

# Do firms use corporate social responsibility to insure against stock price risk? Evidence from a natural experiment

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## Abstract

**Research Summary:** To examine whether firms use corporate social responsibility (CSR) to insure against stock price risk, we exploit an exogenous shock in stock price risk associated with Regulation SHO whereby the SEC randomly selected pilot firms for which the uptick restriction on short sales no longer applied. A difference-in-differences test reveals that pilot firms increased CSR more than nonpilot firms and that in particular they reduced CSR concerns and increased CSR that impacts stakeholders involved in direct resource exchange. We also find that pilot firm CSR reduced short positions against them and that the effect is stronger for CSR concerns and CSR that impacts directly connected stakeholders. Overall, we document a causal effect of stock price risk on managerial incentives to invest in CSR for risk management.

**Managerial Summary:** Corporate social responsibility has many purported benefits, one of which is that it can insure against the adverse stock price effects of negative events. But do managers purposefully use CSR in this way and do such investments provide intended insurance-like benefits? By taking advantage of a natural experiment where a randomly selected set of pilot firms were exposed to elevated short-sale risk unleashed by the SEC regulation, we find evidence that they do. Once the SEC initiated the regulatory

change, firms that faced greater risk increased CSR more than firms that did not. In addition, increased CSR lowered short interests in pilot firms' stocks and this reduction is attributable to the insurance-like effect of CSR rather than simply prevention of adverse events.

#### KEY WORDS

CSR, insurance-like effect, resource allocation, short selling, stock price risk

## 1 | INTRODUCTION

Do firms purposefully use corporate social responsibility (CSR) for risk mitigation, such as to insure against stock price risk? We investigate this question by taking advantage of an exogenous shock in stock price risk associated with the 2005 Regulation SHO (hereinafter Reg SHO) whereby the SEC removed the uptick restriction for a set of randomly selected pilot firms.<sup>1</sup> U.S. firms have intensively engaged in CSR activities in recent decades, so it is of great interest to understand the rationale for such allocation of resources (Mattingly, 2017). Some prior studies address passive firm adoption of CSR in the face of various pressures (Aguinis & Glavas, 2012; Groza, Pronschinske, & Walker, 2011) while others have found that firms actively pursue CSR to gain benefits "from a variety of stakeholders, such as consumers, employees, investors, regulators, and other socio-political actors" (Kaul & Luo, 2018, p. 1653). Within this latter stream, assessing firms' insurance motives to invest in CSR is particularly important given the increasing business need for risk management and mitigation (e.g., Disparte, 2016). To this point, Peloza's (2006, p. 60) observation as to the managerial use of CSR rings true: "... although researchers and firms are moving toward an appreciation of insurance potential from CSR, the certainty of firms' abilities to take advantage of this potential is limited."

Prior literature shows that firms that have invested in CSR enjoy insurance-like benefits (Godfrey, Merrill, & Hansen, 2009; Koh, Qian, & Wang, 2014; Shiu & Yang, 2017) but has not shown that these benefits are the reason firms advance CSR. A firm's enjoyment of such benefits need not imply that firms intentionally leverage CSR for risk mitigation purposes since firms might just happen to realize insurance benefits while engaging in CSR for other reasons. For example, firms face pressure by governments, NGOs, activists, media, and/or various CSR rankings to pursue CSR, which may bring about unintended, ad hoc insurance benefits (Wang, Tong, Takeuchi, & George, 2016); or they may actively pursue CSR to seek benefits other than insurance-related ones (Kaul & Luo, 2018). As well, it is unclear whether CSR undertaken for the instrumental purpose of protecting against future negative events actually does so (Godfrey, 2005). Luo, Kaul, and Seo (2018) highlight the importance of this issue by finding that the insurance-like benefits of philanthropy appear to be opportunistically used by petroleum firms as a shield for more oil spills. In this study, we address these gaps in the literature by exploiting the natural experiment of Reg SHO to examine whether

<sup>1</sup>To ascertain the effect of loosening short selling restrictions (i.e., lifting the uptick rule), the SEC ran a pilot study as part of Reg SHO. It announced the list of pilot stocks on July 28, 2004. The pilot program took effect on May 2, 2005 (i.e., the uptick rule was removed only for pilot securities) and ended on July 6, 2007, when the uptick rule was eliminated for all exchange-listed stocks.

firms invest in CSR in response to greater stock price risk, and whether such investments provide intended insurance-like benefits.

We take this approach because research on the use and benefits of CSR as insurance faces some hurdles. First, given the multiplicity of reasons for undertaking CSR, it is difficult to empirically pin down risk mitigation as the motive behind CSR activities. A clean setting is required to isolate and/or manipulate factors that affect risk while holding constant other reasons to pursue CSR. Second, CSR and an identified risk proxy (e.g., litigation risk) may be endogenously determined and a mere correlation between the two constructs does not warrant a causal explanation that anticipated risks motivate firms to “purchase” CSR as insurance.<sup>2</sup>

Reg SHO serves as an ideal setting to test insurance motives behind CSR since the stratified random selection process used by the SEC makes pilot and nonpilot firms the same except for short-sale constraints (i.e., holds constant factors that affect other CSR motives). Given that the pilot program was not designed to influence firms' CSR activities or any CSR-related corporate decisions (i.e., the regulation-induced increase in stock price risk is exogenous with respect to CSR), we can establish a causal effect from the anticipated stock price decline risk to managerial insurance motives to pursue CSR.

