CEO Risk Taking Equity Incentives and Workplace Misconduct

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Abstract

We examine the relation between CEO risk taking equity incentives, as captured by CEO vega, and workplace misconduct. Workplace misconduct includes health and safety violations, non-compliance with labor laws, and other violations broadly related to labor exploitation, and it results in significant economic costs. Using regression analysis, matched sample tests, and a quasi-natural experiment we find a positive relation between CEO vega and workplace misconduct. We identify a reduction in discretionary expenses and increased employee workload as channels through which CEO vega affects workplace misconduct.

I. INTRODUCTION

Workplace misconduct, such as health and safety violations, non-compliance with labor laws, and other violations broadly related to labor exploitation, is associated with significant economic costs to employers, employees and society. The International Labor Organization (ILO) estimates that globally an average of US$2.8 trillion is lost due to the direct and indirect costs of workplace misconduct (ILO 2013). Yet, while these serious violations affect the wellbeing of employees and pose significant costs to the economy, little is known about their determinants (Caskey and Ozel 2017, Heese and Pérez-Cavazos 2020, Li and Raghunandan 2021).

Firms often regard financial performance and employee wellbeing as the main pillars of their success (Chevron 2018). While firms invest significant resources in creating a healthy and environmentally responsible workplace for employees (Celgene 2019), little is known about how the compensation structure of CEOs influences workplace misconduct. Prior research shows that equity incentives encourage CEOs to undertake risky investment decisions (Armstrong and Vashishtha 2012; Armstrong, Larcker, Ormazabal and Taylor 2013). Given this, we conjecture that CEOs subject to risk taking equity incentives take riskier strategic workplace decisions that can result in workplace misconduct.

To test this conjecture we use data on violations and the ensuing penalties issued by more than 40 federal regulatory agencies and the U.S. Justice Department from Violation Tracker. We merge this dataset with data on executive compensation and firm characteristics from Execucomp and Compustat, respectively. Our final sample consists of 17,831 firm-year observations for 1,916 unique firms from 2000 to 2018. Firms in our sample have on average 0.406 violations per year corresponding to an average penalty of $148,000 per year.

We examine the relationship between risk taking incentives and workplace violations as follows. First, we distinguish between risk taking incentives arising from vega and the risk taking incentives arising from delta (Armstrong et al. 2013; Armstrong, Blouin, Jagolinzer and Larcker

2015).[1] Second, we employ several econometric techniques to test for the relation between CEO risk taking equity incentives and workplace misconduct. Our research design choices closely follow prior literature (Hayes, Lemmon, and Qiu 2012; Armstrong, et al. 2013; Bakke, Mahmudi, Fernando and Salas 2016; Ferri and Li 2020; Hong 2019). Specifically, we examine the relation between equity risk taking incentives and workplace misconduct using both regression and matched sample tests (Armstrong, Jagolinzer and Larcker 2010; Armstrong et al. 2013) with year and firm fixed effects, and standard errors clustered by firm.

To ensure that we capture management strategic risk taking decisions concerning workplace misconduct, as opposed to earnings management decisions like those examined by Caskey and Ozel (2017), we control for firm performance throughout our analysis. We also use the implementation of Statement of Financial Accounting Standards (SFAS) 123R in 2005 (Hayes et al. 2012; Bakke et al.2016; Ferri and Li 2020; Hong 2019), that mandated the expensing of stock-based compensation in the Income Statement, as a quasi-natural experiment to test our conjectures. Prior literature documents a significant reduction in the use of stock options in executive compensation contracts following the implementation of SFAS 123R (Carter, Lynch and Tuna 2007; Hayes et al. 2012; and Bakke et al.2016). Therefore, the implementation of SFAS 123R provides a plausible exogenous shock to CEO vega.

Our results show that CEO risk taking equity incentives, as captured by vega are positively related to workplace misconduct, as captured by the number and severity of workplace violations. The observed relation between CEO vega and workplace violations is economically significant. Specifically, a one standard deviation increase in CEO vega is related to a 6.7 percentincrease in the number of violations and a 5.5 percent increase in the value of penalties for the mean

[1] Vega captures the sensitivity of an executive's equity wealth to stock price volatility and provides an explicit channel between equity incentives and risk taking. Delta measures the sensitivity of an executive's equity wealth to stock price, however its effect on risk taking is less clear. On one hand, a higher sensitivity to changes in stock price should encourage managers to take risky investment decisions that maximize firm value. Yet, on the other hand, it strengthens the effect of equity risk on the total riskiness of a manager's equity portfolio, generally discouraging risk averse managers from taking risky projects (Armstrong et al. 2013).

observation in our sample. Results show that the implementation of SFAS 123R, which reduced the use of stock options in CEO executive contracts, is related to a reduction in the number and severity of workplace violations. Given that it is unlikely that the implementation of SFAS 123R had an influence on the number and severity of workplace violations other than through its effect on CEO vega, we believe that these results support our conjecture that CEO vega influences workplace misconduct. Finally, the fact that our results are robust to different econometric choices, firm and year fixed effects, and firm specific controls suggest that our results are not driven by a correlated omitted variable.

We identify the mechanisms through which CEO vega affects workplace misconduct. CEOs may take riskier strategic workplace decisions that directly affect workplace misconduct by cutting safety-related expenditures, or indirectly affect workplace misconduct by imposing a heavy workload on employees. We find that both channels have an important role. Specifically, the relationship between CEO vega and workplace violations is a function of reductions in safety-related spending and increased workloads.

We undertake several robustness tests to examine the sensitivity of our results to different research design choices. First, we test whether our results are sensitive to scaling the dependent variables in our analysis by total assets. Second, to ensure that our analysis is robust to different types of matching, we repeat our matching analysis and match violator firms with non-violator firms on size, year and industry. Third, to ensure that our measures for employee workload do not capture changes in employee workloads arising from structural changes in the firm, we drop firms subject to mergers and acquisitions (M&As) from our analysis. Fourth, we control for CEO motivations and incentives that might be correlated with CEO vega such as CEO severance pay, CEO dismissal threat, and managerial ability. Results of these robustness tests support our baseline results.

In further analysis, we examine why firms compensate CEOs with high vega when such compensation structure is potentially detrimental to firm employees. We find that firms with a high number of workplace violations and penalties have higher profitability. Moreover, as we conjecture that workplace misconduct results from risk taking incentives arising from vega, we examine the relation between workplace misconduct and future stock volatility. In line with expectations, we find a positive relation between workplace misconduct and future stock volatility, suggesting that CEOs elicit stock volatility through higher workplace misconduct. Finally, we examine the moderating effect of board oversight on the relation between CEO vega and workplace misconduct. In line with the notion that less (more) busy boards provide more (less) effective monitoring of managerial activities, we find that the relation between vega and workplace misconduct is attenuated when board members are less busy.

Our study contributes to extant literature in the following ways. First, we contribute to the nascent literature on the determinants of employee welfare. Li and Raghunandan (2021) find that institutional ownership is negatively related to a firm’s propensity of violating labor laws while Heese and Pérez-Cavazos (2020) and Christensen, Floyd, Liu and Maffett (2017) show that greater monitoring and investor awareness of employee safety issues result in a reduction in worker injuries and workplace violations. Cohn and Wardlaw (2016) show that financing frictions lower employee welfare as firms underinvest in employee safety while Caskey and Ozel (2017) document a higher injury rate in benchmark beating firms. We contribute to this literature on the determinants of workplace misconduct by showing that an important determinant of employee welfare is the executive compensation structure. Specifically, we show that CEO risk taking incentives influence the amount and severity of workplace misconduct.

Second, we contribute to the literature examining the effects of CEO compensation sensitivity to stock price volatility on firm misconduct and corporate irresponsible behavior in general. Prior literature shows that firms are more likely to engage in financial misreporting if

CEOs have high risk taking incentives (Bergstresser and Philippon 2006; Burns and Kedia 2006; Erickson, Hanlon and Maydew 2006; Efendi, Srivastava and Swanson 2007; Armstrong et al. 2010; Armstrong et al. 2013). Using matched sample tests, prior literature shows that firms with higher CEO risk taking incentives have higher discretionary accruals, more accounting restatements, and more accounting fraud cases (Armstrong et al. 2013).

Studies examining the effects of CEO risk taking incentives on corporate socially irresponsible behavior show mixed results (Bouslah, Liñares-Zegarra, M'Zali and Scholtens 2018; Dunbar, Li and Shi 2020).[2] These results might be partly driven by measurement errors in capturing data on corporate social irresponsibility.[3] We address these limitations in prior literature by identifying a cleaner measure of a specific type of corporate socially irresponsible behavior, i.e., workplace violations. Unlike the subjective measures of corporate social irresponsibility used in prior literature, workplace violations are objective as they are the result of an investigation and a subsequent official pronouncement by regulatory agencies. Moreover, workplace violations directly affect a specific stakeholder of the firm – its employees.

Third, we contribute to the literature on executive compensation in general. Prior literature shows that risk taking equity incentives provided by stock option compensation significantly affect corporate policies. Guay (1999) shows a positive relation between risk taking equity incentives and riskier investment policies proxied by growth options and research and development (R&D) expenditures. Further Coles, Daniel and Naveen (2006) demonstrate that higher CEO wealth sensitivity to risk results in higher investment in R&D and higher leverage. Several studies use the

[2] Bouslah et al. (2018) show a positive relation between risk taking incentives as captured by vega and socially irresponsible behavior in the pre-2007 period but no such relation post-2007. The authors attribute these results to the increased scrutiny of compensation packages and the increased importance of reputational issues post-2007. In a similar vein, Dunbar et al. (2020) examine the relation between lagged corporate social responsibility and vega. While the authors find a positive relation between lagged corporate social responsibility and vega, this relation is largely driven by corporate social responsibility strengths as opposed to weaknesses.

[3] For example, both Bouslah et al. (2018) and Dunbar et al. (2020) use MSCI ESG (formerly KLD) data. The subjective nature of the MSCI ESG data collection process (Chatterji, Durand, Levine, and Touboul 2016) and the fact that some of the dimensions of corporate social responsibility in MSCI ESG data might be less relevant to corporate social performance (Servaes and Tamayo 2013; Lins, Servaes and Tamayo 2017) makes it difficult to identify the specific corporate social responsibility activities related to CEO risk taking incentives.

implementation of SFAS 123R as an exogenous shock to establish causality between risk taking equity incentives and corporate policies, yet in general, the results are mixed (Hayes et al. 2012; Bakke et al. 2016; Aboody, Levi and Weiss 2018; Hong 2019). We add to this literature by showing that equity incentives influence firm's employees.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Equity incentives and corporate policies

The use of stock options in executive compensation contracts encourages the underdiversified manager to undertake risky and value increasing projects (Jensen and Meckling 1976). Smith and Stulz (1985) conclude that managerial compensation should be a convex function of firm value. This can be done by including stock options in executive compensation where increased risk taking increases stock price volatility hence making stock options more valuable. Subsequent theoretical studies show that stock options might have an ambiguous effect on risk taking incentives (Lambert, Larcker and Verrecchia 1991; Carpenter 2002; Ross 2004; Lewellen 2006). Armstrong and Vashishtha (2012) note that the convexity effect that increases the sensitivity of CEO wealth to risk (vega) can be offset by the increase in CEO wealth sensitivity to stock price (delta). Theoretically, the overall net effect of stock option compensation on risk taking incentives and thus corporate policies is unclear.

