11.5 | 3 | 5.1 | 4 | 33.3 |
| 13-16 | 41 | 7.9 | 2 | 5.3 | 35 | 8.6 | 3 | 5.1 | 1 | 8.3 |
| 17-20 | 22 | 4.2 | 3 | 7.9 | 17 | 4.2 | 2 | 3.4 | 0 | 0.0 |
| > 20 | 15 | 2.9 | 1 | 2.6 | 13 | 3.2 | 1 | 1.7 | 0 | 0.0 |
| Total | 518 | 100.0 | 38 | 100.0 | 409 | 100.0 | 59 | 100.0 | 12 | 100.0 |

Table 2 (cont.)

| Panel D: Industry distribution ⁶ | | | | |
|---|-----------------|------------|------------------------------|------------|
| Industry (SIC2 codes) | Sample | | CRSP Population ⁷ | |
| | Number of firms | % of total | Number of firms | % of total |
| Agriculture (01-09) | 0 | 0 | 15 | 0 |
| Mining (10-14) | 10 | 2 | 154 | 3 |
| Construction (15-19) | 3 | 1 | 54 | 1 |
| Food and tobacco (20-21) | 9 | 2 | 100 | 2 |
| Textiles and apparel (22-23) | 7 | 1 | 45 | 1 |
| Lumber, furniture, paper, and print (24-27) | 12 | 2 | 140 | 3 |
| Chemicals (28) | 35 | 7 | 365 | 7 |
| Petroleum, rubber, and plastics (29-30) | 6 | 1 | 70 | 1 |
| Leather, stone, glass (31-32) | 6 | 1 | 42 | 1 |
| Primary and fabricated metals (33-34) | 9 | 2 | 116 | 2 |
| Machinery (35-36) | 78 | 15 | 677 | 13 |
| Transport equipment (37) | 9 | 2 | 83 | 2 |
| Instruments and miscellaneous manufacturing (38-39) | 31 | 6 | 359 | 7 |
| Transport, communications, utilities (40-49) | 40 | 8 | 379 | 7 |
| Wholesale trade (50-51) | 24 | 4 | 203 | 4 |
| Retail trade (52-59) | 37 | 7 | 330 | 6 |
| Finance, insurance, real estate (60-69) | 61 | 12 | 1,033 | 20 |
| Hotels and personal services (70-71) | 3 | 1 | 26 | 0 |
| Services (72-89) | 138 | 26 | 1,043 | 20 |
| Public administration and others (90-99) | 0 | 0 | 1 | 0 |
| Total | 518 | 100 | 5,235 | 100 |

Table 2 (cont.)

| Panel E: Time Distribution | | |
|---|----------------------------|-----------------------|
| Year of restatement announcement | Sample | |
| | Number of firms | % of total |
| 1996 ⁸ | 7 | 1 |
| 1997 | 51 | 10 |
| 1998 | 61 | 12 |
| 1999 | 92 | 18 |
| 2000 | 127 | 25 |
| 2001 | 117 | 22 |
| 2002 | 63 | 12 |
| Total | 518 | 100 |

¹ The Pearson correlation coefficient between the type of accounts restated and the identity of the initiator is -0.04457, which is indistinguishable from zero in a two-tailed t-test for statistical significance. We test whether the frequency of restatements involving core accounts is homogeneous across the four groups of initiators; the p-value of the chi-squared test statistic is 0.790.

² Includes 245 cases where the initiator was not identified in the GAO database

³ The sum of net income for all quarters affected by the restatement

⁴ Defined as $(\text{Restated earnings} - \text{Original earnings}) / |\text{Original earnings}|$

⁵ The Pearson correlation coefficient between the number of quarters restated and the identity of the initiator is -0.08657, which is statistically significant at the 5% level in a two-tailed t-test. We test whether the frequency of firms restating four or fewer quarters is homogeneous across the four groups of initiators; the p-value of the chi-squared test statistic is 0.129.

⁶ The z-statistic from the Wilcoxon signed-rank test for differences in distributions has a p-value of 0.955 in a two-tailed test.

⁷ Industry distribution of active CRSP firms as of December 31, 2002

⁸ These firms announced restatements in 1996 (reported as 1997 in the GAO database).