Using difference-in-differences analyses (DiD), we find a differential increase in CSR between pilot and nonpilot firms during the Reg SHO period that is statistically significant and economically substantial. We further present evidence that CSR performance between two types of firms tended to converge after short-selling constraints were lifted for all stocks. We also show that pilot firms both reduced CSR concerns and increased CSR that impacts stakeholders involved in direct resource exchange (such as employees and customers). We further show that pilot firms that increased CSR had lower short interests than pilot firms that did not increase it and that the effect was stronger for CSR concerns and CSR that impacts directly connected stakeholders. More importantly, we provide some evidence that CSR reduced short interests through its insurance effect rather than simply the adverse event prevention effect. Finally, we find that the documented pattern regarding CSR was not due to greater market attention and was not an artifact of alternative means of countering short sellers. Overall, our findings from this natural experiment demonstrate that firms use CSR to insure against stock price risk and that doing so provides intended insurance-like benefits. We contribute to the CSR literature empirically by providing a causally identified test of existing arguments for the insurance-like role of CSR.

## 2 | THEORY AND HYPOTHESIS DEVELOPMENT

Corporate social responsibility can generate insurance-like protection as it accrues moral capital among stakeholders and thus can lessen their negative reactions to adverse events (Godfrey, 2005). Evidence on the insurance role of CSR mostly comes from studies that examine its insurance-like benefits. Specifically, firms with higher CSR experience less severe stock and bond price decline in the face of negative legal or regulatory events (Godfrey et al., 2009; Luo et al., 2018; Shiu & Yang, 2017), product recalls (Minor & Morgan, 2011), and litigation risk (Koh et al., 2014). While these findings are insightful, they do not inform whether managers purposefully invest in CSR as insurance against the future risk of possible negative events nor whether CSR activity undertaken for this

<sup>2</sup>For example, unobserved managerial characteristics may affect both risk exposure and CSR activities, which causes a spurious relationship between CSR and risk proxies. Firms may also use CSR to influence their risk exposure (reverse causality), that is, firms with a strong CSR reputation can be more likely to take on additional risk.

instrumental purpose actually does so. This issue is further complicated by endogeneity between CSR and risk exposure.

Reg SHO, as a natural experiment, enables us to employ a DiD methodology to isolate firms' strategic use of CSR for risk mitigation. Short sellers are sophisticated market participants who trade on bad news and profit from downward stock price movements. Short selling puts downward pressure on a stock's price and can aggravate market volatility and turmoil during down markets (Brunnermeier & Pedersen, 2005). So, from the 1930s, short selling was only allowed on an uptick in the market price. In 2005, Reg SHO suspended the uptick rule for stocks of every third firm on the Russell 3000 Index ranked by average daily trading volume on the NYSE, NASDAQ NM, and AMEX stock exchanges. The lifting of short-selling constraints incentivized short sellers to trade on negative information, which made pilot firms more vulnerable to predatory trading and exposed them to heightened stock price decline risk. Not surprisingly, prior studies find that the pilot program had a positive effect on short-sale activities and a negative effect on stock prices (Grullon, Michenaud, & Weston, 2015; Office of Economic Analysis, 2007).<sup>3</sup> Further, greater exposure to shorting magnified the adverse stock price effect of negative events (De Angelis, Grullon, & Michenaud, 2017; Li & Zhang, 2015).<sup>4</sup> In addition, anecdotal evidence shows that Reg SHO caused concern and fear among managers and market participants.<sup>5</sup>

Because short selling threatened pilot firms, managers were conscious about the adverse stock price impact and took both short-term and long-term actions such as reducing equity financing and risky investment (Grullon et al., 2015), reporting bad news with less precision (Li & Zhang, 2015), reducing earnings management (Fang, Huang, & Karpoff, 2016), increasing antitakeover provisions and offering more stock options (De Angelis et al., 2017).

We posit that, in response to Reg SHO, pilot firms would increase CSR relative to nonpilot firms to insure against elevated short-selling threats and growing stock price decline risk.<sup>6</sup> First, CSR ensures top management's attention on social criteria and such states of mind can reduce the likelihood of unethical and socially harmful activities, thereby providing short sellers fewer opportunities to exploit. Even though pilots and nonpilots had the same degree of exposure to negative events, short sellers would have preferred to target pilots as they were not restricted from taking positions to further drive down the prices of those stocks when prices started falling. In other words, conditioning on the incidence of negative events, greater short-selling threats increased the probability of the negative events being exploited in a bear raid. Because of this greater susceptibility to negative events, pilot firms had incentives to increase CSR to lower the incidence of bad events. We refer to this as the prevention effect of CSR. Second, stakeholders are more likely to give high-CSR firms the

<sup>3</sup>Grullon et al. (2015) report that the announcement of Reg SHO caused an increase in short interest of about 10% of the average monthly short interest and a decrease in stock price of 1.5%. The SEC's Office of Economic Analysis (Office of Economic Analysis, 2007) finds that Reg SHO causes an 8% increase in short-selling activity relative to the mean short-selling volume before the implementation date.

<sup>4</sup>For example, Li and Zhang (2015) find that pilot firms experienced increased price sensitivity to bad news during the Reg SHO period. De Angelis et al. (2017) document that the pilot firms' share prices become more sensitive to negative earnings surprises.

<sup>5</sup>For example, NYSE officials, specialists, and member firms, in public comments, all expressed support for short-sale restrictions and opposed removal of price constraints on short selling for randomly selected pilots. In a 2008 NYSE survey, 85% of CEOs, CFOs, and investor relation officers surveyed were in favor of reinstating the uptick rule as soon as possible (this information is taken from Grullon et al., 2015).