While early empirical studies find a positive relation between the use of stock options in executive compensation contracts and risk taking (Agrawal and Mandelker 1987; Guay 1999; Rajgopal and Shevlin 2002)[4], results of studies examining the effects of equity incentives on financial misconduct are mixed (Cheng and Warfield 2005; Bergstresser and Philippon 2006;

[4] Low (2009) reports that managers with low stock option incentives reduced firm risk after a court ruling in mid-1990s that made it more difficult for firm outsiders to penalize excessive caution. Gormley (2013) shows that the change in business risk resulting from the discovery of carcinogens changed the influence of stock option risk taking incentives on firm risk. Coles et al. (2006) separately examine delta and vega and show that CEOs whose compensation is more sensitive to stock volatility (vega) take riskier decisions such as investing more in research and development, less in property, plant and equipment and take on higher leverage, yet they find mixed results relating to the effects of delta on risk taking.

Burns and Kedia 2006; Erickson et al.2006; Armstrong et al. 2010). Armstrong et al. (2013) separately examine the effects of CEO delta and CEO vega on financial misreporting and find that the positive effect of CEO vega on financial misreporting dominates the incentives arising from CEO delta.

Several studies use the implementation of SFAS 123R in 2005 as a quasi-natural experiment that resulted in a reduction in the use of stock options and an increase in managerial risk aversion. Hayes et al. (2012) show that there is little evidence that the decline in the use of stock options resulted in less risky investment and financing policies. However, other studies do find that the reduction in the use of stock options resulted in significant changes in corporate policies. Bakke et al. (2016) claim that the reduction in stock options resulting from the implementation of SFAS 123R increased hedging intensity in the oil and gas industry. Hong (2019) provides evidence that the reduction in CEO vega, resulting from the reduction in the use of stock options following the implementation of SFAS 123R, caused an increase in debt maturity. Using the same setting Aboody et al. (2018) show that managers reduce operating leverage (i.e., the fixed-to-variable cost ratio) associated with firm systematic risk in response to reductions in option-based compensation following the issuance of SFAS 123R. Overall, this literature shows that risk taking incentives have important effects on corporate policies.

2.2. Equity incentives and workplace misconduct

Serious workplace misconduct includes the violation of health and safety regulations, non-compliance with labor laws, and other violations broadly related to labor exploitation. Even though labor violations are associated with significant economic costs for the firm, employees, and society in general, workplace misconduct might generate benefits. Similar to financial misconduct, workplace misconduct can also be perceived as a type of risky project where CEO strategic workplace decisions increase firm value at the expense of employee welfare.[5]

Prior literature shows that in specific situations firms treat employees poorly. For example, Caskey and Ozel (2017) show that firms that just meet or beat analysts' forecasts have higher injury rates than those missing or comfortably beating analyst forecasts. Similarly, Leone and Rock (2002) show that local managers violate rules and regulations when under pressure. Further, Heese and Pérez-Cavazos (2020) show that while onsite visits by managers generally reduce misconduct, when firms are under pressure, there is an increase in misconduct.

Armstrong et al. (2013) show that high CEO risk taking incentives lead to financial misreporting. CEOs with higher risk taking equity incentives are more likely to misbehave and take riskier decisions to improve productivity and perfomance. Yet, if these irregularities are detected they will negatively affect the company's stock price. Nevertheless, if the probability of detection is low the potential benefits might offset any potential costs. For example, in the context of employees, CEOs might cut health and safety expenses or increase employee workloads. These decisions, while potentially advantageous for shareholders, might have negative consequences for employees and result in labor law, and health and safety violations.[6] We therefore formalize our hypothesis as follows:

H1: ***Risk taking CEO equity incentives are positively related to the incidence and severity of workplace misconduct.***

[5] While Caskey and Ozel (2017) sees investment in health and safety as an earnings management tool where firms adjust the level of their investment in employee health and safety as a function of the likelihood of meeting or beating analyst forecasts, we see the level of investment in employee wellbeing as a strategic decision.

[6] We recognize that some of these decisions might be made at the establishment level (Heese and Pérez Cavazos, 2020), however we contend that CEOs set the tone at the top and managers at the establishment level will follow the lead of the CEO.

III. SAMPLE AND VARIABLE MEASUREMENT

3.1. Sample construction

Our sample consists of observations at the intersection of Compustat, ExecuComp and the Centre for Research in Security Prices (CRSP) database. We begin by collecting financial data from Compustat for the period 1999 to 2018. We start in 1999 to have one year of data before the start of our workplace misconduct data which starts in 2000. This is the first year for which Violation Tracker collected data on violations of U.S. public firms. Having firm level data for one year before the start of the violations data allows us to calculate control variables with a one-year time lag.

Following prior literature on executive compensation (e.g., Hong 2019, Caskey and Ozel 2017) we exclude firms with industry classification codes (SIC) lower than 2000, between 4900 and 4999, and between 6000 and 6999.[7] Next, we add the data on Chief Executive Officers (CEOs) compensation from Execucomp and generate measures of sensitivity to risk (*Vega*) and stock prices (*Delta*) similar to Coles, Daniel, and Naveen (2013). These measures require data on stock market returns from the Center for Research in Security Prices (CRSP). After preparing other control variables for our baseline regression and eliminating missing observations, our final sample consists of 17,831 observations for 1,916 unique firms, which we merge with data on workplace misconduct from Violation Tracker. The sample selection process is described in detail in Online Appendix A.

[7] Similar to Caskey and Ozel (2017) we exclude regulated industries (i.e., industries with classification codes (SIC) between 4900 and 4999, and between 6000 and 6999) from our sample and merge the remaining observations with Execucomp. We exclude these industries as their business is more regulated in terms of risk taking than the average firm in our sample. Additionally, we exclude industries with SIC codes lower than 2000 (these include industries such as agriculture, fishing, forestry, mining, and construction). These industries are different from the rest of our observations in terms of the severity of accidents due to the nature of their business.

3.2. Variable measurement

3.2.1. Measures of workplace misconduct

We construct measures of the incidence and severity of workplace misconduct using data from Violation Tracker.[8] Violation Tracker, developed by the Corporate Research Project of Good Jobs First, contains records of several types of violations broadly defined as environmental, product, and workplace violations. We capture the incidence of workplace misconduct using the number of violations and the severity of workplace misconduct using the value of penalties mandated for identified violations. A violation is classified as a workplace violation if it is identified as such by regulatory agencies including the Employee Benefits Security Administration, Equal Employment Opportunity Commission, Labor Department Wage and Hour Division, and Occupational Safety and Health Administration. In total, we identify 7,039 workplace violations in Violation Tracker. These violations account for $7,980 million worth of penalties.

Violation Tracker records violations that result in penalties greater than $5,000. The reporting of violations is done at the establishment level, which we aggregate to the firm level. Aggregating the number of violations and the value of penalties to the firm level is essential for us to link the degree of workplace misconduct to CEO's sensitivity to risk. We present the distribution of workplace violations by year and industry in Online Appendix B.

3.2.2. Measures of CEO incentives

In measuring CEO incentives, we concentrate on incentives originating from executive compensation in general, and equity stock options in particular. While equity incentives encourage risk averse managers to take risks to increase the performance of the firm, and consequently stock prices, they also encourage managers to increase the volatility of stock prices. Hence, in examining the impact of CEO equity stock options on workplace misconduct we need to consider the

[8] This database has been used by Heese and Pérez-Cavazos (2020).

incentives arising from increased CEO wealth sensitivity to stock prices, delta, and stock price volatility, vega. As in prior literature (e.g., Core and Guay 2002; Coles et al. 2006; Armstrong and Vashishtha 2012; Armstrong et al. 2013) we define *Delta* as the natural log of the sensitivity of CEO's wealth to changes in stock price and *Vega* as the natural log of the sensitivity of CEO's equity portfolio to changes in stock price volatility. While Armstrong et al. (2013) concludes that *Vega* provides risk taking incentives, *Vega* cannot be examined in isolation from *Delta* since both *Vega* and *Delta* arise from the same stock options. Thus, throughout our analysis, we examine the relation between *Vega* and workplace misconduct while controlling for *Delta.* We also control for incentives arising from cash compensation by including a variable capturing CEO cash compensation in our empirical analysis. We measure CEO cash compensation (*CashComp*), as the natural logarithm of total cash compensation (including bonuses) the CEO received during a year.

3.2.3. Controls

Following Cohn and Wardlaw (2016), we include in our analysis several time-varying controls that have previously been shown to be related to firm misconduct. These include *Leverage, CashFlow, DividendPayout, FirmSize, Employees, AssetTurnover, Market-to-book, Tangibility* and *Capex*. *Leverage* is the ratio of the book value of debt to the book value of assets. *CashFlow* is the ratio of cash flows from operations to the book value of assets. *DividendPayout* is the ratio of the total amount of cash dividends declared to common shareholders scaled by the lagged book value of assets. *FirmSize* is the natural logarithm of the market value of the firm. *Employees* is the natural logarithm of the number of employees. *AssetTurnover* is the ratio of gross sales to the book value of assets. *Market-to-book* is the ratio of the market value of assets to the book value of assets. *Tangibility* is the ratio of the value of tangible fixed assets used in the regular business operations of the company to the book value of assets. *Capex* is the ratio of funds used for investment in long-term tangible assets, excluding those arising from acquisitions to the lagged book value of assets. Additionally, we control for the annualized buy-and-hold return, *RET,* to ensure that our results are not driven by short-term performance pressures as those examined in Caskey and Ozel (2017). Further, we include *CEOage* expressed in years, as well as *CEOtenure*, the number of years since the current CEO joined the company, to control for CEO-specific characteristics. We present the definitions of the variables used in the analysis in Appendix 1.

We include firm fixed effects to control for time-invariant firm characteristics and year fixed effects to control for time trends in the number and severity of violations. Through the use of firm fixed effects, our analysis is essentially a within-firm analysis where we examine the relation between CEO vega and violations for a specific firm. This fixed effect structure reduces the possibility that our results are driven by an omitted correlated variable. We winsorise all continuous variables at the 1 percent and 99 percent levels to ensure that outliers do not bias our results,.

3.2.4. Sample distribution and summary statistics

Table 1 reports the number and the percentage of observations across years (Panel A) and industries (Panel B). The number of observations in each year of our sample is stable until 2013, after which it gradually declines. Panel B presents the distribution of sampled observations across the 48 Fama French Industries. The industries with the most observations in our sample are Business Services, Electronic Equipment, and Retail with 13.53 percent, 8.49 percent and 7.72 percent of the observations in the sample, respectively. Conversely, the industries least represented in our sample are the Shipbuilding, Railroad Equipment, Tabaco Products and Fabricated Products with 0.19 percent, 0.17 percent and 0.10 percent of the observations in the sample.

Table 2 presents summary statistics for the variables used in the analysis. The main variables of interest capture the frequency and severity of workplace misconduct. The average firm in our sample has 0.406 violations per year (*Violations*) and an average of $148,000 penalties (*Penalties*) per year. The distribution of violations is negatively skewed, with most offences distributed in the top two deciles of the sample. The maximum number of violations per year after winsorising is 19 and the largest penalty is $20.6 million.

