Stakeholder Orientation and the Alignment of CEO and Shareholders Wealth

by

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Abstract

We investigate whether the alignment of chief executive officer (CEO) and shareholders wealth influences decisions on engaging in stakeholder-oriented activities. CEOs maximizing their own utility are more likely to engage in such activities when they are not strongly aligned with shareholders wealth. Empirically, firms with CEOs whose wealth is more sensitive to the firm value are less likely to engage in external activities (communities, environments, and human rights). We find that this negative effect is mitigated after the conflict of interests between shareholders and stakeholders is reduced by the constituency statutes. Furthermore, after an exogenous reduction in the alignment of CEO and shareholders wealth, we find that firms that were prone to overinvestment before this exogenous reduction are more likely to engage stakeholder-oriented activities. Overall, our analysis suggests that strong alignment of CEO and shareholders wealth effectively prevents overinvestment in stakeholder-oriented activities that might be motivated by agency problems.

Keywords: Stakeholder orientation, Corporate social responsibility, Risk-aversion, Agency problem

JEL Classification: D21, D81, G32, G34

1. Introduction

Based on the principal-agent theory of Jensen and Meckling (1976), shareholders are expected to tie the chief executive officer's (CEO) wealth to their wealth, to reduce agency costs between management and themselves, and to induce the CEO to make optimal investments maximizing their wealth. As a result, the literature on managers' compensation structure shows that, in particular, the sensitivity of CEO's wealth to firm value or firm risk (i.e., the CEO's delta or vega, respectively) significantly affects corporate investment policy.

Meanwhile, the firm's motivation to engage in stakeholder-oriented activities has been discussed over the last several decades, even though stakeholder-oriented activities have recently become important components of corporate investment. Based on the agency problem view, CEOs or the management of a firm are more likely to overinvest in stakeholder-oriented activities at the shareholders expense, to increase their own utilities, such as personal reputation. Cespa and Cestone (2007) also argue that socially responsible leaders benefit their career by reducing the probability of displacement. This view concludes that stakeholder-oriented activities are generally caused by agency conflicts; hence, such activities may harm shareholders wealth. At the same time, stakeholder-oriented activities can encourage stakeholders to support firm operation, consistent with stakeholder theory (e.g., Jensen (2001), and Jawahar and McLaughlin (2001)). This opposite view argues that investment in being a socially responsible firm leads to higher productivity and firm value.

However, as mentioned in Ferrell et al. (2016), the reality could lie between these two conflicting views. Therefore, we rule out neither of these two views in this study. Extending both views, our study specifically assumes that the engagement in stakeholder-oriented activities can enhance firm's productivity and value by increasing stakeholders' willingness to support the firm (Deng et al., 2013; Lins et al., 2017). In addition, the CEO can benefit from stakeholders as the engagement in stakeholder-oriented activities explicitly increases stakeholders' utilities (Friedman, 1970; Petrenko et

al., 2016), no matter whether it eventually enhances or harms shareholders wealth.

Furthermore, the effect of CEO compensation structure on engagement in stakeholder-oriented activities is less clear,[1] even though a large number of studies have examined this effect on corporate investment policy, such as innovation (Anderson and Core, 2018; Cain and McKeon, 2016; Canil, 2017; Coles et al., 2006; Guay, 1999; Hayes et al., 2012; Hirshleifer and Thakor, 1992; Jin, 2002; Mao and Zhang, 2018), or the CEO characteristic effects (e.g., gender, age, and political preferences) on the engagement in stakeholder-oriented activities (Borghesi et al., 2014; Chin et al., 2013; Cronqvist and Yu, 2017; Manner, 2010; Petrenko et al., 2016; Zhang et al., 2013). Hence, we seek to contribute to the literature by investigating the effect of CEO's alignment with shareholders wealth on stakeholder-oriented activities from investment perspective.

Our study begins with a simple model suggesting that the CEO's risk-aversion restrains the engagement in stakeholder-oriented activities, typically when a risk-averse CEO faces high uncertainty of such activities on firm value, and high private benefit (which is unrelated to shareholders wealth). The rationale for our conjecture is as follows. First, with a moderate level of investment in stakeholder-oriented activities, the engagement in such activities can enhance the firm value (e.g., Freeman et al.

[1] We find a few numbers of well-documented studies that relate directly to our study (Fabrizi et al., 2014; Mayberry, 2020; McGuire et al., 2003; McGuire et al., 2017). For example, Fabrizi et al. (2014) find that monetary incentives (based on bonus compensation and delta) of a CEO negatively affect stakeholder-oriented activities, which is consistent with our prediction and empirical results. More recently, Mayberry (2020) argues that the CEO's risk-taking incentives (measured by vega) discourage a firm's stakeholder-oriented activities, using the adoption of Financial Accounting Standards No.123R (FAS 123R) as a quasi-natural experiment. In addition to these studies, we adopt the several fixed effects regression and two quasi-natural experiments (including FAS 123R), to investigate the causal relation between CEO compensation structure and stakeholder-oriented activities.

(2004), and Jensen and Meckling (1976)). However, likewise conventional investment activities, the uncertainty in the return of such activities on firm value is also inherent. Second, the CEOs who maximize their own utility have incentives to engage in such activities because of their benefits that are only related to stakeholders' utilities but unrelated to shareholders wealth (e.g., Borghesi et al. (2014), and Cheng et al. (2013a)). Collectively, stakeholder-oriented activities with high uncertainty of the return on firm value, or motivated by private benefits of the CEO (thus, the CEO can overinvest) may harm shareholders wealth (e.g., Fernando et al. (2017), and Krüger (2015)). Our simple model predicts that, for these cases, the CEO who is strongly aligned with shareholders wealth is less likely to engage in stakeholder-oriented activities. We note that the strong alignment of CEO and shareholders wealth (i.e., high sensitivity of the CEO's wealth to changes in the firm's stock price, or high delta) leads the CEO being more risk-averse, under the assumption that an objective function of CEO is derived from the compensation scheme being proportional to firm value (e.g., Campbell et al. (2011), and Coles et al. (2006)).

To provide empirical evidence, we employ several approaches using the five categories (Environment, Community, and Human Rights, which are related to external stakeholders, and Employees Relations and Diversity, which are related to internal stakeholders) in MSCI ESG Stats database as the measure of stakeholder-oriented activities (e.g., Lins et al. (2017)). We first use the fixed effect model (the baseline regression) for our primary sample of 13,079 U.S. firm-year observations from 1992 to 2013. To mitigate the endogeneity concern, we account year, state × year, industry × year and the firm fixed effects. Our baseline results show that the CEO's delta is negatively associated to stakeholder-oriented activities, especially for external strengths which might have high uncertainty of the return on firm value and/or high private benefit for CEO. Second, we examine our prediction when the CEO turnover arises. Both univariate and multivariate tests support the view that higher delta CEO turnovers, compared with lower ones, are less (more) likely to lead active (inactive) engagement in strength activities for external (internal) stakeholders, supporting our baseline results.

After matching observations of turnovers with non-turnovers, or restricting forced turnovers, we find consistent results.

Next, to alleviate further endogeneity concerns, we employ two quasi-natural experiments representing the exogenous shock on stakeholder orientation and CEO's option-based compensation. The former relies on the constituency statutes (CS) staggered adopting in U.S. state legislatures, which represent an exogenous shock for the stakeholder orientation in firms. We use this exogenous shock to examine the different response in the effect of the CEO's alignment with shareholders wealth on stakeholder-oriented activities, if any, in the incorporated state with CS and without. The passage of CS allows the firm's managers to consider interests of not only shareholders, but also stakeholders. Therefore, the statutes reduce agency costs by mitigating the conflict of interests between shareholders and stakeholders (e.g., Flammer et al. (2019), and Gao et al. (2020)). Intuitively, the statutes can also reduce the uncertainty of stakeholder orientation on firm value. Our difference-in-difference estimation shows that a negative relation between the alignment of CEO and shareholders wealth and stakeholder-oriented activities weakens for the firms incorporated under CS. For the firms incorporated without CS, we also find that higher delta CEO turnovers, relative to lower ones, have more significant impact on the external and internal strength activities.

For a latter quasi-natural experiment, we use the adoption of Financial Accounting Standards 123R (FAS 123R), exogenously reducing the CEO's option-based compensation (Hayes et al., 2012). Specifically, FAS 123R adoption significantly reduces the sensitivity of the CEO's wealth to the firm's stock price and volatility (i.e., the CEO's delta and vega). To examine the causality between the alignment of CEO and shareholders wealth and stakeholder-oriented activities, our approach is constructed following a large number of prior studies on FAS 123R (e.g., Ferri and Li (2018), and Mao and Zhang (2018)). We find that, after the implementation of FAS 123R, the firms with CEOs who experienced more significant reduction in their alignment with shareholders wealth are more likely to engage in external strength activities. This causal relation is more pronounced for firms that were prone

to overinvestment before FAS 123R, in line with our prediction.

As for the robustness tests, we first re-estimate our analysis to rule out alternative explanations and further alleviate endogeneity concerns due to the omitted variables related to CEO characteristics and corporate governance. Most importantly, we find that the negative effect of the CEO's delta on stakeholder-oriented activities remains statistically significant, when we include several additional variables. Second, we replace our dependent variable by equally weighting for each five categories following Deng et al. (2013). Furthermore, as suggested by Edmans et al. (2009), we use alternative measure for CEO's delta. Overall, our main results are largely unchanged in these robustness tests.

Our study—overall supported by both theoretical prediction and empirical evidence—contributes to the literature in two ways. First, we extend the theoretical model to predict the relationship between stakeholder orientation and the alignment of CEO and shareholders wealth. The number of prior studies on the CEO's behavior shows that the risk-aversion of a CEO affects corporate investment (e.g., Coles et al. (2006), Guay (1999), Gervais et al. (2011), and Malmendier and Tate (2005)). According to this literature, we extend our model to exploit the role of a CEO's risk-aversion as a determinant of the engagement in stakeholder-oriented activities. Under the assumption that a strong alignment of the CEO's and shareholders wealth makes CEO more risk-averse, our study theoretically shows that when the firm's CEO faces high uncertainty of such activities on firm value and/or high benefit which is unrelated to shareholders wealth, the CEO's strong alignment with shareholders wealth refrains them from engagement in stakeholder orientation.

Second, we extend the literature on stakeholder orientation and corporate social responsibility. Existing literature generally focuses on the role and effect of stakeholder orientation, as well as which determinants and motivation affect stakeholder-oriented activities in the firm. Specifically, our study contributes to the literature focusing on the role of a CEO as a potential motivation of stakeholder orientation and corporate social responsibility (e.g., Barnea and Rubin (2010), Baron (2008), Cheng et

al. (2013a), and Petrenko et al. (2016)). We add to this literature by showing both theoretically and empirically that the alignment of CEO and shareholders wealth can prevent overinvestment in stakeholder-oriented activities, especially those might be motivated by agency problems, as suggested in Ferrell et al. (2016) and Krüger (2015). Overall, our findings suggest that, from shareholders' perspectives, the structure of CEO compensation can be an effective tool for mitigating agency problems.

The remainder of this paper is organized as follows. In Section 2, we construct a simple model and empirical prediction with a numerical example. Section 3 describes the data and our primary sample. In Section 4, we test our prediction using the fixed effect model, CEO turnovers, and two quasi-natural experiments. We further perform robustness tests in Section 5. Finally, Section 6 concludes the paper.

2. Theoretical prediction

2.1. The simple model

In this subsection, we develop a simple model to provide an intuition on how a risk-averse CEO chooses the investment level of stakeholder-oriented activities. Based on previous theoretical studies (e.g., Campbell et al. (2011)), our model builds on several assumptions as follows: ownership and control are separated, and managers are risk-averse, whereas both shareholders and stakeholders are risk-neutral.[2]

[2] In general, the portfolio of a CEO is assumed to be under-diversified relative to shareholders, due to the large amount of stock and options grants in their compensation (Jin, 2002; Lambert et al., 1991; Malmendier and Tate, 2005). Moreover, our model assumes that the CEO and shareholders have the same time preference, while risk preference of CEO is different from that of shareholders (Epstein and Zin, 1989).

The CEO decides how much to invest in stakeholder-oriented activities in period 1. We denote the level of investment in such activities as I. The CEO realizes the return for shareholders wealth in period 2. In particular, the production function f is

$$f(I, \tilde{A}) = \tilde{A}g(I) \tag{1}$$

where $\tilde{A}$ is the return on firm productivity from stakeholder-oriented activities,[3] and the function $g(\cdot)$ is twice-continuously differentiable for non-negative I, strictly increasing and strictly concave, and satisfies $g(0) = 0$, $\lim_{I \to 0} g'(I) = \infty$ and $\lim_{I \to \infty} g'(I) = 0$.[4] In particular, the stochastic term of return on firm productivity by stakeholder-oriented activities $\tilde{A}$ can be decomposed into

$$\tilde{A} = \mu + \sigma\tilde{\varepsilon} \tag{2}$$

where $\mu > 0$, $\sigma > 0$, and $\tilde{\varepsilon}$ is a random number with $E[\tilde{\varepsilon}] = 0$ and $Var[\tilde{\varepsilon}] = 1$, and $Var[\tilde{A}] = \sigma^2 < \infty$. We note that μ and σ are the expected mean and standard deviation for the $\tilde{A}$. Furthermore, to rule out negative production realization, the support of σ is such that $\tilde{A} > 0$.

Strictly positive $\tilde{A}$ implies that stakeholders who gain from the firm's stakeholder-oriented activities always help to enhance firm value. For instance, the firm's social reputation (i.e., being socially responsible) may help to attract high-quality employees. Therefore, if the level of investment in stakeholder-oriented activities is moderate, then firm value can increase. This view is in line with the theory by Coase (1937), Freeman et al. (2004), Jensen (2001), and Jensen and Meckling (1976).[5]

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[3] In general, previous theoretical studies denote $\tilde{A}$ as the stochastic term of technology shock by investments such as R&D. Similarly, we use $\tilde{A}$ as the stochastic improvement of firm productivity by stakeholders, since our study focuses on stakeholder-oriented activities.

[4] The described conditions of $g(\cdot)$ strictly guarantees a positive solution I. Consequently, we can safely assume that $g(\cdot)$ is a form of utility function with decreasing absolute risk-aversion.

[5] For relatively recent studies on the relation between stakeholder-oriented activities and shareholders wealth,

Without loss of generality, the discount rate is assumed to be zero. In addition, for simplicity, our model assumes that the firm's internal resources are sufficient to finance any level of investment for stakeholders that the CEO decides in period 1. For shareholders wealth maximization,

$$\max_{I \geq 0} -I + E\left[\tilde{A}g(I)\right] \tag{3}$$

The optimal level of investment in stakeholder-oriented activities (that maximize shareholders wealth) I^{op} is determined by the first order condition of equation (3). The second order condition of equation (3) is strictly negative by the concavity of $g(\cdot)$; therefore, the first order condition is necessary and sufficient.

$$I^{op} = g'^{-1}\left(\frac{1}{E\left[\tilde{A}\right]}\right) \tag{4}$$

Our model assumes that a benefit of CEO's utility exists in period 1, which is unrelated to shareholders wealth, but related to stakeholders' utilities. We denote this term as λU_o where λ is a coefficient of CEO's internalized utility from stakeholders' utilities, and U_o are incremental utilities of stakeholders. For example, if the CEO decides to invest in R&D activities inside the firm in period 1, this decision manifestly does not affect the utilities of stakeholders (i.e., $U_o = 0$). Therefore, there is no additional benefit for the CEO (unless related to shareholders wealth). However, in terms of stakeholder-oriented activities that our study focuses on, λU_o is always positive if λ is positive.[6]

Suppose that the CEO's utility function $u(\cdot)$ is assumed to be twice-continuously

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see, for example, Albuquerque et al. (2019), Deng et al. (2013), Fatemi et al. (2015), and Lins et al. (2017).

[6] Theoretical framework focusing on CEO's motivation to invest in stakeholder-oriented activities provides the evidence of positive λ (Borghesi et al., 2014; Cheng et al., 2013a; Ferrell et al., 2016). For example, the CEO may believe that stakeholder-oriented activities enhances her private reputation (Barnea and Rubin, 2010; Petrenko et al., 2016). CEOs' social wealth or altruism make them become a manager with a moral imperative (Baron, 2008; Bénabou and Tirole, 2010)

differentiable, strictly increasing and strictly concave.[7] The CEO's certainty-equivalent for period 2 is $u^{-1}E[u(\tilde{A}g(I))]$ (Arrow, 1971; Pratt, 1964). Under the assumption that the CEO maximizes her own utility, then the firm's investment in stakeholder-oriented activities is determined by

$$\max_{I\geq 0} -I + \lambda U_o + u^{-1}E\left[u\left(\tilde{A}g(I)\right)\right] \tag{5}$$

where U_o are incremental utilities of stakeholders increasing in I.

Equation (5) indicates that our model separates the CEO's benefit by stakeholder-oriented activities into two parts. The first one is related to CEO's compensation scheme.[8] The second part is not related to shareholders wealth but CEO's social wealth, λU_o, which is related to stakeholders' utilities. Given that stakeholders are risk-neutral, equation (5) (where $\lambda < 1$) is equivalent to[9]

$$\max_{I\geq 0} -I + \lambda I + u^{-1}E\left[u\left(\tilde{A}g(I)\right)\right] \tag{6}$$

The optimal level of investment in stakeholder-oriented activities (that maximize CEO's utility), I^* is determined by the first order condition of equation (6). The second order condition of equation (6) is strictly negative by the concavity of $g(\cdot)$; therefore, the first order condition is

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[7] Our model assumes that the CEO's absolute risk-aversion is decreasing. Decreasing absolute risk-aversion (DARA) suggests that CEOs become more risk-averse when their wealth is reduced. This assumption of DARA is widely used in the literature.

[8] Following Campbell et al. (2011), we assume that the CEO's objective function is derived from the compensation scheme being proportional to firm value, and the compensation scheme cannot be written contingent on the CEO's risk-aversion.

[9] If $\lambda \geq 1$, then the CEO's utility maximization problem has no interior solution, since we assume that stakeholder-oriented activities enhance firm productivity ($\tilde{A} > 0$). Hence, the condition $\lambda < 1$ is necessary and it implies that CEO's benefit by the utility internalization from stakeholders' utilities cannot exceed the original cost of stakeholder-oriented activities.

necessary and sufficient.

$$I^{\star} = g'^{-1}\left(\frac{1-\lambda}{u^{-1}Eu\tilde{A}}\right) \tag{7}$$

If the CEO is risk-neutral like shareholders, the decision in equation (7) shows that a CEO who maximizes her own utility may overinvest in stakeholder-oriented activities, compared with the first-best investment (I^{op} in equation (4)), due to the CEO's utility internalization from stakeholders' utilities. The following lemma summarizes a case of risk-neutral CEO and the relation between CEO's risk aversion and CEO's optimal choice for stakeholder-oriented activities.