<sup>6</sup>While we focus on pilot firms using CSR to insure against short selling threats, we acknowledge that it is not the only tool available for this purpose, nor is it necessarily the primary tool. This study does not attempt a comprehensive exploration of how firms mitigate stock price risk in response to Reg SHO. However, it does examine one unique means of mitigating such an imminent risk.

benefit of the doubt and impose less severe punishment when negative events occur (Godfrey, 2005). This insurance effect of CSR can reduce a stock's price sensitivity to adverse events (Godfrey et al., 2009; Koh et al., 2014; Minor & Morgan, 2011; Shiu & Yang, 2017). To earn greater profits, short sellers tend to target stocks with greater risk of a price drop, and lower stock price sensitivity to negative events may discourage short sellers from targeting high-CSR firms (Jain, Jain, & Rezaee, 2016). Thus, pilot firms had incentives to increase CSR to dissuade short sellers. This leads to our hypothesis:

**Hypothesis (H1).** *Firms treat CSR as insurance-like protection against short-selling threats such that, compared to nonpilot firms, pilot firms showed a greater relative increase in CSR levels from pre- to during-Reg SHO periods.<sup>7</sup>*

### 3 | METHODOLOGY

#### 3.1 | Data and sample

We construct our sample from three data sources: the Russell 3000 Index member firms from FTSE Russell, social ratings data from the MSCI ESG KLD STATS data set, and financial data and short interest data from S&P Compustat. Our sample period spans from 2003 to 2006, covering 2 years before and 2 years after the implementation date of Reg SHO (May 2, 2005).<sup>8</sup> Because we employ DiD analyses, we require sample firms to have available data at least 1 year before and 1 year during the pilot program. Our final sample includes 5,633 firm-year observations from 1,497 distinct firms, among which 1,939 observations are from 512 pilot firms and 3,694 from 985 nonpilot firms.

#### 3.2 | Empirical model

We use DiD analyses to examine whether pilot firms engaged in CSR activity more than nonpilots in response to the greater short-selling threats unleashed by Reg SHO. The DiD tests alleviate concerns about reverse causality (because of the arbitrary selection process, that is, being selected as a pilot was not caused by the firm) and omitted variables as well as control for time trends of CSR that are common to both types of firms. Specifically, we estimate the following model:

$$CSR_{it} = \alpha \times Pilot + \beta \times (Pilot \times During) + \gamma' X_{it-1} + \lambda_{it} + \delta_t + \epsilon_{it}, \quad (1)$$

<sup>7</sup>One could argue that it is challenging for firms to use CSR to mitigate short-term price risk given the long-term nature of CSR (i.e., it takes time for CSR benefits to materialize). However, stock prices in an efficient market should incorporate all possible future implications of current events such as CSR. Consistent with this view, prior studies find that pilot firms took both short-term actions (such as earnings management and disclosure precision) and long-term actions (such as investment and antitakeover provisions) to mitigate the stock price risk induced by Reg SHO. As well, the favorable publicity, enhanced reputation and marketing advantages (Godfrey, 2005) associated with CSR can begin to take hold even in the short run.

<sup>8</sup>The SEC announced the list of pilot securities on July 28, 2004. Since it takes a median life of 1 year for firms to implement CSR initiatives (Dimson, Karakas, & Li, 2015) and Reg SHO became effective on May 2, 2005, we treat 2004 as pre-Reg SHO, and 2005 as during-Reg SHO. Our inferences remain unchanged if we drop both 2004 and 2005 or either of them. We start our preperiod at 2003 because the KLD's coverage before 2003 is limited.

where  $i$  indexes firms and  $t$  indexes years;  $CSR$  is CSR score for firm  $i$  in year  $t$ ;  $Pilot$  is an indicator variable equal to one for pilot firms and zero for nonpilots;  $During$  denotes during-Reg SHO pilot program (equal to one for during-Reg SHO and zero for pre-Reg SHO);  $X$  is a vector of control variables;  $\lambda$  and  $\delta$  are industry and year fixed effects;  $\epsilon$  is the error term. We do not include  $During$  itself in Equation (1) as it is perfectly correlated with, and thus fully absorbed by, the year fixed effects. We obtain similar results if we include  $During$  and drop the year indicator variable. All standard errors are adjusted for clustering at the firm level to account for serial correlations across years. The coefficient estimate of  $\alpha$  represents the difference in CSR between pilots and nonpilots pre-Reg SHO. We are interested in the estimate of  $\beta$ , the coefficient on  $Pilot \times During$ , as it is the DiD estimator which represents the difference between the two groups in the during-period relative to the pre-period, capturing incremental changes in CSR by pilot firms relative to nonpilot firms from pre- to during-Reg SHO.

We estimate the CSR score ( $CSR$ ) as a net score (strengths-concerns) of the six dimensions in KLD (community, diversity, employee relations, environment, product, and human rights). We control for variables that could affect a firm's incentive to invest in CSR. Firms with greater financial resources are more likely to engage in CSR activities (McWilliams & Siegel, 2000); to account for the firm financial strength effect, we include firm size ( $SIZE$ , estimated as the natural logarithm of total assets), accounting performance ( $ROA$ , estimated as net income before extraordinary items scaled by total assets), leverage ( $Leverage$ , estimated as total debts divided by total assets), cash reserves ( $Cash$ , estimated as cash and cash equivalent divided by total assets), the market-to-book ratio ( $MTB$ , estimated as total assets minus book value of equity plus market value of equity divided by total assets), and financial constraints proxied by Kaplan and Zingales (1997) Index ( $KZIndex$ ) and Whited and Wu (2006) Index ( $WWIndex$ ). We also include in the regression R&D expenditure ( $R&D$ ) and advertising expense ( $Advertise$ ) each scaled by total sales. We further control for asset structure and physical capital investment by including the ratio of physical assets to total assets ( $PPENT$ ) and capital expenditure-to-asset ratio ( $Capex$ ). These controls are particularly important in our setting as prior studies find that Reg SHO affected pilot firms' investment and innovation activities (Grullon et al., 2015).

