

## Whistleblowers and Outcomes of Financial Misrepresentation Enforcement Actions

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### ABSTRACT

Whistleblowers are ostensibly a valuable resource to regulators investigating securities violations, but whether there is a link between whistleblower involvement and the outcomes of enforcement actions is unclear. Using a data set of employee whistleblowing allegations obtained from the U.S. government and the universe of enforcement actions for financial misrepresentation, we find that whistleblower involvement is associated with higher monetary penalties for targeted firms and employees and with longer prison sentences for culpable executives. We also find that regulators more quickly begin enforcement proceedings when whistleblowers are involved. Our

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findings suggest that whistleblowers are a valuable source of information for regulators who investigate and prosecute financial misrepresentation.

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## *1. Introduction*

Policy makers have implemented ambitious whistleblower programs to motivate individuals to come forward and reveal information about potential securities violations or financial misconduct. However, our understanding of the role whistleblowers play in the enforcement process is limited. We investigate the association between employee whistleblowers and the outcomes of financial misrepresentation enforcement actions by the Securities and Exchange Commission (SEC) and Department of Justice (DOJ). Our intent is not to examine the efficacy of any particular whistleblowing program; instead, our objective is to provide empirical evidence on the links between whistleblowers and (i) penalties, (ii) prison sentences, and (iii) the duration of regulatory enforcement actions for financial misrepresentation.

Examining the role of whistleblowers in securities enforcement is important because policy makers continue to enact legislation attempting to encourage whistleblower involvement and because regulators dedicate significant resources to promoting and rewarding whistleblowing activity (SEC [2014]). For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act) requires the SEC and the Commodity Futures Trading Commission (CFTC) to establish whistleblower offices that provide a formal venue through which whistleblowers can voice complaints and share evidence with regulators. Rewards for whistleblowers who come forward with original information about corporate misconduct can be large, ranging from 10% to 30% of monetary sanctions over \$1 million stemming from investigations facilitated by whistleblowers' information, documentation, or cooperation (CFTC [2013], SEC [2013b]).

Despite this heightened emphasis on whistleblower programs, prior research offers little insight into whether whistleblowers are associated with meaningful differences in enforcement outcomes. If whistleblowers provide incriminating information or details, similar to the role a witness plays in a criminal investigation (Decker [1995]), their involvement in the enforcement process should be associated with heightened enforcement outcomes.

However, prior research notes that whistleblower complaints can be frivolous in some settings (e.g., Near and Miceli [1996], Bowen, Call, and Rajgopal [2010]), and even credible whistleblowers can slip through

the cracks.<sup>1</sup> Further, regulators have historically conferred relatively few whistleblower awards, raising questions about the usefulness of whistleblowers in enforcement efforts.<sup>2</sup> Given that regulators have the power to subpoena documents and interview employees with or without a whistleblower, it is unclear whether whistleblower involvement is associated with more severe enforcement outcomes.

Using the universe of SEC and DOJ enforcement actions for financial misrepresentation since the passage of the Sarbanes-Oxley Act of 2002 (hereafter, SOX) (Karpoff, Lee, and Martin [2008a,b], Karpoff et al. [2017]), we investigate whether whistleblower involvement is associated with more severe enforcement outcomes. Specifically, we examine the associations between whistleblower involvement and: (i) monetary penalties against targeted firms; (ii) monetary penalties against culpable executives; and (iii) the length of prison sentences imposed against employee respondents.<sup>3</sup> We also investigate the association between whistleblower involvement and penalties assessed against third-party respondents (e.g., the firm's auditor, bankers, suppliers), as well as the duration of the discovery and regulatory proceedings periods. Notably, we examine the role of whistleblowers conditional on the existence of a regulatory enforcement action. This distinction is important because our tests exploit variation in consequences to SEC and DOJ enforcement with and without whistleblower involvement; we do not examine whistleblower allegations for which there are no corresponding regulatory enforcement actions.

To identify whistleblower involvement in enforcement actions, we use two distinct data sources. First, we begin with a data set of employee whistleblowing allegations we obtained from the U.S. government using a Freedom of Information Act (FOIA) request (Bowen, Call, and Rajgopal [2010]), Wilde [2017]). The Sarbanes-Oxley Act of 2002 tasked the Occupational Safety and Health Administration (OSHA) with fielding employee complaints of discrimination for blowing the whistle on alleged financial misconduct. OSHA is required to communicate these allegations to the SEC (OSHA [2012]), after which the SEC can choose to investigate the underlying allegations or refer the allegations to the DOJ. We obtain 934 allegations of financial misconduct in complaints filed with OSHA from 2002 to 2010.

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<sup>1</sup> A whistleblower in the Bernie Madoff Ponzi scheme made multiple attempts over a nine-year period to alert the SEC concerning the fraud. He stated, "In May 2000, I turned over everything I knew to the SEC. Five times I reported my concerns, and no one would listen until it was far too late." (Markopolos [2010], p. 3).

<sup>2</sup> The U.S. federal government has offered financial rewards to whistleblowers since 1863. Between the creation of the SEC Whistleblower Office in 2011 and the SEC's report to Congress on the Dodd-Frank Whistleblower Program in 2016, only 34 whistleblowers received bounties under the program (SEC [2016a]). Many, including the Government Accountability Office, have criticized agencies for being slow and inefficient in addressing whistleblower concerns related to the OSHA whistleblower program (Scott [2010]).

<sup>3</sup> The respondent is the party (either a firm or an individual) targeted by the SEC/DOJ.

Because we cannot directly observe whether regulators actually used the information from each OSHA whistleblower, these whistleblower allegations reflect only potential whistleblower involvement in an enforcement action.

To supplement the OSHA whistleblower data, we search enforcement-related documents from the legal proceedings for information identifying enforcement actions that resulted from a *qui tam* lawsuit or containing direct evidence of whistleblower involvement.<sup>4</sup> When a whistleblower's involvement is specifically referenced in the administrative and legal proceedings associated with financial misrepresentation, we identify this enforcement action as having whistleblower involvement.

Of the 658 enforcement actions since the passage of SOX, 148 (22%) are associated with at least one whistleblower complaint made after the beginning of the violation period and before the end of the regulatory proceedings period. Using guidelines published by the SEC and DOJ (SEC [2006], USSC [2013]), we identify a broad set of controls for other factors related to the magnitude of penalties and sanctions. Specifically, when examining the association between whistleblower involvement and outcomes of enforcement actions, we control for the breadth, depth, scope, and egregiousness of the violation. We employ proxies such as abnormal stock returns on the date the financial misrepresentation became public, the length of the violation period, the number and type of violations involved, the number of C-level executive respondents named in the enforcement action, and indicator variables based on whether the firm was involved in foreign bribery, whether the firm misled the auditor, and whether the firm was credited with cooperating with regulators when penalties were determined. We also control for firm characteristics, such as size, growth, capital structure, and governance mechanisms that are potentially associated with both the existence of a whistleblower and with enforcement outcomes.

After controlling for various factors that affect the amount of penalties assessed in an enforcement action, we find that whistleblower involvement is associated with larger monetary penalties for the targeted firms and longer prison sentences for targeted employees. Whistleblower involvement in the enforcement process is associated with an 8.58% increased likelihood that the SEC imposes monetary sanctions on the firm, and a 6.64% increased likelihood of criminal sanctions against the targeted employees. We also find some evidence that whistleblower involvement is associated with larger monetary penalties against targeted employees; however, this result is less robust across alternative design choices. In addition, we also find that whistleblower involvement is positively associated with monetary penalties imposed on third-party defendants, such as the company's auditor. Collectively, these findings suggest that whistleblowers are a valuable source

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<sup>4</sup>A *qui tam* lawsuit is a civil lawsuit whistleblowers bring under the False Claims Act to help the government stop fraud related to goods and services provided to the federal government.

of information for regulators in investigating and prosecuting financial misrepresentation.

A common misconception about whistleblowers is that their primary role is to help discover and expose misconduct. However, whistleblower statutes suggest the benefits of whistleblower involvement often arise *after* a regulator has already begun an investigation (SEC [2016b]). Therefore, we also investigate the association between whistleblowing and outcomes of enforcement actions conditional on the timing of the whistleblower's complaint. We find that both whistleblowers who allege misconduct before the end of the violation period and/or before regulators begin their investigation (i.e., "tipster" whistleblowers) and whistleblowers who emerge after the SEC has already begun an investigation of the firm (i.e., "nontipster" whistleblowers) are associated with heightened enforcement outcomes.

We also examine whether whistleblower involvement is associated with the time it takes regulators to begin regulatory enforcement (the "discovery" period) and with the duration of enforcement actions. If information from whistleblowers provides a "road map" that facilitates the SEC's or DOJ's case, their involvement could expedite the discovery and resolution of enforcement actions. Alternatively, because whistleblowers provide regulators with additional information to investigate, their involvement could also prolong the enforcement process. After controlling for factors associated with the outcomes of investigation and enforcement, we find that the discovery period is shorter when whistleblowers are involved (particularly tipster whistleblowers); but we find no significant difference in the length of the regulatory proceedings when whistleblowers are involved.

We note that whistleblowers may be more likely to voice allegations when violations are severe and likely to result in larger penalties. We approach this potential endogeneity in a variety of ways. First, we control for a series of factors the SEC and DOJ indicate are relevant to the penalties assessed to targeted firms. Second, following Larcker and Rusticus [2010], we estimate the Impact Threshold for a Confounding Variable, which estimates the sensitivity of our results to a potentially confounding correlated omitted variable. We find that the endogeneity would have to be severe (more influential than every control variable except for firm size) in order for the associations we document to be statistically insignificant. Third, consistent with the recommendations of Oster [2016], we assess unobservable selection and coefficient stability to assess the sensitivity of the results to unobservable heterogeneity. The results from these tests mitigate concerns that the associations we observe between whistleblowing and outcomes of enforcement actions are attributable to unobserved variables that give rise to both whistleblower allegations and severe enforcement outcomes.

This study makes important contributions to the literature and to ongoing policy discussions about whistleblowing. As policy makers and

regulators continue to promote whistleblower programs, we empirically document an association between whistleblowers and the outcomes of financial misrepresentation enforcement actions. Prior research identifies whistleblowers as a mechanism for uncovering financial misconduct (Dyck, Morse, and Zingales [2010]) and examines potential determinants of whistleblowing (Bowen, Call, and Rajgopal [2010], Call, Kedia, and Rajgopal [2016]) as well as stock market and governance reactions to whistleblower allegations (Bowen, Call, and Rajgopal [2010]). Wilde [2017] investigates whistleblowing as a deterrent to subsequent financial misreporting and tax aggressiveness. We are the first, however, to investigate the association between whistleblowers and regulatory enforcement outcomes, and we provide additional evidence on the determinants of enforcement outcomes (Karpoff, Lee, and Martin [2008a, b]). Further, although prior research emphasizes the role of external monitors on financial reporting activities (Becker et al. [1998], Xie, Davidson, and Dadalt [2003], Yu [2008], Karpoff and Lou [2010]), our evidence complements recent work that suggests employee whistleblowers play an integral role in monitoring firm behavior (Dyck, Morse, and Zingales [2010]). Our findings are important to legislators considering the efficacy of current whistleblower policies and the determination of budgets for whistleblower programs, to regulators who design enforcement programs, to SEC and DOJ prosecutors evaluating the merits of using information from whistleblowers in their investigations, and to firms in assessing the consequences of potential enforcement actions.

## 2. *Background and Related Research*

### 2.1 HISTORY OF EMPLOYEE WHISTLEBLOWER PROGRAMS

The U.S. government has a long history of sponsoring whistleblowing programs. In 1863, Congress passed the False Claims Act, which allows individuals who are not affiliated with the government to initiate actions against federal contractors who defraud the government. These *qui tam* lawsuits, if successful, allow whistleblowers to receive between 10% and 30% of any award or settlement amount. In 1988, Congress passed the Insider Trading and Securities Fraud Enforcement Act authorizing the SEC to award a bounty of up to 10% of settled amounts to persons who provide information that leads to a civil penalty in insider trading litigation. The program was not particularly successful, as the SEC awarded less than \$1.2 million in total bounty payments to six claimants under the program (SEC [2010]).

Three recent Congressional acts, the Sarbanes-Oxley Act of 2002, the Tax Relief and Health Care Act of 2006 (TRHCA), and the Dodd-Frank Act, have significantly reshaped the whistleblowing environment and suggest an increasing regulatory emphasis on whistleblowing activities. Section 806 of the Sarbanes-Oxley Act prohibits retaliation against employees of publicly traded companies or employees of nationally recognized statistical rating

organizations who reveal “questionable accounting or auditing matters,” outlines specific protection for whistleblowers (Title 18 U.S.C., §1514A and 29 CFR 1980), and delegates to OSHA the responsibility to handle cases of discrimination against employee whistleblowers.

