

Whistle-Blowing: Target Firm Characteristics and Economic Consequences

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ABSTRACT: We document the first systematic evidence on the characteristics and economic consequences of firms subject to employee allegations of corporate financial misdeeds. First, compared to a control group that avoided public whistle-blowing allegations, firms subject to whistle-blowing allegations were characterized by unique firm-specific factors that led employees to expose alleged financial misdeeds. Second, on average, whistle-blowing announcements were associated with a negative 2.8 percent market-adjusted five-day stock price reaction; this reaction was especially negative for allegations involving earnings management (−7.3 percent). Third, compared to a control group that exhibits similar characteristics, firms subject to whistle-blowing allegations were associated with further negative consequences including earnings restatements, shareholder lawsuits, and negative future operating and stock return performance. Finally, whistle-blowing targets exposed by the press were more likely to make subsequent improvements in corporate governance. Our results suggest whistle-blowing is far from a trivial nuisance for targeted firms, and on average, appears to be a useful mechanism for uncovering agency issues.

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I. INTRODUCTION

The purpose of our study is to identify characteristics of firms subject to whistle-blowing allegations, examine the economic consequences of such allegations, and thus shed light on the role of employee whistle-blowers in uncovering corporate financial misdeeds. Notable anecdotal evidence suggests that whistle-blowers can make a difference. For example, two whistle-blowers, Cynthia Cooper and Sherron Watkins, played significant roles in exposing accounting frauds at WorldCom and Enron, respectively, and were named as the 2002 “persons of the year” by *TIME* magazine. In response to Enron, WorldCom, and other scandals, Congress passed the Sarbanes-Oxley Act (SOX) in July 2002, which, in part, made it unlawful for companies to take punitive action against employees who disclose “questionable accounting or auditing matters” (SOX Section 806, codified as title 15 U.S.C., § 78f(m)(4)). Under the whistle-blower provisions of SOX, employees who disclose improper financial practices receive greater protection from discrimination (Title 18 U.S.C., § 1514A(a)(1)). SOX also required firms listed on a U.S. stock exchange to set up a hotline enabling whistle-blowers to communicate anonymously to the board of directors (*Economist* 2006). Further, the Securities and Exchange Commission is considering a whistle-blower program to encourage individuals to identify potential violations of federal securities laws (SEC 2009).

In contrast to these anecdotes suggesting that whistle-blowers help uncover financial improprieties, skeptics argue that (1) whistle-blowers often misjudge the situation and indulge in trivial or frivolous complaints (Miceli and Near 1992), (2) “Machiavellian” whistle-blowers who have an axe to grind lodge baseless allegations (Gobert and Punch 2000), and (3) ineffective workers misuse their protected “whistle-blower” status to avoid discharges or disciplinary proceedings (Schmidt 2003).

Despite the recent prominence of whistle-blowing events, we are not aware of prior work in the accounting and finance literatures that attempts to resolve the conflict between these perspectives. We examine the characteristics of firms subject to publicly available whistle-blowing allegations and the economic consequences of whistle-blowing events for target firms. We analyze 81 employee whistle-blowing allegations related to financial misconduct between 1989 and 2004 reported in the financial press (Press sample) and 137 instances of employee whistle-blowing between 2002 and 2004 obtained from records of the U.S. government’s Occupational Safety and Health Administration office (OSHA), the agency responsible for handling complaints of discrimination from whistle-blowers who report SOX-related allegations (OSHA sample). We label these wide-ranging allegations as “external financial” whistle-blowing events. They are “external” because they are made known outside of the organization; we generally cannot observe cases of whistle-blowing that are resolved internally. They are “financial” because they include alleged earnings management, improper disclosure, insider trading, price-fixing in product markets, tax fraud, or violations of securities regulation. We investigate four related research questions:

- Q1:** What operating, financial, governance, industry, and regulatory characteristics differentiate firms subject to external financial whistle-blowing from other firms that avoid publicly disclosed whistle-blowing allegations?
- Q2:** What is the *immediate* stock market reaction to an external financial whistle-blowing announcement? Do these stock price reactions vary with the nature of the allegation?
- Q3:** What are the *subsequent* economic consequences for firms subject to external financial

whistle-blowing events? Do these firms experience more earnings restatements, more shareholder lawsuits, and/or poorer future operating and stock return performance?

Q4: Do firms respond to whistle-blowing allegations by improving their governance structure?

To investigate our first research question (Q1), we identify variables that potentially differentiate firms subject to public whistle-blowing actions. We argue that certain firm characteristics are associated with the probability that an employee will voice an allegation of financial impropriety to someone outside the organization. We compare whistle-blowing samples to two control groups: (1) a broad set of firms not subject to whistle-blowing allegations, and (2) firms “tarnished” by either a shareholder lawsuit or an earnings restatement (suggesting some level of financial misdeeds) that were able to avoid an external whistle-blowing allegation.

Compared to other tarnished firms, both Press and OSHA firms were more likely to be large, growing firms with strong recent stock return performance that had recently suffered employee layoffs. In addition, Press firms had relatively weak external monitoring and OSHA firms were relatively well regarded, had weak internal monitoring, and were more likely to be firms where the whistle-blowing employee had the opportunity to share in the proceeds of any fraud-related settlement with the U.S. government. Overall, we interpret our evidence as consistent with whistle-blowing targets being systematically different from other tarnished firms that avoided public whistle-blowing allegations of financial wrongdoing.

Our second research question (Q2) addresses the immediate stock market reaction to whistle-blowing allegations that are reported in the press. We find the average market-adjusted five-day stock return surrounding the announcement in the financial press was -2.8 percent. This reaction was especially negative if the allegation involved earnings management (-7.3 percent).

Our third research question (Q3) investigates subsequent economic consequences for firms targeted by whistle-blowing allegations, including restatements, lawsuits, and poor operating and stock return performance. Our research design uses a propensity-score matched control sample that includes firms with similar characteristics as the whistle-blowing targets to control for the fact that whistle-blowing is not an exogenous event and that negative consequences following whistle-blowing allegations could arise from many of the same underlying economic forces that contribute to the allegations themselves.

Compared to a propensity-score matched control sample, we find that whistle-blowing targets identified by the press were more likely to restate their earnings and be subject to shareholder litigation in the three years following the whistle-blowing allegation. In addition, we find evidence suggesting whistle-blowing targets (both Press and OSHA) suffered lower operating and stock return performance than did their control firm counterparts. Thus, whistle-blowers appeared to expose firms that (1) engaged in financial misconduct and (2) had previously unknown agency problems—both of which resulted in negative future consequences for the firm.¹ Evidence of such negative *ex post* consequences is consistent with the implicit premise in SOX that whistle-blowers can disclose valuable new information about firms’ agency problems.

Our fourth research question (Q4) examines firms’ responses to whistle-blowing allegations. We find that, compared to a matched control sample, firms subject to public whistle-blowing allegations (Press sample) were more likely to reduce the size of the board, reduce the proportion of insiders on the board, have less busy directors, and replace their CEO, whereas firms subject to less publicized whistle-blowing allegations (OSHA firms) did not respond to these allegations by making governance changes.

¹ Agency problems include corporate financial misdeeds that result from conflicts of interest between management and stakeholders such as shareholders and creditors.

Overall, our evidence suggests that whistle-blowing is an important mechanism for discovering information about agency problems at firms. On balance, our findings are inconsistent with claims by critics that whistle-blowing complaints are frivolous, misleading, or unreliable. Our research also provides indirect evidence on the efficacy of SOX Section 806 as a mechanism to uncover agency issues at firms. Interestingly, public whistle-blowing events are relatively infrequent, and a majority of the whistle-blowing allegations we identify are not directly related to the types of fraudulent behavior that precipitated the SOX legislation.

From a broader perspective, we contribute to an emerging stream of literature in corporate governance related to how information about financial wrongdoing reaches the stock market. In related work, [Dyck et al. \(2008\)](#) investigate who reveals information about corporate fraud. Using a sample of firms subject to shareholder class action litigation, they find that the most important sources of information are employees (19 percent of the cases), media (16 percent), and analysts (15 percent). Unlike [Dyck et al. \(2008\)](#), our focus is on (1) characteristics of firms targeted by employee whistle-blowers, (2) the economic consequences of whistle-blowing revelations, and (3) firms' responses via governance changes subsequent to such whistle-blowing events. In addition, [Miller \(2006\)](#) investigates the role of the press in revealing fraud, but does not indicate that employees are often named as the source of the articles. Furthermore, [Miller \(2006\)](#) identifies firms that are, *ex post*, known to have committed financial wrongdoing, and tracks these firms to determine the role of the press in uncovering these known cases of wrongdoing. In contrast, we identify firms *alleged* to have engaged in financial wrongdoing, and examine whether these firms ultimately suffered negative consequences.

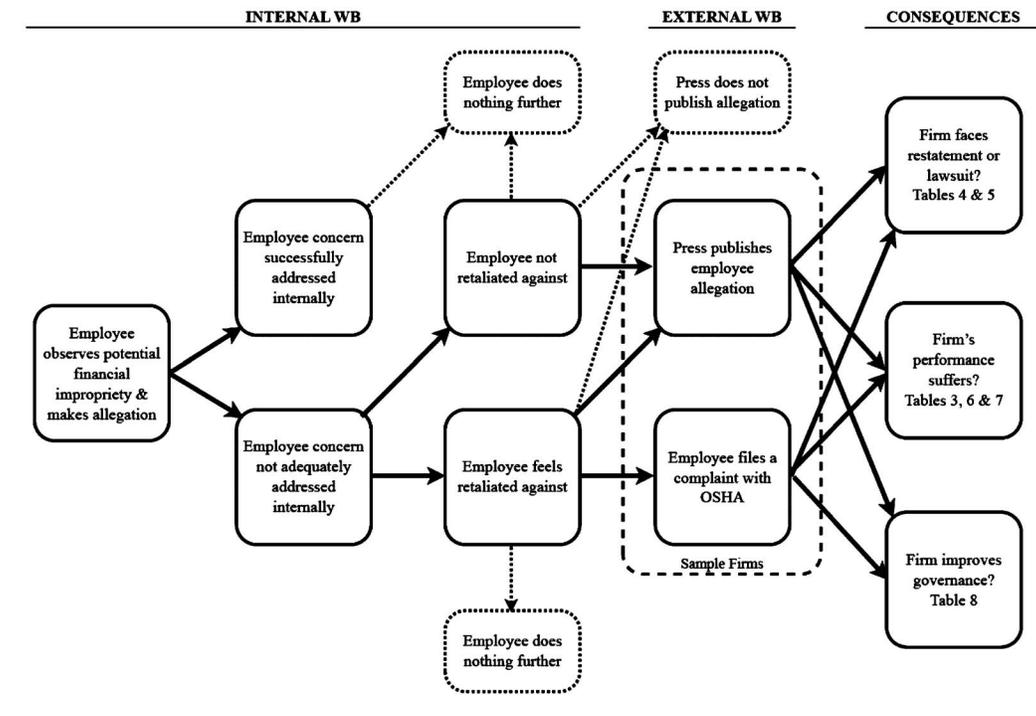
Section II discusses financial whistle-blowing and introduces predictions about firm-specific factors likely to be associated with whistle-blowing events. Section III describes the sample and Section IV presents evidence on the predictions discussed in Section II. Section V presents evidence on stock price reactions surrounding whistle-blowing allegations and also provides evidence on longer-term consequences of whistle-blowing actions. Section VI reports evidence on whether firms improve governance after whistle-blowing allegations. Section VII provides a summary of findings and contributions.

