The information value of corporate social responsibility

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Abstract

Using a simple cheap-talk game, we theoretically demonstrate that corporate social responsibility (CSR) helps mitigate the CEO-board information asymmetry, leading to more informed advising and monitoring by the board. By optimally engaging in CSR, the board can take advantage of stakeholder information revelation and reduce its informational dependence on the CEO, which enables the shareholders to choose an ex ante higher level of board independence. For a sample of U.S. firms between 1999 and 2013, we find strong support for this strategic complementarity between board independence and the information value of CSR. Our results highlight a novel rationale for CSR – the information motive.

Keywords: Corporate social responsibility, stakeholder information revelation, cheap-talk game, endogenous information acquisition

JEL Classification: D8, G3, M14

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I. Introduction

A significant portion of the U.S. corporate expense budget is allocated to corporate social responsibility (CSR) spending; Fortune 500 companies spend more than $15 billion per year on their CSR activities (Financial Times, October 12, 2014). Given its importance, there has been a long-standing debate on the desirability of CSR spending from shareholders' perspective. Several recent studies posit that CSR creates shareholder value through maximizing stakeholder value, a result known as "doing well by doing good" (Edmans, 2011; Deng, Kang, and Low, 2013; Flammer, 2013; Ferrell, Liang, and Renneboog, 2016). Proponents of this good governance view argue that firms whose managers are properly incentivized engage in appropriate level of CSR activities, with the benefits ultimately accrued to shareholders. In contrast, beginning with Milton Friedman's famous claim that "the only responsibility of corporations is to make profits (New York Times Magazine, 1970, p. 122)," the agency view of CSR claims that CSR is merely a manifestation of managerial and shareholder interest misalignment (e.g., Cheng, Hong, and Shue, 2016). The empirical evidence on these two opposing views is mixed, leaving this important question – what is the fundamental motive of CSR activities? – largely unresolved.[1]

While the two opposing views on CSR primarily focus on the managerial incentives that determine CSR activities, one important aspect of CSR that is relevant yet has been largely overlooked in the literature is the information value of CSR. CSR activities could alter a firm's information environment and consequently affect the board's decision-making. Given the dual role of a board as an advisor and a monitor of management, stakeholders could reveal valuable private information to the board, particularly to its outside directors who are lacking in relevant firm-specific information. In the absence of stakeholders, these outside directors are largely dependent on the information from the CEO and other key corporate insiders in order to make valuable advice to the management (Raheja, 2005). When too much board independence hinders effective communication between the CEO and outside independent directors (Adams and Ferreira, 2007), firm-specific information in the hands of

[1] Edmans (2011) and Flammer (2013) find that firms that manage their employee relations or environmental issues well are also viewed favorably by the stock market, whereas Cheng, Hong, and Shue (2016) show that, to a certain extent, CSR spending appears to be agency-driven using the 2003 Dividend Tax Cut as a natural experiment. Krüger (2015) also finds a mixed stock market reaction to CSR news, while Ferrell, Liang, and Renneboog (2016) find evidence in support for the good governance view of CSR.

stakeholders could provide a valuable second opinion to the outside board members, facilitating their informed advising on the top management team.

A case in point on this information value of CSR is the corporate responsibility committee within Nike's board of directors who drove a series of CSR agenda with active communications with the firm's stakeholders (Paine, 2014).[2] Jill Ker Conway, an independent director at Nike, institutionalized a CSR drive by setting up a board-level corporate responsibility committee in 2001. Through this board-level initiative, with four out of five members consisting of independent directors, the full Nike's board members gained in-depth knowledge of the firm's production process and could provide "informed advising" on its ongoing innovation efforts. The committee, for example, initiated contract factory studies to foster improvement in labor conditions and by engaging with employees in an 18-month coordinated initiative for a strategic planning, was able to identify root causes of Nike's excessive overtime problem. With a need for innovative ways to deal with making the manufacturing process itself safer and more sustainable, the committee encouraged management to invest in a Dutch start-up that offered a waterless process for dyeing polyester that would improve both the product quality and be more environment-friendly. According to Nike's executives, such "board-level discussions of labor issues in the supply chain gained traction only after the corporate responsibility committee was formed, [… and the committee's regular reports elevated] the entire board's level of understanding and ensure that critical issues receive the scrutiny they require (Paine, 2014, p. 94)."[3]

The information benefit of CSR does not merely consist of direct information revelation by the stakeholders. There could also be an indirect benefit of CSR in enhancing a firm's external information environment. For instance, there is growing evidence that firms' voluntary CSR activity disclosure reduces analyst forecasting errors and attracts more dedicated institutional investors (Dhaliwal, Li, Tsang, and Yang, 2011; Dhaliwal, Radhakrishnan, Tsang, and Yang, 2012). Moreover, firms' decisionmakers do appear to be aware of the role CSR plays in improving their external information environment; according to McKinsey's (2009) global survey of CFOs and CSR professionals, compliance and transparency are identified as the two most important pillars of various CSR programs. Thus, either directly and/or indirectly, a firm's CSR activities have the potential to significantly alleviate the

[2] For a detailed summary of Paine's (2014) case study, refer to Appendix B.

[3] See also Libit (2013) who identifies "enabling informed board and management decision making" as the primary benefit of effective stakeholder engagement through appropriate CSR activities and reporting.

board's information asymmetry (Duchin, Matsusaka, and Ozbas, 2010), enabling the board to provide more informed advising and monitoring to the firm's management.

If firms are aware of these information benefits, we expect the firms to be more willing to expend resources on CSR activities when its information environment is opaque so that the marginal information value of CSR is heightened. In accordance with this expectation, top 10 most socially reputable companies in the world on Reputation Institute's 2017 Global CSR RepTrak® 100 list consist of high tech firms such as Microsoft, Google, Intel, and Cisco Systems, where the intangible nature of human capital increases the opacity of information, and firms producing consumer "experience goods" (McWilliams and Siegel, 2001) such as LEGO and The Walt Disney Company, where it is difficult to predict in advance how customers would react to a new product. This additional evidence further corroborates a potentially close association between firms' information environment and their willingness to engage in CSR activities. Yet, whereas the strategic nature of CSR has been well discussed in the literature (Freeman, 1984), particularly with respect to a firm's need to manage a complex web of implicit contracts (Jensen and Meckling, 1976), these information benefits of CSR have not hitherto been singled out for analysis in the literature.[4] We fill the void in this paper.

We start out our analysis by modeling a cheap-talk communication game between the CEO and the board (Adams and Ferreira, 2007), where we explicitly introduce a possibility that the board could endogenously acquire costly firm-specific information from stakeholders by engaging in CSR activities.[5] Consistent with the key intuition in Adams and Ferreira (2007), the board's access to the CEO's private information enhances both its advising and monitoring qualities. Informed advising by the board benefits both parties by reducing the uncertainty about the project outcome. However, it becomes more difficult to achieve when the CEO derives strong private benefit from controlling the project; a self-entrenched CEO is unwilling to share valuable private information as she believes this would also lead to a loss of control through increased monitoring by the board. Thus, shareholders face a trade-off between firm-specific information and monitoring intensity, and when the degree of information asymmetry between the board and the CEO is sufficiently high, the shareholders have no other option but to appease the CEO and sacrifice monitoring.

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[4] While a number of studies address the issue of firm complexity and board structure (e.g., Boone, Field, Karpoff, and Raheja, 2007; Coles, David, and Naveen, 2008; Linck, Netter, and Yang, 2008), the information value of CSR is not explicitly addressed in these studies.

[5] For a similar communication game with the option of endogenous information acquisition, see Di Pei (2015) among others.

However, by endogenously engaging in CSR activities and inducing stakeholders to reveal their valuable firm-specific information, if any, the board can achieve both informed advising and tight monitoring of management without sacrificing their functional efficiency. We derive such equilibrium decision to engage in CSR as an optimal response by the board who aims to enhance its knowledge of firm-specific information and endogenously shake off its informational dependence on the CEO. In opaque information environment, shareholders are able to increase board independence *because* they correctly anticipate that the firm's information environment would be enhanced as a result of CSR activities. In more transparent environment, the board may still opt for CSR to intensify its monitoring, but this action has a less pronounced effect on board independence because the board is less informationally dependent on the CEO in the first place. The informational value of CSR is also larger when the CEO derives a large private benefit from project control. Thus, CSR in the context of our model ought to be perceived as a potential remedy for internal agency problems rather than simply being a symptom of the managerial agency.

Based on these intuitions, our model predicts a strategic complementarity between board independence and CSR activities, which would be stronger when a firm's information environment is opaque. As direct corollaries to this key hypothesis, our model also predicts the monitoring intensity of a board in equilibrium; the direct effect of CSR on the board's monitoring intensity would be stronger among low information cost firms, whereas the joint effect of CSR and board independence on monitoring intensity would be more pronounced among high information cost firms.

We test these predictions using data on the U.S. firms from 1999 to 2013. Using the standard data sources widely used in the literature, we collect the comprehensive information on firm financials (Compustat/CRSP), board and CEO characteristics (BoardEx and Execucomp), the degree of a firm's information asymmetry (Thomson Reuters IBES), and CSR activity scores (MSCI ESG KLD STATS). Using segment- and analyst-forecast-based measures of a firm's information environment, we find that the joint effect of board independence and information cost on a firm's level of CSR activities is positive, with strong statistical significance across all information cost measures. Whereas the positive association between board independence and CSR has been documented in a number of studies (e.g., Harjoto and Jo, 2011; Ferrell, Liang, and Renneboog, 2016), our study is the first to highlight that this relationship is strongly influenced by a firm's information environment, with board independence exerting a stronger effect on the level of CSR activities as the information cost increases. Moreover, the joint effect of board independence and information cost is stronger among CSR sub-categories

that specific, targeted groups of stakeholders are likely to view as important, such as community, diversity, and environmental issues, rather than those that are aimed at enhancing the overall corporate image, such as human rights and product-related activities.

Furthermore, our model predicts that, while the strategic complementarity properties of board independence and CSR would be stronger in high information cost environment, CSR would directly lead to increased monitoring in low information cost environment. Consistent with this prediction, we find that the direct effect of CSR on attenuating CEO pay and increasing the likelihood of forced CEO turnovers is stronger among firms with transparent information environment. In contrast, the joint effect of board independence and CSR on monitoring, as proxied by CEO pay and turnover likelihood, is stronger when firms operate in high information cost environment. The fact that the interaction of CSR and board independence has a differential effect on the intensity of monitoring according to a firm's information environment is a novel finding, further suggesting the importance of information motives of CSR from shareholders' perspective.

Our key empirical finding, namely a stronger strategic complementarity between board independence and CSR activities among firms operating in high information cost environment, is robust to controlling for firm fixed effect as well as the instrumental variable of Knyazeva, Knyazeva, and Masulis (2013), suggesting that the result is unlikely to be driven by unobserved heterogeneity at the firm level or simultaneity-induced endogeneity. We also discuss the robustness of our findings – both theoretically and empirically – to a concern about powerful CEOs who instead make CSR investment decisions rather than outside board members. Our results strongly hold even after considering these possibilities.

To the best of our knowledge, we are the first to introduce the notion of strategic complementarity between board independence and the information value of CSR. We emphasize the information value of CSR through its link to the dual role of a board, namely, a board as an informed advisor and a monitor of management. We show that in equilibrium, the marginal information value of CSR is highest among firms that suffer most from self-entrenched CEOs who are unwilling to share valuable private information to highly independent board members for agency reasons. Our notion of the informationally-motivated CSR endogenously arises under such circumstances as an optimal remedy to the significant agency problems. In this regard, our theory complements and extends the two popular narratives of CSR in the literature: the good and bad governance views of CSR.

Our paper is organized as follows. Section II provides our theoretical model and derives key testable predictions. Section III describes our data, and Section IV presents our main empirical results. Section V concludes our study.

II. The model

A. Basic setup

We consider a simple two-player game with dates $t = 0, 1, 2, 3$. The firm is established at date 0, and the shareholders appoint the CEO and the board, with the latter's level of independence given by $I \in [0, 1]$. At date 1, with probability $c \in [0, 1]$, only the CEO learns about the realization of some information $\theta \sim U[-\infty, \infty]$. With probability $1 - c$, both the CEO and the board become informed. With probability c, only the CEO is informed about θ.

When the board does not learn θ on its own merit, it first consults the CEO, who has the option to reveal the information to the board. If the CEO reveals the information on θ to the board, the board does not approach the stakeholders. If the CEO refuses to reveal θ, then the board may consult the stakeholders, who knows θ with some probability $d \in [0, 1]$.[6] c and d are independent of each other. This implies that the board has the decision-making power over the firm's CSR initiative.[7] Before the board approaches the stakeholders, however, it must first make CSR expenditure amounting to R. Then, the stakeholders reveal θ when they have the correct knowledge. We stress that, even

[6] We do not explicitly assume how information is distributed among the stakeholders, although it would be natural to motivate our model in an environment where each stakeholder holds fragments of potentially value-relevant information. Then, any compensation ought to take the form of payments to the overall group as the board must gather the information of all potentially relevant stakeholders to piece them together and uncover firm-specific information. After all, it is unlikely that a single person outside the boardroom has the entire knowledge about the firm's project that the board itself is unaware of. Thus, d may best be thought of as the probability of stakeholders' information *collectively* providing the board with accurate overall picture.

[7] However, in the presence of an agency problem, the CEO may wish to disable this additional channel of information arising from stakeholder consultation, particularly when the board's information acquisition results in tighter monitoring that goes against her agency intention. In Appendix C, we consider an extension of our model, where the CEO puts forward an informationally meaningless rival CSR proposal and fights against the board for the control of the CSR agenda. Allowing for this possibility weakens the information value of CSR, but its existence remains qualitatively unaffected as long as the board controls the CSR agenda with some positive probability. In Section IV.D, we further show that our results are empirically robust to this concern, and that our results are consistent with these predictions of our extended model.

though we focus on the case of direct stakeholder information revelation, the model's intuitions remain unchanged as long as CSR reduces the extent of CEO-board information asymmetry, either directly or indirectly.

