

DO HEADS ROLL?

AN EMPIRICAL ANALYSIS OF CEO TURNOVER AND PAY WHEN THE CORPORATION IS FEDERALLY PROSECUTED

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Abstract

Does the criminal prosecution of a corporation affect the CEO? Or do criminal actions directed at the organization itself pose few consequences for the individuals at the top, and the CEO in particular? While CEOs are rarely themselves prosecuted, organizations could discipline CEOs through paycuts or outright replacing the CEO in response to a criminal prosecution. We sought to examine whether and how that occurs. We focus our analysis on a dataset of public companies that settled criminal cases brought by federal prosecutors from 2000-2014. We compared those companies to the larger set of companies in the Execucomp database of S&P 1500 firms, focusing on CEO compensation and turnover during the same time period. We examined the time period before and after prosecution, and the year that the company resolved the criminal charges against the company. We found that in the year that the company settled its prosecution, through a guilty plea or a deferred or non-prosecution agreement, there was a significantly higher level of CEO turnover. However, we do not find evidence of CEO pay cut. Second, for the prosecuted firms that did *not* have CEO turnover after prosecution, there is no evidence of a reduction in compensation. Indeed, we observed a *spike* in CEO bonuses in the year of prosecution—confirming concerns expressed by judges, prosecutors, lawmakers, and academics that corporate prosecutions do not sufficiently impact high-level decision-makers like CEOs. For the prosecuted firms that *did* have CEO turnover after prosecution, there is some evidence of a pay cut, both to salary and bonus, prior to the replacement of the CEO. These results raise larger questions whether federal prosecutors targeting the most serious corporate crimes sufficiently incentivize accountability at the top.

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Introduction

When a major bank or corporation is prosecuted, then-U.S. Attorney for the Southern District of New York Preet Bharara famously explained that the company facing charges will present a “Chicken Little routine” describing the dire consequences of a prosecution for the company, but that typically, after settling the criminal case, “the sky does not fall.” Instead, Bharara maintained, all too often “the sky brightens,” the firm is seen as having put its problems behind it, and “the CEO even gets a raise.” (Bharara, 2011). Other commentators have been skeptical that prosecutions of a company alter behavior of high-level officers such as CEOs. Some have argued that it takes individual-level prosecutions to deter corporate crime. “That, to me, achieves great deterrence, when a white-collar executive of a company says, ‘Wow, if I break the law, there is a chance that I could go to jail,’” as Judge John S. Martin, Jr. has put it. (Martin, 2006).

To be sure, sometimes, the CEO appears to be affected by a possible prosecution of the company. The CEO of Wells Fargo stepped down without any criminal prosecution initiated, after civil enforcement and high-profile Congressional hearings brought public attention to bear on unlawful sales tactics the bank used. (Glazer, 2016).

Are CEOs punished for corporate crime, or do they remain above the fray entirely, or do they even receive rewards, like a pay raise? CEO compensation has continued to dramatically rise in the United States, and perhaps that rise is insensitive to serious misconduct or even crimes at a company. Even if a firm is responsive to a corporate prosecution and attempts to clean house, perhaps it might not hold those at the top accountable. A firm might be correct not to hold a CEO responsible. A CEO may not have been involved in the crime and might not have been in the best position to detect or prevent the activity. A firm can be federally prosecuted for the actions of employees or officers at any level.

If firms do hold the CEO accountable, we wondered how: by firing a CEO, or reducing pay or bonuses to reflect the harm of a criminal prosecution? If firms hold executives accountable in different ways, we wondered what characteristics might explain those differences. These questions have not been explored in the literature. We aimed to examine those questions, enabled by a hand-collected data set concerning public companies that settled criminal cases brought by federal prosecutors from 2000-2015. We compared those companies to the larger set of companies in the Execucomp database of S&P 1500 firms, focusing again on CEO pay and turnover during the same time period.

On the theory that CEO compensation is closely connected to performance, one might expect CEOs to be rewarded for criminality, before it is detected if fraud or rule-breaking allowed the company to achieve higher

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returns. Once the company is caught and prosecuted, however, one might expect the CEOs fortunes to change along with that of the company. If criminal prosecutions are treated as a more serious failure of governance than civil violations, perhaps the Board would dismiss the CEO to restore the company's reputation and leadership. Or perhaps profitable risk-taking would continue to be rewarded by management and shareholders. Perhaps, if the CEO did not personally know of the criminal actions, a CEO can often make the case that any compliance failures were not leadership failures and will be corrected going forward. Federal prosecutions of the CEOs themselves are comparatively quite rare. (Garrett, 2015). Having resolved a criminal case, perhaps the CEO would be rewarded for having navigated a difficult time for the company. We were uncertain whether CEOs would suffer adverse consequences when corporations are prosecuted or receive outright rewards, as U.S. Attorney Bharara suggested.

We began our research with a set of hand-collected data concerning each federal prosecution of an organization from 2000 to present, assembled by one of the authors. We then focused on the public companies for which data was available in the Execucomp database—our sample consisted of 109 public companies, listed in Appendix A. We examined the time period before and after prosecution, and the year that the company resolved the criminal charges against the company. We found that in the year that the company settled its prosecution, through a guilty plea or a deferred or non-prosecution agreement, there was a significantly high level of CEO turnover in the year of prosecution. The result is driven by forced turnovers, as classified by Jenter and Kanaan (2015) and Peters and Wagner (2014). Appendix B displays the list of twenty-five CEOs replaced in the prosecution year. However, we do not find evidence of a CEO pay cut. Focusing on the prosecuted firms that did not experience CEO turnover after the prosecution, we observe a *spike* in bonus in the year of prosecution—confirming U.S. Attorney Bharara's concerns. Second, for the prosecuted firms that do have CEO turnover after prosecution, there is some evidence of a pay cut prior to replacement of the CEO. Specifically, salary and bonus are significantly lower in the year prior to prosecution.

These results suggest that CEOs are not always disciplined in criminal matters, and that only a subset of firms hold CEO's accountable after a criminal prosecution.¹ This runs contrary to the stated purpose of corporate criminal prosecutions: federal prosecutors say that they target the entire corporation only when the governance and compliance failures are particularly systemic and pervasive, tolerated or encouraged by higher-ups, and not just due to conduct by isolated rogue employees. If CEOs at the firms prosecuted for particularly systemic criminal violations do not face adverse internal

¹ This study focuses on prosecutions' immediate consequences to CEOs such as turnover and pay cut. Prosecutions may also have long-term career consequences such as reputation penalties. We do not study long term career consequences in this paper. However, given that we do not find the short-term consequences impactful, it is unlikely that the long-term career effect (if any) will be more significant.

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consequences, then the disciplinary and deterrent effect of criminal prosecutions is cast into doubt, particularly because CEOs themselves are rarely prosecuted. (Garrett, 2015). To be sure, research suggests that forced turnover among CEOs has in general declined during the past fifteen years. (Karlsson, 2015). Perhaps criminal prosecutions of corporations have increased at a time when CEOs have become increasingly insulated from firing for any reason at all.

These findings also implicate the goals of modern executive compensation, designed to align interests of executives with firm performance by making compensation incentive based. Perhaps use of bonuses and other perks can increase incentives to be productive. However, many have criticized the structure of modern executive compensation and the agency problems it can create (e.g. Bebchuck 2003), based on a concern that it promotes short-term decisions or undue risk taking, and still more have criticized the sheer size of CEO compensation in particular and the remarkable rise of CEO pay over the past three decades. (Mishel 2015). Scholars have long argued that badly aligned compensation, including CEO compensation, can create incentives for corporate crime (Arlen, 1997). An underlying concern is that the structure of CEO compensation in particular may contribute to rule-breaking. Some studies suggest that the financial incentives of CEOs are far greater (50% greater) at firms that engage in fraud, including Burns and Kedia 2006; Bruner, 2008; Peng, 2008, Johnson, 2009; and Feng, 2011.

The first Part of this Article describes the legal standards for federal corporate prosecutions and the current practices and guidelines for prosecuting corporations, as well as data concerning the relatively infrequent prosecution of individuals and CEOs of those companies. Second, we describe our data sources, including hand-collected data concerning public firms prosecuted between 2000 and 2015, and executive compensation and turnover data. Third, we present our results. Finally, we conclude and describe the implications of these results for future research and policy.

I. How Corporations and CEOs are Prosecuted (and Not)

Corporations may be prosecuted in federal court for the criminal actions of any employee or agent, intended at least in part to benefit the corporation.² That superior standard makes corporations derivatively liable for the actions of agents. High-level employees need not have been involved in the wrongdoing or aware of it. That said, for certain federal misdemeanors, under the responsible corporate officer doctrine, an executive or other responsible officer may be held criminally liable for a violation that the officer was not personally aware of.³ Due to that structure of the federal criminal corporate liability doctrine, it is often not known how often CEOs were themselves aware of

² N.Y. Cent. & Hudson River R.R. v. United States, 212 U.S. 481, 491–95 (1909).

³ U.S. v. Dotterweich, 320 U.S. 277 (1943); U.S. v. Park, 421 U.S. 658 (1975).

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corporate criminality. Typically, prosecutors do not report which officers or employees were involved or aware of the misconduct. Corporations do not typically report the results of their internal investigations, either.