The TRHCA provides significant monetary incentives to prospective whistleblowers, calling for mandatory bounties of up to 30% of the total proceeds the Internal Revenue Service (IRS) collects from delinquent taxpayers, as long as the whistleblower identifies amounts exceeding \$2 million. It also requires the IRS to establish a Whistleblower Office and permits whistleblowers to take their awards to the Tax Court on appeal (IRS [2012]).

The Dodd-Frank Act provides additional protections for employee whistleblowers and stipulates significant monetary incentives to prospective whistleblowers who reveal financial improprieties. These incentives range from 10% to 30% of the monetary sanctions collected via criminal or civil proceedings, as long as monetary sanctions exceed \$1 million. Section 922 of the Dodd-Frank Act established the SEC Investor Protection Fund (Fund) to provide, among other things, funding for the Commission’s whistleblower award program, including the payment of awards in related enforcement actions. As of the beginning (ending) of the fiscal year 2016, the Fund had a balance of \$400.7 (\$368.1) million (SEC [2016a]). Since the passage of the whistleblower provisions of the Dodd-Frank Act, 34 whistleblowers have received bounties stemming from their involvement in SEC investigations (SEC [2016a]). Although our purpose is not to examine the efficacy of any specific whistleblower program, our analysis of the impact of whistleblowers on financial misrepresentation enforcement actions is relevant to the literature and to policy discussions about the merits of promoting and rewarding whistleblowing activity.

## 2.2 RESEARCH ON WHISTLEBLOWING

Whistleblowers have received significant regulator and media attention in recent years, and archival research on whistleblowing in finance and accounting is expanding. Dyck, Morse, and Zingales [2010] examine the effectiveness of various firm monitors in uncovering financial wrongdoing. In their sample of shareholder lawsuits related to accounting improprieties from 1996 to 2004, they find that employee whistleblowers uncover more cases of financial misconduct than any outside monitor.

Bowen, Call, and Rajgopal [2010] investigate the characteristics of firms subject to employee whistleblowing allegations and the economic consequences of such allegations. Consistent with employee whistleblowing allegations uncovering agency issues, they find that firms that are the subject of media reports of whistleblowing allegations are associated with negative stock market reactions and an increased likelihood of experiencing shareholder lawsuits and accounting restatements. They also find that these

firms exhibit relatively weaker future performance and are more likely to make subsequent governance changes. Call, Kedia, and Rajgopal [2016] provide evidence that firms grant relatively more stock options to rank-and-file employees (i.e., would-be whistleblowers) during periods of misreporting, and that the likelihood of avoiding whistleblowing allegations is increasing in rank-and-file stock options grants.

Miller [2006] investigates the role of the press as a “watchdog” of firm behavior, and finds that, while the business press helps uncover financial wrongdoing, the nonbusiness press typically reports on financial misdeeds uncovered by other monitors. Finally, Wilde [2017] finds that firms subject to whistleblowing allegations are more likely than a set of control firms to exhibit decreases in financial misreporting and tax aggressiveness.

### 2.3 WHISTLEBLOWING INFORMATION AND REGULATORY ENFORCEMENT

Although external stakeholders such as auditors, analysts, and investors closely monitor firm behavior, prior research highlights the increasing complexity of corporations (Zingales [2004]) and suggests that external stakeholders often fail to identify financial misconduct with publicly available information (e.g., Hobson, Mayew, and Venkatachalam [2012], PCAOB [2007]). In contrast, employees have superior access to inside information, and management is unlikely to be able to perpetrate financial misconduct without at least some employees becoming aware (Dyck, Morse, and Zingales [2010]). Although employee whistleblowers have no authority to enforce appropriate reporting behavior, they can serve as effective monitors if they reveal inside information about misconduct that is useful to external parties such as regulators or auditors. The SEC promotes its whistleblower program as one of “the most powerful weapons in [its] . . . enforcement arsenal,” and argues that it helps “identify possible fraud and other violations much earlier than might otherwise have been possible” (SEC [2013a]). The SEC states that “even if a whistleblower’s tip does not cause an investigation to be opened, it may still help lead to a successful enforcement action if the whistleblower provides additional information that substantially contributes to an ongoing or active investigation” (SEC [2013a]).

However, even without the aid of a whistleblower, regulators have the authority to subpoena company documents and interview employees. Thus, even if a whistleblower provides important information that would help regulators detect or prosecute financial misconduct, it is not clear that such information would result in more severe enforcement outcomes than would have occurred otherwise.

## 3. *Sample Description*

### 3.1 FINANCIAL MISREPRESENTATION ENFORCEMENT DATA

Our financial misrepresentation enforcement data is based on the database developed in Karpoff, Lee, and Martin [2008a, b] and further



explained in Karpoff et al. [2017]. It consists of the universe of 1,133 enforcement actions by the SEC and DOJ from 1978 through 2012 that include violations of the accounting provisions enacted under the 1977 Foreign Corrupt Practices Act (FCPA).<sup>5</sup> All of the enforcement actions include charges of financial misrepresentation under one of three sections of the Securities Exchange Act of 1934 as amended by the FCPA: 15 USC §§ 78.m(b) and two rules under the Code of Federal Regulations 17 CFR 240.13b2-1 and 13b2-2. In combination, these regulations require every issuer of a security under Section 12 of the Exchange Act to (1) make and keep books, records, and accounts that accurately reflect the transactions of the issuer, and (2) devise and maintain a system of internal accounting controls. The regulations also mandate that no person shall knowingly circumvent a system of internal accounting controls; knowingly falsify any book, record, or account required under these regulations; or directly or indirectly make a materially false or misleading statement to an accountant. The database contains all federal enforcement actions for books and records and internal controls violations and is constructed from information gathered in various regulatory and legal filings, administrative actions by the SEC, civil complaints filed by the SEC and DOJ, criminal indictments from the DOJ and state Attorney General offices, district court documents, and corporate filings in EDGAR.

The term “enforcement action” refers to information surrounding the entire series of events related to the firm whose financial statements are misrepresented and result in a regulatory enforcement action. Each enforcement action begins with a defined period over which the violation occurred (violation period) and culminates with one or more enforcement proceedings by regulators (regulatory proceedings period). Between these periods, the firm may publicly announce any number of events related to the enforcement action, including that the firm has become aware of the potential misconduct; initiated an internal investigation; restated one or more financial statements; received an informal inquiry or a formal order of investigation from the SEC; is the subject of a warrant, subpoena, or raid by the FBI/DOJ; is named in private class or derivative actions; or has received a Wells Notice.

Importantly, regulators do not provide information on the targets of their investigations, nor do they confirm the existence of any inquiry or investigation. The only indication of regulator involvement prior to the regulatory proceedings is a voluntary public announcement from the firm or related agents targeted in the inquiry/investigation. As a result, we are unable to determine precisely when inquiries or investigations begin, and because investigations often continue after the first regulatory proceeding is filed, we are also unable to conclusively establish when each investigation is completed. Nevertheless, the mean (median) duration of enforcement

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<sup>5</sup> Our primary analyses focus on the 658 enforcement actions in the post-SOX period.

actions in the post-SOX period, from the beginning of the violation period to the date of the last known regulatory proceeding, is 103.2 (96.4) months, or eight (nine) years. The violation period occurs over 41.2 (33.0) months and the regulatory proceedings occur over 31.5 (19.7) months.<sup>6</sup>

### 3.2 WHISTLEBLOWING DATA

Our whistleblowing data come from two sources. First, we obtained whistleblowing allegations submitted to OSHA through an FOIA request to OSHA's national office in Washington D.C. We requested information about the date the employee filed the complaint with OSHA and the name of the firm in question for every whistleblowing allegation ever filed with OSHA. Because OSHA handles other types of employee complaints (e.g., workplace safety), we specifically requested information *only* about whistleblowing allegations that fall under section 806 of the Sarbanes-Oxley Act. These cases represent employee complaints of workplace discrimination at publicly traded companies for having blown the whistle on alleged financial misconduct. In total, we received data on 934 unique whistleblowing complaints (relating to 619 firms) filed from October 2002 through December 2010.<sup>7</sup> These allegations represent all whistleblowing allegations filed with OSHA except for any cases exempted or excluded (<http://www.foia.gov/faq.html>).<sup>8</sup>

We supplement the OSHA whistleblower data by searching enforcement-related documents from the legal proceedings for information revealing related that it resulted from a *qui tam* lawsuit where the government intervened on behalf of the *qui tam* relator (whistleblower) or direct evidence that a whistleblower provided information pertinent to the case.<sup>9</sup> Enforcement actions involving a whistleblower may not specifically reference the whistleblower's involvement in the enforcement documents, either to protect the whistleblower's identity or because the information provided by the

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<sup>6</sup> The violation and regulatory periods are sometimes overlapping, with some violation periods extending past the start of the regulatory period. The regulatory proceedings include a mixture of administrative, civil injunctive, and criminal proceedings that implicate a variety of respondents responsible for the violation and may include the firm itself, its subsidiaries or parent, agent firms, employees, and/or individuals not directly employed by the firm.

<sup>7</sup> Each of OSHA's 10 regional offices sent us all data corresponding to that particular region, and depending on the region, the date of the last whistleblowing complaint ranges from June 2009 to December 2010.

<sup>8</sup> As a matter of policy, OSHA does not release whistleblower information related to ongoing cases. As a result, whistleblowing cases that were ongoing as of the time we filed the FOIA request are not included in our sample.

<sup>9</sup> For example, on July 25, 2006, the SEC announced an enforcement action involving Endocare, Inc. The complaint filed with the U.S. District Court for the Central District of California specifically states that the "acting controller (the 'whistleblower') raised serious questions about Endocare's accounting practices" and further explains that "Endocare announced in a Form 8-K and press release the termination of the whistleblower for conduct 'materially injurious to the company'" (<http://www.sec.gov/litigation/complaints/2006/comp19772.pdf>).

whistleblower was not deemed pertinent to the legal proceedings. We identified 13 *qui tam* related enforcement actions and 25 additional enforcement actions with direct whistleblower evidence not included in the OSHA data.<sup>10</sup> Because most of the whistleblowing allegations in our sample take place in the post-SOX period (after OSHA began fielding whistleblower complaints), we focus on the 658 enforcement actions that start and/or conclude after the enactment of the Sarbanes Oxley Act.<sup>11</sup> In an online appendix, we provide results based on the full universe of enforcement actions dating back to 1978.

### 3.3 LINKING ENFORCEMENT DATA WITH OSHA WHISTLEBLOWING DATA

We consider an enforcement action from the financial misrepresentation database to have potential whistleblower involvement if an employee filed an allegation with OSHA on any date between the start of the violation period and the last regulatory proceeding associated with the enforcement action. This process potentially oversamples the whistleblower-related enforcement actions because it could link a whistleblower complaint with an enforcement action when, in fact, the whistleblower complaint was not associated with the enforcement action or regulators decided the complaint was of no use in an existing enforcement action. Thus, our tests amount to a joint test of whether whistleblowers were in fact involved in the investigation and whether they are associated with enforcement outcomes.

A total of 110 enforcement actions are associated with these OSHA whistleblowing allegations. On average, whistleblowers file these allegations less than a year after the end of the violation period. Combined with the 13 *qui tam* whistleblowing cases and the 25 additional enforcement actions with direct evidence of whistleblower involvement, a total of 148 enforcement actions are associated with whistleblower involvement. These 148 enforcement actions represent 22.5% of the 658 enforcement actions in our sample.

### 3.4 THE ASSOCIATION BETWEEN WHISTLEBLOWERS AND ENFORCEMENT OUTCOMES

We examine the association between whistleblowers and various enforcement outcomes using the following regression:

$$Y = \alpha + \beta WB + \gamma Controls + \varepsilon, \quad (1)$$

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<sup>10</sup> There are several reasons why a whistleblower identified in the administrative or legal proceedings may not be identified by OSHA: (1) some of the enforcement actions pre-date OSHA's responsibility for handling whistleblower complaints, (2) OSHA redacted actions that are part of an ongoing investigation, (3) OSHA receives only cases of whistleblowers who allege retaliation or discrimination from their employers for blowing the whistle, and (4) some whistleblowers may have contacted the SEC or DOJ directly.

<sup>11</sup> Specifically, we use all enforcement actions where the violation period and/or regulatory proceedings begin after or extend past the enactment of the Sarbanes Oxley Act.

where  $Y$  is one of several outcomes of an enforcement action that we examine, including firm penalties, employee penalties, length of prison sentences for guilty employees, and the duration of an enforcement action.  $WB$  is a dichotomous variable equal to one if a whistleblower was associated with the enforcement action and equal to zero otherwise.  $Controls$  is a vector of control variables explained below.