## 4 | EMPIRICAL ANALYSES

### 4.1 | Descriptive statistics

Table 1 presents descriptive statistics for all variables used in our main analyses. The mean value of  $CSR$  is  $-0.269$ , consistent with the evidence that the mean CSR score for the universe of KLD firms turns negative in 2003. The mean value of  $Pilot$  (0.344) indicates that roughly one third of our sample firms are pilots, consistent with SEC's selection process (i.e., one stock was picked from every three). The mean value of  $During$  is 0.495, showing that our sample construction process generates a balanced sample for the pre- and during-periods. To alleviate concern about multicollinearity, we run a Pearson pair-wise correlation test and find that most correlations between explanatory variables are below 0.500.

To verify the randomness of the pilot sample, we compare pilot and nonpilot firms in terms of CSR, firm size, market-to-book, leverage, return on assets, cash holdings, capital expenditure, physical assets intensity, R&D expenditure, advertising expenses, and financial constraint index in 2004, the selection year. As reported in Panel B of Table 1, there exist no significant differences in any of the firm attributes between the two groups of firms.

**TABLE 1** Summary statistics

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Panel A: Summary statistics and correlations</b>															
CSR (1)	-0.269	1.910	1												
Pilot (2)	0.344	0.475	0.013	1											
During (3)	0.495	0.500	-0.010	0.001	1										
SIZE (4)	6.827	1.487	<b>0.133</b>	0.013	<b>0.077</b>	1									
MTB (5)	2.202	1.329	<b>0.144</b>	0.021	<b>0.062</b>	-0.271	1								
Leverage (6)	0.195	0.189	<b>-0.069</b>	0.005	-0.036	0.304	-0.215	1							
ROA (7)	0.034	0.118	<b>0.069</b>	<b>0.028</b>	<b>0.114</b>	<b>0.159</b>	<b>0.108</b>	<b>-0.158</b>	1						
CASH (8)	0.203	0.213	<b>0.092</b>	-0.010	0.002	<b>-0.408</b>	<b>0.419</b>	-0.328	-0.291	1					
Capex (9)	0.049	0.049	<b>-0.045</b>	0.011	<b>0.031</b>	0.018	<b>0.037</b>	<b>0.034</b>	<b>0.124</b>	-0.203	1				
PPENT (10)	0.251	0.214	-0.127	0.010	-0.036	<b>0.211</b>	-0.206	<b>0.258</b>	<b>0.094</b>	-0.423	<b>0.680</b>	1			
R&D (11)	0.150	0.607	0.013	0.009	-0.020	<b>-0.198</b>	<b>0.160</b>	<b>0.045</b>	<b>-0.573</b>	<b>0.459</b>	<b>-0.098</b>	<b>-0.161</b>	1		
Advertise (12)	0.013	0.029	<b>0.077</b>	0.008	0.010	-0.010	<b>0.100</b>	-0.012	<b>0.103</b>	-0.038	<b>0.055</b>	-0.009	<b>-0.083</b>	1	
KZIndex (13)	-6.548	14.455	<b>-0.060</b>	-0.007	<b>-0.057</b>	<b>0.181</b>	-0.262	<b>0.201</b>	-0.047	<b>-0.454</b>	<b>0.248</b>	<b>0.385</b>	<b>-0.165</b>	0.013	1
WWIndex (14)	-0.327	0.085	<b>-0.120</b>	-0.024	<b>-0.104</b>	<b>-0.899</b>	<b>0.209</b>	-0.208	<b>-0.317</b>	<b>0.439</b>	<b>-0.046</b>	<b>-0.248</b>	<b>0.259</b>	-0.016	<b>-0.098</b>
<b>Panel B: Comparisons between pilot and nonpilot firms in 2004</b>															
			<b>Pilot</b>				<b>Nonpilot</b>				<b>Dif (t-stat)</b>				
CSR			-0.307				-0.364				0.57				
SIZE				6.756				6.686			0.85				
MTB					2.307						1.01				
Leverage						0.197					0.07				

TABLE 1 (Continued)

**Panel B: Comparisons between pilot and nonpilot firms in 2004**

	Pilot	Nonpilot	Dif* (t-stat)
ROA	0.033	0.024	1.55
CASH	0.206	0.215	-0.75
Capex	0.047	0.045	0.61
PPENT	0.253	0.251	0.17
R&D	0.169	0.163	0.18
Advertise	0.013	0.012	0.32
KZIndex		-6.185	-0.03
WWIndex		-0.323	-1.21

Note: correlations that are statistically significant at the 5% level or better are in boldface.  
Abbreviations: CSR, corporate social responsibility; MTB, market-to-book.

## 4.2 | Changes in CSR in response to Reg SHO

We first conduct a DiD univariate analysis and present the results in Panel A of Table 2. In the pre-Reg SHO period, the mean value of CSR for pilot and nonpilot firms is  $-0.289$  and  $-0.283$ , respectively, with a difference of  $-0.006$ . In the during-Reg SHO period, the corresponding number is  $-0.217$  and  $-0.343$ , respectively, with a difference of  $0.126$ . The difference between the two groups in the during-period relative to the pre-period, which is  $0.132$ , is statistically significant ( $t = 2.07$ ). This indicates that pilot firms increased their CSR activities more than nonpilot firms during the implementation of the Reg SHO pilot program. Figure 1 shows a clear trend that differential CSR was minimal in the pre-period and increased in the during-period.