In some cases, if the CEO was personally involved and then subject to civil or criminal enforcement, it is certainly public information that the CEO committed a crime. There are a few high-profile examples of this occurring. For example, the chairman and CEO of Halliburton personally met with Nigerian officials and arranged to pay bribes to secure a multi-billion-dollar contract, receiving a personal kickback, actions that later became the subject of FCPA prosecutions.⁴ Bernard Ebbers, former CEO of Worldcom, received a 25 year sentence, a \$30 million fine, and was ordered to transfer all of his assets to the court.⁵ However, CEOs are rarely prosecuted. Department of Justice (DOJ) policy has long emphasized that “[o]nly rarely should provable individual culpability not be pursued, particularly if it relates to high-level corporate officers.”⁶ Yet of 306 deferred and non-prosecution agreements entered by federal prosecutors from 2001-2014, only 104 companies, or 34% had individuals prosecuted, and of those, only 26 were CEOs. (Garrett, 2015, at 1791). In Fall 2015, DOJ revised guidelines for prosecution of organizations to emphasize the importance of investigating potentially culpable individuals in corporate cases.⁷

To be sure, civil enforcement may also substantially affect CEOs. The Department of Health and Human Services, for example, has filed civil cases to exclude CEOs and other officers from participating in federal health care programs for time periods ranging from months to years to permanent exclusions, effectively making it impossible to continue in their positions. While very little work has examined executives at companies that have been criminal prosecuted, more studies have examined executives at companies that committed fraud, typically civil fraud. One might predict that more serious criminal cases would affect executives and CEOs far more than mere civil enforcement actions. We aimed to examine that question. Studies have found that when employees are identified as responsible parties by the SEC, they are highly likely to be fired and to face prosecution (Karpoff 2008). Studies have also found that when crimes are committed, firms are highly likely to fire employees even when they do not report the conduct to regulators (Healy, 2016). Whether those results extend to higher-up individuals and even CEOs, however is more equivocal. One study has found that more senior executives face less severe internal discipline, as do male executives (Healy and Serafeim 2016). Moreover, the question also remains how often responsible employees

⁴ James Pinkerson, Former KBR Exec. Gets Prison Time in Nigerian Bribery Scheme, Hous. Chron. (Feb. 23, 2012).

⁵ Jennifer Bayot, Ebbers Sentenced to 25 Years in Prison for \$11 Billion Fraud, N.Y. Times (July 13, 2005).

⁶ See U.S. Dep't of Justice, U.S. Attorneys' Manual §9-28.200 (2015), at <http://www.justice.gov/opa/documents/corp-charging-guidelines.pdf>.

⁷ See id.

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are identified internally by the corporation. A few studies have found no differences in employment or turnover at firms found to have engaged in securities fraud. For example, Beneish (1999) found no change in employment in firms that did manipulate earnings (also finding that the SEC was unlikely to disbar executives). Another study by Agrawal et al. (1999) found companies charged with fraud did not have significantly higher turnover of senior managers or directors. Each of those studies provide some reason to be skeptical whether corporate criminal prosecutions would result in CEO discipline in the form of turnover; whether CEO compensation would be affected is less clear from the literature.

When CEO's are held individually accountable, through criminal or civil actions, the company or its D&O insurers will typically bear the costs of legal fees for the defense, which may run in the tens of millions. A company can also choose to fire its CEO. Its ability to do so may depend on the terms of the CEO's contract. The contracts typically state that a felony conviction is cause for termination, as well as gross misconduct or deliberate neglect of duties. However, the CEO may often not have been personally involved in the criminal conduct at issue; the company would have to show recklessness or deliberate neglect in supervision of those who committed the crimes. It is rare for CEOs to challenge their dismissals, but when it does occur, the costs can be quite burdensome for the company. (Lublin, 2014) The larger costs to shareholder value of replacing a CEO, including severance, search costs, and transition costs to performance, can run in the billions. (Karlsson, 2015).

Corporate prosecutions can have multiple goals, including obtaining cooperation in prosecuting individual offenders, compensating victims, and deterring future crime, but also changing the governance of a company. Few corporate prosecution agreements call for replacement of a CEO or altering CEO compensation. One exception was the Bristol-Myers Squibb deferred prosecution agreement entered with the U.S. Attorney's Office for the District of New Jersey, which required the company to separate the positions of CEO and chairman of the Board. In 2006, following revelations of new misconduct, the independent monitor appointed by the federal prosecutor requested that the CEO be replaced. More commonly, agreements require reporting of a chief compliance officer to the Board, or other changes designed to enhance the compliance function. When pay is addressed, it is typically compensation of lower-level employees that may have had financial incentives to break the law, or provisions requiring claw-backs of bonuses for employees that break rules. Prosecution agreements have not addressed the compensation of high-level officers, much less CEOs. Any changes to such compensation have not come at the direction of federal prosecutors.

II. Data and Research Design

A. Data Sources

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The data concerning corporate prosecutions comes from a hand-collected set of data concerning corporations prosecuted from 2000 to 2014, by federal prosecutors, and which settled their cases through deferred and non-prosecution agreements as well as plea agreements. These data are maintained by Brandon Garrett and Jon Ashley, and are available online in a Corporate Prosecution Registry.⁸ When public corporations are federally prosecuted they are typically not convicted. In the majority of cases, public corporations receive deferred or non-prosecution agreements. (Garrett, 2014, 62). Such an agreement permits the company to avoid an indictment and a conviction—there is no criminal record. Deferred prosecution agreements are filed in a federal court, but upon filing, the parties agree to waive Speedy Trial Act rights. If the company complies with the terms of the agreement, following a predetermined period of time usually two to three years, then the case is then dismissed from the judge’s docket. (Garrett, 2014, 63). Non-prosecution agreements are not filed in court, but consist in an agreement not to prosecute if the company follows through with the terms of the deal. These agreements commonly impose criminal fines, other penalties, payments to victims using restitution or forfeiture payments, as well as terms requiring ongoing cooperation in investigations, imposition of corporate monitors, compliance programs, and other changes to governance. (Garrett, 2014, 72-75). Plea agreements are also entered with public companies, and a guilty plea brings with it a criminal conviction and typically some period of probation, including court-supervised probation if the judge is concerned with monitoring a company’s compliance. Corporate prosecution agreements of all types are also commonly accompanied by civil enforcement and settlements with regulatory agencies. (Garrett, 2014, 68).

The corporations prosecuted and studied from this dataset were then examined in the Execucomp dataset, which has detailed compensation data for the top five highly paid officers in each firm. There are 353 public companies in the Corporate Prosecution Registry (as of this writing), in cases brought from 1992 through 2018. However, the intersection of Execucomp with our list of prosecuted companies yields a usable sample of 109 firms (see appendix A for a list of these firms along with the charges filed).⁹ For each firm, we examined executive pay and turnover for the three years prior to and following the year of prosecution. We also have information about the type of crime that each firm was prosecuted for. These crimes range widely from financial crimes

⁸ See Brandon L. Garrett & Jon Ashley, *Corporate Prosecution Registry*, at <http://lib.law.virginia.edu/Garrett/corporate-prosecution-registry/index.html>.

⁹ The full corporate prosecution data set contains 265 prosecutions among NYSE and NASDAQ firms in the 2000-2014 period. Execucomp only covers firms that have been (currently or historically) in the S&P 1500 index and a small number of additional firms (around 3,000 firms in total by 2017), with many firms not consistently covered over time. After merging the two data sets, 109 unique Execucomp firms can be linked to at least one prosecution in the sample period.

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such as fraud, to bank secrecy act provisions, environmental violations, pharmaceutical regulations, international sanctions, and foreign bribery-related crimes. (Garrett, 2014, 64). And finally, we also have hand-collected information about whether any executives were prosecuted, focusing here on CEOs. For some companies, CEOs might turn over, but there may not be any prosecution of the CEO or other individuals. Or one might imagine that the CEO might be prosecuted, but with charges eventually dropped and no turnover in the position.

B. Research Design

To examine the consequences of criminal prosecution of CEOs, we compared the patterns of CEO turnover and compensation of prosecuted firms to the other firms on the Execucomp database. In other words, our research design can be viewed as akin to a difference-in-difference (DID) strategy. To formalize the design, we first group firms into two categories: prosecuted firms and control firms. Prosecuted firms are defined as public firms that were prosecuted by federal prosecutors for which we were able to collect at least one year of data both before and after the prosecutions. Control firms are public firms on Execucomp without prosecutions in the sample period. Firms that were prosecuted but do not have sufficient data to estimate the regressions discussed later are excluded from the sample.