Table 3

Descriptive Statistics of Restating and Control Firms

This table shows the mean and median values for matched samples of restating and control firms and tests for differences between the two groups. The restatement sample consists of 518 publicly traded U.S. firms that announced earnings-decreasing restatements during the period January 1, 1997 to June 30, 2002, as identified by the GAO Report. Each restating firm is matched with a control firm that has the closest size (market capitalization one year before the restatement is announced) from among all firms in its industry that did not announce, during the period January 1, 1995 to June 30, 2002, financial restatements to correct GAAP violations. All dollar values have been adjusted for inflation and converted to 2005 dollars.

| | Mean | | | Median | | | Sample size |
|---|---------|---------|----------------------|---------|---------|----------------------|-------------|
| | Restate | Control | p-value ¹ | Restate | Control | p-value ² | |
| Panel A: Firm Characteristics³ | | | | | | | |
| Firm size | | | | | | | |
| Total assets (\$million) | 2,796 | 2,213 | 0.111 | 236 | 243 | 0.001 | 413 |
| Net sales (\$million) | 2,123 | 1,539 | 0.048 | 153 | 173 | 0.132 | 413 |
| Market value of equity (\$million) | 2,885 | 3,187 | 0.599 | 207 | 232 | 0.500 | 413 |
| Firm value ⁴ (\$million) | 4,798 | 4,740 | 0.932 | 391 | 409 | 0.022 | 413 |
| Number of employees ('000) | 7.7 | 6.4 | 0.137 | 0.9 | 1.0 | 0.072 | 390 |
| Growth | | | | | | | |
| Firm value/total assets | 2.26 | 2.43 | 0.322 | 1.41 | 1.48 | 0.068 | 413 |
| Sales growth ⁵ | 20.42 | 17.63 | 0.231 | 13.30 | 11.65 | 0.139 | 231 |
| Financial leverage | | | | | | | |
| Long-term debt/total assets | 0.18 | 0.18 | 0.599 | 0.12 | 0.13 | 0.933 | 413 |
| Total debt/total assets ⁶ | 0.25 | 0.24 | 0.392 | 0.22 | 0.21 | 0.176 | 413 |
| Long-term debt/firm value | 0.14 | 0.13 | 0.432 | 0.07 | 0.07 | 0.375 | 413 |
| Total debt/firm value | 0.20 | 0.17 | 0.033 | 0.14 | 0.12 | 0.057 | 413 |
| Panel B: Board Characteristics⁷ | | | | | | | |
| Board size | 7.1 | 7.3 | 0.174 | 7 | 7 | 0.123 | 518 |
| % of outsiders on board | 67.4 | 67.6 | 0.840 | 71.4 | 71.4 | 0.946 | 518 |
| Boss ⁸ | 0.65 | 0.62 | 0.250 | 1 | 1 | 0.250 | 518 |

¹ For the matched-pairs t-test (two-tailed)

² For the Wilcoxon signed rank test (two-tailed)

³ Observed for the last fiscal year ending before the announcement date

⁴ Firm value=Book value of total assets-Book value of equity+Market value of equity

⁵ Sales growth rate=[Sales(-1) / Sales (-6)]^{1/5}-1

⁶ Total debt equals long-term debt plus debt in current liabilities

⁷ As of one year before the year of announcement using the *S&P Register*

⁸ Equals one if a firm's CEO chairs the board; it equals zero otherwise

Table 4

This table shows the mean and median cumulative abnormal returns (CARs) of restating firms from 20 trading days before to 20 days after the announcement date. For each firm, the abnormal return for trading day t is computed by subtracting the return on the equal-weighted CRSP (i.e., NYSE, Nasdaq and AMEX) index from the return on a stock on day t . Both returns include dividends. Mean and median values are reported as percentages. The sub-sample of more serious cases excludes restatements that are triggered by SAB 101 or certain EITF consensuses, correct earnings releases, or involve only non-core accounts. *Large (small)* and *high (low)* refer to the top (bottom) 40% of the full sample when ranked according to the sub-sample characteristic of interest. Restatement size is the absolute percentage change in reported earnings. We use the CAR (-5, +5) relative to the announcement date when assigning firms to the high and low announcement-return sub-samples. Firm size is the market value of equity at the last fiscal year-end before the announcement date. Initiators of restatements are identified using the GAO database. Following Coles, Daniel and Naveen (2008), we use factor analysis to measure firm complexity; the factors are number of business segments, the natural logarithm of sales, and leverage, defined as total debt (long-term debt plus debt in current liabilities) divided by total assets. After multiplying each estimated factor loading by the normalized value of the corresponding factor observed for a firm, we sum the products to obtain the firm's factor score. More (less) complex firms have factor scores above (below) the median. The 'tech bubble' is the period January 1, 1998 to March 10, 2000.