II. BACKGROUND AND CHARACTERISTICS OF FIRMS SUBJECT TO WHISTLE-BLOWING ALLEGATIONS

Financial Whistle-Blowing—Internal versus External

[Miceli and Near \(1985\)](#) define whistle-blowing as the disclosure by either former or current employees of alleged illegal, immoral, or illegitimate practices that are under employer control. Figure 1 summarizes outcomes of potential employee whistle-blowing allegations and related consequences for the targeted firm. Whistle-blowing can be either internal or external. Internal whistle-blowing involves informing relevant members of the firm (e.g., management, internal audit) about potential wrongdoing. External whistle-blowing, on the other hand, involves either an internal allegation becoming public or the whistle-blower directly disclosing an allegation outside the organization (e.g., to the media or a regulatory agency such as OSHA). We focus on external whistle-blowing because instances of internal whistle-blowing generally are not reported in the media and public data on such cases generally are not available. Moreover, we concentrate only on whistle-blowing related to financial practices.

FIGURE 1
Employee Whistle-Blowing Allegations: Sequence of Possible Actions and Consequences



Congressional Action to Protect Whistle-Blowers

Largely in response to the Enron and WorldCom scandals, Congress passed the Sarbanes-Oxley Act (SOX) in July 2002.² SOX, in part, sought to provide whistle-blowers greater legal protection. In addition to creating civil remedies for retaliation against employees in fraud cases, SOX made it a felony to take any action that is harmful to any person in retaliation for providing information about a federal crime to law enforcement officials. Thus, a retaliatory firing or demotion of a whistle-blowing employee would constitute a crime.

Whistle-Blowing is Frivolous, Misused, Misleading, and/or Unreliable

Some survey evidence (Brickey 2003; Zingales 2004) suggests that the personal cost to the whistle-blower can be high.³ Given that whistle-blowers likely anticipate these costs, their allega-

² Enron and WorldCom represent high-profile examples of internal whistle-blowing that became public. Our general conclusions are not affected when we delete Enron and WorldCom from the sample, i.e., our results are not driven by these prominent examples.

³ Zingales (2004) summarizes evidence on the consequences of whistle-blowing for individual employees. In a 1992 survey of 1,500 federal workers, 25 percent of employees reported that they experienced verbal harassment and intimidation; 20 percent were shunned by co-workers and managers; 18 percent were assigned to less desirable duties; and 11 percent were denied a promotion. A 1998 survey of 448 emergency physicians paints an even worse picture: 23 percent of those who complained about an issue reported having been fired or threatened with termination. Brickey (2003) reports that a random review of 200 whistle-blower complaints filed with the National Whistleblower Center in 2002 found that about half of the complainants said they were fired after they reported misconduct. The remaining complain-

tions should be credible. However, some critics suggest that whistle-blowers often misjudge the situation and lodge frivolous complaints to garner attention and publicity (Near and Miceli 1996). Indeed, in June 2005, the French government's Data Protection Authority refused to allow the installation of anonymous whistle-blower hotlines, saying that such lines "were disproportionate to the objectives sought with the risks of slanderous denunciations" (*Economist* 2006). Furthermore, troublemakers could potentially misuse their whistle-blower status to avoid being suspended or dismissed from employment. For example, Anechiarico and Jacobs (1996) argue that several municipal employees in New York City chose to blow the whistle in order to fall under state protection as a pre-emptive measure to being fired. Hence, given the enormous trouble that can result from disciplining a whistle-blower, supervisors and managers might find it easier to tolerate an unproductive and ineffective employee rather than dismiss or demote the employee. Gobert and Punch (2000) argue that an employee might even be excluded from necessary salary cuts to avoid the perception that such a cut is retaliation against the whistle-blower. On average, if whistle-blower complaints are frivolous, misused, misleading, and/or unreliable, then we should observe no significant economic consequences to a whistle-blowing action. Having said that, we acknowledge that even the taint of an allegation could potentially lead to some negative consequences for the firm.

Characteristics of Firms Subject to Whistle-Blowing Allegations: Opportunities and Incentives for Committing Financial Misdeeds

In this section, we argue that whistle-blowing allegations are related to management's opportunity and incentives to engage in financial wrongdoing and are a function of employees' incentives to voice their allegations outside the organization. At the outset, we acknowledge that some of these hypothesized factors are exploratory and descriptive. Given how little published research exists in the area of whistle-blowing, a solid theory is not available on why whistle-blowing occurs and what its consequences may be. Hence, we believe our descriptive approach is appropriate at this early stage of the literature's development. Factors we expect to explain external whistle-blowing follow.

Capital Market Pressure

In recent years, firms have faced heightened capital market pressure to deliver sustained earnings growth (Graham et al. 2005). Such pressures have likely created incentives for some managers to aggressively boost earnings, either via earnings management or via other questionable practices such as overbilling customers or improper disclosure of material financial events. We predict that firms subject to capital market pressure are more likely to experience a whistle-blowing event. To capture capital market pressure, we rely on three variables (described in detail in the Appendix) to proxy for (1) the need to access capital (*FIN_NEED*), (2) merger and acquisition activity (*M&A*), and (3) the amount of potential earnings management (*ABSDACC*). We compute the averaged scaled rank of these three proxies and label the averaged rank as *CM_PRESSURE*.

Growth

Firms that are rapidly growing are more likely to outgrow their controls. Responsibility for overall decision-making is typically spread across many individuals, and as a firm grows and responsibility is spread over more individuals, each individual has less information and authority

ants had been subjected to other retaliatory action such as on-the-job harassment or discipline. A survey by another watchdog group, the Government Accountability Project, found that about 90 percent of whistle-blowers are subjected to reprisals or threats.

to stop wrongdoing (Baucus and Near 1991). We predict that growth firms are more likely to be subject to a whistle-blowing event. We proxy for high-growth environments by using the scaled rank of sales growth (*GROWTH*) over the three years prior to the whistle-blowing event.

Past Performance

We predict that firms with strong past stock market performance are more likely to be a target of whistle-blowing for two reasons. First, these firms are more newsworthy to the media. Second, an employee might be more likely to expose financial misdeeds perceived to enable the firm to artificially achieve strong performance. We measure the prior performance of the firm (*PAST_PERF*) as the scaled rank of stock returns over the year before the whistle-blowing event.

Firm Reputation

We predict that a highly regarded firm is more likely to attract the ire of a disgruntled employee and the resulting allegation is more likely to be newsworthy. The external whistle-blower or the media outlet is likely to get more attention from exposing wrongdoing at a highly regarded firm.⁴ We proxy for firm reputation based on whether the firm is listed either as a “Most Admired” firm or a “Best Place to Work For” by *Fortune* magazine (*REPUTATION*) in any of the five years prior to the whistle-blowing event.⁵

Unclear Internal Communication Channels

We hypothesize that the employee’s motivation to resort to external whistle-blowing is higher when channels for raising concerns within the company are unclear. This situation likely occurs in at least two cases. First, Rothschild and Miethe (1999) suggest that bureaucratic and undemocratic work environments are likely to experience higher levels of *external* whistle-blowing because of significant barriers to effective *internal* whistle-blowing. Miceli and Near (1994) state that it is common for employees to first report problematic activities to management and, if the issue is ignored, then resort to reporting the problem to external audiences such as the media. We assume older firms (*AGE*) are likely to be more bureaucratic and, hence, more likely to be subject to a whistle-blowing action.

Second, King (1999) argues that geographical distance and multiple industrial segments in a firm make communication channels less clear. In particular, an employee who has to report a misdeed to a boss he or she hardly knows and who is geographically distant might feel uncomfortable raising sensitive issues (Miceli and Near 1994; Beresford et al. 2003). Such unclear internal communication channels increase the likelihood the employee will resort to external whistle-blowing. We measure industrial and geographical concentration as the Herfindahl-Hirschman index in the year prior to the whistle-blowing event based on revenues for each of the firm’s industrial and geographic segments, respectively (*IND_CONC* and *GEO_CONC*). We expect the probability of external whistle-blowing to decrease with the industrial and geographic concentration of the firm’s business segments. Our empirical measure for unclear communication channels (*COMMUNICATION*) is the averaged scaled rank of *AGE*, *IND_CONC*, and *GEO_CONC*.

Employee Downsizing

Luthans and Sommer (1999) find that following employee downsizing, employees experience a decline in both loyalty and commitment to the firm. We predict that employees, especially

⁴ Of course, it is possible that a highly regarded firm is more likely to avoid organizational misconduct or have processes in place that resolve employee allegations before they are disclosed publicly.

⁵ Note that the “Best Places” list is only available from 1998, while the “Most Admired” list is available throughout our entire sample period.

former employees who have been let go, are more likely to make public allegations following layoffs. Further, layoffs can increase the level of animosity between the firm and existing employees, and if existing employees perceive their job as being less secure, the potential cost of blowing the whistle decreases. We proxy for downsizing (*DOWNSIZE*) by using the scaled rank of the average percentage change in the number of employees over the three years prior to the whistle-blowing event.

Monetary Incentive to Report Financial Misdeeds (Qui Tam)

In certain instances, whistle-blowers have the potential to benefit financially by uncovering corporate misdeeds. Under the Federal False Claims Act, citizens who help uncover fraud in government contracts or government programs may be awarded a portion of the recovered funds. Since these whistle-blower provisions went into effect in 1986, the government has recovered over \$15.6 billion in settlements and judgments from these *qui tam*-related cases. Of this amount, over 16 percent of the recovered funds have been distributed to the individuals who helped bring the fraud to light (TAF 2009).

The majority of *qui tam* cases fall into one of two industries: healthcare and defense contracting. Over 70 percent of the funds recovered as part of the *qui tam* provisions relate to matters in which the Department of Health and Human Services is the primary agency, while over 15 percent of the recovered funds pertain to matters in which the Department of Defense is the primary agency. We argue that the *qui tam* provisions included in the Federal False Claims Act provide employees in the healthcare and defense industries with increased incentives to blow the whistle. We proxy for these *qui tam* incentives and set *QUITAM* equal to 1 if the firm is in a healthcare industry (two-digit SIC code equal to 80) or if the firm has been on the Department of Defense's "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards" list in any of the three years prior to the whistle-blowing event.

Firm Size

The media is generally more interested in information about firms that are large (Miller 2006). It is also possible that regulators (e.g., OSHA) are similarly more likely to pay attention to information about large firms. As a result, employees of large firms are likely to be more confident that their allegations will have an audience, and we therefore predict that employees of large firms will be more likely to make allegations of financial wrongdoing. Our proxy for firm size (*SIZE*) is the scaled rank of sales in the year prior to the whistle-blowing event.

