Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence

Finance Working Paper N° 359/2013
June 2014

Rui Albuquerque
Boston University, Católica-Lisbon School of Business and Economics, CEPR and ECGI

Art Durnev
University of Iowa

Yrjo Koskinen
Boston University and CEPR

ECGI Working Paper Series in Finance

Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence

Working Paper N°. 359/2013
June 2014

Rui Albuquerque
Art Durnev
Yrjo Koskinen

We thank C. B. Bhattacharya, Ruslan Goyenko, Jonathan Karpoff, Anders Loflund, Robert Marquez, Laura Starks, Chen Xue, Chendi Zhang and seminar participants at the BSI Gamma Foundation Conference in Venice, the CalPERS and UC Davis Sustainability & Finance Symposium, the 2012 FIRS conference, 2nd Helsinki Finance Summit, Geneva Summit on Sustainable Finance, Imperial College Business School, Boston University, University of Iowa and Warwick Business School for their comments. We also thank the BSI Gamma Foundation for a research grant and the Geneva Summit on Sustainable Finance for the Best Paper Prize. Albuquerque gratefully acknowledges the financial support from a grant from the Fundação para a Ciência e Tecnologia. The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement PCOFUND-GA-2009-246542 and from the Foundation for Science and Technology of Portugal.

Abstract

This paper presents an industry equilibrium model where firms can choose to engage in corporate social responsibility (CSR) activities. We model CSR activities as an investment in customer loyalty and show that CSR decreases systematic risk and increases firm value. These effects are stronger for firms producing differentiated goods and when consumers' expenditure share on CSR goods is small. We find supporting evidence for our predictions. In our empirical tests, we address a potential endogeneity problem by instrumenting CSR using data on the political affliation of the firm's home state, and data on environmental and engineering disasters and product recalls.

Keywords: corporate social responsibility, systematic risk, expected return, corporate valuation, customer loyalty, industry equilibrium

JEL Classifications: G12, G32, D43, L13, M14

Rui Albuquerque
Associate Professor of Finance
Boston University - School of Management
595 Commonwealth Avenue
Boston, MA 02215, United States
phone: +1 617 353 4614
e-mail: ralbuque@bu.edu

Art Durnev*
Assistant Professor
University of Iowa - Tippie College of Business
108 Pappajohn Business Building
Iowa City, IA 52242-1000, United States
phone: +1 319 335 2626
e-mail: artem-durnev@uiowa.edu

Yrjo Koskinen
Assistant Professor of Finance and Economics
Boston University - School of Management
595 Commonwealth Avenue
Boston, MA 02215, United States
phone: +1 617 353 9775
e-mail: yrjo@bu.edu

*Corresponding Author

Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence*

Rui Albuquerque Art Durnev Yrjö Koskinen

June 2014

Abstract

This paper presents an industry equilibrium model where firms can choose to engage in corporate social responsibility (CSR) activities. We model CSR activities as an investment in customer loyalty and show that CSR decreases systematic risk and increases firm value. These effects are stronger for firms producing differentiated goods and when consumers' expenditure share on CSR goods is small. We find supporting evidence for our predictions. In our empirical tests, we address a potential endogeneity problem by instrumenting CSR using data on the political affiliation of the firm's home state, and data on environmental and engineering disasters and product recalls.

JEL classification: G12, G32, D43, L13, M14.
Keywords: corporate social responsibility, systematic risk, expected return, corporate valuation, customer loyalty, industry equilibrium.

*We thank C. B. Bhattacharya, Ruslan Goyenko, Jonathan Karpoff, Anders Loflund, Robert Marquez, Laura Starks, Chen Xue, Chendi Zhang and seminar participants at the BSI Gamma Foundation Conference in Venice, the CalPERS and UC Davis Sustainability & Finance Symposium, the 2012 FIRS conference, 2nd Helsinki Finance Summit, Geneva Summit on Sustainable Finance, Imperial College Business School, Boston University, University of Iowa, University of Missouri, Tilburg University and Warwick Business School for their comments. We also thank ECGI for the Standard Life Investments Finance Prize, the BSI Gamma Foundation for a research grant and the Geneva Summit on Sustainable Finance for the Best Paper Prize. Albuquerque gratefully acknowledges the financial support from a grant from the Fundação para a Ciência e Tecnologia. The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement PCOFUND-GA-2009-246542 and from the Foundation for Science and Technology of Portugal. Albuquerque: Boston University School of Management, Católica-Lisbon School of Business and Economics, CEPR, and ECGI. Address: Finance and Economics Department, Boston University School of Management, 595 Commonwealth Avenue, Boston, MA 02215. Email: ralbuque@bu.edu. Durnev: Tippie College of Business, University of Iowa, 108 John Pappajohn Building, Iowa City, IA 52242. Email: artem-durnev@uiowa.edu. Koskinen: Boston University School of Management, and CEPR: Address: Finance and Economics Department, Boston University School of Management, 595 Commonwealth Avenue, Boston, MA 02215. Email: yrjo@bu.edu. The usual disclaimer applies.

