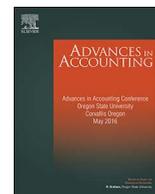




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## Corporate social responsibility and CEO compensation structure

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## ABSTRACT

We examine how firms' corporate social responsibility (CSR) performance affects CEO compensation structure. Traditional agency theory suggests that CEOs engage in CSR for their own interests at the expense of shareholders. A competing argument is that CEOs consider firms' social performance as a business strategy to increase firm value and align their interests with those of shareholders. Our results support the latter prediction. We find that a firm's social performance is negatively associated with the proportion of cash-based compensation, while it is positively associated with the proportion of equity-based compensation. These results are robust to the degree of corporate governance, and they are more pronounced for firms with high levels of inside director ownership and long director tenure. Overall, our findings highlight the positive impact of CSR performance on CEO compensation packages, implying that CEOs' fiduciary behavior of engaging in CSR leads to mitigating agency problems and maximizing firm value.

## 1. Introduction

Prior literature shows that corporate social responsibility (CSR) has great impact on various aspects of accounting and finance. These studies show that a firm's CSR activity improves operating and financial performance (Hillman & Keim, 2001; Jiao, 2010; Karpoff, Lott, & Wehrly, 2005; McGuire, Sundgren, & Schneeweis, 1988; Waddock & Graves, 1997), reduces the cost of capital (El Ghoul, Guedhami, Kwok, & Mishra, 2011; Sharfman & Fernando, 2008), and limits firms' earnings management behavior (Kim, Park, & Wier, 2012). In line with this, some suggest the introduction of new standards on environmental reporting and environmental assurance service (Beets & Souther, 1999). Some studies, however, find no significant effect of CSR (Nelling & Webb, 2009) or its negative effect on firms' financial performance (Brammer, Brooks, & Pavelin, 2006).

Since a firm's CSR performance is not the main goal of its business activity, mixed evidence from the prior studies raises the question of why CEOs intend to engage in CSR.<sup>2</sup> Classic agency theory introduced by Jensen and Meckling (1976) argues that CEOs tend to pursue their own interests rather than to maximize shareholders' value. For instance, CEOs tend to invest in CSR to hide their wrongdoings such as corporate

misconduct (Hemingway & Maclagan, 2004), or to increase their own benefits such as strengthened reputation and bargaining power (Barnea & Rubin, 2010; Milbourn, 2003). A competing argument, on the other hand, posits that CEOs perceive CSR activity as a business strategy that improves firm performance and aligns their interest with those of shareholders. This is supported by Deng, Kang, and Low (2013), who argue that improving relationships with a firm's stakeholders leads those stakeholders to be more willing to support a firm's operation, contributing to increasing firm value. Under this argument, CEOs' engagement in CSR would end up mitigating agency problems between managers and shareholders, rather than amplifying them.

Empirically, though, it is challenging to test these two arguments, since the consequences of CEOs' CSR activities, such as changes in their reputation level or increased firm value attributable to CSR performance, are not clearly observable through financial data. One indicator that shows CEOs' motivation for CSR is CEO compensation. For example, if CEOs engage in CSR for their own interests, firms' high social performance will be followed by high levels of CEO compensation (Barnea & Rubin, 2010; Borghesi, Houston, & Naranjo, 2014; Brown, Helland, & Smith, 2006; Hemingway & Maclagan, 2004; Krüger, 2015; Masulis & Reza, 2015; Milbourn, 2003). In contrast, CEO compensation

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<sup>2</sup> Although a firm's CSR investment is primarily initiated by CEOs, such strategic decisions must be ultimately approved by the board of directors. Therefore, CSR activities could be significantly affected by the board and its characteristics. Nonetheless, our assertion that CEOs take lead in firms' social activities is still valid, given that the main function of the board is to monitor CEOs' business activities on behalf of shareholders, rather than initiating new activities (Fama & Jensen, 1983; Hillman & Dalziel, 2003; Jensen & Meckling, 1976).

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may decrease with firms' CSR performance, because high social performance makes CEOs proud of being “an exemplary CEO” and internally rewarded by doing the right thing (Potts, 2006; Rekker, Benson, & Faff, 2014), or improved relationships between CEOs and other employees reduce the compensation gap between CEOs and non-CEOs (Cai, Jo, & Pan, 2011).

Although the total level of CEO compensation represents CEOs' financial benefits, its association with CSR performance may not provide dichotomous conclusions on CEOs' intention to engage in CSR and its effect on firm value. Motivated by this, we extend the literature by analyzing the structure of CEO compensation measured by the proportions of cash-based (short-term) or equity-based (long-term) compensation.

CEO compensation structure is a crucial factor in inducing executives to take on riskier investments and pursue long-term profits in alignment with the interests of shareholders (Indjejikian, 1999). In particular, given that CEOs' preference for less risky short-term compensation is closely related to their entrenchment, an analysis on how a firm's social performance is associated with the proportions of cash- and equity-based compensation provides direct evidence on CEOs' motivation for CSR as well as the consequences of their CSR activity on shareholders' wealth. For example, if CEOs invest in CSR for their own interests at the expense of shareholders, firms' CSR performance can be positively associated with the proportion of cash-based compensation, such as salary and bonus. On the other hand, if CEOs engage in CSR to increase firm value in alignment with shareholders' interests or if CEOs' successful CSR performance improves their relationships with other stakeholders including employees and shareholders, the proportion of equity-based compensation may increase with their social performance.

We find that the proportion of cash-based compensation decreases with CSR performance, while the proportion of equity-based compensation increases with CSR performance. This result refutes CEOs' opportunistic behavior of engaging in CSR for their own interests. Furthermore, it shows that CEOs' CSR activities are beneficial to shareholders by altering their compensation structure in a way to reduce agency problems.

The results are robust to the magnitudes of corporate governance variables, such as inside director ownership, director tenure, and the proportion of independent board members, and they are more pronounced for firms with higher inside director ownership, longer director tenure, and a lower proportion of independent directors on board. These results suggest that the positive association between CSR and CEOs' equity-based compensation is even more conspicuous when firms have weak corporate governance system.<sup>3</sup> We also find that firms' social performance reinforces the relation between CEO compensation structure and firm value. We find that firm value, proxied by Tobin's Q, increases with the proportion of equity-based compensation, and this relation is reinforced by firms' high CSR performance. These results emphasize the positive role of firms' social performance.

Additionally, our results are more or less pronounced depending on certain dimensions of CSR and the passage of the Sarbanes-Oxley Act of 2002 (SOX) and the Statement of Financial Accounting Standard No. 123(R) (SFAS 123R). While the negative association between CSR and the proportion of cash-based compensation is more pronounced in environment, the positive association between CSR and the proportion of equity-based compensation is more pronounced in environment and

<sup>3</sup> To articulate what these variables proxy for, we examine the relations between these corporate governance variables and CEO compensation components before analyzing the effect of corporate governance on the CSR-CEO compensation association. Regardless, we should note that the implications of these results could be drawn in a cautious way, because of mixed evidence on the corporate governance variables in the prior literature. For example, some studies show that managerial ownership still play a role as an incentive to motivate managers to align their interests with those of shareholders when it exceeds certain thresholds (Morck et al., 1988). We discuss this issue in more detail in the fourth section.

employee relations. It is also found that the results are more pronounced after the adoption of SOX and SFAS 123R.

Overall, our results show that improved CSR performance is associated with CEO compensation structure that is beneficial to shareholders. This is supported by Haugen and Senbet (1981) and Agrawal and Mandelker (1987), who argue that equity-based compensation, such as restricted stocks and stock options, plays an important role in inducing managers to increase shareholders' value and reducing agency problems.

This is the first study to examine the association between firms' CSR performance and the structure of CEO compensation using the intensity of each compensation component. While prior studies investigate on CEO total compensation or the levels of the compensation components, this study on the proportions of cash- and equity-based compensation draws clearer implications on how CSR is associated with the structure of CEO compensation. In addition, our results imply the extensive future use of CSR information among stakeholders and investors, since the CSR information provides insights into not only a firm's attempt to improve relationships with other stakeholders but also CEOs' intention to engage in CSR and its possible impact on shareholders' wealth.

The remainder of this paper is organized as follows. The following section reviews background literature including the development of testable hypotheses, and the third section describes data and methodology. In the fourth section, we discuss our empirical results of the association between CSR and CEO compensation structure, and the fifth addresses additional tests including robustness checks. Finally, the sixth section summarizes and concludes the paper.

## 2. Background and hypotheses development

Our main goal of the paper is to examine how a firm's social performance is associated with CEO compensation structure. For the analysis, we divide CEO compensation into two components: 1) the proportion of cash-based compensation, which is the sum of salary and bonus divided by total compensation, and 2) the proportion of equity-based compensation, which is the sum of the value of restricted stocks and the Black-Scholes value of stock options granted during the fiscal year divided by total compensation.

The association between CSR and CEO compensation is anticipated in two ways. First, if CEOs intend to exploit firms' social performance for their own benefits, such opportunistic behavior will lead to changes in CEO compensation in favor of CEOs. This conjecture is supported by Milbourn (2003), who finds a positive association between CEO reputation and stock-based pay sensitivities awarded to CEOs. The dynamics of this positive relation between CEOs' reputation and their compensation will lead CEOs to gain more bargaining power and better career opportunities. Therefore, CEOs are motivated to actively engage in CSR activities and increase their reputation through their social performance.

Barnea and Rubin (2010) also provide evidence supporting this rent extraction view. They find that CEOs tend to be more involved in CSR when insider ownership and leverage are low. This suggests that CEOs tend to overinvest in CSR when they bear little costs for such activity due to low levels of ownership and leverage. Given this, we can presume that CEOs' opportunistic engagement in CSR eventually leads to high levels of CEO compensation. With respect to each component of CEO compensation, we conjecture that CEOs prefer a less risky compensation structure with greater cash-based compensation that easily facilitates their extraction of rents, rather than equity compensation based on long-term performance (Harris & Raviv, 1979; Westphal, 1998). This conjecture is also supported by recent work by Dai, Rau, Stouraitis, and Tan (2017). They document that CEOs prefer cash-based compensation to mitigate future uncertainty when they earn an 8.8% terrorist compensation premium for working at firms located near terrorist attacks. Increased reputation and managerial power attributable

to high CSR performance also explain such changes in CEO pay structure (Bebchuk, Fried, & Walker, 2002). All things considered, we can hypothesize that CSR is positively associated with the proportion of cash-based compensation and negatively associated with the proportion of equity-based compensation. The above discussion leads to our Hypothesis H1a as follows:

**H1a.** If CEOs engage in CSR for their own interests, CSR performance is positively associated with the proportion of CEOs' cash-based compensation, while it is negatively associated with the proportion of CEOs' equity-based compensation.