Lemma 1. Suppose that λ is positive. A risk-neutral CEO engages more in stakeholder-oriented activities than the optimal level for shareholders wealth maximization. A risk-averse CEO engages less in stakeholder-oriented activities than a risk-neutral CEO. Suppose that CEO 1 is more risk-averse than CEO 2, then, CEO 1 engages less in stakeholder-oriented activities than CEO 2.

Proof. See Appendix A.

In equation (7), our model shows that the CEO's utility maximization problem (rather than shareholders wealth maximization) is affected by the CEO's risk-aversion in $u(\cdot)$, the uncertainty of return on firm productivity by stakeholder-oriented activities σ (for simplicity, we assume that μ is fixed), and the coefficient of CEO's internalized utility from stakeholders' utilities λ. The relation between $I^{\star}$ and σ is summarized in Proposition 1 as follows.

Proposition 1. If σ increases (decreases), a risk-averse CEO engages less (more) in stakeholder-oriented activities, whereas a risk-neutral CEO is not affected.

Proof. See Appendix A.

For example, when the CEO decides the engagement of stakeholder-oriented activities, they may not strongly believe that such activities can enhance firm value (i.e., the CEO perceives a high uncertainty σ of such activities). In this case, Proposition 1 implies that the more risk-averse CEO, relative to less risk-averse CEO, decides to reduce the engagement in stakeholder-oriented activities more.

We also investigate whether changes in λ affect the impact of CEO's risk-aversion on CEO's optimal choice for stakeholder-oriented activities. The relation between $I^{\star}$, λ, and the CEO's risk-aversion is summarized in Proposition 2 as follows.

Proposition 2. If λ increases, a risk-averse CEO engages more in stakeholder-oriented activities, but the negative effect of risk-aversion on the engagement in stakeholder-oriented activities increases (i.e., the effect of risk-aversion on stakeholder-oriented activities becomes more negative).

Proof. See Appendix A.

For example, the stakeholder-oriented activities may have a great reputation effect (i.e., the CEO faces high λ for such activities), then private benefits of CEO from high λ make them more engaged in such activities. At the same time, it is possible that λ depends on firm-specific condition. When the firm faces high agency problem from the conflict of interests between stakeholders and shareholders, the CEO can make her own utilities higher by engaging stakeholder-oriented activities (rather than only focusing on shareholders' interests). Proposition 2 implies that the CEO's risk-aversion prevents these cases of overinvestment.

Note that σ and λ may not be mutually exclusive (also these are ambiguous to separate). For example, if the management of a firm has access to a large amount of cash, the overinvestment problem may arise in the firm (e.g., Opler et al. (1999), and Biddle et al. (2009)). Then, the CEO may invest the firm's money in stakeholder-oriented activities. This might be more related to the CEO's private benefit (i.e., high λ in our model), and/or higher uncertainty on the return (i.e., high σ in our model), compared with other projects with greater positive-NPV. As described in Propositions 1 and 2, The CEO's risk-aversion helps in mitigating overinvestment in the stakeholder-oriented activities.

2.2. Numerical example and empirical prediction

In this subsection, we construct the numerical example before we investigate this prediction empirically. The firm production function is assumed to be Cobb-Douglas form with decreasing returns to scale: $f(I, \tilde{A}) = \tilde{A}I^{\alpha}$ where $0 < \alpha < 1$. The CEO's utility function is assumed to be of the decreasing absolute risk aversion (DARA) form: $u(c) = c^{1-\gamma}/(1-\gamma)$ if $\gamma \neq 1$, and $u(c) = ln(c)$ if $\gamma = 1$. The risk-aversion of CEO, γ, is varied over the interval [0, 2]. Other parameters in our numerical example are as follows: the return on firm productivity from stakeholder-oriented activities, $\tilde{A}$, is uniformly distributed with mean value equal to one, and $\alpha = 0.9$.

[Insert Figure 1 here]

Figure 1 supports our propositions. In panel A, we set $\tilde{A}$ to be uniformly distributed on the interval [0.5, 1.5], and it shows that the risk-neutral CEO with positive λ always overinvests in stakeholder-oriented activities (i.e., more than optimal level for shareholders wealth maximization). As the risk-aversion of CEO increases, the firm can mitigate the overinvestment problem, especially with large λ. Panel B illustrates that as σ increases, the risk-averse CEO strictly reduces investments in stakeholder-oriented activities, whereas the risk-neutral CEO depends only on λ (which is fixed at 0.05 in panel B).

As shown in Figure 1, we expect that the negative effect of CEO's risk-aversion on stakeholder-oriented activities is more likely to be observed (empirically) in higher λ and/or σ. However, the CEO's risk-aversion is not directly observable. Nevertheless, under the assumption that an objective function of the CEO is derived from the compensation scheme being proportional to firm value, we argue that, the CEO's delta (i.e., the sensitivity of CEO's wealth with respect to one percentage point change in the firm's stock price) is the most suitable measure in our model for the alignment between shareholders wealth and a CEO's wealth, which makes the CEO more risk-averse.[10] Therefore, based on Proposition 1 and 2, we construct our empirical prediction as follows.

Prediction. When a CEO decides to engage in stakeholder-oriented activities, the strong alignment of CEO and shareholders wealth—which makes a CEO's risk aversion larger— negatively affects the engagement in stakeholder-oriented activities; in particular, a CEO perceives high λ and/or high σ.[11]

[10] Note that vega of the CEO's compensation can also be a proxy for the CEO's risk-aversion. However, we find that there are two conflicting views of the expected relation between the CEO's vega and stakeholder-oriented activities based on the literature as follows. First, if the CEO with large vega is less risk-averse (Coles et al., 2006; Core and Guay, 1999; Guay, 1999), then according to our model, she may invest more in stakeholder-oriented activities so that we could expect the positive effect of vega. Second, as stakeholder-oriented activities efficiently reduce the firm's risk (Albuquerque et al., 2019; Dhaliwal et al., 2011; El Ghoul et al., 2011; Lins et al., 2017), these activities may harm wealth of the CEO with large vega. In other words, the CEO with large vega has no incentive to invest in stakeholder-oriented activities, thus we could expect a negative effect (or no effect) of vega. Overall, we have no clear expectation about the effect of vega on stakeholder-oriented activities. Nevertheless, we include the CEO's vega as a control variable in our empirical analysis.

[11] We note that λ and σ are also not directly observable and ambiguous to separate empirically. Therefore,

3. Data and sample selection

We first start with the sample covered in Execucomp which provides detailed information on CEOs including compensations starting from 1992. Following the literature on the executives' compensation (Coles et al., 2006; Core and Guay, 1999), we use the CEO's delta as the change in the dollar value of CEO's wealth for one percentage point change in the firm's current stock price, and the CEO's vega as one percentage change in the standard deviation of firm's stock return. Delta and vega calculations are based on the option valuation model modified for dividends (Black and Scholes, 1973; Merton, 1973). Next, we obtain financial information from Compustat.[12] We exclude firms in regulated industries (i.e., utilities and financial industries), which have Standard Industrial Classification (SIC) code 4900–4999 and 6000–6999. The firm-level independent variables are winsorized at the 1st and 99th levels, to avoid the potential impact of outliers. We provide a detailed definition of variables in Appendix B.1.

[Insert Table 1 here]

To measure a firm's stakeholder-oriented activities, we then obtain data based on the environmental, social, and governance scores in the MSCI ESG Stats database (formerly, KLD database), which is most extensively used in the related literature (Deng et al., 2013; Flammer et al., 2019; Krüger, 2015; Lins et al., 2017). As suggested by Lins et al. (2017) and Servaes and Tamayo (2013), we focus on the scores of strengths and concerns in five categories in the MSCI ESG Stats

based on the literature review, this study attempts to provide several empirical identifications in Section 4.

[12] In our robustness test, we further obtain the governance data from Investor Responsibility Research Center (IRRC) database to construct *CEO duality*, *E-index*, *Board independence*, and *Board size* following Bebchuk et al. (2009).

database: Environment, Community, Human Rights, Employees Relations, and Diversity,[13] where the first three categories are related to the external stakeholders and the last two categories are related to the internal stakeholders. The effects of stakeholder-oriented activities may differ among categories, and strengths vs. concerns (e.g., Krüger (2015)); hence, we separately aggregate the scores of strengths and concerns related external and internal stakeholders, and construct four variables (*External Strengths*, *External Concerns*, *Internal Strengths*, and *Internal Concerns*) as our main dependent variables. Our primary sample period is 1992–2013 and the variables of stakeholder-oriented activities are from 1993–2014 (one-year after). Table 1 presents the descriptive statistics of our primary sample.

4. Empirical evidence

4.1. Baseline regression

Table 2 reports the univariate analysis for stakeholder-oriented activities. For our univariate test, we simply classify that a CEO is less risk-averse if their delta is low and vega is high, following the literature on the CEO's compensation structure (e.g., Coles et al. (2006)). In panel A (panel B), we use the sample median (industry-year median within the same state of firm's headquarter location) as the threshold, and perform *t*-test. Panel A shows that more risk-averse CEOs are less likely to engage external strengths and concerns, and internal strengths. However, if we subtract the median value from the scores of stakeholder-oriented activities in panel B, only external and internal strengths are different

[13] We do not include the governance category in our tests as the majority of literature uses MSCI ESG Stats database. Furthermore, we exclude the product category since it represents the product quality and innovation, which are outside the scope of stakeholder-oriented activities (Lins et al., 2017; Servaes and Tamayo, 2013); however, our empirical results are unchanged overall if we include the product category in internal stakeholder-oriented activities.

between firms with more and less risk-averse CEOs.

[Insert Table 2 here]

Stakeholder orientation benefits managers who earn a good reputation at the expense of shareholders, so that positive news about stakeholder relation may be bad news for shareholders (Krüger, 2015). Besides that, a large number of studies argue that stakeholder relation can be the manifestation of agency problems (see, Bénabou and Tirole (2010), and Ferrell et al. (2016)). In particular, Krüger (2015) finds a significant reduction in shareholders wealth when strength activities for external stakeholders were announced (typically, environment and communities). The author suggests that investors punish firms with agency problems, in which CEOs might be improving their personal reputation as green or socially responsible leaders at the shareholders expense.[14]

According to this line of thought, we argue that internal stakeholders such as employees (related to employee relation category) and directors (related to diversity category) are more directly related to the firm value, rather than other stakeholders in the society. In addition, the engagement in strength activities may not be associated with shareholders wealth (or it may harm shareholders wealth), whereas concern activities can explicitly harm shareholders wealth. This first argument is associated with Proposition 1 and consistent with the results of Krüger (2015).[15] Second, in general, higher executive's pay-for-performance sensitivity (i.e., delta) indicates the strong alignment of interests

[14] See, for more examples, Di Giuli and Kostovetsky (2014) which show that firms with active stakeholder orientation are more likely to have negative future stock returns and declines in ROA using the same database (MSCI ESG Stats), and therefore suggesting that any benefits to stakeholders come at the expense of shareholders value. Fernando et al. (2017) also find that high "greenness" does not increase firm value.

[15] Krüger (2015) finds negative market reactions by event-study methodology, for not only negative events (in our study, concern activities) but also positive events (in our study, strength activities), in terms of stakeholder-oriented activities.

between managers and shareholders, and it leads to less severe agency problems (Bebchuk and Fried, 2003; Masulis et al., 2007). Therefore, if the external stakeholder-oriented activities and strength activities are more likely to be the manifestation of agency problems, the negative effect of strong alignment of CEO and shareholders wealth on such activities should be more pronounced. This argument is associated with Proposition 2, and consistent with theoretical framework of Cespa and Cestone (2007).

Collectively, in our model, we expect that increasing strengths (rather than reducing concerns) and the stakeholder-oriented activities on the external stakeholders (rather than the internal stakeholders) are more likely to be related to high λ and/or high σ. Therefore, in line with our prediction, the negative effect of the CEO's delta on stakeholder-oriented activities is expected to be more pronounced for strengths and/or external stakeholder-oriented activities.

For our baseline regression, we adopt the following estimation with various fixed effects:

$$\begin{aligned}\text{Stakeholder}-\text{oriented activities}_{i,j,s,t+1} &= \beta_1 \text{Delta}_{i,j,s,t} + \beta_2 \text{Vega}_{i,j,s,t} \\ &+ \theta' \text{CEO or Firm Characteristics}_{i,j,s,t} \\ &+ \beta_0 + \delta_t + \delta_s \delta_t + \delta_j \delta_t + \delta_i + \varepsilon_{i,j,s,t}\end{aligned} \tag{8}$$

where *i*,*j*,*s*, and *t* represent the firm, the industry based on the first two digit of SIC code, the state of corporate headquarters location, and fiscal year, respectively. Consequently, δ_t, $\delta_s \delta_t$, $\delta_j \delta_t$ and δ_i denote the year, the state × year, the industry × year, and the firm fixed effect, respectively. $\text{CEO or Firm Characteristics}_{i,j,s,t}$ indicate the time-variant variables as follows: *CEO total pay*, *CEO cash pay ratio*, *Female CEO*, *CEO tenure*, *CEO age*, *Firm size*, *Tobin's Q*, *ROA*, *Leverage*, *Tangibility*, *Cash* and *R&D*. Various fixed effects in equation (8) enable us to alleviate endogeneity concern by controlling potential effect from year-, industry-, local-, and firm-specific time-invariant characteristics.

[Insert Table 3 here]

Table 3 presents our baseline regression results. In panel A, we focus on the external stakeholder-oriented activities, and find that the CEO's delta and vega affect significantly the engagement in such activities after controlling various fixed effects to mitigate potential endogeneity concerns. In panel B, where we focus on the internal stakeholder-oriented activities, only the CEO's vega has a significant effect on strength activities. The significance level of CEO's delta and vega in our main result (in column (3)) is about 5–10%; however, these relatively low significances are not surprising given that these are identified after controlling all the fixed effects in equation (8).

Taking a closer look at the results in Table 3, we also find that the effects of control variables are generally consistent with our model and the literature. First, *Female CEO*, who might be more sensitive to stakeholders' utilities (Cronqvist and Yu, 2017), significantly reduces external concern activities. Second, the firm's profitability measured by *ROA*, shows a negative relation with the internal concern activities. Finally, firms with sufficient cash are more likely to engage in external strength activities.

Overall, as we expected in our model, more risk-averse CEOs are less likely to engage in external strength activities. Economically, the coefficients in Table 3 indicate that a firm with more risk-averse CEO is 2.39% and 5.55% less likely to engage in external stakeholder-oriented strength activities, as the CEO's delta moves from the first quartile to the third one and the CEO's vega moves from the third quartile to the first one, respectively.[16] However, we note that, even though we control

[16] The mean value of *External Strengths* is 0.5699 in our sample. From Column (3) in Table 3, assuming all else at sample mean, *External Strengths* decreases 2.39% at its mean value (= (0.6657–0.1046)×(–0.0243)/0.5699) as *Delta* moves from the first quartile (0.1046) to the third one (0.6657). Similarly, *External Strengths* decreases 5.55% at its mean value (= (0.0212–0.1846)×0.1936/0.5699) as *Vega* moves from the third quartile (0.1846) to the first one (0.0212).

for various fixed effects, there might exist the potential endogeneity problems such as reverse causality. Therefore, we further alleviate these concerns using CEO turnover sample analysis, and two quasi-natural experiments in the next sections.

4.2. Evidence from CEO turnover

In this subsection, we use CEO turnover to examine the effect of CEO's wealth sensitivity on stakeholder-oriented activities. We consider a three-year window prior to (Pre-turnover period: from year $t - 3$ to year $t - 1$), and after (Post-turnover period: from year t to year $t + 2$) the CEO turnover in our analysis, where year t is the fiscal year when a turnover arises. As a result, our CEO turnover sample identifies 100 cases that CEO's delta before the turnover is lower than after the turnover (i.e., higher delta CEO turnover) and 363 cases vice-versa (i.e., lower delta CEO turnover) with available data. Consistent with our model, we expect that newly-hired-CEOs with lower delta are more likely to engage in stakeholder-oriented activities, or that newly-hired-CEOs with higher delta are more likely to reduce existing stakeholder-oriented activities.

[Insert Figure 2 here]

Figure 2 plots the mean value and standard error for each year in the pre- and post-turnover period. In particular, we observe no clear difference in external strengths between higher and lower delta CEO turnover until the turnover year (from year $t - 2$ to t) in Figure 2-(A). However, for higher delta CEO turnovers (the red line; $n = 100$), the external strengths decrease sharply two years after the CEO turnover (year $t + 2$). In contrast, for lower delta CEO turnovers (the blue line; $n = 363$), external strengths increase in the post-turnover period. In other words, the difference in external strengths between higher and lower delta CEO turnover becomes significant approximately two years after the CEO turnover (year $t + 2$). We observe a similar but weaker pattern in internal strengths differences (see Figure 2-(C)). Overall, our univariate evidence in Figure 2 is consistent with our expectation.

Table 4 reports the results of univariate and multivariate tests on panels A and B, respectively. In particular, our empirical approach in panel B uses the following cross-sectional regression:

$$\begin{aligned} \Delta\text{Stakeholder} - \text{oriented activities}_{i,j,s} \\ = \beta_1 \text{Low} - \text{to} - \text{High Delta turnover}_{i,j,s} \\ + \theta' \Delta\text{CEO or Firm Characteristics}_{i,j,s} \\ + \beta_0 + \delta_j + \delta_s + \varepsilon_{i,j,s} \end{aligned} \tag{9}$$

where $\text{Low} - \text{to} - \text{High Delta turnover}_{i,j,s}$ is an indicator equal to one for higher delta CEO turnovers and zero for lower delta CEO turnovers, as described above. Control variables are conducted as the within-firm differences between the mean value of pre- (from year *t – 3* to year *t – 1*) and post-turnover periods (from year *t* to year *t + 2*). For stakeholder-oriented activities, we set a period based on the one-year after the turnover, consistent with equation (8). In addition, we include the industry and state fixed effects to account time-invariant industry and local characteristics.

[Insert Table 4 here]

Panel A of Table 4 shows results consistent with figure 2. For external strengths, the mean difference between post- and pre-turnover period for higher delta CEO turnovers (i.e., *c* in column (1)) is not significant, whereas one for lower delta CEO turnovers (i.e., *f* in column (1)) is significantly positive. The difference-in-difference comparison (i.e., *c – f* in column (1)) also supports that lower delta CEO turnovers observe greater incidence of active engagement in the external strength activities, than higher delta CEO turnovers. In addition, firms with higher delta CEO turnovers significantly reduce the existing internal strengths (i.e., *c* in column (3)), whereas there is no difference between post- and pre-turnover period for lower delta CEO turnovers (i.e., *f* in column (3)). Consequently, similar to the external strengths, the internal strength activities are also significantly different between higher vs. lower delta CEO turnovers.