In the baseline model, we do not directly specify the stakeholders' optimization problem for ease of exposition. This raises a natural question regarding stakeholders' preference, i.e., why they demand required CSR expenditure of R to reveal θ to the board; it may be in the stakeholders' own interest to reveal their information even in the absence of the board's CSR activities. However, as long as the stakeholders' preference is reasonably biased relative to the shareholders', in the same direction as the CEO's bias, the basic set up of our model is well-justified. We demonstrate this point in Appendix D.[8]

Under our set-up, the board's payment to the stakeholders, i.e., R, needs not be explicitly in the form of CSR spending; we do not rule out any alternative form of spending that could have an impact on the stakeholders' information revelation constraint. In this respect, R may be thought of as a catch-all parameter that incorporates all forms of payments to stakeholders, both including and excluding the conventional definition of CSR spending. In doing so, we deliberately abstract ourselves from the delicate issue of defining exactly what constitutes CSR. However, as long as a firm's CSR activities have a material impact on the stakeholders' information revelation constraint, which we assume to be the case under a reasonable set-up, the rationale for informationally-motivated CSR is fully nested within the confines of our model.

At date 2, the board then engages in its own signal gathering. If the board knows θ, it can uncover firm-specific signal ε with certainty. If the board only knows the prior distribution of θ, then $\varepsilon \sim U[0,\ 1]$. Following the board's learning process about ε, it also chooses the monitoring intensity $\pi \in [0,\ 1]$. This monitoring intensity determines who gets the control of the project at date 3. Specifically, the board has the control with probability π, while the CEO controls the project with probability $1 - \pi$. For the latter case, the board sends a message to the CEO about its knowledge about the firm-specific signal ε, denoted a (i.e., the board's *advice* to the CEO). The project action at date 3 is denoted y. Thus, the set-up of the model is similar to Adams and Ferreira (2007) except for the

[8] When stakeholders' preference is similar to the shareholders', stakeholders may merely serve to reduce the extent of CEO-board information asymmetry with no interesting interaction between board independence and CSR. In such circumstances, our model may be thought of as revealing potential governance benefits of the stakeholders even when their interests diverge from those of the shareholders.

added option of stakeholder consultation from the board's perspective; required CSR spending, R, may thus be thought of as the "price" of stakeholder information. With the subscripts s, c, and b denoting shareholders, CEO, and the board, respectively, their utility functions are:

$$U_s = -(y-\varepsilon)^2 - \omega R, \text{ where } \omega = 1 \text{ if the board engages in CSR and 0 otherwise,} \quad (1)$$

$$U_c = -(y-\varepsilon+g)^2 + \chi b, \text{ with } g, b > 0, \text{ and } \chi = 1 \text{ if the CEO retains control but 0 otherwise,} \quad (2)$$

$$U_b = -(y-\varepsilon)^2 - \omega R - \frac{\pi^2}{2I}. \quad (3)$$

Here, g denotes the CEO's bias relative to shareholders' preference, while b captures her private benefit from retaining control. Finally, the board's preferences are such that the cost of monitoring is smaller as the level of independence increases, captured by the last term of U_b.

B. Project action at $t = 3$

Under this set-up, Adams and Ferreira (2007) demonstrate that, when the board learns ε but control of the project is assigned to the CEO, then there exists a Bayesian Nash equilibrium in this advising game. Specifically, for $N+1$ real numbers ordered by $0 = a_0 < a_1 < \cdots < a_n = 1$, (a) the conditional probability distribution function of the board's message a upon its observing ε, denoted $q(a|\varepsilon)$, is uniform on support $[a_i,\ a_{i+1}]$ whenever $\varepsilon \in (a_i,\ a_{i+1})$, and (b) the CEO's action given a, $y_c(a)$, is $\frac{a_{i+1}-a_i}{2} - g$ for all $a \in (a_i,\ a_{i+1})$. This is the familiar cheap talk partitioning equilibrium of Crawford and Sobel (1982), who also show that, in the most informative equilibrium, N is the smallest integer that satisfies $N \geq \widetilde{N} \equiv -\frac{1}{2} + \frac{1}{2}\sqrt{1+\frac{2}{g}}$, and the CEO's residual variance of ε is $\sigma_\varepsilon^2 = \frac{1}{12N^2} + \frac{g^2(N^2-1)}{3}$. If the board controls the project, it chooses $y_b = \varepsilon$.

When the board does not know θ, it chooses $y_b = \frac{1}{2}$ when they control the project, while the CEO chooses $y_c = \frac{1}{2} - g$ when she has the control. The residual variance of ε is at its maximum at $\sigma_M^2 = \frac{1}{12}$. Let $\sigma_\varepsilon^2 < \sigma_M^2$ to generate a tension between the board's advising and monitoring roles.

C. Board's monitoring intensity decision at $t = 2$

The board's choice of monitoring intensity is solely dependent on whether it has knowledge of θ or not, regardless of who supplies it. This turns out to be identical to the case in Adams and Ferreira

(2007); if we denote the board's information set as $i \in \{\theta,\ \emptyset\}$, its choice of the monitoring intensity, holding the shareholders' choice of board independence as given, is:

$$\pi(i = \theta; I) = I(\sigma_\varepsilon^2 + g^2), \tag{4}$$

$$\pi(i = \emptyset; I) = Ig^2. \tag{5}$$

Thus, an informed board chooses higher intensity of monitoring.

D. Board's decision to engage in CSR at $t = 1$

We now examine the board's incentive to engage in CSR activities, which only arises when the CEO does not reveal θ. Assuming we have reached this stage, the board's expected utility conditional on its information set is given by:

$$EU_b(i = \theta; I; \omega = 1) = -\big(1 - \pi(i = \theta; I)\big)(\sigma_\varepsilon^2 + g^2) - R - \tfrac{\pi(i=\theta;I)^2}{2I}, \tag{6}$$

$$EU_b(i = \emptyset; I; \omega = 1) = -\pi(i = \emptyset; I)\sigma_M^2 - \big(1 - \pi(i = \emptyset; I)\big)(\sigma_M^2 + g^2) - R - \tfrac{\pi(i=\emptyset;I)^2}{2I}, \tag{7}$$

$$EU_b(i = \emptyset; I; \omega = 0) = -\pi(i = \emptyset; I)\sigma_M^2 - \big(1 - \pi(i = \emptyset; I)\big)(\sigma_M^2 + g^2) - \tfrac{\pi(i=\emptyset;I)^2}{2I}. \tag{8}$$

Notice that whether the stakeholders also reveal θ to the CEO or not is irrelevant, as the valuable advice a to the CEO is only available from the board who has such expertise. This becomes:

$$EU_b(i = \theta; I; \omega = 1) = -(\sigma_\varepsilon^2 + g^2)\left(1 - \tfrac{I}{2}(\sigma_\varepsilon^2 + g^2)\right) - R, \tag{9}$$

$$EU_b(i = \emptyset; I; \omega = 1) = -(\sigma_M^2 + g^2) + \tfrac{Ig^4}{2} - R, \tag{10}$$

$$EU_b(i = \emptyset; I; \omega = 0) = -(\sigma_M^2 + g^2) + \tfrac{Ig^4}{2}. \tag{11}$$

The board strictly prefers to engage in CSR if and only if:

$$dEU_b(i = \theta; I; \omega = 1) + (1 - d)EU_b(i = \emptyset; I; \omega = 1) > EU_b(i = \emptyset; I; \omega = 0). \tag{12}$$

This may be rearranged as:

$$R \le d\left(\sigma_M^2 - \sigma_\varepsilon^2 + \tfrac{I}{2}\sigma_\varepsilon^2(\sigma_\varepsilon^2 + g^2)\right) \equiv \bar{R} \tag{13}$$

The right hand side denotes the maximum CSR expenditure that the board is willing to pay. Notice that this value increases in I, because the main benefit of CSR from the board's perspective lies in its subsequent ability to choose higher monitoring intensity, and this difference in intensity, $\pi(i = \theta; I) - \pi(i = \emptyset; I) = I\sigma_\varepsilon^2$, increases in the level of board independence.

E. CEO's decision to share information at $t = 1$

When the CEO decides whether to share θ to the board, it must form an expectation about whether the board would engage in CSR activities upon her refusal. However, this is irrelevant, because:

$$\begin{aligned} &EU_c(i = \theta; I) \geq dEU_c(i = \theta; I) + (1 - d)EU_c(i = \emptyset; I) \\ &\Rightarrow EU_c(i = \theta; I) \geq EU_c(i = \emptyset; I), \end{aligned} \tag{14}$$

where $EU_c(i = \theta; I)$ denotes the expected utility of the CEO if the board is informed about θ; if the board is uninformed about θ, it is denoted $EU_c(i = \emptyset; I)$.

Importantly, Equation (14) indicates that the CEO's information revelation constraint remains the same regardless of the board's subsequent CSR choice. Her decision is identical to the baseline case without stakeholders in Adams and Ferreira (2007), with the CEO revealing θ whenever $I \leq I'$, with $I' \equiv \frac{\sigma_M^2 - \sigma_\varepsilon^2}{\sigma_\varepsilon^2\{b - \sigma_\varepsilon^2\}}$ if $\sigma_\varepsilon^2 < b$ and $I' \equiv 1$ if $\sigma_\varepsilon^2 \geq b$.

F. Shareholders' board independence choice at $t = 0$

In this section, we discuss the central result of this paper, specifically the shareholders' choice of board independence when they have an additional option to extract firm-specific information from the stakeholders by engaging in CSR activities. First, Proposition 1 states that the shareholders have no incentive to push for CSR whenever the first best is attainable:

Proposition 1 (no CSR under the first best case). If $b \leq \frac{\sigma_M^2 + \sigma_\varepsilon^2(\sigma_\varepsilon^2 - 1)}{\sigma_\varepsilon^2} \equiv b^f$, CSR does not occur.

Proof. When $b \leq \sigma_\varepsilon^2$, the CEO always reveals θ regardless of the chosen level of independence, so the game will never reach the stage where the board makes its choice over CSR. On the other hand, if $b > \sigma_\varepsilon^2$, the board must satisfy the CEO's information revelation constraint, i.e., $I \leq I'$,

with $I' \equiv \frac{\sigma_M^2 - \sigma_\varepsilon^2}{\sigma_\varepsilon^2\{b - \sigma_\varepsilon^2\}}$, for the CEO to reveal the information. However, the first best is still attainable if $I' \geq 1$, which reduces to the inequality in Proposition 1.■

This is the first best scenario in Adams and Ferreira (2007). When the CEO's private benefit from retaining project control is sufficiently small, the CEO wishes to avoid the advising equilibrium in which the board partitions the information, and thus she willingly reveals her knowledge of θ. In this instance, the shareholders receive no benefit from stakeholder consultation. Of course, in practice, the firm is still likely to engage in CSR to some extent, but our model makes it clear that this CSR activity will not be informationally motivated.

In contrast, suppose Proposition 1 is not satisfied and the first best scenario of information revelation is not attainable, then there are two distinct equilibria under the baseline setting of Adams and Ferreira (2007) without stakeholders. First, when the degree of CEO-board information asymmetry is high (i.e., large c), or the degree of asymmetry is low and the CEO's private benefit is not too extreme, then the shareholders find it optimal to satisfy the CEO's information revelation constraint by choosing a level of board independence lower than the first best level, $I = I' < 1$, which leads to lower monitoring intensity. This is referred to as "induced revelation." Alternatively, when c is sufficiently small and b is sufficiently large so that appeasing the CEO through lower independence is too costly from the shareholders' perspective, then the shareholders instead choose the maximum level of independence, i.e., $I = 1$, and proceed without the CEO's information revelation.

Before we proceed with presenting our main result, Proposition 2 outlines two simple intermediate findings that aid the ease of exposition for the analyses that follow.

Proposition 2 (Intermediate results on the shareholders' CSR incentives).
(i) If the shareholders decide not to induce the CEO to reveal her information but rely instead on stakeholder consultation, they choose the maximum level of independence, $I = 1$, and the board engages in CSR whenever:

$$R \leq d\left(\sigma_M^2 - \sigma_\varepsilon^2 + \frac{\sigma_\varepsilon^2}{2}(\sigma_\varepsilon^2 + g^2)\right). \tag{15}$$

(ii) Whenever it is in the board's interest to engage in CSR, it is also in the shareholders' ex ante interest to do so.

Proof. See Appendix A.

Proposition 2 tells us that, even in the absence of CEO's information revelation, the board's ability to obtain firm-specific information through stakeholder consultation has the potential to alleviate the advising-monitoring trade-off to some extent, which in turn enables the shareholders to opt for the maximum level of independence. Using this result, we summarize the circumstances under which the shareholders find it optimal to engage in CSR activities:

Proposition 3 (Shareholders' CSR incentives). Suppose that (15) is satisfied. Then, stakeholder consultation and CSR occur in our model under one of the following two scenarios:
(i) (from no revelation to stakeholder-assisted revelation) when c is small but b is sufficiently large, the shareholders do not induce the CEO to reveal information in the absence of stakeholders. CSR occurs as long as (15) is satisfied, but the level of board independence remains unchanged. Ex ante expected monitoring intensity increases.
(ii) (from induced revelation to stakeholder-assisted revelation) when c is sufficiently large, or when c is small and b is within some intermediate range, shareholders engage in "induced revelation" in the absence of stakeholders. However, the shareholders switch to stakeholder-assisted revelation when d is sufficiently large, R is sufficiently small, and b is sufficiently large. Board independence increases and expected monitoring intensity also increases when b is sufficiently large.
Proof. See Appendix A.

Proposition 3 tells us that the shareholders engage in CSR under two distinct circumstances. First, suppose the shareholders are not overly concerned about the degree of information asymmetry between the CEO and the board. Then, when the CEO's private benefit is too high, the shareholders choose the maximum level of board independence and proceed without information revelation in the absence of stakeholders, because satisfying the CEO's information revelation constraint requires too much sacrifice of board independence. Stakeholder consultation, in this instance, is merely an additional source of information that enables more intensive monitoring; if the benefit of increased monitoring exceeds its cost, then it is in the shareholders' interest to do so.

However, as the information asymmetry increases, it can be shown that induced revelation becomes optimal for a larger range of the CEO's private benefit; in fact, when the asymmetry is too severe, the shareholders always relies on the CEO for information through lowering the level of independence in the absence of stakeholder consultation. Nevertheless, if the shareholders are convinced

that the board is incentivized to gather information from the stakeholders through CSR, they can ex ante choose a higher level of board independence, breaking off their informational dependence on the CEO. Thus, board independence and CSR expenditure are strategic complements in this high information cost environment. Put differently, even when the CEO holds informational advantage, the shareholders are willing to be more aggressive in setting the firm's corporate governance if they are confident that stakeholders have accurate firm-specific information and could be persuaded through reasonable levels of CSR expenditure.

In Figures 1 and 2, we illustrate how board independence and expected monitoring intensity change as the option of stakeholder consultation becomes available to the shareholders, assuming c is low enough to admit both the cases of "induced revelation" and "no revelation" in the absence of stakeholders.