Alternatively, if CEOs invest in CSR as a business activity that improves shareholders' value and their engagement in CSR is considered as their fiduciary duty, CEOs will be compensated for their attempt to improve firms' social performance. In this case, we expect a positive association between the proportion of equity-based compensation and CSR and a negative association between the proportion of cash-based compensation and CSR. Our argument is somewhat consistent with Gan and Park (2016), who find a positive association between CEOs' managerial ability and their pay-for-performance sensitivity of the equity-based compensation. An alternative explanation is that such high CSR performance makes CEOs confident about doing the right thing and thus make them internally rewarded by firms' social performance (Potts, 2006; Rekker et al., 2014), or the consequences of pursuing CSR, such as improved relationships between CEOs and other stakeholders including employees and shareholders, may reduce the compensation gap between CEOs and non-CEOs (Cai et al., 2011). These arguments lead to our Hypothesis H1b in alternative form as follows:

**H1b.** If CEOs engage in CSR as a business activity that improves firm value in alignment with shareholders' interests, CSR performance is negatively associated with the proportion of CEOs' cash-based compensation, while it is positively associated with the proportion of CEOs' equity-based compensation.

We also examine if the association between CSR and CEO compensation structure varies depending on a firm's corporate governance. Although an extensive literature documents the effect of a firm's corporate governance on its CSR performance or CEO compensation separately, it is not clear whether the sensitivity of CEO compensation to its social performance relies on the quality of corporate governance. Having said that, we can infer the results from previous findings on the impact of corporate governance on the sensitivity of CEO pay to firm performance. Ozkan (2011) finds that, while strong monitoring by high institutional ownership leads to high CEO pay-performance sensitivity, weak corporate governance, indicated by large board size and long CEO tenure, leads to lower equity-based pay-performance sensitivity. She also shows that CEO age is negatively associated with the equity-based pay-for-performance sensitivity, since old CEOs prefer cash compensation due to their short employment horizon. Consistently, Hartzell and Starks (2003) show that concentration of institutional ownership is positively associated with the pay-for-performance sensitivity, due to strong institutional monitoring.

Given this, whether the association between a firm's social performance and CEO compensation structure is more or less pronounced with different degrees of corporate governance depends on how a firm's CSR activity is initiated. If CEOs exploit firms' social performance for their own interests, i.e., Hypothesis H1a holds, weak corporate governance will aggravate their opportunistic behavior and compensation packages they prefer. Given that CEOs' salaries and bonuses are more immediate, effective, and short-term compensation mechanisms compared to stocks and options, the positive association between a firm's social performance and CEOs' cash-based compensation is expected to be more pronounced for firms with such weak corporate governance. Analogously, the negative

association between CSR performance and CEOs' equity-based compensation will be more pronounced for such firms, since CEOs will be less likely to prefer long-term compensation when they are more entrenched and have more bargaining power.<sup>4</sup> These discussions lead to the following Hypothesis H2.

**H2.** If Hypothesis H1a holds, the positive association between CSR and the proportion of CEOs' cash-based compensation and the negative association between CSR and the proportion of CEOs' equity-based compensation are more pronounced in firms with weak corporate governance system.

Meanwhile, if Hypothesis H1b holds, i.e., CEOs' engagement in CSR is driven by their attempt to increase shareholder value, we can establish two competing hypotheses on the association between CSR and CEO compensation structure depending on the quality of corporate governance. First, from the prior finding of positive impact of corporate governance on CEOs' equity-based pay performance sensitivity, we expect that the positive (negative) association between CSR and CEOs' equity-based (cash-based) compensation will be more pronounced in firms with strong corporate governance system.

**H3a.** If Hypothesis H1b holds, the negative association between CSR and the proportion of CEOs' cash-based compensation and the positive association between CSR and the proportion of CEOs' equity-based compensation are more pronounced in firms with strong corporate governance system.

On the other hand, if H1b holds, i.e., CEOs' engagement in CSR is driven to increase shareholder value, CSR is expected to mitigate the effect of weak corporate governance on CEO compensation structure.

**H3b.** If Hypothesis H1b holds, the negative association between CSR and the proportion of CEOs' cash-based compensation and the positive association between CSR and the proportion of CEOs' equity-based compensation are more pronounced in firms with weak corporate governance system.

### 3. Data and methodology

#### 3.1. Data description

We collect annual CSR data from the Kinder, Lydenberg, and Domini Stats database (KLD STATS) for the period 1998–2012. KLD STATS includes social and environmental performance of more than 3000 publicly traded companies, and the database contains the company ID (CUSIP), binary indicators for strength and concern activities in 13 CSR categories, and summary counts for all the areas. The CSR rating criteria consist of strength and concern indicators for seven qualitative issue areas and six controversial business issue areas. The seven major qualitative issue areas include community, corporate governance, diversity, employee relations, environment, human rights, and product, and the six controversial business issues are alcohol, gambling, firearms, military, nuclear power, and tobacco.<sup>5</sup>

Using the KLD STATS dataset, we obtain several CSR measures used in our analysis. Our CSR measures are based on six main categories: community, diversity, employee relations, environment, human rights,

<sup>4</sup> This empirical design is somewhat in line with that of Armstrong, Ittner, and Larcker (2012), who examine the effect of corporate governance on the relation between the use of compensation consultants and levels of CEO compensation. They find that CEOs of firms with compensation consultants tend to receive relatively high compensation compared to those of firms without compensation consultants. However, this relationship between CEO pay and the use of compensation consultants disappears when corporate governance is taken into account. This suggests that higher CEO compensation for firms hiring compensation consultants is attributable to weak governance.

<sup>5</sup> The details of CSR categories and strength/concern items are described in Appendix A.

**Table 1**

Sample selection. This table reports the sample selection procedures for the period 1998–2012. Panel A summarizes the construction of the final sample, and Panel B presents the breakdown of the sample by year.

Panel A. Sample selection			
Number of observations in KLD			34817
Deleting missing independent variable from:			
Compustat		(12811)	
RiskMetrics		(13999)	
CRSP		(47)	
Deleting missing CSR variable:		(165)	
Deleting missing VEGA_RESID variable:		(3451)	
Final sample			4344

Panel B. Sample firms by year			
Year	Number of Firms	%	Cumulative
1998	22	0.51	22
1999	25	0.58	47
2000	29	0.67	76
2001	70	1.61	146
2002	85	1.96	231
2003	194	4.47	425
2004	240	5.52	665
2005	256	5.89	921
2006	285	6.56	1206
2007	295	6.79	1501
2008	438	10.08	1939
2009	512	11.79	2451
2010	568	13.08	3019
2011	636	14.64	3655
2012	689	15.86	4344

and product.<sup>6</sup> We first calculate total strength and total concern scores separately by adding up strength and concern indicators across the six categories. After that, we obtain net CSR scores for each data observation by calculating differences between these total strength and concern scores. The net CSR score for each of the six CSR categories is also used in the detailed analysis.

We collect CEO compensation data from ExecuComp for our sample period. The database includes the details of CEO compensation such as salary, bonus, restricted stocks, stock options, pensions, and other annual compensation. Based on this dataset, we calculate total compensation as the sum of salary, bonus, total value of restricted stocks and stock options, long-term incentive payouts, and all other compensation given for the fiscal year. We also calculate cash- and equity-based compensation, which are the sum of salary and bonus and the sum of restricted stocks and stock options granted respectively during the fiscal year. Using these level data, we calculate the proportions of cash- and equity-based compensation, which are key compensation measures of this study. Following Core, Holthausen, and Larcker (1999), Leone, Wu, and Zimmerman (2006), and Rekker et al. (2014), we control for total number of directors and the proportion of independent directors on board, which are obtained from RiskMetrics. For the analysis of managerial ownership, we obtain CEO ownership and inside directors' ownership from the RiskMetrics data. We also control for several CEO characteristics, such as CEO duality, age, and tenure, since these variables possibly affect CEO compensation and its structure.

We obtain financial statements data from COMPUSTAT and stock return data from CRSP. Utilities and financial companies (SIC codes 4000-4999 and 6000-6999) are excluded from the sample. We control

<sup>6</sup> We exclude CSR scores on corporate governance in this study, since its definition contains CEO compensation.

for outliers by winsorizing the upper and lower 1% of observations of each independent variable. A list of the variables and their definitions are reported in more detail in Appendix B.

Table 1 describes the sample selection procedures for the sample. As shown in Panel A, the final balanced panel includes 4344 observations.<sup>7</sup> When we break down the sample by year in Panel B, we find that the number of sample firms increases monotonically over time, implying that more firms became actively engaged in CSR activities over the sample period.

### 3.2. Regression model

As described above, we test two hypotheses on the association between CSR performance and the proportions of CEO compensation components. CEO compensation is divided into cash- and equity-based compensation. Cash-based compensation is regarded as a short-term incentive, while equity-based compensation is known as an effective tool to mitigate agency problems by aligning CEOs' interests with those of shareholders. If CEOs invest in CSR for their own benefits, such self-interested behavior of exploiting CSR will be reflected in the relationship between CSR performance and CEO compensation structure. Thus, high CSR performance will be followed by a CEO-friendly compensation package indicated by a high proportion of cash-based compensation and a low proportion of equity-based compensation. On the other hand, if CEOs consider CSR activity as a business strategy that improves firm value and reduces agency problems between them and their stakeholders, high social performance will be followed by a shareholder-friendly pay package which has a low proportion of cash-based compensation and a high proportion of equity-based compensation.