Panel B of Table 4 presents the multivariate test results using equation (9). Corresponding to

the univariate test in panel A, we find that, in columns (1) and (3), higher delta CEO turnovers, relative to lower delta CEO turnovers (*Low-to-High delta*), are negatively associated with both external and internal stakeholder-oriented strength activities. Meanwhile, we find no evidence for the internal concern activities in multivariate regression, although there exists a significant difference in univariate test (see, $c - f$ in panel A in column (4)).

Our CEO turnover analysis is consistent with the baseline regression results. However, CEO turnovers might not be perfectly exogenous; hence, we use alternative sample to further alleviate potential endogenous concerns in CEO turnovers. Table 5 presents the regression results as in equation (9) using the alternative sample. First, in panel A, we generate a one-to-one matched sample (without replacement) among higher delta CEO turnovers and non-turnovers within same industry, fiscal year, and the state of headquarters location. Based on the year prior to turnover, we estimate a propensity score using the CEO's delta, vega and control variables in equation (8), by the probit model with a caliper of 0.1%. In addition, to improve matching quality, we drop 2% of the treatment observations for which the propensity score density of the control observations is the lowest (Smith and Todd, 2005). Similarly, we generate a matched sample between lower delta CEO turnovers and non-turnovers in panel B. Finally, in panel C, we merge our CEO turnover sample with the forced turnover sample in Peters and Wagner (2014);[17] however, due to the limited sample size, we could not account for the fixed effects.

[Insert Table 5 here]

[17] Peters and Wagner (2014) identify the forced CEO turnovers using press reports such as LexisNexis and Factiva, as follows: press reports state that the CEO was fired, forced out, or retires or resigns due to policy differences or pressure, turnovers of CEOs below the age of 60 if the press do not report the certain reason (death, poor health, acceptance of another position), and retirements of CEOs below the age of 60 without the announcement of the firm at least six months before the retirement.

Column (1) in panel A of Table 5 indicates that, higher delta CEO turnovers, relative to the matched non-turnover sample, have less engagement in external strength activities. By contrast, lower delta CEO turnovers in panel B shows a positive coefficient, but has no sufficient significance level (*t*-statistic = 1.397). In panel C of Table 5, we find that higher delta CEO turnovers in the forced turnover negatively affect external strengths and internal concern activities. To sum up, Table 5 shows that the results for the alternative sample are consistent with our previous results.

4.3. Evidence from the adoption of Constituency Statutes

In this subsection, we provide the evidence from a quasi-natural experiment representing an exogenous variation in the firm's stakeholder orientation. Specifically, we use the staggered U.S. state legislatures of Constituency Statutes (CS) as the exogenous shock to the stakeholder orientation of firms (e.g., Atanassov (2013), Flammer (2018) and Luoma and Goodstein (1999)).[18] Prior to the enactment of CS, corporate managers run their firms only for shareholders wealth maximization, so that there is a conflict of interests between shareholders and stakeholders in the society. However, corporate managers under CS are legally allowed to consider the interests of both shareholders and stakeholders, thereby CS reduce the agency conflict (Flammer et al., 2019; Orts, 1992). Since the adoption of CS does not reflect any firm's decision, statutes exogenously affect λ and/or σ in our model; hence, this empirical approach plausibly can be a quasi-natural experiment.[19] Collectively, we

[18] The adoption of CS is unrelated to any other firm characteristics or firm's strategic decision. Therefore, it is used as an important instrument in many studies on stakeholder orientation. For example, Flammer (2018) and Flammer et al. (2019) use it as the instrument variable on stakeholder-oriented activities, which is same variable in our study.

[19] For the recent study, Gao et al. (2020) uses the CS as a natural experiment, and shows that it reduces the cost of debt by mitigating conflicts of interest between shareholders and stakeholders.

argue that CS exogenously reduce the CEO's benefits from stakeholders, but are unrelated to shareholders (i.e., denoted as λ) and uncertainty of return on firm value by stakeholder-oriented activities (i.e., denoted as σ).[20] Therefore, in line with our prediction, the negative effect of the CEO's delta on stakeholder-oriented activities is expected to be less pronounced under CS.

[Insert Table 6 here]

In addition to our baseline regression, we account the adoption of CS at the level of U.S. states, thus perform the following regression:

$$\begin{aligned}\text{Stakeholder}-\text{oriented activities}_{i,j,s,t+1} &= \beta_1 \text{Delta}_{i,j,s,t} + \beta_2(\text{Delta}_{i,j,s,t} \times \text{Constituency Statute}_{i,t}) \\ &+ \beta_3 \text{Vega}_{i,j,s,t} + \beta_4(\text{Vega}_{i,j,s,t} \times \text{Constituency Statute}_{i,t}) \\ &+ \beta_5 \text{Constituency Statute}_{i,t} \\ &+ \theta' \text{CEO or Firm Characteristics}_{i,j,s,t} \\ &+ \beta_0 + \delta_t + \delta_s \delta_t + \delta_j \delta_t + \delta_i + \varepsilon_{i,j,s,t}\end{aligned} \quad (10)$$

where $\text{Constituency Statute}_{i,t}$ is an indicator of firms that incorporated states adopting the CS.[21] It should be noted that the state of incorporation and the state of corporate headquarters location (denoted

[20] In equation (7) of our model, I^* may increase or decrease by the adoption of CS. However, our main focus is the negative effect of CEO's risk-aversion, $\partial I^* / \partial(\text{the CEO's risk}-\text{aversion})$, which is expected to be estimated as less negative by the adoption of CS in our regression (the coefficient on the CEO's delta).

[21] Note that *Directors' Duties Laws* described in Karpoff and Wittry (2018) is same as CS in our study. We follow Karpoff and Wittry (2018), and construct *Constituency Statutes (indicator)* in our empirical tests. However, as illustrated in Appendix B.2, our sample period 1992–2013 can be seriously imbalanced. Henceforward, we exclude the observations incorporated in states that adopted CS before 1991 (29 out of 35 U.S. states). As a robustness test, we find that our results are overall unchanged if we exclude the observations incorporated in states that adopted CS before 1993.

by *s*) are different for a large proportion of U.S. public firms (Bertrand and Mullainathan, 2003; Karpoff and Wittry, 2018). We also include various fixed effects as in equation (8).

Table 6 presents the results of equation (10), where columns (1), (3), (5), and (7) do not include the interaction between *Vega* and *Constituency Statute*. In line with our prediction, the effect of the CEO's delta is still significantly negative, and interaction terms with CS are significantly positive in columns (1) and (2), suggesting that the negative effect of the CEO's delta on the external strength activities weakens after the adoption of CS.

[Insert Table 7 here]

We combine this empirical approach to our CEO turnover sample, since the negative effect of higher delta CEO turnover on the external and internal strengths, which we show in the previous section, can be different among firms incorporated CS and non-CS states. In our CEO turnover sample (total 463 observations), among 313 in non-CS states and 150 in CS states, the number of higher delta turnover is 67 (about 21%) and 33 (about 22%), respectively. We also find that the Pearson correlation coefficient between *Low-to-High delta* and *Constituency Statute* in Table 7 is 0.0068 (with *p*-value 0.8847), confirming that there is no statistical difference in likelihood of higher delta CEO turnovers (relative to lower delta CEO turnovers) between firms incorporated CS and non-CS states. Then, we perform the regression of equation (9) including an indicator of the CS adoption, and present the results in Table 7.

Consistent with the result in Table 6, we find that higher delta CEO turnovers have a significant negative effect on the external and internal strengths for firms incorporated in non-CS states (see, panel A in Table 7). Moreover, since higher vs. lower delta CEO turnover and higher vs. lower vega CEO turnover are not independent,[22] we construct three indicators (*Higher delta-Higher vega, Higher*

[22] Conventional wisdom holds that executive's delta and vega are both increasing in the value of option-based

delta-Lower vega, and *Lower delta-Higher vega*) in panel B of Table 7, and perform *F*-test to examine the higher delta CEO turnover effect among higher vega CEO turnovers. In line with panel A, higher delta CEO turnover effects on external and internal strengths (columns (1) and (3)) are significant only for firms in non-CS, while insignificant for firms in CS.

According to Bebchuk and Cohen (2003), more than half of public U.S. firms are incorporated in Delaware. However, Delaware has never adopted CS, thus our results shown in Table 6 could be biased if Delaware-incorporated firms only have a significant negative relation between the CEO's delta and external strength activities. To rule out this possibility, we perform equation (10) for firms incorporated in non-Delaware states and Delaware. In this untabulated test (see, Appendix B.3 for the result), we find that the effect of CEO's delta on external strengths is significantly negative for both firms incorporated non-Delaware states and Delaware. Note that, for firms incorporated in non-Delaware states, this negative effect is economically (as well as statistically) significant,[23] and the adoption of CS among non-Delaware-incorporated firms make this negative effect weaken. Moreover, to check which categories in stakeholder-oriented activities were significantly affected, we perform our baseline regression (equation (8)) and a quasi-natural experiment approach using CS (equation (10)) on each category. Consistent with the results of Fabrizi et al. (2014) and Krüger (2015), we find that the effects of CEO's delta on the environment and community categories are significant in this

compensation (Ross, 2004). Therefore, delta and vega are positively correlated inevitably, so that higher delta-lower vega CEO turnovers and lower delta-higher vega CEO turnovers in Table 7 have few observations.

[23] For non-Delaware incorporated firms, when a firm's incorporated state does not adopt CS, the effect of CEO's delta on external stakeholder-oriented strength activities is statistically and economically significant (which is estimated by –0.2029). For the sample of Column (1) of Appendix B.3, the estimated coefficient of *Delta* indicates that *External Strengths* decreases 19.89% at its mean value 0.5721 (= 0.5609×(–0.2029)/0.5721) as *Delta* moves from the first quartile (0.0976) to the third one (0.6585), assuming all else at sample mean.

unreported test (see, Appendix B.4 for the result).

4.4. Evidence from the adoption of FAS 123R

In this subsection, we provide the evidence from a quasi-natural experiment representing an exogenous variation in the CEO compensation structure to examine the causality. In particular, we use the adoption of Financial Accounting Standards 123R which took effect in 2005 (FAS 123R). Prior to FAS 123R, firms were allowed to expense employee stock options (ESO) intrinsic value at the grant date and disclose the fair value in footnotes. As a result, firms generally reported no expense in their income statements since most ESO were granted at the money with zero intrinsic value (Hall and Murphy, 2002). After the implementation of FAS 123R, firms were required to expense ESO at fair value in their income statements. Hayes et al. (2012) show that firms responded to FAS 123R by granting fewer options. The authors report that this dramatic decline in the median value of the ratio of CEO option-based compensation to the total CEO compensation from 39.7% to 13.9%, concluding that FAS 123R causes an exogenous reduction in CEO option-based compensation.

Following the spirit of Hayes et al. (2012), the large numbers of studies in finance and accounting use FAS 123R as an exogenous shock on the CEO's compensation structure and risk-seeking behavior (e.g., Cain and McKeon (2016), Canil (2017), Dou et al. (2019), Ferri and Li (2018), and Mao and Zhang (2018)). In accordance with these studies, we also construct our sample period to 2002–2008 since FAS 123R became effective for large U.S. public firms for the first reporting period beginning June 15, 2005. To avoid ambiguous information at the effective year, we exclude fiscal year 2005 (Mao and Zhang, 2018).[24]

For our sample with 5,018 observation (in Table 8), we find that the mean (median) value of

[24] We find the overall unchanged results when we include fiscal year 2005 as the post-FAS123 period.

Delta and *Vega* are 0.88 and 0.21 (0.34 and 0.10) and 0.65 and 0.14 (0.21 and 0.06) in pre- and post-FAS123 period, respectively. This decline in mean (median) value of *Delta* and *Vega* by about 26% and 33% (38% and 40%) is strongly supported by the *t*-test (*Wilcoxon*-test) of differences.[25] Collectively, these untabulated results indicate that the implementation of FAS 123R exogenously affects the CEO's delta and vega by reducing the CEO option-based compensation. Therefore, in line with our prediction, the impact of CEO's delta and vega is expected to be significant for the post-period of FAS 123R after controlling various fixed effects as in equation (8). Specifically, we adopt the following regression for a quasi-natural experiment by FAS 123R, and report the results in Table 8:

$$\begin{aligned}\text{Stakeholder}-\text{oriented activities}_{i,j,s,t+1} &= \beta_1 \text{Delta}_{i,j,s,t} + \beta_2(\text{Delta}_{i,j,s,t} \times \text{Post}-\text{FAS123}_t) \\ &+ \beta_3 \text{Vega}_{i,j,s,t} + \beta_4(\text{Vega}_{i,j,s,t} \times \text{Post}-\text{FAS123}_t) \\ &+ \beta_5 \text{Post}-\text{FAS123}_t + \theta' \text{CEO or Firm Characteristics}_{i,j,s,t} \\ &+ \beta_0 + \delta_t + \delta_s\delta_t + \delta_j\delta_t + \delta_i + \varepsilon_{i,j,s,t}\end{aligned} \quad (11)$$

where $\text{Post}-\text{FAS123}_t$ is an indicator equal to one for observations in post-FAS123 period (2006–2008) and zero for pre-FAS123 period (2002–2004). To control the potential effect from time-invariant unobservable factors, we include various fixed effects as in equation (8).

[Insert Table 8 here]

In Table 8, we perform *F*-test to examine whether the impact of the CEO's delta and vega for

[25] In the untabulated test, the mean and median differences in *Delta* between pre- and post-FAS123 periods are about –0.23 and –0.13 with *t*-statistic = 5.167 and *z*-statistic = 12.886, respectively. The mean and median differences in *Vega* between pre- and post-FAS123 periods are about –0.07 and –0.04 with *t*-statistic = 10.190 and *z*-statistic = 12.429, respectively.

the post-FAS123 period are significant. Columns (1) and (2) show causal effects between the CEO's delta and the external strength activities, which support our previous results. As FAS 123R reduces the CEO's delta exogenously (by about 26% of mean), weakening the alignment of CEO and shareholders wealth fosters the CEO engagement in external stakeholder-oriented activities. The significance level of *F*-test in columns (1) and (2) are relatively low for the CEO's delta; however, it is not surprising given that these are identified after controlling all the fixed effects that we include.

Employing a quasi-natural experiment by FAS 123R is a plausible instrument to examine our prediction as for the following reasons. First, the reduction of CEO option grants under this act is explicitly unrelated to stakeholder-oriented activities (or any other firm's strategic decision). Second, as suggested in the literature on the ex-ante likelihood of overinvestment (e.g., Opler et al. (1999), and Biddle et al. (2009)), cash-rich and low-leverage firms are more likely to overinvest (i.e., high likelihood of overinvestment). According to our model, such firms may have high λ and/or σ. Hence, CEOs in such firms have more incentives to engage stakeholder-oriented activities, while the CEO's risk-aversion helps to prevent this overinvestment problem. Lastly, note that likelihood of overinvestment could be related to the CEO compensation structure, which raises potential endogeneity concern; however, FAS 123R was exogenously applied for most U.S. public firms irrespective of the firms' likelihood of overinvestment. Therefore, FAS 123R provides an ideal setting for us to examine the relation of the CEO's compensation structure (delta and vega), stakeholder-oriented activities, and likelihood of overinvestment.

Collectively, in line with our prediction, if the negative effect of CEO's delta on stakeholder-oriented activities is more pronounced with higher λ and/or σ, then this negative effect from the implementation of FAS 123R is expected to be more significant when the firms were facing high likelihood of overinvestment prior to FAS 123R. To the extent that the unobservable characteristics of the contracting environment are largely time-invariant (Himmelberg et al., 1999), we examine the causal effect by adopting the following cross-sectional regression, which is also consistent with the

prior studies using FAS 123R (e.g., Hayes et al. (2012) and Mao and Zhang (2018)):

$$\begin{aligned}\Delta\text{Stakeholder}-\text{oriented activities}_{i,j,s} &= \beta_1\Delta\text{Delta}_{i,j,s} + \beta_2\left(\Delta\text{Delta}_{i,j,s}\times\text{Overfirm}_i\right)\\ &+ \beta_3\Delta\text{Vega}_{i,j,s} + \beta_4(\Delta\text{Vega}_{i,j,s}\times\text{Overfirm}_i)\\ &+ \beta_5\text{Overfirm}_i + \theta'\Delta\text{CEO or Firm Characteristics}_{i,j,s}\\ &+ \beta_0 + \delta_s + \delta_j + \varepsilon_{i,j,s}\end{aligned} \quad (12)$$

where all right-hand-side variables are conducted as the within-firm difference between the mean value of pre- (2002–2004) and post-FAS123 periods (2006–2008), and for left-hand-side variable (stakeholder-oriented activities), we set pre- and post-FAS123 periods as 2003–2005 and 2007–2009, respectively. We require at least one observation per firm in both periods, as suggested in the literature using this approach (e.g., Anderson and Core (2018), and Hayes et al. (2012)). Thereby, our sample is constructed by 754 unique firm observations. Before we estimate equation (12), we also check that $\Delta Delta$ and $\Delta Vega$ (in Table 9) are both significantly negative,[26] supporting that FAS 123R is a plausible natural experiment in line with the literature (e.g., Hayes et al. (2012)). Overfirm_i is based on the mean value of likelihood of overinvestment in the pre-FAS123 period, where likelihood of overinvestment is the average annual industry-ranked (deciles) value of cash and leverage multiplied by negative one, following Biddle et al. (2009), Cheng et al. (2013b), and Dou et al. (2019). In addition, we include the industry and state fixed effects to control potential effect from industry- and local-specific time-invariant characteristics.

[26] For our 754 observations in Table 9, we find that the mean (median) value of *Delta* and *Vega* are 0.85 and 0.20 (0.35 and 0.09) and 0.75 and 0.17 (0.27 and 0.08) in pre- and post-FAS123 period, respectively. These reductions in mean (median) value of *Delta* and *Vega* are about 12% and 15% (23% and 11%) with *t*-statistics 2.359 and 5.277 (*z*-statistics 3.593 and 5.345), respectively, indicating that $\Delta Delta$ and $\Delta Vega$ are significantly negative.

[Insert Table 9 here]

If the firm's ex-ante likelihood of overinvestment is closely related to high λ and/or σ in our model, then according to our prediction (in Section 2.2), the effect of delta should be greater for such firms. In other words, when the alignment of CEO and shareholders wealth gets weaker (i.e., the CEO's delta decreases due to the implementation of FAS 123R), then the CEO can engage more in stakeholder-oriented activities to maximize her own utility. To sum up, in terms of equation (12), we expect the negative coefficient of delta for firms with high likelihood of overinvestment (i.e., $\beta_2 < 0$), and significance level for $\beta_1 + \beta_2 < 0$.

Table 9 presents the results of equation (12). In columns (1) and (2), we find that, the estimated coefficient on *ΔDelta* × *Overfirm* is significantly negative and the sum of the coefficients on *ΔDelta* and *ΔDelta* × *Overfirm* is also significantly negative (different from zero by *F*-test). Consistent with our prediction, these results suggest that the weakening alignment of CEO and shareholders wealth, in firms that are prone to overinvestment, exhibits a significant increase in their external stakeholder-oriented strength activities. For the internal strengths, we also find similar results (see columns (5) and (6)).