Two challenges that arise when estimating outcomes of regulatory enforcement actions are the large number of zero-valued observations (i.e., enforcement actions without any resultant penalties or criminal prison sentences) and the severe positive skewness in the dependent variable (i.e., some extremely large penalties).<sup>12</sup> Whereas other regression techniques using a log-transformed dependent variable plus a constant (e.g., Tobit or log-linear regression) suffer from potentially severe bias when estimating regressions using data with these attributes (Santos Silva and Tenreyro [2006, 2011]), prior research shows that the Poisson pseudo-maximum likelihood (PPML) estimator (Gourieroux, Monfort, and Trognon [1984]) is a particularly effective modeling technique for data distributions characterized by a disproportionate number of zeros and severe skewness (Santos Silva and Tenreyro [2006, 2011], Tenreyro [2007], Cameron and Trivedi [2010], Wooldridge [2010], Irarrazabal, Moxnes, and Opromolla [2013], Karolyi and Taboada [2015]).<sup>13</sup>

Because whistleblowers may be more likely to approach regulators when they have knowledge of egregious violations that are more likely to result in large penalties and sanctions, we control for factors the SEC and DOJ indicate they take into consideration when recommending penalties and sanctions. After controlling for these factors, any association between whistleblower involvement and outcomes of enforcement actions is incremental to the impact of these other determinants of enforcement outcomes.

The Statement of the Securities and Exchange Commission Concerning Financial Penalties and the DOJ's Federal Sentencing Guidelines Manual describe the factors the SEC and DOJ consider when submitting recommendations to the court in the sentencing hearing or in the penalty phase of the legal proceedings. In table 1, we summarize these factors and provide specific references to the sections of the SEC's framework and the DOJ's Sentencing Guidelines that describe these factors. Below we briefly list these factors and describe our proxies, and we provide detailed definitions in the appendix:

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<sup>12</sup> We provide more details on the significant number of zeros and the highly skewed distributions for our enforcement outcomes when we discuss table 3 below. We confirm in untabulated tests that firm penalties, employee penalties, and prison sentences exhibit highly skewed, non-normal distributions ( $p < 0.001$ ).

<sup>13</sup> The primary difference between PPML and conventional Poisson regression is that PPML does not impose the assumption of equality in the first and second moments of the distribution. In table 8, panel A, we provide the results of sensitivity tests that employ alternative estimation techniques, including Logit, Tobit, and OLS.

**TABLE 1**  
*Criteria Used in Determining Penalties and Related Proxy Variables*

Securities and Exchange Commission	Federal Sentencing Guidelines Manual	Proxy variables
The presence or absence of a direct benefit to the corporation as a result of the violation.	§8C2.4. (a)(2) The pecuniary gain to the organization from the offense.	Self-dealing
The degree to which the penalty will recompense or further harm injured shareholders.	§8C2.8. (a)(3) Any collateral consequences of conviction, including civil obligations arising from the organization's conduct. §8C2.9. Disgorgement. The court shall add to the fine any gain to the organization from the offense that has not and will not be paid as restitution or by way of other remedial measures.	% Blockholder ownership
The extent of the injury to innocent parties.	§8C2.4. (a)(2) The pecuniary loss from the offense caused by the organization. §8C2.8. (a)(4) Any nonpecuniary loss caused or threatened by the offense.	% Initial abnormal return Violation period
The need to deter the particular type of offense.	§8C2.8. (a)(1) The need for the sentence to reflect the seriousness of the offense, promote respect for the law, provide just punishment, afford adequate deterrence, and protect the public from further crimes of the organization.	Bribery Organized crime Deterrence <i>If any of the following occurred:</i> Option backdating related Insider trading related Offering/IPO related Merger related Reverse merger
Whether complicity in the violation is widespread throughout the corporation.	§8C2.5. (b) Involvement in or Tolerance of Criminal Activity. §8C2.8. (a)(2) The organization's role in the offense.	# C-level respondents # Code violations

(Continued)

TABLE 1—Continued

Securities and Exchange Commission	Federal Sentencing Guidelines Manual	Proxy variables
The level of intent on the part of the perpetrators.	§8C2.3. Offense Level.	Fraud Misled auditor
The degree of difficulty in detecting the particular type of offense.		Big N auditor
Presence or lack of remedial steps by the corporation.		Exec respondent terminated
Extent of cooperation with Commission and other law enforcement.	§8C2.5. (g) Self-Reporting, Cooperation, and Acceptance of Responsibility. §8C2.5. (e) Obstruction of Justice.	Cooperation Impeded investigation
Effective compliance programs.	§8C2.8. (a) (11) Whether the organization failed to have, at the time of the instant offense, an effective compliance and ethics program.	% Independent directors
Prior enforcement history.	§8C2.5. (c) Prior History. §8C2.5. (d) Violation of an Order. §8C2.8. (a) (6) Any prior criminal record of an individual within high-level personnel of the organization or high-level personnel of a unit of the organization who participated in, condoned, or was willfully ignorant of the criminal conduct. §8C2.8. (a) (7) Any prior civil or criminal misconduct by the organization.	Recidivist
Legislative history and statutory authority.		Post-SOX (full sample analysis)
Firm-level controls		Market capitalization Market-to-book ratio Leverage ratio Distance from regulator Industry (Fama & French 12-industry)

This table presents a summary of the SEC's framework for the determination of corporate penalties released on January 4, 2006 (SEC [2006]) and the relevant sections of the United States Sentencing Commission Guidelines Manual Chapter 8: Sentencing of Organizations, Part C—Fines (USSC [2013]) and the independent proxy variables used in regression analyses. We provide a detailed description of each of the variables and their construction in the appendix.

- (i) *The presence or absence of a direct benefit to the corporation as a result of the violation:* We include an indicator variable equal to one if the violation includes self-dealing by the respondents (Self-dealing), and equal to zero otherwise. Self-dealing involves a direct benefit to the respondents in the form of higher stock prices, compensation for meeting internal or external expectations, or expropriation or theft.
- (ii) *The degree to which the penalty will recompense or further harm injured shareholders:* We include the percentage of blockholder ownership (% Blockholder ownership) to control for amount of the firm that is held by sophisticated investors who, following a violation, (a) are better able to find recourse through private litigation, and (b) may be in a better position to take corrective action by influencing firm management and policy.
- (iii) *The extent of the injury to innocent parties:* We control for the abnormal initial market reaction at the announcement of the investigation (% Initial abnormal return) and the natural log of the length of violation period in months (Violation period).
- (iv) *The need to deter the particular type of offense:* We include three separate indicator variables equal to one for cases that regulators likely have specific interest in deterring, either because the violation represents willful misconduct or when the potential for public harm is high. These violations include: (a) charges to bribe a foreign official under the FPCA (Bribery), (b) violations related to organized crime (Organized crime), or (c) violations related to option backdating, insider trading, a stock offering, an IPO, a merger, or a reverse merger (Deterrence), and equal to zero otherwise.
- (v) *Whether complicity in the violation is widespread throughout the corporation:* We control for the natural log of the number of C-level respondents (# C-level respondents) and the number of violations (# Code violations) to capture the extent to which the violation is pervasive in the firm.
- (vi) *The level of intent on the part of the perpetrators:* We include an indicator variable equal to one if either fraud charges (Fraud) are included in the enforcement action or if the corporation misled its auditors (Misled auditor), and equal to zero otherwise.
- (vii) *The degree of difficulty in detecting the particular type of offense:* We include an indicator variable equal to one if the firm used a Big N auditor (Big N auditor), and equal to zero otherwise. Big N auditors conduct higher-quality audits that could detect issues before they rise to the level of misrepresentation. Alternatively, if managers are able to deceive the high-quality auditors, the illicit activity is relatively more difficult to detect.
- (viii) *Presence or lack of remedial steps by the corporation:* We include an indicator variable equal to one if the firm terminated a culpable CEO, Chairman of the Board, or President specifically for his or her

- involvement in the financial misrepresentation (Executive terminated), and equal to zero otherwise.
- (ix) *Extent of cooperation with Commission and other law enforcement*: We include an indicator variable equal to one if regulators acknowledged the firm's cooperation in enforcement proceedings and equal to zero otherwise (Cooperation), and an indicator variable equal to one if regulators acknowledged they were deliberately misled and/or charges were included for lying to investigators (Impeded investigation), and equal to zero otherwise. Files [2012] finds that firms that cooperate with the SEC during an enforcement action receive lower monetary penalties.
  - (x) *Effective compliance programs*: We control for the percentage of the firm's directors that are independent (% Independent directors).
  - (xi) *Prior enforcement history*: We include an indicator variable equal to one if the firm has a history of repeat offenses and equal to zero otherwise (Recidivist).

We also control for other firm attributes, such as firm market capitalization, growth (market-to-book ratio), capital structure (leverage ratio), distance from regulator (e.g., Kedia and Rajgopal [2011]), and industry, which are potentially associated with both whistleblowing activity and enforcement outcomes.<sup>14</sup> The appendix provides detailed definitions of each variable.

#### 4. Descriptive Statistics

In table 2, panel A, we report the number of whistleblower complaints obtained through the OSHA FOIA requests and the number of enforcement actions from 2002 to 2012 with whistleblower involvement. Whistleblowers are involved in 148 (22.5%) of the 658 enforcement actions during this period. Of these whistleblower cases, we classify 74 as tipster and 74 as nontipster whistleblowers.<sup>15</sup> In panel B of table 2, we report the frequency with which each respondent type is included in the 658 enforcement actions. A company executive is named as a respondent in 543 (82.5%) of the enforcement actions. The CEO is named as a respondent in 369 (56.1%), other C-level executives in 135 (20.5%), and a nonexecutive employee in 163 (24.8%) enforcement actions. The firm is named as a respondent in 524 (79.6%) of the enforcement actions, and the firm is the sole respondent in 99 (15.1%) of the enforcement actions.

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<sup>14</sup> In the online appendix, we present our main findings using a more parsimonious set of control variables, and our inferences are unchanged.

<sup>15</sup> We describe the classification of whistleblowers as tipsters or nontipsters in section 5.2. We note that our identification of an equal number of tipster and nontipster whistleblowers is by chance, and not by design.



**TABLE 2**  
*Description of Whistleblowing and Enforcement Action Samples*

Panel A: Source of whistleblower action		N	%
Type			
OSHA FOIA whistleblower complaints received		934	100.00
Total enforcement actions		658	77.51
No whistleblower		510	22.49
Whistleblower		148	
Whistleblower Cases by Source:			
OSHA FOIA		110	16.72
<i>Qui tam</i>		13	1.98
As noted in enforcement proceedings		25	3.80
Whistleblower Cases by Type:			
Tipster		74	11.25
Non-tipster		74	11.25

  

Panel B: Whistleblower actions by respondent type		N	%	Whistleblower	
Category			Actions	Yes	%
Total enforcement actions		658	100.00	148	22.49
<i>Respondent type</i>					
Executive		543	82.52	98	18.05
CEO		369	56.08	57	15.45
Other C-level executive		135	20.52	27	20.00
Nonexecutive employee		163	24.77	34	20.86
Firm		524	79.64	128	24.43
Firm only		99	15.05	43	43.43

(Continued)

TABLE 2—Continued

Industry	Panel C: Whistleblower actions (by Fama and French 12 Industry Classification)										
	Compustat Firms			Whistleblower Complaints			Enforcement Actions			Actions with Whistleblower	
	N	% Firms	% Actions	N	% Firms	% Actions	N	% Firms	% Actions	N	% Actions
Consumer Nondurables: food, tobacco, textiles, apparel, leather, toys	1,404	38	2.71	36	2.56	5.47	7	19.44			
Consumer Durables: cars, TVs, furniture, household appliances	621	21	3.38	21	3.38	3.19	5	23.81			
Manufacturing: machinery, trucks, planes, office furniture, paper, commercial printing	2,433	75	3.08	54	2.22	8.21	17	31.48			
Oil, Gas, & Coal Extraction & Products	1,312	23	1.75	30	2.29	4.56	5	16.67			
Chemicals & Allied Products	509	16	3.14	16	3.14	2.43	4	25.00			
Business Equipment: computers, software & electronic equip	4,494	159	3.54	164	3.65	24.92	38	23.17			
Telephone and Television Trans	957	45	4.70	25	2.61	3.80	6	24.00			
Utilities	595	39	6.55	15	2.52	2.28	4	26.67			

(Continued)

TABLE 2—Continued

Industry	Panel C: Whistleblower actions (by Fama and French 12 Industry Classification)						Enforcement Actions				
	Compustat		Whistleblower Complaints		All Actions		Actions with Whistleblower				
	Firms	N	% Firms	N	% Firms	N	% Firms	N	% Actions	N	% Actions
Wholesale, Retail & Some Services (Laundries, Repair Shops)	2,578	81	3.14	77	2.99	11.70	14	18.18			
Healthcare, Medical Equip & Drugs	2,293	90	3.92	55	2.40	8.36	12	21.82			
Finance	4,805	255	5.31	79	1.64	12.01	26	32.91			
Other: mines, construction, building maintenance, trans, hotels, business services, entertainment	3,813	130	3.41	86	2.26	13.07	10	11.63			
Total	25,814	972	3.77	658	2.55	100.00	148	22.49			

The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. Panel A summarizes the type of whistleblower actions by source. OSHA refers to the Occupational Safety and Health Administration, FOIA refers to the OSHA whistleblower actions received through a Freedom of Information Act filing, and Non-FOIA refers to whistleblower actions directly referred to in administrative and legal proceedings as part of the enforcement action. Panel B presents the enforcement actions partitioned by whistleblower involvement and by type of respondent (the firm or individual targeted by the SEC/DOJ) named and the position or relation to the firm. Panel C presents frequency counts and percentages of firms listed in Compustat over the relevant period with positive assets, positive sales, and nonmissing net income, along with enforcement actions by industry using the Fama and French 12-industry classification, and the number of OSHA whistleblower complaints received through the FOIA filing.