For this analysis, we estimate the following regressions of CEO compensation components on CSR scores:

$$PCASH_{it} \text{ (or PEQUITY}_{it}) = \alpha + \beta TCSR_{it-1} + \theta' \gamma + \varepsilon_{it} \quad (1)$$

where the dependent variable is the proportion of cash-based compensation ( $PCASH_{it}$ ) or the proportion of equity-based compensation for firm  $i$  in year  $t$  ( $PEQUITY_{it}$ ). The independent variables are: lagged total CSR score, calculated as the sum of net CSR scores across six CSR categories (community, environment, diversity, employee relations, human rights, and product) in year  $t - 1$  ( $TCSR_{it-1}$ ), and  $\theta$ , which is a vector of lagged control variables including CEO- and firm-specific variables.<sup>8</sup> We run this regression with year and industry fixed effects.<sup>9</sup>

Our main interest in Eq. (1) lies in the regression coefficient on the total CSR score,  $\beta$ . If  $\beta$  is positive (negative) with the dependent variable

<sup>7</sup> Including Core and Guay's (1999) incentive residuals (VEGA\_RESID) as a control variable substantially reduces our sample size from 7795 to 4344. However, overall results are not changed. The actual sample for each analysis varies due to missing observations of the dependent variables.

<sup>8</sup> Following Core et al. (1999) and Hill, Lopez, and Reitenga (2016), we include as CEO-specific variables the logarithm of the number of directors on the board of directors (BSIZE), the proportion of outside directors on board (PIND), ownership by CEOs (CEO\_OWN), CEO duality (CEO\_DUL), CEO age (CEO\_AGE), and CEO tenure (CEO\_TEN). The firm-specific variables include the logarithm of sales (SALE), book-to-market (BM), the return-on-assets ratio (ROA), the Tobin's q ratio (TOBINQ), the leverage ratio (LEV), the liquidity ratio (LIQ), firm age (FAGE), market beta (BETA), aggregated returns for 12 months in years  $t - 1$  and  $t - 2$  (RET and LAGRET), and the standard deviation of aggregated returns over 5 years (STDRET). We also include incentive residuals from Core and Guay (1999) to control for the effect of agency considerations on equity compensation. The detailed descriptions are reported in Appendix B.

<sup>9</sup> We conjecture that CEOs' equity-based compensation is determined based on their performance for the previous year. In terms of cash-based compensation, however, Perry and Zenner (2001) and Comprix and Muller (2006) address that bonuses are based on the current year's performance, while salaries are determined before the year-end performance is released. Taken together, a firm's performance may contemporaneously affect the components of CEO compensation. Given this, we repeat all regression analyses using contemporaneous variables to ensure that our findings are robust. In unreported tables, the overall results are unchanged in terms of magnitude and significance. These results are available upon request.

**Table 2**

Descriptive statistics. This table reports the summary statistics for variables used in the analysis. Panels A, B, and C show the statistics of CSR, CEO compensation and other CEO-specific variables, and firm-specific variables, respectively. The definitions of the variables are described in Appendix B.

	N	Mean	p25	Median	p75	SD
Panel A. CSR variables						
TCSR	4344	0.27	-1	0	1	2.74
CSR_S	4344	1.84	0	1	2	2.78
CSR_C	4344	1.57	0	1	2	1.76
COMM	4344	0.12	0	0	0	0.54
DIV	4344	0.13	0	0	0	0.95
ENV	4344	0.16	-1	0	1	1.41
ER	4344	0.02	0	0	0	1.11
HR	4344	-0.03	0	0	0	0.27
PROD	4344	-0.12	0	0	0	0.62
Panel B. CEO compensation and other CEO-specific variables						
TCOMP (000s)	4330	5905	1990	3965	7177	7669
CASH (000s)	4344	1095	619	885	1200	1183
EQUITY (000s)	4224	3568	753	1983	4295	6584
PCASH (%)	4330	0.31	0.14	0.23	0.40	0.23
PEQUITY (%)	4222	0.49	0.37	0.54	0.67	0.24
BSIZE	4344	2.16	1.95	2.20	2.30	0.24
CEO_AGE	4344	55.12	51	55	59	6.60
CEO_DUL	4344	0.16	0	0	0	0.37
CEO_OWN	4304	2.67	0.20	0.77	2.30	6.03
CEO_TEN	4344	8.70	4	6	11	6.88
PIND (%)	4344	0.76	0.69	0.78	0.88	0.13
VEGA_RESID	4344	-0.01	-0.29	0.00	0.52	1.87
Panel C. Firm-specific variables						
BETA	4344	1.26	0.65	1.17	1.75	0.92
BM	4344	0.48	0.27	0.42	0.62	0.30
CAPEX	4340	0.05	0.02	0.03	0.06	0.05
FAGE	4344	3.01	2.56	3.00	3.61	0.72
LEV	4344	0.19	0.02	0.18	0.30	0.16
LIQ	4344	2.56	1.38	2.01	3.01	1.83
OPPROF	3915	0.17	0.10	0.15	0.21	0.11
RET (%)	4344	0.15	-0.05	0.16	0.34	0.36
ROA	4344	0.11	0.06	0.10	0.15	0.08
SALE	4344	7.44	6.38	7.32	8.43	1.49
STDRET (%)	4344	0.40	0.23	0.35	0.50	0.23
TOBINQ	4010	2.00	1.24	1.64	2.34	1.22

of the proportion of cash-based (equity-based) compensation, the results will support Hypothesis H1a, suggesting CEOs' entrenched behavior of exploiting CSR for their own interests. If  $\beta$  is negative (positive) with the dependent variable of the proportion of cash-based (equity-based) compensation, the results will support Hypothesis H1b, highlighting CEOs' CSR activities that are beneficial to their firms and shareholders.

To investigate whether the association between CSR and CEO compensation components is more or less pronounced depending on corporate governance, we include interaction terms between CSR and dummies for weak and strong corporate governance as follows:

$$\begin{aligned}
 PCASH_{it} \text{ (or PEQUITY}_{it}) &= \alpha + \gamma_0 TCSR_{it-1} + \gamma_1 CGVAR_W \\
 &+ \gamma_2 TCSR_{it-1} \times CGVAR_W + \\
 &\gamma_3 CGVAR_S + \gamma_4 TCSR_{it-1} \times CGVAR_S + \theta' \eta \\
 &+ \varepsilon_{it}
 \end{aligned} \tag{2}$$

where  $CGVAR_W$  and  $CGVAR_S$  are dummies indicating relatively weak and strong corporate governance. For this analysis, we employ three corporate governance measures: inside director ownership, director tenure, and a proportion of independent directors. With these corporate governance variables,  $CGVAR_W$  represents high inside director ownership, long director tenure, and a low proportion of independent

directors, while  $CGVAR_S$  indicates low inside director ownership, short director tenure, and a high proportion of independent directors. If both  $\gamma_0$  and  $\gamma_2$  are significantly positive with the dependent variable of the proportion of cash-based compensation, this will suggest that weak corporate governance system aggravates the association between CEOs' opportunistic behavior of investing in CSR for their own benefits and the proportion of cash-based compensation. On the other hand, if  $\gamma_0$  and  $\gamma_4$  are significantly positive with the dependent variable of the proportion of equity-based compensation, the results show that strong corporate governance reinforces the positive association between CSR and the proportion of equity-based compensation.

Additionally, we repeat the analysis using CSR strength and concern scores to see if test results from Eq. (1) are primarily driven by CSR strengths or concerns:

$$PCASH_{it} \text{ (or PEQUITY}_{it}) = \alpha + \beta_1 \times CSRS_{it-1} + \beta_2 \times CSRC_{it-1} + \theta' \gamma + \varepsilon_{it} \tag{3}$$

where  $CSR_{S_{it-1}}$  and  $CSR_{C_{it-1}}$  are total strength and concern scores for firm  $i$  in year  $t-1$ .

## 4. Empirical results

### 4.1. Descriptive statistics

Table 2 reports summary statistics for key variables in the entire sample. Panel A shows the statistics of CSR variables. The mean of the total CSR scores (TCSR) is positive (0.27), which is consistent with Cai et al. (2011) and Rekker et al. (2014). The mean of CSR strength scores (CSR\_S) (1.84) is greater than the mean of CSR concern scores (CSR\_C) (1.57). This shows that firms disclosing their CSR information tend to have relatively good CSR performance. In terms of each CSR category, the mean of net CSR scores is positive in community (COMM), diversity (DIV), environment (ENV), and employee relations (ER), while the mean of net CSR scores is negative in human rights (HR), and product (PROD).

Panels B and C of Table 2 report the statistics of CEO compensation, CEO-specific, and firm-specific variables. The average dollar amount of equity-based compensation (EQUITY) (\$3.6 million) is much higher than that of cash-based compensation (CASH) (\$1.1 million). Consistently, the average proportion of equity-based compensation (PEQUITY) (49%) is higher than the average proportion of cash-based compensation (PCASH) (31%). This is confirmed by Fig. 1, which displays the time series of cross-sectional averages of the proportions of cash- and equity-based compensation for the sample period. The statistics of the other compensation and firm-specific variables, such as board size (BSIZE), CEO ownership (CEO\_OWN), book-to-market (BM), and Tobin's Q (TOBINQ), are in general consistent with the statistics shown in prior studies (Cai et al., 2011; Rekker et al., 2014).

Table 3 reports Pearson correlations among CSR, compensation, and CEO-specific variables. While the proportion of cash-based compensation is negatively correlated with the total CSR score (-0.17), the proportion of equity-based compensation is positively correlated with the total CSR score (0.17). These correlations imply that socially responsible firms tend to have a relatively low proportion of cash-based compensation and a high proportion of equity-based compensation. Meanwhile, the negative (positive) correlation between the proportion of independent directors and the proportion of cash-based (equity-based) compensation suggests that strong corporate governance, indicated by board independence, improves CEO compensation structure in a way to reduce agency problems.

## Cross-sectional averages of CEOs' cash- and equity-based compensation

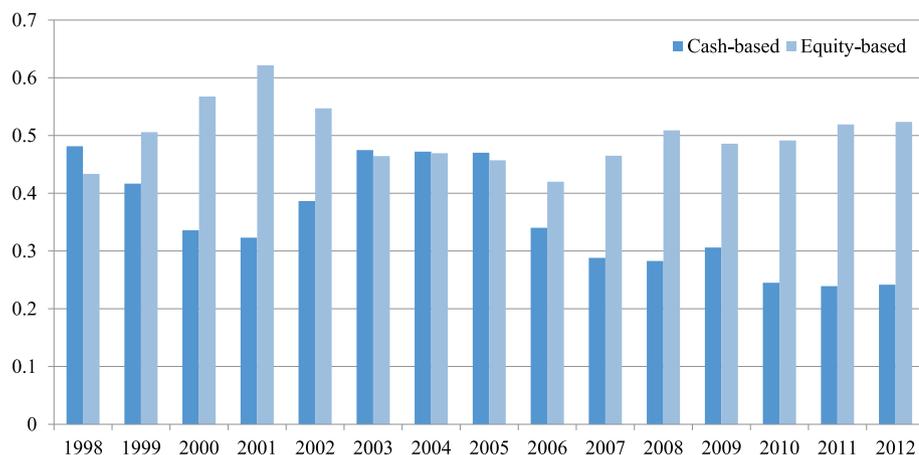


Fig. 1. Cross-sectional averages of CEOs' cash- and equity-based compensation

This figure shows the time series of cross-sectional averages of CEO compensation components, which are the proportions of cash- and equity-based compensation. These variables are described in Appendix B.