We next conduct a DiD multivariate analysis by estimating Equation (1) and present the estimated results in Panel B of Table 2. In Column 1, the coefficient estimate on *Pilot*  $\times$  *During* is positive and significant ( $0.169$ ,  $p = .014$ ), which is consistent with pilot firms increasing CSR to a greater extent than nonpilot firms from pre- to during-Reg SHO period. The magnitude of incremental increase of  $0.169$  is substantial given the mean value of CSR score of  $-0.269$ . The coefficient on *Pilot* is insignificant ( $-0.075$ ,  $p = .392$ ), in support of the notion that there is no pretreatment effect.<sup>9</sup> The evidence supports our hypothesis.

## 4.3 | Evidence of convergence in CSR post-Reg SHO

The SEC pilot program ended on July 6, 2007, when short-sale price tests were eliminated for all exchange-listed stocks. Now that nonpilot firms were also free from short-selling restrictions, we surmise that they might have caught up with pilot firms in terms of CSR investment, and the documented differential treatment effect should disappear along with the repeal of the experiment (post-Reg SHO period, 2008–2009). To examine this conjecture, we first look at changes in CSR from during- to post-period. Data in Panel A of Table 2 show that nonpilot firms increased their CSR from  $-0.343$  to  $-0.211$  ( $0.132$ ) and pilot firms from  $-0.217$  to  $-0.131$  ( $0.086$ ), indicating some catch-up effect. This effect makes the difference between the two groups in the post-period relative to the pre-period ( $0.086$ ) statistically insignificant, indicating that when the two groups of firms faced the same short-selling conditions, they exhibited similar inclination to CSR investment. As well, Figure 1 shows that the differential CSR between the two groups decreased in the post-period.

To examine the disappearance of the treatment effect in the post-period, we augment Equation (1) by adding an interaction term, *Pilot*  $\times$  *Post* (*Post* is an indicator variable equal to one for 2008–2009 and zero otherwise). Its coefficient represents the difference between the two groups in the post-period (2008–2009) relative to the pre-period (2003–2004). The estimated results are reported in Column 2 of Table 2. While the coefficients on *Pilot*  $\times$  *During* remain unchanged, the coefficients on *Pilot*  $\times$  *Post* are positive and insignificant, providing some evidence of the convergence of CSR undertakings between the two groups after short-selling constraints are lifted for all stocks.<sup>10</sup>

<sup>9</sup>We also estimate a firm fixed effects regression to achieve a DiD analysis by dropping *Pilot*, *Pilot*  $\times$  *During*, and industry fixed effects from Equation (1), and adding an indicator variable *RegSHO* (equal to one for pilot firms during the Reg SHO period and zero otherwise). The coefficient on *RegSHO* represents the DiD estimator. Untabulated results show that the coefficient on *RegSHO* is  $0.148$  with *p*-value of  $.002$ .

<sup>10</sup>However, certain caveats are worth making regarding these tests and findings. First, even though pilots experienced significant changes during the pilot program, the two groups of firms were not randomly assigned at the revocation of the experiment (i.e., nonpilot firms become treatment firms while pilot firms serve as control firms). Second, the removal of the uptick rule for all stocks might have been partially anticipated by the market. Thus, the end of the experiment was not nearly as exogenous as its initiation and this might complicate both empirical testing and the interpretation of empirical results.

**TABLE 2** Short-selling threats and CSR

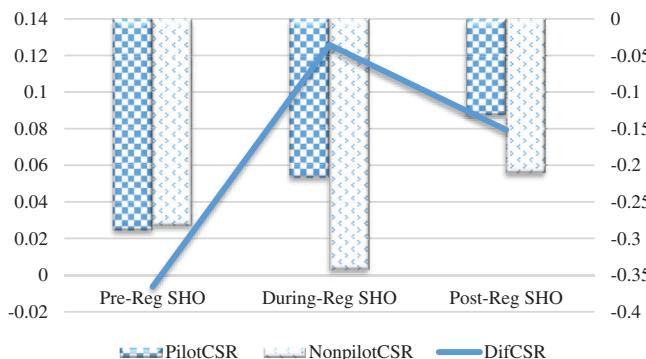
Panel A: Difference-in-differences univariate analysis						
	N	Pre_CSR	During_CSR	Post_CSR	During-Pre	Post-Pre
Pilot	512	-0.289	-0.217	-0.131	0.072	0.158
Nonpilot	985	-0.283	-0.343	-0.211	-0.060	0.072
Pilot–Nonpilot		-0.006	0.126	0.079	0.132	0.086
					(t = 2.07)	(t = 1.59)
Panel B: Difference-in-differences multivariate analysis						
Dependent variable	CSR	CSR_Str	CSR_Con	Direct_CSR	Broad_CSR	
	(1)	(2)	(3)	(4)	(5)	(6)
Pilot	-0.075 (.391)	-0.074 (.403)	-0.051 (.463)	0.027 (.668)	-0.049 (.522)	-0.030 (.429)
Pilot × During	0.169 (.014)	0.166 (.016)	0.058 (.284)	-0.113 (.023)	0.144 (.016)	0.027 (.374)
Pilot × Post	0.153 (.175)					
SIZE	0.316 (.000)	0.365 (.000)	0.785 (.000)	0.454 (.000)	0.284 (.000)	0.047 (.110)
MTB	0.163 (.000)	0.178 (.000)	0.218 (.000)	0.053 (.027)	0.126 (.000)	0.039 (.000)
Leverage	-0.385 (.124)	-0.472 (.054)	-1.043 (.000)	-0.636 (.001)	-0.485 (.026)	0.078 (.417)
ROA	0.998 (.005)	0.408 (.148)	-0.441 (.099)	-1.414 (.000)	0.801 (.010)	0.172 (.121)
CASH	0.600 (.018)	0.547 (.026)	0.957 (.000)	0.324 (.065)	0.622 (.006)	0.011 (.894)
Capex	3.076 (.002)	2.829 (.005)	0.444 (.582)	-2.913 (.000)	2.127 (.008)	1.230 (.014)
PPENT	-0.571 (.101)	-0.527 (.128)	0.146 (.597)	0.762 (.002)	-0.184 (.525)	-0.432 (.008)
R&D	0.171 (.011)	0.141 (.040)	-0.035 (.488)	-0.211 (.000)	0.136 (.022)	0.040 (.116)
Advertise	5.760 (.001)	6.411 (.000)	5.851 (.000)	-0.142 (.886)	4.777 (.001)	1.216 (.135)
KZIndex	0.000 (.925)	-0.001 (.698)	0.002 (.369)	0.001 (.382)	-0.000 (.975)	0.001 (.357)
WWIndex	-1.004 (.352)	-0.316 (.778)	-2.101 (.019)	-0.956 (.199)	-1.626 (.071)	0.481 (.293)
Constant	-3.493 (.001)	-3.759 (.000)	-2.554 (.393)	0.356 (.785)	-2.458 (.046)	-0.452 (.508)