| | Days around announcement | | | | | Days around announcement | | | | | Sample size |
|------------------------------|--------------------------|--------------------|--------------------|--------------------|--------------------|--------------------------|--------------------|--------------------|--------------------|--------------------|-------------|
| | Means | | | | | Medians | | | | | |
| | (-1,+1) | (-5,+1) | (-5,+5) | (-20,+1) | (-20,+20) | (-1,+1) | (-5,+1) | (-5,+5) | (-20,+1) | (-20,+20) | |
| Full sample | -10.3 ^a | -12.7 ^a | -12.7 ^a | -17.7 ^a | -20.9 ^a | -4.9 ^a | -6.1 ^a | -6.2 ^a | -10.5 ^a | -12.9 ^a | 419 |
| More serious cases | -13.7 ^a | -16.9 ^a | -17.7 ^a | -23.5 ^a | -28.4 ^a | -8.8 ^a | -9.6 ^a | -10.2 ^a | -17.6 ^a | -22.3 ^a | 263 |
| Positive restated earnings | -7.1 ^a | -8.5 ^a | -9.2 ^a | -12.2 ^a | -15.3 ^a | -3.4 ^a | -4.5 ^a | -4.0 ^a | -8.3 ^a | -10.0 ^a | 197 |
| Negative restated earnings | -13.1 ^a | -16.4 ^a | -15.9 ^a | -22.6 ^a | -26.0 ^a | -6.1 ^a | -8.2 ^a | -9.7 ^a | -14.2 ^a | -18.5 ^a | 222 |
| Large restatements | -14.5 ^a | -18.5 ^a | -17.7 ^a | -23.2 ^a | -26.8 ^a | -7.4 ^a | -9.9 ^a | -11.5 ^a | -18.5 ^a | -19.6 ^a | 166 |
| Small restatements | -9.0 ^a | -10.2 ^a | -8.7 ^a | -14.1 ^a | -14.3 ^a | -4.6 ^a | -4.9 ^a | -4.4 ^a | -9.8 ^a | -11.5 ^a | 169 |
| ≤ 4 restated quarters | -8.3 ^a | -9.7 ^a | -8.8 ^a | -12.4 ^a | -15.0 ^a | -3.9 ^a | -5.5 ^a | -4.8 ^a | -7.5 ^a | -9.1 ^a | 235 |
| >4 restated quarters | -12.8 ^a | -16.4 ^a | -17.7 ^a | -24.6 ^a | -28.4 ^a | -6.2 ^a | -7.7 ^a | -9.5 ^a | -16.0 ^a | -20.8 ^a | 184 |
| High announcement returns | 0.2 | 3.3 ^a | 8.7 ^a | -2.6 | -0.6 | 0.4 | 3.5 ^a | 5.6 ^a | 0.0 | 1.8 | 168 |
| Low announcement returns | -23.8 ^a | -31.4 ^a | -37.1 ^a | -37.7 ^a | -45.8 ^a | -19.4 ^a | -26.9 ^a | -28.2 ^a | -33.4 ^a | -37.2 ^a | 168 |
| Large firms | -10.4 ^a | -12.3 ^a | -12.9 ^a | -17.7 ^a | -21.0 ^a | -5.0 ^a | -5.7 ^a | -8.1 ^a | -10.5 ^a | -12.4 ^a | 184 |
| Small firms | -9.8 ^a | -12.9 ^a | -12.1 ^a | -17.2 ^a | -20.8 ^a | -5.1 ^a | -6.9 ^a | -6.6 ^a | -11.2 ^a | -12.3 ^a | 151 |
| Initiated by the company | -11.0 ^a | -13.6 ^a | -13.1 ^a | -18.0 ^a | -20.6 ^a | -4.4 ^a | -6.1 ^a | -5.7 ^a | -10.6 ^a | -12.0 ^a | 332 |
| Initiated by others | -7.7 ^a | -9.1 ^a | -11.3 ^a | -16.9 ^a | -21.9 ^a | -5.7 ^a | -5.7 ^a | -6.8 ^a | -10.4 ^a | -17.6 ^a | 87 |
| Less complex firms | -10.9 ^a | -13.0 ^a | -12.8 ^a | -17.7 ^a | -19.7 ^a | -5.2 ^a | -6.7 ^a | -6.1 ^a | -12.3 ^a | -12.5 ^a | 176 |
| More complex firms | -10.5 ^a | -13.3 ^a | -13.4 ^a | -17.7 ^a | -20.8 ^a | -4.3 ^a | -6.0 ^a | -6.6 ^a | -10.2 ^a | -12.5 ^a | 177 |
| Announced before tech bubble | -9.5 ^a | -14.2 ^a | -17.8 ^a | -20.7 ^a | -21.8 ^a | -4.0 ^a | -6.6 ^a | -5.3 ^a | -10.8 ^a | -12.0 ^a | 50 |
| Announced during tech bubble | -14.0 ^a | -16.6 ^a | -16.2 ^a | -23.7 ^a | -25.3 ^a | -6.5 ^a | -9.6 ^a | -11.1 ^a | -18.7 ^a | -18.3 ^a | 150 |
| Announced after tech bubble | -7.9 ^a | -9.6 ^a | -9.2 ^a | -12.9 ^a | -17.6 ^a | -3.8 ^a | -4.8 ^a | -4.0 ^a | -8.1 ^a | -10.0 ^a | 219 |