[INSERT FIGURES 1 AND 2 HERE]

Our model yields some interesting testable predictions. First, strategic complementarity between board independence and CSR would only be observed when the shareholders switch from "induced revelation" to "stakeholder-assisted revelation." Given that the shareholders are more likely to induce the CEO to reveal her information in the first place when the firm suffers from a high degree of CEO-board information asymmetry, we have:

(H1) *A positive relationship between the level of board independence and a firm's CSR activities will be more evident among firms with high information cost.*

Moreover, our model predicts that the shareholders would engage in CSR activities to increase the intensity of monitoring. However, in low information cost environment, increased monitoring through CSR occurs without any effect on the firm's level of board independence. In contrast, when the degree of information asymmetry is sufficiently high, and assuming b is sufficiently large so that stakeholder consultation enables a higher level of monitoring intensity, the intensity of monitoring will be primarily determined by the *joint* effect of board independence and CSR expenditure, because of their strategic complementarity properties discussed earlier. Thus:

(H2) *The direct effect of CSR on the board's monitoring intensity will be stronger among the low information cost firms, but the joint effect of board independence and CSR will be stronger among the high information cost firms.*

Finally, Proposition 3 also tells us that the shareholders find it optimal to engage in CSR when the level of CEO's private benefit from control, i.e., b, is sufficiently large. After all, in the first best case where the CEO willingly reveals her firm-specific information, they have no incentive to engage in CSR activities out of informationally motivated reasons. Thus, it must be that:

(H3) *CSR expenditure will be higher among firms where the CEOs derive high private benefits from retaining corporate control.*

It is generally viewed that CEOs enjoying high private benefit from corporate control engage in more CSR activities out of various agency problems, with various perks and personal satisfaction that stem from being on good terms with the firm's internal and external stakeholders; in other words, CSR expenditure is seen as being symptomatic of greater agency issues within the firm. While this cannot be ruled out, our model suggests that CSR could instead be an optimal response by the board and the shareholders to enhance their knowledge of firm-specific information and shake off their informational dependence on the CEO. If so, CSR expenditure ought to be as a potential remedy for internal agency problem rather than being a symptom of it.

Of course, as acknowledged earlier, the board could repay stakeholders through other means of spending apart from the conventional definition of CSR activities; after all, our model does not explicitly distinguish between CSR and all other forms of spending that affect the stakeholders' information revelation constraint. However, we specifically focus on a firm's CSR activities for our subsequent empirical analysis as they form the central part of stakeholder engagement efforts in most firms. Thus, we apply the testable predictions of our model specifically within the context of CSR spending, although it is *a priori* possible that the predictions of our model, i.e., informationally motivated stakeholder engagement, could materialize itself in other related contexts.

III. Data

Our sample consists of firms incorporated in the U.S. and covered by Compustat/CRSP, BoardEx, and MSCI ESG KLD STATS between 1999 and 2013. Board variables are constructed primarily from BoardEx, supplemented with ISS, while CEO-related variables are constructed from Execucomp. CSR activities are assessed using MSCI ESG KLD STATS. Analyst forecast variables are from Thomson Reuters IBES, and business segment variables are constructed using Compustat Historical Segments. State-level U.S. Presidential Election results between 1996 and 2012 are from the National Archives and Records Administration. Finally, we use geographic coordinates from 2010 U.S. Census Gazetteer Files to compute the distance between firm headquarters.

A. Board independence and other board characteristics

Our key measure, *Board Independence*, is the percentage of independent directors in the board for each firm-year. We follow the BoardEx definition of independent directors for this purpose.[9] We also construct industry median board independence, with industry defined according to the first two digits of the SIC code, as one of the instrumental variables.[10] Moreover, we construct the following variables from BoardEx as controls: *Log Board Size*, *CEO-Chair Duality*, *Busy Board*, and *Old Independent Director* dummy. We further construct some CEO-related variables from BoardEx, namely *CEO Age*, *CEO Tenure*, and *Inside-Succession CEO* dummy. From ISS, we compute *Average Independent Director Equity Ownership* and *E-index* (Bebchuk, Cohen, and Ferrell, 2009).[11] A detailed definition of each control variable is provided in Appendix D.

B. CSR score

We use MSCI ESG KLD STATS to assess a firm's CSR activities along seven categories: community, corporate governance, diversity, employee relations, environment, human rights, and products. It has an extensive checklist of strengths and concerns for each category. However, as the number of criteria for each category differs from year to year, it is not straightforward to engage in a direct comparison

[9] In untabulated analysis, we confirm that employing the ISS definition of independent directors does not lead to any qualitative change to the results.

[10] This is used as one of the instruments for a firm's board independence in Knyazeva, Knyazeva, and Masulis (2013), as Levit and Malenko (2016) demonstrate that the directors' desire to join other boards leads to strategic complementarity of corporate governance among competitors.

[11] ISS discontinued coverage of some of the provisions necessary for the calculation of Gompers, Ishii, and Metrick's (2003) G-index during our sample period, so we use E-index instead, which Bebchuk, Cohen, and Ferrell (2009) demonstrate to hold stronger value implications compared to other ISS provisions.

of the CSR score. Thus, we use the adjustment proposed by Manescu (2011) and Deng, Kang, and Low (2013), with the adjusted score of firm i in year j for category X defined as:

$$X_{i,j} = \frac{No.of\ Strengths_{i,j}}{No.of\ Strength\ Criteria_j} - \frac{No.of\ Concerns_{i,j}}{No.of\ Concern\ Criteria_j}. \quad (16)$$

We then aggregate the adjusted score of each category to arrive at a firm's adjusted CSR score for a given year. However, since board independence and executive pay both form part of a firm's corporate governance score, our measure of CSR excludes this category, aggregating only the adjusted scores of the other six categories.

C. Information cost

Our model predicts that the strategic complementarity of board independence and CSR would be stronger in high information cost environment. Similar to Duchin, Matsusaka, and Ozbas (2010), we use four measures that proxy for a firm's level of information asymmetry. First, we calculate *Analyst Forecast Error*, which is the absolute difference between the analysts' consensus estimate for quarterly earnings in the last calendar month before the earnings statement, normalized by the firm's total book assets, and the actual earnings, also normalized by the firm's total assets, averaged across four quarters in a given calendar year. We also calculate *Analyst Forecast Dispersion*, namely the standard deviation of the analysts' forecasts for quarterly earnings, normalized and averaged in the identical manner. This measure, however, is sensitive to firm size, with large firms followed by substantially more analysts and garnering higher accuracy of forecasts. Thus, we use the residual of a simple regression of analyst forecast variables on log assets to adjust for firm size.

Second, using the Compustat Historical Segments file, we construct two further measures: *Multiple Segment* dummy, which equals 1 if and only if the firm reports more than one business segment with non-missing sales in a given year,[12] and *Business Segment Concentration*, namely segment-level sales Herfindahl-Hirschman Index (HHI).[13]

[12] Results are similar when we use the number of business segments instead.

[13] When constructing the measure, we do not include a small number of segment with negative sales entries, which arise from complexities within the IFRS rules.

D. CEO pay and turnover

Our model predicts the board may strategically engage in CSR activities to enhance its monitoring intensity. As in the previous literature on corporate governance, we surmise that increased monitoring would affect CEO pay and turnover. Thus, we construct *Log CEO Total Pay*, using item TDC1 in Execucomp expressed in constant 2002 dollars.[14] We also construct *CEO Equity Ownership*, namely the percentage of the firm's shares held by the CEO.

CEO turnovers are also identified from Execucomp. We assign a CEO turnover event to fiscal year *t* if the event occurs during the last two fiscal quarters of year t or the first two fiscal quarters of year $t+1$, as is standard in the literature. We classify a CEO turnover as suspected forced in a similar manner to Fee, Hadlock, and Pierce (2013), namely when the departing CEO is less than 60 years old and does not re-emerge immediately as CEO of another firm within the one-year window that follows.

E. Other controls

From Compustat and CRSP, we construct the following variables as controls, with accompanying explanation provided in Appendix D: *Log Assets*, *Book-to-Market*, *Market Leverage*, *Free Cash Flow*, *Sales Growth*, *Cash Ratio*, *Return on Assets (ROA)*, and *1-year Abnormal Stock Return*. We further calculate the Democratic leaning of the firm's headquarter state, namely the difference between the state's percentage of votes cast for the Democratic candidate in the last Presidential Election and the corresponding national figure, given Di Giuli and Kostovetsky's (2014) finding of blue state firms' greater propensity to engage in CSR activities. Finally, we calculate *Local Director Pool*, namely the number of Compustat firms not sharing the same four-digit SIC headquartered within sixty-mile radius, which Knyazeva, Knyazeva, and Masulis (2013) show to be a valid instrument for the level of board independence, along with *Big City* and *Medium City* dummies using the 2010 U.S. Census data.[15]

F. Summary statistics

Table 1 reports the summary statistics. A dominant 95.2% of firm-year observations in our sample have a majority of independent directors in the board, which is not surprising given that most of our sample period falls after the implementation of the Sarbanes-Oxley Act. However, the percentage of

[14] Results remain directionally consistent, albeit with weaker statistical significance, when the log of CEO's current compensation (Execucomp item *TOTAL_CURR*) in constant 2002 dollars is used as the dependent variable instead.

[15] Knyazeva, Knyazeva, and Masulis (2013) restrict their sample to firms not belonging to financial (SIC 6000-6999) or utilities (SIC 4900-4999) industry and thus their *Local Director Pool* variable is computed by counting only non-financial firms. We do not make a similar restriction and thus we count the number of both financial and non-financial firms within sixty-mile radius in this paper.

independent directors vary substantially, with the inter-quartile range in excess of 20%, suggesting that there is sufficient variation in the level of board independence across firms. This is important as a director conventionally classified as independent may be more closely linked to the CEO through connections or co-option (e.g., Hwang and Kim, 2009; Fracassi and Tate, 2012; Coles, Daniel, Naveen, 2014). The percentage of independent directors in the board may also matter if there is a supermajority requirement for mergers or charter amendments, both constituents of the E-index.

[INSERT TABLE 1 HERE]

As for the firms' CSR activities, we find that both the mean and the median of CSR score (excluding corporate governance) is marginally negative. CEO turnover and suspected forced turnover events comprise 9.7% and 5.2% of the firm-year observations, respectively, and an average CEO in our sample receives around $4.6 million in total annual compensation in constant 2002 dollars.

[INSERT FIGURE 3 HERE]

In Figure 3, we plot sample average CSR score (excluding corporate governance) by Fama-French 12-industry classification. Two industries with the highest engagement in CSR activities are consumer non-durables and business equipment, which is very much in line with the industry characteristics of global top 10 firms with CSR reputation such as LEGO, Microsoft, and Google, that we have identified in the introduction. At the opposite end of the spectrum, the industry that stands out from others with the lowest level of CSR engagement is oil, gas, and coal extraction.

IV. Results

A. Univariate correlation

Our model predicts that the strategic complementarity between board independence and CSR would be stronger when the information asymmetry between the board and the CEO is sufficiently high so that the option of stakeholder consultation enables the shareholders to free their dependence on the CEO and choose a higher ex ante level of board independence. To examine whether this is the case, we first present univariate correlation between board independence and CSR score, separately for high and low information cost environments. We define a firm to be operating in a high information cost

environment if its information cost measure at the previous fiscal year-end exceeds that of sample median for the previous fiscal year. For business segment concentration, a high number implies lower information cost, so a firm above the sample median is defined as operating in low information cost environment. We then compute the correlation between a firm's level of board independence at the beginning of the fiscal year and its year-end CSR score. Table 2 presents our results.

[INSERT TABLE 2 HERE]

Across all four measures, the correlation between board independence and CSR is stronger in high information cost environments, which supports our (H1). In particular, the difference in correlation coefficients is particularly strong when information cost is defined in terms of analyst-based measures; whereas we observe strong and significant correlation between board independence and CSR in opaque information environment, coefficient estimates become statistically insignificant in more transparent environment. Table 2 thus presents some prima facie evidence of strategic complementarity between board independence and CSR in opaque information environment.

B. Board independence and CSR activities

Our first hypothesis states that the positive relationship between a firm's board independence and CSR activities would be stronger in high information cost environment. To test this, we set up an OLS model in the following manner:

$$\begin{aligned}\text{CSR Score} = {} & \beta_0 + \beta_1 \text{Board Independence} + \beta_2 \text{Info. cost} + \beta_3 \text{Board Independence} \times \\ & \text{Info. cost} + f(\text{Controls}) + \varepsilon \end{aligned} \tag{17}$$

All specifications include log assets, book-to-market, free cash flow, cash ratio, and sales growth as firm-level controls. We also control for CEO age and tenure. Among board characteristics, we control for log board size, CEO-chair duality, busy board, and old independent director dummy. Finally, we control for the Democratic leaning of the firm's headquarter state (Di Giuli and Kostovetsky, 2014). We further control for industry fixed effect using SIC two-digit dummies, and we also include year dummies. Standard errors are clustered by firm (Petersen, 2009). Table 3 presents our results.

[INSERT TABLE 3 HERE]

Across all four information cost measures, Table 3 reveals that an increase in the level of board independence has a strong positive effect on a firm's CSR activities in opaque environments, with the interaction term bearing the expected sign and significant at the 1% level in all instances. The estimates imply that the overall CSR score of multiple-segment firms are higher by 0.25 than single-segment firms with similar characteristics. For other measures, a one standard deviation increase in information cost is consistent with an increase in overall CSR score of between 0.11 and 0.19.

All firm-level controls turn out to be significant at the 5% level. Large, growth firms tend to engage more in CSR activities, as is the case for firms with lower leverage, consistent with Bae, Kang, and Wang (2011). Firms with high free cash flow and cash ratio also engage more in terms of CSR activities, which could either be agency-motivated or consistent with our (H3), namely that the shareholders are more willing to engage in CSR activities to utilize information provided by the stakeholders when the CEO derives large private benefits from retaining control. As in Di Giuli and Kostovetsky (2014), we also find greater propensity of blue-state firms to engage in CSR activities, with statistical significance at the 1% level. Finally, old CEOs and independent directors are markedly less hospitable toward CSR activities, with both variables bearing negative sign significant at the 1% level.