**TABLE 2** (Continued)

Panel B: Difference-in-differences multivariate analysis						
Dependent variable	CSR	CSR_Str	CSR_Con	Direct_CSR	Broad_CSR	
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,633	7,890	5,633	5,633	5,633	5,633
R-squared	17.71%	17.58%	42.12%	34.00%	17.39%	14.46%

Note: *p*-values based on robust SEs clustered at the firm level are reported in parentheses. *Pilot* is an indicator variable equal to one for pilot firms and zero for nonpilot firms. *During* is an indicator variable equal to one for the during-Reg SHO period (2005 and 2006) and zero for the pre-Reg SHO period (2003 and 2004). *Post* is an indicator variable equal to one for the post-Reg SHO period (2008 and 2009) and zero for the during- and pre-Reg SHO period.

Abbreviations: CSR, corporate social responsibility; MTB, market-to-book.



**FIGURE 1** Difference in CSR between pilot and nonpilot firms over time. Note: This figure plots the difference in CSR between pilot and nonpilot firms in the pre-, during-, and post-Reg SHO period. CSR, corporate social responsibility [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

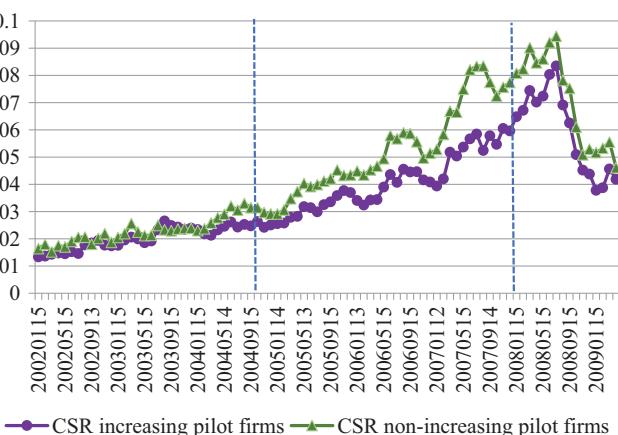
#### 4.4 | CSR components

We conduct two finer-grained analyses to better understand the underlying mechanism. Mattingly and Berman (2006) find that CSR strength ratings differ from CSR concern ratings both conceptually and empirically, with the former representing firms' strategies, programs, and policies to promote "community" and the latter being mostly related to actual social performance. Prior studies find that market participants are more sensitive to "irresponsible" than to "responsible" corporate behavior (Bhattacharya & Sen, 2004). Thus, it appears rational for pilot firms to have put more effort to reduce CSR concerns than improve CSR strengths in response to short-selling threats. We examine CSR strengths and CSR concerns separately. As shown in Columns 3 and 4 of Table 2, while the coefficient on *Pilot*  $\times$  *During* is positive and insignificant for CSR strengths, it is negative and significant for CSR concerns, suggesting that pilots responded to short-selling threats by addressing CSR concerns to improve actual social performance.

Corporations take social actions to manage stakeholder relationships. Following in the spirit of Mattingly and Berman (2006), we categorize actions toward stakeholders that directly transact with the firms as direct CSR (i.e., employee, product, human rights, and diversity dimensions), and actions toward other stakeholders as broad CSR (i.e., community and environment dimensions).<sup>11</sup>

<sup>11</sup>In the KLD database, the employee dimension covers employee-related issues such as compensation and benefits, safety, and participation in decision-making; the product dimension includes consumer-related issues such as product quality, innovation, safety, and advertising truthfulness; the diversity dimension contains issues related to employees such as employing minorities; and the human rights dimension also deals with issues related to employees such as labor rights.

**FIGURE 2** Comparison of short interests between CSR increasing and CSR nonincreasing pilot firms. Note: This figure plots monthly short interests for pilot firms that increase CSR from pre-Reg SHO period to during-Reg SHO period and pilot firms that do not increase CSR during the same period. Dashed lines indicate the Reg SHO period. CSR, corporate social responsibility [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



We examine these two types of CSR separately and report estimated coefficients in Columns 5 and 6 of Table 2. While pilot firms boosted both types of CSR, the increase in direct CSR dominates, suggesting that negative responses from directly connected stakeholders, such as withdrawing their resources from the firm, were perceived to carry greater weight with short sellers, thus prompting pilot firms to focus more on this type of CSR. We also do a four-way split and examine CSR strengths and concerns broken down by the nature of the stakeholder and find that pilot firms only decreased CSR concerns that impact directly connected stakeholders. Please see our Table S1A for detailed results.