A challenge related to the use of a standard (DID) design is that we are ex ante uncertain about the ideal way to think about event time. Specifically, the time window from the first revelation of criminal activities to prosecution and final settlement can potentially span several years and is not available in all cases. If the board decides to penalize the CEO, the penalty may be observed at any of point in that window. To deal with this challenge, we modify the standard DID specification by allowing the treatment status of a firm to interact with the year relative to prosecution year. In particular, we estimate the following regression

$$Y_{i,t} = \sum_{k=-2}^3 \beta_k \text{Prosecution}(k)_{i,t} + \Gamma \text{Controls}_{i,t-1} + \delta_i + \eta_t + \epsilon_{i,t} \quad (1)$$

where $Y_{i,t}$ is the outcome variable, such as turnover indicator or total pay. $\text{Prosecution}(k)_{i,t}$ refers to a series of indicators of the k^{th} year relative to the prosecution. In other words, $\text{Prosecution}(k)_{i,t}$ equals 1 if and only if in year t , firm i is prosecuted in year $t-k$. The only exception is $\text{Prosecution}(3)$ which equals one for not only the third year after prosecution but also subsequent years after the third. We do not include indicators for observations three or more years prior to prosecution, as these observations serve as bench mark. $\text{Prosecution}(k)_{i,t}$ is always zero for firms that are never prosecuted. For firms

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with multiple prosecutions, we code $Prosecution(k)_{i,t}$ based on only the first prosecution for simplicity. Our main interest is β_k coefficients of the indicator variables. The coefficients tell us whether, conditional on firm and year effects, firms have more CEO turnover or lower CEO pay around prosecutions compared to three or more years prior to the prosecutions.

$Controls_{i,t-1}$ is a vector of control variables, including book assets (in natural logarithm), book-to-market ratio, sales growth, CEO age, industry stock return and firm stock-returns. All control variables are measured with one-year lag. δ_i and η_t are firm fixed effects and year fixed effects, respectively. Firm fixed effects help us control for unobserved time-invariant firm characteristics. For example, a firm that operates in a risky environment may have both a high probability of prosecution and higher CEO turnover on average, even if there is no causal association between prosecution and CEO turnover. Year fixed effects control for aggregate trends in CEO turnover and CEO pay in the sample period, such as the passage of FAS 123R that precipitated a preference for restricted stock relative to stock options in CEO pay.

The specification in equation (1) represents a generalized difference-in-difference design, where the coefficient is allowed to vary by the number of years relative to treatment time. In other words, instead of examining the average change of turnover probability or compensation level, we examine how these variables evolve year over year relative to the year of the prosecution. This refinement provides two advantages. First, assuming the CEO is penalized, we do not know ex ante when the actual penalty is imposed on the CEO. Considering the years before the actual prosecution enables us to account for the possibility that the board holds the CEO accountable for the misbehavior even before the firm is prosecuted. Second, penalties in the form of a CEO firing or a pay cut, should they occur, are likely to be temporary. Even if we are willing to assume that penalties are imposed on the CEO after the prosecution, it is unlikely that the prosecuted firm would have persistently higher probability of turnover or a persistently lower level of pay after the prosecution.

We use the difference-in-difference design because it directly answers our research question, i.e., whether prosecuted firms' managers experience turnover/pay cut relative to those of not prosecuted firms. DID designs are also commonly used with experimental settings in the law and economics literature for causal interference. Since we do not see prosecutions as natural experiments, we do not claim the ability to make sharp causal inference from our results.

That being said, it may be helpful to discuss the key identification assumption of DID, parallel trend, under our setting. The assumption states that the outcomes of the treated units and the control units should trend similarly if there is no treatment. Since the counterfactual outcomes cannot be observed, we cannot empirically verify the assumption. To alleviate the

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concern that prosecuted firms and the control firms have different CEO turnover/pay trends in the absence of prosecution, we conduct a placebo test after the main analysis Section III. E. In addition, as will be discussed in Section III. B, we repeat the main test within the sample of prosecuted firms by exploiting the timing the prosecutions.

III. Results: Corporate Prosecutions, CEO Turnover, and CEO Compensation

A. Descriptive Data

Table 1 panel A presents the year in which 109 of the prosecuted firms appear.¹⁰ Viewing that list of companies, displayed in Appendix A, one can observe how the numbers of public companies prosecuted per year increases over the past decade. The types of crimes for which public companies are prosecuted also changes, to some degree. For example, FCPA or foreign bribery prosecutions become far more common after 2005. Other types of prosecutions remain relatively uncommon for public companies, such as antitrust prosecutions and import/export related violations.

¹⁰ Since we only require each prosecuted firm to have at least one year of data both before and after the prosecution, not all prosecuted firms have data for the entire sample period.

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Table 1

This table presents summary statistics. Panel A shows the number of prosecutions in the sample in each year. For each prosecuted firm, we only consider the first prosecution in the sample and ignore repeated prosecutions. Panel B shows the number of prosecuted firms and control firms in each industry. Prosecuted firms are defined as firms that were prosecuted and have at least one year of data both before and after the prosecutions. Control firms are firms without prosecutions in the sample period. Industries are grouped based on Fama-French 48 industry classification. Panel 3 presents the mean and median of CEO pay, CEO turnover rate and other firm characteristics for prosecuted firms and control firms, respectively. The notation *, ** and *** indicate statistically significant at 10%, 5% and 1% level in two-tailed t-tests, respectively. Panel D shows the average CEO turnover rate and CEO pay of prosecuted firms in each year relative to each firm's prosecution.

Panel A: Frequency of prosecution by year

Year	Number of Prosecutions	Percent
2000	1	0.9%
2001	4	3.7%
2002	2	1.8%
2003	4	3.7%
2004	4	3.7%
2005	6	5.5%
2006	11	10.1%
2007	18	16.5%
2008	15	13.8%
2009	9	8.3%
2010	13	11.9%
2011	5	4.6%
2012	4	3.7%
2013	7	6.4%
2014	6	5.5%
Total	109	100.0%

Although the first prosecution in the sample took place in 2000, we start the sample period from 1998 to have sufficient observations to enable measurement of changes in turnover and pay before the prosecution. On average there are seven prosecutions per year, but the period from 2006 to 2010 witnessed a much higher number (13 prosecutions per year). Prosecutions in the sample peak in 2007 (18 firms).

Panel B shows the number of prosecuted firms and control firms in each industry. The control sample consists of 2,801 firms leading to a total of 2,910 firms. The control sample spans from 1998 to 2014. Pharmaceutical, oil and banking sectors have the highest *number* of prosecuted firms, whereas aircraft, agriculture and coal sectors have the highest *percentage* of prosecuted firms.

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Panel B: Number of prosecuted and control firms by industry

Industry	Control Firms	Prosecuted Firms	Total	% Prosecuted	Industry	Control Firms	Prosecuted Firms	Total	% Prosecuted
AGRIC	5	2	7	29%	HLTH	52	1	53	2%
AERO	12	3	15	20%	COMPS	109	2	111	2%
COAL	6	1	7	14%	BUSSV	326	4	330	1%
SHIPS	7	1	8	13%	FIN	82	1	83	1%
OIL	109	13	122	11%	CHIPS	165	2	167	1%
DRUGS	110	13	123	11%	BEER	7	0	7	0%
CHEM	59	6	65	9%	BLDMT	53	0	53	0%
FOOD	51	5	56	9%	BOOKS	20	0	20	0%
LABEQ	49	4	53	8%	BOXES	10	0	10	0%
OTHER	26	2	28	7%	ELCEQ	30	0	30	0%
CNSTR	29	2	31	6%	FABPR	4	0	4	0%
TRANS	73	4	77	5%	FUN	33	0	33	0%
MACH	92	5	97	5%	GOLD	10	0	10	0%
UTIL	122	6	128	5%	GUNS	7	0	7	0%
WHLSL	83	4	87	5%	MEALS	57	0	57	0%
INSUR	128	6	134	4%	MINES	10	0	10	0%
BANKS	218	9	227	4%	PAPER	43	0	43	0%
PERSV	30	1	31	3%	RLEST	7	0	7	0%
RTAIL	171	5	176	3%	RUBBR	14	0	14	0%
HSHLD	42	1	43	2%	SMOKE	5	0	5	0%
MEDEQ	84	2	86	2%	SODA	7	0	7	0%
TELCM	85	2	87	2%	STEEL	50	0	50	0%
CLTHS	43	1	44	2%	TOYS	12	0	12	0%
AUTOS	45	1	46	2%	TXTLS	18	0	18	0%

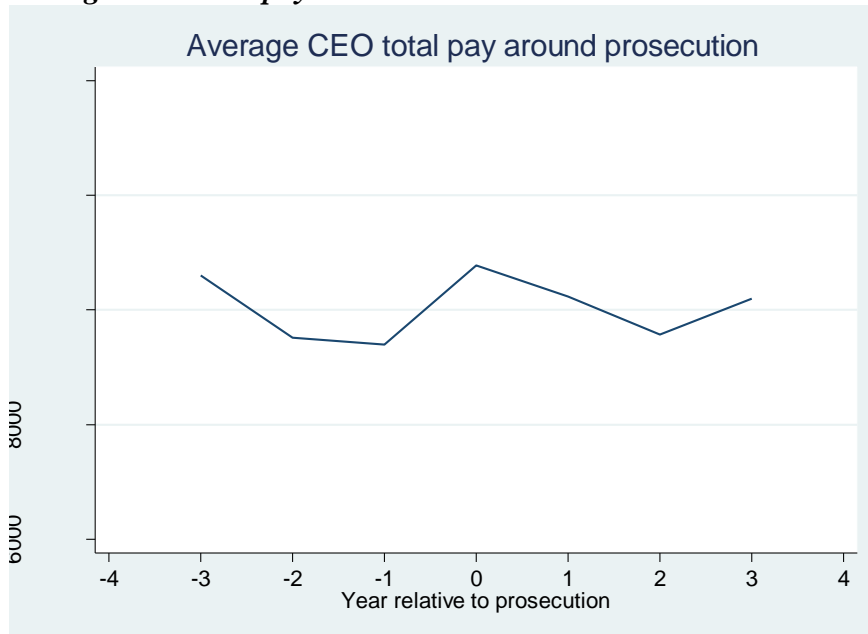
The two figures below display trends of CEO turnover and total pay around prosecution. Panel A and B plot the average CEO turnover rate and CEO pay of prosecuted firms in each year relative to each firm's prosecution, respectively. For each graph, the value at year -3 include the year at t-3 and before; the value at year 3 include the year at t+3 and after, where t indicates the prosecution year.