^{a,b,c} Denote significantly difference from zero at the 1%, 5%, and 10% levels, respectively, in two-tailed tests.

Table 5**Operating Performance of Restating and Control Firms**

The table shows the median operating performance for matched samples of restating and control firms and tests for differences between the two groups. The restatement sample consists of 518 publicly traded U.S. firms that announced earnings-decreasing restatements during the period January 1, 1997 to June 30, 2002, as identified by the GAO Report. Each restating firm is matched with a control firm that has the same two-digit SIC code and closest market value of equity one year before the restating firm's announcement date. The control firms did not announce restatements during the period January 1, 1995 to June 30, 2002. A sample firm's OPA (OPS) equals operating income before depreciation as a percentage of the firm's total assets (net sales). OPA and OPS are calculated for seven fiscal years beginning three fiscal years before the announcement year and ending three fiscal years subsequent to the announcement year. Each firm's OPA or OPS percentages are summed over the applicable years to calculate median values for multiple-year periods. P-values are for matched-pairs t-tests (two-tailed) for differences in means or Wilcoxon signed rank tests (two-tailed) for differences in medians.

| Year(s) | OPA | | | | OPS | | | |
|---------|---------|---------|---------|-------------|---------|---------|---------|-------------|
| | Restate | Control | p-value | Sample size | Restate | Control | p-value | Sample size |
| -3 | 9.9 | 11.1 | 0.143 | 441 | 10.9 | 11.7 | 0.475 | 418 |
| -2 | 9.4 | 11.4 | 0.014 | 472 | 11.1 | 11.8 | 0.275 | 463 |
| -1 | 7.1 | 11.2 | 0.000 | 433 | 8.5 | 12.6 | 0.005 | 426 |
| 0 | 4.5 | 9.7 | 0.000 | 341 | 6.6 | 11.2 | 0.001 | 337 |
| +1 | 5.0 | 9.4 | 0.000 | 276 | 6.6 | 11.0 | 0.000 | 273 |
| +2 | 5.8 | 10.2 | 0.007 | 225 | 7.3 | 10.7 | 0.003 | 221 |
| +3 | 7.5 | 9.0 | 0.136 | 169 | 8.9 | 10.7 | 0.207 | 162 |
| (-3,-1) | 27.9 | 34.1 | 0.041 | 384 | 30.3 | 35.3 | 0.244 | 364 |
| (0,+1) | 7.3 | 21.5 | 0.000 | 267 | 13.3 | 23.6 | 0.000 | 262 |
| (+2,+3) | 13.5 | 19.1 | 0.143 | 164 | 17.5 | 19.8 | 0.475 | 158 |

Table 6

Management and Auditor Turnover in Restating and Control Firms

The table shows mean turnover rates for matched samples of restating (R) and control (C) firms and tests for differences between the means and medians of the two groups. The sample of restating firms consists of 518 publicly traded U.S. firms that announced earnings-decreasing restatements during the period January 1, 1997 to June 30, 2002. Each restating firm is matched with a control firm that has the same two-digit SIC code and closest market value of equity one year before the restating firm's announcement date. The control firms did not announce restatements during the period January 1, 1995 to June 30, 2002. For each firm, we observe turnover for five groups: CEO, top management (CEO, Chairman, and President), CFO, top financial officers (CFO, Controller, Treasurer), and outside auditor. For a given year, a firm's turnover equals one if the group of officers or auditor listed in the *S&P Register of Corporations, Directors and Executives* differs from the previous year's listing; it equals zero otherwise. Turnover is shown for years -1 to +2, where 0 is the year of announcement. Turnover values for individual years are summed to compute turnover for multiple-year periods. P-values are from two-tailed matched-pairs t-tests for differences in means and Wilcoxon signed rank tests for differences in medians.