We present the distribution of financial misrepresentation enforcement actions by industry (using the Fama and French 12-industry classifications) in table 2, panel C. The industries most frequently subject to enforcement actions are Business Equipment (164 or 24.9% of all enforcement actions); Finance (79 or 12.0%); Wholesale, Retail, and Some Services (77 or 11.7%); Healthcare, Medical Equipment and Drugs (55 or 8.4%); and Manufacturing (54 or 8.2%). No other industry accounts for more than 6.0% of the enforcement actions.

We find some variation in the proportion of firms in different industries that are subject to whistleblower complaints. For example, 6.6% of firms in the Utilities industry are subject to a whistleblower complaint, compared to 1.8% of firms in come from the Oil, Gas, and Coal industry. The percentage of enforcement actions associated with a whistleblower complaint is distributed rather homogeneously across industries, ranging from 16.7% to 32.9% of the enforcement actions in each industry.

In table 3, we report descriptive statistics for the dependent and independent variables used in subsequent regression analyses. For continuous variables, we perform a *t*-test of means (assuming unequal variances where appropriate), and for dichotomous variables, we conduct a test of proportions. The results suggest that whistleblower involvement is associated with significantly larger firm penalties. The mean penalties assessed against firms in enforcement actions with whistleblower involvement are \$74.21 million, which are significantly larger than the \$5.09 million assessed against firms in enforcement actions without whistleblower involvement. For employees, the mean penalties in enforcement actions with whistleblower involvement are \$61.97 million compared to \$23.54 million for those without, but this difference is not statistically significant. Mean prison sentences with whistleblower involvement are 34.69 months compared to 23.62 months without a whistleblower, but again the difference is not statistically significant. We also find significant differences between the two groups in many of the independent and control variables used in the determination of penalties by the SEC and DOJ, which supports the need to control for these variables in our regression models.

## 5. Regression Results

As noted above, a potential problem that arises when estimating outcomes of regulatory enforcement actions is the combination of a large number of zero-valued observations with a severe positive skew in the dependent variable (e.g., many observations with no penalties and a nontrivial number of very large penalties). In our sample, 474 (72.0%) of the enforcement actions have no penalties assessed against the firm, while each of the largest 20 actions has \$100 million or more in firm penalties (with three actions exceeding \$1 billion). Further, 208 (31.6%) actions have no penalties assessed against employees, while the largest 22 each exceed \$100 million in employee penalties and the largest four each exceed \$1 billion. Finally,

**TABLE 3**  
*Descriptive Statistics*

Dependent Variables	Whistleblower											
	No ( $N = 510$ )					Yes ( $N = 148$ )						
	Mean	Std Dev.	Median	P75	P95	Max.	Mean	Std Dev.	Median	P75	P95	Max.
Firm penalties (\$MM)	5.09	28.56	0.00	0.00	20.71	365.00	74.21*	280.90	1.80	24.60	450.00	2,277.67
Employee penalties (\$MM)	23.54	237.20	0.12	0.98	28.60	4,886.93	61.97	544.92	0.07	1.48	69.56	6,557.17
Prison term (months)	23.62	69.43	0.00	0.00	139.00	513.00	34.69	121.72	0.00	0.00	271.00	840.00
Independent Variables												
Self-dealing	0.17	0.38	0.00	0.00	1.00	1.00	0.07*	0.25	0.00	0.00	1.00	1.00
% Blockholder ownership	0.43	0.25	0.42	0.60	0.90	1.00	0.27*	0.25	0.20	0.38	0.81	1.00
% Initial abnormal return	(0.11)	0.16	(0.03)	0.00	0.02	0.05	(0.08)*	0.15	(0.01)	0.00	0.02	0.05
Violation period (mos.) <sup>§</sup>	37.32	29.61	29.96	48.00	93.96	218.98	54.75*	42.54	48.00	71.99	132.01	296.98
Bribery	0.10	0.30	0.00	0.00	1.00	1.00	0.29*	0.46	0.00	1.00	1.00	1.00
Organized crime	0.02	0.15	0.00	0.00	1.00	1.00	0.01	0.08	0.00	0.00	0.00	1.00
Deterrence	0.66	0.47	1.00	1.00	1.00	1.00	0.57*	0.50	1.00	1.00	1.00	1.00
# C-level respondents <sup>§</sup>	1.67	1.30	2.00	2.00	4.00	10.00	1.34*	1.87	1.00	2.00	4.00	16.00
# Code violations <sup>§</sup>	12.42	5.52	12.00	15.00	23.00	33.00	10.79*	6.31	10.00	15.00	22.00	34.00
Fraud	0.79	0.41	1.00	1.00	1.00	1.00	0.60*	0.49	1.00	1.00	1.00	1.00
Misled auditor	0.58	0.49	1.00	1.00	1.00	1.00	0.36*	0.48	0.00	1.00	1.00	1.00
Big N auditor	0.68	0.47	1.00	1.00	1.00	1.00	0.89*	0.31	1.00	1.00	1.00	1.00
Executive terminated	0.55	0.50	1.00	1.00	1.00	1.00	0.42*	0.50	0.00	1.00	1.00	1.00
Cooperation	0.36	0.48	0.00	1.00	1.00	1.00	0.55*	0.50	1.00	1.00	1.00	1.00
Impeded investigation	0.05	0.22	0.00	0.00	1.00	1.00	0.06	0.24	0.00	0.00	1.00	1.00
% Independent directors	0.48	0.27	0.50	0.70	0.85	0.92	0.65*	0.22	0.68	0.80	0.92	0.92

(Continued)

**TABLE 3—Continued**  
**Panel A: Descriptive Statistics of Whistleblower Versus Nonwhistleblower Enforcement Actions**

	No (N = 510)							Yes (N = 148)						
	Mean	Std Dev.	Median	P75	P95	Max.		Mean	Std Dev.	Median	P75	P95	Max.	
Whistleblower														
Recidivist	0.17	0.37	0.00	0.00	1.00	1.00		0.23*	0.42	0.00	0.00	1.00	1.00	
Market capitalization (\$MM) <sup>§</sup>	3,200	10,254	244	1,237	16,481	90,300		32,650*	66,239	5,487	28,546	163,923	386,402	
Market-to-book ratio	3.91	9.48	1.72	3.08	12.89	75.02		1.61*	1.72	1.16	2.02	4.06	16.40	
Leverage ratio	0.73	1.22	0.52	0.77	1.40	9.67		0.71	0.86	0.63	0.80	0.95	9.67	
Distance to regulator <sup>§</sup>	430.32	1,288.77	36.15	213.46	3,729.71	9,539.16		691.30*	1,597.82	31.49	259.90	4,576.95	8,126.44	

This table reports descriptive statistics for the variables in our models, partitioned by whether or not there is whistleblower involvement. The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. All variables are defined in the appendix. We indicate significance differences in mean values, based on a parametric *t*-test (assuming unequal variances where appropriate) next to the reported means for the whistleblowing sample. For dichotomous variables we present the proportions along with the significance from a test of proportions. Variables indicated with <sup>§</sup> are presented in their nontransformed metric but are log transformed in the regression analyses.

\*\*\*, \*\*, and \* represent significance at the 0.01, 0.05, 0.10 levels, respectively (two-tailed tests).

**TABLE 4**  
*Enforcement Outcomes*

	(1)		(2)		(3)	
	Firm Penalties		Employee Penalties		Prison Sentences	
	Coefficient	(z-stat)	Coefficient	(z-stat)	Coefficient	(z-stat)
Whistleblower	1.250**	(1.999)	1.111***	(2.706)	0.621**	(2.434)
Self-dealing	-1.337*	(-1.697)	1.838**	(2.176)	0.999***	(3.800)
% Blockholder ownership	-1.716	(-1.036)	1.664**	(2.096)	0.200	(0.466)
% Initial abnormal return	2.060	(1.265)	-1.524	(-1.329)	-2.521**	(-2.536)
Violation period	0.746***	(3.232)	1.716***	(5.168)	0.588**	(2.563)
Bribery	1.085***	(3.000)	-0.816	(-0.620)	0.211	(0.268)
Organized crime	-15.202***	(-15.833)	-0.576	(-0.560)	0.162	(0.306)
Deterrence	0.465	(1.426)	0.719	(0.967)	-0.827*	(-1.839)
# C-level respondents	0.719**	(2.204)	1.270**	(2.011)	1.099***	(3.696)
# Code violations	1.338***	(3.114)	1.624	(1.442)	2.156***	(6.135)
Fraud	-0.429	(-0.955)	-0.397	(-0.356)	-0.237	(-0.286)
Misled auditor	0.637	(1.508)	0.854	(1.215)	-0.303	(-0.741)
Big N auditor	15.026	(1.290)	-1.283**	(-2.298)	0.507*	(1.706)
Exec respondent terminated	-0.527	(-1.259)	1.164	(1.409)	0.543	(1.558)
Cooperation	0.562*	(1.808)	0.213	(0.343)	-0.174	(-0.657)
Impeded investigation	0.281	(0.423)	0.056	(0.046)	-0.107	(-0.220)
% Independent directors	-0.321	(-0.396)	-0.713	(-0.728)	-0.455	(-1.027)
Recidivist	-0.194	(-0.606)	-1.571**	(-2.298)	0.209	(0.684)
Market capitalization	0.185**	(2.208)	0.219	(1.291)	-0.025	(-0.399)
Market-to-book ratio	-0.301	(-1.484)	-0.040	(-0.511)	0.000	(0.000)
Leverage ratio	1.817	(1.472)	0.102	(0.500)	-0.140	(-1.339)
Distance from regulator	-0.026	(-0.483)	-0.039	(-0.554)	0.018	(0.315)
Intercept	-21.830*	(-1.777)	-14.428***	(-5.387)	-6.266***	(-5.136)
Observations	658		658		658	
$\chi^2$	1,907.90		957.10		575.04	
(p-value)	(0.000)		(0.000)		(0.000)	
Pseudo <i>R</i> -squared	0.750		0.800		0.480	

This table presents exponential regression results examining the association between employee whistleblowing allegations and enforcement outcomes. The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. We present coefficient estimates (left) and associated test statistics (right) using robust standard errors. All variables are defined in the appendix. The dependent variables are total firm penalties in millions of dollars, total employee penalties in millions of dollars, and total employee prison sentences in months.

\*\*\*, \*\*, and \* represent significance at 0.01, 0.05, and 0.10, respectively (two-tailed tests).

506 (76.9%) have no prison sentences assessed against employees, while 25 exceed 20 years. Notably, we find that 105 (16.0%) actions result in no penalties (firm, employee, or agent firm/employee) and no prison sentences. These distributions (i.e., severe skewness and many observations with zeros) suggest that PPML is the best estimator for our regression analyses (Santos Silva and Tenreyro [2011]). We present the results of the PPML regressions in table 4.

### 5.1 FIRM PENALTIES, EMPLOYEE PENALTIES, AND PRISON SENTENCES

We first examine the association between whistleblowers and penalties in millions of dollars levied against targeted firms (Firm Penalties). As

presented in table 4, the presence of a whistleblower is positively associated with firm penalties ( $p < 0.05$ ). Consistent with our expectations based on regulator guidelines, firm penalties are positively associated with the length of the violation period (Violation period), the incidence of bribery (Bribery), the number of C-level respondents (# C-level respondents), the number of violations (# Code violations), and the size of the firm (Market capitalization). With the exception of a positive coefficient estimate for cooperation (Cooperation) and negative coefficients on the indicators for self-dealing and organized crime, these findings are consistent with our expectations based on the government's criteria in determining penalties as outlined in table 1.