1 Introduction

Corporate social responsibility (CSR) represents a long-standing strategic concern for corporations around the world. Recent trends are pressuring firms into adopting CSR as a core management or board-level function. The Global Reporting Initiative founded in the 1990's, later partnered with the United Nations Environment Program and the Organization for Economic Cooperation and Development, has provided corporations with a reporting framework on their economic, environmental, and social sustainability. The success of this initiative is visible in the widespread integration of its reporting framework within regular company annual reports.[1] Arguably, CSR's increased popularity inside boardrooms has outpaced the research needed to justify it.[2] No longer necessarily viewed outside the profit maximizing framework, questions still remain on *how* CSR policies affect the risks firms are facing and the stock market implications of those policies (Bénabou and Tirole, 2010, and Starks, 2009).[3] In this paper, we investigate theoretically and empirically a mechanism through which CSR affects firms' systematic risk and market value.

We develop an industry equilibrium model where firms make production and CSR investment decisions and embed this model within a standard asset pricing framework. Following an extensive marketing literature (see e.g. Bhattacharya and Sen, 2003, Luo and Bhattacharya, 2006, 2009), we model an investment in CSR as a mechanism to acquire customer loyalty. Greater customer loyalty takes the form of a less price elastic demand and, all else equal, a firm with higher customer loyalty has higher profit margins. However, we show

[1] Intel Corporation provides a good example of the reporting framework of the Global Reporting Initiative. CSR forms a part of Intel's integrated value approach with quantitative metrics for its CSR policies. Intel's Corporate Responsibility Report for 2012 can be found at http://csrreportbuilder.intel.com/PDFFiles/CSR_2012._Full-Report.pdf

[2] In 2008, the Economist wrote to attest to the popularity of CSR that "The CSR industry, as we have seen, is in rude health. Company after company has been shaken into adopting a CSR policy: it is almost unthinkable today for a big global corporation to be without one."

[3] For example, Bénabou and Tirole (2010, p. 9) argue that: "Corporate social responsibility (CSR) is somewhat of a 'catch-all' phrase for an array of different concepts. An analysis of CSR must therefore clarify its exact meaning, and in particular the presumed impact of CSR on the cost of capital."

that the decision to invest in CSR has nontrivial effects on firm risk and value. On the one hand, higher profit margins reduce operating leverage. The model is thus able to capture the widely held view in the marketing literature that a firm with a more loyal demand has profits that are relatively less sensitive to aggregate economic conditions than a firm with a less loyal demand. From the perspective of a risk averse investor, a firm facing a more loyal demand exhibits lower systematic risk and is valued more highly.

On the other hand, higher profit margins per unit of revenue lead more firms to adopt CSR policies. Consequently, firms with higher adoption costs start implementing CSR policies as well. These higher adoption costs increase operating leverage and lead to higher systematic risk for the marginal firm. This industry-equilibrium-feedback effect contrasts with the original partial-equilibrium benefit from CSR adoption as a risk management tool.

We show that the relative strength of these two effects, and thus the relative riskiness of CSR firms, depends on the expenditure share on CSR goods. A sufficiently small expenditure share on CSR limits the proportion of CSR firms and implies that the marginal CSR firm has a lower systematic risk and a higher valuation than non-CSR firms. Thus, the two main model predictions are that high-CSR firms have lower systematic risk and higher firm values. Since lower systematic risk is associated with lower co-movement of net profits with aggregate economic conditions, the model also predicts that the ratio of net profits of CSR firms relative to that of non-CSR firms decreases in economic expansions.

The industry equilibrium of the model also allows us to study the effects of CSR adoption across industries. These additional predictions are important tests of the model's mechanism and are also indirect tests of the model's hypothesis that CSR helps build customer loyalty. The model predicts that industries with greater product differentiation have a stronger CSR-risk relation. The model also predicts that industries with a larger consumer's expenditure share on CSR goods have a weaker CSR-risk relation. This second prediction is somewhat surprising and is explained by the fact that increased CSR investing results in the marginal

CSR firm having higher adoption costs, higher operating leverage and systematic risk. The opposite occurs for non-CSR firms at the same time: fewer firms produce with non-CSR technologies and with less competition these firms obtain higher profit margins, lowering their operating leverage and systematic risk.