| Years around announcement year(0) | CEO | | | | | Top Management | | | | | CFO | | | | |
|---|------|------|----------------------|---------------------|----------------|----------------|------|----------------------|---------------------|----------------|------|------|----------------------|---------------------|----------------|
| | R | C | p-value of t-test | Wilcoxon p-value | Sample size | R | C | p-value of t-test | Wilcoxon p-value | Sample size | R | C | p-value of t-test | Wilcoxon p-value | Sample size |
| -1 | 0.12 | 0.11 | 0.482 | 0.485 | 514 | 0.20 | 0.19 | 0.618 | 0.615 | 509 | 0.15 | 0.12 | 0.282 | 0.283 | 491 |
| 0 | 0.20 | 0.09 | 0.000 | 0.000 | 479 | 0.30 | 0.17 | 0.000 | 0.000 | 476 | 0.27 | 0.11 | 0.000 | 0.000 | 465 |
| +1 | 0.21 | 0.14 | 0.007 | 0.006 | 411 | 0.37 | 0.25 | 0.004 | 0.004 | 408 | 0.27 | 0.19 | 0.006 | 0.005 | 391 |
| +2 | 0.21 | 0.10 | 0.000 | 0.000 | 345 | 0.33 | 0.21 | 0.004 | 0.003 | 342 | 0.21 | 0.12 | 0.005 | 0.005 | 322 |
| (-1,0) | 0.33 | 0.20 | 0.000 | 0.000 | 475 | 0.50 | 0.35 | 0.001 | 0.001 | 471 | 0.42 | 0.22 | 0.000 | 0.000 | 454 |
| (+1,+2) | 0.44 | 0.23 | 0.000 | 0.000 | 345 | 0.72 | 0.45 | 0.000 | 0.000 | 341 | 0.50 | 0.31 | 0.000 | 0.000 | 320 |
| (0,+1) | 0.41 | 0.23 | 0.000 | 0.000 | 411 | 0.66 | 0.42 | 0.000 | 0.000 | 408 | 0.53 | 0.31 | 0.000 | 0.000 | 390 |
| (-1,+1) | 0.53 | 0.34 | 0.000 | 0.000 | 407 | 0.85 | 0.59 | 0.000 | 0.000 | 404 | 0.65 | 0.43 | 0.000 | 0.000 | 380 |
| (-1,+2) | 0.75 | 0.43 | 0.000 | 0.000 | 342 | 1.20 | 0.80 | 0.000 | 0.000 | 338 | 0.87 | 0.54 | 0.000 | 0.000 | 311 |

Table 6 (cont.)

| Years around announcement year(0) | Top Financial Officers | | | | | Auditor | | | | |
|---|------------------------|------|----------------------|---------------------|----------------|---------|------|----------------------|---------------------|----------------|
| | R | C | p-value of t-test | Wilcoxon p-value | Sample size | R | C | p-value of t-test | Wilcoxon p-value | Sample size |
| -1 | 0.20 | 0.22 | 0.770 | 0.733 | 114 | 0.06 | 0.04 | 0.190 | 0.192 | 507 |
| 0 | 0.31 | 0.20 | 0.144 | 0.170 | 118 | 0.10 | 0.07 | 0.128 | 0.129 | 479 |
| +1 | 0.37 | 0.19 | 0.007 | 0.007 | 134 | 0.13 | 0.08 | 0.032 | 0.032 | 403 |
| +2 | 0.22 | 0.20 | 0.887 | 0.894 | 93 | 0.10 | 0.07 | 0.180 | 0.183 | 333 |
| (-1,0) | 0.56 | 0.48 | 0.538 | 0.598 | 84 | 0.16 | 0.11 | 0.048 | 0.048 | 468 |
| (+1,+2) | 0.77 | 0.49 | 0.080 | 0.034 | 65 | 0.21 | 0.16 | 0.094 | 0.094 | 332 |
| (0,+1) | 0.81 | 0.49 | 0.009 | 0.012 | 75 | 0.22 | 0.16 | 0.034 | 0.033 | 403 |
| (-1,+1) | 1.09 | 0.77 | 0.058 | 0.058 | 64 | 0.28 | 0.20 | 0.020 | 0.021 | 392 |
| (-1,+2) | 1.40 | 1.02 | 0.143 | 0.086 | 47 | 0.36 | 0.27 | 0.038 | 0.039 | 325 |