[INSERT TABLE 4 HERE]

In Table 4, we re-run the OLS regressions in Table 3, but using each KLD category score as the dependent variable instead. If CSR activities are informationally motivated, as we posit, then it may be thought of as a "cost" of acquiring information held by the stakeholders. In this instance, our model predicts that CSR activities would be geared toward stakeholders that are likely to bear valuable firm information in the first place. Employees and local residents are the likely candidates, who are most likely to be concerned about community, employee relations, and local environmental issues. In addition, a firm's female and ethnic minority stakeholders may feel unwilling to share their information if it lags behind its peers on promoting diversity. In contrast, human rights or product safety are more likely to be associated with a firm's general corporate image rather than managing a targeted group of stakeholders. Thus, we expect the statistical significance of the first four KLD categories (community, diversity, employee relations, and environment) to be stronger than the last two. We indeed find this

to be the case in Table 4, with the interaction term exerting a significant impact on community, diversity, and environment scores, and to a lesser extent, employment relations score, but its effects on human rights and product scores are insignificant.

Even though a recent paper by Ferrell, Liang, and Renneboog (2016) also examines the relationship between board independence and the firm's propensity to engage in CSR, board independence enters only as an instrument for managerial "pay-for-performance" incentives in their setting; in their analysis, there is no reason to assume that board independence may directly be associated with CSR activities except through the alignment of managerial incentives. In contrast, we posit that CSR activities may be chosen by the board *precisely* to reduce its reliance on management for firm-specific information and opt for an ex ante higher level of board independence in opaque information environments. Our model is thus able to account for the strong complementarity between board independence and CSR activities particularly in opaque information environment.

C. Board independence, CSR, and monitoring intensity

a) CEO compensation

Our (H2) predicts that the direct effect of CSR on monitoring intensity would be higher among low information cost firms, while the joint effect of CSR and board independence on monitoring intensity would be more pronounced among high information cost firms. To test this hypothesis, we estimate the following equation separately for high and low information cost environments:

$$\begin{aligned}\text{Log CEO Total Pay} = {} & \gamma_0 + \gamma_1 \text{Board Independence} + \gamma_2 \text{CSR Score} \\ & + \gamma_3 \text{Board Independence} \times \text{CSR Score} + g(\text{Controls}) + \varepsilon \end{aligned} \quad (18)$$

If, as our model predicts, the direct effect of CSR on monitoring intensity is stronger when the firm's information environment is relatively transparent, then we expect γ_2 to be lower in low information cost environment subsample. In contrast, as the joint effect of board independence and CSR activities on monitoring intensity is stronger among high information cost firms, we expect γ_3 to be lower in opaque environments. In other words, when we take a subsample difference of coefficients between high and low information environments, the difference of γ_2 should bear positive sign while that of γ_3 should be negative.

Given the importance of firm performance in CEO compensation, we include the following as controls in addition to those used in the previous subsection: ROA, 1-year abnormal stock return,

inside-succession CEO dummy, and CEO equity ownership.[16] We drop the firm headquarter state's Democratic leaning from the set of controls, as there is no obvious reason why this should have a strong relation with CEO compensation. Table 5 presents our results.

[INSERT TABLE 5 HERE]

Across all four measures of information cost, empirical results support our (H2); whereas subsample difference of γ_2 is positive and significant at the 10% level in all instances, the opposite is true of the coefficient difference for γ_3, negative and significant at the 10% level in all cases. More importantly, the direct effect of CSR on CEO compensation is negative in low information cost environments across all four measures, while the joint effect of CSR and board independence on CEO compensation is negative in high information cost environments, further supporting our hypothesis that CSR activities enable the board to intensify its monitoring intensity.[17] In contrast, our empirical results are difficult to reconcile with the agency view that treats CSR as a symptom of misalignment of interest between the shareholders and management. Even though firms with high free cash flow and cash ratio do tend to engage more in CSR, as is evident from Table 3, the agency view cannot explain the disciplining effect of CSR (in transparent information environment) or the interaction between CSR and board independence (in more opaque information environment) on CEO compensation. Rather, the results are more in line with our (H3), which suggests that the board finds it more attractive to engage in CSR when it is more susceptible to agency issues *because of* its desire to obtain firm-specific information and intensify monitoring.

b) CEO turnover

In addition to CEO compensation, we now analyze whether CSR activities—either directly or through its interaction with board independence—have a differential effect on the likelihood of CEO turnover depending on the firms' information environments. When analyzing CEO turnover, previous studies

[16] The use of the ISS database leads to a non-trivial loss of firm-year observations, so we exclude E-index and average independent director equity ownership in our main analysis. However, to check whether our results are sensitive, we include re-estimate our results with these controls in the Internet Appendix. Results remain qualitatively consistent.

[17] While the marginal effect of board independence is positive and significant at the 1% level across all four information cost measures, which may appear puzzling from an agency point of view (e.g., Bebchuk and Fried, 2003), Hermalin (2005) shows that an independent board that increases monitoring could be consistent with higher CEO compensation if the CEO demands more compensation for greater effort and job insecurity that arises as a result.

focus on turnover-performance sensitivity by interacting the main variable of interest with performance measures such as abnormal stock return or ROA (Hwang and Kim, 2009; Coles, David, and Naveen, 2014). However, in our setting, this amounts to a three-way interaction between board independence, CSR, and performance measure, complicating the interpretation of each variable. Thus, we propose the empirical set-up as follows:

$$\begin{aligned}\text{Suspected Forced CEO Turnover Dummy} = \Lambda\{&\theta_0 + \theta_1 \text{Board Independence} + \theta_2 \text{CSR Score} \\ &+ \theta_3 \text{Board Independence} \times \text{CSR Score} + h(\text{Controls}) + \varepsilon\},\end{aligned} \tag{19}$$

where $\Lambda(\cdot)$ denotes the logistic link function. In other words, we examine the direct effect of CSR and the interaction term on the likelihood of turnover rather than measuring the turnover-performance sensitivity, albeit limiting our attention to turnover cases with a suspicion of being performance-motivated.[18] We then separately estimate (18) for firms operating in high and low information cost environments in the identical manner to Table 5. Since the comparison of regression coefficients between subsamples in logit or probit models is a contentious issue, we report the results from two subsample regressions while abstracting ourselves from any statistical inference on their difference. Table 6 presents our results.

[INSERT TABLE 6 HERE]

While much caution is needed when interpreting the logit results of the two subsamples without a clear, undisputed means of testing for the equality of coefficients, the results are broadly in line with our predictions. Except for when size-adjusted analyst forecast dispersion is used as an information cost measure, we find that θ_2, i.e., the direct effect of CSR on the likelihood of suspected forced CEO turnover, is larger in more transparent information environment, while θ_3, which captures the joint effect of CSR and board independence, is larger in opaque information environment.

[18] In the Internet Appendix, we confirm that turnover-performance sensitivity analysis yields similar results, with the signs of CSR Score × 1-year Abnormal Stock Return and Board Independence × CSR Score × 1-year Abnormal Stock Return consistent with the main analysis. The signs of CSR Score and Board Independence × CSR Score also remain unchanged. We also confirm that our results are consistent when the dependent variable includes all turnover cases.

Taken together, Tables 5 and 6 suggest that there appears to be a systematic difference in how CSR engagement, either on its own or through its interaction with the level of board independence, affects the intensity of monitoring between opaque and transparent information environments. The results are thus broadly in line with our hypothesis, namely that CSR engagement could provide the board with a means of ameliorating its internal conflict between the dual roles of advising and monitoring. Without information motive as outlined in our model, it is difficult to explain the differential effect of CSR and the interaction of CSR and board independence on monitoring intensity as a firm's information environment changes, strongly suggesting the importance and relevance of this motive from the perspective of shareholders and independent directors.

D. Robustness Tests

We carry out several additional tests to document the robustness of our key result, namely a positive relationship between the strategic complementarity of board independence and CSR activities and the firm's information cost environment. First, even though we control for unobserved heterogeneity at the industry level through SIC two-digit dummies, board independence, CSR, and other corporate financial decisions may be influenced by unobserved heterogeneity at the firm level. This is particularly important given that the board structure of a firm is known to be relatively stable over time (e.g., Linck, Netter, and Yang, 2008). Thus, in Table 7, we re-estimate our baseline regression in Table 3 albeit with firm fixed effect replacing SIC two-digit industry fixed effect. We find that the interaction term of board independence and information cost measure continues to bear the expected sign and with statistical significance at the 5% level in all instances, strongly suggesting that our result is unlikely to be driven by firm-level time-invariant unobserved heterogeneity.

[INSERT TABLE 7 HERE]

However, it is still possible that other omitted variables drive both the level of board independence as well as CSR activities, given that both form part of corporate decisions are simultaneously decided by the board and management. To this end, we follow the instrumental variable approach of Knyazeva, Knyazeva, and Masulis (2013). In accordance with their specification, the following four instruments proxy for the level of board independence: local director pool, big city dummy, medium city dummy, and industry median board independence. For each information cost measure, we interact each instrument with the information cost measure to instrument for the board independence-information cost interaction term in the second stage. We re-estimate the CSR regression in Table 3 using

the two-stage least squares (2SLS) model and present the second stage results in Table 8.[19] Given the firm clustering of standard errors, which invalidates the error distributional assumptions of standard tests that require homoscedasticity, we report Kleibergen-Paap (2006) rk Wald F-statistic instead of Cragg-Donald (1993) Wald F-statistic for weak instrument test, and Difference-in-Sargan C-statistic for the endogeneity test instead of the standard Wu-Hausman test.[20]

[INSERT TABLE 8 HERE]

Across all four measures of information cost, we find that the joint effect of board independence and information cost measure on CSR activities bears the expected sign and is always significant at the 5% level and also at the 1% level except for one instance. Kleibergen-Paap rk Wald first-stage F-statistic for weak instrument test is between 15 and 17, which is above the Stock and Yogo's (2005) critical value for the maximal 2SLS size of 15% at 13.96.[21] Apart from when size-adjusted analyst forecast dispersion is used as the information cost measure, difference-in-Sargan endogeneity test also indicates that there is statistically significant different in coefficient estimates between OLS and 2SLS models, further justifying the use of instrumental variables to address possible endogeneity issues.[22]

Furthermore, we consider a possibility that the board may not have the full control of the CSR agenda in firms with powerful CEOs. In Appendix C, we first theoretically demonstrate that such possibility of the CEO controlling the CSR agenda indeed weakens the informational value of CSR but has no qualitative impact on its existence. We then conduct additional empirical robustness tests toward the relative strength of our information channel; we investigate how the channel effect depends on the likelihood of the board's ability to control CSR agenda. To this end, we construct two equal subsamples based on the two proxies for the CEO power, (i) the previous year-end value of CEO pay slice (Bebchuk, Cremers, and Peyer, 2011) and (ii) the level of board independence being above and below the sample median at the same fiscal year-end, respectively. We suspect that CEOs are more

[19] First stage results are available in the Internet Appendix.

[20] Regression specifications in Table 8 do not pass the Hansen (1982) overidentification test at the 10% level, but as Knyazeva, Knyazeva, and Masulis (2013) note, this requires strong distributional assumptions.

[21] However, as the Stock-Yogo critical values are computed by assuming homoscedasticity, this ought to be seen at best as indicative and any statistical inference ought to be treated with much caution.

[22] In untabulated analysis, we also use independent director death and mandatory retirement as an additional instrument, drawing on from the insights of Fracassi and Tate (2012). Results are qualitatively very similar.

likely to have control of the CSR agenda in firms with high levels of CEO pay slice and low levels of board independence. According to the predictions of the extended model, the information channel of CSR will be weaker among these subsamples, but there is no reason to expect it to disappear completely. To examine whether this is the case, we re-estimate our main regressions in columns (3) and (4) of Table 3. Table 9 reports the results.

[INSERT TABLE 9 HERE]

In line with the predictions of our extended model, the board independence-information cost interaction term is larger in economic magnitude for the high board independence subsample, compared to the low board independence subsample, with statistical marginal significance at the 10% level. We obtain similar results for CEO pay slice subsamples, though we do not find statistically significant difference in coefficients between the two subsamples. Overall, the evidence suggests that the information channel is indeed marginally weaker among firms where the CEOs are suspected to be powerful and thus likely to have sizeable control of the CSR agenda. However, most importantly, the interaction term remains statistically significant at the 1% level across all subsamples regardless of the information cost measure used. Thus, our informationally-motivated CSR channel remains robust, albeit somewhat weaker in magnitude, even among firms where the CEO is likely to have some control over the CSR decision-making process.

To summarize, regardless of whether we control for firm-level unobserved heterogeneity or engage in rigorous 2SLS IV estimation to address possible endogeneity issues, and across all levels of board independence and CEO power measures, our main findings on the strategic complementarity of board independence and information value of CSR remains intact. These robustness tests thus suggest that CSR activities could be driven by these information motives.

V. Conclusion

We propose a new rationale for CSR – the information motive of socially responsible investments by corporations. Using a simple cheap-talk game between a firm's CEO and outside independent directors, where the directors could endogenously obtain valuable firm-specific information from stakeholders by engaging in CSR activities, we demonstrate that CSR could mitigate the CEO-board

information asymmetry and facilitate the board's full functional efficiency in its dual role, namely, informed advising and tight monitoring of management by independent directors.

We theoretically show that, in equilibrium, the marginal information value of CSR is greatest among firms that suffer most from self-entrenched CEOs, who are unwilling to share valuable private information to highly independent board members for agency reasons. Under such circumstances, our notion of the informationally-motivated CSR activities endogenously arises as a remedy to this familiar agency problem. Given these perspectives, our model predicts a novel strategic complementarity between board independence and CSR activities, particularly for firms that operate in informationally opaque environments.

Using the data on firms' socially responsible activities from 1999 to 2013, together with the board compositions and various proxies for firm information environments, we find empirical evidence to be largely consistent with our theory. We find a significant and positive relation between the level of board independence and a firm's CSR activities as the firm's information environment becomes more opaque. Our results hold across various information acquisition cost proxies, including analyst forecast error, analyst forecast dispersion, multiple business segments dummy, and the degree of sales concentration across multiple segments. They are also robust to controlling for omitted firm-level heterogeneity as well as simultaneity concerns.

Overall, our study sheds light on the information value of CSR. We model CSR activities as a potential remedy for the managerial agency problems, and CSR is more than just a manifestation of good governance; rather, it enables good governance by ameliorating the CEO-board information asymmetry. In this respect, our information view of CSR stands apart from the prevailing views of CSR, namely the good versus bad governance views. By providing an alternative explanation that goes beyond the usual focus on the managerial incentives that determine CSR activities, our theory and empirical analyses significantly extend our understanding of the unresolved yet important issue in the literature, namely the fundamental motive of CSR.