Figure 1. Average CEO turnover



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Figure 2. *Average CEO total pay*



Panel C presents the mean and median firm characteristics. Prosecuted firms are, on average, larger than the control firms in terms of total assets. The average total book assets of prosecuted firms is \$63 billion whereas that of the control firms is only \$11 billion. Consequently, the prosecuted firms have higher level of CEO pay than control firms on average given prior work that documents a strong association between pay level and firm size (e.g., Gabaix and Landier 2008). Despite the difference in average size, other characteristics between the two groups are marginally different from one another.

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Panel C: Characteristics of prosecuted and control firms

	Prosecuted Firms		Control Firms		Difference	
	# Firm-Year	Mean	# Firm-Year	Mean		
Total Pay (\$1000)	1615	10505	26962	5126	5378	***
Salary (\$1000)	1615	1031	26962	715	316	***
Bonus (\$1000)	1615	2035	26962	965	1070	***
Option (\$1000)	1615	3212	26962	1788	1424	***
Restricted Stock (\$1000)	1615	3323	26962	1252	2070	***
CEO Turnover	1615	0.13	26962	0.11	0.02	**
Total Assets (\$M)	1615	65163	26962	11547	53616	***
Log(Total Assets)	1615	9.22	26962	7.48	1.73	***
Book-to-Market	1615	0.53	26962	0.54	-0.01	*
Return on Assets	1615	0.05	26962	0.05	0.01	***
Sales Growth	1615	0.11	26962	0.12	-0.01	**
CEO Age	1579	56.1	25608	55.7	0.4	**
Stock Return	1615	0.15	26962	0.18	-0.03	*
Std. Dev of Return	1615	0.10	26962	0.12	-0.02	***
Industry Return	1615	0.11	26962	0.11	0.00	

Panel D shows the average CEO pay and turnover probability around prosecutions for prosecuted firms. Figure 1 also presents these trends graphically. Notably, the CEO turnover is at the prosecution year is 23.4% (25 cases), which is almost twice as high as the unconditional average as shown in Panel C. For the prosecuted firms, the total number of CEO turnovers in each of the two years preceding prosecutions is 19 and 16, respectively. For each of the two years immediately after the prosecution year, the number is eight and six. Turnovers are also more frequent than normal in the two years prior to the prosecution, and less frequent in the two years after prosecution. As will be discussed in detail later, only six CEOs are personally charged.

Panel D: Average CEO turnover and pay around prosecution

	CEO Turnover	Total Pay	Salary	Bonus	Option	Restricted Stock
T-3 or before	10.9%	10,605	926	1,645	4,157	2,773
T-2	17.8%	9,518	970	2,094	2,946	2,645
T-1	14.7%	9,394	978	2,361	2,403	3,140
T	23.4%	10,778	1,040	2,498	3,050	3,479
T+1	8.1%	10,234	1,094	1,809	2,507	3,691
T+2	6.7%	9,569	1,102	2,230	1,836	3,468
T+3 or after	11.8%	10,198	1,203	2,441	1,997	3,954

However, this pattern should be interpreted with caution, because it is possible that both prosecution and CEO turnover are triggered by other factors

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unrelated to the question at hand, such as the 2008 financial crisis. In terms of CEO pay, the patterns are far less clear. The average total pay drops in the two years prior to prosecution (from \$10,605,000 to \$9,569,000), but rises in the prosecution year (to \$10,778,000). Overall, the dollar amount of CEO total pay for prosecuted firms remained relatively stable around prosecutions.

B. CEO outcomes in prosecuted firms

Table 2 Panel A presents the results of estimating equation (1) with both prosecuted and control firms. We begin with an examination of the pattern of CEO turnover in column 1. The coefficient for Prosecution(k) is positive for k between -2 to 0 (from two years before the prosecution to prosecution year), but becomes negative for k greater 1 (after the prosecution year). Notably, the estimated coefficient of Prosecution(0) is 0.107, indicating that, after controlling for firm characteristics and time trends, prosecuted firms are associated with a 10.7% increase in the frequency of CEO turnover in the year of prosecution. This increase is also economically significant, as the unconditional turnover probability is around 12%.

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Table 2

This table examines the pattern of CEO turnover and CEO pay around prosecution by regressing CEO turnover or CEO pay on prosecution indicators and control variables. For both Panel A and Panel B, from Column (1) to (6), the outcome variable is CEO turnover indicator, total pay, salary, bonus, option grant value and restricted stock grant value, respectively. Prosecution(k) are a series of indicators of the kth year relative to the prosecution. Control variables include book assets (in natural logarithm), book-to-market ratio, return on assets, sales growth, industry stock return and firm stock return. All control variables are measured with one year lag. All models also include firm fixed effects and year fixed effects. All variables are defined in Appendix. Panel A shows the results of estimating equation (1) using both prosecuted firms and control firms. Panel B presents the results from using prosecuted firms only. All standard errors are clustered at the firm level. Two-tailed t-statistics are shown in parentheses. The notation *, ** and *** indicate statistically significant at 10%, 5% and 1% level, respectively.

Panel A: Whole sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Turnover	Total Pay (log)	Salary (log)	Bonus (log)	Option (log)	Stock (log)
Prosecution(-2)	0.055 (1.30)	-0.010 (-0.13)	-0.182 (-1.60)	-0.155 (-0.53)	0.238 (0.71)	0.088 (0.25)
Prosecution(-1)	0.021 (0.56)	-0.069 (-0.86)	-0.143 (-1.49)	0.052 (0.19)	0.079 (0.23)	0.136 (0.40)
Prosecution(0)	0.107** (2.37)	0.031 (0.31)	-0.006 (-0.10)	0.441 (1.47)	0.739* (1.78)	0.013 (0.03)
Prosecution(1)	-0.036 (-1.17)	-0.052 (-0.52)	0.012 (0.20)	-0.104 (-0.29)	0.486 (1.17)	-0.077 (-0.19)
Prosecution(2)	-0.054* (-1.70)	-0.063 (-0.56)	-0.096 (-1.01)	0.051 (0.13)	-0.207 (-0.44)	-0.127 (-0.28)
Prosecution(3+)	-0.011 (-0.56)	-0.107 (-1.19)	-0.051 (-0.91)	0.150 (0.50)	0.537 (1.19)	0.178 (0.51)
Total Assets (log)	0.015*** (3.01)	0.253*** (12.20)	0.147*** (7.75)	-0.085 (-1.56)	0.332*** (4.53)	0.416*** (5.83)
Book-to-Market	0.023*** (2.78)	-0.179*** (-6.79)	-0.028 (-1.09)	-0.210*** (-2.89)	-0.467*** (-5.61)	-0.151** (-2.00)
ROA	-0.237*** (-7.79)	0.668*** (6.86)	0.309*** (4.43)	0.998*** (4.19)	0.772*** (2.56)	1.045*** (3.71)
Sales Growth	-0.027*** (-3.05)	0.070** (2.16)	0.011 (0.52)	-0.059 (-0.81)	0.262*** (2.79)	-0.317*** (-4.04)
Industry Return	0.025** (1.97)	0.088*** (3.13)	0.026 (1.22)	0.527*** (6.00)	-0.014 (-0.13)	0.108 (1.23)
Firm Return	-0.020*** (-4.87)	0.108*** (8.14)	0.016** (1.97)	0.258*** (8.31)	0.059 (1.48)	0.105*** (3.19)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level	Firm level	Firm level	Firm level	Firm level
Adj. R-squared	0.010	0.648	0.587	0.377	0.427	0.497
Number of observations	28577	28577	28577	28577	28577	28577
Number of firms	2919	2919	2919	2919	2919	2919

Although statistically insignificant, prosecuted firms also have a higher rate of CEO turnover in the two years before prosecution. However, in the two years following the prosecution year, CEOs are less likely to be replaced. This pattern is not surprising because we observe that prosecuted firms replace CEOs much more frequently in prosecution year and would hence be likely reluctant to change their CEO yet again in the following two years. If we assume that the propensity to fire CEO due to prosecution is accurately captured by incremental turnover rates in the prosecution year, then around 10% of the boards are willing to fire CEOs when their firms are prosecuted. However, it is unclear whether the observed CEOs turnovers in the prosecution

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year are (i) forced or voluntary; and (ii) are causally linked. It is possible that CEOs voluntarily resign to avoid public scrutiny.

In columns 2-6, we change the outcome variable to CEO total pay and its four major components: salary, bonus, dollar value of option grants and restricted stock grants (TDC1 from the Execucomp database). We measure pay variables using the natural log of one plus the dollar amount of pay. Surprisingly, we do not find strong evidence for pay cuts around prosecution across all pay variables.