Table 3

Pearson correlations. This table reports Pearson correlations among CSR, CEO compensation, and CEO-specific variables. The definitions of the variables are described in Appendix B, and correlations in bold are statistically significant within the 5% level.

	TCSR	CSR_S	CSR_C	PCASH	PEQUITY	BSIZE	CEO_AGE	CEO_DUL	CEO_OWN	CEO_TEN	PIND	VEGA_RESID
TCSR	1	<b>0.80</b>	<b>-0.30</b>	<b>-0.17</b>	<b>0.17</b>	<b>0.25</b>	0.01	-0.01	<b>-0.07</b>	<b>-0.07</b>	<b>0.09</b>	<b>0.03</b>
CSR_S		1	<b>0.34</b>	<b>-0.27</b>	<b>0.21</b>	<b>0.41</b>	<b>0.04</b>	<b>0.04</b>	<b>-0.11</b>	<b>-0.13</b>	<b>0.18</b>	0.02
CSR_C			1	<b>-0.16</b>	<b>0.07</b>	<b>0.26</b>	<b>0.05</b>	<b>0.08</b>	<b>-0.06</b>	<b>-0.09</b>	<b>0.14</b>	-0.01
PCASH				1	<b>-0.70</b>	<b>-0.24</b>	0.03	-0.01	<b>0.24</b>	<b>0.15</b>	<b>-0.33</b>	<b>-0.09</b>
PEQUITY					1	<b>0.12</b>	<b>-0.11</b>	<b>0.03</b>	<b>-0.17</b>	<b>-0.13</b>	<b>0.19</b>	<b>0.07</b>
BSIZE						1	0.02	<b>-0.03</b>	<b>-0.17</b>	<b>-0.24</b>	<b>0.17</b>	0.01
CEO_AGE							1	<b>0.06</b>	<b>0.18</b>	<b>0.45</b>	-0.03	0.03
CEO_DUL								1	<b>0.05</b>	<b>0.11</b>	<b>0.08</b>	0.01
CEO_OWN									1	<b>0.38</b>	<b>-0.30</b>	0.01
CEO_TEN										1	<b>-0.17</b>	0.02
PIND											1	<b>0.05</b>
VEGA_RESID												1

#### 4.2. CSR performance and CEO compensation structure

To analyze the association between CSR performance and the proportions of cash- and equity-based compensation, we sort firms into quartiles each year and look into the average proportions of cash- and equity-based compensation.<sup>10</sup> Table 4 reports the portfolio analysis results. While the proportion of cash-based compensation declines from 29.74% for the lowest CSR portfolio (Q1) to 23.20% for the highest CSR portfolio (Q4), the proportion of equity-based compensation increases from 47.61% for the lowest CSR portfolio to 56.88% for the highest CSR portfolio. Differences in the proportions of cash- and equity-based compensation between Q4 and Q1 (Q4-Q1) are significantly negative (-6.54) and positive (9.27), respectively. To sum up, the results show that firms' CSR performance increases with the proportion of equity-based compensation while it decreases with the proportion of cash-based compensation. These results support our hypothesis H1b, suggesting that firms' social performance is negatively associated with CEOs' cash-based compensation and positively associated with CEOs' equity-based compensation. Since we only perform the univariate analysis between CSR and CEO compensation components, we run regressions of the proportion cash- or equity-based compensation to see if the results are robust after controlling for other CEO- and firm-specific variables that might affect CEO compensation components.

<sup>10</sup> We manually set the intervals for this analysis, because CSR performance measures are integers and are not evenly distributed. Data observations within the ranges of [Min, -2] and (-2, 0] account for 25.20% and 40.61%, respectively. In particular, those within the ranges of (-2, -1] and (-1, 0] constitute 18.67% and 21.94%. The detailed distribution of the sample is described in Table 4.

To analyze the association between CSR performance and the proportions of cash- and equity-based compensation, we estimate Eq. (1) with year and industry fixed effects. Table 5 reports the estimation results. When we use the proportion of cash-based compensation as a dependent variable in the first column, the coefficient on the total CSR score is negative (-0.001), although it is not significant. In contrast, when we use the proportion of equity-based compensation in the third column, the coefficient on the total CSR score is significantly positive (0.005).

The results support our hypothesis H1b, suggesting that CEOs consider firms' social performance as a business activity that improves firm value and their relationship with shareholders and thus they are compensated for their engagement in CSR. Also, this evidence is in line with prior studies that found the positive impact of a firm's CSR performance on its financial and operational performance.<sup>11</sup>

We also find that the associations between CSR and the proportions of cash- (PCASH) and equity-based (PEQUITY) compensation are mainly driven by CSR strength scores (CSR\_S). The regression results with the independent variables of CSR strength (CSR\_S) and concern (CSR\_C) scores are reported in the second and fourth columns of Table 5. When we run the regression of the proportion of cash-based compensation, the coefficient on the CSR strength score is negative (-0.002) but statistically insignificant. Meanwhile, with the dependent

<sup>11</sup> To check if our results are robust to different scalars in the dependent variables, we repeat our regression analysis using the ratios of cash to equity and equity to cash compensation. The results are consistent with those in Table 5 when we use the cash-to-equity ratio. Similarly, the results are not changed when we use the ratio of equity to cash compensation, although significance becomes weaker.

**Table 4**

CEO compensation for CSR portfolios. This table reports CEO compensation components for CSR portfolios. Each year we sort firms into quartiles based on total CSR scores and report the average proportions of cash- and equity-based compensation for each group. Differences in the proportions of cash- and equity-based compensation between the top and bottom quartiles (Q4-Q1) are reported in the sixth column. *t*-statistics are reported in parentheses below the compensation estimates, and ‘\*\*\*’, ‘\*\*’, and ‘\*’ represent significance at 1%, 5%, and 10% levels, respectively.

	Q1	Q2	Q3	Q4	Diff.
	[MIN, - 2]	(- 2.0]	(0, 1]	(1, MAX]	(Q4-Q1)
Number of observations (%)	25.20	40.61	13.74	20.45	
PCASH (%)	29.74	33.10	30.18	23.20	- 6.54
	(41.30)***	(55.89) ***	(31.94) ***	(33.27) ***	(- 6.53) ***
PEQUITY (%)	47.61	47.38	50.04	56.88	9.27
	(64.34) ***	(73.96) ***	(47.86) ***	(73.72) ***	(8.61) ***

**Table 5**

CSR and CEO compensation structure. This table reports regression results of the proportions of cash- and equity-based compensation on CSR with year and industry-fixed effects. The dependent variables are the proportions of cash- and equity-based compensation. The independent variables are described in Appendix B. For the CSR variables, we use the total CSR score and the total strength and concern scores in separate regressions. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. ‘\*\*\*’, ‘\*\*’, and ‘\*’ represent significance at 1%, 5%, and 10% levels, respectively.

	(1) PCASH				(2) PEQUITY			
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	1.006	(15.95)***	0.974	(14.91)***	0.242	(3.29)***	0.288	(3.78)***
TCSR	- 0.001	(- 0.49)			0.005	(3.45)***		
CSR_S			- 0.002	(- 1.5)			0.007	(4.17)***
CSR_C			- 0.002	(- 1.03)			0.000	(- 0.12)
BSIZE	- 0.028	(- 1.38)	- 0.026	(- 1.27)	0.000	(- 0.01)	- 0.002	(- 0.1)
PIND	- 0.406	(- 11.83)***	- 0.401	(- 11.56)***	0.259	(7.25)***	0.253	(6.99)***
CEO_OWN	0.004	(4.22)***	0.004	(4.21)***	- 0.003	(- 2.65)***	- 0.003	(- 2.69)***
CEO_DUL	0.006	(0.7)	0.005	(0.6)	0.006	(0.62)	0.007	(0.65)
CEO_AGE	- 0.001	(- 1.32)	- 0.001	(- 1.07)	- 0.002	(- 3.41)***	- 0.002	(- 3.59)***
CEO_TEN	0.001	(1.15)	0.001	(1.05)	- 0.001	(- 1.64)	- 0.001	(- 1.5)
SALE	- 0.054	(- 16.42)***	- 0.051	(- 12.49)***	0.045	(12.01)***	0.040	(8.54)***
BM	0.044	(2.67)***	0.041	(2.41)**	- 0.097	(- 5.45)***	- 0.091	(- 5.11)***
ROA	0.222	(3.16)***	0.212	(3.01)***	- 0.400	(- 5.31)***	- 0.381	(- 5.09)***
TOBINQ	- 0.017	(- 4.07)***	- 0.017	(- 4.11)***	0.022	(3.35)***	0.022	(3.35)***
LEV	0.006	(0.22)	0.001	(0.05)	- 0.031	(- 1.08)	- 0.029	(- 1)
LIQ	- 0.006	(- 2.27)**	- 0.005	(- 2.04)**	0.013	(4.66)***	0.013	(4.3)**
FAGE	0.034	(6.04)***	0.035	(6.08)***	- 0.044	(- 7.2)***	- 0.046	(- 7.38)***
BETA	- 0.008	(- 1.68)*	- 0.008	(- 1.69)*	0.002	(0.5)	0.003	(0.54)
RET	- 0.024	(- 1.92)*	- 0.026	(- 2.01)**	- 0.028	(- 1.93)*	- 0.026	(- 1.78)*
LAGRET	- 0.003	(- 0.2)	- 0.002	(- 0.19)	- 0.004	(- 0.39)	- 0.004	(- 0.36)
STDRET	- 0.008	(- 0.4)	- 0.006	(- 0.29)	0.049	(2.23)**	0.046	(2.08)**
VEGA_RESID	- 0.009	(- 2.98)***	- 0.008	(- 2.97)***	0.006	(2.68)***	0.006	(2.65)***
Year-fixed effects	Yes		Yes		Yes		Yes	
Industry-fixed effects	Yes		Yes		Yes		Yes	
N	3561		3538		3475		3452	
R <sup>2</sup>	0.229		0.228		0.146		0.146	

variable of the proportion of equity-based compensation, the coefficient on the CSR strength score (0.007) is significantly positive.