In table 4, we also show the association between whistleblower involvement and two additional enforcement outcomes: monetary penalties (in millions of dollars) and prison sentences (in months) levied against culpable employees. We find that monetary penalties for culpable employees are significantly larger with whistleblower involvement ( $p < 0.01$ ). In terms of control variables, we find a positive association between employee penalties and the length of the violation period (Violation period), violations that include self-enrichment (Self-dealing), the percentage of blockholder ownership at the firm (% Blockholder ownership), and the number of C-suite executives named as respondents (#C-level respondents). Employee penalties decrease if the violation is associated with a Big N auditor (Big N auditor) or prior enforcement history (Recidivist).

Employee prison sentences also increase when a whistleblower is involved ( $p < 0.05$ ). In addition, prison sentences increase with longer violation periods (Violation period), when the violation includes self-enrichment (Self-dealing), with the number of C-suite executives named respondents (#C-level respondents), with the number of code violations (# Code violations), and with a Big N auditor (Big N auditor). Prison sentences increase with violations that have a lower initial abnormal return (% Initial abnormal return) and decrease with violations that are targeted by regulators for deterrence (Deterrence).<sup>16,17</sup>

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<sup>16</sup> Although we draw our control variables from the SEC and DOJ penalty guidelines, including many potentially related variables in the same model may raise concerns about collinearity. We find in untabulated tests that variance inflation factors (VIFs) do not exceed 3.02 (4.43 if we include industry fixed effects) for the independent variables, suggesting that collinearity is unlikely to influence our results. We report these VIFs in the online appendix. We also note that some of the proxies we use for determinants of penalties may be insignificant or have unexpected signs when evaluated in conjunction with so many other determinants.

<sup>17</sup> In terms of economic significance, we find that whistleblowers are associated with an increase in predicted firm penalties from \$8.7 million (without a whistleblower) to \$30.5 million (with a whistleblower), an increase in predicted employee penalties increase from \$22.8 million to \$69.4 million, and an increase in predicted prison sentences increase from 22.5 months to 41.9 months. However, these estimates should be interpreted with caution because of severe skewness in distribution of both the outcome variables (firm penalties, employee penalties, prison sentences) and several of the control variables associated with outcomes of enforcement actions (e.g., Bribery, Organized crime).



## 5.2 TIPSTER VS. NONTIPSTER WHISTLEBLOWERS

Whistleblowers potentially play a variety of roles in the enforcement process. Some whistleblowers sound the first alarm about potential violations, bringing to the attention of regulators possible violations that could be investigated. We refer to these whistleblowers as “tipsters.” In other cases, the SEC or DOJ begins investigating a firm, and a whistleblower later emerges to provide additional information and/or help investigators build a stronger case against the targeted firm and executives. We refer to these whistleblowers as “nontipsters.”

In describing individuals who are eligible for whistleblower awards, SEC Rule 21F-4(c) defines whistleblowers as individuals who provide “the Commission [with] original information that was sufficiently specific, credible, and timely to cause the staff to *commence* an examination, open an investigation, reopen an investigation that the Commission had closed, or to inquire concerning different conduct as part of a current examination or investigation” (e.g., a tipster whistleblower) or who provide “original information about conduct that was *already under examination or investigation* by the Commission [or other federal or state authorities] . . . and [the] submission significantly contributed to the success of the action” (e.g., nontipster whistleblower) (emphasis added). Both types of whistleblowers potentially add value to regulators, but their roles are somewhat different. While both tipsters and nontipsters can effectively serve as witnesses in the enforcement process, identifying relevant facts and evidence to help regulators successfully prosecute cases, only tipsters help reveal wrongdoing that was previously unknown to investigators.

We assess the association between both tipsters and nontipsters and outcomes of enforcement actions and present the results in table 5. For the sample of whistleblowers that filed a report with OSHA, we use the filing date of the whistleblowing allegation with OSHA as the relevant date for determining whether the whistleblower is a tipster or a nontipster. We consider whistleblowers to be nontipsters when the whistleblowing date is after the earliest known regulatory investigation or enforcement inquiry date. When the whistleblowing date precedes the end of the violation period or the earliest known regulatory investigation or enforcement inquiry date, or when the whistleblowing date is unknown, we treat the action as a tipster whistleblower case.<sup>18</sup>

We present full summary statistics on both tipster and nontipster observations in panel A of table 5. As reported in panel B of table 5, we find

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<sup>18</sup> Although enforcement-related documents can unambiguously identify enforcement actions with whistleblower involvement, the date the whistleblower joined the investigation is often unknown. Of the 148 whistleblowing cases in our sample, 135 have a date associated with the whistleblowing activity, and for these cases, we use this date to classify each observation as either a tipster or a nontipster. We classify the remaining 13 cases as tipsters. Given limitations in precisely determining when whistleblower involvement begins, the tipster vs. nontipster designation is measured with noise.

**TABLE 5**  
*Enforcement Outcomes: Tipster versus Nontipster Whistleblowers*

	Whistleblower (Tipster) (N = 74)					Whistleblower (Nontipster) (N = 74)						
	Mean	Std Dev.	P50	P75	P95	Max.	Mean	Std Dev.	P50	P75	P95	Max.
<b>Dependent Variables</b>												
Firm penalties (\$MM)	59.77	264.75	0.68	12.00	185.00	1,658.50	88.65	297.27	3.92	30.00	510.00	2,277.67
Employee penalties (\$MM)	15.46	66.33	0.04	1.07	157.19	505.73	108.48	767.57	0.14	2.35	69.56	6,557.17
Prison term (months)	38.92	140.90	0.00	0.00	280.00	840.00	30.46	99.73	0.00	4.00	271.00	636.00
<b>Independent Variables</b>												
Self-dealing	0.08	0.27	0.00	0.00	1.00	1.00	0.05	0.23	0.00	0.00	1.00	1.00
% Blockholder ownership	0.29	0.28	0.23	0.41	0.98	1.00	0.25	0.22	0.18	0.36	0.70	0.82
% Initial abnormal return	(0.06)	0.15	0.00	0.00	0.03	0.05	(0.09)	0.15	(0.03)	0.00	0.01	0.05
Violation period (mos.) <sup>§</sup>	61.48	47.57	56.43	84.01	144.00	296.98	48.02*	35.91	40.49	60.03	107.99	214.18
Bribery	0.35	0.48	0.00	1.00	1.00	1.00	0.23	0.42	0.00	0.00	1.00	1.00
Organized crime	0.01	0.12	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Deterrence	0.51	0.50	1.00	1.00	1.00	1.00	0.64	0.48	1.00	1.00	1.00	1.00
# C-level respondents <sup>§</sup>	1.23	2.15	1.00	2.00	4.00	16.00	1.45	1.55	1.00	2.00	5.00	7.00
# Code violations <sup>§</sup>	10.22	6.81	9.00	15.00	22.00	34.00	11.36***	5.77	11.00	15.00	22.00	27.00
Fraud	0.54	0.50	1.00	1.00	1.00	1.00	0.66	0.48	1.00	1.00	1.00	1.00
Misled auditor	0.31	0.47	0.00	1.00	1.00	1.00	0.41	0.49	0.00	1.00	1.00	1.00
Big N auditor	0.86	0.34	1.00	1.00	1.00	1.00	0.92	0.27	1.00	1.00	1.00	1.00
Executive terminated	0.36	0.48	0.00	1.00	1.00	1.00	0.47	0.50	0.00	1.00	1.00	1.00
Cooperation	0.58	0.50	1.00	1.00	1.00	1.00	0.51	0.50	1.00	1.00	1.00	1.00
Impeded investigation	0.04	0.20	0.00	0.00	0.00	1.00	0.08	0.27	0.00	0.00	1.00	1.00
% Independent directors	0.65	0.24	0.71	0.80	0.92	0.92	0.65	0.19	0.67	0.80	0.92	0.92
Recidivist	0.28	0.45	0.00	1.00	1.00	1.00	0.18	0.38	0.00	0.00	1.00	1.00
Market capitalization (\$MM) <sup>§</sup>	26,596	59,885	4,449	21,514	157,047	386,402	38,704	71,935	6,116	32,720	207,665	386,402
Market-to-book ratio	1.42	1.11	1.14	1.89	4.06	5.48	1.79	2.16	1.42	2.31	4.65	16.40
Leverage ratio	0.79	1.19	0.63	0.80	0.95	9.67	0.63	0.27	0.63	0.79	0.95	1.74
Distance to regulator <sup>§</sup>	626.28	1,580.28	30.20	213.59	4,123.12	8,126.44	756.32	1,623.33	32.67	329.24	4,782.58	6,455.73

(Continued)

TABLE 5—Continued

	(1)		(2)		(3)	
	Firm Penalties		Employee Penalties		Prison Sentences	
	Coefficient	(z-stat)	Coefficient	(z-stat)	Coefficient	(z-stat)
Whistleblower (Tipster)	1.323*	(1.802)	0.691	(0.886)	0.813**	(2.029)
Whistleblower (Nontipster)	1.199**	(2.061)	1.258***	(2.961)	0.424	(1.386)
Self-dealing	-1.320*	(-1.708)	1.792**	(2.259)	1.013***	(3.742)
% Blockholder ownership	-1.723	(-1.068)	1.775**	(2.073)	0.162	(0.368)
% Initial abnormal return	2.053	(1.257)	-1.626	(-1.301)	-2.538***	(-2.671)
Violation period	0.739**	(3.123)	1.723***	(5.230)	0.573***	(2.708)
Bribery	1.089***	(2.974)	-0.817	(-0.639)	0.229	(0.286)
Organized crime	-14.172***	(-14.900)	-0.204	(-0.195)	0.161	(0.319)
Deterrence	0.492	(1.365)	0.612	(0.898)	-0.787*	(-1.951)
# C-level respondents	0.703**	(2.084)	1.304*	(1.954)	1.072***	(3.398)
# Code violations	1.328***	(3.196)	1.648	(1.515)	2.109***	(5.814)
Fraud	-0.407	(-0.868)	-0.349	(-0.318)	-0.215	(-0.251)
Misled auditor	0.632	(1.472)	0.824	(1.292)	-0.285	(-0.760)
Big N auditor	15.291	(1.323)	-1.185**	(-2.216)	0.495*	(1.672)
Exec respondent terminated	-0.497	(-1.158)	1.069	(1.277)	0.576	(1.579)
Cooperation	0.570*	(1.767)	0.168	(0.270)	-0.161	(-0.589)
Impeded investigation	0.266	(0.392)	0.060	(0.050)	-0.117	(-0.242)
% Independent directors	-0.361	(-0.410)	-0.592	(-0.610)	-0.498	(-1.119)
Recidivist	-0.203	(-0.640)	-1.475**	(-2.307)	0.191	(0.647)
Market capitalization	0.191**	(2.309)	0.204	(1.234)	-0.019	(-0.308)
Market-to-book ratio	-0.288	(-1.409)	-0.037	(-0.506)	-0.001	(-0.001)
Leverage ratio	1.837	(1.502)	0.104	(0.510)	-0.133	(-1.404)
Distance from regulator	-0.029	(-0.525)	-0.043	(-0.619)	0.018	(0.319)
Intercept	-22.146*	(-1.808)	-14.378***	(-5.642)	-6.184***	(-5.275)

(Continued)

TABLE 5—Continued

	(1) Firm Penalties	(2) Employee Penalties	(3) Prison Sentences
Observations	658	658	658
$\chi^2$	1767.92	969.73	623.28
( <i>p</i> -value)	(0.000)	(0.000)	(0.000)
Pseudo <i>R</i> -squared	0.750	0.801	0.482
$\beta_{Whistleblower(Tipster)} - \beta_{Whistleblower(Nontipster)}$	0.124	-0.568**	0.390**

This table presents results of enforcement outcomes based on tipster versus nontipster whistleblower involvement. Panel A reports descriptive statistics for tipster versus nontipster whistleblower actions and panel B reports exponential regression results examining the association between employee whistleblowing allegations and enforcement outcomes. The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. The “tipster” (“nontipster”) designation reflects actions for which the whistleblower came forward before (after) the beginning of the regulatory enforcement period. In panel B we present coefficient estimates (left) and associated test statistics (right) using robust standard errors. All variables are defined in the appendix. The dependent variables are total firm penalties in millions of dollars, total employee penalties in millions of dollars, and total employee prison sentences in months. Variables indicated with \* in panel A are presented in their nontransformed metric but are log transformed in the regression analyses. \*\*\*, \*\*, and \* represent significance at the 0.01, 0.05, 0.10 levels, respectively (two-tailed tests).

that both tipsters and nontipsters are associated with tougher enforcement penalties. Specifically, both tipster and nontipster whistleblowers are associated with larger firm penalties ( $p < 0.10$  and  $< 0.05$  for the Tipster and Nontipster coefficients, respectively). We also find that tipster (nontipster) whistleblowers are significantly associated with longer prison sentences (larger employee penalties) ( $p < 0.05$  or better). Because we cannot observe the full spectrum of whistleblower involvement (e.g., we do not know the date the whistleblower began assisting the SEC), the tipster and nontipster designation is measured with noise. Nevertheless, the results of these tests, coupled with the recent emphasis on rewarding both tipster and nontipster whistleblowers, highlight the association between both tipster and nontipster whistleblowers and enforcement outcomes.