Table 7

Logistic Regressions

The table shows marginal effects (dy/dx) and their z-statistics from logistic regressions of turnover on several explanatory variables. The sample consists of publicly traded U.S. firms that announce earnings-decreasing restatements during 1997-2002, and industry-size matched control firms that do not announce restatements during this period. Panel A shows regression results for the sample period (-1,+1), where 0 is the year of the restatement announcement. Panel B shows regression results for all sample periods: (-1,0), (+1,+2), (0,+1), (-1,+1) and (-1,+2). To save space, Panel B only reports the marginal effects (dy/dx) of RESTATE, their z-statistics, and the percentage increases in turnover probability due to restatement. TURNOVER equals one if there were any officer or auditor changes during the sample period according to the *S&P Register of Corporations, Directors and Executives*; it equals zero otherwise. RESTATE is a binary variable that equals one for a restating firm; it equals zero otherwise. Board data are obtained from the *S&P Register* for the year before the announcement year. OUTSIDER equals the number of outside directors divided by BDSIZE, the number of directors on the board. BOSS equals one if the CEO chairs the board; it equals zero otherwise. NUMTOPMGR equals the number of persons holding the titles CEO, chairman of the board, president, or chief operating officer in the year before the beginning of the turnover period. NUMTOPFINMGR equals the number of persons in the year before the beginning of the turnover period that hold the titles CFO, controller, treasurer, or vice president (VP) of finance, including executive or senior VPs of finance. CAR(-5,+5) is the cumulative abnormal return over days (-5,+5), where day 0 is the announcement day. Financial data are observed for the last fiscal year ending before the announcement year. LSALES is the natural logarithm of net sales. OPA, V/A and D/A are operating income before depreciation, firm value and total debt, respectively, divided by total year-end assets. Firm value equals total assets minus the book value of equity plus the market value of equity. Total debt equals long-term debt plus debt in current liabilities. LAGE is the natural logarithm of one plus firm age. We define firm age as the number of months from a firm's start date in CRSP to the announcement date of the firm's restatement. All dollar values have been adjusted for inflation and converted to 2005 dollars. Reported marginal effects have been multiplied by 10 for all explanatory variables except RESTATE. Test statistics are computed using a robust variance estimator.

| Independent variable | Dependent variable: Turnover | | | | | | | | | |
|--|------------------------------|--------------------|----------------|--------------------|--------|--------------------|------------------------|-------------------|---------|--------------------|
| | CEO | | Top Management | | CFO | | Top Financial Officers | | Auditor | |
| | dy/dx | z | dy/dx | z | dy/dx | z | dy/dx | z | dy/dx | z |
| Panel A: (-1,+1) | | | | | | | | | | |
| RESTATE | 0.137 | 3.40 ^a | 0.092 | 2.13 ^b | 0.095 | 2.26 ^b | 0.109 | 0.89 | 0.048 | 1.42 |
| OUTSIDER | 0.024 | 1.97 ^b | 0.031 | 2.35 ^b | -0.001 | -0.05 | 0.035 | 1.02 | -0.019 | -1.97 ^b |
| BDSIZE | -0.065 | -0.81 | -0.176 | -2.01 ^b | -0.009 | -0.11 | 0.119 | 0.60 | 0.095 | 1.50 |
| BOSS | -2.035 | -4.94 ^a | -0.711 | -1.40 | 0.267 | 0.62 | 0.521 | 0.44 | 0.456 | 1.33 |
| NUMTOPMGR | | | 2.710 | 5.67 ^a | | | | | | |
| NUMTOPFINMGR | | | | | | | 0.464 | 0.53 | | |
| CAR(-5,+5) | -0.019 | -2.00 ^b | -0.027 | -2.46 ^b | -0.010 | -0.97 | 0.053 | 1.95 ^c | -0.014 | -1.87 ^c |
| LSALES | 0.188 | 1.42 | 0.351 | 2.42 ^b | 0.365 | 2.64 ^a | 0.183 | 0.52 | -0.133 | -1.21 |
| V/A | -0.067 | -0.71 | -0.053 | -0.56 | -0.026 | -0.26 | 0.110 | 0.55 | -0.036 | -0.35 |
| OPA | -0.028 | -2.60 ^a | -0.029 | -2.30 ^b | -0.018 | -1.50 | -0.054 | -1.10 | -0.004 | -0.74 |
| D/A | -0.658 | -0.55 | -0.857 | -0.67 | -0.524 | -0.44 | 1.814 | 0.49 | 1.312 | 1.29 |
| LAGE | -0.040 | -0.18 | -0.169 | -0.75 | -0.507 | -2.29 ^b | -0.327 | -0.54 | 0.092 | 0.50 |
| Constant | -0.92 | -1.86 ^c | -2.40 | -3.84 ^a | -0.22 | -0.46 | -1.52 | -1.08 | -1.20 | -2.09 ^b |
| Number of observations | 666 | | 658 | | 630 | | 100 | | 648 | |
| p-value ¹ | 0.0000 | | 0.0000 | | 0.0166 | | 0.5931 | | 0.1060 | |
| Pseudo R-squared | 0.0615 | | 0.0939 | | 0.0267 | | 0.0812 | | 0.0223 | |
| % ↑ in turnover probability ² | 41.9 | | 20.4 | | 23.4 | | 19.7 | | 24.2 | |