One potential concern about the results related to the full sample is that we have many more control firms than prosecuted firms, and further, that the two groups may differ in both observable and unobservable ways. To respond to this concern, we estimate the same regressions for the subsample of the 109 prosecuted firms only. Every firm has been prosecuted at some point in this subsample. Hence, the variation in the Prosecution(k) variable is attributable entirely to the timing of the prosecution. Table 2 Panel B presents the results, which are similar to the results in Panel A. That is, while we find an increase in CEO turnover in the year of the prosecution, we do not find any consistent change in the compensation for the CEOs around the prosecution year.

Panel B: Prosecuted firms only

	(1)	(2)	(3)	(4)	(5)	(6)
	Turnover	Total Pay (log)	Salary (log)	Bonus (log)	Option (log)	Stock (log)
Prosecution(-2)	0.059 (1.28)	-0.062 (-0.79)	-0.037 (-0.30)	0.120 (0.39)	0.353 (1.08)	-0.184 (-0.52)
Prosecution(-1)	0.031 (0.69)	-0.125 (-1.26)	0.050 (0.42)	0.465 (1.43)	0.288 (0.75)	-0.237 (-0.56)
Prosecution(0)	0.121** (2.21)	-0.032 (-0.24)	0.218 (1.15)	0.944** (2.22)	1.068** (2.16)	-0.429 (-0.91)
Prosecution(1)	-0.021 (-0.50)	-0.114 (-0.90)	0.271 (1.24)	0.538 (1.01)	0.932 (1.58)	-0.556 (-1.00)
Prosecution(2)	-0.046 (-1.03)	-0.111 (-0.72)	0.220 (0.97)	0.828 (1.56)	0.329 (0.48)	-0.593 (-0.89)
Prosecution(3+)	0.013 (0.28)	-0.171 (-1.12)	0.360 (1.42)	1.235** (2.03)	1.345 (1.63)	-0.416 (-0.57)
Total Assets (log)	0.027 (1.40)	0.019 (0.20)	0.189*** (3.58)	-0.078 (-0.32)	0.050 (0.21)	0.355 (1.28)
Book-to-Market	0.020 (0.65)	-0.312*** (-2.82)	-0.274* (-1.84)	-0.744** (-2.15)	-1.002** (-2.56)	0.050 (0.13)
ROA	-0.514*** (-3.45)	1.280*** (3.73)	0.489** (2.25)	-0.262 (-0.21)	1.286 (1.04)	-0.695 (-0.46)
Sales Growth	0.038 (0.82)	0.165* (1.68)	0.129 (0.79)	-0.097 (-0.26)	0.632* (1.72)	-0.245 (-0.67)
Industry Return	0.015 (0.25)	0.066 (0.59)	-0.002 (-0.03)	0.874** (2.35)	-0.060 (-0.12)	-0.079 (-0.15)
Firm Return	-0.015 (-0.55)	0.141** (2.40)	0.005 (0.11)	0.230 (1.51)	0.181 (0.91)	0.224 (1.00)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level	Firm level	Firm level	Firm level	Firm level
Adj. R-squared	-0.004	0.683	0.672	0.279	0.384	0.445
Number of observations	1615	1615	1615	1615	1615	1615
Number of firms	109	109	109	109	109	109

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Because of the higher than usual level of CEO turnover around the prosecution, it is possible that the variation in CEO pay around prosecutions are driven by CEO turnover. Therefore, it is interesting to separately examine firms with CEO turnover around the prosecution year and the firms without such turnover. Firms *without* CEO turnover are particularly interesting for two reasons. First, conditional on the knowledge that the CEO is not fired, the penalty to the CEO, if any, potentially takes the form of a pay cut. Second, the pay variables for the same CEO are more comparable from year to year, potentially making the tests more powerful.

Table 3 presents the results of estimating equation 1 after partitioning the prosecuted firms based on whether or not the prosecutions were accompanied by CEO turnover. In panel A, we remove the prosecuted firms that had CEO turnover in the three-year window (T+1, T, T-1) around prosecution. In other words, the sample consists of control firms and prosecuted firms without CEO turnover around prosecution. We use the same set of five CEO turnover/pay outcome variables, as in Table 2. Overall, the results are similar to those reported in Table 2 Panel A. That is, we do not find evidence of a CEO pay cut when the CEOs are not replaced around prosecutions. In panel B, we retain control firms and prosecuted firms that experienced CEO turnover around the prosecution. This is a potentially less interesting group because the CEO pay outcome variables are likely driven by new compensation contracts of the incoming CEO. There is no consistent evidence of a pay cut in this sub-sample either. However, both the absolute magnitude of estimated coefficient and estimated standard errors are larger in this sub-sample, consistent with the noisy nature of pay changes around CEO turnover.

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Table 3

This table examines the pattern of CEO turnover and CEO pay around prosecution, after partitioning prosecuted firms based on whether the prosecutions were accompanied by CEO turnover. For both Panel A and Panel B, from Column (1) to (5), the outcome variable is CEO total pay, salary, bonus, option grant value and restricted stock grant value, respectively. Prosecution(k) are a series of indicators of the kth year relative to the prosecution. Control variables include book assets (in natural logarithm), book-to-market ratio, return on assets, sales growth, industry stock return and firm stock return. All control variables are measured with one year lag. All models also include firm fixed effects and year fixed effects. Panel A shows the results of estimating equation (1) using both prosecuted firms and control firms, excluding prosecuted firms with CEO turnover in the three-year window (T-1, T, T+1) around the prosecutions. Panel B presents the results after excluding prosecuted firms without CEO turnover in the three-year window (T-1, T, T+1) around the prosecutions. Panel C shows average CEO pay around prosecution for firms that replaced CEO in the prosecution year. The post-prosecution pay variables reflect the compensation to the “old” CEOs replaced in the prosecution year, after they were replaced. Panel D examine the compensation for the replaced CEO around prosecution. The sample consists of 25 prosecuted firms that replaced their CEOs in the prosecution year and all control firms. For prosecuted firms, the pay variables after prosecution reflects the compensation to the “old” CEO replaced in the prosecution year, after they were replaced. Observations for CEOs appointed after prosecution are excluded from the sample. All variables are defined in Appendix. All standard errors are clustered at the firm level. Two-tailed t-statistics are shown in parentheses. The notation *, ** and *** indicate statistically significant at 10%, 5% and 1% level, respectively.

Panel A: No CEO turnover group

	(1)	(2)	(3)	(4)	(5)
	Total Pay (log)	Salary (log)	Bonus (log)	Option (log)	Stock (log)
Prosecution(-2)	-0.103 (-1.02)	-0.142 (-0.99)	-0.135 (-0.37)	-0.295 (-0.67)	0.199 (0.47)
Prosecution(-1)	-0.059 (-0.64)	-0.096 (-0.68)	0.478 (1.54)	-0.054 (-0.12)	0.503 (1.23)
Prosecution(0)	0.011 (0.11)	0.041 (0.79)	0.344 (1.09)	0.474 (0.90)	0.201 (0.43)
Prosecution(1)	-0.002 (-0.02)	0.029 (0.48)	-0.073 (-0.17)	0.445 (0.88)	0.253 (0.53)
Prosecution(2)	-0.025 (-0.24)	0.022 (0.35)	0.110 (0.25)	-0.426 (-0.74)	0.128 (0.23)
Prosecution(3+)	-0.155 (-1.57)	-0.035 (-0.49)	0.130 (0.41)	0.328 (0.58)	0.033 (0.08)
Total Assets (log)	0.259*** (12.53)	0.145*** (7.53)	-0.076 (-1.39)	0.344*** (4.64)	0.424*** (5.88)
Book-to-Market	-0.174*** (-6.67)	-0.014 (-0.58)	-0.180** (-2.49)	-0.448*** (-5.40)	-0.172** (-2.27)
ROA	0.650*** (6.62)	0.315*** (4.47)	1.040*** (4.34)	0.814*** (2.68)	1.040*** (3.66)
Sales Growth	0.067** (2.03)	0.000 (0.02)	-0.063 (-0.86)	0.246*** (2.57)	-0.314*** (-3.95)
Industry Return	0.086*** (3.01)	0.029 (1.35)	0.534*** (6.03)	-0.006 (-0.06)	0.099 (1.12)
Firm Return	0.108*** (8.12)	0.018** (2.35)	0.264*** (8.46)	0.063 (1.57)	0.101*** (3.06)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level	Firm level	Firm level	Firm level
Adj. R-squared	0.646	0.586	0.380	0.426	0.499
Number of observations	27991	27991	27991	27991	27991
Number of firms	2877	2877	2877	2877	2877

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To shed more light on how CEO pay changes when prosecutions are accompanied by CEO turnovers, we focus on the 25 firms that replaced CEO in the year of prosecution (see appendix B). For these firms, we investigate the compensation of the replaced CEO around prosecution. Out of the 25 replaced CEOs, the Execucomp database reports compensation data in the year of prosecution (i.e. the first year they step down) for 16 of the CEOs. Only two of the replaced CEOs have compensation data after the year in which their firms were prosecuted. (We note that we did not study the subsequent careers of CEO's that left a firm, at any new employment they obtained).