The mean (median) equity compensation sensitivities, *Delta* and *Vega*, are 4.015 (4.148) and 5.386 (5.399) respectively. These statistics suggest that on average a one percent change in stock volatility (prices) results in $135.53 ($540.22) increase in the value of CEO stock options and therefore CEO wealth. These descriptives are comparable to Dunbar et al. (2020) who, for a sample that partly overlaps ours, report an average vega of $123. The mean *CashComp* is 6.769 equivalent to $869,441 while the median *CashComp* is 6.773 equivalent to $872,930.

The mean (median) *Leverage*, *CashFlow* and *DividendPayout* are 0.220 (0.197), 0.075 (0.091) and 0.013 (0.037), respectively. Mean (median) *FirmSize* is $6.42 ($1.511) billion and the mean (median) firm in our sample employs 19.5 thousand (6 thousand) employees. The mean (median) *AssetTurnover, Market-to-book, Tangibility, Capex and RET* are 1.218 (1.027), 1.848 (1.36), 0.236 (0.178), 0.049 (0.035), and 0.142 (0.082), respectively. These summary statistics are generally in line with prior literature.[9] Finally, the mean (median) firm is managed by a 55 (55)-year-old CEO who has worked in the company for 8 (6) years.

Table 3 presents pairwise Pearson correlation coefficients for the variables used in the analysis. As expected we find a significant positive correlation between *ln(Violations)* and *ln(Penalties)* suggesting that the incidence of violations is related to the severity of violations. Importantly, in line with our hypothesis, we observe a positive and significant correlation between *Vega* and both measures of workplace misconduct. These univariate statistics provide preliminary support for our hypothesis and suggest that risk taking incentives are related to both the incidence and severity of violations. It is pertinent to note that as expected *Delta* is highly correlated with

[9] Summary statistics for *Leverage, CashFlow, DividendPayout, Market-to-book,* and *Capex* are in line with Cohn and Wardlaw (2016). Our summary statistics for *FirmSize, AssetTurnover* and *Tangibility* suggest that the average firm in our sample is smaller, has a lower asset turnover and a lower tangible asset ratio relative to the average firm in Cohn and Wardlaw (2016). Summary statistics for *RET* are in line with Armstrong, Blackburne and Quinn (2021) who use a sample of firms and a sample period which partly overlaps our sample.

Vega. The correlation of 61.5 percent between *Delta* and *Vega* suggests that to distinguish the effect of *Vega* from that of *Delta*, one needs to control for *Delta* in the empirical analysis. Similarly, we find a significant positive correlation between *CashComp* and both *Delta* and *Vega* suggesting that CEOs with higher cash compensation have higher wealth sensitivity to changes in stock price and stock price volatility. All control variables other than *Market-to-Book*, *Capex*, *RET* and *CEOtenure* are significantly positively correlated to both *ln(Violations)* and *ln(Penalties).* *Market-to-Book* and *CEOtenure* are negatively correlated with both violations and penalties while we do not observe a significant correlation between either *Capex* or *RET*, and the magnitude (*ln(Violations)*) and severity (*ln(Penalties)*) of workplace misconduct.

IV. RESEARCH DESIGN

Our research design closely follows extant literature examining the effects of CEO risk taking equity incentives on CEO behavior. In particular, we implement 1) regression analysis (Bergstresser and Philippon 2006; Burns and Kedia 2006), 2) matched sample tests (Erickson, et al. 2006; Efendi et al. 2007; Armstrong et al. 2010, Armstrong et al. 2013), and 3) a difference-in-differences approach where we exploit the implementation of SFAS 123R to examine the effect of equity risk taking incentives on workplace misconduct (Mao and Zhang 2018; Hong 2019).

4.1. Regression analysis and matched sample tests

We examine the relation between risk taking equity incentives and workplace misconduct using the following Ordinary Least Squares (OLS) regression model:

$$Y_{i,t} = \alpha + \theta\ Incentives_{i,t} + \beta\ Controls_{i,t-1} + FEs + \varepsilon_{i,t} \quad (1)$$

where the dependent variable $Y_{i,t}$ refers to our measures for workplace misconduct by firm *i* in year *t* and *Incentives* refers to CEO incentives: *Vega*, *Delta*, and *CashComp*. Whereas we do not have any a priori expectation for the association between workplace misconduct and *Delta* or *CashComp*, in line with our hypothesis we expect a positive significant association between *Vega* and workplace misconduct. *Controls* refers to the vector of controls consisting of variables captured at time *t-1* including *Leverage*, *Employees*, *Market-to-Book*, and *Tangibility* and a set of controls measured contemporaneously including *CashFlow*, *DividendsPayout*, *AssetTurnover*, *Capex, RET, CEOage, and CEOtenure*. *FE* refers to firm and year fixed effects. We estimate this regression model with standard errors clustered by firm.

We estimate Eq. (1) for unmatched and matched samples. To create the matched sample, we follow Armstrong et al. (2010) and Armstrong et al. (2013) and apply non-bipartite matching where we match based on the propensity score estimated using the control variables in Eq. (1). Propensity score is defined by Rosenbaum and Rubin (1983) as the probability of treatment assignment conditional on observed baseline covariates. The propensity score is typically estimated using a logistic regression model, in which treatment status is regressed on observed baseline characteristics. Thus, the estimated propensity score is the predicted probability of treatment derived from the fitted regression model.

Non-bipartite matching is conceptually similar to propensity score matching in that matched pairs are created by matching an observation that received the treatment with an observation having the closest propensity score, but which did not receive the treatment. However, unlike propensity-score matching, non-bipartite matching allows for continuous treatment (Derigs 1988; Lu, Zanutto, Hornik and Rosenabum, 2001). In our case we follow a non-bipartite matching procedure since the treatment variable *Vega* is a continuous variable.

First, to form matched pairs we transform *Vega* into quintiles. We call this categorical variable *VegaQuintile*, and then we estimate an ordered logistic propensity-score model for each year in our sample where we regress *VegaQuintile* on control variables that we define in Eq. (1).[10] The predicted values from this first regression are the propensity scores used in subsequent matching.

[10] Following Armstrong et al. (2010) we estimate the following ordered logistic propensity score model annually for the CEOs in our sample: Pr $(VegaQuintile_{i,t}) = \alpha + \beta\, Controls_{i,t-1} + FEs + \varepsilon_{i,t}$.

Second, we employ a non-bipartite matching algorithm. In the case where there is binary treatment, one forms matched pairs by selecting a treated and a control observation with the closest propensity score. Since our treatment is now *VegaQuintiles* we need to solve numerically for the set of matched pairs where the algorithm simultaneously minimizes the difference in estimated propensity scores and maximizes the difference in CEO risk taking incentives. Following Lu et al. (2001) and Armstrong et al. (2010) we calculate the distance between observations as:

$$\Delta_{i,j} = \frac{PScore_i - PScore_j}{\delta_i - \delta_j} \qquad if\ \delta_i \neq \delta_j \tag{2}$$

$$\Delta_{i,j} = \infty \qquad if\ \delta_i = \delta_j. \tag{3}$$

PScore is the propensity score computed from the ordered logistic propensity score model, δ is each observation's equity incentive quintile, and *i*, *j* index the individual observations. We then use a non-bipartite algorithm to identify, across all possible permutations, the minimum sum of pairwise distances (Derigs, 1988; Lu et al. 2001 and Armstrong et al. 2010). Each treatment firm is matched with a control firm with the lowest pairwise distance.

4.2. Identification strategy

While matched sample tests allow us to mitigate endogeneity concerns, we complement our analysis by exploiting the change in the accounting treatment for stock options, SFAS 123R, as a quasi-natural experiment. SFAS 123R was published in December 2004 and became effective for financial periods beginning after June 15, 2005. SFAS 123R mandated the expensing of share-based payments in the Income Statement. Before SFAS 123R was effective, firms were able to either use the intrinsic value method of accounting for share based payments and disclose the value of stock options in the notes to the accounts or expense stock options in the Income Statement. Given this choice, firms opted for the former approach since this approach mandated the disclosure but not the recognition of the stock option expense in the financial statements (Mao and Zhang

2018; Hong 2019). SFAS 123R removed this option and mandated that firms issuing share-based payments such as CEO stock options must expense these stock options in the Income Statement.[11]

Many studies report a significant drop in the use of stock options in the period after SFAS 123R became effective (Carter et al. 2007; Hayes et al. 2012; Bakke et al.2016; Mao and Zhang 2018). Given SFAS 123R deals exclusively with the accounting for share-based payments, it is exogenous with respect to firm risk taking incentives. The exogeneity of SFAS 123R to risk taking incentives provides us with a shock to CEO compensation that allows us to impute causality to the relation between CEO risk taking incentives and workplace misconduct.[12]

We design a difference-in-differences test with observations for the period 2002 to 2008. Since SFAS 123R became effective in 2005, we define years 2002 to 2004 as the pre-SFAS 123R period and years 2006 to 2008 as the post-SFAS 123R period. We drop observations for transitory year 2005, the year in which SFAS 123R became effective, to account for the time lag required to adjust CEO compensation contracts. Following Mao and Zhang (2018) we split our sample into treated and control firms based on the perceived costs of option expensing. These are calculated as the average value of the pro forma option expenses scaled by the fully diluted number of shares used to calculate the reported earnings per share during the pre-SFAS 123R period of 2002-2004. The treatment group consists of firms with pro forma option expenses in the top tercile, while the control group consists of firms with pro forma option expenses in the bottom tercile. Put differently, the treatment group consists of firms where the impact of SFAS 123R was high, while the control group consists of firms where the impact of SFAS 123R was low. To validate this experiment, we first check if SFAS 123R had an effect on the stock option compensation of firms

[11] Specifically, at the grant date, firms must calculate the fair value of the CEO stock options and systematically recognize the value of these stock options over the period in which the CEO is deemed to provide service to the firm (Murphy 2013; Choudhary, Rajgopal and Venkatachalam, 2009).

[12] We recognise that vega might not completely capture the convexity in the pay contract. Specifically, the increasing use of performance-vesting restricted stock following SFAS 123R provide risk taking incentives not captured by vega. The prevalence of performance-vesting restricted stock after SFAS 123R works against finding changes in risk taking around the implementation of SFAS 123R.

in our sample. In line with prior studies, in untabulated results, we observe a significant drop in *Vega* in the period after SFAS 123R became effective. Subsequently, we examine the relationship between equity incentives and workplace misconduct using the following Ordinary Least Squares (OLS) regression model:

$$Y_{i,t} = \alpha + \gamma_1 Treatment * Post + \gamma_2 Post + \gamma_3 Treatment + \beta\ Controls_{i,t-1} + FEs + \varepsilon_{i,t} \quad (4)$$

where the dependent variable, $Y_{i,t}$ is workplace misconduct by firm *i* in year *t*. *Post* takes the value of one in the post-SFAS 123R period (years 2006-2008), and zero in the pre-SFAS 123R period (years 2002-2004). *Treatment* equals to one if the firm has pro forma option expenses in the top tercile, i.e., highly affected by SFAS 123R , and zero if the firm has pro forma option expenses in the bottom tercile, i.e., not affected much by SFAS 123R. Our main variable of interest is $Treatment * Post$. We expect the coefficient on this variable to be positive and significant. In Eq. (4) we include the same controls as in Eq. (1), firm and year fixed effects. [13] Standard errors are clustered by firm.