Internal Control Weaknesses

Internal controls weaknesses are defined as "a significant likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected" (PCAOB 2004). We argue that employees are more likely to resort to external whistle-blowing when the firm has poor internal controls. To capture the extent of a firm's internal control weaknesses (*ICW*), we use the scaled rank of the fitted value from a model of the determinants of internal control weaknesses, as outlined by Doyle et al. (2007) and described in the Appendix.

External Monitoring

Managers are more likely to engage in financial misconduct when the quality of external monitoring is poor. To capture such external monitoring we use two empirical proxies: (1) the presence of block-holders (*BLOCK*) and (2) public pension funds ownership (*PP*). Consistent with prior literature (e.g., Cremers et al. 2005), we argue that firms for which *BLOCK* and *PP* are low are characterized by relatively poor external monitoring. We use the averaged scaled rank of *BLOCK* and *PP* measured in the year prior to the whistle-blowing event and label the averaged

rank *EXT_MONITOR*. We expect a negative association between whistle-blowing allegations and monitoring by powerful shareholders.

Governance

Managers are more likely to indulge in wrongdoing in the presence of weak corporate governance and strong private incentives. To capture the quality of internal governance, we obtain board data from the IRRC database, and use the averaged scaled rank of seven empirical proxies (described in detail in the Appendix) related to (1) the CEO's private incentives and (2) overall board structure. We label the averaged rank as *GOVERNANCE*.

Model for Assessing Characteristics of Firms Subject to Whistle-Blowing Allegations

Next, we estimate a logistic model and regress the presence or absence of a whistle-blowing allegation on the above-mentioned proxies. We introduce industry fixed effects (based on two-digit SIC codes other than for SIC code 80 covered by *QUITAM*) and year fixed effects as controls for potential unspecified factors. Model 1 (where firm and year subscripts are suppressed) links whistle-blowing events to managerial incentives to commit financial misdeeds and the whistle-blowers' likelihood of coming forward:

$$\begin{aligned} Pr(\text{Whistle-blowing}) = & \beta_0 + \beta_1 CM_PRESSURE + \beta_2 GROWTH + \beta_3 PAST_PERF \\ & + \beta_4 REPUTATION + \beta_5 COMMUNICATION + \beta_6 DOWNSIZE \\ & + \beta_7 QUITAM + \beta_8 SIZE + \beta_9 ICW + \beta_{10} EXT_MONITOR \\ & + \beta_{11} GOVERNANCE + \text{Industry} + \text{Year} + \text{error} \end{aligned} \quad (1)$$

where $Pr(\text{Whistle-blowing})$ is the probability of a whistle-blowing event for this binary dependent variable, i.e., 1 = a whistle-blowing event and 0 = none. Detailed definitions for the independent variables are in the Appendix.

III. WHISTLE-BLOWING SAMPLES AND CONTROL FIRMS

Whistle-Blowing Samples

Our whistle-blower sample comes from two sources, as illustrated in Figure 1. The first source, labeled the Press sample, consists of 81 whistle-blowing events drawn from a Lexis-Nexis search of every combination of the following two groups of search terms (1) "whistle," "whistle-blowing," "whistleblower," "whistle-blower," and (2) "financial," "accounting," "reporting," "fraud," "accounting fraud" over the calendar years 1989 to 2004. Note that the Press sample label does not imply that employee whistle-blowers directly informed the press. These are merely instances of whistle-blowing reported in the media.

The second source, labeled the OSHA sample, consists of 137 whistle-blowing discrimination cases gathered from written requests to the Occupational Health and Safety Administration (OSHA).⁶ While OSHA handles other varieties of whistle-blower allegations besides those who

⁶ While the vast majority of OSHA cases were not resolved in favor of the employee whistle-blower (Moberly 2007; *New York Times* 2009), this does not negate the importance or credibility of the allegations. First, OSHA's rulings were decisions about whether the whistle-blower was *discriminated* against—not rulings on whether the alleged financial impropriety was taking place. It is entirely possible that the underlying allegation of impropriety was credible and important, even though OSHA determined the employee was not treated unfairly. Second, Moberly (2007) finds that one of the reasons employee whistle-blowers have not been successful at winning claims is because "OSHA tended to misapply Sarbanes-Oxley's burden of proof regarding causation, to the substantial detriment of employees." Thus, despite the limited success employee whistle-blowers have had in their discrimination cases filed with OSHA, it remains unclear whether these employees were raising concerns about legitimate cases of financial malfeasance, e.g., a *New York Times* (2009) editorial argues that "Most often, the reason for the dismissal has nothing to do with the merits of the

claim to have uncovered fraud and file for protection under SOX, we asked for and received data related only to financial whistle-blowing under the purview of SOX.⁷ These cases represent whistle-blowers' complaints of discrimination in the workplace (e.g., demotion, termination) for having voiced allegations of financial impropriety. In essence, the OSHA sample reflects the very whistle-blowers SOX Section 806 was intending to protect. While we are unable to observe whistle-blowing allegations that did not result in alleged employee discrimination (because these allegations were not reported to OSHA) and did not otherwise become public, each OSHA case represents a previously internal allegation of financial wrongdoing being made public. Figure 1 highlights the external whistle-blowing allegations we are able to observe.

The Press sample differs from the OSHA sample in several ways. First, the Press sample likely reflects the media's bias in covering more visible, important, or sensational whistle-blowing allegations. In contrast, the OSHA sample is likely to be less biased but is more likely to include relatively frivolous complaints. Second, Callahan and Dworkin (1994) find that misdeeds reported to the media are likely to involve larger sums of money than those reported to other outlets. Third, observations in the Press sample, by definition, represent a clear public revelation of the whistle-blowing allegation whereas the OSHA whistle-blowing data are less likely to be widely disseminated in local and national media given the information has to be obtained via a special request from a government agency. Fourth, we can ascertain the date on which the whistle-blowing allegation was made public based on the news story in the press; such event-dating is difficult with the OSHA sample. Hence, we conduct a study of the stock market reaction surrounding the whistle-blowing event only for the Press sample. However, to the extent possible, we examine the long-run consequences of both types of whistle-blowing events.

We start with an initial Press (OSHA) sample of 81 (137) unique firms.⁸ Panel A of Table 1 presents an annual breakdown of the firms subject to whistle-blowing actions. The number of whistle-blowing actions in the Press sample is relatively stable at a median value of 4 per year, except for a peak of 23 events in 1998 and 13 events in 2002. Because the OSHA sample begins in August 2002, this year has only 12 events, followed by 62 events in 2003 and 63 events in 2004. Panel B of Table 1 lists the nature of whistle-blowing allegations in both samples. These diverse allegations range from clearly "earnings management" to potential earnings management (e.g., "overbilling" with the motivation to boost revenue) to other accounting decisions that affect disclosure (e.g., "improper disclosure" and "accounting irregularities") to other types of financial impropriety not directly related to financial reporting (e.g., "insider trading," "price-fixing" and "tax fraud").

Control Samples

We rely on two control samples. The purpose of the first control sample (labeled "broad control sample") is to benchmark our whistle-blowing firms against a broad set of firms that have not been publicly accused of financial improprieties by employee whistle-blowers. This sample consists of all firms that have non-missing CRSP and Compustat data for all of the independent variables listed in model (1). All observations that have non-missing data in the year before the whistle-blowing event for one of our sample firms are eligible for inclusion in the broad control

case." Our study provides direct evidence on this question.

⁷ The Sarbanes-Oxley Act did not assign the job of protecting whistle-blowers to the Securities and Exchange Commission. Instead, the task went to the Labor Department's OSHA because the law's drafters reasoned that OSHA had a record of helping workers penalized for voicing concerns. For example, OSHA has the responsibility of enforcing 13 additional whistle-blower statutes covering truckers, airline mechanics, nuclear-power-plant employees, and others.

⁸ The number of firms used in each empirical test is reported in the tables that follow and varies depending on data availability.

TABLE 1
Whistle-Blowing Allegations by Year and Type

Panel A: Whistle-Blowing Allegations by Year

	<u>Press</u>	<u>OSHA</u>		<u>Press</u>	<u>OSHA</u>
1989	1	NA	1997	2	NA
1990	0	NA	1998	23	NA
1991	1	NA	1999	2	NA
1992	3	NA	2000	5	NA
1993	4	NA	2001	4	NA
1994	5	NA	2002	13	12
1995	5	NA	2003	8	62
1996	5	NA	2004	0	63
				<u>81</u>	<u>137</u>

Panel B: Whistle-Blowing by Type of Allegation

	<u>Press</u>	<u>%</u>	<u>OSHA</u>	<u>%</u>
Earnings Management	24	29.6%	16	11.7%
Improper Disclosure	1	1.2%	4	2.9%
Overbilling	40	49.4%	3	2.2%
Insider Trading	3	3.7%	1	0.7%
Price Fixing	6	7.4%	0	0.0%
Tax Fraud	2	2.5%	0	0.0%
Securities Law Violations	0	0.0%	10	7.3%
Other Accounting-Related Allegations	1	1.2%	26	19.0%
Corporate Governance Issues	0	0.0%	3	2.2%
Fraud	0	0.0%	14	10.2%
Other	4	4.9%	18	13.1%
No Info	0	0.0%	42	30.7%
	<u>81</u>	<u>100.0%</u>	<u>137</u>	<u>100.0%</u>

sample at the first pass. We next impose the following filters: (1) no observation relating to any of the sample firms can be included in the broad control sample, and (2) no control firm can appear in the broad control sample more than once (i.e., no more than one firm-year observation for each control firm). Whenever we found multiple observations from the same firm in the control sample, we randomly selected just one firm-year.

One drawback to benchmarking the whistle-blowing sample to a broad sample of firms is that firms subject to a whistle-blowing event are inherently different from the average firm. Thus, we construct a second control group by comparing whistle-blowing firms to other firms tarnished by allegations of financial misdeeds that have *not* been exposed to a public whistle-blowing event. In particular, we identify firms that were subject to a lawsuit during the years 1989–2006 (“lawsuit sample”) and firms that filed earnings restatements between 1997–2005 based on two GAO reports (“restatement sample”). We emphasize comparisons between our whistle-blowing samples and this second control group because they allow us to more directly assess differences between firms that face whistle-blowing allegations and other tarnished firms that avoid public allegations.

We rely on an updated version of the lawsuit sample of 1,119 usable firms compiled by [DuCharme et al. \(2004\)](#) covering the period April 1988 through May 2006 to identify firms that

were sued in connection with alleged financial misdeeds. The restatement sample is drawn from two lists of firms compiled by the General Accounting Office (GAO 2002, 2006) through a Lexis-Nexis search with variations of the word “restate.” Data limitations on several of the independent variables constrain the restatement sample to 1,304 firm-year observations.⁹

IV. CHARACTERISTICS OF FIRMS FACING EXTERNAL WHISTLE-BLOWING ALLEGATIONS (Q1)

In this section, we present evidence on the characteristics of the whistle-blowing targets versus the two control samples discussed in Section III. Given the Press and OSHA samples differ, we separately compare each whistle-blowing sample to the control samples.