The signs of coefficients on the board of directors and CEO-specific variables from the regressions are in general consistent with prior studies. The coefficient on board size (BSIZE) is negative for the proportion of cash-based compensation and positive for the proportion of equity-based compensation, but they are not statistically significant. Meanwhile, the coefficient on the proportion of independent directors on board (PIND) is significantly negative (positive) for the proportion of cash-based (equity-based) compensation, suggesting that firms with high board independence pay a relatively high level of equity-based compensation compared to cash-based compensation. The coefficient on CEO ownership (CEO\_OWN) is significantly positive (negative) with the proportion of cash-based (equity-based) compensation, suggesting that CEOs who own more shares tend to earn a relatively high proportion of cash-based compensation. This is consistent with Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990), who suggest that the alignment effect attributed to low levels of managerial ownership is dominated by the CEO entrenchment effect when

managerial ownership is high. Meanwhile, the coefficients on CEO duality (CEO\_DUL) (0.006 and 0.006) are consistently positive, but they are not statistically significant.

Coefficients on firm-specific variables in the third and fourth columns are also in line with prior studies. The coefficients on sales and book-to-market are consistent with Core et al. (1999), who show that CEOs tend to earn larger compensation when firms are larger and have higher investment opportunities proxied by low book-to-market ratios. The positive coefficients on the standard deviation of stock return (STDRET) in the third and fourth columns show that CEOs tend to have higher equity-based compensation when the return volatility is higher. The coefficients on firm age (FAGE) are consistent with Fahlenbrach (2009), indicating that younger firms tend to pay a higher proportion of equity-based compensation.

Overall, we find that firms with high CSR performance tend to have a higher proportion of equity-based compensation and a lower proportion of cash-based compensation than firms with low CSR performance. These results suggest that a firm's CSR performance is significantly associated with the structure of CEO compensation that

possibly reduces agency problems and induces CEOs to align their interests with those of shareholders.

#### 4.3. Corporate governance and the CSR–CEO compensation association

We further examine if the association between CSR and CEO compensation components depends on a firm's corporate governance. For this analysis, we use three corporate governance variables, which are inside director ownership, director tenure, and the proportion of independent directors on board.

Agency theory suggests that inside director ownership resolves conflicts of interest between managers and shareholders (Fama & Jensen, 1983; Jensen & Meckling, 1976). However, some empirical studies find that managerial entrenchment tends to dominate such positive effect within a certain range of managerial ownership. Morck et al. (1988) document that the relation between inside ownership and Tobin's Q is positive when the insider ownership is between 0% and 5% or exceeds 25%, while it is negative with the ownership of 5–25%. In the same vein, Kim and Lu (2011) also find that high levels of CEO ownership lead CEOs to avoid risk-taking and be more entrenched, which will reduce firm value.

If we find a positive (negative) coefficient on inside director ownership with the dependent variable of the proportion of cash-based (equity-based) compensation, it will support the domination of the entrenchment effect at high levels of inside director ownership. In this case, our finding of the positive association between CSR and equity-based CEO compensation structure can be less pronounced for firms with high inside director ownership due to the weak monitoring role of inside directors. In contrast, the result can be less pronounced with low inside director ownership if strong corporate governance restricts CEOs' business activities and does not allow CEOs to actively engage in CSR. For the analysis, we use the ownership of inside directors (IDOWNER), which is the number of shares held by inside directors divided by the total number of shares outstanding.

We also use director tenure as the second corporate governance variable in this section. Prior literature shows that board members who have served on the board for a long time tend to be less independent than those who recently started serving as board members (Byrd, Cooperman, & Wolfe, 2010; Vafeas, 2003). We should note, however, that the interpretation of this variable is also controversial, because some studies document that long director tenure enables directors to accumulate knowledge about the firm and its business environment, enhancing corporate governance (Dou, Sahgal, & Zhang, 2015; Vafeas, 2003).

The third measure of corporate governance is the proportion of independent board members. The advantage of this measure is that its interpretation is not ambiguous, compared to the previous two measures. A low (high) proportion of independent directors on board indicates weak (strong) corporate governance. This dichotomous interpretation may lead to clear implications on how the relation between CSR and CEO compensation structure changes with corporate governance.<sup>12</sup> Motivated by this, we repeat the test with the measure of the proportion of independent board members, although this variable is already included in Eqs. (1)–(3) as one of the control variables.

To analyze this, we add to the regression two dummy variables that indicate the weakest and strongest corporate governance portfolios sorted based on these three corporate governance measures. Table 6 reports coefficient estimates on the variables of interest: total CSR score, dummies for the two extreme corporate governance portfolios, and their interaction terms from Eq. (2). The results show that the coefficient on total CSR score is significantly positive in Panels A–C when we regress the proportion of equity-based compensation. Although the coefficient on the proportion of cash-based compensation is not significant, the overall results are consistent with our finding of the positive association between CSR and CEOs'

equity-based compensation.

When we use inside director ownership as a corporate governance measure in Panel A, the coefficient on a dummy variable for the lowest ownership portfolio (CGVAR\_S) is significantly negative with the proportion of cash-based compensation, while it is significantly positive with the proportion of equity-based compensation. On the other hand, the signs of the coefficients are opposite for the highest ownership portfolio (CGVAR\_W). This confirms that low (high) levels of inside director ownership lead to a higher (lower) proportion of equity-based compensation, which is associated with strong (weak) corporate governance. Meanwhile, the coefficient on the interaction term between CSR and CGVAR\_W is significantly negative (positive) with the proportion of cash-based (equity-based) compensation. This suggests that our findings of the negative association between CSR and cash-based compensation and the positive association between CSR and equity-based compensation are more pronounced in firms with high levels of inside director ownership, which indicate weak corporate governance in our analysis. These results support our hypothesis H3b, although the results are not significant for firms with low levels of ownership.

When we use director tenure in Panel B, the coefficient on the interaction term between CSR and the highest tenure portfolio (CGVAR\_W) is significantly negative for the proportion of cash-based compensation. Given our finding that long tenure is associated with weak corporate governance, our results on the association between CSR and CEO compensation structure are more pronounced in firms with weak corporate governance, which is consistent with the results in Panel A.

Regression results are also consistent when we use the proportion of independent board members (PIND) in Panel C. The coefficient on the interaction term between CSR and the lowest PIND portfolio (CGVAR\_W) is significantly negative (positive) with the dependent variable of cash-based (equity-based) compensation. Given that a low proportion of independent board members indicates weak corporate governance, this suggests that the negative (positive) association between CSR and CEOs' cash-based (equity-based) compensation is more pronounced for firms with weak corporate governance. This supports our hypothesis H3b, confirming the above findings with the two corporate governance variables, insider ownership and director tenure.

Overall, the results show that the negative association between CSR and cash-based compensation and the positive association between CSR and equity-based compensation are robust to the degree of corporate governance, and they are more pronounced for firms with high levels of inside director ownership, long director tenure, and a low proportion of independent board members, all of which indicate weak corporate governance.

## 5. Additional tests

### 5.1. The effects of CSR on the relation between CEO compensation structure and firm value

We have shown that a firm's CSR performance is associated with a relatively high (low) proportion of equity-based (cash-based) compensation. This result provides evidence on the implementation of a firm's CSR policy and its dynamics with CEO characteristics. More importantly, the results imply that structural changes in CEO compensation that are associated with CSR performance may affect shareholders' wealth and firm value in the future.

Motivated by this, we examine how CSR affects the role of each CEO compensation component on firm value. The effect of CSR on firm value and the effect of CEO compensation structure on firm value have been investigated separately in existing studies. The agency theory suggests that granting equity-based compensation provides CEOs with incentives to align their interests with those of shareholders and maximize firm value, and it is supported by many early studies (Bryan, Hwang, & Lilien, 2000; DeFusco, Johnson, & Zom, 1990; McConnell & Servaes,

<sup>12</sup> We thank the referee for suggesting this measure.

**Table 6**

Corporate governance and the CSR-CEO compensation association. This table reports coefficient estimates from the regressions of CEO compensation components on CSR, indicators for the weakest and strongest corporate governance portfolios, and their interaction terms with year and industry-fixed effects. The three corporate governance variables used in this analysis are inside director ownership (IDOWNER, Panel A), director tenure (DTENURE, Panel B), and the proportion of independent directors (PIND, Panel C). These variables are described in Appendix B. The dependent variable is the proportion of cash- or equity-based compensation. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. \*\*\*\*, \*\*\*, and \*\* represent significance at 1%, 5%, and 10% levels, respectively.

	Panel A. IDOWNER				Panel B. DTENURE				Panel C. PIND			
	PCASH		PEQUITY		PCASH		PEQUITY		PCASH		PEQUITY	
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
TCSR	0.001	(0.37)	0.004	(2.51)**	0.000	(-0.12)	0.004	(2.56)***	0.001	(0.51)	0.004	(2.6)***
CGVAR_W	0.067	(4.17)***	-0.054	(-3.38)***	-0.003	(-0.18)	-0.031	(-2.04)**	-0.007	(-0.36)	0.017	(0.85)
TCSR*CGVAR_W	-0.011	(-1.91)*	0.011	(1.72)*	-0.013	(-1.72)*	0.008	(1.16)	-0.013	(-1.75)*	0.016	(2.15)**
CGVAR_S	-0.022	(-2.11)**	0.036	(2.96)***	0.025	(1.64)	-0.012	(-0.74)	0.040	(2.98)***	-0.017	(-1.11)
TCSR*CGVAR_S	0.000	(-0.12)	-0.003	(-1.09)	0.006	(1.49)	0.001	(0.25)	-0.004	(-2.22)**	-0.002	(-0.66)

1990; Mehran, 1995). Recent work by Pfeiffer and Shields (2015) shows that the manager's choice of compensation contract tends to be incorporated into equity prices. A growing literature documents that a firm's CSR activity improves firm performance and increases shareholders' values. Although we find that these two factors, CSR and CEO compensation components, that crucially affect firm value are closely associated, it is not clear how one of them affects the relation between the other and firm value. In particular, a firm's CSR performance may reinforce or mitigate the effects of the components of CEO compensation on firm value. Investigating this issue will enable us to draw additional implications on the channels through which a firm's CSR performance influences firm value.