V. RESULTS

To test whether CEO vega is positively related to workplace misconduct, we conduct three types of analyses. First, we test for the relationship between CEO vega and workplace misconduct for the full sample using regression analysis. Second, to address the possibility that our results are driven by firm specific characteristics other than CEO vega we run tests for matched samples. Finally, we use a quasi-natural experiment where we employ a difference-in-differences methodology to impute the effect of *Vega* on workplace misconduct.

[13] In the vector of control variables, we also include *Delta* and *CashComp*. In doing so, we ensure that *Post*Treatment* only captures the effect of the change in *Vega* after SFAS 123R became effective. Further, main effects *Treatment* and *Post* are subsumed by the fixed effect structure.

5.1. Unmatched sample tests

Table 4 shows the results when we examine the relation between CEO risk taking incentives and the incidence of workplace violations using Eq. (1). We first run this test as an OLS regression where we use the natural log transformation of *Violations* as the dependent variable. We present the results for this analysis in column (1). In column (2) we show the results when we estimate Eq. (1) as a Poisson regression where the dependent variable is the count of violations.

Vega is consistently positive and significant while *Delta* is insignificant in both specifications. Specifically, *Vega* is significant at the five percent level in specification (1) (t-stat.: 2.04) and specification (2) (z-stat.: of 2.37). The results are not only statistically significant but also economically significant. Specifically, the results of specification (1) suggest a one standard deviation increase in CEO vega is related to a 6.7 percent increase in the number of violations for the mean observation in our sample.[14]

While the increase in the number of violations might appear small given the average number of violations in our sample, it is pertinent to note that the social cost, in terms of penalties, legal liability, and reputational damage to companies is significant. While the total social and economic cost of a violation is difficult to estimate, the ILO (2013) estimates the total global cost of workplace misconduct at $2.8 trillion. Assuming a linear relation between the number of violations and the cost of workplace misconduct, if all firms increased the number of violations by 6.7 percent, then such an increase would translate to an increase of $187 billion in the economic cost of workplace misconduct.

Finally, the insignificant coefficients on both *Delta* and *CashComp* suggest that *Vega* completely captures the incentives arising from CEO compensation. These results are in line with prior literature, in particular, Armstrong et al. (2013). In both specifications, the size of the firm

[14] In calculating the economic significance for violations, we multiply the standard deviation of *Vega* (1.563: vide Table 2) by the coefficient on Vega when *ln(Violations)* is the dependent variable (0.008: vide Table 4) and divide the resultant figure by mean *ln(Violations)* (0.186: vide Table 2): ((1.563*0.008)/0.186).

and the number of employees are positively related to the number of violations suggesting that the larger the size of the firm and the greater the number of employees, the greater the incidence of workplace violations.

Next, we examine the relation between *Vega* and the severity of workplace violations. Table 5 presents the results for these tests. Like Table 4, in column (1) we present the results for Eq. (1) using OLS regression, and in column (2) we present the results for Eq. (1) using Poisson regression. The coefficient on the main variable of interest, i.e., *Vega*, is positive and statistically significant in both specifications. Specifically, *Vega* is significant at the ten percent level (t-stat.: 1.69) in the OLS model in column (1) and at the five percent level (z-stat.: 2.21) in the Poisson model in column (2). The economic significance of these results suggests that a one standard deviation increase in CEO Vega is related to a 5.5 percent increase in the dollar value of penalties for the average firm in our sample.[15]

5.2. Matched sample tests

To attenuate the possibility that our results are driven by a correlated omitted variable we run a matched sample analysis. Specifically, given the continuous nature of our treatment, i.e., *Vega,* we follow Armstrong et al. (2010) and Armstrong, et al. (2013), and apply a non-bipartite matching procedure. As explained in Section 4.1, we first estimate an ordered logistic propensity-score model where we regress quintiles of *Vega* on the independent variables in Eq. (1) for each year in our sample period. We apply an ordered logistic model to estimate the probability that a CEO receives a certain level of *Vega* (e.g. *VegaQuintile* 1 as opposed to *VegaQuintile 2*) as a function of the independent variables in Eq. (1). Panel A of Table 6 presents the results of the ordered logistic propensity-score model. The size of the average z-statistics suggests that *Delta, CashComp, Leverage, FirmSize,* and *Employees* are positively related and *AssetTurnover, Market-*

[15] In calculating the economic significance for penalties, we multiple the standard deviation of *Vega* (1.563: vide Table 2) by the coefficient on Vega when *ln(Penalties)* is the dependent variable (0.068: vide Table 5) and divide the resultant figure by mean *ln(Penalties)* (1.931: vide Table 2): ((1.563*0.068)/1.931).

to-book, *Tangibility*, *Capex*, *RET*, *CEOage*, and *CEOtenure* are negatively related to the level of CEO vega. Further, the average pseudo R-square for this analysis is comparable to Armstrong et al. (2010) and suggests that the control variables explain 28% of the probability that a CEO receives a certain level of *Vega*.

Using the propensity scores from the ordered logistic regressions we match treatment observations with control observations using non-bipartite matching to reduce the differences in estimated propensity scores while maximizing the difference in our treatment variable, i.e. *VegaQuintile*. As shown in Panel B of Table 6, we successfully match 5,953 observations. Tests for differences in means suggest no significant difference in most control variables between the treatment and control groups. Exceptions are *CEOage* and *CEOtenure* where we find that the control group is managed by older and longer tenured CEOs relative to the treatment group.

Panel C of Table 6 shows the results for the regression analysis using the non-bipartite matched sample. In columns (1) and (2) we present the results for OLS and Poisson regressions when the number of violations is the dependent variable and in columns (3) and (4) we present the results for OLS and Poisson regressions when the value of penalties is the dependent variable. As in the baseline regressions *Vega* is positive and significant in all specifications. Specifically, *Vega* is significant at the five percent level (t-stat.: 2.28) in the OLS regression and significant at the one percent level (z-stat.: 2.92) in the Poisson regression when the number of violations is the dependent variable. Further, *Vega* is significant at the ten percent level (t-stat.: 1.84) for the OLS regression and at the five percent level (z-stat.: 2.52) for the Poisson regression when penalties is the dependent variable. Taken together these results support the notion that *Vega*, as opposed to a correlated omitted variable, is driving the baseline results.

5.3. Identification strategy

In this subsection, we present the results for a quasi-natural experiment, i.e. the introduction of SFAS 123R discussed in Section 4.2. Prior literature (e.g. Carter, Lynch and Tuna 2007; Hayes et al. 2012; and Bakke et al. 2016) documents a significant drop in *Vega* following the introduction of SFAS 123R. Similarly, in untabulated results, we also find a large and significant drop in *Vega* in the period following the introduction of SFAS 123R.

As discussed in Section 4.2 our treatment group consists of firms with pro forma option expenses in the top tercile, while the control group consists of firms in the bottom tercile. Panel A of Table 7 shows descriptive statistics for the treatment and control groups. We have a balanced sample where both groups consist of 924 observations. Further, in untabulated results, we test for the parallel trend assumption for the pre-treatment period with respect to the number and severity of violations and find that the assumption holds for both *Violations* and *Penalties.* Also, the Granger causality test indicates that there was no effect in anticipation of the treatment with p-values of 0.3112 for *Violations* and 0.4327 for *Penalties*. Both tests support the validity of our difference-in-differences tests. To ensure that unobservable differences in firm characteristics do not unduly influence our analysis, as in our baseline regression, we include firm fixed effects in our difference-in-differences analysis.

Panel B of Table 7 shows the results for the difference-in-differences regression. In column (1) we show the results when *ln(Violations)* is the dependent variable and in column (2) we show the results when *ln(Penalties)* is the dependent variable. *Treatment*Post* captures the average incremental effect of the introduction of SFAS 123R for treated firms (firms that award CEOs with stock options) relative to control firms (firms that do not award CEOs with stock options). The coefficient on *Treatment*Post* is negative and significant (t-stat. of -2.05 in column (1) and -2.44 in column (2)) in both specifications suggesting that the reduction in *Vega* following the introduction of SFAS 123R resulted in a reduction in the incidence and severity of workplace violations for treated firms relative to control firms.

5.4. Examining the mechanism for the relation between CEO vega and workplace violations

In this section, we aim to provide corroborating evidence that the mechanism linking *Vega* and workplace misconduct is related to CEO actions that are motivated by excessive risk taking and that affect employees directly or indirectly. Specifically, we test for two possible channels for this relation. In the first channel, which we refer to as the *direct* channel, CEO risk taking incentives encourage CEOs to reduce safety-related expenditures such as health and safety equipment that directly lead to workplace violations. In the second channel, which we refer to as the *indirect channel,* CEOs risk taking incentives foster an increase in employees' workloads by reducing the workforce or increasing production per employee. This leads to an increase in workplace violations.

To test the *direct channel,* we examine if the relation between CEO vega and workplace misconduct is a function of the reduction in safety-related expenditures. In conducting this test, we face the empirical challenge of identifying safety-related expenditures since firms are not required to separately disclose this information in their financial statements. To address this challenge, we follow the procedure set out in Caskey and Ozel (2017) and Roychowdhury (2006), and estimate cuts to abnormal discretionary expenses per employee (*AbDiscExpCuts*) using the residuals from the pooled OLS regression model in Eq. (5).

$$\frac{SGA_{i,t}}{Emp_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{Emp_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{Emp_{i,t-1}} + FEs + \varepsilon_{i,t} \quad (5)$$

where *SGA* is selling, general and administrative expenses, *Emp* is the number of employees, and *Sales* is net turnover.[16] As a cut in expenses means that abnormal discretionary expenditure turns negative, we multiply the residuals by minus one to obtain a more intuitive measure for *AbDiscExpCuts*. Given we expect the effects of CEO vega on workplace misconduct to be a function of safety-related expenditures, we include the interaction term *Vega*AbDiscExpCuts* in

[16] We source the additional data items, i.e. *Emp; Sale; and SGA*, from COMPUSTAT.

Eq. (1) and posit that larger cuts to safety-related expenditures explain the positive association between *Vega* and workplace violations.

Table 8 reports the results of this test. The dependent variable in column (1) is the number of violations and the dependent variable in column (2) is the value of penalties. The estimated coefficient on the interaction term is positive and statistically significant (coeff: 0.067; t-stat.: 2.73 in column (1) and coeff: 0.699; t-stat: 3.02 in column (2)). This result shows that the impact of *Vega* on workplace violations is a function of cuts to abnormal discretionary expenditures. Further, this result suggests that a channel through which higher CEO risk taking incentives lead to workplace violations takes the form of a reduction in safety-related expenditure.[17] The positive and insignificant coefficient on *Vega* suggests that the effect of *Vega* on *Violations* when *AbDiscExpCuts* equals zero is not statistically different from zero. This is consistent with the conjecture that the reduction in health and safety investment drives the relationship between CEO equity incentives and workplace misconduct.