Whistle-Blowing Firms versus the Broad Control Sample

In Panel A of Table 2, we compare whistle-blowing firms to the broad control sample of firms that have avoided external whistle-blowing allegations. We estimate multivariate model (1) separately for the Press sample in columns 1 and 2 and the OSHA sample in columns 3 and 4. Columns 1 and 3 present results without the external monitoring and internal governance variables because data restrictions on these variables severely restrict our sample sizes. Results in columns 2 and 4 include external monitoring and internal governance variables.

We find that, relative to the broad control sample, whistle-blowing firms in both Press and OSHA samples (1) were growing more rapidly (with statistically significant differences reported in columns 1, 2, and 3), (2) had relatively unclear internal communication channels (all four columns), (3) came from *QUITAM* environments where the whistle-blower had an opportunity to share in the proceeds of any fraud-related settlement with the U.S. Government (columns 1, 3, and 4), and (4) were larger (all four columns). Results in columns 2 and 4 suggest that whistle-blowing targets also had relatively weak external monitoring. We also find some evidence that capital market pressures were associated with whistle-blowing (columns 2 and 3). Two variables were only significant for the OSHA sample. OSHA firms were more likely to (1) have a strong reputation (columns 3 and 4), and (2) have undergone employee downsizing (column 3).

Whistle-Blowing Firms versus Lawsuit and Restatement Firms

In Panel B of Table 2, we compare the whistle-blowing sample to a combined sample composed of the lawsuit and restatement control samples.¹⁰ Although both whistle-blowing firms and these control firms (lawsuit and restatement firms) are likely tarnished, only the whistle-blowing targets experienced a public allegation. Hence, our analysis in Panel B focuses on differences between firms where employees made external whistle-blowing allegations and lawsuit and restatement firms *where a public whistle-blowing allegation presumably could have been made*.

Compared to lawsuit and restatement firms, whistle-blowing firms (1) were growing more rapidly (significant in all four columns of Panel B), (2) were relatively more successful in their prior stock return performance (all four columns), (3) had experienced employee downsizing (columns 2, 3, and 4), and (4) were larger (all four columns).¹¹ In addition, OSHA firms (1) were more highly regarded (columns 3 and 4), (2) came from *QUITAM* environments (columns 3 and

⁹ We eliminate firms that overlap the whistle-blowing treatment sample and the tarnished-firm control sample (lawsuits and restatements) to avoid any mechanical correlation between these samples.

¹⁰ In an effort to capture the period of alleged financial malfeasance for our control firms, for lawsuit firms we calculate the average of all our continuous variables over the years of alleged wrongdoing. For restatement firms we calculate the average of all our continuous variables over the three years prior to the restatement announcement ($t-1$ through $t-3$). For comparability, we also use prior three-year averages for the continuous variables in our whistle-blowing sample.

¹¹ We acknowledge that the finding that whistle-blowing firms are characterized by relatively more successful prior stock return performance may be driven by the fact that lawsuits are often triggered by poor stock performance.

TABLE 2

What Firm Characteristics Lead Employees to Make Whistle-Blowing Allegations Public? (Q1)

Panel A: Whistle-Blowing Sample versus Broad Control Sample

$$\begin{aligned} \text{Pr}(\text{whistle-blowing}) = & \beta_0 + \beta_1 \text{CM_PRESSURE} + \beta_2 \text{GROWTH} + \beta_3 \text{PAST_PERF} + \beta_4 \text{REPUTATION} + \beta_5 \text{COMMUNICATION} \\ & + \beta_6 \text{DOWNSIZE} + \beta_7 \text{QUITAM} + \beta_8 \text{SIZE} + \beta_9 \text{ICW} + \beta_{10} \text{EXT_MONITOR} + \beta_{11} \text{GOVERNANCE} + \text{Industry} + \text{Year} \\ & + \text{error} \quad (1) \end{aligned}$$

Determinant	Pred. Sign	(1)		(2)		(3)		(4)	
		Press versus Control		Press versus Control		OSHA versus Control		OSHA versus Control	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
CM_PRESSURE	+	1.46	0.141	4.26	0.031**	2.41	0.007***	-0.64	0.663
GROWTH	+	2.40	0.013**	5.03	0.001***	1.25	0.022**	1.27	0.117
PAST_PERF	+	-0.84	0.869	-2.86	0.987	-0.56	0.854	-0.78	0.819
REPUTATION	+	0.29	0.344	0.47	0.328	1.46	0.001***	1.11	0.014**
COMMUNICATION	-	-2.66	0.006***	-2.93	0.054*	-1.23	0.061*	-2.03	0.053*
DOWNSIZE	-	-0.00	0.499	-0.52	0.359	-1.29	0.015**	-0.12	0.450
QUITAM	+	0.92	0.043**	0.39	0.319	1.33	0.012**	1.61	0.019**
SIZE	+	8.26	<0.001***	28.27	<0.001***	3.01	<0.001***	7.14	<0.001***
ICW	+	-0.86	0.874	-0.11	0.534	-0.27	0.699	0.97	0.106
EXT_MONITOR	-			-1.86	0.076*			-1.96	0.019**
GOVERNANCE	-			-1.01	0.234			1.05	0.771
Pseudo-R ²		50.6%		65.8%		39.0%		43.1%	
Likelihood Ratio Statistic		354.42	<0.001***	280.37	<0.001***	361.78	<0.001***	194.85	<0.001***
ROC Curve Statistic		0.944		0.983		0.942		0.943	
n		n _{PRESS} = 67		n _{PRESS} = 50		n _{OSHA} = 95		n _{OSHA} = 54	
		n _{CONTROL} = 4,552		n _{CONTROL} = 1,282		n _{CONTROL} = 4,552		n _{CONTROL} = 1,282	

(continued on next page)

Panel B: Whistle-Blowing Sample versus Tarnished (Combined Lawsuit and Restatement) Samples

$$\text{Pr}(\text{whistle-blowing}) = \beta_0 + \beta_1 \text{CM_PRESSURE} + \beta_2 \text{GROWTH} + \beta_3 \text{PAST_PERF} + \beta_4 \text{REPUTATION} + \beta_5 \text{COMMUNICATION} + \beta_6 \text{DOWNSIZE} \\ + \beta_7 \text{QUITAM} + \beta_8 \text{SIZE} + \beta_9 \text{ICW} + \beta_{10} \text{EXT_MONITOR} + \beta_{11} \text{GOVERNANCE} + \text{Industry} + \text{Year} + \text{error} \quad (1)$$

Determinant	Pred. Sign	(1)		(2)		(3)		(4)	
		Press versus Lawsuit/Restate		Press versus Lawsuit/Restate		OSHA versus Lawsuit/Restate		OSHA versus Lawsuit/Restate	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
<i>CM_PRESSURE</i>	+	0.03	0.499	-1.42	0.667	1.54	0.120	-3.63	0.937
<i>GROWTH</i>	+	1.93	0.087*	7.63	0.003***	2.02	0.003***	2.42	0.046**
<i>PAST_PERF</i>	+	3.08	0.009***	4.17	0.078*	3.98	<0.001***	5.19	0.001***
<i>REPUTATION</i>	+	1.16	0.200	0.77	0.354	1.13	0.023**	1.55	0.012**
<i>COMMUNICATION</i>	-	-1.97	0.163	-0.35	0.419	1.15	0.868	0.49	0.599
<i>DOWNSIZE</i>	-	-0.86	0.239	-4.92	0.032**	-2.18	<0.001***	-1.88	0.072*
<i>QUITAM</i>	+	0.12	0.457	-3.37	0.949	2.23	0.010***	3.96	0.006***
<i>SIZE</i>	+	5.62	0.001***	20.18	0.003***	3.19	<0.001**	4.90	0.022**
<i>ICW</i>	+	0.54	0.343	1.49	0.261	-0.37	0.700	-0.22	0.571
<i>EXT_MONITOR</i>	-			-2.37	0.163			-2.33	0.055*
<i>GOVERNANCE</i>	-			-7.53	0.034**			1.73	0.803
Pseudo-R ²		67.7%		79.5%		52.6%		59.6%	
Likelihood Ratio Statistic		265.19	<0.001***	211.44	<0.001***	371.65	<0.001***	186.74	<0.001***
ROC Curve Statistic		0.976		0.995		0.963		0.970	
n		n _{PRESS} = 38 n _{LAWNSUIT} = 2,397		n _{PRESS} = 30 n _{LAWNSUIT} = 915		n _{OSHA} = 80 n _{LAWNSUIT} = 2,397		n _{OSHA} = 43 n _{LAWNSUIT} = 915	

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

p-values are one-sided for variables with directional predictions. We report (1 - p) values for coefficients that assume a sign opposite to the one predicted.

All variables are as defined in the Appendix. Firm and year subscripts are suppressed.

4), and (3) had relatively weak external monitoring (column 4). Press firms appeared to have worse governance (column 2).

In general, a comparison of whistle-blowing firms to lawsuit and restatement firms suggests whistle-blowing firms were systematically different from other tarnished firms. These unique environmental factors encouraged whistle-blowers to make their allegations public and help explain why some firms were subject to whistle-blowing allegations while other firms that presumably could have been targeted by whistle-blowers did not experience such allegations.

V. IMMEDIATE (Q2) AND SUBSEQUENT (Q3) CONSEQUENCES OF WHISTLE-BLOWING ALLEGATIONS

Immediate Stock Market Reactions to Whistle-Blowing Announcements

Recall that we can compute stock market reactions only for the Press sample, as the dates on which the OSHA whistle-blowing events become public are not generally available. Panel A of Table 3 presents evidence on the stock market reaction to whistle-blowing events measured around five days, from the day before the announcement to three days after (day -1 through day $+3$). *RET* represents raw returns while *CAR* signifies market-adjusted returns. The mean five-day abnormal market-adjusted stock market reaction was -2.84 percent. The median abnormal reactions, while smaller in magnitude, were also significantly negative. Given that the median market capitalization of a Press sample firm was \$7.3 billion (untabulated), market reactions following whistle-blowing allegations resulted in significant losses in shareholder value, on average. The frequency of negative reactions is also high, at 67.9 percent of the sample.¹²

These significant negative reactions suggest that, on average, announcements of whistle-blowing allegations were economically important for the targeted firm and were not immediately seen as frivolous by stock market participants. We consider subsequent economic consequences of these whistle-blowing allegations later in Section V.

Cross-Sectional Determinants of the Stock Market Reactions to Whistle-Blowing Announcements

In Panel B of Table 3, we attempt to explain the cross-sectional distribution of stock market reactions to a whistle-blowing event by including five factors that potentially affect investors' reaction to whistle-blowing allegations. First, we expect larger firms (*SIZE*) to suffer larger negative stock price reactions. Larger firms have deeper pockets and are more likely to be the subject of a subsequent class action lawsuit. Second, highly regarded firms have more credibility to lose from an external whistle-blowing action reported in the financial press. We measure a firm's reputation based on whether the firm is ranked as most admired or best to work for per *Fortune* magazine (*REPUTATION*). Third, awareness of whistle-blowing actions likely heightened after the passage of SOX, and we expect the stock market to react more negatively to a whistle-blowing action in the post-SOX era. We define a variable, *SOX*, set equal to 1 if the whistle-blowing action was reported in the press after the calendar year 2002. Fourth, we argue that allegations of earnings management and overbilling represent especially large agency issues, and we predict these allegations are likely to result in particularly negative stock market reactions. *EM* is set to 1 if the allegation pertains to earnings management (and 0 otherwise) and *OVERBILLING* is set to 1 if the allegation involves overbilling (and 0 otherwise).