We investigate how a firm's CSR performance affects the relation between CEO compensation components and firm value. To analyze this, we estimate the regression of a measure for firm value on the total CSR score, the proportion of cash- or equity-based compensation, and their interaction term as follows:

$$TOBINQ_{it} = \alpha + \delta_1 \times TCSR_{it-1} + \delta_2 \times PCASH_{it-1} \text{ (or PEQUITY}_{it-1}) + \delta_3 \times TCSR_{it-1} \times PCASH_{it-1} \text{ (or PEQUITY}_{it-1}) + \theta' \gamma + \varepsilon_{it} \quad (4)$$

Following Faleye (2007), we use Tobin's Q (TOBINQ) as a proxy for firm value. This is calculated as the market value of assets over the book value of assets, where the market value is the sum of the book value of assets, the market value of common stock, and deferred taxes minus the book value of common stock. For explanatory variables, we include the proportions of cash- and equity-based compensation and their interaction terms with total CSR score. We also add to the equation other control variables that can possibly affect firm value, such as board size (BSIZE), the proportion of outside directors on board (PIND), capital expenditure (CAPEX), leverage (LEV), sales (SALE), and operating profitability (OPPROF).

Given the findings in the previous section, we expect to find a positive relation between the total CSR score and Tobin's Q. Also, there will be a positive (negative) relation between the proportion of equity-based (cash-based) compensation and Tobin's Q. If a firm's CSR performance reinforces the positive impact of equity-based compensation on firm value, the coefficient on the interaction term between the CSR score and the proportion of equity-based compensation will be significantly positive. In the same sense, if a firm's CSR performance deteriorates the negative impact of cash-based compensation on firm value, the coefficient on the interaction term between CSR and the proportion of cash-based compensation will be significantly negative.

Table 7 reports the estimation results of the panel regression analysis. The coefficient on the total CSR score is positive in Column (1), although it is not significant when we regress Tobin's Q on CSR, the proportion of equity-based compensation, and their interaction term in Column (2). With respect to the components of CEO compensation, the coefficient on the proportion of cash-based compensation (-0.473) is

**Table 7**

Effect of CSR on the relation between CEO compensation and firm value. This table reports regression results of Tobin's Q on the total CSR score, the proportion of cash- or equity-based compensation, and their interaction term with year and industry-fixed effects. The dependent variable is Tobin's Q, which is the ratio of market value of assets to book value of assets. The independent variables are described in Appendix B. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. \*\*\*\*, \*\*\*, and \*\* represent significance at 1%, 5%, and 10% levels, respectively.

	(1)		(2)	
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	3.042	(12.34)***	2.486	(11.68)***
TCSR	0.057	(5.17)***	-0.022	(-1.16)
PCASH	-0.473	(-4.65)***		
TCSR*PCASH	-0.057	(-1.61)		
PEQUITY			0.617	(5.83)***
TCSR*PEQUITY			0.116	(3.22)***
BSIZE	-0.081	(-0.84)	-0.072	(-0.74)
PIND	-0.826	(-4.88)***	-0.775	(-4.69)***
CAPEX	-2.710	(-5.67)***	-2.730	(-5.73)***
LEV	-0.987	(-6.98)***	-1.023	(-7.02)***
SALE	-0.113	(-6.61)***	-0.106	(-6.03)***
OPPROF	6.080	(13.42)***	6.117	(13.18)***
Year-fixed effects	Yes		Yes	
Industry-fixed effects	Yes		Yes	
N	3593		3507	
R <sup>2</sup>	0.382		0.394	

significantly negative, while the coefficient on the proportion of equity-based compensation (0.617) is significantly positive. These results in general support the previous findings that CSR performance and equity grants to CEOs have positive impacts on firm value.

In Column (1), the coefficient on the interaction term between CSR and the proportion of cash-based compensation (-0.057) is negative, but it is not statistically significant. Meanwhile, the coefficient on the interaction term between CSR and the proportion of equity-based compensation (0.116) is significantly positive in Column (2). This suggests that a firm's CSR performance strengthens the positive effect of equity-based compensation on firm value. In other words, the result highlights the positive aspects of CSR on the relation between CEO compensation structure and firm value. Socially responsible firms tend to have a higher proportion of equity-based compensation, and the positive marginal impact of higher equity-based compensation on firm value is stronger for these firms. This confirms that CEOs engage in CSR as a business strategy that increases firm value. It also demonstrates that the dynamics between CSR performance and CEO compensation components can boost firm value, which makes a firm's engagement in CSR activities more valuable.

Overall, our results reveal that a firm's CSR performance is not only positively associated with the proportion of equity-based compensation but also reinforces the positive role of such shareholder-friendly

**Table 8**

Each CSR dimension and CEO compensation components. This table reports regression results of the proportions of cash- and equity-based compensation on the net CSR score for each of six CSR categories: community (COMM), environment (ENV), diversity (DIV), employee relations (ER), human rights (HR), and product (PROD). The dependent variable is the proportion of cash- or equity-based compensation. The independent variables are described in Appendix B. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. \*\*\*, \*\*, and \* represent significance at 1%, 5%, and 10% levels, respectively.

	(1) PCASH		(2) PEQUITY	
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	1.027	(16.17)***	0.240	(3.25)***
COMM	0.006	(1.13)	0.003	(0.45)
ENV	-0.016	(-5.09)***	0.007	(1.84)*
DIV	0.007	(2.5)**	0.004	(1.48)
ER	0.000	(0.14)	0.007	(1.83)*
HR	-0.007	(-0.45)	-0.004	(-0.25)
PROD	0.008	(1.58)	-0.003	(-0.44)
BSIZE	-0.033	(-1.63)	0.000	(-0.01)
PIND	-0.401	(-11.67)***	0.258	(7.16)***
CEO_OWNS	0.003	(3.92)***	-0.003	(-2.6)***
CEO_DUL	0.004	(0.42)	0.006	(0.61)
CEO_AGE	-0.001	(-1.03)	-0.002	(-3.43)***
CEO_TEN	0.001	(1.21)	-0.001	(-1.58)
SALE	-0.056	(-15.57)***	0.044	(11.05)***
BM	0.047	(2.83)***	-0.097	(-5.46)***
ROA	0.230	(3.29)***	-0.397	(-5.28)***
TOBINQ	-0.017	(-4.17)***	0.022	(3.3)***
LEV	0.012	(0.45)	-0.032	(-1.11)
LIQ	-0.005	(-2.06)**	0.013	(4.62)***
FAGE	0.031	(6.09)***	-0.042	(-7.31)***
BETA	-0.008	(-1.74)*	0.003	(0.56)
RET	-0.022	(-1.75)*	-0.028	(-1.89)*
LAGRET	0.002	(0.18)	-0.004	(-0.36)
STDRET	-0.012	(-0.61)	0.048	(2.21)**
VEGA_RESIDUAL	-0.009	(-2.99)***	0.006	(2.67)***
Year-fixed effects	Yes		Yes	
Industry-fixed effects	Yes		Yes	
N	3561		3475	
R <sup>2</sup>	0.234		0.146	

compensation package in firm value. These results reemphasize the positive impacts of CEOs' engagement in CSR activities and its further impact on shareholders' wealth.

## 5.2. CSR categories and CEO compensation structure

In the previous sections, we used the total CSR score as a measure of CSR performance, which is calculated as the sum of net CSR scores across six CSR categories. However, if a given CSR category contains certain issues that could affect CEO compensation, our findings on the association between CSR and CEO compensation structure can be more or less evident. For example, a positive association between CSR and the proportion of equity-based compensation can be more pronounced in firms with high CSR scores in employee relations, because these firms may have a more incentive-based compensation structure to improve relations with their employees.

Motivated by this, we further explore the link between CSR performance and CEO compensation using the net CSR score in each category. We re-estimate Eq. (1) using net CSR scores in the six categories as independent variables as follows:

$$\begin{aligned}
 \text{PCASH}_{it} \text{ (or PEQUITY}_{it}) &= \alpha + \beta_1 \times \text{COMM}_{it-1} + \beta_2 \times \text{ENV}_{it-1} \\
 &+ \beta_3 \times \text{DIV}_{it-1} + \\
 &+ \beta_4 \times \text{ER}_{it-1} + \beta_5 \times \text{HR}_{it-1} + \beta_6 \times \text{PROD}_{it-1} \\
 &+ \theta' \gamma + \varepsilon_{it}
 \end{aligned}
 \tag{5}$$

where  $\text{COMM}_{it-1}$ ,  $\text{ENV}_{it-1}$ ,  $\text{DIV}_{it-1}$ ,  $\text{ER}_{it-1}$ ,  $\text{HR}_{it-1}$ , and

$\text{PROD}_{it-1}$  are lagged net CSR scores on community, environment, diversity, employee relations, human rights, and product. The net CSR score is calculated as the difference between strength and concern scores in a given CSR category.

Table 8 reports the estimation results of Eq. (5). When we use the proportion of cash-based compensation as a dependent variable in Column (1), the regression coefficient on the net CSR score is significantly negative in environment. Meanwhile, the net CSR score is significantly positively associated with the proportion of equity-based compensation in the categories of environment and employee relations, although the coefficients are marginally significant in Column (2). The positive relation between the net CSR score in employee relations and the proportion of equity-based compensation demonstrates that firms paying attention to employee relations tend to have more incentive-based compensation structure for their CEOs. This is consistent with our expectations.

Overall, the results show that our findings on the associations between CSR and CEO compensation components are more pronounced in certain CSR categories. The positive association between CSR and the proportion of equity-based compensation is more pronounced in environment and employee relations, while the negative association between CSR and the proportion of cash-based compensation is more pronounced in environment.

## 5.3. Regulations: Sarbanes-Oxley Act of 2002 (SOX) and Statement of Financial Accounting Standard No. 123(R) (SFAS 123R)

An exogenous shock, such as the enactment of accounting and financial regulations, may affect the association between CSR performance and the structure of CEO compensation. In this section, we conduct robustness tests using two regulatory changes: SOX and SFAS 123R.