[Insert Table 10 here]

Furthermore, in Table 10, we jointly estimate the high and low likelihood of overinvestment using seemingly unrelated regression models and test the difference between the coefficients on *ΔDelta* and *ΔVega* across the two subsamples. Specifically, we allocate firms to columns (1), (3), and (5), if the mean value in the pre-FAS123 period of *Overinvestment* and *Cash* is higher, and one of *Leverage* is lower than the sample median, respectively, where *Overinvestment* is annual industry-ranked deciles value of cash and leverage (Biddle et al., 2009; Cheng et al., 2013b; Dou et al., 2019). Table 10 supports our prediction and is consistent with Table 9. For firms with high likelihood of before FAS 123R, the effect of CEO's delta is overall negative in columns (1), (3), and (5). In particular, the

negative effect of CEO's delta on the external and internal strengths is significantly different between firms with high and low likelihood of overinvestment (see, panels A and C of columns (1) and (2)).

Meanwhile, the generally negative coefficients of *ΔVega* in columns (1), (3), and (5) of Table 10 are puzzling. However, we interpret that, as FAS 123R exogenously reduces option-based compensation, it may affect (reduce) the alignment of CEO and shareholders wealth directly. For example, CEOs with higher vega due to the large amount of option-based compensation before FAS 123R (then also CEO's delta can be high),[27] might be strongly aligned with shareholders wealth. Such CEOs' alignment with shareholders wealth sharply dropped after FAS 123R, but we observe these observations with simply both *ΔDelta* and *ΔVega* are negative. In this case, we may observe that the estimated coefficients of *ΔVega* have negative values (as well as *ΔDelta*). Nevertheless, in Table 10, we find the overall negative coefficients of *ΔDelta*, therefore supporting our expectation.

5. Robustness tests

5.1. Additional test for CEO characteristics and governance effects

As a robustness test, we perform our baseline regression where the dependent variable is the external strength activities. Specifically, we account the moderating effect by including interaction terms based on the following literature. First, female CEOs are considered to be more sensitive to other people in the general literature. Thereby, compared with male CEOs, the effect of female CEOs' delta would be different if they care more about stakeholders' utilities (Cronqvist and Yu, 2017). Second, greater career concerns may lead to excessive risk-averse behavior (Hirshleifer and Thakor, 1992; Holmström, 1999). If the career concern effect dominates, then CEOs who are old and close to their

[27] Note that executive's delta and vega are both increasing in the value of option-based compensation (Ross, 2004). Therefore, the correlation between delta and vega is strongly positive.

retirement might have lower risk-aversion, resulting in weaker negative effect of the CEO's delta. Third, prior studies on the CEO's behavior emphasize that CEO's optimism or overconfidence significantly affects their decision-making (Campbell et al., 2011; Hirshleifer et al., 2012; Malmendier and Tate, 2005). Fourth, similar to CEO overconfidence, the CEO with high managerial ability may overestimate their ability, so that it may affect our main results. We include the managerial ability measured by Demerjian et al. (2012), in which they estimate based on firm efficiency.[28]

Lastly, the corporate governance can play a significant role when the CEO makes a decision (e.g., Bebchuk et al. (2009)). Hence, we include the governance index as a proxy of entrenchment, and the board independence as a proxy of monitoring instrument in the firm. Furthermore, we account the effect of co-opted board—appointed directors after the CEO takes office—since Coles et al. (2014) show that the CEO's delta decreases with co-option. Moreover, Coles et al. (2014) suggest that not all independent directors are effective, hence we separate the board independence composition by co-option (i.e., non-co-opted independence vs. co-opted independence).

Based on equation (8), we include candidates of the moderator and its interaction term with the CEO's delta and vega, and then re-estimate. It should be noted that candidates of the moderator we described above can be correlated with the CEO's delta and vega; therefore, we report these results as a robustness test.

[Insert Table 11 here]

Table 11 reports the results of the robustness test for CEO gender, career concern, CEO overconfidence, and managerial ability. We find that the effect of delta on the external strength

[28] Demerjian et al. (2012) verify that their managerial ability measurement is strongly correlated to CEO fixed effects. As a result, we can further alleviate potential concern from the unobservable (therefore, omitted) time-invariant CEO characteristics, by including managerial ability in our analysis.

activities is generally negative, consistent with our previous results. In panel A, we find no evidence supporting CEO gender effect. For career concern, we find partial evidence since the negative effect of *Delta* is mitigated when CEOs are close to retirement; however, for CEOs on the chair of board, who might have much less career concern, show insignificant results.

In panels B and C, most importantly, after we include an indicator for CEO overconfidence and managerial ability measures, we still find that the negative effects of *Delta* are statistically significant (see, columns (1) and (4) in panels B and C), suggesting that our main results are not driven by omitted variable bias. Taking a closer look at the results in panels B and C, confident CEOs and CEOs with high managerial abilities reduce external strength activities (see, columns (1) and (4) in panels B and C), in particular when they are strongly aligned with shareholders wealth (see, the interaction terms with *Delta* in columns (2) and (5) in panels B and C). For these results, we interpret that confident CEOs and CEOs with high managerial abilities may allocate the firm's resource from stakeholder-oriented activities to other investment (such as R&D). The reasoning behind this interpretation is that such CEOs are confident on their own abilities thus regard stakeholder-oriented activities as wasteful spending, relative to other investment.

[Insert Table 12 here]

Table 12 reports the results of the robustness test for corporate governance effect. In column (1) in panels A and B, most importantly, we find that the effects of *Delta* are still significantly negative, suggesting that our main results are overall not driven by omitted corporate governance variables.

For columns (2) and (3) in panel A, if we accept the argument that more entrenched CEOs have less career concerns, then the positive coefficient on *Delta* × *E-index* is supportive by career concern effect. Similarly, if the entrenchment encourages CEOs to take the risk for long-term value (Stein, 1988, 1989), such CEOs can become less risk-averse. Thus, if CEOs are more entrenched, the negative effect of *Delta* should be mitigated and the positive effect of *Vega* should be reinforced. It can

explain the positive coefficients both on *Delta* × *E-index* and *Vega* × *E-index* in panel A. However, this interpretation is not supported in panel B, as the co-opted board mitigate the positive effect of *Vega* in column (3).

Meanwhile, the monitoring effect can prevent overinvestment problem on stakeholder-oriented activities in our model. We find supportive evidence in columns (5) and (6) of panel A: the risk-averse CEO who has larger delta and/or smaller vega, is more likely to reduce the external strength activities when the board independence is higher. In panel B, we separate the monitoring effect by independent directors into *Non-co-opted independence* and *Co-opted independence* (Coles et al., 2014). Column (6) in panel B shows that *Non-co-opted independence* has more explanatory power for monitoring effect than *Co-opted independence*, which is a consistent result with Coles et al. (2014).

Once again, we emphasize that variables in Tables 12 and 13 that we include can strongly correlate with the CEO's delta and vega. Nevertheless, since the negative coefficients of *Delta* in Tables 12 and 13 are generally significant, the overall results in this subsection supports that our main results are not driven by omitted variable bias concerns.[29]

5.2. Alternative measurement

In this subsection, we perform a robustness test where we replace our dependent variables (i.e., the firm's stakeholder-oriented activities). Prior studies focusing on the social performance (e.g., Deng et al. (2013) and Lins et al. (2017)) argue that an analysis using a simple summation of scores in MSCI ESG Stats could suffer from the fact that the number of strength and concern indicators varies

[29] In untabulated results, we find that the effects of *Delta* on *External Concerns*, *Internal Strengths*, and *Internal Concerns* are still statistically insignificant, consistent with our previous results, and there are no extraordinary moderating effects (also statistically insignificant) of candidates that we use.

considerably each year. This issue may raise a potential bias concern in our analysis, even we include various fixed effects so far. Therefore, as suggested by Deng et al. (2013), we construct the adjusted score by dividing the strength and concern scores for each category by the respective number of strength and concern indicators. Now, the adjusted scores give equal weight to the five categories that we use, and help mitigating a bias concern by an indicator on the firms' social performance in relatively irrelevant industries (Deng et al., 2013). We re-estimate equations (8), (10) and (11), and report the results in each panel of Table 13, respectively.

[Insert Table 13 here]

Table 13 shows that, even we use the adjusted score to further alleviate endogeneity concern, the CEO's delta has a statistically significant and negative effect on the external strength activities, for the baseline regression (panel A), and two quasi-natural experiments (panels B and C). In panel A, the impact of vega is also supported as in our previous results; however, it is not supported in other panels. Overall, we confirm that our main results are driven by the causal relation between the CEO's delta and stakeholder-oriented activities (typically, the external strengths).

Next, we use the measure for CEO's wealth-performance sensitivity in Edmans et al. (2009) (hereafter, *WPS*), as an alternative measure of our independent variable. Compared to the conventional measure of the CEO's delta, Edmans et al. (2009) show that their measure, *WPS*—the dollar change in CEO wealth scaled by annual pay—is empirically independent of firm size and, as such, a more suitable variable. It is worth discussing the fact that, in our sample, *WPS* shows a correlation coefficient with *Delta* of 0.23 (*p*-value of 0.00), and has mean value of 0.7774 (over 13,243 observations), while *Delta* has mean value of 0.7688 (over 13,079 observations). In specific, the Pearson pairwise correlation coefficients of *WPS* with *Firm size* and *CEO total pay* are 0.04 and –0.07 (with both *p*-values of 0.00), respectively. At the same time, the ones of *Delta* with *Firm size* and *CEO total pay* are 0.24 and 0.20 (with both *p*-values of 0.00), respectively. This indicates that *WPS* can be an appropriate

substitute for our independent variable, *Delta*. We re-estimate equation (8), (10) and (11) in Appendix B.5, and find the overall consistent results. Finally, to mitigate the potential concern from outliers, we re-estimate equation (8) excluding the top 2.5%, or the both of top 2.5% and bottom 2.5% of the CEO's delta and vega. In this untabulated test, our re-estimation shows that coefficients of *Delta* and *Vega* are still statistically significant (at least 10% levels) and have greater magnitude than estimated ones in our previous results.

6. Conclusion

In this paper, we contribute to the literature on the motivation of stakeholder orientation by providing a simple model in which we show that the CEO's risk-aversion restrains the engagement in stakeholder-oriented activities, typically when a risk-averse CEO faces high uncertainty of such activities on firm value, and high private benefit unrelated to shareholders wealth. Specifically, we predict that CEOs who are strongly aligned with shareholders wealth (therefore, more risk-averse) are less likely to engage in such activities. We test this theoretical prediction using the U.S. sample of the environmental, social, and governance scores in MSCI ESG Stats database. Based on the previous literature, we expect that increasing strengths (rather than reducing concerns) and the stakeholder-oriented activities aimed for external stakeholders (rather than the internal stakeholders) are more likely to be related to high uncertainty on the return and/or high private benefit. Consequently, the effect of CEO's delta on stakeholder-oriented activities should be empirically observed more (or only) negative for external stakeholders and strength activities.

We find supportive evidence from our baseline regression with several fixed effects for year, state-year, industry-year, and the firm. We also find consistent results in both univariate and multivariate cross-sectional tests using CEO turnover sample, showing that higher delta CEO turnovers, compared to lower delta CEO turnovers, are less (more) likely to lead active (inactive) engagement in

strength activities for external (internal) stakeholders. Furthermore, the results employing two quasi-natural experiments: constituency statutes (CS) as the state-level exogenous shock on stakeholder orientation for incorporated firms, and Financial Accounting Standards 123R (FAS 123R) as an exogenous reduction for CEO option-based compensation, also strongly support our prediction. In particular, in firms that are prone to overinvestment (i.e., cash-rich and low-leverage), the weakening alignment of CEO and shareholders wealth due to the adoption of FAS 123R exhibits a significant increase in their external stakeholder-oriented strength activities. This suggests that a strong alignment of CEO and shareholders wealth prevents overinvestment problem in stakeholder-oriented activities. Finally, our main results are robust to additional tests in which we consider alternative explanations and replace our main variables.

Ferrell et al. (2016) argue that, with regard to the firm's stakeholder orientation, reality could lie somewhere between agency problem view and stakeholder theory view, so that firms engaging more in stakeholder-oriented activities can be better or worse. Consistently, we also find that the strong alignment of CEO and shareholders wealth refrains stakeholder-oriented activities which might be motivated by agency problem view, not all activities. Overall, our study suggests that, from shareholders' perspective, the well-designed CEO compensation structure can effectively mitigate the agency problem.

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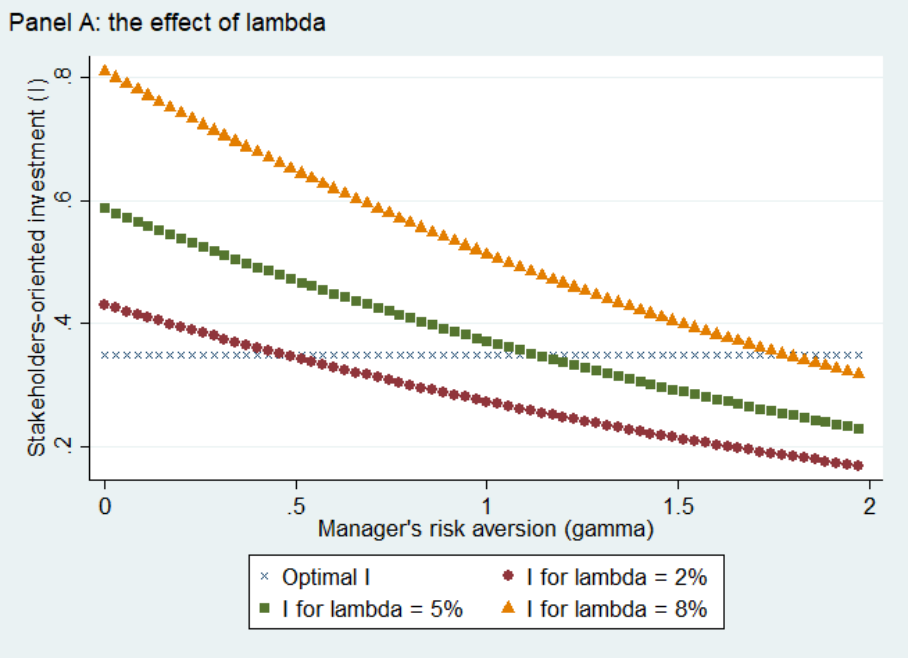
Figure 1. Stakeholder-oriented investment under the CEO's risk-aversion

This figure presents the relation between level of investment in stakeholder-oriented activities and CEO's risk-aversion. Panel A (Panel B) reports the simulation results for the different level of λ and σ, based on 10,000 random numbers of $\tilde{A}$. Panel A shows the first-best investment for shareholders wealth maximization (*Optimal I*), CEO's optimal investment for her utility maximization with λ = 0.02, 0.05 and 0.08 (*I for lambda = 2%, 5% and 8%*). Panel B shows the first-best investment for shareholders wealth maximization (*Optimal I*), CEO's optimal investment for their utility maximization when the uniform distribution for return on firm productivity by stakeholder-oriented activities $\tilde{A}$ is [0.50, 1.50], [0.45, 1.55], and [0.40, 1.60] so that σ is about 0.29, 0.32, and 0.35, respectively, with λ=0.05 (*I when A is from [0.50, 1.50], [0.45, 1.55] and [0.40, 1.60]).*