Panel B of Table 3 presents evidence on the cross-sectional variation in stock price reactions around whistle-blowing allegations. Two of our predictions are consistently significant. We find that the stock market viewed whistle-blowing allegations relatively negatively for firms with

¹² We find qualitatively similar results when we examine three-day (day -1 through day $+1$) returns instead of five-day returns.

TABLE 3

What is the Immediate Stock Market Reaction to Whistle-Blowing Announcements? (Q2)

Panel A: Five-Day Market Reaction (n = 78)

	% negative	Mean	Q1	Median	Q3	p-value ^a	p-value ^b
RET	60.3%	-0.0246	-0.0478	-0.0125	0.0208	0.055*	0.033**
CAR	67.9%	-0.0284	-0.0592	-0.0147	0.0284	0.024***	0.013**

Panel B: Cross-Sectional Determinants of the Market Reaction

$$\text{Model: } CAR = \beta_0 + \beta_1 \text{SIZE} + \beta_2 \text{REPUTATION} + \beta_3 \text{SOX} + \beta_4 \text{EM} + \beta_5 \text{OVERBILLING} + \varepsilon$$

Independent Variables	Pred. Sign	Coefficient	t-statistic
Intercept	?	0.070	1.73*
SIZE	-	-0.000	-0.69
REPUTATION	-	-0.024	-0.31
SOX	-	-0.041	-0.87
EM	-	-0.143	-3.04***
OVERBILLING	-	-0.074	-1.62*
Adj. R ²			8.9%
F-statistic		2.24	0.063*
n			64

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

p-values are one-sided for variables with directional predictions. We report (1 - p) values for coefficients that assume a sign opposite to the one predicted.

^a p-values are one-sided associated with t-statistics.

^b p-values are one-sided associated with Wilcoxon Z-statistics.

Variable Definitions (where firm and year subscripts are suppressed):

RET = five-day cumulative raw returns beginning the day before the whistle-blowing allegation;

CAR = five-day cumulative abnormal returns beginning the day before the whistle-blowing allegation;

SIZE = total sales revenue for the year before the whistle-blowing event;

REPUTATION = an indicator variable coded as 1 if the firm has appeared on *Fortune's* "Best Companies to Work For" list or on *Fortune's* "Most Admired Companies" list in any of the five years prior to the whistle-blowing event, and coded as 0 otherwise;

SOX = an indicator variable equal to 1 if the allegation was made later after 2002, 0 otherwise;

EM = an indicator variable equal to 1 if the allegation is related to earnings management, 0 otherwise; and

OVERBILLNG = an indicator variable equal to 1 if the allegations related to overbilling, 0 otherwise.

alleged earnings management. Specifically, the coefficient on EM is -0.143 (t-statistic = -3.04) indicating that allegations related to earnings management resulted in an average incremental (overall) -14.3 percent (-7.3 percent) return over the five-day window. Allegations of overbilling indicate an average incremental (overall) -7.4 percent (-0.4 percent) five-day return. Hence, it appears that, on average, whistle-blowing events were far from trivial for targeted firms, particularly for firms accused of managing earnings.

Subsequent Consequences of Whistle-Blowing Events (Q3)

In this section, we explore four potential subsequent consequences of whistle-blowing events: (a) earnings restatements, (b) shareholder lawsuits, (c) future operating performance, and (d) future stock market performance. If a whistle-blowing event reveals financial reporting or agency

problems in the firm, then one would expect firms subject to such allegations to be more likely to file future earnings restatements, to be the target of shareholder lawsuits, and to suffer weak future operating and stock return performance.

We recognize the issue of endogeneity in evaluating the consequences of whistle-blowing events. In other words, when we assess future economic consequences such as operating or stock return performance, it is possible that whistle-blowing allegations arise from many of the same economic forces that contribute to subsequent problems after a whistle-blowing allegation. Hence, it would be inappropriate to treat the whistle-blowing event as exogenous, especially given that we attempt to model the factors associated with whistle-blowing in Section IV.

We control for the potential endogeneity between whistle-blowing allegations and future economic consequences by comparing whistle-blowing targets to a sample of control firms matched on the propensity to experience a whistle-blowing event (Armstrong et al. 2009; Francis and Lennox 2008). The primary benefit of using a control sample matched on propensity scores is that it allows us to compare whistle-blowing firms to a set of firms that are the same on all observable dimensions, thus allowing us to more clearly attribute any observed consequence to the whistle-blowing event itself, rather than to the firm characteristics associated with whistle-blowing allegations. From a practical standpoint, this matched sample also allows us to compare whistle-blowing firms to control firms along a variety of dimensions (e.g., restatements, lawsuits, operating performance, stock return performance) without the need for additional control variables. In essence, our propensity-score matching procedure directly controls for any relevant difference between whistle-blowing and control firms.

To identify the propensity-score matched control sample, we estimate model (1) for the whistle-blowing firms and the broad control sample (as outlined in Panel A of Table 2), and calculate a propensity score for each firm, which is the conditional probability of receiving the treatment effect (i.e., the probability that the firm experienced a whistle-blowing event) given all the observable data.¹³ For each whistle-blowing target, we select two control firms with the closest propensity scores, and these firms constitute the propensity-score matched control sample. The result is that each whistle-blowing firm is matched to two firms that were not subject to whistle-blowing allegations but are similar along all other relevant dimensions.¹⁴ Since the matched control sample is similar along every observable dimension, any difference in outcome between whistle-blowing and control samples can be attributed to the whistle-blowing event.

We measure “covariate balance” to ensure that the whistle-blowing and matched control samples are similar across all dimensions except the variable of interest (i.e., being the target of whistle-blowing allegations).¹⁵ In general, untabulated results suggest that in comparing whistle-blowing firms to these control firms, we effectively control for the potential endogeneity linking whistle-blowing allegations and future consequences. However, we do find a significant difference in the *distribution* (but not the *mean*) of *SIZE* when comparing whistle-blowing and control samples. Therefore, to be conservative, we control for *SIZE* in subsequent tests.

¹³ In order to maximize the number of observations available for the propensity score matching procedure, we estimate model (1) excluding *EXT_MONITOR* and *GOVERNANCE*.

¹⁴ We choose two matched firms for each whistle-blowing target in an effort to maximize the number of firms in this control sample while ensuring that there is no statistical difference in the propensity scores between treatment and control firms.

¹⁵ We formally assess covariate balance by testing whether the means and medians of the covariates used in model (1) differ between the whistle-blowing and controls samples. The untabulated results suggest that the propensity-score matched samples resemble the whistle-blowing samples along virtually all dimensions. Specifically, there is no significant difference in means of any of the covariates between whistle-blowing and matched control firms (for either the Press or OSHA samples). Furthermore, the Kolmogorov-Smirnov test fails to reject the null hypothesis of similar distributions for each of these variables, with the exception of *SIZE*.

Do Whistle-Blowing Announcements Lead to Subsequent Earnings Restatements? (Q3a)

To assess subsequent consequences (in this and the following lawsuit-based tests), we rely on the restatement and lawsuit samples discussed in Section III with one major exception. Unlike Section III, we do not eliminate whistle-blowing firms that experienced a restatement or lawsuit, as the purpose of this analysis is to document the existence of such a link should it exist.^{16,17}

The results in Panel A of Table 4 indicate that whistle-blowing firms in the Press sample experienced significantly more subsequent restatements ($p = 0.013$) in the three years following a whistle-blowing action (17.9 percent) than propensity-score matched control firms (7.5 percent). Panel B of Table 4 reports that whistle-blowing firms in the OSHA sample also experienced more restatements (13.7 percent) than propensity-score matched control firms (9.5 percent), but the difference is not significant at conventional levels ($p = 0.141$). However, when we look only at the subset of future restatements that represent accounting irregularities (as defined by Hennes et al. [2008]), we find that OSHA firms were more likely to experience an accounting irregularity than their matched counterparts ($p = 0.053$, untabulated).

Because the whistle-blowing and propensity-score matched control samples had different *SIZE* distributions, we also controlled for *SIZE*. These results, reported in Panel C of Table 4, support our earlier conclusions. In sum, firms exposed to whistle-blowing events reported in the press were more likely to experience a subsequent restatement than were matched control firms with similar underlying characteristics.

Do Whistle-Blowing Announcements Lead to Subsequent Shareholder Lawsuits? (Q3b)

Table 5 provides evidence on whether whistle-blowing allegations were a precursor to shareholder lawsuits. The sample analyzed for this test again includes 67 Press firms and their 134 propensity-score matched control firms, and 95 OSHA firms along with their 190 matched control firms. The results in Panel A of Table 5 indicate that whistle-blowing firms in the Press sample experienced significantly more subsequent lawsuits ($p = 0.004$) following a whistle-blowing action (26.9 percent) than propensity-score matched control firms (11.9 percent). Panel B of Table 5 reports that whistle-blowing firms in the OSHA sample also experienced more lawsuits (11.6 percent) than propensity-score matched control firms (8.4 percent), but the difference is not significant at conventional levels ($p = 0.196$). Controlling for *SIZE* in Panel C yields similar conclusions. In summary, the evidence in Tables 4 and 5 suggests that a whistle-blowing event reported in the press can be an early warning indicator of future earnings restatements or shareholder lawsuits, and that whistle-blowing allegations are not trivial and/or baseless, on average.

Are Whistle-Blowing Events Associated with Relatively Poor Future Operating Performance? (Q3c)

In this and the following section, we evaluate whether whistle-blowing allegations serve as an early warning of negative future operating or stock price performance. The link between a whistle-blowing event and negative future performance can be motivated in at least three ways. First, given our earlier evidence that whistle-blowing can be a significant indicator of subsequent earn-

¹⁶ We verified that the whistle-blowing announcement preceded the earnings restatement before the announcement entered the empirical analyses. However, note that the GAO report discloses the date of the restatement announcement, and not the years being restated. Data on the year being restated is generally patchy and unreliable. Hence, we did not pursue an investigation into the year for which the financial statements were restated.

¹⁷ The time-windows and data selection for the restatement tests need some elaboration. We assume that whistle-blowing events increase the probability of a restatement announcement within the next three years (including the year of the allegation). Because the GAO restatement data are available only from 1997 to 2005, we are forced to delete observations that occur in and before 1993. Thus, the sample analyzed for these tests includes 67 Press firms and their 134 propensity-score matched control firms, and 95 OSHA firms along with their 190 propensity-score matched control firms.