First, we investigate if the implementation of SOX affects the associations between CSR and the proportions of cash- and equity-based compensation. SOX requires firms to disclose more accurate information and meet the independence requirements of a firm's board of directors. This suggests that the passage of SOX paved the way for improving the transparency of accounting disclosures and the effectiveness of corporate governance system. Given this, the association between CSR performance and CEO compensation structure could be affected by this environmental change. In particular, enhancement in the independence of the board of directors might lead to a more pronounced negative (positive) association between CSR performance and cash-based (equity-based) compensation. In this case, our findings in the previous section are expected to be more pronounced during the post-SOX period.

Secondly, we repeat the analysis using the introduction of SFAS 123R as another exogenous shock. The SFAS 123R, effective June 15, 2005, requires firms to expense the estimated fair value of stock options granted, leading to higher costs in granting stock options to CEOs. Recent studies show that firms tend to decrease the use of stock options after the adoption of SFAS 123R (Hayes, Lemmon, & Qiu, 2012; Skantz, 2012). If the passage of SFAS 123R significantly affects CEO compensation structure, it may also affect our findings on the association between CSR and CEO compensation structure. Motivated by this, we examine if our results are robust to this policy change.

We divide the sample period into the pre-SOX (1998–2001) and post-SOX periods (2003–2012) and the pre-SFAS (1998–2004) and post-SFAS periods (2006–2012), respectively, and repeat the analyses shown in Table 5.<sup>13</sup> The regression results are reported in Table 9. Panel A reports the estimation results for the pre-SOX and post-SOX periods.

<sup>13</sup> We exclude the years in which the regulations came into effect, because it is not clear whether these years should be classified as the pre- or post-regulation period. Therefore, we omit 2002 and 2005 for the SOX and SFAS analyses, respectively.

**Table 9**

Subsample analysis. This table reports regression results of the proportions of cash- and equity-based compensation on CSR before and after the adoption of SOX (Panel A) and SFAS 123R (Panel B). The dependent variable is the proportion of cash- or equity-based compensation, and the independent variables are described in Appendix B. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. ‘\*\*\*’, ‘\*\*’, and ‘\*’ represent significance at 1%, 5%, and 10% levels, respectively.

Panel A. SOX								
	PCASH		PEQUITY		PCASH		PEQUITY	
	(1) Pre-SOX (1998–2001)				(2) Post-SOX (2003–2012)			
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	0.814	(1.23)	1.763	(2.03)**	1.006	(15.45)***	0.201	(2.72)***
TCSR	0.053	(2.23)**	– 0.028	(– 1.12)	– 0.001	(– 0.76)	0.005	(3.53)***
BSIZE	0.020	(0.12)	– 0.328	(– 1.27)	– 0.036	(– 1.75)*	0.002	(0.09)
PIND	– 0.973	(– 3.54)***	0.899	(2.68)***	– 0.398	(– 11.52)***	0.281	(7.7)***
CEO_OWN	– 0.007	(– 0.83)	– 0.010	(– 0.98)	0.004	(4.41)***	– 0.002	(– 2.33)**
CEO_DUL	0.011	(0.08)	0.124	(0.81)	0.009	(1.02)	0.003	(0.31)
CEO_AGE	– 0.008	(– 1.1)	0.003	(0.34)	– 0.001	(– 1.42)	– 0.002	(– 2.98)***
CEO_TEN	0.001	(0.19)	– 0.003	(– 0.33)	0.001	(1.28)	– 0.001	(– 1.51)
SALE	– 0.040	(– 1.03)	0.060	(1.06)	– 0.053	(– 16.49)***	0.045	(11.71)***
BM	0.234	(0.96)	– 0.507	(– 1.72)*	0.052	(3.01)**	– 0.096	(– 5.35)***
ROA	0.426	(0.92)	– 1.100	(– 1.62)	0.194	(2.5)**	– 0.347	(– 4.44)***
TOBINQ	– 0.019	(– 1.55)	0.006	(0.49)	– 0.012	(– 2.24)**	0.018	(2.47)**
LEV	0.497	(1.34)	– 0.692	(– 1.66)	0.000	(– 0.01)	– 0.040	(– 1.36)
LIQ	– 0.051	(– 0.94)	0.078	(1.04)	– 0.006	(– 2.28)**	0.013	(4.53)***
FAGE	0.180	(2.74)***	– 0.280	(– 3.88)***	0.033	(6.24)***	– 0.043	(– 7.47)***
BETA	– 0.058	(– 1.21)	0.039	(0.73)	– 0.006	(– 1.24)	0.003	(0.58)
RET	0.176	(2.02)**	– 0.192	(– 1.98)**	– 0.028	(– 2.17)**	– 0.027	(– 1.81)*
LAGRET	– 0.063	(– 0.78)	– 0.151	(– 1.97)*	0.000	(0)	– 0.006	(– 0.57)
STDRET	0.405	(1.69)*	– 0.848	(– 4.2)***	– 0.008	(– 0.39)	0.053	(2.39)**
VEGA_RESIDUAL	– 0.066	(– 0.73)	0.067	(0.51)	– 0.009	(– 3)***	0.006	(2.63)***
Year-fixed effects	Yes		Yes		Yes		Yes	
Industry-fixed effects	Yes		Yes		Yes		Yes	
N	71		69		3423		3343	
R <sup>2</sup>	0.501		0.475		0.237		0.142	

Panel B. SFAS 123R								
	(1) Pre-SFAS (1998–2004)				(2) Post-SFAS (2006–2012)			
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	0.650	(3.29)***	0.832	(3.82)***	0.839	(13.35)***	0.182	(2.16)**
TCSR	– 0.009	(– 1.27)	0.011	(1.43)	0.000	(– 0.29)	0.004	(2.76)***
BSIZE	0.041	(0.69)	– 0.077	(– 1.23)	– 0.034	(– 1.65)	– 0.002	(– 0.06)
PIND	– 0.189	(– 2.19)**	0.028	(0.37)	– 0.292	(– 8.65)***	0.325	(7.58)***
CEO_OWN	0.005	(2.72)***	– 0.009	(– 3.54)***	0.003	(3.03)***	– 0.001	(– 1.13)
CEO_DUL	0.023	(0.66)	– 0.028	(– 0.78)	0.003	(0.35)	0.004	(0.35)
CEO_AGE	0.000	(0.18)	– 0.004	(– 2.12)**	0.000	(0.13)	– 0.002	(– 2.46)**
CEO_TEN	– 0.003	(– 1.34)	0.002	(0.62)	0.002	(3.15)***	– 0.002	(– 2.91)***
SALE	– 0.025	(– 1.84)*	0.021	(1.68)*	– 0.053	(– 17.64)***	0.046	(11.29)***
BM	0.002	(0.04)	– 0.103	(– 1.45)	0.073	(4.7)***	– 0.103	(– 5.5)***
ROA	0.226	(1.57)	– 0.403	(– 2.32)**	0.305	(4.25)***	– 0.394	(– 4.79)***
TOBINQ	– 0.040	(– 5.06)***	0.036	(2.77)***	– 0.010	(– 1.9)*	0.011	(1.39)
LEV	– 0.087	(– 1.09)	0.070	(0.83)	– 0.024	(– 1.06)	– 0.040	(– 1.34)
LIQ	0.003	(0.34)	0.008	(0.88)	– 0.005	(– 1.98)**	0.013	(4.05)***
FAGE	0.032	(2.03)**	– 0.040	(– 2.41)**	0.027	(6.29)***	– 0.040	(– 6.66)***
BETA	– 0.007	(– 0.51)	– 0.001	(– 0.04)	– 0.002	(– 0.37)	0.000	(– 0.07)
RET	0.042	(1.04)	– 0.048	(– 1.23)	– 0.046	(– 3.75)***	– 0.022	(– 1.32)
LAGRET	– 0.027	(– 0.85)	– 0.018	(– 0.58)	– 0.009	(– 0.82)	0.001	(0.06)
STDRET	– 0.083	(– 1.68)*	0.041	(0.79)	– 0.011	(– 0.59)	0.032	(1.42)
VEGA_RESIDUAL	– 0.060	(– 2.6)***	0.047	(2.01)**	– 0.009	(– 3.04)***	0.005	(2.37)**
Year-fixed effects	Yes		Yes		Yes		Yes	
Industry-fixed effects	Yes		Yes		Yes		Yes	
N	445		434		2891		2819	
R <sup>2</sup>	0.181		0.201		0.262		0.158	

When we run the regressions for the pre-SOX period, the coefficient on the total CSR score is positive with the dependent variable of the proportion of cash-based compensation, which differs from the main results in Table 5. On the contrary, our previous results are robust in the post-SOX period, especially the positive association between CSR and the proportion of equity-based compensation, and the magnitudes of the coefficients are almost identical to those in Table 5.

Panel B reports regression results for the pre-SFAS and post-SFAS periods. The signs of the coefficients on total CSR score are consistent with our findings for the pre-SFAS period, but they are not statistically significant. Meanwhile, during the post-SFAS period, the coefficient on

CSR is significantly positive with the dependent variable of equity-based compensation, and its magnitude is similar to that in Table 5. It shows that our main results come from the post-SFAS period. Given the previous finding of decreases in stock options after the passage of SFAS 123R, our finding of an increase in the proportion of equity-based compensation during the post-SFAS period suggests that the association between CSR and CEO compensation structure is strongly robust to changes in accounting policies.

Overall, we find in this section that our results are mainly driven by the post-SOX and post-SFAS periods. The results imply that regulatory changes play a crucial role in reinforcing the association between CSR

**Table 10**

Two-stage least squares regressions (2SLS). This table reports results of the 2SLS regressions with an instrumental variable. In the first stage, we obtain the fitted value of firm-level CSR (*IVCSR*) from the regression of the total CSR score on the industry median of CSR scores. In the second-stage regression, we regress the proportions of cash- and equity-based compensation on the estimated value of the CSR score from the first-stage regression with year-fixed effects. The independent variables are described in Appendix B. Standard errors are clustered by year and industry, and *t*-statistics are reported in parentheses. \*\*\*\*, \*\*\*, and \*\* represent significance at 1%, 5%, and 10% levels, respectively.