To test the *indirect channel*, we examine if the relation between CEO vega and workplace misconduct is a function of increased employee workload. While we are unable to measure the amount of hours worked by employees, we use two variables to proxy for an increase in employee workload. First, we consider the reduction in the number of employees as captured by high layoffs (*HighLayoffs)*. Employee layoffs lead to a reduced workforce, requiring the remaining employees to absorb the responsibilities of the departing employees, thereby increasing employee workload. *HighLayoffs* captures the reduction in the firms' number of employees and takes the value of one for firms in the bottom quartile of *Turnover* and zero for firms in the top quartile of *Turnover.*[18] *Turnover* is calculated as the number of employees in *t-1* divided by the number of employees in

[17] Following previous literature we acknowledge that our measure of safety-related expenses proxied by cuts to abnormal discretionary expenditures is not perfect but it is the only proxy we are able to obtain. Abnormal discretionary expenditures might also reflect general earnings management efforts in addition to maintenance and safety-related expenditures (Caskey and Ozel 2017).

[18] We drop observations in the other two quartiles.

t-2. If the effect of CEO risk taking incentives on workplace misconduct is a function of increased employee workload as captured by employee layoffs, then the coefficient on the interaction term *Vega*HighLayoffs* should be positive and statistically significant. Second, we use production per employee (*ProdperEmp)*, where the increase in production per employee implies a greater volume of work within the same timeframe, thereby increasing employee workload. *ProdperEmp* is measured as the sum of the cost of goods sold and inventory divided by the number of employees.[19] If the effect of CEO risk taking incentives on workplace misconduct is a function of an increase in workload as captured by increased production per employee, then the coefficient on the interaction term *Vega*ProdperEmp* should be positive and statistically significant.

Table 9 reports results for tests examining whether the relation between CEO vega and workplace misconduct is a function of increased employee workload. Panel A shows the results when we proxy for increased employee workload using high layoffs. As expected, the reported coefficient for the interaction terms *(Vega*HighLayoffs)* is positive and significant irrespective of whether the number of violations (coeff: 0.019; t-stat.: 2.58 in column 1) or penalties (coeff: 0.170; t-stat: 2.28 in column 2) is the dependent variable. Panel B shows the results when we proxy for increased employee workload using the production per employee. Similar to the results for high layoffs, the reported coefficient for the interaction term *(Vega*ProdperEmp)* is positive and significant irrespective of whether the number of violations (coeff: 0.013; t-stat.: 2.07 in column 1) or penalties (coeff: 0.152; t-stat: 2.91 in column 2) is the dependent variable. Like the results for the *direct channel* the positive and insignificant coefficient on *Vega* suggests that the effect of *Vega* on *Violations* is conditional on the CEO taking risky actions by cutting health and safety expenses or by significantly increasing employee workloads.

[19] The computation of the measure production per employee, *ProdperEmp*, follows Caskey and Ozel (2017).

VI. ROBUSTNESS AND FURTHER ANALYSIS

6.1 Robustness tests

We undertake a series of robustness tests to examine the sensitivity of our results. First, to ensure that differences in size between firms do not drive our baseline results, we run our baseline analysis with the dependent variables scaled by size. Specifically, we scale *Violations* and *Penalties* by total assets to compute *ln(Scaled_Violations)* and *ln(Scaled_Penalties)*. Panel A of Table 10 shows the results when we use the scaled dependent variables in Eq. (1).[20] In line with our baseline results, the coefficient on *Vega* when either *ln(Scaled_Violations)* or *ln(Scaled_Penalties)* is the dependent variable is positive and significant.

Second, to ensure that our results for the matched sample are not sensitive to the type of matching, we create an *"outcome based matched"* sample where we match treatment with control observations based on size, industry, and year. Specifically, we match each violating firm to a non-violating firm at the time when the violating firm enters our sample. We select control firms to minimize differences in size and industry. To improve the quality of our matching procedure, we match with replacement so that the quality of matching is not unduly influenced by the number of matched observations. Panel B of Table 10 shows the results when matching on size, industry, and year. Columns (1) and (2) show the results when the number of violations is the dependent variable and we run Eq. (1) as an OLS and Poisson regressions respectively, while columns (3) and (4) show the results when penalties is the dependent variable and we run Eq. (1) as an OLS and Poisson regression. In all specifications, the coefficient on *Vega* is positive and significant suggesting that our baseline results for the matched sample are not sensitive to the type of matching.

Third, to ensure that the analysis relating to increased employee workload as captured by the amount of employee layoffs is not unduly influenced by structural changes in the firm, we repeat the analysis in Panel A of Table 9 after excluding from the sample firms undergoing M&As.

[20] In this analysis we drop *Size* from Eq. (1) since we control for size differences by scaling the dependent variables by total assets.

[21] Panel C of Table 10 shows the results of this analysis. In line with our main results, the coefficient on the interaction *Vega*HighLayoffs* is significant for both violations and penalties, suggesting that this result is not driven by firms with M&A activities.

Finally, notwithstanding that in Table 6 and Panel B of Table 10, we show that our baseline results are robust to different types of matching for firm characteristics, to further attenuate the concern that our results are driven by correlated omitted variables, we run Eq. (1) with controls for alternative CEO incentives identified in prior literature (e.g. Baginski, Campbell, Hinson and Koo 2018; Jenter and Kanaan 2015; Demerjian, Lev and McVay 2012) that might be correlated with workplace misconduct.[22] Specifically, we test whether our baseline results are robust to controlling for a) CEO severance pay (measured as an indicator variable that equals 1 if the ratio of CEO contracted severance pay to CEO cash compensation is in the top quartile, and 0 otherwise), b) CEO dismissal threat proxied by *IndUnderperformance* (measured as a lagged dummy variable, equal to one if the firm return is 10% (or more) lower than the industry peers' median return, and zero if the firm return is 10% (or more) higher than the industry peers' median return), and c) managerial ability (measured as a dummy variable equal to one if manager ability is in the top quartile, and zero otherwise). As shown in Panel D of Table 10, irrespective of which alternative CEO incentives we control for, the coefficient on *Vega* is positive and significant.[23]

[21] To exclude firms with M&A activities we exclude all firm-year observations for which Compustat variable "acquisition/merger pretax" (*aqp*) is different than zero and non-missing.

[22] Baginski, Campbell, Hinson and Koo (2018) find that CEOs with high levels of severance pay have fewer career concerns. Therefore, we predict that the CEOs with high severance pay are less likely to exploit workers to achieve performance. Hence, these firms will have lower levels of workplace misconduct.

Ex-ante a CEO under higher dismissal threat might put more pressure on employees to deliver better performance and therefore compromise on workplace safety. Jenter and Kanaan (2015) show that CEOs face a higher threat of dismissal after bad industry performance as boards learn more about the abilities of CEOs during a bad performance that is otherwise unobservable. Following Jenter and Kanaan (2015) we base our measure for dismissal threat in relation to peer performance and predict that it increases workplace misconduct.

Literature suggests that CEO managerial ability affects firm performance as higher managerial ability allows for a better understanding of industry trends and better prediction of product demand. It lowers the likelihood of bankruptcy and allows for the efficient management of employees (Demerjian, Lev and McVay, 2012; Leverty and Grace, 2012). While managerial ability is positively correlated with CEO pay it is an empirical question as to whether it affects workplace misconduct.

[23] The only exception is the coefficient on *Vega* when *ln(Penalties)* is the dependent variable and we control for CEO severance pay in Eq. (1). In this specification, the coefficient on *Vega* is positive albeit marginally insignificant.

Taken together, these results suggest that it is unlikely that correlated omitted variables drive our results.

6.2 Further analysis

We undertake analysis to further examine why and when CEO vega is related to workplace misconduct. First, to examine the rationale for workplace misconduct, we examine the relation between workplace misconduct and profitability. Specifically, we run Eq. (1) with return on assets as the dependent variable, and, *Violations* or *Penalties* as additional independent variables. In untabulated results, we find that firms with a higher number of workplace violations or penalties have higher profitability.

Second, we examine the relation between workplace misconduct and future stock volatility. Based on our argumentation, that workplace misconduct can also be perceived as a type of risky project, CEOs will only allow workplace violations if they benefit from such violations through increased stock volatility. To undertake this test, we replace the dependent variable in Eq. (1) with the standard deviation of stock returns in the subsequent period, i.e., $t+1$, to take into account the period between a violation being identified by regulators and the market becoming aware of such misconduct, and replace *Vega* with *Violations* and *Penalties*. In untabulated results, we find a positive relation between workplace misconduct and stock volatility, suggesting that CEOs elicit higher stock volatility through higher workplace misconduct.

Third, we examine whether board monitoring moderates the relation between CEO vega and workplace misconduct. Prior literature (Fich and Shivdasani 2006; Field, Lowry, and Mkrtchyan 2013; Falato, Kadyrzhanova, and Lel 2014) concludes that busy boards are less effective in monitoring firm management such that board busyness is associated with weaker profitability, lower market-to-book profitability, and excessive management compensation. Given this, we posit that boards that are less busy are better able to effectively monitor the CEO. In line with this conjecture, in untabulated cross-sectional results, we find that less busy boards attenuate the relation between *Vega* and workplace misconduct relative to more busy boards.

VII. CONCLUSION

We examine whether the risk taking incentives embedded in CEO stock options are related to workplace misconduct. In our analysis, we distinguish between the incentives arising from vega and the incentives arising from delta, and show that only the risk taking incentives arising from vega affect workplace misconduct. We test our predictions using unmatched and matched sample tests where we control for firm characteristics that might be correlated with workplace violations. Our results show that CEO risk taking incentives, as captured by vega, are positively related to workplace misconduct, as captured by the number and severity of workplace violations. Further, we exploit the implementation of SFAS 123R, which resulted in a reduction in the use of equity based compensation in CEO remuneration contracts as a shock to the relation between CEO vega and workplace misconduct. Specifically, we conjecture that any relation between the implementation of SFAS 123R and workplace misconduct occurs through the effect of SFAS 123R on CEO vega. We find that following the implementation of SFAS 123R there was a significant reduction in the incidence and severity of workplace violations for firms that award CEOs with stock options. Further, we find that the relationship between CEO risk taking incentives and workplace violations is a function of cuts to safety-related expenditures and increases in employee workload.

The use of firm and year fixed effects, and the fact that our results are robust to different econometric models suggest that it is unlikely that a correlated omitted variable drives our results. Notwithstanding this, we recognize that given our research design, we are unable to control for all possible determinants of workplace misconduct. Our study contributes to the executive compensation, financial, and workplace misconduct literature by showing that CEO risk taking incentives influence the incidence of workplace misconduct.

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TABLE 1

Sample Composition

This table reports the sample composition by fiscal year in Panel A and by industry, according to the Fama-French Industry Classification Type-48, in Panel B.