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Figure 1: Optimal board independence with vs. without stakeholder information

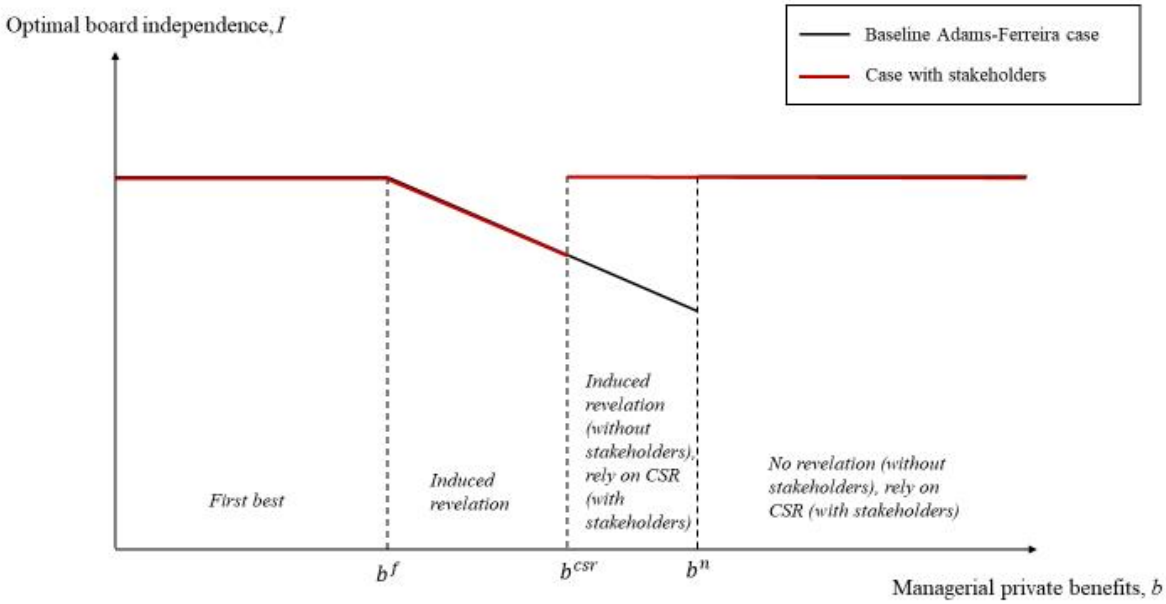

Figure 2: Expected monitoring intensity with vs. without stakeholder information

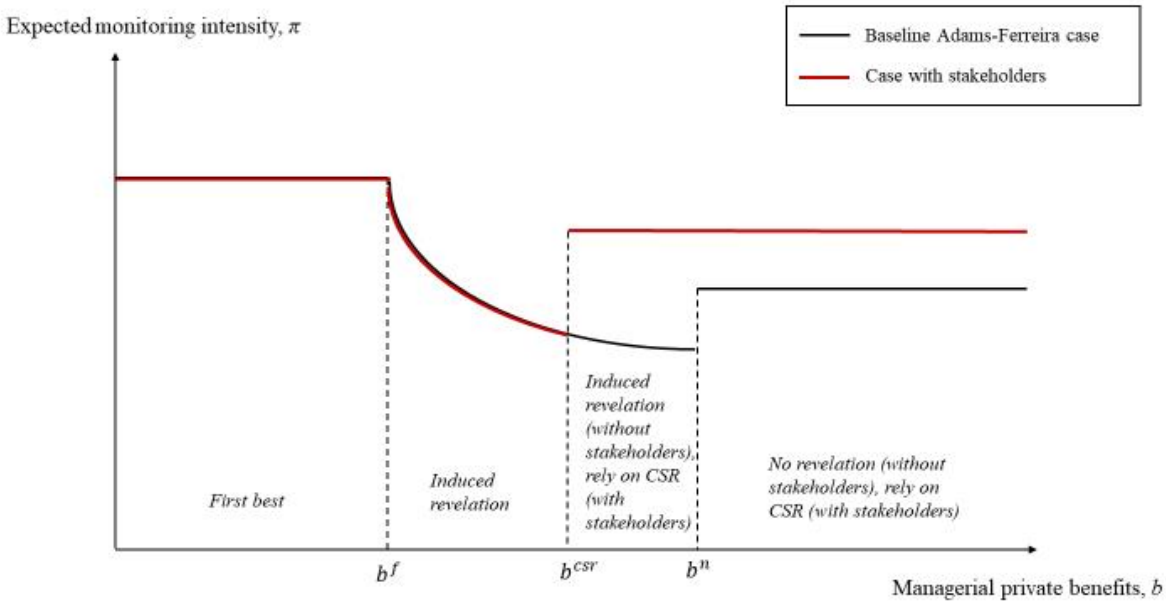

Figure 3: Industry breakdown of CSR scores

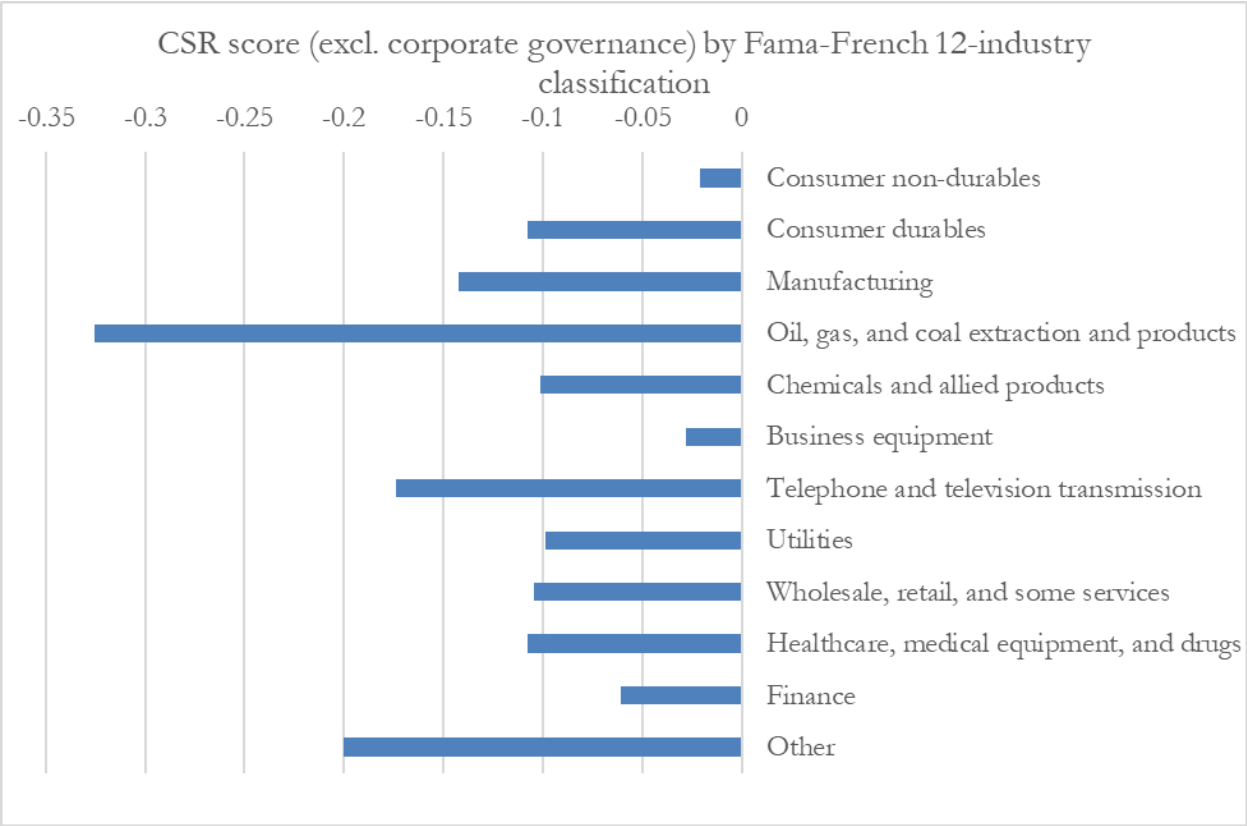

Table 1: Summary Statistics

This table summarizes the characteristics of our main variables of interest. All reported values are winsorized at the 1st and 99th percentiles. For detailed explanation on the definition of each variable, please refer to Appendix D.

	Obs.	Mean	St. Dev.	Q1	Median	Q3
Panel A: Firm-level variables						
Assets (in $ millions)	24,007	7,713.9	21,354.7	479.3	1524.3	4,769.1
Book-to-Market	24,004	0.565	0.440	0.287	0.487	0.756
Market Leverage	23,955	0.172	0.178	0.026	0.123	0.260
Free Cash Flow	24,010	0.043	0.134	0.126	0.055	0.102
Sales Growth	23,984	0.109	0.288	-0.016	0.072	0.182
Cash Ratio	24,010	0.191	0.237	0.032	0.097	0.260
Return on Assets (ROA)	24,010	0.026	0.134	0.006	0.037	0.085
1-Year Abnormal Stock Return	23,980	0.059	0.456	-0.206	-0.004	0.229
Size-Adjusted Analyst Forecast Error	19,587	0.000	0.041	-0.014	-0.007	0.001
Size-Adjusted Analyst Forecast Dispersion	18,759	0.000	0.018	-0.057	-0.003	0.001
Multiple Segment dummy	19,904	0.554	0.497	0.000	1.000	1.000
Business Segment Concentration	19,832	0.760	0.266	0.511	0.900	1.000
Firm HQ State's Democratic Leaning	23,816	0.014	0.075	-0.036	0.027	0.081
Panel B: Board-level variables						
Board Size	23,973	9.174	2.494	7.000	9.000	11.00
Board Independence (BoardEx)	23,973	0.763	0.128	0.667	0.786	0.875
Board Independence (ISS)	14,099	0.751	0.133	0.667	0.778	0.867
Majority Independent dummy (BoardEx)	23,973	0.952	0.213	1.000	1.000	1.000
CEO-Chair Duality	23,973	0.639	0.480	0.000	1.000	1.000
Busy Board	23,793	0.445	0.497	0.000	0.000	1.000
Old ID dummy	23,785	0.605	0.489	0.000	1.000	1.000
Average ID Equity Ownership	14,089	0.002	0.005	0.000	0.001	0.001
E-index	15,367	2.748	1.466	2.000	3.000	4.000
Panel C: CSR-related variables						
Overall CSR Score (ex. Corporate Governance)	23,392	-0.109	0.548	-0.417	-0.167	0.092
Community Score	23,392	0.021	0.173	0.000	0.000	0.000
Diversity Score	23,392	-0.097	0.305	-0.333	0.000	0.125
Employee Relations Score	23,392	-0.022	0.167	-0.033	0.000	0.000
Environment Score	23,392	0.015	0.128	0.000	0.000	0.000
Human Rights Score	23,392	-0.010	0.051	0.000	0.000	0.000
Product Score	23,392	-0.014	0.185	0.000	0.000	0.000

(Table 1 continued)

Panel D: CEO-level variables						
CEO Age (in years)	23,433	55.65	7.376	51.00	56.00	60.00
CEO Tenure (in years)	23,433	5.558	5.445	1.800	3.900	7.500
Inside-Succession CEO dummy	23,433	0.718	0.450	0.000	1.000	1.000
CEO Turnover dummy	16,969	0.104	0.305	0.000	0.000	0.000
CEO Turnover dummy (Suspected Forced)	16,969	0.056	0.230	0.000	0.000	0.000
CEO Total Pay (in constant 2002 $ thousands)	16,884	4,562.1	4,931.0	1,479.0	2,967.4	5,657.5
CEO Equity Ownership	16,715	0.019	0.046	0.001	0.003	0.011
Panel E. Instruments						
Local Director Pool (raw number of firms)	23,883	256.6	252.5	56.00	206.0	349.0
Big City	23,883	0.391	0.488	0.000	0.000	1.000
Medium City	23,883	0.354	0.478	0.000	0.000	1.000
Industry Median Board Independence (BoardEx)	24,088	0.741	0.071	0.714	0.750	0.800

Table 2: Univariate correlation

This table reports the correlation coefficient between CSR score at the end of a fiscal year and the beginning-of-year level of board independence, separately for firms in high and low information cost environments. A firm's environment is defined as high information cost if its information cost measure exceeds the sample median at the beginning of the year (or below the sample median for the case of business segment concentration). *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	All	High info. cost environment	Low info. cost environment
Panel A. Multiple Business Segment dummy			
Board Independence-CSR Correlation Coefficient	0.103***	0.120***	0.065***
No. of Obs.	19,216	10,561	8,655
Panel B. Business Segment Concentration			
Board Independence-CSR Correlation Coefficient	0.103***	0.123***	0.066***
No. of Obs.	19,163	9,730	9,433
Panel C. Size-Adjusted Analyst Forecast Error			
Board Independence-CSR Correlation Coefficient	0.110***	0.150***	-0.002
No. of Obs.	18,961	9,525	9,436
Panel D. Size-Adjusted Analyst Forecast Dispersion			
Board Independence-CSR Correlation Coefficient	0.109***	0.144***	0.006
No. of Obs.	18,056	9,079	8,977

Table 3: Determinants of CSR: Board independence and information cost environment

This table reports the OLS regressions of KLD CSR score (excluding Corporate Governance) on board independence and information cost measures. We control for firm-, board-, and CEO-level characteristics as specified in the table, as well as SIC 2-digit industry and year dummies. All controls are lagged by one year. Board independence follow the BoardEx definition. Firm-clustered standard errors are in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	Dependent variable: Overall CSR Score (excl. Corporate Governance)			
	(1)	(2)	(3)	(4)
Information cost measure used:	Multiple Business Segment dummy	Business Segment Concentration	Size-Adjusted Analyst Forecast Error	Size-Adjusted Analyst Forecast Dispersion
Board Independence	0.052	0.521***	0.222***	0.226***
	(0.059)	(0.141)	(0.051)	(0.053)
Information Cost Measure	-0.202***	0.359***	-2.556***	-8.172***
	(0.058)	(0.121)	(0.660)	(1.954)
Board Independence	0.253***	-0.424***	3.491***	10.582***
× Information Cost Measure	(0.080)	(0.164)	(0.883)	(2.581)
Log Assets	0.085***	0.086***	0.085***	0.087***
	(0.007)	(0.007)	(0.008)	(0.008)
Book-to-Market	-0.050***	-0.048***	-0.058***	-0.051***
	(0.015)	(0.015)	(0.015)	(0.016)
Market Leverage	-0.263***	-0.269***	-0.293***	-0.301***
	(0.042)	(0.042)	(0.043)	(0.045)
Free Cash Flow	0.085**	0.085**	0.099***	0.106***
	(0.033)	(0.034)	(0.036)	(0.038)
Cash Ratio	0.104***	0.099***	0.092***	0.091***
	(0.025)	(0.025)	(0.026)	(0.027)
Sales Growth	-0.023**	-0.023**	-0.024**	-0.024**
	(0.011)	(0.011)	(0.012)	(0.012)
CEO Age	-0.002***	-0.002***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
CEO Tenure	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)