	(1) PCASH		(2) PEQUITY	
	Estimate	<i>t</i> -stat	Estimate	<i>t</i> -stat
Intercept	0.854	(12.47)***	0.406	(5.1)***
IVCSR	-0.001	(-0.23)	0.004	(0.82)
BSIZE	-0.025	(-1.41)	-0.003	(-0.14)
PIND	-0.254	(-8.95)***	0.245	(7.38)***
CEO_OWN	0.003	(4.76)***	-0.002	(-3.2)***
CEO_DUL	0.001	(0.14)	0.013	(1.19)
CEO_AGE	0.000	(0.65)	-0.002	(-3.63)***
CEO_TEN	0.001	(1.89)*	-0.002	(-2.28)**
SALE	-0.053	(-17.1)***	0.046	(12.81)***
BM	0.079	(5.21)***	-0.118	(-6.68)***
ROA	0.310	(5.79)***	-0.402	(-6.46)***
TOBINQ	-0.020	(-5.02)***	0.020	(4.34)***
LEV	-0.021	(-0.92)	-0.041	(-1.56)
LIQ	-0.006	(-2.69)***	0.014	(5.54)***
FAGE	0.030	(6.07)***	-0.042	(-7.27)***
BETA	-0.007	(-1.91)*	0.007	(1.51)
RET	-0.024	(-2.05)**	-0.032	(-2.34)**
LAGRET	-0.009	(-0.81)	-0.023	(-1.84)*
STDRET	-0.018	(-1.09)	0.038	(2.02)**
VEGA_RESIDUAL	-0.009	(-5.7)***	0.006	(3.38)***
Year-fixed effects	Yes		Yes	
Industry-fixed effects	Yes		Yes	
N	3560		3474	
R <sup>2</sup>	0.295		0.161	

performance and CEO compensation structure. With respect to the introduction of SFAS 123R, we find that our results are strongly robust to policy changes related to CEO compensation components.

#### 5.4. Two-stage least square (2SLS) model

We explore the association between CSR and CEO compensation after controlling for other firm characteristic and corporate governance variables used in prior studies. Regardless, the problem of omitted variables may still arise. In this section, we address this concern using a 2SLS approach with an instrumental variable (IV).

Following Cai et al. (2011), we use the industry median of CSR

#### Appendix A. CSR variables

Variables	Strengths	Concerns
Qualitative issue areas		
Community	Charitable giving, innovative giving, non-US charitable giving, support for housing, support for education, indigenous peoples relations, volunteer programs, and other strength	Investment controversies, negative economic impact, indigenous peoples relations, tax disputes, and other concern
Corporate governance	Limited compensation, ownership strength, transparency strength, political accountability strength, and other strength	High compensation, ownership concern, accounting concern, transparency concern, political accountability concern, and other concern
Diversity	CEO, promotion, board of directors, work/life benefits, women & minority contracting, employment of the disabled, gay & lesbian policies, and other strength	Controversies, non-representation, and other concern

<sup>14</sup> As Cai et al., 2011 point out, the industry-median CSR is one of the IVs that meet both conditions for instrument relevance and exogeneity in our setting.

<sup>15</sup> When we ran the regression with a larger sample of 7795 observations excluding Core & Guay's, 1999 incentive residuals (VEGA\_RESID), the regression coefficients on CSR are consistent with those in Table 5, and the results are even stronger in terms of magnitude. Given this, we presume that insignificant results might be attributable to the small sample size.

scores as an IV.<sup>14</sup> We first estimate firm-level CSR scores from the regression of total CSR score on the industry-median. In the second stage, we run regressions of compensation measures on the estimated value of firm-level CSR (IVCSR). For the 2SLS regressions, we use the same control variables shown in Table 5.

Table 10 reports the 2SLS regression results. The signs of the regression coefficients on CSR are consistent with those reported in Table 5. However, they are not statistically significant.<sup>15</sup>

#### 6. Summary and conclusion

We investigate how a firm's CSR activity is associated with the structure of CEO compensation. We find that socially responsible firms tend to have a relatively high proportion of equity-based compensation and a relatively low proportion of cash-based compensation. These results support that CEOs engage in CSR as a business activity to improve their relationships with other stakeholders and maximize firm value. At the same time, this evidence refutes CEOs' rent-seeking behavior through overinvestment in CSR.

We also find that the positive (negative) association between CSR and the proportion of equity-based (cash-based) compensation is robust to the degree of corporate governance and more pronounced in firms with weak corporate governance, such as higher levels of inside director ownership, longer director tenure, and a lower proportion of independent board members. In addition, a firm's high CSR performance reinforces the positive impact of the proportion of equity-based compensation on firm value. These results confirm CEOs' intention of engaging in CSR as a business activity that improves firm value.

The results are also more pronounced in certain CSR categories. The negative association between CSR performance and the proportion of cash-based compensation is more pronounced in environment, while the positive association between CSR performance and the proportion of equity-based compensation is more pronounced in environment and employee relations. Our analysis on regulatory changes shows that the results are mainly driven by the post-SOX and post-SFAS periods.

Overall, the results suggest that firms' social performance is associated with a more efficient CEO compensation structure that induces CEOs to maximize firm values in the long run. Given the fact that CEOs formulate and implement firms' CSR policies, our results offer important insights into how and to what extent they determine firms' engagement in CSR activities. Furthermore, our findings provide further implications on how a firm's CSR performance is associated with the profiles of CEOs and how CEOs perceive their role in firms' CSR activities.

Employee relations	Union relations, no-layoff policy, cash profit sharing, employee involvement, retirement benefits strength, health and safety strength, and other strength	Union relations, health and safety, workforce reductions, retirement benefits concern, and other concern
Environment	Beneficial products and services, pollution prevention, recycling, clean energy, communications, property/plant/equipment, management systems, and other strength	Hazardous waste, regulatory problems, ozone depleting chemicals, substantial emissions, agricultural chemicals, climate change, and other concern
Human rights	Positive record in South Africa, indigenous peoples relations strength, labor rights strength, and other strength	South Africa, Northern Ireland, Burma concern, Mexico, labor rights concern, indigenous peoples relations concern, and other concern
Product	Quality, R&D/Innovation, Benefits to economically disadvantaged, and other strength	Product safety, marketing/contracting concern, antitrust, and other concern
Controversial business issues		
Alcohol	Licensing, manufacturers, manufacturers of products necessary for production of alcoholic beverages, retailers, ownership by an alcohol company, ownership of an alcohol company, and alcohol other concern	
Gambling	Licensing, manufacturers, owners and operators, supporting products or services, ownership by a gambling company, ownership of a gambling company, and gambling other concern	
Tobacco	Licensing, manufacturers, manufacturers of products necessary for production of tobacco, retailers, ownership by a tobacco company, ownership of a tobacco company, and tobacco other concern	
Firearms	Manufacturers, retailers, ownership by a firearms company, and ownership of a firearms company	
Military	Manufacturers of weapons or weapons systems, manufacturers of components for weapons or weapons systems, ownership by a military company, ownership of a military company, minor weapons contracting involvement, major weapons-related supplier, and military other concern	
Nuclear power	Construction & design of nuclear power plants, nuclear power fuel and key parts, nuclear power service provider, ownership of nuclear power plants, ownership by a nuclear power company, design, fuel cycle/key parts, and nuclear power other concern	

## Appendix B. Variable definitions

Variables	Definitions	Source
CSR variables		
TCSR	The sum of net CSR scores in six categories (community, environment, diversity, employee relations, human rights, and product). The net CSR scores are calculated as the total number of strengths minus the total number of concerns in each category.	KLD STATS
CSR_S	Total number of strengths in the six CSR categories	
CSR_C	Total number of concerns in the six CSR categories	
COMM	Net community CSR scores	
DIV	Net diversity CSR scores	
ENV	Net environment CSR scores	
ER	Net employee relations CSR scores	
HR	Net human rights CSR scores	
PROD	Net product CSR scores	
Compensation and CEO-specific variables		
TCOMP	The sum of salary, bonus, total value of restricted stocks and stock options granted during the fiscal year, long-term incentive payouts, and all other compensation	EXECUCOMP
CASH	The sum of salary and bonus	
EQUITY	The sum of the value of restricted stocks and the Black-Scholes value of stock options granted during the fiscal year <sup>a</sup>	
PCASH	The proportion of cash-based compensation to total compensation	
PEQUITY	The proportion of equity-based compensation to total compensation	
BSIZE	The logarithm of total number of directors on the board of directors	RISKMETRICS
CEO_AGE	CEO age	EXECUCOMP
CEO_DUL	CEO duality, which is 1 if a CEO is a chairman of the board of directors, 0 otherwise	EXECUCOMP
CEO_OWN	The number of shares owned by CEOs scaled by the total number of shares outstanding	EXECUCOMP
CEO_TEN	CEO tenure measured by the number of years the CEO has held the current position	EXECUCOMP
PIND	Ratio of independent directors on board	RISKMETRICS
IDOWNER	The number of shares owned by inside directors scaled by the total number of shares outstanding	RISKMETRICS
DTENURE	Director tenure measured by the number of years for which directors have served in the board	RISKMETRICS
CGVAR_W	A dummy variable indicating weak corporate governance. This is proxied by high inside director ownership, high director tenure, and a low ratio of independent directors.	
CGVAR_S	A dummy variable indicating strong corporate governance. This is proxied by low inside director ownership, low director tenure, and a high ratio of independent directors.	CGVAR_S

## Firm-specific variables

BETA	Market beta obtained from the regression of a firms' excess returns on the CRSP value-weighted index	CRSP
BM	Total book value of equity divided by total market value of equity (total number of shares outstanding multiplied by stock price at the end of the fiscal year)	COMPUSTAT
CAPEX	The ratio of capital expenditure to total assets	COMPUSTAT
FAGE	The logarithm of the number of years the firm has been listed on CRSP	COMPUSTAT
LAGRET	Lagged value of the aggregated return	CRSP
LEV	Total debt divided by total assets	COMPUSTAT
LIQ	Current assets over current liabilities	COMPUSTAT
OPPROF	The ratio of operating income before depreciation to total assets	COMPUSTAT
RET	Aggregated return for 12 months	CRSP
ROA	Operating income before depreciation divided by book value of assets	COMPUSTAT
SALE	The logarithm of sales	COMPUSTAT
STDRET	Standard deviation of aggregated returns over 5 years	CRSP
TOBINQ	Market value of assets (book value of assets + market value of common stock - book value of common stock + deferred taxes) over book value of assets	COMPUSTAT
VEGA_RESID	Residuals from the Core and Guay model (1999) for levels of CEOs' equity incentives	

<sup>a</sup> It is calculated as the sum of OPTION\_AWARDS\_BLK\_VALUE and RSTKGRNT before the introduction of SFAS123R in 2006 and the sum of OPTION\_AWARDS\_FV and STOCK\_AWARDS\_FV after 2006.

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