¹ Of the chi-squared test.

² The percentage increase in the probability of turnover upon restatement equals $100 \times [\{p(\text{TURNOVER}=1 | \text{RESTATE}=1) / p(\text{TURNOVER}=1 | \text{RESTATE}=0)\} - 1]$, where the probabilities are predicted values from the logistic model computed at the means of the other independent variables.

^{a,b,c} Denote statistical significance at the 1%, 5%, and 10% levels, respectively, in two-tailed tests.

Table 7 (cont'd)

| Panel B: All sample periods | | | | | | | | | | | | | | | |
|--|-------------------------------------|-------------------|-------------------------------------|-----------------------|-------------------|-------------------------------------|-----------------|-------------------|-------------------------------------|-------------------------------|-------------------|-------------------------------------|-----------------|----------|-------------------------------------|
| Sample period relative to announcement year 0 | Dependent variable: Turnover | | | | | | | | | | | | | | |
| | CEO | | | Top Management | | | CFO | | | Top Financial Officers | | | Auditor | | |
| | $\frac{dy}{dx}$ | z | % ↑ in prob.² | $\frac{dy}{dx}$ | z | % ↑ in prob.² | $\frac{dy}{dx}$ | z | % ↑ in prob.² | $\frac{dy}{dx}$ | z | % ↑ in prob.² | $\frac{dy}{dx}$ | z | % ↑ in prob.² |
| (-1,0) | 0.108 | 3.27 ^a | 59.2 | 0.089 | 2.34 ^b | 32.4 | 0.110 | 3.13 ^a | 48.7 | -0.069 | -0.67 | -16.9 | 0.025 | 1.02 | 23.0 |
| (+1,+2) | 0.129 | 3.24 ^a | 54.3 | 0.094 | 2.14 ^b | 26.4 | 0.125 | 2.91 ^a | 41.1 | 0.231 | 1.92 ^c | 73.2 | 0.023 | 0.69 | 13.5 |
| (0,+1) | 0.137 | 3.72 ^a | 57.6 | 0.106 | 2.59 ^a | 31.0 | 0.121 | 3.02 ^a | 39.4 | 0.193 | 1.64 | 47.2 | 0.045 | 1.45 | 28.0 |
| (-1,+1) | 0.137 | 3.40 ^a | 41.9 | 0.092 | 2.13 ^b | 20.4 | 0.095 | 2.26 ^b | 23.4 | 0.109 | 0.89 | 19.7 | 0.048 | 1.42 | 24.2 |
| (-1,+2) | 0.158 | 3.60 ^a | 38.0 | 0.081 | 1.82 ^c | 14.0 | 0.127 | 2.84 ^a | 25.8 | 0.131 | 0.95 | 19.9 | 0.037 | 0.94 | 14.1 |

Table 8
Sub-Sample Regressions of Turnover over Years (-1, +1)

The table shows the marginal effects (dy/dx) of RESTATE, their z-statistics, and the percentage increases in turnover probability due to restatement for several sub-sample regressions similar to those described in Table 8. Turnover observations are for the period (-1, +1) relative to the year of restatement announcement (year 0). Each cell in the table reports the result of one regression. Test statistics are computed using a robust variance estimator.