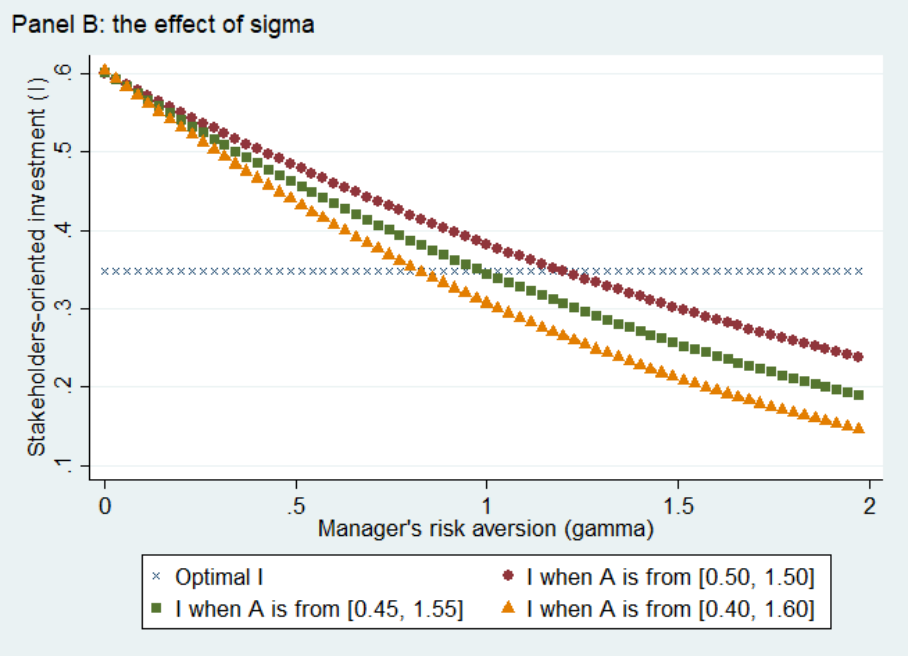
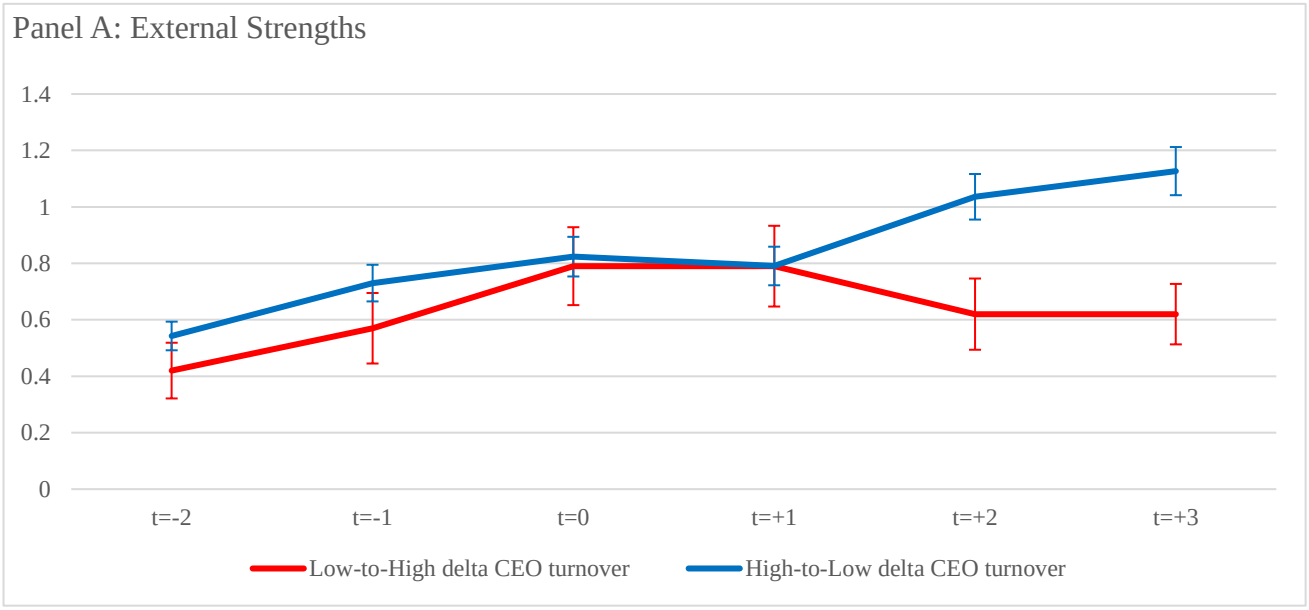
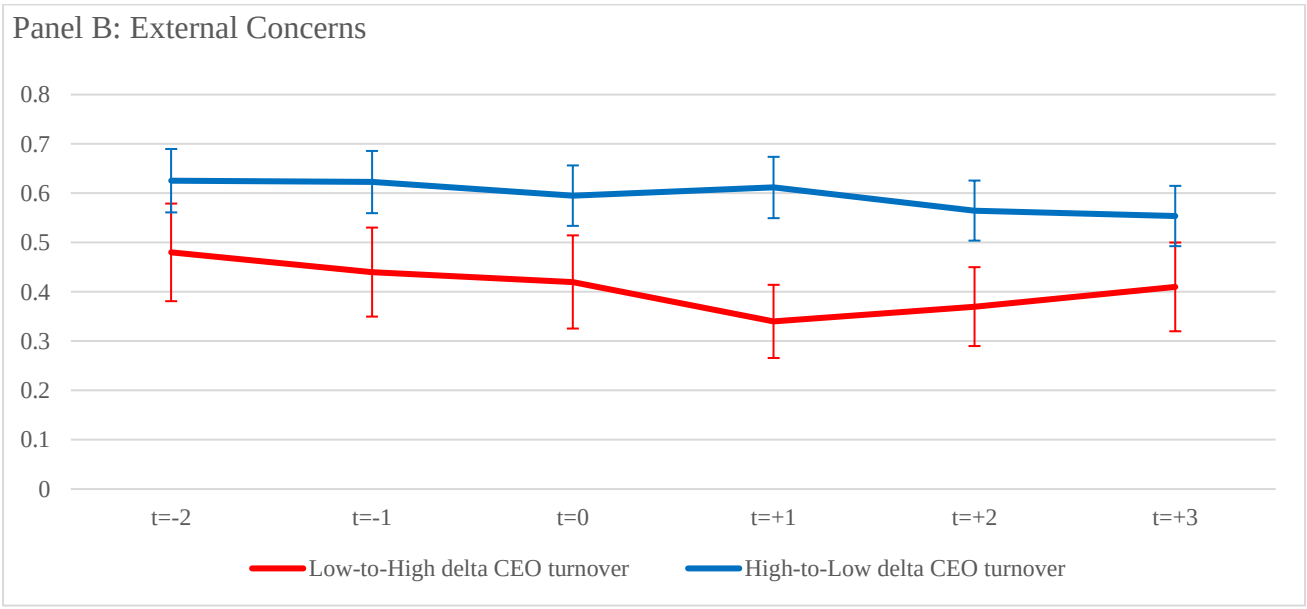
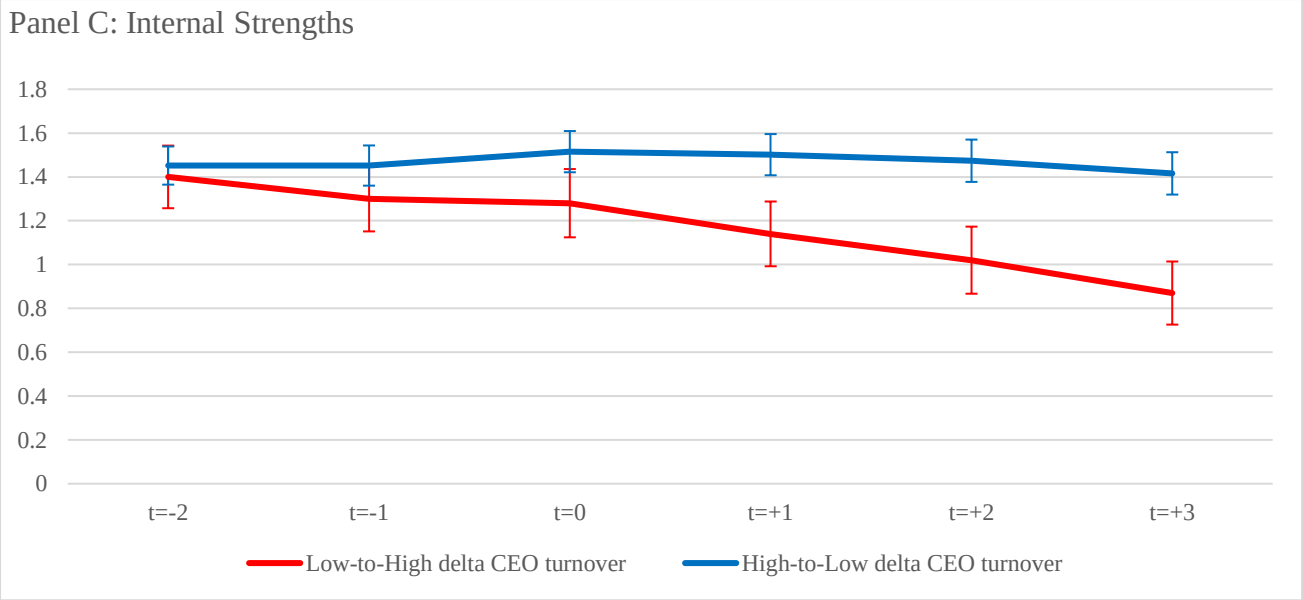


Figure 2. Changes of Stakeholder-oriented activities when CEO turnover arises

This figure presents stakeholder-oriented activities for firms with CEO turnover over a 6-year period. Panels A–D report the scores for external strengths, external concerns, internal strengths, and internal concerns, respectively. *Higher delta CEO turnover (Lower delta CEO turnover)* indicates that delta of CEO before the turnover is less (greater) than delta of CEO after the turnover. Year *t* is the fiscal year when a CEO turnover arises. The figure plots the mean score (standard error) of stakeholder-oriented activities for *Higher delta CEO turnover* as the red line (bar), and *Lower delta CEO turnover* as the blue line (bar).






Panel C: Internal Strengths
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
t=-2
t=-1
t=0
t=+1
t=+2
t=+3
Low-to-High delta CEO turnover
High-to-Low delta CEO turnover

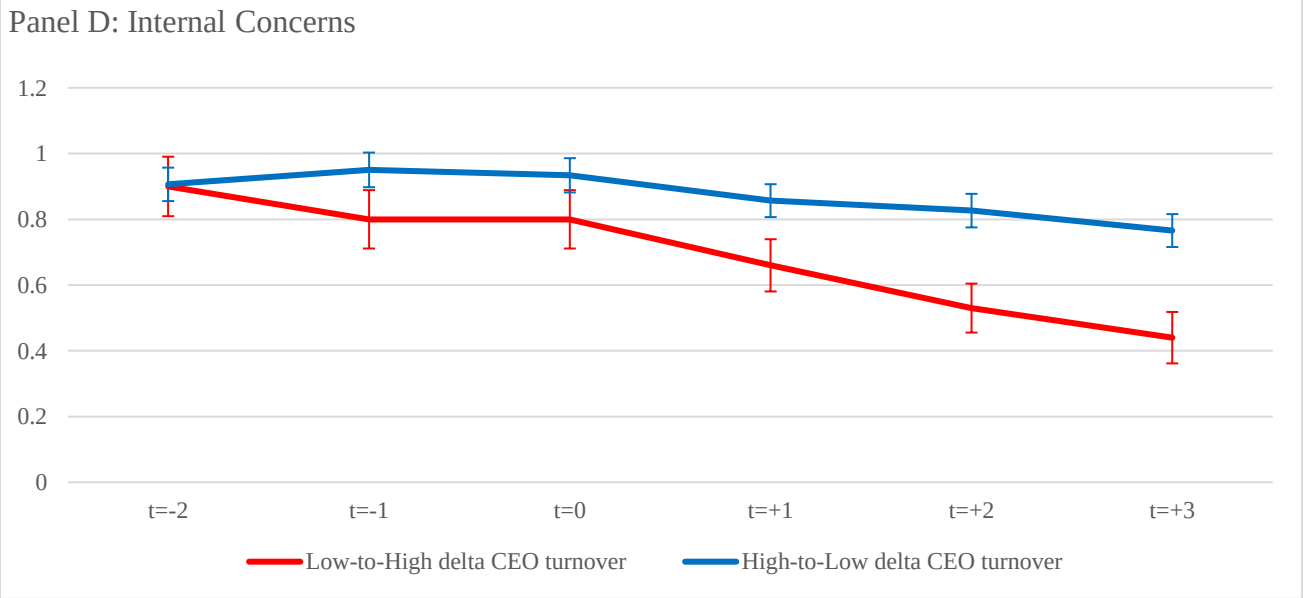

Panel D: Internal Concerns
1.2
1
0.8
0.6
0.4
0.2
0
t=-2
t=-1
t=0
t=+1
t=+2
t=+3
Low-to-High delta CEO turnover
High-to-Low delta CEO turnover

Table 1. Descriptive statistics

This table presents the summary statistics of our sample. The sample consists of 13,079 firm-year observations from 1992–2013. We exclude the regulated industries (Standard Industrial Classification (SIC) codes 4900–4999 and 6000–6999). We winsorize all independent (and continuous) variables at the 1st and 99th percentiles. A detailed explanation of the variables is in Appendix B.1. N, SD, p25, and p75 denote the number of observations, standard deviations, and 25th and 75th percentiles, respectively.

Variables	N	Mean	SD	p25	p50	p75
External Strengths	13,079	0.5699	1.1415	0.0000	0.0000	1.0000
External Concerns	13,079	0.4052	0.9960	0.0000	0.0000	0.0000
Internal Strengths	13,079	0.9830	1.4611	0.0000	0.0000	1.0000
Internal Concerns	13,079	0.7128	0.8796	0.0000	0.0000	1.0000
Delta	13,079	0.7688	1.7367	0.1046	0.2590	0.6657
Vega	13,079	0.1596	0.2443	0.0212	0.0690	0.1846
CEO total pay	13,079	8.1892	0.9687	7.5369	8.2153	8.8430
CEO cash pay ratio	13,079	0.3538	0.2554	0.1581	0.2756	0.4832
Female CEO	13,079	0.0239	0.1528	0.0000	0.0000	0.0000
CEO tenure	13,079	1.7780	0.8593	1.0986	1.7918	2.3979
CEO age	13,079	4.0114	0.1258	3.9318	4.0254	4.0943
Firm size	13,079	7.6539	1.5141	6.5436	7.5503	8.6520
Tobin's Q	13,079	2.0540	1.2287	1.2762	1.6620	2.3721
ROA	13,079	0.0534	0.0869	0.0243	0.0576	0.0961
Leverage	13,079	0.2098	0.1744	0.0529	0.1957	0.3155
Tangibility	13,079	0.2698	0.2188	0.0999	0.2028	0.3837
Cash	13,079	0.1556	0.1632	0.0327	0.0957	0.2252
R&D	13,079	0.0308	0.0491	0.0000	0.0048	0.0430

Table 2. Univariate test: Risk-aversion of CEO and Stakeholder-oriented activities

This table presents the results of univariate test for differences between firms with more risk-averse and less risk-averse CEOs. In panel A (panel B), we use the median value as the sample median (industry-year median within same state of headquarter location) to define the CEO's risk-aversion. We classify CEOs with delta which is higher (lower) than median, and vega which is lower (higher) than median, as the more (less) risk-averse CEO in column (1) (column (2)). We use t-test for means and N denotes the number of observations. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) More risk-averse CEO (Delta > median & Vega < median)	(2) Less risk-averse CEO (Delta < median & Vega > median)	(3) Difference
Panel A: Using sample median			
External Strengths	0.3506	0.5579	-0.2073***
External Concerns	0.2890	0.4761	-0.1871***
Internal Strengths	0.6736	0.9833	-0.3097***
Internal Concerns	0.7156	0.7496	-0.0340
Total Strengths	1.0242	1.5412	-0.5170***
Total Concerns	1.0046	1.2257	-0.2211***
Total Net score	0.0196	0.3155	-0.2959***
N	1,737	1,737	
Panel B: Using industry-year median within same state			
External Strengths – median	0.0698	0.2363	-0.1665***
External Concerns – median	0.0906	0.0850	0.0056
Internal Strengths – median	0.0181	0.2854	-0.2673***
Internal Concerns – median	0.0773	0.0377	0.0396
Total Strengths – median	0.0048	0.4515	-0.4467***
Total Concerns – median	0.1253	0.0753	0.0499
Total Net score – median	-0.1652	0.3139	-0.4792***
N	938	876	

Table 3. Baseline regression: Delta and Vega of CEO and Stakeholder-oriented activities

This table presents the baseline regression results where the dependent variables are the external (internal) stakeholder-oriented activities in panel A (panel B). A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: External stakeholder-oriented						
	(1)	(2)	(3)	(4)	(5)	(6)
	Strengths	Strengths	Strengths	Concerns	Concerns	Concerns
Delta	-0.0263**	-0.0268**	-0.0243*	-0.0014	0.0005	-0.0056
	(-2.127)	(-2.126)	(-1.893)	(-0.147)	(0.049)	(-0.570)
Vega	0.2380**	0.2301**	0.1936*	0.0451	0.0339	-0.0219
	(2.079)	(2.016)	(1.704)	(0.463)	(0.350)	(-0.221)
CEO total pay		-0.0428	-0.0513*		0.0186	-0.0100
		(-1.596)	(-1.880)		(1.208)	(-0.649)
CEO cash pay ratio		-0.1147	-0.1254*		-0.0399	-0.0753*
		(-1.604)	(-1.762)		(-0.882)	(-1.679)
Female CEO		-0.1137	-0.1033		-0.1963**	-0.1738**
		(-0.681)	(-0.625)		(-2.435)	(-2.207)
CEO tenure		0.0366*	0.0376*		-0.0163	-0.0149
		(1.803)	(1.850)		(-1.261)	(-1.174)
CEO age		-0.2651	-0.2895		0.0426	0.0445
		(-1.408)	(-1.539)		(0.383)	(0.409)
Firm size			0.1151**			0.2024***
			(2.444)			(5.741)
Tobin's Q			-0.0127			0.0273**
			(-0.748)			(2.431)
ROA			-0.0434			-0.0304
			(-0.300)			(-0.314)
Leverage			0.1178			-0.1088
			(0.885)			(-1.331)
Tangibility			0.1200			0.0505
			(0.441)			(0.281)
Cash			0.3364**			0.0253
			(2.021)			(0.296)
R&D			0.2309			0.8622**
			(0.272)			(2.269)
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	13,079	13,079	13,079	13,079	13,079	13,079
Adj. R-squared	0.628	0.628	0.629	0.782	0.782	0.785

Panel B: Internal stakeholder-oriented

	(1) Strengths	(2) Strengths	(3) Strengths	(4) Concerns	(5) Concerns	(6) Concerns
Delta	0.0187	0.0202	0.0113	0.0031	0.0021	0.0015
	(0.963)	(1.025)	(0.545)	(0.317)	(0.208)	(0.142)
Vega	0.4528***	0.4476***	0.3745**	-0.1097	-0.1034	-0.1088
	(3.075)	(3.043)	(2.510)	(-1.364)	(-1.234)	(-1.299)
CEO total pay		-0.0178	-0.0547*		-0.0096	-0.0107
		(-0.574)	(-1.685)		(-0.385)	(-0.425)
CEO cash pay ratio		-0.1491*	-0.1948**		-0.0178	-0.0178
		(-1.675)	(-2.153)		(-0.263)	(-0.264)
Female CEO		-0.0689	-0.0422		0.1690	0.1719
		(-0.349)	(-0.216)		(1.398)	(1.419)
CEO tenure		0.0034	0.0047		0.0045	0.0052
		(0.140)	(0.198)		(0.254)	(0.295)
CEO age		-0.1074	-0.0966		0.0131	-0.0012
		(-0.468)	(-0.419)		(0.089)	(-0.008)
Firm size			0.2520***			0.0453
			(4.782)			(1.145)
Tobin's Q			0.0386*			0.0096
			(1.813)			(0.693)
ROA			0.1657			-0.3337**
			(0.955)			(-2.431)
Leverage			-0.0941			0.0297
			(-0.609)			(0.255)
Tangibility			0.3755			-0.0904
			(1.264)			(-0.401)
Cash			-0.0805			0.0890
			(-0.466)			(0.665)
R&D			1.2297			-0.3011
			(1.336)			(-0.481)
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	13,079	13,079	13,079	13,079	13,079	13,079
Adj. R-squared	0.706	0.706	0.708	0.530	0.530	0.531

Table 4. CEO turnover and Stakeholder-oriented activities

This table presents the results from the CEO turnovers. *Higher delta CEO turnover (Lower delta CEO turnover)* indicates that the CEO's delta before the turnover is less (greater) than delta of CEO after the turnover. We consider a three-year window prior to (Pre-turnover period: from year *t – 3* to year *t – 1*), and after (Post-turnover period: from year *t* to year *t + 2*) the CEO turnover in our analysis. Panel A reports the results of univariate test for the differences of stakeholder-oriented activities between pre- and post-turnover periods. Panel B reports the regression results. *Low-to-High delta (indicator)* in panel B is one for *Higher delta CEO turnover* and zero for *Lower delta CEO turnover*. All control variables in panel B are conducted as the within-firm difference of variables in Table 3 between the pre- and post-turnover periods. The dependent variables are computed as the within-firm difference based on the one-year after the turnover. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Univariate test

	(1) External Strengths	(2) External Concerns	(3) Internal Strengths	(4) Internal Concerns
Higher delta CEO turnover (n=100)				
Pre: a	0.5933	0.4467	1.3267	0.8333
Post: b	0.6767	0.3733	1.0100	0.5400
Post-Pre: c	0.0833	-0.0733	-0.3167***	-0.2933***
Lower delta CEO turnover (n=363)				
Pre: d	0.6988	0.6143	1.4729	0.9302
Post: e	0.9844	0.5767	1.4619	0.8163
Post-Pre: f	0.2856***	-0.0376	-0.0110	-0.1139**
Difference				
Pre (= a-d)	-0.1055	-0.1677	-0.1462	-0.0969
Post (= b-e)	-0.3077**	-0.2033*	-0.4519**	-0.2763***
Diff-in-Diff (= c-f)	-0.2419*	-0.0357	-0.3056***	-0.1794*