(Table 3 continued)

Log Board Size	0.201***	0.203***	0.215***	0.221***
	(0.028)	(0.028)	(0.030)	(0.031)
Busy Board	0.017	0.018	0.009	0.008
	(0.012)	(0.012)	(0.012)	(0.013)
CEO-Chair Duality	0.008	0.009	0.019	0.019
	(0.013)	(0.013)	(0.013)	(0.014)
Old Independent Director Dummy	-0.050***	-0.050***	-0.061***	-0.062***
	(0.012)	(0.012)	(0.012)	(0.013)
Firm HQ State's Democratic Leaning	0.487***	0.484***	0.506***	0.492***
	(0.103)	(0.102)	(0.108)	(0.112)
Constant	-1.240***	-1.604***	-1.442***	-1.450***
	(0.196)	(0.206)	(0.242)	(0.246)
Industry Dummies	SIC2D	SIC2D	SIC2D	SIC2D
Year Dummies	YES	YES	YES	YES
No. of Obs.	19,216	19,163	18,961	18,056
Adjusted R-squared	0.200	0.200	0.206	0.206

Table 4: Determinants of CSR activities by each KLD category

This table reports the OLS regressions of each KLD category adjusted score on board independence and various information cost measures. All regressions include the identical set of controls as in Table 3, as well as SIC 2-digit industry and year dummies. All explanatory variables are lagged by one year. Firm-clustered standard errors are in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Community	Diversity	Employee Relations	Environment	Human Rights	Product
Panel A. Multiple Business Segment dummy						
Board Independence × Information Cost Measure	0.063***	0.173***	0.004	0.057***	0.002	-0.030
	(0.022)	(0.044)	(0.027)	(0.018)	(0.008)	(0.027)
Controls, SIC2D industry and year dummies	YES	YES	YES	YES	YES	YES
No. of obs.	19,216	19,216	19,216	19,216	19,216	19,216
Adjusted R-squared	0.103	0.339	0.160	0.168	0.122	0.108
Panel B. Business Segment Concentration						
Board Independence × Information Cost Measure	-0.126**	-0.267***	-0.002	-0.132***	-0.002	0.071
	(0.049)	(0.080)	(0.053)	(0.042)	(0.018)	(0.057)
Controls, SIC2D industry and year dummies	YES	YES	YES	YES	YES	YES
No. of obs.	19,163	19,163	19,163	19,163	19,163	19,163
Adjusted R-squared	0.103	0.338	0.161	0.169	0.123	0.108
Panel C. Size-Adjusted Analyst Forecast Error						
Board Independence × Information Cost Measure	0.765***	1.418***	0.575*	0.627***	-0.021	0.254
	(0.203)	(0.540)	(0.346)	(0.172)	(0.061)	(0.203)
Controls, SIC2D industry and year dummies	YES	YES	YES	YES	YES	YES
No. of obs.	18,961	18,961	18,961	18,961	18,961	18,961
Adjusted R-squared	0.107	0.339	0.161	0.175	0.123	0.109

(Table 4 continued)

Panel D. Size-Adjusted Analyst Forecast Dispersion						
Board Independence × Information Cost Measure	2.113***	4.514***	1.844*	1.853***	-0.059	0.591
	(0.584)	(1.500)	(0.982)	(0.541)	(0.147)	(0.590)
Controls, SIC2D industry and year dummies	YES	YES	YES	YES	YES	YES
No. of obs.	18,056	18,056	18,056	18,056	18,056	18,056
Adjusted R-squared	0.110	0.334	0.164	0.181	0.126	0.112

Table 5: Determinants of CEO Pay: Board independence, CSR, and information cost

This table presents the OLS regressions of log CEO total annual compensation on board independence and CSR score, separately for high and low information cost subsamples. All specifications include ROA, 1-year abnormal stock return, log assets, book-to-market, market leverage, free cash flow, cash ratio, CEO age, CEO tenure, CEO equity ownership, inside-succession CEO dummy, log board size, busy board, CEO-Chair duality, and old independent director dummy as controls, as well as SIC 2-digit industry and year dummies. All explanatory variables are lagged by one year. Firm-clustered standard errors are in parentheses. For subsample tests, chi-squared test value is indicated in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	Dependent variable: Log CEO Total Pay			
	(1)	(2)	(3)	Subsample
	All	High info. cost	Low info. cost	diff. in coeff. (2)-(3)
Panel A. Multiple Business Segment dummy				
Board Independence	0.660***	0.580***	0.838***	-0.258
	(0.111)	(0.129)	(0.201)	(1.23)
CSR Score	0.058	0.234*	-0.424	0.658*
	(0.147)	(0.136)	(0.349)	(3.19)
Board Independence × CSR Score	-0.109	-0.311**	0.449	-0.760*
	(0.170)	(0.157)	(0.412)	(3.08)
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,744	7,738	5,006	
Adjusted R-squared	0.515	0.537	0.475	
Panel B. Business Segment Concentration				
Board Independence	0.661***	0.569***	0.809***	-0.240
	(0.111)	(0.132)	(0.185)	(1.20)
CSR Score	0.054	0.268*	-0.371	0.638**
	(0.148)	(0.137)	(0.300)	(4.01)
Board Independence × CSR Score	-0.104	-0.358**	0.407	-0.765**
	(0.172)	(0.158)	(0.354)	(4.56)
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,730	7,178	5,552	
Adjusted R-squared	0.514	0.542	0.475	

(Table 5 continued)

Panel C. Size-Adjusted Analyst Forecast Error				
Board Independence	0.650***	0.487***	0.896***	-0.409**
	(0.108)	(0.145)	(0.133)	(4.83)
CSR Score	0.094	0.247	-0.422**	0.669**
	(0.145)	(0.175)	(0.212)	(6.31)
Board Independence × CSR Score	-0.149	-0.317	0.493*	-0.810**
	(0.168)	(0.203)	(0.258)	(6.44)
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,756	7,346	5,410	
Adjusted R-squared	0.525	0.447	0.362	
Panel D. Size-Adjusted Analyst Forecast Dispersion				
Board Independence	0.645***	0.436***	0.948***	-0.513***
	(0.108)	(0.147)	(0.134)	(7.39)
CSR Score	0.078	0.218	-0.376*	0.594**
	(0.145)	(0.177)	(0.204)	(5.15)
Board Independence × CSR Score	-0.132	-0.288	0.430*	-0.718**
	(0.168)	(0.205)	(0.249)	(5.22)
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,457	7,062	5,395	
Adjusted R-squared	0.521	0.442	0.359	

Table 6: Determinants of suspected forced CEO turnover: Board independence, CSR, and information cost environment

This table reports logit estimation results of the probability of a suspected forced CEO turnover on board independence and CSR score, separately for high and low information cost subsamples. A CEO turnover is classified as suspected forced if the departing CEO's age is less than 60 and he/she does not re-surface as CEO of another firm within the one-year window afterward. The definition of information cost environment, as well as the set of controls and fixed effects, are identical to Table 5. Firm-clustered standard errors are in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	Dependent variable: Suspected Forced CEO Turnover dummy			
	(1)	(2)	(3)	Subsample
	All	High info. cost	Low info. cost	diff. in coeff. (2)-(3)
Panel A. Multiple Business Segment dummy				
Board Independence	-0.686*	-0.578	-0.698	0.120
	(0.353)	(0.455)	(0.555)	
CSR Score	-0.462	-1.105*	0.566	-1.672
	(0.472)	(0.583)	(0.787)	
Board Independence × CSR Score	0.563	1.356*	-0.686	2.041
	(0.591)	(0.719)	(1.013)	
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,572	7,473	4,766	
Pseudo R-squared	0.049	0.057	0.065	
Panel B. Business Segment Concentration				
Board Independence	-0.693**	-0.534	-0.622	0.088
	(0.353)	(0.461)	(0.545)	
CSR Score	-0.379	-0.693	-0.127	-0.566
	(0.476)	(0.632)	(0.772)	
Board Independence × CSR Score	0.463	0.892	0.085	0.807
	(0.596)	(0.779)	(0.989)	
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,557	6,921	5,295	
Pseudo R-squared	0.049	0.059	0.061	

(Table 6 continued)

Panel C. Size-Adjusted Analyst Forecast Error				
Board Independence	-0.786**	-0.780*	-0.889	0.109
	(0.330)	(0.429)	(0.570)	
CSR Score	-0.222	-0.399	0.171	-0.570
	(0.463)	(0.525)	(1.031)	
Board Independence × CSR Score	0.271	0.574	-0.321	0.895
	(0.578)	(0.653)	(1.311)	
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,577	7,209	5,102	
Pseudo R-squared	0.047	0.059	0.064	
Panel D. Size-Adjusted Analyst Forecast Dispersion				
Board Independence	-0.733**	-0.636	-0.860	0.224
	(0.336)	(0.435)	(0.574)	
CSR Score	-0.231	-0.348	-0.455	0.107
	(0.470)	(0.543)	(1.037)	
Board Independence × CSR Score	0.273	0.483	0.520	-0.037
	(0.585)	(0.670)	(1.323)	
Controls, SIC2D industry and year dummies	YES	YES	YES	
No. of obs.	12,260	6,911	5,090	
Pseudo R-squared	0.049	0.059	0.064	

Table 7: Determinants of CSR: Firm fixed effect

This table re-estimates Table 3, albeit with firm fixed effect replacing SIC two-digit industry fixed effect. All explanatory variables are identical to those used in Table 3. Firm-clustered standard errors are in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	Dependent variable: Overall CSR Score (excl. Corporate Governance)			
	(1)	(2)	(3)	(4)
Information cost measure used:	Multiple Business Segment dummy	Business Segment Concentration	Size-Adjusted Analyst Forecast Error	Size-Adjusted Analyst Forecast Dispersion
Board Independence	-0.143*	0.496**	0.039	0.039
	(0.078)	(0.175)	(0.069)	(0.072)
Information Cost Measure	-0.264***	0.439**	-3.431**	-10.280**
	(0.072)	(0.150)	(1.083)	(4.246)
Board Independence	0.358***	-0.583**	4.374**	12.051**
× Information Cost Measure	(0.097)	(0.199)	(1.386)	(5.146)
Log Assets	-0.009	-0.010	-0.018	-0.025
	(0.016)	(0.016)	(0.016)	(0.017)
Book-to-Market	0.003	0.004	0.009	0.011
	(0.015)	(0.015)	(0.015)	(0.016)
Market Leverage	0.016	0.014	-0.006	-0.002
	(0.047)	(0.047)	(0.049)	(0.051)
Free Cash Flow	0.007	0.003	0.001	0.021
	(0.038)	(0.038)	(0.041)	(0.042)
Cash Ratio	0.043*	0.044*	0.050*	0.043
	(0.024)	(0.024)	(0.026)	(0.027)
Sales Growth	0.011	0.010	0.022*	0.025**
	(0.010)	(0.010)	(0.011)	(0.012)
CEO Age	-0.002	-0.002	-0.003**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
CEO Tenure	0.000	0.001	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.002)

(Table 7 continued)

Log Board Size	0.062	0.063	0.041	0.028
	(0.042)	(0.042)	(0.043)	(0.044)
Busy Board	-0.001	-0.001	-0.013	-0.010
	(0.014)	(0.014)	(0.014)	(0.014)
CEO-Chair Duality	0.001	0.002	0.013	0.017
	(0.018)	(0.018)	(0.019)	(0.020)
Old Independent Director Dummy	-0.024*	-0.024*	-0.021	-0.023
	(0.014)	(0.014)	(0.014)	(0.015)
Firm HQ State's Democratic Leaning	0.383	0.396	0.375	0.330
	(0.371)	(0.370)	(0.387)	(0.399)
Constant	-0.371	-0.821**	-0.576*	-0.494
	(0.308)	(0.331)	(0.341)	(0.345)
Firm Fixed Effect	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES
No. of Obs.	19,216	19,163	18,961	18,056
Adjusted R-squared	0.481	0.481	0.479	0.480

Table 8: Determinants of CSR: Instrumental variable regressions

This table reports the 2SLS regressions of overall CSR score (excluding corporate governance) on board independence and information cost measures. We use local director pool, big city dummy, medium city dummy, and SIC two-digit industry median board independence to instrument for board independence. For a detailed explanation of each instrument, refer to Appendix D. All other controls are identical to those used in Table 3, and we also include SIC two-digit industry and year dummies. All explanatory variables in the second stage are lagged by one year. Firm-clustered standard errors are in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	Dependent variable: Overall CSR Score (excl. Corporate Governance)			
	(1)	(2)	(3)	(4)
Information cost measure used:	Multiple Business Segment dummy	Business Segment Concentration	Size-Adjusted Analyst Forecast Error	Size-Adjusted Analyst Forecast Dispersion
Board $\widehat{\text{Independence}}$	0.295	1.587***	0.824**	0.730*
	(0.407)	(0.484)	(0.411)	(0.428)
Information Cost Measure	-0.524***	0.978***	-9.201***	-21.091**
	(0.137)	(0.257)	(3.461)	(9.345)
Board $\widehat{\text{Independence}}$	0.687***	-1.238***	12.331***	27.370**
× Information Cost Measure	(0.188)	(0.345)	(4.562)	(12.070)
Log Assets	0.076***	0.078***	0.076***	0.080***
	(0.010)	(0.010)	(0.010)	(0.010)
Book-to-Market	-0.045***	-0.042***	-0.057***	-0.050***
	(0.016)	(0.016)	(0.016)	(0.016)
Market Leverage	-0.235***	-0.248***	-0.269***	-0.283***
	(0.044)	(0.045)	(0.046)	(0.047)
Free Cash Flow	0.085**	0.084**	0.098**	0.106***
	(0.033)	(0.033)	(0.038)	(0.039)
Cash Ratio	0.105***	0.097***	0.083***	0.087***
	(0.025)	(0.025)	(0.027)	(0.028)
Sales Growth	-0.015	-0.017	-0.015	-0.017
	(0.013)	(0.013)	(0.015)	(0.015)
CEO Age	-0.002**	-0.002**	-0.002**	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
CEO Tenure	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)

(Table 8 continued)