| Full sample and sub-samples | Dependent variable: Turnover of | | | | | | | | | | | | | | |
|--|---------------------------------|-------------------|---------------------------|-----------------|-------------------|---------------------------|-----------------|-------------------|---------------------------|------------------------|-------------------|---------------------------|-----------------|-------------------|---------------------------|
| | CEO | | | Top Management | | | CFO | | | Top Financial Officers | | | Auditor | | |
| | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ |
| Full sample | 0.137 | 3.40 ^a | 41.9 | 0.092 | 2.13 ^b | 20.4 | 0.095 | 2.26 ^b | 23.4 | 0.109 | 0.89 | 19.7 | 0.048 | 1.42 | 24.2 |
| More serious restatements ² | 0.163 | 3.12 ^a | 50.4 | 0.115 | 2.06 ^b | 26.0 | 0.104 | 1.89 ^c | 24.8 | 0.215 | 1.27 | 43.1 | 0.045 | 1.03 | 23.3 |
| Low announcement returns ³ | 0.222 | 2.89 ^a | 70.6 | 0.197 | 2.39 ^b | 46.1 | 0.125 | 1.59 | 31.3 | 0.619 | 2.70 ^a | 304.6 | 0.018 | 0.26 | 8.1 |
| Negative restated earnings | 0.178 | 3.06 ^a | 50.1 | 0.227 | 3.80 ^a | 55.9 | 0.145 | 2.37 ^b | 35.2 | 0.062 | 0.26 | 11.1 | 0.077 | 1.62 | 42.6 |
| > 4 quarters restated | 0.105 | 1.65 ^c | 28.0 | 0.055 | 0.82 | 11.2 | 0.172 | 2.60 ^a | 48.3 | 0.143 | 0.71 | 24.6 | 0.103 | 1.81 ^c | 49.3 |
| Large restatements ⁴ | 0.113 | 1.72 ^c | 34.6 | 0.148 | 2.15 ^b | 37.8 | 0.076 | 1.10 | 17.1 | -0.064 | -0.20 | -9.2 | 0.002 | 0.04 | 1.2 |
| Large firms ⁵ | 0.111 | 1.87 ^c | 37.8 | 0.095 | 1.36 | 21.4 | -0.001 | -0.02 | -0.3 | -0.036 | -0.25 | -5.3 | 0.015 | 0.31 | 8.7 |
| Initiated by company | 0.088 | 1.40 | 27.1 | -0.038 | -0.57 | -7.6 | 0.025 | 0.38 | 6.2 | 0.161 | 0.66 | 56.5 | 0.064 | 1.27 | 37.2 |
| Initiated by other parties | 0.184 | 3.45 ^a | 56.9 | 0.197 | 3.48 ^a | 49.2 | 0.148 | 2.72 ^a | 37.2 | -0.003 | -0.02 | -0.5 | 0.032 | 0.70 | 14.9 |

Table 8 (cont.)

| Full and sub-samples | Dependent variable: Turnover of | | | | | | | | | | | | | | |
|--|---------------------------------|-------------------|---------------------------|-----------------|-------------------|---------------------------|-----------------|-------------------|---------------------------|------------------------|---|---------------------------|-----------------|------|---------------------------|
| | CEO | | | Top Management | | | CFO | | | Top Financial Officers | | | Auditor | | |
| | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ | $\frac{dy}{dx}$ | z | % ↑ in prob. ¹ |
| AAER ⁶ | 0.245 | 2.66 ^a | 72.5 | 0.198 | 2.00 ^b | 41.1 | 0.201 | 2.05 ^b | 47.6 | 0.000 | . | 0.0 | 0.067 | 1.25 | 88.4 |
| Securities class action lawsuit ⁷ | 0.309 | 3.88 ^a | 109.3 | 0.291 | 3.45 ^a | 73.7 | 0.154 | 1.75 ^c | 36.5 | 1.000 | . | 0.0 | 0.083 | 1.33 | 59.0 |

¹ The percentage increase in the probability of turnover upon restatement equals $100 \times [\{p(\text{TURNOVER}=1 | \text{RESTATE}=1) / p(\text{TURNOVER}=1 | \text{RESTATE}=0)\} - 1]$, where the probabilities are predicted values from the logistic model computed at the means of other independent variables.

² Excludes firms whose restatements were triggered by SAB 101 or certain EITFs, corrected earnings releases, or involved only non-core accounts.

³ Restating firms in bottom 40% of the sample based on the cumulative abnormal return over days (-5, +5) around the restatement announcement

⁴ Restatements in the top 40% of the sample ranked by the absolute percentage change in reported earnings

⁵ Restating firms in the top 40% of the sample based on market capitalization one year before the announcement date

⁶ Restating firms that the SEC named as respondents in Accounting and Auditing Enforcement Releases related to the firms' restatements.

⁷ Restating firms that the Stanford Securities Class Action Clearinghouse database lists as defendants in class action lawsuits related to the firms' announced restatements.

^{a,b,c} Denote statistical significance at the 1%, 5%, and 10% levels, respectively, in two-tailed tests.