Panel B: CEO turnover group

	(1)	(2)	(3)	(4)	(5)
	Total Pay (log)	Salary (log)	Bonus (log)	Option (log)	Stock (log)
Prosecution(-2)	0.146 (1.41)	-0.254 (-1.39)	-0.191 (-0.40)	1.121** (2.31)	-0.083 (-0.13)
Prosecution(-1)	-0.080 (-0.54)	-0.227** (-2.23)	-0.641 (-1.27)	0.313 (0.68)	-0.446 (-0.78)
Prosecution(0)	0.068 (0.33)	-0.091 (-0.82)	0.583 (0.98)	1.182* (1.77)	-0.290 (-0.40)
Prosecution(1)	-0.136 (-0.65)	-0.025 (-0.20)	-0.174 (-0.27)	0.546 (0.75)	-0.637 (-0.88)
Prosecution(2)	-0.139 (-0.52)	-0.343 (-1.35)	-0.081 (-0.11)	0.203 (0.25)	-0.603 (-0.80)
Prosecution(3+)	-0.012 (-0.07)	-0.091 (-1.08)	0.167 (0.27)	0.907 (1.27)	0.494 (0.86)
Total Assets (log)	0.261*** (12.48)	0.147*** (7.49)	-0.094* (-1.68)	0.336*** (4.46)	0.412*** (5.64)
Book-to-Market	-0.175*** (-6.44)	-0.025 (-0.97)	-0.207*** (-2.79)	-0.451*** (-5.33)	-0.144* (-1.88)
ROA	0.664*** (6.69)	0.304*** (4.27)	1.017*** (4.22)	0.728** (2.37)	1.087*** (3.81)
Sales Growth	0.067** (2.04)	0.015 (0.70)	-0.049 (-0.67)	0.261*** (2.71)	-0.327*** (-4.12)
Industry Return	0.091*** (3.15)	0.024 (1.12)	0.500*** (5.59)	-0.018 (-0.17)	0.127 (1.43)
Firm Return	0.107*** (7.97)	0.015* (1.82)	0.254*** (8.09)	0.054 (1.34)	0.104*** (3.14)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level	Firm level	Firm level	Firm level
Adj. R-squared	0.641	0.578	0.378	0.427	0.497
Number of observations	27548	27548	27548	27548	27548
Number of firms	2852	2852	2852	2852	2852

In Table 3 Panel C, we compare the average pay of the replaced CEO in the prosecution year to previous years. We modify our firm-year panels in the following steps. First, we extract the 25 firms that have CEO turnover in the prosecution year. For these firms, we base the pay variables in and after

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prosecution year on the “old” CEOs (i.e. those replaced in the prosecution year). The specific firm-year stream stops when the “old” CEO no longer has pay information, which usually happens right after the prosecution year. CEOs appointed in and after prosecution year are excluded from the sample. Surprisingly, the level of pay in the prosecution year is not much lower than the previous two years. This suggests that CEOs who are replaced around prosecution continue to receive sizable compensation (e.g., severance pay) in the year that they step down.¹¹

Panel C: Average pay for CEOs replaced in the prosecution year

	Total Pay	Salary	Bonus	Option	Restricted Stock	Other Pay
T-3 or before	11,605	812	1,189	3,005	5,454	310
T-2	8,002	896	1,119	2,843	2,342	205
T-1	6,045	840	1,089	1,355	2,151	299
T	10,847	510	667	2,578	5,080	1,925

In Panel D, we combine the modified 25 firms with the control firms and regress total pay on prosecution year indicator (Prosecution(0)) and control variables. The coefficient on prosecution year indicator is negative but not statistically significant. Together with Panel C, there is no evidence for significant drop in pay when the CEOs are placed when the firms are prosecuted.

¹¹ The data does not separately report severance pay from the rest.

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Panel D: CEO turnover around firm prosecution and CEO prosecution

	(1)
	Turnover
Prosecution(-2)	0.055 (1.29)
Prosecution(-2)*Charged	0.014 (0.06)
Prosecution(-1)	0.021 (0.56)
Prosecution(-1)*Charged	0.009 (0.05)
Prosecution(0)	0.103** (2.24)
Prosecution(0)*Charged	0.088 (0.41)
Prosecution(1)	-0.049 (-1.63)
Prosecution(1)*Charged	0.228 (1.11)
Prosecution(2)	-0.045 (-1.34)
Prosecution(2)*Charged	-0.118** (-2.53)
Prosecution(3)	-0.010 (-0.51)
Prosecution(3)*Charged	0.008 (0.12)
Control variables	Yes
Fixed effects	Firm, Year
Standard error clustering	Firm level
Adj. R-squared	0.0103
Number of observations	28577
Number of firms	2919

C. Criminally Charged CEOs

As mentioned earlier, it is hard to ascertain whether the fired CEOs in our sample were forced to step down in connection with the prosecution or whether they were replaced for unrelated reasons. One way to shed some light on this question is to identify CEOs who were individually charged by prosecutors with having committed federal crimes. Six of the 109 firms in our sample are associated with CEOs who were specifically charged in criminal cases related to the case that the corporation resolved in a prosecution

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agreement (Computer Associates, Halliburton Company, Sotheby's Holdings Inc., Alpha Natural Resources, Kellogg Brown & Root LLC, and Wellcare Health Plans, Inc.). Two companies fired such charged CEOs in the year in which the firm was prosecuted (Sanjay Kumar of Computer Associates and Diana Brooks of Sotheby Holdings). One company fired a charged CEO in the year after the year of the prosecution (Heath Schiesser of Wellcare).

Panel C of Table 3 presents compensation data for the two CEOs who were replaced in the year of the prosecution. As can be seen, total pay falls in the year leading up to the prosecution of the firm and the replacement of the CEO. The decline in pay is primarily attributable to lower levels of equity grants (both stock and options) presumably driven by a declining stock price of such firms. Interestingly, salary and bonus remain more or less unchanged in the years leading up to the prosecution. In the year of the prosecution, total pay actually goes up relative to the previous years. A closer look at the composition of pay reveals interesting patterns. Although salary and bonus fall, we observe an increase in the level of option grants, restricted stock grants and “other pay” in the year of the prosecution. The increase of equity pay and “other pay” are likely parts of the severance package for the departing CEO.

Next, we compare the compensation and turnover patterns of CEOs whose firms have been prosecuted with those of CEOs who were specifically charged. To do so, we define an indicator variable labelled “prosecuted CEO” that is set to one if the CEO has been charged. We interact the “prosecuted CEO” dummy with the “Prosecution” indicator. As shown in Panel D, we find that when the CEOs are prosecuted, their turnover is higher but not statistically significant.

Turning to CEO pay, in Panel E of Table 3, when we include the interaction between “Prosecuted” and “Prosecuted CEO” in the CEO pay regression for replaced CEOs, the prosecuted CEOs experience a big and significant drop in total pay in the prosecution year. This data suggests, that relative to the CEOs of firms that were prosecuted, individually charged CEOs of firms that were prosecuted suffer a significant cut in compensation.

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Panel E: Compensation for the replaced CEOs around prosecution

	(1)	(2)
	Total Pay (log)	Total Pay (log)
Prosecution(-2)	0.182 (1.01)	0.076 (0.43)
Prosecution(-2)*Charged		0.286 (1.04)
Prosecution(-1)	-0.230 (-1.11)	-0.117 (-0.60)
Prosecution(-1)*Charged		-2.341*** (-11.91)
Prosecution(0)	-0.312 (-0.79)	-0.009 (-0.02)
Prosecution(0)*Charged		-3.354*** (-7.94)
Total Assets (log)	0.270*** (12.93)	0.269*** (12.90)
Book-to-Market	-0.169*** (-6.31)	-0.169*** (-6.31)
ROA	0.654*** (6.56)	0.654*** (6.55)
Sales Growth	0.063* (1.88)	0.063* (1.90)
Industry Return	0.090*** (3.10)	0.090*** (3.11)
Firm Return	0.107*** (7.98)	0.107*** (7.99)
Fixed effects	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level
Adj. R-squared	0.637	0.638
Number of observations	27187	27187
Number of firms	2835	2835

D. Forced vs. Voluntary Turnover

In Table 2, we document a spike of CEO turnover in the year of prosecution. However, it is unclear whether the incremental turnovers are forced or voluntary. On the one hand, it is natural to expect that board members fire CEOs for the poor management that led to prosecutions; on the other hand, CEOs may voluntarily quit or switch jobs to avoid direct responsibility or additional reputational penalty. To investigate the nature of the CEO turnovers around prosecution, we classify CEO turnovers into two groups, forced and voluntary, based on the data shared by Jenter and Kanaan

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(2015) and Peters and Wagner (2014). Since this turnover data stops at 2010, we use the observations prior to 2010 in our sample for this analysis.

Table 4 presents the results. In the first column, we estimate equation (1) with total turnover, and confirm our turnover results holds for this period. In the next column, we switch the outcome variable to forced turnover, and find forced turnovers increase by 6.6% in the prosecution years.¹² In the third column, we do not find similar result for voluntarily turnovers. However, we find that voluntarily turnovers are relatively rare in the two years following prosecutions. Overall, the results indicate that forced turnovers are primarily responsible for the turnover spike in the prosecution years.