Log Board Size	0.206***	0.208***	0.216***	0.221***
	(0.029)	(0.029)	(0.031)	(0.032)
Busy Board	0.008	0.010	-0.002	-0.000
	(0.014)	(0.014)	(0.015)	(0.015)
CEO-Chair Duality	0.015	0.015	0.029**	0.026*
	(0.014)	(0.014)	(0.015)	(0.015)
Old Independent Director Dummy	-0.054***	-0.055***	-0.066***	-0.067***
	(0.012)	(0.012)	(0.013)	(0.013)
Firm HQ State's Democratic Leaning	0.513***	0.508***	0.530***	0.514***
	(0.104)	(0.103)	(0.109)	(0.112)
Industry Dummies	SIC2D	SIC2D	SIC2D	SIC2D
Year Dummies	YES	YES	YES	YES
No. of Obs.	19,216	19,163	18,961	18,056
Diff.-in-Sargan Endogeneity Test C-stat.	6.276**	4.877*	8.118**	3.671
(p-value)	(0.043)	(0.087)	(0.017)	(0.160)
Kleibergen-Paap rk Wald first-stage F-stat.	16.960	16.477	16.539	15.642

Table 9: Informational value of CSR: Subsample analysis

This table re-estimates columns (3) and (4) of Table 3, separately for CEO pay slice or board independence subsamples. At each fiscal year-end, we define low CEO pay slice or board independence firms as those with values below the sample median at the fiscal year-end, with high CEO pay slice or board independence firms defined analogously. We then use the latest fiscal year-end data to construct high and low CEO pay slice or board independence subsamples. All regressions include the identical set of controls as in Table 3, as well as SIC 2-digit industry and year dummies. All explanatory variables are lagged by one year. Firm-clustered standard errors are in parentheses. For the subsample difference-in-coefficient test results in column (3) and (6), we report the χ^2-statistic in parentheses. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	CEO pay slice subsample			Board independence subsample		
	Low	High	Subsample diff.-in.-coeff.	High	Low	Subsample diff.-in.-coeff.
Panel A. Size-Adjusted Analyst Forecast Error						
Board Independence × Information Cost Measure	12.612***	6.896***	5.716	11.935***	4.300***	7.635*
	(3.400)	(2.827)	(2.29)	(3.771)	(1.242)	(3.66)
Controls, SIC2D industry and year dummies	YES	YES		YES	YES	
No. of obs.	6,430	6,987		9,465	9,496	
Adjusted R-squared	0.234	0.229		0.246	0.171	
Panel B. Size-Adjusted Analyst Forecast Dispersion						
Board Independence × Information Cost Measure	32.256***	17.916***	14.340	35.814***	15.517***	20.297*
	(10.186)	(8.041)	(1.99)	(11.887)	(4.012)	(2.71)
Controls, SIC2D industry and year dummies	YES	YES		YES	YES	
No. of obs.	6,241	6,844		9,159	8,897	
Adjusted R-squared	0.236	0.231		0.248	0.168	

Appendix A: Proofs

Proof of Proposition 2. We prove this proposition in steps. The shareholders' ex ante expected utility from not inducing CEO information revelation but engaging in stakeholder consultation is equal to:

$$EU_s(I;\omega=1) = -c(1-d)[\sigma_M^2 + (1-Ig^2)g^2] \\ -\big(1-c(1-d)\big)[1-I(\sigma_\varepsilon^2+g^2)](\sigma_\varepsilon^2+g^2) - cR \qquad \text{(A.1)}$$

Simple algebraic inspection of (A.1) yields that it unambiguously increases in I. Thus, when the shareholders anticipate stakeholder-assisted information revelation through their CSR activities, they will set the level of board independence at its maximum, i.e., $I = 1$. This is not surprising as there is no tension between board independence and stakeholder information provision. Putting $I = 1$ into (13) yields the board's maximum willingness to engage in CSR as given in the proposition.

On the other hand, when the CEO does not reveal her information and the board decides not to engage in CSR, the shareholders, once again, choose the maximum level of board independence, with their ex ante expected utility given by:

$$EU_s(I=1;\omega=0) = -c[\sigma_M^2 + (1-g^2)g^2] - (1-c)(1-\sigma_\varepsilon^2-g^2)(\sigma_\varepsilon^2+g^2). \qquad \text{(A.2)}$$

Thus, the difference in the shareholders' expected utility between "no revelation" and "stakeholder-assisted revelation," i.e., $EU_s(I;\omega=1) - EU_s(I;\omega=0)$, is given by:

$$EU_s(I=1;\omega=1) - EU_s(I=1;\omega=0) = cd[\sigma_M^2 + (1-g^2)g^2] \\ -cd(1-\sigma_\varepsilon^2-g^2)(\sigma_\varepsilon^2+g^2) - cR. \qquad \text{(A.3)}$$

But, knowing that $R \le d\left(\sigma_M^2 - \sigma_\varepsilon^2 + \frac{\sigma_\varepsilon^2}{2}(\sigma_\varepsilon^2+g^2)\right)$, it must be that:

$$EU_s(I=1;\omega=1) - EU_s(I=1;\omega=0) \ge cd[\sigma_M^2 + (1-g^2)g^2] \\ -cd(1-\sigma_\varepsilon^2-g^2)(\sigma_\varepsilon^2+g^2) - cd\left(\sigma_M^2 - \sigma_\varepsilon^2 + \frac{\sigma_\varepsilon^2}{2}(\sigma_\varepsilon^2+g^2)\right). \qquad \text{(A.4)}$$

A simple rearrangement of (A.4) yields:

$$EU_s(I=1;\omega=1) - EU_s(I=1;\omega=0) \ge \frac{cd\sigma_\varepsilon^2}{2}(\sigma_\varepsilon^2+3g^2) > 0. \qquad \text{(A.5)}$$

This completes the second part of the proposition, namely that when the board finds it optimal to engage in stakeholder consultation, it is also in the ex ante interest of the shareholders'. In fact, even at the board's cut-off point, the shareholders strictly prefer CSR activities; this discrepancy stems

from the fact that, whereas the board internalizes the increased cost of monitoring following stakeholder consultation, the shareholders are not affected by it. Thus, the board exhibits a lower willingness to expend on CSR activities than the shareholders. ■

Proof of Proposition 3. Part (i) of Proposition 3 follows immediately from Proposition 2; whenever (15) is satisfied, stakeholder consultation always dominates no revelation from the shareholders' point of view. However, in both instances, the shareholders set the level of board independence at $I = 1$, so stakeholder consultation has no impact on board independence. Ex ante expected monitoring intensity increases from $cg^2 + (1-c)(\sigma_\varepsilon^2 + g^2)$ to $c(1-d)g^2 + \big(1 - c(1-d)\big)(\sigma_\varepsilon^2 + g^2)$.

On the other hand, suppose that $EU_s(I = I'; \omega = 0) \geq EU_s(I = 1; \omega = 0)$, which guarantees that the shareholders prefer to induce the CEO to reveal her information by setting a lower level of board independence in the absence of stakeholders. First, notice that:

$$EU_s(I = I'; \omega = 0) = -\left[1 - \frac{(\sigma_M^2 - \sigma_\varepsilon^2)(\sigma_\varepsilon^2 + g^2)}{\sigma_\varepsilon^2(b - \sigma_\varepsilon^2)}\right](\sigma_\varepsilon^2 + g^2). \tag{A.6}$$

We still need to compare whether the shareholders have an incentive to engage in CSR activities strategically in order to obtain firm-specific information from the stakeholders. To do so, we need to compare $EU_s(I = I'; \omega = 0)$ and $EU_s(I = 1; \omega = 1)$. Since:

$$\begin{aligned} EU_s(I = 1; \omega = 1) = &-c(1-d)[\sigma_M^2 + (1 - g^2)g^2] \\ &-\big(1 - c(1-d)\big)(1 - \sigma_\varepsilon^2 - g^2)(\sigma_\varepsilon^2 + g^2) - cR, \end{aligned} \tag{A.7}$$

at the cut-off point of $b = b^f$, $EU_s(I = I'; \omega = 0) = -(1 - \sigma_\varepsilon^2 - g^2)(\sigma_\varepsilon^2 + g^2)$, which is larger than $EU_s(I = 1; \omega = 1)$ even in the limit of $d = 1$ because $R > 0$. Thus, as long as b is close to b^f, the shareholders will find it optimal to induce the CEO to reveal her information even when the stakeholders hold accurate firm-specific information.

Now suppose that (15) is satisfied. Then, the proof of Proposition 2 demonstrates $EU_s(I = 1; \omega = 1) > EU_s(I = 1; \omega = 0)$. Notice that there are two circumstances under which "induced revelation" occurs in the absence of stakeholder consultation. First, when c is sufficiently low, the shareholders induce the CEO to reveal her information for some intermediate range of b but switch to no revelation as b becomes too large, because $EU_s(I = I'; \omega = 0)$ decreases in b but $EU_s(I = 1; \omega = 0)$ is unaffected by it. Let us denote the threshold at which this switch occurs by b^n. In other words, at b^n, $EU_s(I = 1; \omega = 0) = EU_s(I = I'; \omega = 0)$ and thus $EU_s(I = 1; \omega = 1) > EU_s(I = I'; \omega = 0)$. In fact, since $EU_s(I = 1; \omega = 1)$ is also unaffected by b, $EU_s(I = 1; \omega =$

$1) = EU_s(I = I'; \omega = 0)$ will occur at a lower level of b, which we denote b^s. Then, $EU_s(I = 1; \omega = 1) > EU_s(I = I'; \omega = 0)$ for all $b \in (b^s, b^n]$, and the shareholders find it optimal to engage in stakeholder consultation through CSR. As $I' < 1$, the level of independence increases as a result.

The expected monitoring intensity under induced revelation is:

$$\pi(I = I'; \omega = 0) = I'(\sigma_\varepsilon^2 + g^2) = \frac{(\sigma_M^2 - \sigma_\varepsilon^2)(\sigma_\varepsilon^2 + g^2)}{\sigma_\varepsilon^2(b - \sigma_\varepsilon^2)} \tag{A.8}$$

But the expected monitoring intensity under stakeholder-assisted revelation is:

$$\pi(I = 1; \omega = 1) = c(1 - d)g^2 + \big(1 - c(1 - d)\big)(\sigma_\varepsilon^2 + g^2) \tag{A.9}$$

After some algebraic manipulations, it can be shown that $\pi(I = 1; \omega = 1) > \pi(I = I'; \omega = 0)$ if and only if:

$$b > \sigma_\varepsilon^2 + \frac{(\sigma_M^2 - \sigma_\varepsilon^2)(\sigma_\varepsilon^2 + g^2)}{\sigma_\varepsilon^2\big((1 - c(1 - d))\sigma_\varepsilon^2 + g^2\big)}. \tag{A.10}$$

If (A.10) is satisfied, stakeholder-assisted revelation leads to an increase in monitoring intensity, and vice versa.

However, if c is too high, then even as $b \to \infty$, $EU_s(I = I'; \omega = 0) \geq EU_s(I = 1; \omega = 0)$, and induced revelation always dominates no revelation for regardless of the CEO's private benefit (Lemma 1 of Adams and Ferreira, 2007). Let us check whether the shareholders still have an incentive to engage in stakeholder-assisted revelation even under such circumstances. First, (15) can only be satisfied if d is sufficiently high and/or R is sufficiently low. Let us consider the extreme case of $d = 1$. Then, as $b \to \infty$, we have $EU_s(I = 1; \omega = 1) - EU_s(I = I'; \omega = 0) = (\sigma_\varepsilon^2 + g^2)^2 - cR$, which is positive when R is sufficiently small. Given that $EU_s(I = I'; \omega = 0)$ is continuous in b whenever $b > b^f$, this implies there must exist a non-empty range of b where $EU_s(I = 1; \omega = 1) > EU_s(I = I'; \omega = 0)$, i.e., the shareholders prefer stakeholder-assisted revelation to induced revelation. More generally, it can be shown that, for given d and R, $EU_s(I = 1; \omega = 1) > EU_s(I = I'; \omega = 0)$ as $b \to \infty$ whenever:

$$cR < \big(1 - c(1 - d)\big)(\sigma_\varepsilon^2 + g^2)^2 + c(1 - d)\big(g^4 - (\sigma_M^2 - \sigma_\varepsilon^2)\big) \tag{A.11}$$

The first term of (A.11) is unambiguously positive, while the second term is ambiguous. In any case, it can be shown that (A.11) can be satisfied for sufficiently small R and large d, holding the degree of CEO-board information asymmetry, i.e., c, as given. As long as (A.11) is satisfied, there will always be a non-empty region of b above certain threshold where the shareholders prefer to engage

in CSR instead of appeasing the CEO. Once again, board independence increases as a result, while expected monitoring intensity also increases whenever b is large enough to satisfy (A.10). ■

Appendix B: Detailed summary of the Nike's corporate responsibility committee example

This appendix provides a detailed summary of Paine's (2014) case study on Nike's corporate responsibility committee within the board of directors.

B.1. Background

During the 1990s, Nike faced intense protests from various activist groups over its labor records in Asian contract factories. Jill Ker Conway, a former president of Smith College who was appointed to Nike's board as independent director in 1987, recognized the complexity of these social and environmental issues and proposed to the firm's CEO, Phil Knight, that a corporate responsibility committee be formed within the board to engage in health, labor, and environmental issues.

B.2. Benefits of corporate responsibility committee

According to Paine (2014), since its foundation, the committee's works over the years have brought tangible governance benefits to the board in the following ways: "as a source of knowledge and expertise, as a sounding board and constructive critic, as a driver of accountability, as a stimulus for innovation, and as a resource for the full board (p.88)."

Source of knowledge and expertise: The forming of corporate responsibility committee was an initiative driven by an independent director with domain-specific expertise in CSR issues. The committee's subsequent works have distinctly remained a board-driven initiative, with a "close alignment between Conway's diverse talents and the corporate responsibility issues Nike faced in the 1990s (p. 89)." This is a good example of how independent directors with the relevant expertise could take charge of overseeing CSR initiatives at the board level.

A sounding board and constructive critic: The committee's works involve "asking insightful questions, making suggestions, offering perspectives, raising counterpoints, and proposing alternatives (p. 90)" that both enrich and challenge the prevailing view of management. This is aided by the fact that four out of five committee members are independent directors.

A driver of accountability: Changes at the board-level have been accompanied by changes at the corporate level, with "the introduction of dual-reporting lines between the corporate responsibility group and key business functions such as finance, innovation, and supply chain (p. 92)." Moreover, by asking executives to appear regularly before the committee and explain whether their proposed strategies are compatible with the company's overall sustainability objectives, the committee monitors the executives' actions in more potent ways.