Panel A: Sample Composition by Year

Year	*Freq.*	*Percent*
2000	952	5.34
2001	957	5.37
2002	977	5.48
2003	1012	5.68
2004	1008	5.65
2005	969	5.43
2006	982	5.51
2007	1124	6.3
2008	1151	6.46
2009	1116	6.26
2010	1080	6.06
2011	1064	5.97
2012	1013	5.68
2013	952	5.34
2014	892	5
2015	861	4.83
2016	711	3.99
2017	666	3.74
2018	344	1.93

Panel B: Sample Composition by Industry

Industry Code	*Industry Name*	*Freq.*	*Percent*
2	Food Products	429	2.41
3	Candy & Soda	63	0.35
4	Beer & Liquor	100	0.56
5	Tobacco Products	30	0.17
6	Recreation	180	1.01
7	Entertainment	100	0.56
8	Printing and Publishing	159	0.89
9	Consumer Goods	394	2.21
10	Apparel	330	1.85
11	Healthcare	381	2.14
12	Medical Equipment	772	4.33
13	Pharmaceutical Products	1,023	5.74
14	Chemicals	667	3.74
15	Rubber and Plastic Products	129	0.72
16	Textiles	81	0.45
17	Construction Materials	515	2.89

19	Steel Works Etc	356	2
20	Fabricated Products	17	0.1
21	Machinery	962	5.4
22	Electrical Equipment	259	1.45
23	Automobiles and Trucks	452	2.53
24	Aircraft	160	0.9
25	Shipbuilding, Railroad Equipment	34	0.19
26	Defense	52	0.29
30	Petroleum and Natural Gas	137	0.77
32	Communication	556	3.12
33	Personal Services	302	1.69
34	Business Services	2413	13.53
35	Computers	842	4.72
36	Electronic Equipment	1,514	8.49
37	Measuring and Control Equipment	563	3.16
38	Business Supplies	329	1.85
39	Shipping Containers	114	0.64
40	Transportation	652	3.66
41	Wholesale	724	4.06
42	Retail	1,376	7.72
43	Restaurants, Hotels, Motels	479	2.69
48	Other	185	1.04

TABLE 2
Summary Statistics

The table presents summary statistics for the sample, which contains 17,831 observations for the period 2000-2018. Definitions of all variables are provided in the Appendix 1. The statistics for *FirmSize* and *Employees* are presented for untransformed versions of these variables. Specifically, the *FirmSize* is presented in millions of dollars, *Employees* in thousands of people.

	Mean	Std. dev.	Min.	10^{th}	Median	90^{th}	Max.
Violations Data							
Violations	0.406	1.313	0.000	0.000	0.000	1.000	19.000
ln(Violations)	0.186	0.448	0.000	0.000	0.000	0.693	2.996
Penalties	148,000.00	1,070,000.00	0.00	0.00	0.00	22,500.00	20,600,000.00
ln(Penalties)	1.931	4.267	0.000	0.000	0.000	10.021	16.840
Incentives Variables							
Vega	4.015	1.563	0.000	1.892	4.148	6.015	6.441
Delta	5.386	1.451	0.359	3.557	5.399	7.293	8.176
CashComp	6.769	0.657	3.724	6.048	6.773	7.599	8.224
Financial Controls							
Leverage	0.220	0.218	0.000	0.000	0.197	0.466	3.769
CashFlow	0.075	0.158	-5.035	-0.009	0.091	0.179	0.434
DividendPayout	0.013	0.025	0.000	0.000	0.000	0.037	0.222
FirmSize ($m)	6,419.734	12,242.456	3.968	232.599	1,511.222	18,066.076	53,944.395
Employees('000)	19.544	34.229	0.005	0.600	6.000	53.500	163.000
AssetTurnover	1.218	0.791	0.000	0.456	1.027	2.193	5.493
Market-to-book	1.848	1.879	0.105	0.672	1.360	3.401	75.943
Tangibility	0.236	0.192	0.000	0.046	0.178	0.522	0.942
Capex	0.049	0.049	0.000	0.011	0.035	0.103	0.766
RET	0.142	0.523	-0.877	-0.394	0.082	0.681	2.954
CEOage	55.431	7.077	39.000	46.000	55.000	64.000	76.000
CEOtenure	8.026	6.854	1.000	2.000	6.000	17.000	35.000

TABLE 3

Correlations Matrix

This table presents the matrix of correlations coefficients. An asterisk (*) indicates that the correlation coefficient is significant at the 5% level. Definitions of all variables are provided in Appendix 1.

		(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	(15)	(16)
(1)	*ln(Violations)*	1.000															
(2)	*ln(Penalties)*	0.919*	1.000														
(3)	*Vega*	0.175*	0.175*	1.000													
(4)	*Delta*	0.165*	0.171*	0.615*	1.000												
(5)	*CashComp*	0.229*	0.227*	0.436*	0.351*	1.000											
(6)	*Leverage*	0.112*	0.119*	0.062*	0.005	0.176*	1.000										
(7)	*CashFlow*	0.056*	0.064*	0.176*	0.281*	0.148*	-0.043*	1.000									
(8)	*DividendPayout*	0.105*	0.113*	0.116*	0.110*	0.137*	0.047*	0.205*	1.000								
(9)	*FirmSize*	0.325*	0.323*	0.607*	0.617*	0.484*	0.095*	0.224*	0.280*	1.000							
(10)	*Employees*	0.405*	0.405*	0.427*	0.375*	0.517*	0.215*	0.205*	0.177*	0.681*	1.000						
(11)	*AssetTurnover*	0.103*	0.102*	-0.108*	-0.015*	0.038*	-0.083*	0.205*	0.050*	-0.101*	0.170*	1.000					
(12)	*Market-to-book*	-0.083*	-0.082*	0.096*	0.221*	-0.092*	-0.059*	0.059*	0.129*	0.205*	-0.187*	0.028*	1.000				
(13)	*Tangibility*	0.154*	0.143*	-0.019*	-0.008	0.106*	0.207*	0.130*	0.031*	0.028*	0.274*	0.074*	-0.134*	1.000			
(14)	*Capex*	0.013	0.010	-0.017*	0.098*	-0.011	-0.020*	0.170*	-0.018*	0.031*	0.076*	0.189*	0.195*	0.517*	1.000		
(15)	*RET*	-0.014	-0.014	0.027*	0.198*	0.034*	0.024*	0.157*	-0.035*	-0.163*	-0.062*	0.081*	-0.093*	0.000	-0.003	1.000	
(16)	*CEOage*	0.084*	0.089*	0.023*	0.154*	0.140*	0.060*	0.043*	0.055*	0.066*	0.123*	0.002	-0.088*	0.075*	-0.032*	0.006	1.000
(17)	*CEOtenure*	-0.042*	-0.033*	-0.015*	0.316*	-0.012	-0.067*	0.031*	-0.034*	-0.065*	-0.086*	-0.010	0.031*	-0.009	0.025*	0.010	0.408*

TABLE 4

The Impact of Vega on the Number of Violations

This table reports the estimation results for two models. Column (1) reports the coefficients of OLS regression, where the dependent variable is the natural logarithm of violations. Column (2) reports the coefficients of Poisson regression, where the dependent variable is a count of violations. *Leverage*, *FirmSize*, *Employees*, *Market-to-Book*, and *Tangibility* are lagged one year, while *CashFlow*, *DividendsPayout*, *AssetTurnover*, *Capex*, *RET*, *CEOage*, and *CEOtenure* are measured contemporaneously. The sample spans the period from 2000 to 2018. All variables are defined in Appendix 1. The values in parentheses below the coefficients represent t-statistics in model (1) and z-statistics in model (2). Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

	(1) *ln(Violations)*	*(2)* *Violations*
Vega	0.008**	0.051**
	(2.04)	(2.37)
Delta	-0.005	-0.037
	(-0.98)	(-1.42)
CashComp	-0.010	-0.015
	(-1.27)	(-0.33)
Leverage	0.020	0.256
	(1.01)	(1.15)
CashFlow	-0.012	0.136
	(-1.10)	(0.46)
DividendPayout	0.008	-1.735
	(0.05)	(-1.17)
FirmSize	0.022***	0.151**
	(3.21)	(2.50)
Employees	0.016*	0.231***
	(1.82)	(2.96)
AssetTurnover	0.010	0.124*
	(1.03)	(1.75)
Market-to-book	0.001	0.021
	(1.13)	(0.55)
Tangibility	-0.048	0.082
	(-0.85)	(0.22)
Capex	-0.099	-1.345
	(-1.12)	(-1.50)
RET	0.014**	0.061
	(2.22)	(1.26)
CEOage	0.000	0.007
	(0.46)	(1.27)
CEOtenure	0.000	-0.002
	(0.10)	(-0.33)
Constant	-0.016	-3.434***
	(-0.21)	(-5.27)
R-squared	0.651	

Log-likelihood		-7,562.323
Observations	17,831	17,831
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	Poisson

TABLE 5

Determinants of Penalties

This table reports the estimation results for two models. Column (1) reports the coefficients of the OLS regression, where the dependent variable is the natural logarithm of the total value of penalties. Column (2) reports the coefficients of Poisson regression, where the dependent variable is a categorical variable created by deciles of Penalties. *Leverage, FirmSize, Employees, Market-to-Book*, and *Tangibility* are lagged one year, while *CashFlow, DividendsPayout, AssetTurnover, Capex, RET, CEOage*, and *CEOtenure* are measured contemporaneously. The sample spans the period from 2000 to 2018. All variables are defined in Appendix 1. The values reported in parentheses below coefficients represent t-statistics in the model (1) and z-statistics in the model (2). Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

	(1) *ln(Penalties)*	*(2)* *Q(Penalties)*
Vega	0.068*	0.023**
	(1.69)	(2.21)
Delta	-0.048	-0.026*
	(-0.93)	(-1.85)
CashComp	-0.052	0.003
	(-0.69)	(0.15)
Leverage	0.077	0.050
	(0.35)	(0.65)
CashFlow	-0.120	-0.006
	(-0.84)	(-0.09)
DividendPayout	2.603	0.634
	(1.18)	(1.06)
FirmSize	0.178**	0.050**
	(2.51)	(2.15)
Employees	0.085	0.029
	(1.02)	(1.07)
AssetTurnover	0.052	0.026
	(0.56)	(0.93)
Market-to-book	0.011	0.003
	(0.86)	(0.45)
Tangibility	-0.324	-0.054
	(-0.62)	(-0.35)
Capex	-0.865	-0.281
	(-1.03)	(-0.94)
RET	0.104	0.025
	(1.55)	(1.07)
CEOage	0.004	0.002
	(0.51)	(0.88)
CEOtenure	0.002	0.001
	(0.25)	(0.44)
Constant	0.240	0.863***
	(0.31)	(3.37)
R-squared	0.548	

Log-likelihood		-31,753.488
Observations	17,831	17,831
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	Poisson

TABLE 6

Matched Sample Tests for Non-Bipartite Matching

In Panel A the first column presents average coefficients of year-specific cross-sectional estimations from the ordered logistic regression. The second column reports an aggregate z-statistic, which is calculated as the sum of the individual z-statistics divided by the square root of the number of years over which the ordered logistic regressions were estimated. In Panel B, we report covariate balance for non-bipartite matching, where higher equity-incentive observations are labeled as treatment and lower equity-incentive observations are labeled as control. In Panel C we report the estimation results for a matched sample from OLS regression (models 1 and 3) and Poisson regression (models 2 and 4). *Leverage, FirmSize, Employees, Market-to-Book*, and *Tangibility* are lagged by one year, while *CashFlow, DividendsPayout, AssetTurnover, Capex, RET, CEOage,* and *CEOtenure* are measured contemporaneously. All models include time and firm fixed effects. The sample spans the period from 2000 to 2018. Definitions of all variables are provided in Appendix 1. The values reported in parentheses below the coefficients represent t-statistics in models (1) and (3) and z-statistics in models (2) and (4). Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