Panel B: Multivariate test

	(1) ΔExternal Strengths	(2) ΔExternal Concerns	(3) ΔInternal Strengths	(4) ΔInternal Concerns
Low-to-High delta (indicator)	-0.2982**	-0.1024	-0.2738**	-0.0969
	(-2.559)	(-1.220)	(-2.296)	(-0.791)
ΔCEO total pay	-0.0613	0.0328	-0.2085	-0.0538
	(-0.483)	(0.458)	(-1.618)	(-0.413)
ΔCEO cash pay ratio	-0.2912	-0.4891**	-1.0921***	-0.5279
	(-0.839)	(-2.462)	(-2.843)	(-1.457)
ΔFemale CEO	0.0228	-0.2759	-0.1357	0.2827
	(0.181)	(-1.466)	(-0.655)	(1.497)
ΔCEO tenure	-0.0249	0.0348	-0.0472	-0.0394
	(-0.412)	(0.957)	(-0.658)	(-0.605)
ΔCEO age	-0.2835	0.0108	-0.5483	0.1356
	(-0.950)	(0.066)	(-1.483)	(0.429)
ΔFirm size	-0.2984	0.2043**	0.7810***	0.3656**
	(-1.447)	(2.112)	(3.931)	(2.422)
ΔTobin's Q	-0.2270***	-0.0174	0.0712	-0.0564
	(-2.969)	(-0.439)	(0.990)	(-1.007)
ΔROA	2.0737**	0.0186	0.4925	-0.8298
	(2.560)	(0.042)	(0.491)	(-1.121)

ΔLeverage	1.1839***	-0.3619	-0.8495	0.1483
	(2.900)	(-1.336)	(-1.574)	(0.337)
ΔTangibility	2.5997*	-0.8959	1.3545	-0.5349
	(1.803)	(-1.390)	(0.888)	(-0.613)
ΔCash	1.1468*	-0.3960	-0.4449	0.6771
	(1.784)	(-1.066)	(-0.606)	(1.169)
ΔR&D	-1.8229	0.6500	5.0068	-0.1335
	(-0.645)	(0.420)	(1.491)	(-0.050)
State FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	463	463	463	463
Adj. R-squared	0.0291	0.0651	0.0945	0.0144

Table 5. CEO turnover and Stakeholder-oriented activities: Additional tests

This table presents the additional test results from the CEO turnovers. In panel A (panel B), we generate the matched sample between higher delta CEO turnover (lower delta CEO turnover) and non-turnover. We use one-to-one propensity score matching method within same industry (the first two-digit SIC), fiscal year and the state of headquarters location. Propensity score is estimated by all independent variables in Table 3 at the year prior to turnover (year *t–1*), using 0.1% caliper without replacement and trimming of lowest 2% observations. *Higher delta turnover (indicator)* in panel A is one for matched sample of *Higher delta CEO turnover* (n=73) and zero for matched sample of non-turnover (n=73). *Lower delta turnover (indicator)* in panel B is one for matched sample of *Lower delta CEO turnover* (n=231) and zero for matched sample of non-turnover (n=231). In panel C, we use the forced turnover sample in Peters and Wagner (2014). *Low-to-High delta (indicator)* in panel C is one for *Higher delta CEO turnover* and zero for *Lower delta CEO turnover*, in the forced turnover sample. All control variables are conducted as the within-firm difference of variables in Table 3 between the pre- and post-turnover periods. The dependent variables are computed as the within-firm difference based on the one-year after the turnover. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: 1-to-1 Matched sample (Higher delta CEO turnover vs. Non-turnover)				
	(1) ΔExternal Strengths	(2) ΔExternal Concerns	(3) ΔInternal Strengths	(4) ΔInternal Concerns
Higher delta turnover (indicator)	-0.5103*	-0.0240	-0.1298	-0.0219
	(-1.980)	(-0.206)	(-0.480)	(-0.115)
ΔControl variables	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	146	146	146	146
Adj. R-squared	-0.0840	0.2760	0.0797	0.2910
Panel B: 1-to-1 Matched sample (Lower delta CEO turnover vs. Non-turnover)				
	(1) ΔExternal Strengths	(2) ΔExternal Concerns	(3) ΔInternal Strengths	(4) ΔInternal Concerns
Lower delta turnover (indicator)	0.1571	0.0102	0.1910	0.0614
	(1.397)	(0.165)	(1.471)	(0.580)
ΔControl variables	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	462	462	462	462
Adj. R-squared	0.0249	0.0776	0.0735	0.1560
Panel C: Forced CEO turnover sample				
	(1) ΔExternal Strengths	(2) ΔExternal Concerns	(3) ΔInternal Strengths	(4) ΔInternal Concerns
Low-to-High delta (indicator)	-1.3761*	-0.4798	-1.2147	-1.1055**
	(-1.757)	(-1.365)	(-1.559)	(-2.406)
ΔControl variables	Y	Y	Y	Y
State FE	N	N	N	N
Industry FE	N	N	N	N
N	30	30	30	30
Adj. R-squared	0.1050	0.0175	0.3120	0.1570

Table 6. Adoption of Constituency Statute, Delta and Vega of CEO, and Stakeholder-oriented activities

This table presents the regression results where the dependent variables are stakeholder-oriented activities. *Constituency Statute (indicator)* is one for firms incorporated in states adopting constituency statutes, and zero otherwise. We exclude observations incorporated in states that adopted the constituency statute before 1991, given that our sample period is 1992–2013. Control variables indicate all the variables in Table 3. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	External Strengths	External Strengths	External Concerns	External Concerns	Internal Strengths	Internal Strengths	Internal Concerns	Internal Concerns
Delta	-0.0281*	-0.0277*	-0.0102	-0.0098	0.0162	0.0161	0.0061	0.0069
	(-1.867)	(-1.842)	(-0.961)	(-0.917)	(0.637)	(0.629)	(0.483)	(0.549)
Delta × Constituency Statute	0.0970**	0.0904**	0.0407	0.0341	-0.0316	-0.0294	0.0626*	0.0493
	(2.304)	(2.298)	(1.570)	(1.367)	(-0.539)	(-0.471)	(1.663)	(1.202)
Vega	0.2002	0.1860	-0.0582	-0.0724	0.2385*	0.2433	-0.1443	-0.1729*
	(1.588)	(1.453)	(-0.511)	(-0.595)	(1.711)	(1.629)	(-1.544)	(-1.824)
Vega × Constituency Statute		0.1517		0.1518		-0.0512		0.3071
		(0.315)		(0.508)		(-0.156)		(0.970)
Constituency Statute (indicator)	-0.1233	-0.1329	-0.0968	-0.1065	-0.2283	-0.2250	-0.0751	-0.0947
	(-0.698)	(-0.735)	(-0.713)	(-0.770)	(-0.970)	(-0.954)	(-0.419)	(-0.522)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10,084	10,084	10,084	10,084	10,084	10,084	10,084	10,084
Adj. R-squared	0.611	0.611	0.790	0.790	0.710	0.710	0.539	0.539

Table 7. Adoption of Constituency Statute, CEO turnover, and Stakeholder-oriented activities

This table presents the results from the CEO turnovers classified by the CEO's delta (delta and vega) in panel A (panel B). *Higher delta CEO turnover (Lower delta CEO turnover)* indicates that the CEO's delta before the turnover is less (greater) than delta of CEO after the turnover. *Higher vega CEO turnover (Lower vega CEO turnover)* indicates that the CEO's vega before the turnover is less (greater) than vega of CEO after the turnover. We consider a three-year window prior to (Pre-turnover period: from year $t - 3$ to year $t - 1$), and after (Post-turnover period: from year t to year $t + 2$) the CEO turnover in our analysis. *Constituency Statute (indicator)* is one for firms incorporated states adopting constituency statutes, and zero otherwise. In panel A, *Low-to-High delta (indicator)* is one for *Higher delta CEO turnover* and zero for *Lower delta CEO turnover*. In panel B, *Higher delta-Higher vega (indicator)* is one for *Higher delta CEO turnover* and *Higher vega CEO turnover*, and zero otherwise. *Higher delta-Lower vega (indicator)* is one for *Higher delta CEO turnover* and *Lower vega CEO turnover*, and zero otherwise. *Lower delta-Higher vega (indicator)* is one for *Lower delta CEO turnover* and *Higher vega CEO turnover*, and zero otherwise. All control variables are conducted as the within-firm difference of variables in Table 3 between the pre- and post-turnover periods. The dependent variables are computed as the within-firm difference based on the one-year after the turnover. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: CEO turnover classified by delta

	(1)	(2)	(3)	(4)
	ΔExternal Strengths	ΔExternal Concerns	ΔInternal Strengths	ΔInternal Concerns
Low-to-High delta (indicator): a	-0.3990***	-0.1390	-0.3620**	-0.0529
	(-2.723)	(-1.385)	(-2.491)	(-0.395)
Low-to-High delta × CS: b	0.3645*	0.1289	0.3164	-0.1484
	(1.812)	(0.889)	(1.403)	(-0.555)
Constituency Statute (indicator): CS	-0.0651	-0.0162	0.1273	0.0408
	(-0.587)	(-0.184)	(0.958)	(0.318)
Difference test				
p-value for a+b=0	**0.8231**	**0.9333**	**0.7999**	**0.4054**
ΔControl variables	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	463	463	463	463
Adj. R-squared	0.0286	0.0696	0.0010	0.0095

Panel B: CEO turnover classified by delta and vega

	(1)	(2)	(3)	(4)
	ΔExternal Strengths	ΔExternal Concerns	ΔInternal Strengths	ΔInternal Concerns
Higher delta-Higher vega (indicator): b1	-0.5015***	-0.1402	-0.4895***	-0.0894
	(-3.009)	(-1.146)	(-2.619)	(-0.585)
b1 × CS	0.4653**	0.1472	0.5980**	-0.2493
	(2.099)	(0.814)	(2.166)	(-0.881)
Higher delta-Lower vega (indicator): b2	-0.1805	-0.2007*	-0.1176	-0.0439
	(-0.719)	(-1.715)	(-0.588)	(-0.183)
b2 × CS	0.0122	0.1105	-0.4478	0.0559
	(0.032)	(0.634)	(-1.294)	(0.113)

Lower delta-Higher vega (indicator): b3	-0.0168	-0.0918	-0.0541	-0.1099
	(-0.090)	(-0.757)	(-0.316)	(-0.727)
b3 × CS	-0.2027	0.0877	0.0700	-0.2568
	(-0.843)	(0.570)	(0.283)	(-0.923)
CS	-0.0093	-0.0334	0.1265	0.1034
	(-0.072)	(-0.348)	(0.846)	(0.717)
Difference test among Higher vega CEO turnover				
Higher delta turnover effect in non-CS (= b1 - b3)	**-0.4847****	**-0.0484**	**-0.4354***	**0.0205**
[p-value for b1 - b3 = 0]	**[0.0312]**	**[0.7885]**	**[0.0538]**	**[0.9153]**
Higher delta turnover effect in CS (= b1 + b1×CS - b3 - b3*CS)	**0.1833**	**0.0111**	**0.0926**	**0.0280**
[p-value for b1 + b1×CS - b3 - b3×CS = 0]	**[0.3525]**	**[0.9442]**	**[0.7098]**	**[0.9258]**
ΔControl variables	Y	Y	Y	Y
State FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	463	463	463	463
Adj. R-squared	0.0243	0.0621	0.1000	0.0100

Table 8. Adoption of FAS123R, Delta and Vega of CEO, and Stakeholder-oriented activities

This table presents the regression results where the dependent variables are stakeholder-oriented activities. The sample consists of the pre- and post-period of the adoption of FAS 123R in 2005 (so that we exclude observations at 2005), which represents an exogenous reduction of the CEO's delta and vega. *Post-FAS123 (indicator)* is one for the post-FAS123 period (2006–2008), and zero for the pre-FAS123 period (2002–2004). Control variables indicate all the variables in Table 3. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) External Strengths	(2) External Strengths	(3) External Concerns	(4) External Concerns	(5) Internal Strengths	(6) Internal Strengths	(7) Internal Concerns	(8) Internal Concerns
Delta: a	0.0146	0.0299	-0.0060	-0.0016	-0.0051	-0.0015	-0.0539**	-0.0518**
	(0.532)	(1.246)	(-0.402)	(-0.099)	(-0.185)	(-0.057)	(-2.241)	(-2.162)
Delta × Post-FAS123: b	-0.0461*	-0.0672***	-0.0055	-0.0090	0.0099	0.0062	0.0341	0.0306
	(-1.906)	(-2.987)	(-0.407)	(-0.621)	(0.320)	(0.195)	(1.505)	(1.271)
Vega: c	-0.4216**	-0.0023	-0.3266***	-0.0929	-0.0612	0.2886	-0.1740	-0.0014
	(-2.103)	(-0.011)	(-2.680)	(-0.743)	(-0.312)	(1.431)	(-1.039)	(-0.008)
Vega × Post-FAS123: d	1.0494***	0.3164	0.3831***	0.0183	0.3984*	-0.1401	-0.0492	-0.2746
	(5.054)	(1.605)	(2.981)	(0.123)	(1.876)	(-0.601)	(-0.322)	(-1.499)
Post-FAS123 (indicator)	0.8015	-1.4534	1.7205	0.9425	1.6256*	0.0579	-1.8062***	-2.3102
	(0.936)	(-1.225)	(1.496)	(0.699)	(1.648)	(0.034)	(-3.766)	(-1.568)
Difference test								
p-value for a+b=0	**0.0994**	**0.0323**	**0.3906**	**0.4443**	**0.8532**	**0.8546**	**0.3653**	**0.3290**
p-value for c+d=0	**0.0006**	**0.0549**	**0.6278**	**0.5419**	**0.0977**	**0.4576**	**0.1456**	**0.0780**
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Control variables × Post-FAS123	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	5,018	5,018	5,018	5,018	5,018	5,018	5,018	5,018
Adj. R-squared	0.828	0.842	0.896	0.899	0.872	0.876	0.693	0.698

Table 9. Stakeholder-oriented activities, Overinvestment, and Exogenous changes in Delta and Vega of CEO by the adoption of FAS123R

This table presents the regression results from the adoption of FAS123R in 2005 (so that we exclude observations at 2005), which represents an exogenous reduction of delta and vega of CEO. Following Hayes et al. (2012), we take the mean of each variable for each firm in pre- (2002–2004) and post-FAS123 periods (2006–2008), and calculate the within-firm difference. The dependent variables are computed as the within-firm difference between the mean of 2003–2005 and 2007–2009. *Overfirm* is the mean of likelihood of overinvestment in the pre-FAS123 period (2002–2004), where likelihood of overinvestment is the average annual industry-ranked (deciles) value of cash and leverage multiplied by negative one. Higher value of *Overfirm* indicates that firms with relatively higher likelihood of overinvestment before the adoption of FAS123. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) ΔExternal Strengths	(2) ΔExternal Strengths	(3) ΔExternal Concerns	(4) ΔExternal Concerns	(5) ΔInternal Strengths	(6) ΔInternal Strengths	(7) ΔInternal Concerns	(8) ΔInternal Concerns
ΔDelta: a	0.1154*	0.0828	-0.0197	-0.0546	0.1574**	0.1356*	0.0407	0.0367
	(1.950)	(1.477)	(-0.356)	(-1.014)	(2.016)	(1.723)	(0.435)	(0.385)
ΔDelta × Overfirm: b	-0.2249**	-0.1811*	0.0132	0.0601	-0.3090***	-0.2796***	-0.1564	-0.1510
	(-2.298)	(-1.821)	(0.179)	(0.832)	(-3.083)	(-2.825)	(-1.241)	(-1.179)
ΔVega: c	-0.2159	0.4051	-0.3483**	0.3157	0.2031	0.6184	-0.3798*	-0.3039
	(-0.972)	(0.979)	(-2.491)	(0.881)	(0.815)	(0.972)	(-1.752)	(-0.559)
ΔVega × Overfirm: d		-1.1498		-1.2294**		-0.7688		-0.1405
		(-1.472)		(-2.098)		(-0.743)		(-0.149)
Overfirm	0.0159	-0.0227	-0.2392**	-0.2805***	-0.4957***	-0.5215***	-0.2935*	-0.2982*
	(0.143)	(-0.199)	(-2.449)	(-2.872)	(-3.352)	(-3.445)	(-1.847)	(-1.861)
Difference test								
p-value for a+b=0	**0.0279**	**0.0652**	**0.7922**	**0.8253**	**0.0001**	**0.0001**	**0.0208**	**0.0230**
p-value for c+d=0	**-**	**0.1151**	**-**	**0.0014**	**-**	**0.7676**	**-**	**0.3672**
ΔControl variables	Y	Y	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
N	754	754	754	754	754	754	754	754
Adj. R-squared	0.0240	0.0281	0.1050	0.1120	0.0663	0.0661	0.1120	0.1110

Table 10. Stakeholder-oriented activities and Exogenous changes in Delta and Vega of CEO around the adoption of FAS123R: Sub-sample analysis of Overinvestment proxies

This table presents the results of sub-sample analysis around the adoption of FAS123R in 2005 (so that we exclude observations at 2005), which represents an exogenous reduction of delta and vega of CEO. Following Hayes et al. (2012), we take the mean of each variable for each firm in pre- (2002–2004) and post-FAS123 periods (2006–2008), and calculate the within-firm difference. The dependent variables are computed as the within-firm difference between the mean of 2003–2005 and 2007–2009. In columns (1)–(6), to classify the firms with high and low likelihood of overinvestment, we use the mean of *Overinvestment, Cash, Leverage* in the pre-FAS123 period (2002–2004), where *Overinvestment* is the average annual industry-ranked (deciles) value of cash and leverage multiplied by negative one). Columns (1) and (2) consists of firms with higher and lower value of *Overinvestment* than the sample median, Columns (3) and (4) consists of firms with higher and lower value of *Cash* than the sample median, and Columns (5) and (6) consists of firms with lower and higher value of *Leverage* than the sample median, respectively. Left columns indicate that firms with relatively higher likelihood of overinvestment, than ones in right columns. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Overinvestment		Cash		Leverage	
	High	Low	High	Low	Low	High
Panel A: Dependent variable = ΔExternal strengths						
ΔDelta	-0.0536*	0.0387	-0.0653**	0.0370	-0.0259	-0.0222
	(-1.750)	(1.260)	(-2.220)	(1.130)	(-0.940)	(-0.640)
ΔVega	-0.5254*	0.3079	-0.2872	-0.1346	-0.4975	0.0650
	(-1.920)	(1.240)	(-1.060)	(-0.510)	(-1.510)	(0.270)
Adj. R-squared	0.0159	0.0455	0.0413	0.0472	0.0061	-0.0143
Difference test						
p-value for difference in ΔDelta	**0.0336**		**0.0199**		**0.9344**	
p-value for difference in ΔVega	**0.0241**		**0.6854**		**0.1710**	
Panel B: Dependent variable = ΔExternal concerns						
ΔDelta	-0.0051	-0.0456	-0.0199	-0.0163	-0.0231*	-0.0442
	(-0.330)	(-1.540)	(-1.410)	(-0.520)	(-1.870)	(-1.150)
ΔVega	-0.5215***	0.1460	-0.4091*	-0.1479	-0.5081***	-0.0532
	(-3.860)	(0.750)	(-1.850)	(-0.840)	(-3.110)	(-0.330)
Adj. R-squared	0.2370	0.0744	0.1570	0.0705	0.2410	0.0034
Difference test						
p-value for difference in ΔDelta	**0.2253**		**0.9183**		**0.6015**	
p-value for difference in ΔVega	**0.0047**		**0.3544**		**0.0474**	