### 5.3 OTHER PENALTIES

Firms and their executives are not the only parties that can be penalized as a result of a financial misrepresentation enforcement action. For example, the SEC requires public companies to receive an annual, independent audit of their financial statements, at the conclusion of which the auditor generally attests that the financial statements appear to be free of material error (i.e., an “unqualified opinion”). If the auditor gives an unqualified opinion to financial statements that are later determined to have been materially misrepresented, this is considered an “audit failure,” and it is not uncommon for the auditor to be named as a defendant in a class-action lawsuit or in the regulatory enforcement action. Regulatory enforcement actions can assess penalties against both agent firms (e.g., audit firms) and/or employees of an agent firm (e.g., the audit partner) in connection with the financial misrepresentation. Other parties potentially subject to regulatory enforcement include the firm’s bankers, external lawyers, suppliers, and managers of other related firms who provide fraudulent information when asked to confirm certain contracts or transactions.

Because information provided by whistleblowers allows the SEC or DOJ to build a more successful case against other parties involved in the financial misrepresentation, we investigate whether the presence of a whistleblower is associated with combined penalties imposed on agent firms and/or agent firm employees. We present the results of our tests in table 6. Consistent with our earlier findings, we find that tipster whistleblowers are associated with significantly higher penalties assessed against agent parties connected with the financial misrepresentation. We do not find evidence that nontipster whistleblowers are associated with higher penalties.

### 5.4 TIME TO DISCOVERY AND DURATION OF ENFORCEMENT

The results presented in table 4 suggest that whistleblower involvement is associated with higher penalties and prison sentences for firms and executives that participate in financial misrepresentation. However, it is unclear whether whistleblower involvement is associated with a reduced time to discovery of the underlying misconduct, and whether whistleblowers expedite or prolong the enforcement process, consuming

**TABLE 6**  
*Enforcement Outcomes: Other Penalties*

	(1)		(2)	
	Other Penalties		Other Penalties	
	Coefficient	(z-stat)	Coefficient	(z-stat)
Whistleblower	2.023***	(5.005)		
Whistleblower (Tipster)			2.488***	(7.077)
Whistleblower (Nontipster)			1.136	(1.337)
Self-dealing	1.385*	(1.742)	1.336*	(1.685)
% Blockholder ownership	0.598	(0.735)	0.912	(1.143)
% Initial abnormal return	-4.360***	(-3.309)	-4.169***	(-3.148)
Violation period	1.470***	(3.314)	1.378***	(3.267)
Bribery	2.546***	(2.601)	2.729***	(3.244)
Organized crime	0.661	(1.052)	0.486	(0.796)
Deterrence	0.291	(0.485)	0.383	(0.699)
# C-level respondents	0.209	(0.476)	0.058	(0.121)
# Code violations	2.708**	(2.301)	2.427**	(2.521)
Fraud	-1.348	(-1.277)	-1.437	(-1.318)
Misled auditor	0.828	(1.216)	0.917	(1.423)
Big N auditor	0.437	(0.625)	0.387	(0.570)
Exec respondent terminated	1.071***	(2.588)	1.209***	(2.795)
Cooperation	-2.031***	(-2.969)	-1.887***	(-2.902)
Impeded investigation	-1.030	(-1.069)	-0.953	(-1.036)
% Independent directors	3.099***	(2.890)	2.491**	(2.348)
Recidivist	0.691	(1.440)	0.564	(1.289)
Market capitalization	-0.250**	(-2.300)	-0.193*	(-1.645)
Market-to-book ratio	0.031***	(2.614)	0.029**	(2.398)
Leverage ratio	0.182*	(1.792)	0.171*	(1.811)
Distance from regulator	-0.255**	(-2.244)	-0.248**	(-2.303)
Intercept	-14.069***	(-5.486)	-13.268***	(-6.073)
Observations	658		658	
$\chi^2$	2,019.7		2,555.62	
(p-value)	(0.000)		(0.000)	
Pseudo R-squared	0.893		0.896	
$\hat{\beta}_{\text{Whistleblower (Tipster)}} - \hat{\beta}_{\text{Whistleblower (Nontipster)}}$			1.352***	

This table presents exponential regression results examining the association between employee whistleblowing allegations and enforcement outcomes for third-party respondents (e.g., auditors, bankers, suppliers). The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. The “tipster” (versus “nontipster”) designation reflects actions for which the whistleblower came forward before (after) the beginning of the regulatory enforcement period. We present coefficient estimates (left) and associated test statistics (right) using robust standard errors. All variables are defined in the appendix. The dependent variable is the total of other penalties, in millions of dollars.

\*\*\*, \*\*, and \* represent significance at 0.01, 0.05, and 0.10, respectively (two-tailed tests).

additional time and resources as a result of the information they provide. To investigate this issue, we examine two observable periods of an enforcement action: (1) the time to discovery, which we define as the period from the end of the violation period to the beginning of regulatory proceedings, and (2) the period over which legal and regulatory proceedings took place.

In table 7, panel A, we present descriptive statistics for the time to discovery for all 658 enforcement actions in the post-SOX period and the length of the regulatory proceedings period for the 478 enforcement actions that regulators have indicated are closed. Panel B (panel C) of table 7 presents regression results for all whistleblowers (tipsters and nontipsters) using the periods described in panel A as dependent variables. We



TABLE 7—Continued

Estimator:	(1)		(2)	
	Discovery Period		Regulatory Proceedings Period (Closed Actions Only)	
	Coefficient	( <i>t</i> -stat)	Coefficient	( <i>z</i> -stat)
Violation period	-0.192***	(-3.976)	0.863	(-0.948)
Bribery	-0.208	(-1.289)	3.336**	(2.480)
Organized crime	0.226	(0.667)	1.960*	(1.944)
Deterrence	-0.250**	(-2.580)	1.469	(1.213)
# C-level respondents	-0.330***	(-2.674)	4.658***	(4.124)
# Code violations	-0.401***	(-3.110)	2.989***	(3.383)
Fraud	0.233	(1.507)	15.504***	(4.122)
Misled auditor	0.081	(0.804)	0.952	(-0.166)
Big N auditor	0.528***	(3.922)	0.720	(-0.986)
Exec respondent terminated	0.572***	(4.540)	1.018	(0.060)
Cooperation	-0.004	(-0.044)	0.925	(-0.317)
Impeded investigation	-0.224	(-1.126)	1.433	(1.214)
% Independent directors	0.570**	(2.541)	0.709	(-0.721)
Recidivist	-0.061	(-0.526)	1.339	(1.216)
Market capitalization	0.013	(0.529)	0.997	(-0.048)
Market-to-book ratio	-0.001	(-0.150)	0.997	(-0.401)
Leverage ratio	0.014	(0.297)	1.124	(1.197)
Distance from regulator	0.026	(1.469)	0.902**	(-2.239)
Intercept	4.004***	(11.024)	0.013***	(-4.374)
Shape Parameter			1.238***	(4.178)
Uncensored Observations	658		478	
Censored Observations	0		0	
$\chi^2$ (or <i>F</i> -test)	5.59		1,772.08	
( <i>p</i> -value)	(0.000)		(0.000)	
Adjusted <i>R</i> -squared	0.229		-	

(Continued)



TABLE 7—Continued

Estimator:	(1)		(2)	
	Discovery Period		Regulatory Proceedings Period (Closed Actions)	
	Coefficient	(t-stat)	Coefficient	(z-stat)
Whistleblower (Tipster)	-0.268*	(-1.949)	1.063	(0.167)
Whistleblower (Nontipster)	-0.136	(-1.169)	2.356**	(2.278)
Self-dealing	-0.347**	(-2.499)	1.676*	(1.787)
% Blockholder ownership	0.030	(0.177)	1.158	(0.313)
% Initial abnormal return	0.463*	(1.685)	0.901	(-0.164)
Violation period	-0.190***	(-3.934)	0.875	(-0.853)
Bribery	-0.201	(-1.234)	3.605***	(2.637)
Organized crime	0.225	(0.659)	2.066**	(2.122)
Deterrence	-0.252***	(-2.616)	1.473	(1.222)
# C-level respondents	-0.330***	(-2.677)	4.710***	(4.137)
# Code violations	-0.405***	(-3.123)	2.877***	(3.299)
Fraud	0.233	(1.510)	16.115***	(4.242)
Misled auditor	0.081	(0.813)	0.936	(-0.221)
Big N auditor	0.527***	(3.915)	0.702	(-1.058)
Exec respondent terminated	0.570***	(4.535)	1.030	(0.100)
Cooperation	-0.002	(-0.020)	0.925	(-0.320)
Impeded investigation	-0.228	(-1.148)	1.423	(1.136)
% Independent directors	0.575**	(2.549)	0.749	(-0.604)
Recidivist	-0.056	(-0.478)	1.345	(1.252)
Market capitalization	0.011	(0.463)	0.993	(-0.122)
Market-to-book ratio	-0.001	(-0.143)	0.997	(-0.385)

(Continued)

TABLE 7—Continued

Estimator:	(1)		(2)	
	Discovery Period		Regulatory Proceedings Period (Closed Actions)	
	Coefficient	( <i>t</i> -stat)	Coefficient	( <i>t</i> -stat)
Leverage ratio	0.014	(0.305)	1.121	(1.207)
Distance from regulator	0.026	(1.466)	0.903**	(-2.210)
Intercept	4.014***	(10.982)	0.013***	(-4.349)
Shape Parameter			1.234***	(4.128)
Uncensored Observations	658		478	
Censored Observations	0		0	
X <sup>2</sup> (or <i>F</i> -test)	5.43		1,842.69	
( <i>p</i> -value)	(0.000)		(0.000)	
Adjusted R-squared	0.228		—	
$\beta^{\text{Whistleblower (Tipster)}} - \beta^{\text{Whistleblower (Nontipster)}}$	-0.132*		-1.293*	

This table reports descriptive statistics and regression results for the association between whistleblower complaints and the duration of the discovery and regulatory proceedings periods for enforcement actions. We define the discovery period as the time elapsing between the end of the violation period and the beginning of the regulatory proceedings period, and the regulatory proceedings period as the time elapsing between the initial regulatory action and the conclusion of the final regulatory action. The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. All variables are defined in the appendix. Panel A presents the descriptive statistics for the discovery and regulatory proceedings period in months, partitioned by whistleblower involvement. We set (discovery) periods equal to zero if the violation end date is after the beginning of the regulatory period (i.e., the firm continues financial misrepresentation even after the initial regulatory proceedings have commenced). Panel B presents a regression analysis of each of the periods described in Panel A. We estimate Model (1) using OLS. We estimate Model (2) using a log-logistic parameterization of survival time. For the OLS regression we present the coefficient estimates (left) and associated test statistics (right) using robust standard errors; for the survival regressions we present time ratios (left) and the associated test statistics (right) using robust standard errors. Panel C presents regression analysis in panel B after disaggregating the Whistleblower indicator into tipster and nontipster classifications as in table 5. Variables indicated with § are presented in their nontransformed metric but are log transformed in the regression analyses. # indicates that we present results for the 478 enforcement actions that regulators have indicated are closed.

\*\*\*, \*\*, and \* represent significance at 0.01, 0.05, and 0.10 respectively (two-tailed tests). In panel A, \*\* in the Whistleblower Cases (Whistleblower (Tipster) Cases) section indicates difference between whistleblower and nonwhistleblower (Tipster and Nontipster Whistleblower) cases.

use survival time in a log-logistic parameterization with robust standard errors to estimate the regulatory proceedings period. We control for the same factors that regulators consider when assessing penalties (discussed in the previous tests; see the appendix). In panel B, we find that whistleblower involvement is associated with a shorter time to discovery of financial misrepresentation ( $p < 0.05$ ). However, we do not find evidence that whistleblower involvement is associated with the duration of the regulatory proceedings period.<sup>19</sup> In panel C, we find that the shorter discovery period associated with whistleblowing is primarily driven by tipsters and that nontipsters are associated with a longer regulatory proceedings period than are tipsters ( $p < 0.10$ ). Our collective findings are consistent with whistleblower involvement being associated with more rapid discovery of financial misconduct.