A stimulus for innovation: The committee's roles go beyond merely improving corporate image, and a substantial fraction of its time and effort is spent on providing support for innovation. By engaging with employees in an 18-month coordinated initiative with management, the committee was able to identify root causes of Nike's perennial excessive overtime problem, with a need for innovative ways to deal with making the manufacturing process itself safer and more sustainable. The committee subsequently encouraged management to invest in a Dutch start-up that offered a waterless process for dyeing polyester that would improve both the product quality and be more environment-friendly. With the committee's support, the investment was made, and their technology was amalgamated into the supply chain. This is a good example of the committee's engagement with stakeholders yielding tangible benefits in terms of ultimately improving Nike's production process, by enabling the committee to advise management in a more informed manner.

A resource for the full board: According to Nike's executives, "board-level discussions of labor issues in the supply chain gained traction only after the corporate responsibility committee was formed (p. 94)," with the committee's regular reports elevating the entire board's level of understanding.

B.3. The example's relevance to our model

Nike's corporate responsibility committee and its works provide a clear example of board-level CSR initiatives driven by independent directors with relevant expertise in sustainability issues, with the objectives reaching beyond the traditional channel of improving the firm's brand image. The example aptly demonstrates that, by engaging the stakeholders in a targeted way at the board level, the committee has received important information about shortcomings in the prevailing production process. Subsequently, they have been able to advise on more efficient and sustainable solutions to these supply chain issues. This is a classic example of "informed advising." At the same time, the committee's greater understanding of the firm's production process and supply chain has allowed its members to challenge executives' thinking and ask them to explain their proposed course of actions in a constructive yet focused manner, improving their capacity as monitors of management.

Appendix C: Control of the CSR Agenda

When the CEO has private benefit from control of the project, it may be in her interest to prevent the board from engaging in information gathering through stakeholder consultation. Thus, in this appendix, we prove that our qualitative results remain robust to the possibility of the control of the CSR agenda belonging to the CEO.

To this end, we consider the following extension. When the CEO refuses to share firm-specific information and the game reaches the board's CSR expenditure decision at $t = 1$, the CEO has the option to put forward a rival proposal costing the same amount, R. The CEO's proposal is different from the board's in that her version of stakeholder engagement ensures no firm-specific information would be revealed to the board. Suppose furthermore that, when there are two CSR proposals, the board is able to push through its proposal with probability z, where the probability may or may not depend on I, i.e., the prevailing level of board independence. In our set-up, the board acts completely in accordance with the shareholders' interests, so it is natural to assume that a more independent board would fight harder to secure its proposal. In addition, a more independent board is more likely to have sufficient voting power to curb CEO's rival proposal. Thus, whenever z is a function of board independence, we assume it to be a monotonically increasing function of it, i.e., $z = z(I)$ with $z' > 0$.

Assume that it is in the CEO's interest to put forward a rival proposal whenever the board puts forward a proposal (which will turn out to be the case later). In this instance, the board prefers to engage in CSR if and only if:

$$zdEU_b(i = \theta; I; \omega = 1) + (1 - zd)EU_b(i = \emptyset; I; \omega = 1) > EU_b(i = \emptyset; I; \omega = 0). \quad \text{(C.1)}$$

Then, the board's CSR decision may be characterized as:

$$R \leq zd\left(\sigma_M^2 - \sigma_\varepsilon^2 + \frac{I}{2}\sigma_\varepsilon^2(\sigma_\varepsilon^2 + g^2)\right) \equiv \bar{\bar{R}} < \bar{R} \quad \text{(C.2)}$$

The CEO's ability to put forward a rival proposal reduces the informational value of CSR, making it less attractive for the board to engage in informationally-motivated CSR in the first place. Notice, however, that the addition of the parameter z only serves to scale down the probability d; as long as $z \neq 0$, i.e., as long as the management is unable to completely sabotage the board's channels of informational communication with the stakeholders, our main qualitative result remains unchanged. Moreover, with z either a constant or an increasing function of I, we know that the right hand side of

(C.2) is an increasing function of I. Thus, as in the main model, the board is more willing to expend resources on stakeholder engagement as its level of independence increases.

However, it remains to be checked whether it is in the CEO's interest to put forward such a rival proposal. A simple comparison of the CEO's expected utility yields that the CEO prefers to bid for a rival proposal whenever:

$$zdEU_c(i = \theta; I) + (1 - zd)EU_c(i = \emptyset; I) \geq dEU_c(i = \theta; I) + (1 - d)EU_c(i = \emptyset; I) \quad \text{(C.3)}$$

A necessary and sufficient condition for the bidding of rival proposal upon reaching the CSR decision stage, knowing that $z \in [0,1]$, is $EU_c(i = \theta; I) < EU_c(i = \emptyset; I)$, i.e., whenever the CEO expects a higher utility by not revealing the information, taking I as given.

However, notice that this stage is reached only when it is in the CEO's interest not to reveal the information, i.e., $EU_c(i = \theta; I) < EU_c(i = \emptyset; I)$, for otherwise, the CEO would prefer to reveal the firm-specific information herself in the first place. Then, it can be trivially shown that the CEO's information revelation condition is identical to the main model, which is also equal to the condition in the baseline Adams-Ferreira model, i.e., (14).

Finally, a simple algebraic manipulation analogous to the Proof of Proposition 2 reveals both parts of the proposition stand as long as z is either constant or monotonically increasing in I. This reveals that whenever it is in the board's interest to engage in informationally-motivated CSR, it is also in the shareholders' interest to do so. Then, it is also the case that the shareholders decide to choose the maximum level of board independence, i.e., $I = 1$, whenever the CEO refuses to share firm-specific information and the board has to rely on stakeholder-assisted information revelation.

Thus, if the CEO has the possibility of controlling the CSR agenda and preventing the board from acquiring firm-specific information, the board is less likely to engage in informationally-motivated CSR due to its lower marginal informational value. However, as long as the CEO does not have the complete control of the CSR agenda, the existence of our information channel remains qualitatively robust.

Appendix D: Stakeholders' optimization problem

In this appendix, we explicitly set-up the stakeholders' preference. Suppose that their preference is given by:

$$U_{st} = -(y - \varepsilon + h)^2, \tag{D.1}$$

We do not assume the direction of h, i.e., the stakeholders may be biased either toward or against the CEO. Under the model set-up, the board approaches the stakeholders for information if the CEO refuses to reveal θ. Suppose first that the board refuses to engage in any CSR activities. Then, rationally anticipating the board's monitoring intensity as specified in (4) and (5), the stakeholders' respective expected payoffs from revealing and not revealing θ are:

$$EU_{st}(i = \theta) = -I(\sigma_\varepsilon^2 + g^2)h^2 - \big(1 - I(\sigma_\varepsilon^2 + g^2)\big)(\sigma_\varepsilon^2 + (h - g)^2), \tag{D.2}$$

$$EU_{st}(i = \emptyset) = -Ig^2(\sigma_M^2 + h^2) - (1 - Ig^2)(\sigma_M^2 + (h - g)^2). \tag{D.3}$$

Naturally, information revelation is weakly preferred in the absence of CSR if $EU_{st}(i = \theta) \geq EU_{st}(i = \emptyset)$. Similar to the CEO's revelation constraint, we may derive a maximum level of board independence, I'', at which the stakeholders would reveal their information in the absence of CSR. Specifically, it may be easily shown that stakeholders' information revelation constraint requires $I \leq I''$, where $I'' \equiv \frac{\sigma_M^2 - \sigma_\varepsilon^2}{\sigma_\varepsilon^2\{2g(h-g) - \sigma_\varepsilon^2\}}$ if $\sigma_\varepsilon^2 < 2g(h - g)$, while $I'' \equiv 1$ if $\sigma_\varepsilon^2 \geq 2g(h - g)$.

However, the stakeholders are only consulted when the CEO refuses to reveal information. Thus, if $I'' < I'$, i.e., if the stakeholders' information revelation constraint is more stringent than the CEO's, then the stakeholders refuse to share their firm-specific information in the absence of CSR whenever the CEO refuses to do so. A simple comparison of the two revelation constraints yield that this is the case whenever $b < 2g(h - g)$, or once rearranged,

$$h > g + \frac{b}{2g}. \tag{D.4}$$

In other words, CSR becomes necessary when the stakeholders have sufficiently strong bias of their own, in the same direction as the CEO's. In this instance, the board must engage in some form of compensation to the stakeholders to make up the difference in expected utility, i.e., the gap between $EU_{st}(i = \theta)$ and $EU_{st}(i = \emptyset)$. This provides a more rigorous rationale for the parameter R, namely the minimum CSR expenditure necessary to persuade the stakeholders to reveal θ.

Appendix E: Variable Definitions

In this appendix, we provide a detailed definition of all variables used in our analysis. Data sources are indicated in parentheses following the variable name.

E.1. Firm financial variables

Log assets (Compustat): log of total assets (*AT*).

Book-to-Market (Compustat/CRSP): book value of equity divided by the market value of equity. Book value of equity is defined as total shareholder equity (*SEQ*) minus (1) the liquidating value of preferred stock (*PSTKL*), or if unavailable, (2) the redemption value of preferred stock (*PSTKRV*), or, if neither is available, (3) the total value of preferred stock (*PSTK*). Market value of equity is defined as fiscal year price close (*PRCC_F*) times the number of common shares outstanding (*CSHO*).

Market Leverage (Compustat/CRSP): the sum of debt in current liabilities (*DLC*) plus long-term debt (*DLTT*), divided by the beginning-of-fiscal-year market value of assets. Market value of assets is defined as book value of assets minus book value of equity minus deferred taxes and investment credits (*TXDITC*) plus market value of equity.

Free Cash Flow (Compustat): operating income before depreciation (*OIBDP*) – income taxes (*TXT*) + change in deferred taxes and investment credits (Δ*TXDITC*) – change in working capital (*WCAPCH*) + sale of property, plant, and equipment (*SPPE*) – capital expenditures (*CAPX*), scaled by the beginning-of-fiscal-year book value of total assets (*AT*).

Sales Growth (Compustat): year-on-year percentage change in sales (*SALE*).

Cash Ratio (Compustat): cash and short-term investments (*CHE*) divided by the beginning-of-fiscal year book value of total assets (*AT*).

Return on Assets (Compustat): income before extraordinary items (*IB*) divided by the beginning-of-fiscal-year book value of total assets (*AT*).

1-year Abnormal Stock Return (CRSP): 1-year buy-and-hold return with the CRSP value-weighted return as benchmark.

Size-Adjusted Analyst Forecast Error (Thomson Reuters IBES/Compustat/CRSP): residual of simple regression of analyst forecast error on log assets. Analyst forecast error is defined as the absolute difference between the actual quarterly earnings (i.e., earnings per share multiplied by the number of shares outstanding as reported in CRSP) and the analysts' consensus estimate for the quarter at the last month of the fiscal quarter, normalized by the book value of assets. This forecast error is averaged over all available quarterly observations in a fiscal year to yield an annual figure.

Size-Adjusted Analyst Forecast Dispersion (Thomson Reuters IBES/Compustat/CRSP: residual of simple regression of analyst forecast dispersion on log assets. Analyst forecast dispersion is defined as the standard deviation of the analysts' quarterly earnings estimate at the last month of the fiscal quarter, normalized by the book value of assets. This quarterly forecast dispersion is averaged over all available quarterly observations in a fiscal year to yield an annual figure.

Multiple Segments dummy (Compustat Historical Segments): an indicator variable that equals 1 if and only if the firm reports more than one business segment with non-missing and non-negative sales.

Business Segment Concentration (Compustat Historical Segments): sales HHI of all business segments of a firm in a given year. All segments reporting negative sales are excluded for the purpose of HHI calculation.

Firm HQ State's Democratic Leaning (Compustat/National Archives): the difference between the percentage of votes that a Democratic candidate received in the firm's headquarter state in the last Presidential Election and the Democratic candidate's national share of votes.

Local Director Pool (Compustat/U.S. Census Gazetteer Files): log of one plus the number of Compustat firms (with non-missing assets) within the sixty-mile radius during the same fiscal year that do not share the same four-digit SIC code. 2010 U.S. Census Gazetteer Files is used to identify the latitude-longitude coordinates of firm headquarter ZIP codes.

Big City (Compustat/U.S. Census): an indicator variable that equals 1 if and only if the firm headquarter ZIP code as reported in Compustat belongs to one of the top 10 most populous Metropolitan Statistical Areas (MSAs) as reported in 2010 U.S. Census.

Medium City (Compustat/U.S. Census): an indicator variable that equals 1 if and only if the firm headquarter ZIP code as reported in Compustat belongs to MSAs ranked between 11-50 by their population as reported in 2010 U.S. Census.

E.2. Board variables

Log Board Size (BoardEx): log of the number of directors as reported in BoardEx, which is included as a control due to Yermack (1996).

Board Independence (BoardEx or ISS): the number of independent directors as defined by either BoardEx or ISS, divided by the number of directors.

Industry Median Board Independence (BoardEx): median value of board independence for each SIC two-digit industry-year.

Majority Independence dummy (BoardEx): an indicator variable that equals 1 if and only if board independence exceeds 50% according to the BoardEx definition.

CEO-Chair duality (BoardEx): an indicator variable that equals 1 if and only if the CEO is also the chair of the board.

Busy Board (BoardEx): an indicator variable that equals 1 if and only if a majority of independent directors serve concurrently on three or more boards, following Fich and Shivdasani (2006).

Old Independent Director dummy (BoardEx): an indicator variable that equals 1 if and only if at least one of the independent directors is aged 70 or older.

Average Independent Director Equity Ownership (ISS): the average number of shares held by a firm's independent directors, divided by the fiscal year-end number of common shares outstanding.

E-index (ISS): entrenchment index of Bebchuk, Cohen, and Ferrell (2009).

E.3. CEO-related variables

CEO Age (BoardEx): CEO age as reported in BoardEx.

CEO Tenure (BoardEx): CEO tenure as reported in BoardEx.

Inside-Succession CEO dummy (BoardEx): an indicator variable that equals 1 if and only if the CEO's time spent in company exceeds his or her CEO tenure by more than one year.

CEO Turnover dummy (Execucomp): an indicator variable that equals 1 if the CEO's departure date as reported in Execucomp falls on the third or fourth quarter of the current fiscal year or the first two quarters of the next fiscal year.

Suspected Forced CEO Turnover dummy (Execucomp/Compustat): an indicator variable that equals 1 if, at the time of a CEO turnover event, the CEO is less than 60 years of age and he/she does not re-emerge as CEO of another firm within the one-year window.

CEO Total Pay (Execucomp): log of CEO total annual compensation (Execucomp item TDC1) in constant January 2002 dollars.

CEO Equity Ownership (Execucomp): number of shares held by the CEO divided by fiscal year-end common shares outstanding.