Panel C: Dependent variable = ΔInternal strengths

ΔDelta	-0.0777**	0.0648	-0.0518	-0.0072	-0.0335	0.0115
	(-2.140)	(1.440)	(-1.440)	(-0.150)	(-0.940)	(0.240)
ΔVega	-0.0057	0.3654	0.3030	0.3467	0.2978	0.2001
	(-0.020)	(0.860)	(0.870)	(1.070)	(0.920)	(0.560)
Adj. R-squared	0.0315	0.0391	-0.0110	0.1590	0.0207	0.1010

Difference test

p-value for difference in ΔDelta	**0.0136**	**0.4542**	**0.4486**
p-value for difference in ΔVega	**0.4678**	**0.9268**	**0.8397**

Panel D: Dependent variable = ΔInternal concerns

ΔDelta	-0.0603**	-0.0222	-0.0553*	-0.0953*	-0.0505	-0.0772
	(-2.070)	(-0.400)	(-1.680)	(-1.710)	(-1.600)	(-1.460)
ΔVega	-0.4170*	-0.3151	-0.3658	-0.0850	-0.4721**	-0.3323
	(-1.700)	(-0.940)	(-1.500)	(-0.330)	(-2.110)	(-1.180)
Adj. R-squared	0.1770	0.1110	0.1590	0.0425	0.1940	0.1530

Difference test

p-value for difference in ΔDelta	**0.5460**	**0.5367**	**0.6648**
p-value for difference in ΔVega	**0.8058**	**0.4282**	**0.6965**

ΔControl variables	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
N	383	371	377	377	377	377

Table 11. Robustness test: CEO gender, Career concern, CEO overconfidence and Managerial ability

This table presents the regression results where the dependent variable is external stakeholder-oriented strength activities. We include interaction terms of CEO's delta and vega with *Female CEO*, *CEO retirement*, *CEO duality, Overconfidence_67, Overconfidence_100*, *Managerial ability*, and *Managerial ability rank*, where *CEO retirement* is an indicator for CEOs who are older than 63 years-old, *CEO duality* is an indicator for CEOs who are the chair of board of directors, *Overconfidence_67(100)* is an indicator for CEOs who had vested options that were valued above the 67% (100%) moneyness at least twice during our sample period (Campbell et al., 2011; Hirshleifer et al., 2012), *Managerial ability* is the residual term of the estimation for firm efficiency in Demerjian et al. (2012), and *Managerial ability rank* is the decile rank by industry and year of *Managerial ability.* For columns (5) and (6) in panel A, we include an indicator for observations that have missing values of *CEO duality* to preserve our sample size, and its interactions with CEO's delta and vega but we do not report coefficients for brevity. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = External strengths						
Panel A: CEO gender and Career concern effect						
	(1)	(2)	(3)	(4)	(5)	(6)
Delta	-0.0251*	-0.0238*	-0.0392***	-0.0451***	-0.0071	-0.0113
	(-1.922)	(-1.810)	(-2.835)	(-3.165)	(-0.375)	(-0.587)
Vega	0.1931*	0.1784	0.2126*	0.2821**	0.1718	0.2365
	(1.700)	(1.531)	(1.863)	(2.398)	(1.451)	(1.396)
Delta × Female CEO	0.0272	-0.0631				
	(0.625)	(-0.909)				
Vega × Female CEO		1.0354				
		(1.161)				
Delta × CEO retirement			0.0375**	0.0621***		
			(2.396)	(3.161)		
Vega × CEO retirement				-0.4274*		
				(-1.792)		
Delta × CEO duality					-0.0292	-0.0233
					(-1.497)	(-1.101)
Vega × CEO duality						-0.0899
						(-0.482)
Female CEO	-0.1205	-0.2287**				
	(-0.748)	(-1.990)				
CEO retirement (indicator)			-0.0219	0.0296		
			(-0.491)	(0.597)		
CEO duality (indicator)					0.0287	0.0404
					(0.738)	(0.992)
Control variables	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	13,079	13,079	13,079	13,079	13,079	13,079
Adj. R-squared	0.629	0.630	0.629	0.630	0.630	0.630

Panel B: CEO Overconfidence effect						
	(1)	(2)	(3)	(4)	(5)	(6)
Delta	-0.0229*	0.0394	0.0197	-0.0222*	0.0237	0.0096
	(-1.801)	(1.425)	(0.742)	(-1.743)	(1.027)	(0.425)
Vega	0.1714	0.1621	0.3700**	0.1709	0.1563	0.3225**
	(1.439)	(1.380)	(2.105)	(1.429)	(1.325)	(2.018)

Delta × Overconfidence_67		-0.0727**	-0.0388			
		(-2.552)	(-1.424)			
Vega × Overconfidence_67			-0.3708**			
			(-2.089)			
Delta × Overconfidence_100					-0.0569**	-0.0276
					(-2.355)	(-1.157)
Vega × Overconfidence_100						-0.3781**
						(-2.151)
Overconfidence_67 (indicator)	-0.0822*	-0.0361	0.0153			
	(-1.946)	(-0.857)	(0.337)			
Overconfidence_100 (indicator)				-0.0972**	-0.0558	-0.0041
				(-2.154)	(-1.239)	(-0.088)
Control variables	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	13,068	13,068	13,068	13,068	13,068	13,068
Adj. R-squared	0.624	0.625	0.626	0.624	0.625	0.625

Panel C: Managerial ability effect

	(1)	(2)	(3)	(4)	(5)	(6)
Delta	-0.0295**	-0.0235*	-0.0251*	-0.0291**	-0.0035	-0.0108
	(-2.200)	(-1.778)	(-1.955)	(-2.171)	(-0.205)	(-0.671)
Vega	0.2208*	0.2295*	0.2763**	0.2195*	0.2225*	0.3795
	(1.894)	(1.948)	(2.085)	(1.889)	(1.905)	(1.526)
Delta × Managerial ability		-0.0806*	-0.0559			
		(-1.735)	(-1.176)			
Vega × Managerial ability			-0.3971			
			(-0.848)			
Delta × Managerial ability rank					-0.0382*	-0.0273
					(-1.779)	(-1.261)
Vega × Managerial ability rank						-0.2165
						(-0.748)
Managerial ability	-0.3055**	-0.2227	-0.1541			
	(-2.172)	(-1.608)	(-1.131)			
Managerial ability rank				-0.1228**	-0.0933*	-0.0636
				(-2.358)	(-1.804)	(-1.168)
Control variables	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	12,963	12,963	12,963	12,963	12,963	12,963
Adj. R-squared	0.634	0.634	0.634	0.634	0.634	0.634

Table 12. Robustness test: Corporate Governance effect

This table presents the regression results where the dependent variable is external stakeholder-oriented strength activities. We include interaction terms of CEO's delta and vega with *E-index, Board independence*, *Co-opted board*, *Non-co-opted independence*, and *Co-opted independence,* where *E-index* is the governance index in Bebchuck et al. (2009), *Board independence* is the ratio of number of independent directors to total number of directors, *Co-opted board* is the ratio of number of directors elected after the CEO takes office to total number of directors, *Non-co-opted independence* is the ratio of number of independent directors who were on the board before the CEO takes office to total number of directors, and *Co-opted independence* is the ratio of number of independent directors elected after the CEO takes office to total number of directors. The sum of *Non-co-opted independence* and *Co-opted independence* equals *Board independence. Co-opted board*, *Non-co-opted independence*, and *Co-opted independence* are from Coles et al. (2014). *Board size* is the natural logarithm of total number of directors. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable = External stakeholder-oriented strengths						
Panel A: Corporate Governance effect						
	(1)	(2)	(3)	(4)	(5)	(6)
Delta	-0.0339**	-0.1003***	-0.0363	-0.0340	0.0489	0.0328
	(-2.168)	(-3.058)	(-1.213)	(-0.893)	(1.076)	(0.732)
Vega	0.1787	0.1707	-0.8299***	0.1787	-1.6028***	-1.9453***
	(1.300)	(1.248)	(-3.303)	(1.280)	(-3.787)	(-4.534)
Delta × E-index		0.0299**	0.0040			0.0125
		(2.458)	(0.370)			(1.037)
Vega × E-index			0.4344***			0.3756***
			(5.471)			(4.297)
Delta × Board independence				0.0001	-0.1173*	-0.1277*
				(0.002)	(-1.675)	(-1.724)
Vega × Board independence					2.3136***	1.6331***
					(4.023)	(2.592)
E-index	-0.0147	-0.0401	-0.1023***	-0.0147	-0.0128	-0.0963***
	(-0.578)	(-1.535)	(-4.059)	(-0.578)	(-0.510)	(-3.846)
Board independence	-0.0400	-0.0554	0.0069	-0.0401	-0.3495*	-0.1739
	(-0.233)	(-0.325)	(0.042)	(-0.212)	(-1.859)	(-0.949)
Board size	0.1368	0.1341	0.1519	0.1368	0.1704	0.1738
	(1.030)	(1.015)	(1.173)	(1.030)	(1.287)	(1.343)
Control variables	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	9,613	9,613	9,613	9,613	9,613	9,613
Adj. R-squared	0.647	0.648	0.654	0.647	0.649	0.655

Panel B: Board composition by co-option

	(1)	(2)	(3)	(4)	(5)	(6)
Delta	-0.0360**	-0.0509	-0.0656*	-0.0363**	-0.0365	0.0437
	(-2.259)	(-1.478)	(-1.863)	(-2.282)	(-0.929)	(0.955)
Vega	0.1657	0.1690	0.4490**	0.1670	0.1703	-1.6137***
	(1.223)	(1.245)	(2.057)	(1.233)	(1.224)	(-3.967)
Delta × Co-opted board		0.0207	0.0504			
		(0.496)	(1.204)			
Vega × Co-opted board			-0.5420*			
			(-1.680)			
Delta × Non-co-opted independence					-0.0154	-0.1677*
					(-0.185)	(-1.927)
Vega × Non-co-opted independence						2.7077***
						(4.876)
Delta × Co-opted independence					0.0045	-0.0854
					(0.074)	(-1.213)
Vega × Co-opted independence						2.0204***
						(3.429)
Co-opted board	-0.0629	-0.0739	0.0029			
	(-0.787)	(-0.914)	(0.034)			
Non-co-opted independence				-0.0288	-0.0212	-0.3828**
				(-0.167)	(-0.113)	(-2.037)
Co-opted independence				-0.0923	-0.0943	-0.3481*
				(-0.520)	(-0.482)	(-1.737)
E-index	-0.0177	-0.0177	-0.0174	-0.0175	-0.0175	-0.0161
	(-0.697)	(-0.698)	(-0.690)	(-0.691)	(-0.691)	(-0.647)
Board independence	-0.0614	-0.0615	-0.0467			
	(-0.368)	(-0.369)	(-0.278)			
Board size	0.1237	0.1218	0.1259	0.1205	0.1185	0.1521
	(0.926)	(0.907)	(0.936)	(0.905)	(0.880)	(1.131)
Control variables	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	9,495	9,495	9,495	9,495	9,495	9,495
Adj. R-squared	0.652	0.652	0.652	0.652	0.651	0.655

Table 13. Robustness test: Alternative measures for Stakeholder-oriented activities

This table presents the regression results where the dependent variables are adjusted scores of stakeholder-oriented activities following Deng et al. (2013). The adjusted score is calculated as the sum of strengths or concerns divided by the total number of strengths or concerns items for each year. Panel A re-estimates the baseline regression. In panel B, we exclude observations incorporated in states that adopted the constituency statute before 1991, given that our sample period is 1992–2013. *Constituency Statute (indicator)* is one for firms incorporated in states adopting constituency statutes, and zero otherwise. In panel C, the sample consists of pre- and post-period of the adoption of FAS 123R in 2005 (so that we exclude observations at 2005), which represents an exogenous reduction of delta and vega of CEO. *Post-FAS123 (indicator)* is one for the post-FAS123 period (2006–2008), and zero for the pre-FAS123 period (2002–2004). Control variables indicate all the variables in Table 3. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Baseline regression

	(1) Adjusted External Strengths	(2) Adjusted External Concerns	(3) Adjusted Internal Strengths	(4) Adjusted Internal Concerns	(5) Adjusted Total Strengths	(6) Adjusted Total Concerns	(7) Adjusted Total Net score
Delta	-0.0044*	-0.0011	0.0007	-0.0003	-0.0037	-0.0015	-0.0023
	(-1.866)	(-0.579)	(0.250)	(-0.123)	(-1.002)	(-0.418)	(-0.428)
Vega	0.0234	-0.0125	0.0499**	-0.0167	0.0732**	-0.0292	0.1024**
	(1.101)	(-0.643)	(2.396)	(-0.801)	(2.101)	(-1.067)	(2.459)
Control variables	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
N	13,079	13,079	13,079	13,079	13,079	13,079	13,079
Adj. R-squared	0.618	0.764	0.701	0.516	0.726	0.669	0.609

Panel B: The adoption of Constituency Statute

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Delta	-0.0050*	-0.0016	0.0016	0.0016	-0.0033	-0.0000	-0.0033
	(-1.709)	(-0.746)	(0.476)	(0.477)	(-0.692)	(-0.008)	(-0.497)
Delta × Constituency Statute	0.0157**	0.0049	-0.0048	0.0099	0.0109	0.0148	-0.0039
	(2.304)	(1.017)	(-0.588)	(1.026)	(0.935)	(1.244)	(-0.198)
Vega	0.0243	-0.0203	0.0332	-0.0286	0.0575	-0.0489	0.1064**
	(0.957)	(-0.853)	(1.613)	(-1.225)	(1.606)	(-1.526)	(2.210)
Vega × Constituency Statute	0.0365	0.0410	0.0132	0.0918	0.0497	0.1328	-0.0830

	(0.481)	(0.680)	(0.273)	(1.171)	(0.524)	(1.189)	(-0.477)
Constituency Statute (indicator)	-0.0252	-0.0244	-0.0352	-0.0115	-0.0603	-0.0359	-0.0245
	(-0.790)	(-0.862)	(-1.024)	(-0.246)	(-1.269)	(-0.557)	(-0.292)
Control variables	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
N	10,084	10,084	10,084	10,084	10,084	10,084	10,084
Adj. R-squared	0.604	0.766	0.705	0.529	0.723	0.674	0.612

Panel C: The adoption of FAS 123R

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Delta	0.0043	-0.0018	-0.0015	-0.0122**	0.0028	-0.0140**	0.0168*
	(1.022)	(-0.532)	(-0.375)	(-2.043)	(0.436)	(-2.015)	(1.858)
Delta × Post-FAS123	-0.0102***	-0.0003	0.0018	0.0059	-0.0084	0.0056	-0.0140
	(-2.766)	(-0.097)	(0.403)	(1.071)	(-1.527)	(0.830)	(-1.618)
Vega	0.0017	-0.0242	0.0400	-0.0059	0.0417	-0.0301	0.0718
	(0.051)	(-0.892)	(1.349)	(-0.138)	(0.995)	(-0.653)	(1.266)
Vega × Post-FAS123	0.0468	0.0106	-0.0180	-0.0573	0.0289	-0.0467	0.0756
	(1.445)	(0.338)	(-0.537)	(-1.306)	(0.653)	(-0.827)	(1.090)
Post-FAS123 (indicator)	-0.1686	0.2165	0.0180	-0.5741	-0.1506	-0.3576	0.2070
	(-0.763)	(0.845)	(0.076)	(-1.612)	(-0.410)	(-0.758)	(0.359)
Control variables	Y	Y	Y	Y	Y	Y	Y
Control variables × Post-FAS123	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
N	5,018	5,018	5,018	5,018	5,018	5,018	5,018
Adj. R-squared	0.842	0.881	0.868	0.707	0.901	0.804	0.793

Appendix A: Proofs

In this section, we provide proofs of Lemma 1, Propositions 1 and 2.

Proof of Lemma 1

Consider the risk-neutral CEO with positive λ. We can rewrite equation (7).

$$I^*_{neutral} = g'^{-1}\left(\frac{1-\lambda}{E[\tilde{A}]}\right) \tag{A.1}$$

Since $g'(\cdot)$ is a decreasing function by the concavity of $g(\cdot)$, $g'^{-1}(\cdot)$ is a decreasing function. Therefore, from equations (4) and (A.1), $I^{op} < I^*_{neutral}$.

Next, we consider CEO 1 and 2 with utility function $u_1(\cdot)$ and $u_2(\cdot)$, respectively. Suppose that CEO 1 is more risk-averse than CEO 2. Thus, by the Arrow-Pratt definition of risk aversion, there exists a strictly increasing and strictly concave function $h(\cdot)$ such that

$$u_1(c) = h\big(u_2(c)\big) \tag{A.2}$$

Let $k_i = {u_i}^{-1}Eu_i\tilde{A}$ for $i = 1, 2$. We can rewrite equation (7).

$$I^*_i = g'^{-1}\left(\frac{1-\lambda}{k_i}\right) \tag{A.3}$$

To show $I^*_1 < I^*_2$, we can derive the sufficient condition as follows, since $g'^{-1}(\cdot)$ is a decreasing function

$$k_1 < k_2 \tag{A.4}$$

By equation (A.2), we have

$$k_1 = {u_1}^{-1}Eu_1\tilde{A} = {u_2}^{-1}h^{-1}Ehu_2\tilde{A} \tag{A.5}$$

Jensen's inequality implies

$$k_1 = {u_2}^{-1}h^{-1}Ehu_2\tilde{A} < {u_2}^{-1}h^{-1}hEu_2\tilde{A} = k_2 \tag{A.6}$$

In addition, $k_i < E[\tilde{A}]$. Hence, we now have $I^*_1 < I^*_2 < I^*_{neutral}$. ***End of proof.***

Proof of Proposition 1

From equation (A.3), we need to show that $k = u^{-1}Eu\tilde{A}$ is decreasing in σ, since $g'^{-1}(\cdot)$ is a decreasing function. Note that k is the certainty equivalent of risk-averse CEO for $\tilde{A}$. Hence, according to Pratt (1964), the certainty equivalent decreases in the variance of $\tilde{A}$ (which is σ).