Panel A. Propensity-Score Estimation using Ordered Logistic Regression

Dependent Variable=Vega Quintile	*Average coefficients*	*Aggregate z-statistics*
Delta	1.11	52.69
CashComp	0.65	20.16
Leverage	0.15	2.24
CashFlow	-0.36	-1.37
DividendPayout	0.40	0.34
FirmSize	0.52	23.87
Employees	0.06	3.21
AssetTurnover	-0.26	-12.57
Market-to-book	-0.05	-4.56
Tangibility	-0.41	-4.50
Capex	-2.70	-5.94
RET	-0.34	-8.10
CEOage	-0.02	-6.22
CEOtenure	-0.05	-18.33
Intercept Equity Incentive Quintile 1-2	9.66	39.67
Intercept Equity Incentive Quintile 2-3	11.32	45.77
Intercept Equity Incentive Quintile 3-4	12.91	51.12
Intercept Equity Incentive Quintile 4-5	14.84	57.13
Average Pseudo R^2	0.28	
N	17,831	

Panel B: Covariate Balance for Treatment (N=5,953) and Control (N=5,953) Groups

	Control Group Mean	*Treatment Group Mean*	*Difference in Means*	*t-stat*
Delta	5.660	5.648	-0.012	-0.57
CashComp	6.815	6.813	-0.002	-0.20
Leverage	0.227	0.224	-0.004	-0.90
CashFlow	0.085	0.088	0.003	1.32
DividendPayout	0.013	0.013	0.000	0.22
FirmSize	7.618	7.594	-0.024	-0.96
Employees	1.822	1.796	-0.025	-0.88
AssetTurnover	1.208	1.211	0.002	0.17
Market-to-book	1.883	1.899	0.016	0.48
Tangibility	0.236	0.233	-0.002	-0.64
Capex	0.049	0.050	0.001	0.99
RET	0.145	0.159	0.014	1.53
CEOage	55.534	55.290	-0.244	-1.89
CEOtenure	8.343	8.093	-0.251	-2.00

Panel C: Regression Analysis for the Non-Bipartite Matched Sample

	(1) *ln(Violations)*	(2) *Violations*	(3) *ln(Penalties)*	(4) *Q(Penalties)*
Vega	0.012**	0.068***	0.098*	0.031**
	(2.28)	(2.92)	(1.84)	(2.52)
Delta	-0.007	-0.048	-0.036	-0.030*
	(-1.07)	(-1.63)	(-0.53)	(-1.71)
CashComp	-0.005	-0.019	0.006	0.026
	(-0.46)	(-0.27)	(0.06)	(0.89)
Leverage	0.022	0.366	0.004	0.002
	(0.84)	(1.33)	(0.01)	(0.02)
CashFlow	-0.014	-0.136	-0.202	-0.013
	(-0.64)	(-0.38)	(-0.65)	(-0.10)
DividendPayout	0.022	-0.843	2.402	0.583
	(0.09)	(-0.47)	(0.88)	(0.74)
FirmSize	0.020**	0.117	0.150	0.034
	(2.04)	(1.53)	(1.48)	(1.11)
Employees	0.015	0.252**	0.056	0.021
	(1.19)	(2.54)	(0.48)	(0.62)
AssetTurnover	0.003	0.050	-0.008	0.012
	(0.15)	(0.55)	(-0.05)	(0.30)
Market-to-book	0.003*	0.039	0.034	0.014*
	(1.66)	(0.96)	(1.56)	(1.66)
Tangibility	-0.038	0.147	-0.143	-0.035
	(-0.46)	(0.31)	(-0.19)	(-0.17)
Capex	-0.093	-0.698	-1.205	-0.478
	(-0.81)	(-0.76)	(-1.02)	(-1.22)
RET	0.011	0.028	0.063	0.007
	(1.21)	(0.45)	(0.67)	(0.25)

CEOage	0.000	0.006	0.002	0.002
	(0.36)	(0.87)	(0.21)	(0.69)
CEOtenure	-0.000	-0.004	-0.000	0.000
	(-0.11)	(-0.55)	(-0.04)	(0.02)
Constant	-0.027	-3.171***	0.121	0.866**
	(-0.24)	(-3.66)	(0.11)	(2.50)
R-squared	0.645		0.544	
Log-likelihood		-5,068.667		-21,435.968
Observations	11,906	11,906	11,906	11,906
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Model	OLS	Poisson	OLS	Poisson

TABLE 7

The Effect of FAS123R on Violations and Penalties

This table reports in Panel A the descriptive statistics for treatment and control samples employed in difference-in-difference analysis and in Panel B the results for the difference-in-difference analysis. The estimation results are from OLS regression. *Treatment* firms are defined as those with pro forma option expenses in the top tercile in the pre-SFAS 123R period, and the control firms as those with pro forma option expenses in the bottom tercile in the pre-SFAS 123R period. *Post* is an indicator variable that takes the value of one in the post-period defined as 2006-2008, i.e. after SFAS 123R was implemented, and zero otherwise. Pre-period is defined as years 2002-2004. *Treatment*Post* captures the average incremental effect of the introduction of SFAS 123R for treatment firms. *Leverage, FirmSize, Employees, Market-to-Book*, and *Tangibility* are lagged one year, while *CashFlow, DividendsPayout, AssetTurnover, Capex*, *RET, CEOage*, and *CEOtenure* are measured contemporaneously. All models include firm and year fixed effects. Definitions of all variables are provided in Appendix 1. The values reported in parentheses below coefficients represent t-statistics. Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% levels, respectively.

Panel A: Descriptive Statistics

	N	*Min*	*Mean*	*Median*	*Max*	*SD*
Treatment sample						
Violations	924	0.000	0.200	0.000	8.000	0.740
ln(Violations)	924	0.000	0.100	0.000	2.200	0.330
Penalties	924	0.000	73,744.00	0.000	12,508,047.00	680,294.00
ln(Penalties)	924	0.000	1.100	0.000	16.340	3.370
Vega	924	0.00006	4.780	4.890	6.440	1.240
Delta	924	0.830	5.810	5.880	8.180	1.380
CashComp	924	3.720	6.810	6.820	8.220	0.720
Leverage	924	0.000	0.160	0.110	1.440	0.190
CashFlow	924	-2.360	0.060	0.090	0.390	0.190
DividendPayout	924	0.000	0.010	0.000	0.220	0.020
FirmSize	924	3.770	7.760	7.740	10.900	1.500
Employees	924	-2.360	1.440	1.310	5.130	1.630
AssetTurnover	924	0.010	0.980	0.810	5.490	0.770
Market-to-book	924	0.240	2.240	1.780	14.270	1.540
Tangibility	924	0.010	0.180	0.140	0.920	0.150
Capex	924	0.000	0.040	0.030	0.310	0.040
RET	924	-0.880	0.050	-0.020	2.950	0.510
CEOage	924	39.000	54.000	54.000	76.000	7.000
CEOtenure	924	1.000	9.000	7.000	35.000	6.000
Control sample						
Violations	924	0.000	0.892	0.000	19.000	2.247
ln(Violations)	924	0.000	0.349	0.000	2.996	0.627
Penalties	924	0.000	317,147.47	0.000	19,264,352.00	1,651,494.83
ln(Penalties)	924	0.000	3.289	0.000	16.774	5.228
Vega	924	0.000	4.059	4.103	6.441	1.539
Delta	924	0.775	5.418	5.460	8.176	1.460

CashComp	924	3.724	6.940	6.909	8.224	0.712
Leverage	924	0.000	0.247	0.219	1.563	0.196
CashFlow	924	-1.608	0.087	0.095	0.344	0.105
DividendPayout	924	0.000	0.017	0.012	0.222	0.023
FirmSize	924	2.596	7.653	7.482	10.896	1.730
Employees	924	-2.226	2.344	2.310	5.128	1.534
AssetTurnover	924	0.031	1.427	1.230	4.382	0.793
Market-to-book	924	0.178	1.552	1.202	9.585	1.100
Tangibility	924	0.016	0.306	0.264	0.935	0.197
Capex	924	0.001	0.050	0.040	0.335	0.038
RET	924	-0.877	0.057	0.030	2.954	0.432
CEOage	924	41.000	56.519	57.000	76.000	6.684
CEOtenure	924	1.000	8.367	6.000	35.000	7.480

Panel B: Regression Analysis

	(1) *ln(Violations)*	(2) *ln(Penalties)*
*Treatment*Post*	-0.059**	-0.709**
	(-2.05)	(-2.44)
Delta	-0.008	-0.168
	(-0.48)	(-1.02)
CashComp	-0.002	0.046
	(-0.13)	(0.27)
Leverage	0.033	0.592
	(0.51)	(0.82)
CashFlow	0.008	-0.389
	(0.16)	(-0.43)
DividendPayout	-0.665	-2.731
	(-0.53)	(-0.27)
FirmSize	0.055*	0.667**
	(1.69)	(2.29)
Employees	0.050	0.279
	(1.45)	(0.85)
AssetTurnover	0.044	0.637*
	(1.23)	(1.71)
Market-to-book	-0.008	-0.153*
	(-0.97)	(-1.84)
Tangibility	0.046	0.266
	(0.24)	(0.13)
Capex	0.278	2.648
	(0.81)	(0.75)
RET	0.043	0.328
	(1.58)	(1.20)
CEOage	0.000	0.003
	(0.18)	(0.15)
CEOtenure	0.001	0.027
	(0.53)	(0.95)

Constant	-0.008	-0.168
	(-0.48)	(-1.02)
R-squared	0.780	0.701
Observations	1,848	1,848
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes

TABLE 8

Direct Mechanism: Cuts to Abnormal Discretionary Expenses

This table reports the estimation results from OLS regressions. The dependent variable in model (1) is the natural logarithm of the number of violations, and in model (2) is the natural logarithm of penalty values. *AbDiscExpCuts* is an inverse of abnormal discretionary expenses calculated following Caskey and Ozel (2017). *Leverage, FirmSize, Employees, Market-to-Book*, and *Tangibility* are lagged by one year, while *CashFlow, DividendsPayout, AssetTurnover, Capex, RET, CEOage,* and *CEOtenure* are measured contemporaneously. All models include year firm and fixed effects. Definitions of all variables are provided in Appendix 1. The values reported in parentheses below coefficients represent t-statistics. Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