TABLE 4
Long-Term Consequences: Are Whistle-Blowing Allegations Associated with Subsequent Restatements? (Q3a)

Panel A: Restatement Frequency—Press versus Propensity-Score Matched Sample						Significance ^a
Press Sample			Propensity-Score Matched Sample			
# of Restatements	# of Firms	% with Restatements	# of Restatements	# of Firms	% with Restatements	p-value
12	67	17.9%	10	134	7.5%	0.013**

Panel B: Restatement Frequency—OSHA versus Propensity-Score Matched Sample						Significance ^a
OSHA Sample			Propensity-Score Matched Sample			
# of Restatements	# of Firms	% with Restatements	# of Restatements	# of Firms	% with Restatements	p-value
13	95	13.7%	18	190	9.5%	0.141

Panel C: Logistic Regressions

$$RESTATE_{t+3} = \beta_0 + \beta_1 WB_t + \beta_2 SIZE_{t-1} + \varepsilon_{t+3}$$

Independent Variables	Pred. Sign	Press versus Propensity-Score Matched Sample		OSHA versus Propensity-Score Matched Sample	
		Coefficient	p-value	Coefficient	p-value
<i>WB</i>	+	1.010	0.016**	0.406	0.157
<i>SIZE</i>	?	0.000	0.470	0.000	0.621
Pseudo-R ²			4.1%		0.8%
Likelihood Ratio Statistic		5.432	0.066*	1.467	0.480
ROC Curve Statistic			0.666		0.560
<i>n</i>			<i>n</i> _{PRESS} = 66		<i>n</i> _{OSHA} = 94
			<i>n</i> _{CONTROL} = 124		<i>n</i> _{CONTROL} = 182

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

p-values are one-sided for variables with directional predictions. We report (1 - p) values for coefficients that assume a sign opposite to the one predicted.

^a p-values are associated with the Pearson Chi-square test statistic, and test for differences in the proportion of firms that experience a restatement.

Variable Definitions (where firm subscripts are suppressed):

$RESTATE_{t+3}$ = 1 if the firm experienced a restatement in the event year or in the three subsequent years, 0 otherwise;

WB_t = 1 if the firm experienced a whistle-blowing event, 0 otherwise; and

$SIZE_{t-1}$ = total sales revenue (Compustat annual #12) for the year before the whistle-blowing event.

ings restatements and lawsuits, it is perhaps natural to expect negative future performance subsequent to a whistle-blowing event. Second, managers may engage in defensive actions to mitigate negative publicity and other consequences of a whistle-blowing event. Such defensive efforts can distract managers from normal profit-seeking activities and siphon funds away from strategic investments. Third, a whistle-blowing event can hurt the firm's image with its stakeholders, result in a loss of confidence in management, increase the probability of management turnover, and/or increase the perception that additional problems are lurking.

TABLE 5
Long-term Consequences: Are Whistle-Blowing Allegations Associated with Subsequent Lawsuits? (Q3b)

Panel A: Lawsuit Frequency—Press versus Propensity-Score Matched Sample						
Press Sample			Propensity-Score Matched Sample			Significance ^a
# of Lawsuits	# of Firms	% with Lawsuits	# of Lawsuits	# of Firms	% with Lawsuits	p-value
18	67	26.9%	16	134	11.9%	0.004***

Panel B: Restatement Frequency—OSHA versus Propensity-Score Matched Sample						
OSHA Sample			Propensity-Score Matched Sample			Significance ^a
# of Lawsuits	# of Firms	% with Lawsuits	# of Lawsuits	# of Firms	% with Lawsuits	p-value
11	95	11.6%	16	190	8.4%	0.196

Panel C: Logistic Regressions

$$LAWSUIT_{t+3} = \beta_0 + \beta_1 WB_t + \beta_2 SIZE_{t-1} + \varepsilon_{t+3}$$

Independent Variables	Pred. Sign	Press versus Propensity-Score Matched Sample		OSHA versus Propensity-Score Matched Sample	
		Coefficient	p-value	Coefficient	p-value
<i>WB</i>	+	0.849	0.017**	0.234	0.293
<i>SIZE</i>	?	0.000	0.025**	0.000	0.308
Pseudo-R ²		6.2%		0.8%	
Likelihood Ratio Statistic		10.598	0.005***	1.484	0.476
ROC Curve Statistic		0.728		0.584	
n		n _{PRESS} = 66 n _{CONTROL} = 124		n _{OSHA} = 94 n _{CONTROL} = 182	

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

p-values are one-sided for variables with directional predictions. We report (1 - p) values for coefficients that assume a sign opposite to the one predicted.

^a p-values are associated with the Pearson Chi-square test statistic, and test for differences in the proportion of firms that experience a lawsuit.

Variable Definitions (where firm subscripts are suppressed):

$LAWSUIT_{t+3}$ = 1 if the firm experienced a lawsuit in the event year or in the three subsequent years, 0 otherwise;

WB_t = 1 if the firm experienced a whistle-blowing event, 0 otherwise; and

$SIZE_{t-1}$ = total sales revenue (Compustat annual #12) for the year before the whistle-blowing event.

In analyzing the link between whistle-blowing events and future operating performance, we calculate cumulative return on assets (*ROA*) for three time windows following the whistle-blowing event ranging from one to three years (i.e., *ROA* for year +1; years +1 and +2; and years +1, +2, and +3). The data in Panels A and B of Table 6 indicate that both Press and OSHA firms report lower *ROA* in the year immediately following the whistle-blowing allegation. Beyond the first year, whistle-blowing firms did not report statistically lower *ROA*. In Panels C and D, we control for *SIZE*, finding similar results, except that Press firms also reported lower *ROA* in the two years after the whistle-blowing event.

TABLE 6

Long-Term Consequences: Are Whistle-Blowing Allegations Associated with Poor Future Operating Performance? (Q3c)

Panel A: Future ROA—Press versus Propensity-Score Matched Sample

	Means			Medians		
	Press	Control	p-value ^a	Press	Control	p-value ^b
ROA_{t+1}	0.020 (58)	0.049 (101)	0.015**	0.035 (58)	0.043 (101)	0.020**
ROA_{t+2}	0.061 (53)	0.095 (81)	0.106	0.081 (53)	0.094 (81)	0.201
ROA_{t+3}	0.099 (44)	0.128 (59)	0.255	0.109 (44)	0.098 (59)	0.501

Panel B: Future ROA—OSHA versus Propensity-Score Matched Sample

	Means			Medians		
	OSHA	Control	p-value ^a	OSHA	Control	p-value ^b
ROA_{t+1}	0.017 (84)	0.044 (155)	0.070*	0.035 (84)	0.048 (155)	0.030**
ROA_{t+2}	0.057 (40)	0.063 (59)	0.445	0.071 (40)	0.087 (59)	0.264
ROA_{t+3}	0.160 (6)	0.115 (8)	0.619	0.233 (6)	0.229 (8)	0.526

Panel C: OLS Regressions—Press versus Propensity-Score Matched Sample

$$ROA_{t+n} = \beta_0 + \beta_1 WB_t + \beta_2 SIZE_{t-1} + \varepsilon_{t+n}$$

Independent Variables	Pred. Sign	ROA_{t+1}		ROA_{t+2}		ROA_{t+3}	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
WB	–	–0.025	0.032**	–0.037	0.097*	–0.024	0.303
SIZE	?	0.000	0.040**	0.000	0.012**	0.000	0.140
Adj. R ²		3.1%		4.1%		0.3%	
F-statistic		3.41	0.036**	3.66	0.029**	1.13	0.327
n		n _{PRESS} = 55 n _{CONTROL} = 96		n _{PRESS} = 49 n _{CONTROL} = 76		n _{PRESS} = 41 n _{CONTROL} = 56	

Panel D: OLS Regressions—OSHA versus Propensity-Score Matched Sample

$$ROA_{t+n} = \beta_0 + \beta_1 WB_t + \beta_2 SIZE_{t-1} + \varepsilon_{t+n}$$

Independent Variables	Pred. Sign	ROA_{t+1}		ROA_{t+2}		ROA_{t+3}	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
WB	–	–0.035	0.029**	–0.021	0.317	0.018	0.457
SIZE	?	0.000	0.168	0.000	0.274	0.000	0.685
Adj. R ²		1.1%		–0.8%		–15.4%	
F-statistic		2.29	0.103	0.64	0.527	0.13	0.878
n		n _{OSHA} = 82 n _{CONTROL} = 153		n _{OSHA} = 39 n _{CONTROL} = 58		n _{OSHA} = 6 n _{CONTROL} = 8	

(continued on next page)

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

Coefficients (t-statistics) are reported. p-values are one-sided for variables with directional predictions. We report $(1 - p)$ values for coefficients that assume a sign opposite to the one predicted.

^a p-values are associated with t-statistics.

^b p-values are associated with Wilcoxon z-statistics.

Variable Definitions (where firm subscripts are suppressed):

ROA_{t+n} = buy-and-hold return on assets, starting with ROA in the year after the event date, and ending n years after the whistle-blowing event;

WB_t = 1 if the firm experienced a whistle-blowing event, 0 otherwise; and

$SIZE_{t-1}$ = total sales revenue (Compustat annual #12) for the year before the whistle-blowing event.

Are Whistle-Blowing Events Associated with Relatively Poor Future Stock Price Performance? (Q3d)

Table 7 presents data on future stock return performance of firms subject to whistle-blowing allegations. In particular, we consider monthly returns over three years following the month in which the whistle-blowing allegation becomes public. Thus, this event window does not overlap with our immediate consequences tests reported earlier in Section V. Panel A of Table 7 reveals Press firms reported lower abnormal returns over the one, two, and three years following the whistle-blowing event. Panel B reports some evidence consistent with OSHA firms also reporting lower returns over the subsequent two or three years.

In Panels C and D of Table 7, we regress raw monthly returns RET on (1) $SIZE$ because whistle-blowing firms and the propensity-score matched control firms did not exhibit the same distribution along this one dimension, and (2) the other three Fama-French factors, including momentum. We include a WB indicator equal to 1 for firms in the whistle-blowing sample, and 0 otherwise, which allows for a different intercept for whistle-blowing firms and control firms. The regressions are conducted using the firm-month as the unit of analysis. The variable of interest in these analyses is WB . If whistle-blowing allegations were associated with poor future stock return performance, then we ought to observe a negative coefficient on WB , after controlling for other factors influencing stock returns. The results reported in Panels C and D of Table 7 are generally consistent with the univariate results. Press firms exhibited lower returns in year +1 and year +2, while OSHA firms exhibited lower returns in year +2 and year +3. In general, we find that firms targeted by whistle-blowers suffered lower returns in subsequent years, which in turn suggests that whistle-blowing allegations were not frivolous and without merit, on average.

VI. DO WHISTLE-BLOWING TARGETS RESPOND BY CHANGING CORPORATE GOVERNANCE? (Q4)

In this section, we investigate our fourth research question (Q4): What actions (if any) do whistle-blowing targets take to improve corporate governance following the revelation of a whistle-blowing allegation? It is not clear whether firms will take meaningful actions to improve corporate governance following a whistle-blowing event. For example, a targeted firm can easily initiate cosmetic changes such as replacing one set of inside directors with another set of insiders. In extreme cases, a target firm might even fire the whistle-blower.