However, for the risk-neutral CEO, equation (4) shows that it only depends on $E[\tilde{A}]$ (which is μ that we fixed for simplicity).

Therefore, I^* is decreasing in σ, while I^{op} does not depend on σ. ***End of proof.***

Proof of Proposition 2

Similar to the proof of Lemma 1, consider CEO 1 and 2 with utility function $u_1(\cdot)$ and $u_2(\cdot)$, respectively (suppose that CEO 1 is more risk-averse than CEO 2). Let $\tau(\cdot) = g'^{-1}(\cdot)$ and $k_i = u_i{}^{-1}Eu_i\tilde{A}$ for $i = 1, 2$. We can rewrite equation (A.3).

$$I_i^* = \tau\left(\frac{1-\lambda}{k_i}\right) \tag{A.7}$$

Take the derivative of equation (A.7) with respect to λ, then we have

$$\frac{\partial I_i^*}{\partial \lambda} = -\tau'\left(\frac{1-\lambda}{k_i}\right)\frac{1}{k_i} \tag{A.8}$$

Using the fact that $\tau'(x) = \frac{1}{g''(\tau(x))}$ is always negative by the concavity of $g(\cdot)$, and k_i is positive, $\frac{\partial I_i^*}{\partial \lambda} > 0$ follows immediately.

To investigate whether changes in λ affect the impact of CEO's risk-aversion on I_i^*, we expect the difference between CEO 1 and 2 becomes greater when λ increases. To sum up, the negative effect of risk-aversion (Lemma 1) will be more pronounced with large λ.

We need to show that the less risk-averse CEO (CEO 2) is more affected by increases in λ. As shown above, $\frac{\partial I_i^*}{\partial \lambda} > 0$, we thus derive the condition supporting our conjecture:

$$\frac{\partial I_1^*}{\partial \lambda} < \frac{\partial I_2^*}{\partial \lambda} \tag{A.9}$$

by equation (A.8), which is equivalent to

$$-\tau'\left(\frac{1-\lambda}{k_1}\right)\frac{1}{k_1} < -\tau'\left(\frac{1-\lambda}{k_2}\right)\frac{1}{k_2} \tag{A.10}$$

Using the fact that $\tau'\left(\frac{1-\lambda}{k_i}\right) = \frac{1}{g''\left(\tau\left(\frac{1-\lambda}{k_i}\right)\right)} = \frac{1}{g''(I_i^*)}$ and $\frac{1}{k_i} = \frac{g'(I_i^*)}{1-\lambda}$, we now have

$$-\frac{g'(I_1^*)}{g''(I_1^*)} < -\frac{g'(I_2^*)}{g''(I_2^*)} \tag{A.11}$$

both sides are positive since $g'(\cdot) > 0$ and $g''(\cdot) < 0$. Then, equation (A.11) is equivalent to

$$-\frac{g''}{g'}_{|I=I_1^*} > -\frac{g''}{g'}_{|I=I_2^*} \tag{A.12}$$

where $I_1^* < I_2^*$ by Lemma 1.

From the assumptions of $g(\cdot)$ (in particular, $\lim_{I\to 0} g'(I) = \infty$ and $\lim_{I\to \infty} g'(I) = 0$), we can safely assume that $g(I)$ is in the form of DARA, implying that

$$\frac{\partial}{\partial I}\left(-\frac{g''}{g'}\right) < 0 \tag{A.13}$$

Meanwhile, the inequality of equation (A.12) implies that $g(\cdot)$ is a DARA function (Pratt, 1964). Therefore, the inequalities of equations (A.12) and (A.13) are equivalent and both hold. ***End of proof.***

Appendix B: Appendix Tables

Appendix B.1. Definition of the variables

This table presents detailed definitions for the variables.

Variable name	Definition
External Strengths	The sum of strengths scores across the three MSCI ESG Stats (KLD) categories: Environment, Community and Human Rights
External Concerns	The sum of concerns scores across the three MSCI ESG Stats (KLD) categories: Environment, Community and Human Rights
Internal Strengths	The sum of strengths scores across the two MSCI ESG Stats (KLD) categories: Employees Relations and Diversity
Internal Concerns	The sum of concerns scores across the two MSCI ESG Stats (KLD) categories: Employees Relations and Diversity
Delta	The sensitivity of CEO's granted stock and option value (in millions $) for a one-percent point increase in stock price.
Vega	The sensitivity of CEO's option value (in millions $) for a one-percent increase in stock return volatility.
CEO total pay	The natural logarithm of one plus CEO's total compensation (in thousands $).
CEO cash pay ratio	The ratio of CEO's salary and bonus to total compensation
Female CEO	Dummy variable equal to one if the CEO is female and zero otherwise.
CEO tenure	The natural logarithm of one plus fiscal year minus year became CEO.
CEO age	The natural logarithm of CEO's age.
Firm size	The natural logarithm of firm's total assets (in millions $).
Tobin's Q	The ratio of total assets minus common equity plus the market value of equity to total assets.
ROA	The ratio of net income to total assets.
Leverage	The ratio of the sum of debt in current liabilities and long-term debt to total assets.
Tangibility	The ratio of property, plant and equipment to total assets.
Cash	The ratio of cash and short-term investments to total assets.
R&D	The ratio of research and development expense to total assets.

Appendix B.2. The adoption of Constituency Statutes

This table presents the effective year of constituency statutes (or directors' duties laws).

U.S. states	Effective year
Pre-1990s	
Ohio	1984
Illinois	1985
Maine	1985
Indiana	1986
Missouri	1986
Arizona	1987
Minnesota	1987
New Mexico	1987
New York	1987
Wisconsin	1987
Connecticut	1988
Idaho	1988
Kentucky	1988
Louisiana	1988
Nebraska	1988–1994 (repealed effective 04/25/1995), 2007 (reenacted effective 03/07/2007)
Tennessee	1988
Virginia	1988
Florida	1989
Georgia	1989
Hawaii	1989
Iowa	1989
Massachusetts	1989
New Jersey	1989
Oregon	1989
Post-1990s	
Mississippi	1990
Pennsylvania	1990
Rhode Island	1990
South Dakota	1990
Wyoming	1990
Nevada	1991
North Carolina	1993
North Dakota	1993
Vermont	1998
Maryland	1999
Texas	2006

Appendix B.3. Stakeholder-oriented activities: Sub-sample analysis of Constituency Statute

This table presents the regression results where the dependent variables are stakeholder-oriented activities for firms incorporated in Non-Delaware states and Delaware in columns (1)–(4) and (5)–(8), respectively. Majority of the U.S. public firms is incorporated in Delaware, and Delaware has never adopted the constituency statute so we separate our sample to address the potential effect from Delaware trend. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Non-Delaware incorporated firms				Delaware incorporated firms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	External Strengths	External Concerns	Internal Strengths	Internal Concerns	External Strengths	External Concerns	Internal Strengths	Internal Concerns
Delta	-0.2029***	-0.0332	0.0120	-0.0254	-0.0279*	-0.0127	0.0191	0.0006
	(-2.645)	(-0.609)	(0.117)	(-0.461)	(-1.802)	(-1.109)	(0.725)	(0.044)
Delta × Constituency Statute	0.1817**	0.0828	0.0548	-0.0036				
	(2.190)	(1.403)	(0.520)	(-0.058)				
Vega	0.3482	0.2160	0.6035	-0.1236	0.1962	-0.0759	0.1974	-0.1871*
	(0.767)	(0.777)	(0.898)	(-0.235)	(1.392)	(-0.563)	(1.255)	(-1.864)
Vega × Constituency Statute	-0.4842	-0.1780	-0.2859	0.1994				
	(-0.812)	(-0.505)	(-0.369)	(0.355)				
Constituency Statute	0.2109	0.1722	-0.1322	-0.1198				
	(0.767)	(1.384)	(-0.515)	(-0.282)				
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	4,403	4,403	4,403	4,403	8,620	8,620	8,620	8,620
Adj. R-squared	0.660	0.785	0.724	0.519	0.618	0.798	0.709	0.548

Appendix B.4. Various dimensions of Stakeholder-oriented activities

This table presents the regression results where the dependent variables are stakeholder-oriented activities. In columns (2), (4), (6), (8), and (10), we exclude observations incorporated in states that adopted the constituency statute before 1991, given that our sample period is 1992–2013. *Constituency Statute (indicator)* is one for firms incorporated states adopting constituency statutes, and zero otherwise. Control variables indicate all the variables in Table 3. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Strengths

	External stakeholder-oriented						Internal stakeholder-oriented			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Environment Strengths	Environment Strengths	Community Strengths	Community Strengths	Human rights Strengths	Human rights Strengths	Employee Strengths	Employee Strengths	Diversity Strengths	Diversity Strengths
Delta	-0.0152*	-0.0096	-0.0070	-0.0162*	-0.0026	-0.0020	-0.0119	-0.0057	0.0237	0.0217
	(-1.768)	(-0.930)	(-0.824)	(-1.737)	(-0.746)	(-0.462)	(-1.487)	(-0.619)	(1.389)	(1.023)
Delta × Constituency Statute		0.0251		0.0560***		0.0094		-0.0111		-0.0183
		(0.932)		(2.851)		(1.512)		(-0.499)		(-0.354)
Vega	0.0184	0.0725	0.1892***	0.1344*	-0.0159	-0.0209	0.0819	0.0450	0.2878**	0.1983
	(0.209)	(0.757)	(2.604)	(1.881)	(-0.546)	(-0.527)	(1.149)	(0.572)	(2.564)	(1.612)
Vega × Constituency Statute		-0.0078		0.1549		0.0046		0.0461		-0.0974
		(-0.027)		(0.610)		(0.098)		(0.303)		(-0.381)
Constituency Statute		0.0103		-0.1147		-0.0286		-0.0975		-0.1275
		(0.078)		(-1.541)		(-0.966)		(-0.642)		(-0.701)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	13,079	10,084	13,079	10,084	13,079	10,084	13,079	10,084	13,079	10,084
Adj. R-squared	0.544	0.540	0.611	0.573	0.362	0.346	0.580	0.592	0.690	0.684

Panel B: Concerns

	External stakeholder-oriented						Internal stakeholder-oriented			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Environment Concerns	Environment Concerns	Community Concerns	Community Concerns	Human rights Concerns	Human rights Concerns	Employee Concerns	Employee Concerns	Diversity Concerns	Diversity Concerns
Delta	-0.0022	-0.0056	-0.0046	-0.0052	0.0007	0.0010	0.0070	0.0063	-0.0057	0.0007
	(-0.365)	(-0.850)	(-1.185)	(-1.262)	(0.150)	(0.179)	(0.845)	(0.639)	(-0.879)	(0.090)
Delta × Constituency Statute		0.0303		0.0172		-0.0134		0.0458		0.0035
		(1.636)		(1.236)		(-1.222)		(1.208)		(0.183)
Vega	0.0147	-0.0049	0.0092	0.0116	-0.0489	-0.0792	-0.1743***	-0.2199***	0.0585	0.0469
	(0.244)	(-0.067)	(0.253)	(0.257)	(-1.051)	(-1.244)	(-2.670)	(-2.926)	(1.375)	(1.042)
Vega × Constituency Statute		0.0184		-0.0356		0.1690		0.1601		0.1470
		(0.097)		(-0.247)		(1.340)		(0.642)		(0.845)
Constituency Statute		-0.0352		-0.0767		0.0055		-0.1378		0.0431
		(-0.432)		(-1.145)		(0.107)		(-0.952)		(0.378)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	13,079	10,084	13,079	10,084	13,079	10,084	13,079	10,084	13,079	10,084
Adj. R-squared	0.766	0.776	0.524	0.499	0.554	0.546	0.516	0.519	0.458	0.471

Appendix B.5. Robustness test: Alternative measures for CEO's delta

This table presents the regression results where the dependent variables are stakeholder-oriented activities. We use *Wealth performance sensitivity (WPS)* as an alternative measure for *Delta*, where *Wealth performance sensitivity (WPS)* is the dollar change (in millions of US $) in CEO wealth for one percentage point change in the firm's stock price, divided by CEO's annual pay in Edmans et al. (2009). Panel A re-estimates the baseline regression. In panel B, we exclude observations incorporated in states that adopted the constituency statute before 1991, given that our sample period is 1992–2013. *Constituency Statute (indicator)* is one for firms incorporated in states adopting constituency statutes, and zero otherwise. In panel C, the sample consists of the pre- and post-period of the adoption of FAS 123R in 2005 (so that we exclude observations at 2005), which represents an exogenous reduction of the CEO's delta and vega. *Post-FAS123 (indicator)* is one for the post-FAS123 period (2006–2008), and zero for the pre-FAS123 period (2002–2004). Control variables in panels B and C indicate all the variables in Table 3. A detailed explanation of the variables is provided in Appendix B.1. The *t*-statistics in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered by firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Baseline regression

	(1) External Strengths	(2) External Strengths	(3) External Concerns	(4) External Concerns	(5) Internal Strengths	(6) Internal Strengths	(7) Internal Concerns	(8) Internal Concerns
Wealth performance sensitivity (WPS)	-0.0007**	-0.0010**	0.0000	0.0000	-0.0017***	-0.0020***	-0.0005	-0.0006
	(-2.040)	(-2.276)	(0.124)	(0.167)	(-4.073)	(-5.210)	(-1.139)	(-1.206)
Vega	0.2171**	0.1911*	0.0349	-0.0438	0.5157***	0.4260***	-0.1014	-0.1009
	(1.990)	(1.741)	(0.379)	(-0.459)	(3.576)	(2.924)	(-1.303)	(-1.238)
CEO total pay		-0.0659**		-0.0105		-0.0651**		-0.0135
		(-2.359)		(-0.674)		(-2.251)		(-0.556)
CEO cash pay ratio		-0.1681**		-0.0804*		-0.2229***		-0.0333
		(-2.242)		(-1.763)		(-2.653)		(-0.508)
Female CEO		-0.0550		-0.1209		-0.0375		0.1926
		(-0.313)		(-1.307)		(-0.196)		(1.627)
CEO tenure		0.0273		-0.0177		0.0035		0.0035
		(1.292)		(-1.457)		(0.140)		(0.198)
CEO age		-0.2717		0.0432		-0.0786		0.0203
		(-1.433)		(0.409)		(-0.350)		(0.140)
Firm size		0.1098**		0.2190***		0.2566***		0.0402
		(2.323)		(5.915)		(4.856)		(1.033)
Tobin's Q		-0.0205		0.0245**		0.0466**		0.0108
		(-1.230)		(2.241)		(2.359)		(0.847)
ROA		-0.0206		-0.0398		0.1593		-0.3186**
		(-0.142)		(-0.408)		(0.920)		(-2.333)
Leverage		0.0809		-0.1053		-0.1132		0.0476
		(0.611)		(-1.317)		(-0.720)		(0.413)
Tangibility		0.1178		0.0238		0.4476		-0.1075
		(0.426)		(0.130)		(1.546)		(-0.482)

Cash		0.3777**		0.0376		-0.0620		0.0734
		(2.148)		(0.443)		(-0.364)		(0.561)
R&D		0.2266		0.8983**		1.2010		-0.3117
		(0.265)		(2.340)		(1.308)		(-0.503)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	13,243	13,243	13,243	13,243	13,243	13,243	13,243	13,243
Adj. R-squared	0.623	0.625	0.776	0.780	0.707	0.709	0.526	0.527

Panel B: The adoption of Constituency Statutes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth performance sensitivity (WPS)	-0.0006	-0.0006	0.0000	0.0001	-0.0021***	-0.0021***	-0.0004	-0.0004
	(-1.079)	(-1.078)	(0.224)	(0.242)	(-4.768)	(-4.785)	(-0.893)	(-0.887)
WPS × Constituency Statute	0.1205**	0.1194**	-0.0062	-0.0096	0.0014	0.0045	0.0354	0.0280
	(2.128)	(2.124)	(-0.206)	(-0.319)	(0.026)	(0.084)	(0.653)	(0.504)
Vega	0.1426	0.1367	-0.0848	-0.1031	0.2686*	0.2851*	-0.1196	-0.1589*
	(1.174)	(1.130)	(-0.724)	(-0.843)	(1.921)	(1.950)	(-1.279)	(-1.709)
Vega × Constituency Statute		0.0488		0.1495		-0.1347		0.3206**
		(0.182)		(1.264)		(-0.797)		(2.371)
Constituency Statute (indicator)	-0.1584	-0.1627	-0.0770	-0.0902	-0.2551	-0.2432	-0.0695	-0.0979
	(-0.911)	(-0.914)	(-0.568)	(-0.659)	(-1.079)	(-1.028)	(-0.397)	(-0.550)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10,083	10,083	10,083	10,083	10,083	10,083	10,083	10,083
Adj. R-squared	0.611	0.611	0.784	0.784	0.711	0.711	0.541	0.541

Panel C: The adoption of FAS 123R

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth performance sensitivity (WPS): a	0.0001	0.0003	0.0006	0.0006	-0.0035	-0.0032	-0.0007	0.0000
	(0.072)	(0.218)	(0.931)	(0.796)	(-1.408)	(-1.162)	(-0.470)	(0.013)
WPS × Post-FAS123: b	-0.0000	-0.0051	0.0032	0.0016	0.0062	0.0048	-0.0008	-0.0012

	(-0.008)	(-1.368)	(1.214)	(0.717)	(0.734)	(0.478)	(-0.163)	(-0.211)
Vega: c	-0.3541*	0.0800	-0.3195***	-0.0897	-0.0587	0.2691	-0.2738*	-0.0907
	(-1.861)	(0.407)	(-2.743)	(-0.746)	(-0.318)	(1.361)	(-1.680)	(-0.500)
Vega × Post-FAS123: d	0.9089***	0.1438	0.3652***	0.0081	0.4042**	-0.1003	0.0618	-0.1830
	(4.968)	(0.759)	(3.263)	(0.055)	(2.154)	(-0.438)	(0.454)	(-0.985)
Post-FAS123 (indicator)	0.8383	-1.3925	1.7236	0.9937	1.6164*	-0.2519	-1.7942***	-2.2108
	(0.971)	(-1.174)	(1.497)	(0.739)	(1.667)	(-0.149)	(-3.703)	(-1.506)
Difference test								
p-value for a+b=0	**0.9867**	**0.1417**	**0.1320**	**0.2814**	**0.7497**	**0.8724**	**0.7669**	**0.8387**
p-value for c+d=0	**0.0023**	**0.1832**	**0.6887**	**0.5165**	**0.0825**	**0.4008**	**0.1529**	**0.0779**
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Control variables × Post-FAS123	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
State × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	5,065	5,065	5,065	5,065	5,065	5,065	5,065	5,065
Adj. R-squared	0.824	0.838	0.896	0.898	0.873	0.875	0.687	0.693