	(1) *ln(Violations)*	(2) *ln(Penalties)*
Vega	0.005	0.043
	(1.43)	(1.06)
AbDiscExpCuts	-0.265**	-2.995***
	(-2.53)	(-2.73)
*Vega*AbDiscExpCuts*	0.067***	0.699***
	(2.73)	(3.02)
Delta	-0.002	-0.015
	(-0.37)	(-0.30)
CashComp	-0.008	-0.035
	(-0.98)	(-0.44)
Leverage	0.016	0.041
	(0.76)	(0.17)
CashFlow	-0.007	-0.070
	(-0.58)	(-0.44)
DividendPayout	0.003	2.781
	(0.01)	(1.15)
FirmSize	0.021***	0.172**
	(2.99)	(2.33)
Employees	0.017*	0.076
	(1.65)	(0.80)
AssetTurnover	0.008	0.035
	(0.83)	(0.37)
Market-to-book	0.002	0.013
	(1.38)	(0.97)
Tangibility	-0.064	-0.497
	(-1.06)	(-0.88)
Capex	-0.116	-1.140
	(-1.31)	(-1.34)
RET	0.012*	0.089
	(1.89)	(1.27)
CEOage	0.001	0.007
	(0.79)	(0.83)
CEOtenure	-0.000	-0.001

	(-0.29)	(-0.10)
Constant	-0.045	-0.029
	(-0.58)	(-0.04)
R-squared	0.642	0.542
Observations	16,902	16,902
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	OLS

TABLE 9

Indirect Mechanism: Increase in Employee Workload

This table reports the estimation results from OLS regressions. The dependent variable in column (1) is the natural logarithm of the number of violations, and in column (2) the natural logarithm of penalty values. Panel A shows the results for tests when we proxy for an increase in employee workload using the amount of employee layoffs. *HighLayoffs* equals one if the firm is in the bottom quartile of staff turnover in *t-1*, and zero if the firm is in the top quartile of the turnover. Panel B shows the results for tests when we proxy for an increase in employee workload using production per employee. *ProdperEmp* is production divided by the number of employees. *Leverage*, *FirmSize*, *Market-to-Book*, and *Tangibility* are lagged by one year, while *CashFlow*, *DividendsPayout*, *AssetTurnover*, *Capex*, *RET*, *CEOage*, and *CEOtenure* are measured contemporaneously. All models include firm and year fixed effects. The definitions of all variables are provided in Appendix 1. The values reported in parentheses below coefficients represent t-statistics. Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

Panel A: Employee Layoffs

	(1) *ln(Violations)*	(2) *ln(Penalties)*
Vega	0.005	0.036
	(0.79)	(0.49)
HighLayoffs	-0.077***	-0.774**
	(-2.70)	(-2.55)
*Vega*HighLayoffs*	0.019**	0.170**
	(2.58)	(2.28)
Delta	-0.017**	-0.144*
	(-2.29)	(-1.77)
CashComp	-0.002	0.031
	(-0.21)	(0.29)
Leverage	0.020	-0.064
	(0.73)	(-0.21)
CashFlow	-0.008	-0.116
	(-0.56)	(-0.58)
DividendPayout	-0.067	1.652
	(-0.32)	(0.57)
FirmSize	0.027***	0.161*
	(3.44)	(1.82)
AssetTurnover	0.009	-0.005
	(0.77)	(-0.04)
Market-to-book	0.000	0.013
	(0.25)	(0.77)
Tangibility	0.009	0.238
	(0.14)	(0.34)
Capex	-0.174	-1.950
	(-1.53)	(-1.62)
RET	0.015*	0.133
	(1.69)	(1.43)

CEOage	0.001	0.018
	(0.65)	(1.61)
CEOtenure	-0.000	-0.011
	(-0.03)	(-0.72)
Constant	-0.104	-0.756
	(-0.98)	(-0.65)
R-squared	0.669	0.582
Observations	8,355	8,355
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	OLS

Panel B: Production per Employee

	(1) *ln(Violations)*	*(2)* *ln(Penalties)*
Vega	0.003	0.017
	(0.80)	(0.40)
ProdperEmp	-0.042	-0.576**
	(-1.58)	(-2.48)
*Vega*ProdperEmp*	0.013**	0.152***
	(2.07)	(2.91)
Delta	-0.003	-0.030
	(-0.63)	(-0.57)
CashComp	-0.008	-0.037
	(-1.06)	(-0.49)
Leverage	0.024	0.172
	(1.17)	(0.80)
CashFlow	-0.011	-0.100
	(-0.96)	(-0.69)
DividendPayout	-0.002	2.386
	(-0.01)	(1.09)
FirmSize	0.023***	0.181**
	(3.14)	(2.51)
AssetTurnover	0.015	0.062
	(1.61)	(0.73)
Market-to-book	0.009	0.044
	(0.92)	(0.48)
Tangibility	0.001	0.006
	(0.76)	(0.50)
Capex	-0.043	-0.292
	(-0.75)	(-0.55)
RET	-0.082	-0.606
	(-0.91)	(-0.72)
CEOage	0.013**	0.092
	(2.07)	(1.37)

CEOtenure	0.000	0.002
	(0.31)	(0.29)
Constant	0.000	0.003
	(0.05)	(0.32)
R-squared	0.653	0.552
Observations	17,477	17,477
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	OLS

TABLE 10

Robustness Tests

This table reports robustness tests. Panel A presents OLS regressions where the dependent variables are scaled by total assets. Panel B reports coefficients from OLS and Poisson regressions on a subsample matched on size, industry, and year. Panel C reports the estimation results from OLS regressions testing the indirect mechanisms on subsample of firms not subject to M&A transactions. Panel D reports estimation results from OLS regressions with controls for alternative CEO incentives. All models include the set of controls used in our baseline regression (i.e. *Leverage, Employees, Market-to-Book, Tangibility, CashFlow, DividendsPayout*, *AssetTurnover*, *Capex*, *RET*, *CEOage*, and *CEOtenure*), as well as firm and year fixed effects. The definitions of all variables are provided in Appendix 1. The values reported in parentheses below coefficients represent t-statistics. Standard errors are clustered at the firm level. *, **, *** represent significance at 10%, 5%, and 1% respectively.

Panel A: Dependent Variables Scaled by Total Assets

	(1) *ln(Scaled_Violations)*	(2) *ln(Scaled_Penalties)*
Vega	0.053*	0.069*
	(1.88)	(1.66)
Delta	-0.335***	-0.324***
	(-10.03)	(-6.70)
CashComp	-0.088*	-0.105
	(-1.78)	(-1.39)
R-squared	0.539	0.491
Observations	17,820	17,820
Constant	Yes	Yes
Controls	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	OLS

Panel B: Size, Industry and Year Matched Sample

Dependent variable	(1) *ln(Violations)*	(2) *Violations*	(3) *ln(Penalties)*	(4) *Q(Penalties)*
Vega	0.010**	0.055**	0.103*	0.026**
	(1.99)	(2.50)	(1.94)	(2.21)
Delta	-0.006	-0.036	-0.061	-0.027*
	(-0.89)	(-1.37)	(-0.83)	(-1.66)
CashComp	-0.010	-0.011	-0.029	0.011
	(-0.88)	(-0.21)	(-0.26)	(0.41)
R-squared	0.610		0.494	
Log-likelihood		-7,077.948		-24,929.389
Observations	11,675	11,675	11,675	11,675
Constant	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Model	OLS	Poisson	OLS	Poisson

Panel C: Indirect Mechanism: Employee layoffs without M&As

	(1) *ln(Violations)*	(2) *ln(Penalties)*
Vega	0.010	0.074
	(1.16)	(0.77)
HighLayoffs	-0.065*	-0.811**
	(-1.82)	(-2.17)
*Vega*HighLayoffs*	0.017*	0.204**
	(1.77)	(2.19)
Delta	-0.028***	-0.232**
	(-2.90)	(-2.24)
CashComp	0.009	0.164
	(0.89)	(1.58)
R-squared	0.693	0.613
Observations	6,379	6,379
Constant	Yes	Yes
Controls	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Model	OLS	OLS

Panel D: Controlling for Alternative CEO Incentives

	(1) *ln(Violations)*	(2) *ln(Penalties)*	(3) *ln(Violations)*	(4) *ln(Penalties)*	(5) *ln(Violations)*	(6) *ln(Penalties)*
Vega	0.012**	0.082	0.010**	0.088*	0.008**	0.069*
	(2.22)	(1.50)	(2.32)	(1.86)	(1.99)	(1.69)
Delta	-0.010*	-0.073	-0.004	-0.044	-0.001	-0.019
	(-1.79)	(-1.14)	(-0.63)	(-0.67)	(-0.16)	(-0.45)
CashComp	0.017	0.245**	-0.012	-0.030	-0.010	-0.053
	(1.58)	(2.04)	(-1.29)	(-0.33)	(-1.29)	(-0.69)
SeverancePay	-0.033**	-0.247*				
	(-2.58)	(-1.83)				
IndUnderperformance			0.013*	0.105		
			(1.75)	(1.32)		
ManagerialAbility					0.014**	0.148*
					(1.99)	(1.96)
R-squared	0.671	0.561	0.659	0.556	0.650	0.508
Observations	11,595	11,595	13,907	13,907	17,603	17,603
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Model	OLS	OLS	OLS	OLS	OLS	OLS

APPENDIX 1

Variable Definitions

The table reports definitions of variables used in the analysis. The data for calculating these variables are sourced from the Violation Tracker [VT] produced by the Corporate Research Project of Good Jobs First (available at https://www.goodjobsfirst.org/violation-tracker), Compustat [C], and Center for Research in Security Prices [CRSP].

Variables	**Definition [Database]**
Violations	The total number of employee-related violations per year.[VT]
ln(Violations)	Natural logarithm of one plus the total number of employee-related violations per year. [VT]
Penalties	The total value of penalties for employee-related violations per year. [VT]
ln(Penalties)	Natural logarithm of the total value of penalties for employee-related violations per year. [VT]
Q(Penalties)	The categorical variable dividing the sample into 10 equal parts depending on the total value of violations. [VT]
Vega	Natural logarithm of one plus the sensitivity of the CEO's equity portfolio to 0.01 change in volatility (Coles et al. 2013). [C, CRSP]
Delta	Natural logarithm of one plus the sensitivity of the CEO's equity portfolio to 0.01 change in stock prices (Coles et al. 2013). [C, CRSP]
CashComp	Natural logarithm of one plus the total cash compensation received by the CEO during the year. [C: ln(1+total_curr_w)]
Leverage	The ratio of the total book value of debt to book value of total assets. [C: (dlc+dltt)/at]
CashFlow	The ratio of cash flows from operations to book value of total assets.[C: (ib+dp)/at]
DividendPayout	The ratio of cash dividends to common shareholders to lagged the book value of total assets. [C: dvc/at_{t-1}]
FirmSize	Natural logarithm of market value. [C: ln(mkvalt)]
Employees	Natural logarithm of the number of employees. [C: ln(emp_{t-1})]
LaborIntensity	The standardized ratio of a number of employees to total assets. [C: emp/(at/1000)]
AssetTurnover	The ratio of total sales to the lagged value of the total book value of total assets. [C: sale/at_{t-1}]
Market-to-book	Ratio of market value of total assets to book value of total assets. [C: (cshpri*prcc_f+pstkl+dlc+dltt-txdb)/at]
Tangibility	The ratio of net property, plant, and equipment to book value of total assets. [C: ppent/at]
Capex	The ratio of capital expenditure to lagged book value of total assets. [C: capx/at_{t-1}]
RET	12-month buy and hold abnormal returns [CRSP]
CEOage	Age of the current CEO in a number of years [C]
CEOtenure	A number of years since the current CEO joined the company [C]