## 6. Robustness Tests

### 6.1 SENSITIVITY TO ALTERNATIVE ESTIMATORS

Although we believe PPML is the most appropriate estimator for our data, we also examine the association between whistleblowing and enforcement outcomes with a Logit model (i.e., a binary dependent variable indicating whether a penalty was assessed). We present the results of these sensitivity tests in table 8, panel A. We find that whistleblower involvement is positively associated with the incidence of firm penalties ( $p < 0.05$ ) and prison sentences ( $p < 0.10$ ), but we do not find a significant result for the incidence of employee penalties. These results suggest that whistleblower involvement is associated with an 8.58% increased likelihood that the SEC imposes monetary sanctions on the firm and a 6.64% increased likelihood of criminal sanctions against the targeted employees.

We also employ Tobit and OLS models (with logged dependent variable) and report the results in panel A of table 8.<sup>20</sup> The results of these tests are generally consistent but somewhat weaker than our primary results using PPML. Specifically, we find that firm penalties are positively associated with whistleblowers across both the Tobit and OLS models ( $p < 0.05$  or better) but the alternative estimation techniques do not provide evidence of a significant association between whistleblowers and employee penalties or prison sentences.

### 6.2 ADDRESSING POTENTIAL ENDOGENEITY

We acknowledge the inherent endogeneity in our setting. Whistleblowing activity is not random, which raises concerns that results we observe

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<sup>19</sup> When we estimate a hazard model using all enforcement actions, including those not yet officially closed, the coefficient on the whistleblower indicator variable is statistically significant ( $p < 0.05$ ).

<sup>20</sup> We exclude the organized crime variable from the Tobit and logistic regressions examining firm penalties, as there is no variation in the incidence of firm penalties when organized crime was involved, requiring the exclusion of this variable.

**TABLE 8**  
*Sensitivity Tests*

	Logit, Binary Dependent Variable			Tobit, Logged Dependent Variable			OLS, Logged Dependent Variable		
	(1) Coefficient (z-stat) Pr(Firm Penalties)	(2) Coefficient (z-stat) Pr(Employee Penalties)	(3) Coefficient (z-stat) Pr(Prison Sentences)	(4) Coefficient (t-stat) LN(Firm Penalties)	(5) Coefficient (t-stat) LN(Employee Penalties)	(6) Coefficient (t-stat) LN(Prison Sentences)	(7) Coefficient (t-stat) LN(Firm Penalties)	(8) Coefficient (t-stat) LN(Employee Penalties)	(9) Coefficient (t-stat) LN(Prison Sentences)
Whistleblower	0.806** (2.445)	0.138 (0.471)	0.516* (1.781)	0.749** (2.524)	0.117 (0.763)	0.969 (1.549)	0.484*** (3.316)	0.072 (0.627)	0.181 (1.118)
Intercept	-6.140*** (-4.854)	-4.962*** (-4.173)	-7.425*** (-5.513)	-10.021*** (-8.461)	-4.991*** (-7.830)	-16.171*** (-6.087)	-2.562*** (-6.892)	-2.690*** (-6.502)	-1.987*** (-3.591)
SIGMA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	658	658	658	658	658	658	658	658	658
$\chi^2$ (or $F$ -test)	164.12 (0.000)	177.73 (0.000)	121.42 (0.000)	14.72 (0.000)	7.15 (0.000)	9.72 (0.000)	10.65 (0.000)	6.41 (0.000)	6.59 (0.000)
Pseudo $R$ -squared	0.474	0.373	0.282	0.274	0.172	0.149	0.435	0.289	0.235
Area Under ROC Curve	0.917	0.881	0.844						
Adjusted $R$ -squared									

(Continued)

TABLE 8—Continued

Dependent Variable	LN(Firm Penalties)	
	ITCV	Impact
Whistleblower	0.0579	-0.0001
Self-dealing		0.0069
% Blockholder ownership		0.0039
% Initial abnormal return		0.0074
Violation period		0.0100
Bribery		0.0002
Organized crime		-0.0006
Deterrence		-0.0028
# C-level respondents		0.0056
# Code violations		0.0000
Fraud		0.0040
Misled auditor		-0.0004
Big N auditor		0.0003
Exec respondent terminated		-0.0001
Cooperation		0.0026
Impeded investigation		0.0005
% Independent directors		0.0027
Recidivist		0.0911
Market capitalization		0.0047
Market-to-book ratio		0.0071
Leverage ratio		0.0000
Distance from regulator		

(Continued)

TABLE 8—Continued

Panel C: Unobservable selection and coefficient stability <sup>§</sup>						
Model (LN of Outcome)	$\beta$ (Coefficient on Whistleblower without controls)	$\beta$ (Coefficient on Whistleblower with controls)	$R^2$ without controls	$R^2$ with controls	$\Pi$	$R_{max}$
						$\delta$ ( $\delta > 1$ suggests coefficient stability, i.e., a robust result)
LN(Firm Penalties)	1.311	0.484	0.143	0.463	1.300	0.602
LN(Employee Penalties)	0.142	0.072	0.002	0.325	1.300	0.423
LN(Prison Sentences)	-0.027	0.181	0.000	0.273	1.300	0.355
LN(Other Penalties)	0.143	0.096	0.004	0.205	1.300	0.267
Model (Indicator for incidence of outcome)	$\beta$ (Coefficient on Whistleblower without controls)	$\beta$ (Coefficient on Whistleblower with controls)	$R^2$ without controls	$R^2$ with controls	$\Pi$	$R_{max}$
						$\delta$ ( $\delta > 1$ suggests coefficient stability, i.e., a robust result)
Firm Penalties	0.398	0.133	0.137	0.491	1.300	0.638
Employee Penalties	-0.106	0.021	0.009	0.400	1.300	0.520
Prison Sentences	-0.002	0.044	0.000	0.255	1.300	0.332
Other Penalties	-0.000	0.058	0.000	0.265	1.300	0.345

This table presents the results of sensitivity tests. In panel A, we present the results of tests using alternative estimation techniques. In panels B and C, we present results to assess potential endogeneity threats in our setting. In panel B, we report the impact threshold for a confounding variable using the OLS results reported in panel A. In panel C, we report the results of tests to evaluate the sensitivity of the results to unobservable selection and coefficient stability (Oster [2016]). The 658 enforcement actions represent the universe of all regulatory enforcement actions initiated for financial misrepresentation under Section 13(b) and rules promulgated thereunder of the Securities and Exchange Commission Act of 1934, as amended by the Foreign Corrupt Practices Act of 1977, where any part of the violation or regulatory proceedings extended past the enactment of the Sarbanes-Oxley Act on July 30, 2002. We present coefficient estimates on top and associated test statistics below using robust standard errors. All variables are defined in the appendix. The dependent variables are total firm penalties in millions of dollars, total employee penalties in millions of dollars, and total employee prison sentences in months other than for the Logit regressions in panel A, which use indicator variables equal to one if the action has a nonzero value for the given outcome and zero otherwise.

<sup>§</sup>Oster [2016] proposes a coefficient of proportionality,  $\delta$ , which uses information from movement in the coefficient of interest and explanatory power ( $R$ -squared) of linear regression models with and without controls. The first set of tests above uses the natural log of the given outcome. The second set of tests uses linear probability models (OLS with binary dependent variables equal to one if the action is associated with the given outcome and zero otherwise).

<sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> represent significance at 0.01, 0.05, and 0.10, respectively (two-tailed tests).

could reflect the effects of unobserved firm attributes rather than an association with whistleblower involvement (i.e., unobservable selection). In addition, to the degree that whistleblowers are induced to come forward when violations are more severe, it is possible that our results could reflect reverse causality. Although we are cautious to acknowledge that our objective is to provide important descriptive evidence on the association between enforcement outcomes and whistleblower involvement (i.e., as opposed to making claims about *causal* relations), we conduct a number of tests to assess the likelihood that endogeneity explains our results.

*6.2.1. Impact Threshold for a Confounding Variable.* In our first test, we follow Larcker and Rusticus [2010] and Frank [2000] to compute the impact threshold for a confounding variable (ITCV), which quantifies the sensitivity of results to a potentially confounding correlated omitted variable. The ITCV illustrates how difficult (or easy) it would be for a correlated omitted variable to overturn a statistically significant result. In our setting, it tells us how influential the correlated omitted variable would need to be for the coefficient on the whistleblower indicator variable to become insignificant (i.e., to have a  $p$ -value  $> 0.05$ ).

The ITCV approach is designed for OLS specifications, and we find a significant association ( $p < 0.01$ ) between whistleblower involvement and logged firm penalties using OLS (see table 8, panel A). As reported in panel B of table 8, we find that the ITCV for the whistleblower indicator variable is 0.0579, which suggests that in order to invalidate the significant association between whistleblower involvement and firm penalties, the products of the partial correlations between an omitted variable and (1) the whistleblower indicator variable and (2) the log of firm penalties would need to exceed 0.0579.

This ITCV result suggests that a correlated omitted variable would need an association with enforcement outcomes that is larger than the corresponding association for every variable in our model, with the exception of firm size, in order to invalidate the inferences of our test. In fact, the correlated omitted variable would need to be more influential than all the other control variables in the model, even those based on the SEC and DOJ's regulatory enforcement guidelines. Notably, the impact of the potentially confounding variable would need to be more than five times stronger than the second most important variable in the model, Bribery (impact = 0.0100), in order to invalidate the results. Although it is not possible to rule out endogeneity completely, the results of this ITCV analysis mitigate concerns that unobserved heterogeneity from correlated omitted variables drives our results.

*6.2.2. Unobservable Selection and Coefficient Stability (Oster [2016]).* In our second test, we conduct an assessment of unobservable selection based on recent theory and evidence using bounding arguments to assess bias from correlated omitted variables (Alotnji, Edler, and Taber [2005], Oster [2016]). This analysis draws on a proportional selection relationship

(Altonji, Elder, and Taber [2005]) to incorporate both coefficient movements (between uncontrolled and controlled regressions) and  $R$ -squared movements to identify omitted variable bias. Oster [2016] proposes a coefficient of proportionality,  $\delta$ , which uses information from movement in the coefficient of interest and explanatory power ( $R$ -squared) of linear regression models with and without controls. For example, a  $\delta$  of 2.00 indicates that for unobservable factors to overturn the result, they would need to be two times as important as observables.

Oster [2016] observes that  $R$ -squared movements are a critical component when assessing unobservable selection. Thus, estimating unobservable selection relies on  $R_{max}$ , or the  $R$ -squared from a hypothetical regression of a dependent variable on the treatment variable, observed controls, and unobserved controls. Oster [2016] argues that, because of measurement error, even a full set of controls (i.e., if one could include both unobserved and observed controls in the regression) would fail to fully explain outcomes in many settings. Accordingly, based on replication results of dozens of recent empirical studies in top economics journals, she recommends that researchers use an estimate of  $R_{max}$  equal to  $1.3 \times$  the  $R$ -squared for the OLS regression model that includes observable control variables. Using  $R_{max}$  and differences in the coefficients and  $R$ -squared values between the OLS regressions with and without controls, one can compute  $\delta$  to evaluate the robustness of the treatment effect to unobservable selection. Oster [2016] recommends that researchers report the value of  $\delta$  for which  $\beta$ , the coefficient of interest, equals 0. Values of  $\delta$  greater than 1.00 suggest a robust result, such that for unobservable factors to result in a treatment effect of zero, they would need to be as important as the observable controls.

We report the estimates of  $\delta$  for each of our enforcement outcomes. Because the procedure uses OLS estimates, we use OLS regression with the logged dependent variables (reported in table 8, panel A). In panel C of table 8, we report that  $\delta$  is greater than 1.00 for each of the enforcement outcomes except prison sentences. With a  $\delta$  of 1.129 for firm penalties (2.079 for employee penalties, 3.322 for other penalties), the results suggest that unobservable factors would need to be 1.129 (2.079, 3.322) times as important as the observable control variables (which are based on the SEC's and DOJ's guidelines) to render a null effect. When we repeat this analysis using binary dependent variables that indicate whether the particular penalty was assessed (consistent with the Logit model reported in panel A of table 8), we find similar results for firm penalties, but less robust results for the other outcomes. Overall, these results give us increased confidence that endogeneity stemming from unobserved heterogeneity is unlikely to explain our results.<sup>21</sup>

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<sup>21</sup> We report the Oster [2016]  $\delta$  coefficients for each of the enforcement outcome variables, even where the coefficient on *Whistleblower* is insignificant in the OLS regressions, because we believe the analyses are informative in gauging how large the unobservable selection concerns are in our setting.