¹² This estimate is likely attenuated because not all CEO turnovers have forced/voluntary classification and we cannot use unclassified CEO turnovers in column (2) and (3).

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Table 4

This table shows the pattern of total, forced and voluntary CEO turnovers around prosecutions. The forced/voluntary classification is based on Jenter and Kanaan (2015) and Peters and Wagner (2014). From Column (1) to (3), the outcome variable is total CEO turnover, forced CEO turnover and voluntary CEO turnover, respectively. Prosecution(k) is a series of indicators of the kth year relative to the prosecutions. Control variables include book assets (in natural logarithm), book-to-market ratio, return on assets, sales growth, industry stock return and firm stock return. All control variables are measured with one year lag. All models also include firm fixed effects and year fixed effects. All variables are defined in Appendix. All standard errors are clustered at the firm level. Two-tailed t-statistics are shown in parentheses. The notation *, ** and *** indicate statistically significant at 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)
	Total Turnover	Forced Turnover	Voluntary Turnover
Prosecution(-2)	0.049 (1.05)	0.027 (1.01)	0.022 (0.56)
Prosecution(-1)	0.028 (0.67)	0.038 (1.33)	-0.009 (-0.28)
Prosecution(0)	0.099* (1.89)	0.066* (1.89)	0.032 (0.76)
Prosecution(1)	-0.054 (-1.56)	0.001 (0.04)	-0.055** (-2.05)
Prosecution(2)	-0.031 (-0.71)	0.032 (0.89)	-0.063** (-2.48)
Prosecution(3+)	0.005 (0.14)	-0.019 (-0.78)	0.024 (0.77)
Total Assets (log)	0.019*** (2.99)	0.002 (0.56)	0.017*** (3.04)
Book-to-Market	0.029*** (3.00)	0.031*** (4.12)	-0.002 (-0.25)
ROA	-0.211*** (-6.13)	-0.139*** (-6.52)	-0.072** (-2.48)
Sales Growth	-0.031*** (-3.05)	-0.009* (-1.69)	-0.021** (-2.35)
Industry Return	0.031** (2.26)	0.016** (2.11)	0.015 (1.27)
Firm Return	-0.018*** (-4.02)	-0.013*** (-5.16)	-0.005 (-1.25)
Fixed effects	Firm, Year	Firm, Year	Firm, Year
Standard error clustering	Firm level	Firm level	Firm level
Adj. R-squared	0.004	0.003	0.000
Number of observations	21920	21920	21920
Number of firms	2836	2836	2836

E. Placebo Test

To further validate that our results are driven by prosecutions, we conduct the following placebo test. For each actually prosecuted firm, a pseudo prosecution is randomly placed in the firm's time series. We then estimate

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equation (1) using the pseudo prosecution instead of actual prosecutions. If, as hypothesized, it is the prosecution that drive the spike in CEO turnover, we expect the placebo test to deliver very different results. If the incremental CEO turnovers stem from unobserved differences between prosecuted firms and the rest, then the placebo test should roughly replicate the findings in Table 2. For CEO pay regressions, since we do not reject the null hypothesis that prosecution does not affect CEO pay, the placebo test is less informative.

As shown in Table 5, the placebo tests give very different results for the CEO turnover regression. None of the pseudo prosecution variable predicts CEO turnover, implying that it is the timing of actual prosecution that leads to the observed increase in turnover in Table 2. Similarly, pseudo prosecutions do not predict any of the CEO pay variables. Overall, the results from the placebo tests suggest that our main findings are not contaminated by unobserved characteristics that could affect CEO turnover or pay trends.

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Table 5

This table shows the results of placebo tests based on randomly generated pseudo-prosecutions. For each actually prosecuted firm, a pseudo-prosecution is randomly placed in the firm's time series with equal probability. From Column (1) to (6), the outcome variable is CEO turnover indicator, total pay, salary, bonus, option grant value and restricted stock grant value, respectively. Prosecution(k) is a series of indicators of the kth year relative to the pseudo prosecutions. Control variables include book assets (in natural logarithm), book-to-market ratio, return on assets, sales growth, industry stock return and firm stock return. All control variables are measured with one year lag. All models also include firm fixed effects and year fixed effects. All variables are defined in Appendix. All standard errors are clustered at the firm level. Two-tailed t-statistics are shown in parentheses. The notation *, ** and *** in indicate statistically significant at 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Turnover	Total Pay (log)	Salary (log)	Bonus (log)	Option (log)	Stock (log)
Prosecution(-2)	0.008 (0.18)	0.049 (0.64)	-0.047 (-0.55)	-0.202 (-0.61)	0.043 (0.11)	0.240 (0.63)
Prosecution(-1)	0.025 (0.57)	0.126 (1.45)	-0.068 (-0.77)	0.155 (0.60)	0.373 (0.97)	0.528 (1.36)
Prosecution(0)	0.014 (0.34)	0.090 (1.09)	-0.064 (-0.73)	0.112 (0.35)	0.073 (0.17)	0.165 (0.42)
Prosecution(1)	-0.038 (-1.17)	0.026 (0.31)	-0.070 (-0.77)	0.241 (0.83)	-0.194 (-0.43)	0.062 (0.15)
Prosecution(2)	-0.002 (-0.05)	0.160* (1.91)	-0.077 (-0.80)	0.201 (0.66)	0.534 (1.14)	0.598 (1.40)
Prosecution(3+)	-0.003 (-0.15)	-0.030 (-0.35)	-0.143 (-1.59)	0.030 (0.09)	0.531 (1.06)	0.404 (1.15)
Total Assets (log)	0.015*** (3.07)	0.253*** (12.24)	0.147*** (7.74)	-0.085 (-1.55)	0.331*** (4.53)	0.415*** (5.82)
Book-to-Market	0.023*** (2.77)	-0.180*** (-6.78)	-0.027 (-1.07)	-0.209*** (-2.86)	-0.466*** (-5.61)	-0.152** (-2.01)
ROA	-0.236*** (-7.77)	0.668*** (6.85)	0.310*** (4.44)	0.999*** (4.20)	0.774*** (2.57)	1.044*** (3.71)
Sales Growth	-0.027*** (-3.06)	0.069** (2.14)	0.011 (0.52)	-0.059 (-0.81)	0.262*** (2.77)	-0.317*** (-4.05)
Industry Return	0.025** (1.98)	0.088*** (3.14)	0.025 (1.18)	0.526*** (5.99)	-0.015 (-0.15)	0.110 (1.25)
Firm Return	-0.020*** (-4.90)	0.107*** (8.12)	0.016** (2.01)	0.258*** (8.31)	0.059 (1.48)	0.105*** (3.18)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
Standard error clusterin	Firm level	Firm level	Firm level	Firm level	Firm level	Firm level
Adj. R-squared	0.010	0.648	0.587	0.377	0.427	0.497
Number of observation:	28577	28577	28577	28577	28577	28577
Number of firms	2919	2919	2919	2919	2919	2919

Conclusion

Heads do not often roll at public corporations. When a public corporation is criminally prosecuted, heads roll only modestly more than otherwise. We found that in the year that the company settles a federal criminal prosecution, through a guilty plea or a deferred or non-prosecution agreement, there is a significantly higher level of CEO turnover. At the same time, we did not find evidence of any CEO pay cut, including because of possible severance compensation for departing CEOs. We examined whether these

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were forced or voluntary CEO departures and concluded that the departures were largely forced.

Second, for the prosecuted firms that did *not* have CEO turnover after prosecution, there is no evidence of any reduction in compensation. Indeed, we observed a *spike* in CEO bonuses in the year of prosecution. These findings confirm concerns expressed by judges, prosecutors, lawmakers, and academics that corporate prosecutions do not sufficiently impact high-level decision-makers like CEOs. Third, in contrast, for the prosecuted firms that *did* have CEO turnover after prosecution, there is evidence of a pay cut, both to salary and bonus, prior to the replacement of the CEO. We also observe that relative to the CEOs of firms that were prosecuted, individually charged CEOs of firms that were prosecuted suffer a significant cut in compensation.

These data describe for the first time how corporate prosecutions affect CEOs, and these results add to the literature on corporate criminal liability in several ways. There is some literature on how corporate prosecutions affect the reputation and share price of a public company, but very little literature on how CEOs or other high-level officers are themselves affected by crimes. More broadly, there is very little literature on how corporate prosecutions affects governance or the incentives of internal actors. While the penalty amounts are public, and descriptions of required governance changes can be read in settlement documents, we often know very little about what a company does in response internally. Criminal prosecutions are not frequent and they reflect, one would hope, the most serious possible violations. And yet we know very little about whether companies hold top-level officials accountable in response. We do know that those top-level officials are rarely themselves prosecuted. (Garrett, 2015). That makes internal accountability within the firm all the more important.