#### 4.5 | Insurance effect of CSR on short positions

We argue that pilot firms invested in CSR to insure against increased short-selling threats. An ensuing question is whether such investment actually provides intended insurance-like benefits by reducing short interest. If short sellers believe that they are unable to reap a large return by targeting high-CSR firms due to the targets' smaller stock price reductions from negative events, then they would do better shorting pilot firms with lower CSR. Thus, short interests should have been lower in pilot firms that increased CSR. To check the outcome of CSR investment, we compare the short positions taken against pilot firms that increased CSR with those of pilot firms that did not. In Figure 2, we plot scaled monthly short interests (monthly short interest divided by shares outstanding times 100) of these two types of pilot firms from pre- to post-Reg SHO period. The two types of pilot firms had similar short positions pre-experiment and then exhibited differences with CSR-increase firms having lower short interests following the removal of short-selling constraints. This provides some suggestive evidence on an effective role of pilot firms' CSR strategy in insuring against short-selling threats.

We further conduct a multivariate analysis which include controls for firm size, market-to-book, leverage, average daily trading volume, past stock return, future stock return, and days to cover (Jain et al., 2016).<sup>12</sup> The dependent variable is average monthly scaled short interest during the year and the variable of interest is changes in CSR ( $\Delta CSR$ ). If pilot firms that increased CSR had lower short positions than pilot firms that did not increase CSR, as indicated by Figure 2, we should observe a

<sup>12</sup>Stock return is defined as  $(\text{stock price}_t - \text{stock price}_{t-1})/\text{stock price}_{t-1}$ . Past stock return is stock return in the past year and future stock return is stock return in the following year. Days to cover, calculated as short interest divided by average daily trading volume, measures how long/violent a short squeeze could potentially be in relative terms.

negative relation between changes in CSR and short interests during the Reg SHO period. We estimate a regression of scaled short interests on pilot firms in the during-period and report the estimated coefficients in Column 1 of Table 3. Consistent with our expectation, the coefficient on  $\Delta CSR$  is negative and significant ( $-0.404, p = .026$ ), indicating a beneficial effect of CSR in insuring against short-selling threats.

We further examine the effect of changes in CSR strengths and CSR concerns on short interests and find that an increase in CSR concerns led to larger short positions while an increase in CSR strengths had no effect (Column 2). Similarly, we find that an increase in CSR that impacts directly connected stakeholders had a negative effect on short interests while an increase in broad CSR did not (Column 3). These findings suggest that pilot firms correctly calibrated the form of their CSR “investment.” For a four-way split, we find that changes in both CSR strengths and concerns related to directly connected stakeholders have a significant effect on short interests (see Table S2A).

The effect of changes in CSR on short positions can be due to either the prevention of negative events or CSR's insurance-like effect.<sup>13</sup> Seemingly, the finding on CSR concerns is more in line with the former. Yet, while the decrease in CSR concerns can reduce the incidence of negative events, more importantly it can help pilot firms build up a reputation of restraint and alignment with stakeholders which serves a protective, insurance-like effect. Prior studies find that external parties attend more to CSR concerns than strengths such that concerns represent a tool of accountability and impression management while strengths are more likely viewed as window dressing. For example, the effect on performance of good social actions is lower than the effect of bad ones (Van der Laan, Van Ees, & Van Witteloostuijn, 2008), firm stock market value falls with negative CSR announcements but does not rise with positive ones (Capelle-Blancard & Petit, 2019), and investors shun firms with greater environmental concerns but do not seek out ones that are environmentally friendly (Fernando, Sharfman, & Uysal, 2017). Since it is concerns that draw the most attention, firm reputation will be helped more by lowering these rather than by increasing strengths.

Nevertheless, to support the idea that the documented effect is not driven by prevention, we conduct two tests. First, we control for the level of ex post CSR and its various components to hold the probability of negative events constant. As indicated in Columns 4 through 6, the effect of changes in CSR and its various components on short interests remains significant while the coefficients on the level of CSR and its components are mostly not significant. This suggests that the reduction of negative events was not a dominant effect on short interests. Second, we explore a scenario in which CSR can insure against short-selling risk arising from factors other than negative CSR events. Small firms generally are more often targeted by short sellers due to their small market capitalization, low information transparency and weak financial resources. We find that small firms did have higher short interests (the coefficient on firm size is negative and significant in Table 3) and this short-selling risk is not due to CSR-related negative events (Column 4 of Table 2 shows that small firms have a lower value of CSR concerns). If CSR can insure against the short-selling threat facing small firm, we expect that an increase in CSR would have reduced short interests on small firms. To test this prediction, we create an indicator variable *Small\_SIZE* (equal to one if a firm's total assets fall into the bottom quartile) to denote small firms and interact it with changes in CSR. As reported in the last column of Table 3, the coefficient on the interaction term is negative and significant, providing some direct evidence on the insurance effect of CSR.<sup>14</sup> The overall evidence suggests that CSR reduced short interests through an insurance effect rather than simply prevention of unfavorable events.

<sup>13</sup>In fact, some evidence exists that the latter may come at the cost of the former (Luo et al., 2018).

<sup>14</sup>The mean value of CSR concerns is 0.977 for small firms and 1.677 for large firms, confirming that small firms having higher short interests was due to factors other than CSR negative events.