TABLE 7

Long-Term Consequences: Are Whistle-Blowing Allegations Associated with Poor Future Stock Return Performance? (Q3d)

Panel A: Future Returns—Press versus Propensity-Score Matched Sample

	Means			Medians		
	Press	Control	p-value ^a	Press	Control	p-value ^b
<i>ABNRET</i> _{<i>t</i>+1}	-0.118 (60)	-0.001 (101)	0.047**	-0.107 (60)	0.000 (101)	0.030**
<i>ABNRET</i> _{<i>t</i>+2}	-0.312 (54)	0.037 (89)	0.001***	-0.434 (54)	-0.106 (89)	0.001***
<i>ABNRET</i> _{<i>t</i>+3}	-0.261 (52)	0.177 (84)	0.019**	-0.292 (52)	-0.074 (84)	0.010***

Panel B: Future Returns—OSHA versus Propensity-Score Matched Sample

	Means			Medians		
	OSHA	Control	p-value ^a	OSHA	Control	p-value ^b
<i>ABNRET</i> _{<i>t</i>+1}	-0.068 (90)	-0.014 (167)	0.197	-0.112 (90)	-0.034 (167)	0.152
<i>ABNRET</i> _{<i>t</i>+2}	-0.123 (82)	-0.013 (150)	0.137	-0.249 (82)	-0.077 (150)	0.081*
<i>ABNRET</i> _{<i>t</i>+3}	-0.156 (77)	0.064 (136)	0.080*	-0.221 (77)	-0.078 (136)	0.276

Panel C: OLS Regressions—Press versus Propensity-Score Matched Sample

$$RET_{t+n} = \beta_0 + \beta_1 WB_t + \beta_2 MKT_{t+n} + \beta_3 SMB_{t+n} + \beta_4 HML_{t+n} + \beta_5 MOM_{t+n} + \varepsilon_{t+n}$$

Independent Variables	Pred. Sign	<i>RET</i> _{<i>t</i>+1}		<i>RET</i> _{<i>t</i>+2}		<i>RET</i> _{<i>t</i>+3}	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	?	0.725	0.076*	0.653	0.011**	0.699	0.001***
<i>WB</i>	-	-0.950	0.070*	-0.530	0.091*	-0.370	0.130

(continued on next page)

Panel C: OLS Regressions—Press versus Propensity-Score Matched Sample

$$RET_{t+n} = \beta_0 + \beta_1 WB_t + \beta_2 MKT_{t+n} + \beta_3 SMB_{t+n} + \beta_4 HML_{t+n} + \beta_5 MOM_{t+n} + \varepsilon_{t+n}$$

Independent Variables	Pred. Sign	RET_{t+1}		RET_{t+2}		RET_{t+3}	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
<i>MKT</i>	?	1.098	<0.001***	1.069	<0.001***	1.057	<0.001***
<i>SMB</i>	?	0.416	<0.001***	0.277	<0.001***	0.168	<0.001***
<i>HML</i>	?	0.501	<0.001***	0.568	<0.001***	0.550	<0.001***
<i>MOM</i>	?	-0.231	<0.001***	-0.241	<0.001***	-0.252	<0.001***
Adj. R ²		13.0%		14.1%		13.7%	
F-statistic		57.30	<0.001***	112.60	<0.001***	150.34	<0.001***
n		n _{PRESS} = 691 n _{CONTROL} = 1,189		n _{PRESS} = 1,286 n _{CONTROL} = 2,104		n _{PRESS} = 1,851 n _{CONTROL} = 2,863	

Panel D: OLS Regressions—OSHA versus Propensity-Score Matched Sample

$$RET_{t+n} = \beta_0 + \beta_1 WB_t + \beta_2 MKT_{t+n} + \beta_3 SMB_{t+n} + \beta_4 HML_{t+n} + \beta_5 MOM_{t+n} + \varepsilon_{t+n}$$

Independent Variables	Pred. Sign	RET_{t+1}		RET_{t+2}		RET_{t+3}	
		Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	?	0.281	0.327	0.362	0.034**	0.390	0.018**
<i>WB</i>	-	-0.314	0.242	-0.519	0.046**	-0.478	0.030**
<i>MKT</i>	?	1.225	<0.001***	1.151	<0.001***	1.175	<0.001***
<i>SMB</i>	?	0.269	0.002***	0.346	<0.001***	0.403	<0.001***
<i>HML</i>	?	0.470	<0.001***	0.387	<.001***	0.318	<0.001***
<i>MOM</i>	?	-0.074	0.201	-0.074	0.080*	-0.156	<0.001***
Adj. R ²		10.9%		11.1%		12.9%	
F-statistic		74.73	<0.001***	137.67	<0.001***	212.73	<0.001***
n		n _{OSHA} = 1,050 n _{CONTROL} = 1,967		n _{OSHA} = 1,939 n _{CONTROL} = 3,564		n _{OSHA} = 2,614 n _{CONTROL} = 4,546	

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

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Coefficients (t-statistics) are reported. p-values are one-sided for variables with directional predictions. We report $(1 - p)$ values for coefficients that assume a sign opposite to the one predicted.

^a p-values are associated with t-statistics.

^b p-values are associated with Wilcoxon Z-statistics.

Variables Definitions (where firm subscripts are suppressed):

$ABNRET_{i+n}$ = buy-and-hold abnormal returns (equally weighted) for the subsequent n years, beginning with the monthly return immediately following the event date;

RET_{i+n} = buy-and-hold raw returns for the subsequent n years, beginning with the monthly return immediately following the event date;

WB_i = 1 if the firm experienced a whistle-blowing event, 0 otherwise;

MKT_{i+n} = the Fama-French market factor for the subsequent n years, beginning with the month immediately following the event date;

SMB_{i+n} = the Fama-French size factor for the subsequent n years, beginning with the month immediately following the event date;

HML_{i+n} = the Fama-French book-to-market factor for the subsequent n years, beginning with the month immediately following the event date; and

MOM_{i+n} = the Fama-French momentum factor for the subsequent n years, beginning with the month immediately following the event date.

Changes in Governance Variables

We hand-collect governance data for the Press and OSHA whistle-blowing samples from their 10-Ks and proxy statements.¹⁸ To limit data collection to manageable levels, we focus on six aspects of governance, details of which have been discussed earlier in Section II: (1) the number of directors on the board (*DIRECTORS*); (2) the proportion of insiders on the board (*%INS_DIR*); (3) the proportion of the board composed of busy directors where busy is defined as three additional directorships (*%BUSY*); (4) the percentage attendance at board meetings (*%ATTEND*); (5) the proportion of firms where the CEO is also the chairman of the board (*CEO=COB%*), and (6) the proportion of firms with a new CEO (*NEW_CEO%*). We calculate three-year changes in these six governance variables from the year before the whistle-blowing event (year -1) to two years after the event occurs (year $+2$). Of the 81 (137) possible Press (OSHA) firms, we are unable to find 10-Ks and/or proxy statements for 24 (47) firms.

Since governance improvements were encouraged in the period following the accounting scandals and SOX, we also collect governance data for a sample of matched firms that were not subject to a whistle-blowing allegation. We select matched firms with the same four-digit SIC code, within the same stock exchange, and with net sales as close as possible to the whistle-blowing firm's net sales for the year before the whistle-blowing event.^{19,20}

Table 8 reports the multivariate analyses that compare each governance change between the Press sample and their matched-firms counterparts. Control variables include: size (*SALES*), past stock market performance (*RET*), and the change in firm size over the corresponding three-year period (Δ *SIZE*) to control for the possibility that changes in governance (e.g., smaller board size) were simply driven by changes in firm size. We find that, compared to the matched control sample, firms exposed to whistle-blowing allegations via the press were more likely to reduce the size of the board, reduce insider participation on the board, have less busy board members, and were more likely to replace the CEO.

In untabulated findings, we find no evidence that OSHA firms made changes in governance. Thus, on average, whistle-blowing targets exposed via the press appeared to change governance on four dimensions that exceeded the level of market-wide governance improvements occurring in the post-SOX era, while firms targeted by whistle-blowers via OSHA (a less public venue) did not. This suggests the visibility of the allegation played a role in firms' responses to whistle-blowing allegations.

VII. CONCLUSIONS

Whistle-blowing has received considerable attention in recent years after (1) whistle-blowers were responsible, in part, for revealing the accounting scandals at Enron and WorldCom, and (2) provisions in SOX were enacted to protect employee whistle-blowers. Still, little is known about the nature of firms that are subject to whistle-blowing and whether such allegations are economically significant events with meaningful consequences for the targeted firms. Unlike other research

¹⁸ Note that we hand-collect proxy data to assess subsequent governance changes, rather than use the IRRC data used in Section II, in order to maximize the number of useable observations in this analysis.

¹⁹ If we cannot find a match firm within the same four-digit SIC code, then we relax the matching criteria to include firms with the same three-digit SIC code, and if necessary, the same two-digit SIC code.

²⁰ We employ a matched control sample in this analysis to ensure that any observed governance changes are not the result of market-wide improvements in governance (rather than improvements specific to whistle-blowing targets). Our matching criteria are consistent with this concern. We do not match on propensity scores (as with our consequences analyses) because propensity matches are not necessarily aligned in calendar time, and because we want to examine whether whistle-blowing targets improved governance relative to a broad cross-section of firms. We acknowledge that comparing whistle-blowing firms to the average firm results in a somewhat lower benchmark than would comparing them to a propensity-score matched sample. However, we feel this is appropriate because our sample period already represents a period of improved governance, such that the average firm was likely making governance improvements.

TABLE 8
Do Whistle-Blowing Allegations Lead to Subsequent Changes in Corporate Governance?
(Q4)

Multivariate Analysis—Press Sample:

$$\Delta GOV_{t+2} = \beta_0 + \beta_1 WB_t + \beta_2 REV_{t-1} + \beta_3 RET_{t-1} + \beta_4 \Delta SIZE_{t+2} + \varepsilon_{t+2}$$

Dependent Variables ^a	Pred. Sign of WB	Independent Variables					Adj. R ²	n
		Intercept	WB	REV	RET	ΔSIZE		
ΔDIRECTORS	–	–0.14 (0.738)	–1.29 (0.025)**	0.00 (0.527)	0.59 (0.230)	–0.00 (0.756)	4.2%	70
Δ%INS_DIR	–	0.05 (0.003)***	–0.09 (<0.001)***	–0.00 (0.283)	0.03 (0.078)*	0.00 (0.829)	30.8%	70
Δ%BUSY	–	0.02 (0.565)	–0.07 (0.091)*	0.00 (0.925)	–0.04 (0.399)	–0.00 (0.807)	–2.4%	70
Δ%ATTEND	+	0.01 (0.368)	0.02 (0.111)	–0.00 (0.889)	0.01 (0.122)	0.00 (0.878)	–1.0%	66
Δ%CEO=COB% ^b	–	NA	0.01 (0.506)	0.00 (0.831)	0.16 (0.745)	–0.00 (0.820)	0.2%	72
ΔNEW_CEO% ^c	+	–1.19 (0.005)***	1.34 (0.013)**	0.00 (0.154)	0.80 (0.100)	–0.00 (0.121)	17.0%	68

*, **, *** Significant at 10 percent, 5 percent, and 1 percent levels, respectively.

p-values are reported in parentheses. p-values are one-sided for variables with directional predictions. We report (1 – p) values for coefficients that assume a sign opposite to the one predicted.

^a We compare the value of each governance variable in year –1 (pre-allegation) to its value in year +2 (post-allegation).