These results raise questions whether federal prosecutors targeting the most serious corporate crimes sufficiently incentivize accountability at the top. Few prosecution agreements contain terms regarding high-level leadership or compensation. Yet to the extent that prosecutors and other enforcers consider questions of corporate governance, they appear more interested in individual criminal accountability, including of higher-up officers. Fall 2015 revisions to the Department of Justice organizational prosecution guidelines made a new focus on individual accountability clear. At the time, Deputy Attorney General Sally Yates emphasized that justice is not served if prosecutors merely convict “the vice president in charge of going to jail.”¹³ However, it remains to be seen whether CEOs will actually be targeted in any meaningful numbers. Absent criminal prosecutions of the CEOs, which seem likely to occur in only small numbers of cases, the question will remain whether corporations will themselves hold leadership accountable for serious corporate crimes. These results suggest that internal mechanisms such as replacement of the CEO and

¹³ Matt Apuzzo & Ben Protess, Justice Dept. Sets Its Sights on Executives, N.Y. Times, Sept. 10, 2015, at A1, <http://nyti.ms/1UI3xfX>.

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reducing CEO compensation do not currently provide much added accountability for corporate crimes. While similar results had been observed regarding civil fraud enforcement, one might have expected more observable internal corporate consequences when criminal enforcement occurs.

These results suggest several avenues for potential future work. This research raises questions about the role of CEOs and their relative insulation from consequences for serious breakdowns in corporate behavior. Both the protection from firing and stability of compensation suggests the need for further work to examine how and why these norms of insulation of CEOs from accountability have developed. It could be the case that what explains these results is that there is some consensus among public companies that CEO's are not to blame for crimes that are committed under their watch and that others are more primarily responsible and best positioned to prevent corporate crimes. If so, we would want to know far more about how those others deemed responsible are held accountable.

Thus, a separate line of further work could examine whether others within a firm apart from CEO's are held accountable to a greater degree, apart from any criminal prosecution of those individuals. For example, additional forms of internal sanctions or industry sanctions might affect the careers of individuals involved in corporate crimes. Corporations could be concluding that top-level officials are not to blame but only mid-level managers or lower-level employees. Further work could examine the accountability of corporate board members. Perhaps compliance officers or other gatekeepers who should have detected and reported the criminality face more severe internal consequences. Perhaps other measure of turnover within firms could help one to assess the effect of a prosecution on internal culture or at least the stability of employment. Or, such inquiry could uncover that neither CEO's nor others within a company are held accountable internally, absent external government enforcement.

We hope that this examination of the relative non-impact of criminal prosecutions on CEOs will help to stimulate further inquiry into the utility of corporate criminal prosecutions and into the role of CEO's in modern public corporations.

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Appendix A: List of Public Firms that were Prosecuted between 2000-2014

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Company Name	Prosecution Year	Crime
Sotheby's Holdings Inc.	2000	Antitrust
Kaydon Corp.	2001	False statements
Macdermid Inc.	2001	Environmental - Clean Water Act
Nash-Finch Co., Inc.	2001	Food
Sears	2001	Fraud
Ashland Inc.	2002	Environmental
Carnival Co.	2002	Environmental
Banco Popular De Puerto Rico	2003	Bank Secrecy Act
Merrill Lynch	2003	Bank Secrecy Act
PNC Financial	2003	Securities Fraud
Tyson Foods Inc.	2003	FCPA
AOL	2004	Securities Fraud
Computer Associates	2004	Securities Fraud
Crompton Corp.	2004	Antitrust
GE Funding Capital Market Services, Inc.	2004	Antitrust
Bank of New York	2005	Bank Secrecy Act
Bristol-Myers Squibb	2005	Securities Fraud
ConAgra Foods, Inc.	2005	Environmental
Eli Lilly	2005	Environmental
Monsanto	2005	FDCA
Stryker Orthopedics	2005	Kickbacks
American Int'l Group	2006	Securities Fraud
BankAtlantic	2006	Bank Secrecy Act
Boeing Co.	2006	Fraud
Flowserve	2006	FCPA
Medicis	2006	FDCA
Mellon Bank, N. A.	2006	Other
Schering Plough	2006	FDCA / Kickbacks
Tyco International, Ltd.	2006	FCPA
WesternGeco LLC (subsidiary of Schlumberger Seismic, Inc.)	2006	FCPA
Williams Power Co.	2006	Commodities Fraud
Winn-Dixie Stores Inc.	2006	FCPA
American Express Bank Int'l	2007	Bank Secrecy Act
Baker Hughes	2007	FCPA
Biomet Inc.	2007	Kickbacks
Chevron	2007	FCPA
Chiquita Brands International	2007	Transactions with Terrorist
DePuy Orthopaedics	2007	Kickbacks
Elan Corp.	2007	FDCA
Express Scripts Inc.	2007	FDCA
Honeywell International	2007	Environmental
ITT	2007	Import / Export
Ingersoll Rand	2007	FCPA
Maximus	2007	Health Care Fraud
Overseas Shipholding Group Inc.	2007	Environmental
Pfizer	2007	FDCA / Kickbacks
Reliant Energy Services	2007	Fraud
Rowan Companies	2007	Environmental
Southern Union Co.	2007	Environmental
Textron	2007	FCPA
Archer Daniels Midland Company	2008	FDCA
Cephalon	2008	FDCA
Exxon Mobil Corporation	2008	Environmental

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Company Name	Prosecution Year	Crime
Faro Technologies	2008	FCPA
Forest Laboratories	2008	FDCA
Hershey Creamery Company	2008	Environmental
Lawson Products, Inc.	2008	Fraud
MTS Systems Corp	2008	False statement
Prudential Equity Group	2008	Securities Fraud
Republic Services, Inc.	2008	Immigration
Spartan Motors Chassis	2008	Kickbacks
Union Pacific Railroad Company	2008	Environmental
Unum Group	2008	Fraud
Westinghouse Air Brake Technologies Corp.	2008	FCPA
XTO Energy Inc.	2008	Wildlife
AGCO Corporation	2009	FCPA
Beazer Homes USA, Inc.	2009	Mortgage fraud
Halliburton Company	2009	FCPA
Helmerich & Payne	2009	FCPA
Kellogg Brown & Root LLC (KBR)	2009	FCPA
Pilgrim's Pride, Inc.	2009	Immigration
Quest Diagnostics, Inc. (& Nichols Institute Diagnostics)	2009	FDCA
UTStarcom, Inc.	2009	FCPA
Wellcare Health Plans, Inc.	2009	Health Care Fraud
Allergan	2010	FDCA
Alliance One	2010	FCPA
CVS/Pharmacy	2010	Food and Drug
FirstEnergy Nuclear Operating Co.	2010	Environmental
G&K Services Inc.	2010	Wildlife
Innospec Inc.	2010	Wildlife
Kos Pharmaceuticals	2010	Kickbacks
Metropolitan Life Insurance Co. (MetLife)	2010	Other
Noble Corp.	2010	FCPA
PPG Industries	2010	Import / Export
Shoppers Food Warehouse Corp.	2010	Bribery
Transocean	2010	FCPA
Universal Corp.	2010	FCPA
Alpha Natural Resources, Inc.	2011	Environmental - Mine Act
Aon Corp.	2011	FCPA
Google	2011	FDCA
JPMorgan Chase & Co.	2011	Antitrust
Merck & Co., Inc.	2011	FDCA
Amgen	2012	FDCA
MoneyGram Int'l, Inc.	2012	Bank Secrecy Act
Scotts Miracle-gro	2012	
United Technologies Corp.	2012	Import / Export
Diebold	2013	FCPA
Duke Energy Renewables Inc.	2013	Environmental
Parker Drilling	2013	FCPA
Ralph Lauren	2013	FCPA
United Parcel Service (UPS)	2013	Drug
Wal-Mart Stores, Inc.	2013	Environmental
Weatherford	2013	FCPA
Avon Products Inc.	2014	FCPA
Bio-Rad Laboratories, Inc.	2014	FCPA
Endo Pharmaceuticals, Inc.	2014	FDCA
Gulfport Energy Corp	2014	Environmental
SunTrust Mortgage, Inc.	2014	Fraud
ZAO Hewlett-Packard A.O.	2014	FCPA

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Appendix B: List of CEOs that were replaced in the prosecution year

CEO (replaced)	Company Name	Prosecution Year
Diana D. Brooks	Sotheby's Holdings Inc.	2000
David H. Komansky	Merrill Lynch	2003
Sanjay Kumar	Computer Associates	2004
Vincent A. Calarco	Crompton Corp.	2004
Bruce C. Rohde	ConAgra Foods, Inc.	2005
John W. Brown	Stryker Orthopedics	2005
James A. Bell	Boeing Co.	2006
Kevin E. Sheehan	Flowserve	2006
Martin G. McGuinn	Mellon Bank, N. A.	2006
Daniel P. Hann	Biomet Inc.	2007
Karen L. Katen	Pfizer	2007
Lynn P. Davenport	Maximus	2007
Joel V. Staff	Reliant Energy Services	2007
Richard H. Lenny	Hershey Creamery Company	2008
Sidney W. Emery, Jr.	MTS Systems Corp	2008
Arthur F. Ryan	Prudential Equity Group	2008
J. Clinton Rivers	Pilgrim's Pride, Inc.	2009
Richard L. Marcantonio	G&K Services Inc.	2010
Robert L. Long	Transocean	2010
Richard T. Clark	Merck & Co., Inc.	2011
Eric E. Schmidt, Ph.D.	Google	2011
Kevin W. Sharer	Amgen	2012
Thomas W. Swidarski	Diebold	2013
James E. Rogers, Jr.	Duke Energy Renewables Inc.	2013
James D. Palm	Gulfport Energy Corp	2014