*6.2.3. Treatment Effects.* Treatment effects analysis is an econometric technique that alleviates selection bias as well as the missing counterfactual problem inherent in observational data (e.g., we cannot observe the outcome of each enforcement action both with and without whistleblower involvement) (Greene [2012]). This approach utilizes covariates to make the treatment (i.e., whistleblower involvement) and the outcomes (i.e., monetary penalties and prison sentences) independent after conditioning on these covariates. We employ inverse-probability-weighted regression adjustment (IPWRA) to estimate the average treatment effects on the enforcement actions with whistleblower involvement. We find little evidence of an association between whistleblower involvement and firm or employee penalties (untabulated), but modest evidence of a positive association when we examine total penalties (the sum of firm and employee monetary penalties) ( $p < 0.10$ ).

### 6.3 OTHER SENSITIVITY TESTS

Because OSHA received responsibility for handling whistleblower complaints related to financial misrepresentation after the passage of the Sarbanes-Oxley Act, a majority of our whistleblowing events occur in the post-Sarbanes-Oxley period and our primary analyses above focus on these enforcement actions. However, we repeat the analyses from table 4 using all 1,133 enforcement actions whose violation period was subject to the provisions of Sarbanes-Oxley dating back to 1978 (including an indicator variable identifying enforcement actions in the post-SOX period). We report these results, which are generally consistent with our findings for the full sample of enforcement actions but with additional significance on some of the control variables, in the online appendix.

## 7. Conclusion

Recent Congressional legislation emphasizes whistleblowing programs at regulatory agencies such as the SEC, CFTC, and the IRS. Although policy makers and regulators often tout the importance of whistleblowers, whether whistleblower involvement is associated with outcomes of enforcement actions remains unclear. We empirically estimate the association between whistleblowers and outcomes of enforcement actions for financial misrepresentation.

Using data obtained through a Freedom of Information Act filing and other regulatory proceedings' documents to identify potential whistleblower involvement in regulatory enforcement actions for financial misrepresentation, we investigate whether whistleblower involvement is associated with increased monetary penalties against firms, and larger monetary sanctions and longer prison sentences against culpable employees. After controlling for the factors the SEC and DOJ indicate are important in determining penalties, we find that, on average, whistleblower involvement is associated with additional firm penalties, larger employee penalties, and longer prison sentences, and that these differences are economically significant. We also find that whistleblower involvement is associated with less

time to discovery (the period from the end of the violation period to the beginning of regulatory proceedings), and that both whistleblowers who emerge before the SEC begins investigating and those who come forward after investigations have begun are associated with differential enforcement outcomes. Although our intention is not to document a causal link between whistleblowers and enforcement outcomes, we conduct various tests to mitigate concerns that unobserved heterogeneity or reverse causality explain the associations we document.

Our findings are subject to several important caveats. For example, most of the whistleblower allegations in our sample are obtained from OSHA, and we cannot directly observe whether the SEC or DOJ actually used the information from each OSHA whistleblower. As a result, these cases represent *potential* whistleblower involvement in an enforcement action. Relatedly, our classification of whistleblowers as either tipsters or nontipsters is measured with error. Further, the distribution of regulator penalties (monetary fines and prison sentences) exhibits severe skewness, which limits our ability to reliably quantify the economic impact of our findings. In addition, some of our findings—particularly our finding with respect to monetary employee penalties—are not stable across alternative estimators (e.g., Tobit and OLS), and should therefore be interpreted with caution. Our sample also pre-dates the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, so our study should not be interpreted as an examination of the efficacy of it or any other whistleblowing program.

A limitation of our setting is that, because we investigate the association between whistleblowers and enforcement outcomes within a sample of firms accused of financial misrepresentation, we cannot speak directly to the ability of whistleblowers to deter financial misrepresentation. However, we believe our finding that whistleblowers are associated with heightened enforcement outcomes provides *indirect* evidence that whistleblowers can play a role in deterring financial misconduct. Further, our setting does not allow us to speak to the costs associated with frivolous whistleblowing complaints because we focus on enforcement actions that allege financial misrepresentation. Therefore, our study is less about whether the whistleblowing allegations are frivolous and is more about whether whistleblower involvement is associated with meaningful differences in enforcement outcomes. In spite of these limitations, this study makes important contributions to the literature on whistleblowing, as well as to policy discussions on the efficacy of whistleblowing and formal whistleblowing programs. These findings are likely of interest to legislators who enact whistleblowing policies, to government officials who prosecute firms and executives accused of wrongdoing, and to targeted firms themselves.

APPENDIX  
*Variable Definitions*

(○) Indicates a dependent variable and (●) an independent variable in the associated table.

	3	4	5	6	7	8	Variable	Definition <sup>#</sup>
●	●	●	●	●	●	●	Big N auditor	An indicator variable equal to one if the misreporting firm used a Big N auditor, and equal to zero otherwise.
●	●	●	●	●	●	●	% Blockholder ownership	The percentage of blockholder ownership, defined as owners with at least five percent of common shares outstanding from the last 10-K or DEF 14A prior to the first public announcement the firm may be (is) subject to a regulatory enforcement action; winsorized at the 1 <sup>st</sup> and 99 <sup>th</sup> percentiles.
●	●	●	●	●	●	●	Bribery	An indicator variable equal to one if the enforcement actions includes charges under the Foreign Corrupt Practices Act for bribery of a foreign official and zero otherwise.
●	●	●	●	●	●	●	# C-level respondents	The natural logarithm of the total number of C-level respondents (e.g. CEO, COO, CFO, CAO, CMO, and CIO) named in the enforcement action.
●	●	●	●	●	●	●	# Code violations	The natural logarithm of the total number of unique code sections and rules violated (charges) associated with the enforcement action.
●	●	●	●	●	●	●	Cooperation	An indicator variable equal to one if the firm received credit in the assessment of penalties for cooperation as stated in regulatory enforcement documents during the course of the investigation and equal to zero otherwise.
●	●	●	●	●	●	●	Deterrence	An indicator variable equal to one if the violation includes an offense for either option backdating, insider trading, or an offense related to an offering, IPO, merger, or reverse merger and equal to zero otherwise.
●	●	●	●	●	●	●	Discovery period	The time elapsing between the end of the violation period and the beginning of the regulatory proceedings period.

(Continued)

## APPENDIX—Continued

	3	4	5	6	7	8	Variable	Definition <sup>#</sup>
	●	●	●	●	●	●	Distance from regulator	The natural logarithm of the distance in miles from the location of the firm's headquarters to the offices of the regulator assigned to the geographic area of the firm's headquarter location (closer of the SEC Regional Office or DOJ U.S. District Attorney).
	○	○	○	○	○	○	Employee penalties (\$MM)	The total civil and criminal penalties assessed against all employees consisting of disgorgement, prejudgment interest, civil fines, criminal restitution, and criminal fines in millions of dollars. We use transformations of this measure in table 8.
	●	●	●	●	●	●	Executive terminated	An indicator variable equal to one if the firm terminated an executive respondent as a result of the violations and equal to zero otherwise.
	○	○	○	○	○	○	Firm penalties (\$MM)	The total firm civil and criminal monetary penalties assessed against the firm, its parent and subsidiaries consisting of disgorgement, prejudgment interest, civil fines, criminal restitution, and criminal fines in millions of dollars. We use transformations of this measure in table 8.
	●	●	●	●	●	●	Fraud	An indicator variable equal to one if fraud under 15 USC §§ 77q, 78j(b), or rules promulgated thereunder are included among the charges in the enforcement action.
	●	●	●	●	●	●	Impeded investigation	An indicator variable equal to one if regulators acknowledged they were deliberately misled and/or charges were included for lying to investigators and equal to zero otherwise.
	●	●	●	●	●	●	% Independent directors	The percentage of the firm's directors that are independent from the last 10-K or DEF 14A prior to the first public announcement the firm may be (is) subject to a regulatory enforcement action; winsorized at the 1 <sup>st</sup> and 99 <sup>th</sup> percentiles.

(Continued)

## APPENDIX—Continued

	3	4	5	6	7	8	Variable	Definition <sup>#</sup>
	•	•	•	•	•	•	% Initial abnormal return	The value-weighted market-adjusted return measured at the close of trading on the initial public announcement date that the firm may be (is) subject to a regulatory enforcement action; winsorized at the 1 <sup>st</sup> and 99 <sup>th</sup> percentiles.
	•	•	•	•	•	•	Leverage ratio	Total debt divided by total assets measured at the last fiscal year end prior to the first public announcement the firm may be (is) subject to a regulatory enforcement action; winsorized at the 1 <sup>st</sup> and 99 <sup>th</sup> percentiles.
	•	•	•	•	•	•	Market-to-book ratio	The sum of market value of equity plus total assets minus total debt divided by total assets with market value determined below and total assets and total debt measured at the last fiscal year end prior to the first public announcement the firm may be (is) subject to a regulatory enforcement action; winsorized at the 1 <sup>st</sup> and 99 <sup>th</sup> percentiles.
	•	•	•	•	•	•	Market capitalization	The natural logarithm of the market value of equity measured in millions of dollars prior to the first public announcement that the firm may be (is) subject to a regulatory enforcement action.
	•	•	•	•	•	•	Misled auditor	An indicator variable equal to one if the violation included violations of 17 CFR 240.13b2-2 that prohibits materially false or misleading statement to an accountant in connection with the preparation of financial statements and zero otherwise.
	•	•	•	•	•	•	Organized crime	An indicator variable equal to one if violation or any of the respondents were associated with a known organized crime family and zero otherwise.

(Continued)

## APPENDIX—Continued

	3	4	5	6	7	8	Variable	Definition <sup>#</sup>
				○			Other penalties	The total firm civil and criminal monetary penalties assessed against the agent firms and/or respondents (e.g., the audit firm, bankers, suppliers) in connection with the financial misrepresentation of the target firm, in millions of dollars.
○	○	○	○			○	Prison sentences (mos.)	Total incarceration consisting of jail, prison, home detention, and halfway house in months imposed upon employee respondents named in the enforcement action.
●	●	●	●	●	●	●	Recidivist	An indicator variable equal to one if the firm was previously the subject of a securities regulatory enforcement action and equal to zero otherwise.
					○		Reg. proceedings period	The time period over which the regulatory proceedings occurred in months.
●	●	●	●	●	●	●	Self-dealing	An indicator variable equal to one if the violation includes self-dealing such as embezzlement and theft by respondents and equal to zero otherwise.
●	●	●	●	●	●	●	Violation period	The natural logarithm of the total time the violation occurred in months as indicated in the regulatory enforcement proceedings. An independent variable in the primary regression analyses; the dependent variable or an independent variable in different duration analyses in table 7.
●	●	●	●	●	●	●	Whistleblower	An indicator variable equal to one if a whistleblower is associated with the enforcement action and equal to zero otherwise.

(Continued)

## APPENDIX—Continued

	3	4	5	6	7	8	Variable	Definition <sup>#</sup>
			•	•	•		Whistleblower (Tipster)	An indicator variable equal to one if a "tipster" whistleblower may be associated with the enforcement action and equal to zero otherwise. This designation is our default assignment for enforcement actions associated with a whistleblower, whether based on regulatory proceedings documentation or whistleblower allegations obtained from OSHA Freedom of Information Act requests. We code whistleblowing allegations as "tipster" complaints unless we have specific information noting that the whistleblower involvement occurred after the later of (1) the end of the violation period or (2) the earlier of the regulatory inquiry or investigation date (if known).
			•	•	•		Whistleblower (Nontipster)	An indicator variable equal to one if a "nontipster" whistleblower may be associated with the enforcement action and equal to zero otherwise. We use this designation if the date of the complaint filed with OSHA in the freedom of information request documents or information from the regulatory proceedings documents specifies a whistleblower complaint date after the later of (1) the end of the violation period or (2) the earlier of the regulatory inquiry or investigation date (if known).

<sup>#</sup>For firm-level data unrelated to the enforcement activity (e.g., % Blockholder ownership, % Independent directors, Market-to-book ratio), we use the most recent data, as of the earlier of the end of the violation period and the first public announcement of financial misrepresentation, if available. Otherwise we use data from the first fiscal year available after the earlier of these two dates. The FOIA whistleblower cases reflect all cases for which we can identify a Compustat gkey, which we use to merge with the SEC enforcement action database.

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