^b We report the results of an ordinal logistic regression, including the pseudo-R².

^c We report the results of a logistic regression, including the pseudo-R².

Definition of variables (where firm subscripts are suppressed):

ΔDIRECTORS_{t+2} = number of directors in year +2 minus the number of directors in year –1;

Δ%INS_DIR_{t+2} = percent of inside directors in year +2 minus the percent of inside directors in year –1;

Δ%BUSY_{t+2} = percent of “busy” directors in year +2 minus the percent of busy directors in year –1;

Δ%ATTEND_{t+2} = percent board meeting attendance in year +2 minus the percent board meeting attendance in year –1;

ΔCEO = COB%_{t+2} = an ordinal variable coded as 1 if the CEO was not the COB in year +2 but was in year –1, coded as –1 if the CEO was the COB in year +2 but was not in year –1, and coded as 0 otherwise;

ΔNEW_CEO%_{t+2} = an indicator variable coded as 1 if the firm replaced its CEO in year 0, year +1, or year +2, and 0 otherwise;

WB_t = 1 if the firm experienced a whistle-blowing event, 0 otherwise;

REV_{t-1} = total sales revenue (Compustat annual #12) for the year before the whistle-blowing event;

RET_{t-1} = market-adjusted buy-and-hold returns for 12 months, beginning with month –12 and ending with month –1, where month 0 is the event month; and

ΔSIZE_{t+2} = total assets in year +2 minus total assets in year –1.

to date, our focus is on (1) characteristics of firms targeted by employee whistle-blowers, (2) the economic consequences of such whistle-blowing revelations, and (3) firm responses to such allegations via subsequent governance changes.

Specifically, we report new empirical evidence on 218 employee whistle-blowing events between 1989 and 2004. Our paper adds to the literature on corporate governance in four ways. First, we conduct a cross-sectional analysis of the characteristics of firms subject to whistle-

blowing. Our evidence is broadly consistent with whistle-blowers targeting firms that were large, growing, successful, and highly regarded. Whistle-blowing tended to be more prevalent in firms that had downsized and in firms with worse governance. Finally, and not surprisingly, when the potential benefits to the whistle-blower increased (via the potential to share in any fraud-related settlement), employees were more likely to make public allegations of wrongdoing.

Second, we present evidence that, on average, whistle-blowing allegations had an immediate negative economic consequence for target firms. The average market-adjusted return in the five days around the day the allegation became public was -2.8 percent. Further, the stock market reaction was substantially more negative when the whistle-blower alleged earnings management (-7.3 percent).

Third, we find that whistle-blowing targets had more earnings restatements (Press sample), more shareholder lawsuits (Press sample), and relatively poor operating and stock return performance (press and OSHA samples) compared to a sample of propensity-score matched firms with similar characteristics. Whistle-blower allegations appear to be an early indicator of future negative economic consequences for targeted firms.

Fourth, we find that, on average, whistle-blowing targets exposed in the press improved several dimensions of governance relative to the year before the whistle-blowing event and relative to a matched sample of control firms. Interestingly, these governance improvements were not apparent for firms subject to whistle-blowing allegations that were not widely disseminated (OSHA sample). In sum, whistle-blowing is far from a trivial nuisance for firms targeted by allegations of corporate misconduct.

Our research represents early work on the role of financial whistle-blowing and provides indirect evidence on the effectiveness of Sarbanes-Oxley (SOX) Section 806 as a mechanism to expose agency problems at firms. We find that public whistle-blowing events are relatively infrequent, and a majority of the whistle-blowing allegations we identify are not directly related to the types of fraudulent behavior that precipitated the SOX legislation. Future research could examine (1) the impact of the whistle-blowing provisions in SOX on the incidence and types of whistle-blowing allegations and (2) whether investors, regulators, and other stakeholders benefit from (or overreact to) whistle-blowing allegations. Additionally, future research could examine how OSHA is performing in its role of adjudicating SOX-related whistle-blowing complaints. Finally, if one could obtain the data, an examination of the frequency, importance, and consequences of internal whistle-blowing would be a valuable contribution to the literature.

APPENDIX VARIABLE DEFINITIONS

Capital Market Pressure

FIN_NEED = an indicator variable coded as 1 if the firm's free cash flow in the year prior to the whistle-blowing event is less than -0.1 , and 0 otherwise. Similar to Dechow et al. (1996), we calculate free cash flow as cash flow less the average capital expenditure (Compustat annual #128) over the last three years, deflated by average total assets.

M&A = an indicator variable coded as 1 if the firm was involved in a merger or acquisition (Compustat AFTN #1) in year t or in any one of the three years prior to the whistle-blowing event, and 0 otherwise.

ABSDACC = the absolute value of discretionary accruals based on the modified Jones (1991) model for the fiscal year before the whistle-blowing event. Discretionary accruals are calculated as the fitted values from the following

Regression (2): $TOTACC = \beta_0 + \beta_1 \Delta REV + \beta_2 PPE + \beta_3 CFO + \beta_4 ROA$ + error. This regression is estimated each year for every two-digit SIC code conditional on having at least 10 firms in an industry. Note that $TOTACC$ = total accruals, defined as income before extraordinary items minus cash flow from operations plus extraordinary items (CompUSA annual #18–Compustat annual #308 + Compustat annual #124), ΔREV = the change in revenue (Compustat annual #12), PPE = plant, property, and equipment (Compustat annual #7), CFO = cash from operations (Compustat annual #308), ROA = return on assets (Compustat #18). We scale each variable in Regression (2) by total assets (Compustat annual #6) at the beginning of the period.

$CM_PRESSURE$ = the average scaled rank of the following variables: FIN_NEED , $M\&A$, and $ABSDACC$. Each variable is coded such that higher values are consistent with greater capital market pressure. This measure of capital market pressure is averaged over the number of variables with non-missing data.

Growth

$GROWTH$ = the scaled rank of sales growth, defined as the average growth in sales (Compustat annual #12) over the three years prior to the whistle-blowing event.

Past Performance

$PAST_PERF$ = the scaled rank of market-adjusted buy-and-hold returns for 12 months, beginning from month -12 and ending month -1 , where month 0 is the month the whistle-blowing was reported in the press or to OSHA.

Reputation

$REPUTATION$ = an indicator variable coded as 1 if the firm has appeared on *Fortune's* “Best Companies to Work For” list or on *Fortune's* “Most Admired Companies” list in any of the five years prior to the whistle-blowing event, and coded as 0 otherwise.

Unclear Communication Channels

AGE = the number of years the firm has been listed on CRSP as of the year of the whistle-blowing event.

IND_CONC = the Herfindahl-Hirschman index based on the revenue for each of the firm's industry segments, calculated as the sum of squares of each industry segment's revenue as a percentage of total firm revenue. This variable is calculated for the year prior to the whistle-blowing event. See [Bushman et al. \(2004\)](#).

GEO_CONC = the Herfindahl-Hirschman index based on the revenue for each of the firm's geographic segments, calculated as the sum of squares of each

geographic segment's revenue as a percentage of total firm revenue. This variable is calculated for the year prior to the whistle-blowing event. See [Bushman et al. \(2004\)](#).

COMMUNICATION = the average scaled rank of the following variables: *AGE*, *IND_CONC*, and *GEO_CONC*. We reverse the sign of the rank of *AGE* such that lower values are consistent with worse internal communication channels. This measure of unclear communication channels is averaged over the number of variables with non-missing data.

Employee Downsizing

DOWNSIZE = the scaled rank of employee growth, defined as the average growth in the total employees (Compustat annual #29) over the three years prior to the whistle-blowing event.

Qui Tam

QUITAM = an indicator variable coded as 1 if the firm (1) is in the healthcare industry (2-digit SIC code = 80), or (2) appeared on the "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards" list in any of the three years prior to the whistle-blowing event, and 0 otherwise.

Firm Size

SIZE = the scaled rank of total sales revenue (Compustat annual #12) for the year before the whistle-blowing event.

Internal Control Weaknesses

ICW = the scaled rank of the fitted value from the following model, as estimated by [Doyle et al. \(2007\)](#): $ICW = \beta_2 + \beta_2 MARKETCAP + \beta_2 FIRM_AGE + \beta_2 LOSSES + \beta_2 SEGMENTS + \beta_2 FOREIGN_TRANS + \beta_2 EXTREME_SG + \beta_2 RESTRUCTURE$ + error, where *MARKETCAP* = the log of the firm's market capitalization, *FIRM_AGE* = the log of the number of years the firm has CRSP data, *LOSSES* = an indicator variable equal to 1 if earnings before extraordinary items in the two most recent years sum to less than zero, and 0 otherwise, *SEGMENTS* = the log of the number of operating and geographic segments reported by the Compustat Segments database, *FOREIGN_TRANS* = an indicator variable equal to 1 if the firm has nonzero foreign translation, and 0 otherwise, *EXTREME_SG* = an indicator variable equal to 1 if year-over-year industry-adjusted sales growth falls into the top quintile, and 0 otherwise, and *RESTRUCTURE* = the aggregate restructuring charge in the two most recent years, scaled by the firm's market capitalization. *ICW* is measured as of the year immediately before the whistle-blowing event. We use coefficient values as reported in [Doyle et al. \(2007\)](#). Because of limited data availability, we set *SEGMENTS* equal to 0 if the necessary data is not available.

External Monitoring

BLOCK = percentage 5 percent block-holder ownership of the firm in the year prior to the whistle-blowing event obtained from Compact Disclosure.

PP = percentage pension ownership of the firm in the year prior to the whistle-blowing event obtained from [Cremers et al. \(2005\)](#).

EXT_MONITOR = the average scaled rank of the following variables: *BLOCK* and *PP*. Each variable is coded such that lower values are consistent with worse external monitoring. This measure of external governance is averaged over the number of variables with non-missing data.

Governance

EXECCOMP = the value of the CEO's in-the-money exercisable stock options, scaled by the CEO's wealth. CEO wealth is defined as the sum of the CEO's salary, bonus, the value of stock ownership, and the value of all in-the-money options. This variable is measured for the year prior to the whistle-blowing event.

DIRECTORS = the number of directors on the firm's board of directors in the year before the whistle-blowing event.

INSIDER_PCT = the percentage of directors who are insiders in the year before the whistle-blowing event.

CEO=COB = an indicator variable coded as 1 if the firm's CEO is also the chairman of the board (COB) in the year before the whistle-blowing event, and 0 otherwise.

BUSY_PCT = the percentage of directors who are "busy" in the year before the whistle-blowing event, where "busy" is defined as serving on at least three other corporate boards.

ATTEND = the percentage of board members who attended at least 75 percent of the board committee meetings in the year before the whistle-blowing event.

NEW_CEO = an indicator variable coded as 1 if the firm has a new CEO in the year before the whistle-blowing event, and 0 otherwise.

GOVERNANCE = the average scaled rank of the following variables: *EXECCOMP*, *DIRECTORS*, *INSIDER_PCT*, *ATTEND*, *CEO=COB*, *BUSY_PCT*, and *NEW_CEO*. Each variable is coded such that lower values are consistent with worse internal monitoring. This measure of internal governance is averaged over the number of variables with non-missing data.

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