**TABLE 3** Insurance effect of CSR on short position during the Reg SHO period

Dependent variable	ShortInterest						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔCSR	-0.404 (.026)			-0.330 (.060)			-0.547 (.009)
ΔCSR_Str		-0.282 (.234)			-0.111 (.671)		
ΔCSR_Con		0.481 (.052)			0.470 (.057)		
ΔDirect_CSR			-0.466 (.015)			-0.428 (.022)	
ΔBroad_CSR			0.004 (.992)			0.319 (.417)	
CSR				-0.101 (.278)			
CSR_Str					-0.161 (.145)		
CSR_Con					0.043 (.744)		
Direct_CSR						-0.042 (.718)	
Broad_CSR						-0.340 (.026)	
ΔCSR × Small_SIZE							-1.046 (.095)
Small_SIZE							3.192 (.000)
SIZE	-2.444 (.000)	-2.465 (.000)	-2.456 (.000)	-2.416 (.000)	-2.377 (.000)	-2.455 (.000)	
MTB	-0.222 (.223)	-0.229 (.212)	-0.226 (.217)	-0.206 (.260)	-0.208 (.256)	-0.208 (.258)	0.203 (.277)
Leverage	1.506 (.300)	1.529 (.292)	1.558 (.282)	1.491 (.306)	1.384 (.353)	1.602 (.275)	1.620 (.302)
InstitutionOwnership	5.798 (.000)	5.768 (.000)	5.820 (.000)	5.822 (.000)	5.680 (.000)	5.837 (.000)	7.604 (.000)
Log (TradingVolume)	2.646 (.000)	2.648 (.000)	2.642 (.000)	2.651 (.000)	2.665 (.000)	2.647 (.000)	1.205 (.000)
Past stock return	0.243 (.302)	0.241 (.307)	0.246 (.296)	0.227 (.337)	0.229 (.335)	0.227 (.338)	0.584 (.005)

**TABLE 3** (Continued)

<b>Dependent variable</b>	<b>ShortInterest</b>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Future stock return	-0.149 (.756)	-0.148 (.758)	-0.168 (.725)	-0.144 (.763)	-0.147 (.759)	-0.150 (.754)	0.173 (.679)
Days to cover	0.155 (.000)	0.156 (.000)	0.155 (.000)	0.155 (.000)	0.155 (.000)	0.154 (.000)	0.124 (.000)
Constant	-16.264 (.000)	-16.155 (.000)	-16.145 (.000)	-16.573 (.000)	-16.843 (.000)	-16.275 (.000)	-17.251 (.000)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	713	713	713	713	713	713	713
R-squared	50.01%	49.99%	50.05%	50.08%	50.11%	50.23%	41.62%

Note: This table presents results from regression of scaled short interest on change in CSR and control variables for pilot firms during the implementation of Reg SHO (2005–2006). *p*-Values based on robust SEs clustered at the firm level are reported in parentheses.

Abbreviations: CSR, corporate social responsibility; MTB, market-to-book.

## 4.6 | Alternative explanations

Although we argue that pilot firms invest in CSR to insure against stock price risk arising from short-selling threats, an alternative explanation for the documented pattern of CSR is that the pilot program focused market attention on pilot firms, and that it was the market-wide attention rather than short seller attention that drove these firms to pursue more CSR. To investigate this possibility, we conduct two tests. We first examine whether there was a differential increase in market attention on pilot firms relative to nonpilot firms. We use the coverage by sell-side financial analysts to capture attention from institutional investors, and the total trading volume in the stock to capture general investor awareness. We restrict our DiD analyses on market attention to the pre-announcement period (January 1, 2004 to July 27, 2004) and post-announcement period (July 28, 2004 to December 31, 2004) and find little evidence on a differential increase in market attention on pilot firms relative to nonpilot firms. We then control for the effects of analyst coverage and trading volume and find that the coefficients on *Pilot* × *During* remain largely unchanged compared to those reported in Table 2.

As stated above in the theory and hypothesis section, pilot firms could have taken various actions to counter short-selling threats. These actions and their outcomes could have affected firms' CSR directly or in an unobservable way. For example, pilot firms could have invested in CSR aimed at improving their access to external finance rather than shielding short-selling risk, or increased investment in CSR might have been motivated by changing managerial equity incentives. To address these alternative explanations, we (a) conduct subsample analyses for firms with the tendency to issue equity or an actual issuance of equity and firms that do not have this tendency or an actual equity issuance, (b) control for managerial incentives by including CEO equity *delta* and equity-based compensation, and (c) control for earnings management by including signed abnormal accruals and the absolute value of abnormal accruals. Our inferences remain unchanged. Please see Supporting Information Appendix for detailed results.

## 5 | DISCUSSION

A growing stream of research views CSR through the lens of an insurance-based perspective, in that it can provide protection against risks arising from unfavorable events. Prior studies show that firms enjoy insurance-like benefits from CSR but did not directly show that firms instrumentally undertake it for this purpose. Indeed, some scholars (Godfrey, 2005) may suggest that CSR undertaken in such a transparently instrumental fashion would produce few insurance-like benefits. Other scholars, however, surmise that firms do pursue CSR for such benefits (Luo et al., 2018). Thus, while previous research has only been able to conjecture that firms seek CSR insurance benefits, our study offers proof. Using a DiD methodology to help establish causality, we uncover evidence that pilot firms facing higher exogenous risk from Reg SHO more instrumentally pursued CSR to gain such protective, insurance-like effects and that they enjoyed lowered risk from doing so. We also find that firms correctly calibrated the form of their CSR “investment,” by identifying the pressing CSR activities and targeting the appropriate stakeholders for effective and optimal risk mitigation. In addition, we find some direct evidence that the risk reduction effect of CSR investment is derived from insurance-like protection rather than simply prevention of adverse events. This finding is important and interesting as the prior literature has not clearly distinguished between prevention and insurance effects of CSR and Luo et al. (2018) even show that insurance may come at the cost of prevention. Overall, just as firms buy insurance to protect against potential dangers, they invest in CSR and adjust their CSR levels with the same risk management objective in view. From this perspective, our research demonstrates yet another benefit, that of insurance, which firms seek from the pursuit of CSR and highlights one of the many ways that social considerations are increasingly integrated into the strategy of business firms.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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