We test the model predictions using a comprehensive dataset on firm-level CSR from MSCI's Environmental, Social and Governance (ESG) database. The sample consists of a panel of U.S. firms spanning the years from 2003 to 2011 with a total 23,803 firm-year observations. From ESG we obtain an overall firm-level CSR score that aggregates six different ratings attributes: community, diversity, employee relations, environment, product, and human rights. ESG also includes a governance attribute. To separate our analysis from studies that focus on governance related topics, our main results exclude the governance attribute from the firm's aggregate CSR score. We estimate firm systematic risk using a three factor model of returns and, following our theoretical model, take firm beta to be the coefficient on the market return. We run panel regressions with firm and year fixed effects and with control variables that are known to affect systematic risk.

We first document that the level of systematic risk is statistically and economically significantly lower for firms with a higher CSR score. One standard deviation increase in firm CSR score reduces firm beta on average by 0.034, which represents a decline in systematic risk of about 4% relative to beta's sample mean. This effect does not appear to be caused by any single CSR attribute though the attributes diversity and environment have the largest economic impact. Consistent with the risk mechanism in our model and the customer loyalty assumption, we provide evidence that the ratio of CSR firms' profits to non-CSR firms' profits is negatively related to GDP growth.

Next, we find evidence supportive of the prediction that the effect of CSR on firm beta is stronger in industries with greater product differentiation. We use two measures of product differentiation, one developed by Giannetti et al. (2011) and another by Hoberg and Phillips

(2010). We find that the economic magnitude of the effect of CSR on firm beta is higher in differentiated goods industries for both measures. We also find evidence supportive of the prediction that industries with a larger expenditure share on CSR goods have a weaker CSR-risk relation. In our model, increased consumer spending in CSR translates into a relatively larger number of firms that adopt CSR policies in an industry and increases the relative valuation of these firms. We therefore test whether the stock market capitalization of the higher-rated CSR firms in an industry is associated with lower betas for CSR firms. We find evidence consistent with the model prediction.

We find that higher CSR score has a positive impact on Tobin's Q. A one standard deviation increase in CSR score increases firm value by 6.7% of the sample mean of Tobin's Q of 1.927. Consistent with the model, this effect is larger for firms that produce differentiated goods and when top CSR firms have lower market capitalization. We also document results using a model of excess returns from Ang et al. (2009). We find evidence consistent with our model that an increase in firm CSR is associated with a decrease in expected excess returns. This decrease in expected excess returns is largely explained by a decrease in firm beta. Finally, we discuss the consistency of the quantitative results across the various tests on systematic risk, excess returns and firm value.

Endogeneity is a major concern in the CSR literature, because a firm's financial performance may determine its CSR decisions. Alternatively, firms that build customer loyalty through branding, and thus have lower systematic risk, might also do more CSR. In order to address these concerns, we run our tests with a comprehensive set of control variables. In addition, we address endogeneity concerns by employing two novel sets of instruments for CSR. The first instrument is based on the company's headquarters' state political affiliation. As shown by Di Giuli and Kostovetsky (2014), firms headquartered in Democratic-leaning states are more likely to spend more resources on CSR. However, as we discuss, the state's political affiliation should be unrelated to systematic risk and firm value.

The second instrument is based on a sample of product recalls, and environmental and engineering disasters. We argue that these are good instruments because MSCI's construction of the CSR score relies on some of the same information. In addition, the perception of CSR is likely to decrease following a disaster and, while the likelihood of disasters may lead to increases in idiosyncratic risk and lower firm value, for example due to the risk of law suits, it is unlikely that firm beta is related to these exogenous incidents. In our tests, we cannot reject that both of these sets of instruments are exogenous. We find that when we use the political affiliation of the firm's state of headquarter as the instrument, the instrumented CSR is negatively related to systematic risk and excess stock returns, and positively related to firm value, as predicted. When we use product recalls and environmental and engineering disasters as the instrument, the instrumented CSR is negatively related to beta. The results from the instrumental variables approach yield higher economic significance effects than the results using ordinary least squares and provide strong support that CSR leads to lower systematic risk and higher valuations, not the other way around. We deem these results to be one of our main contributions.

We organize the rest of the paper as follows. Section 2 reviews the existing literature. Section 3 presents the model and derives its equilibrium. Section 4 analyzes the equilibrium properties regarding risk and firm value. Section 5 presents the data used in our empirical tests and Section 6 presents the results and discusses additional robustness tests. Section 7 concludes the paper. Proofs are relegated to the appendix.

2 Related Literature

Our research is part of an established literature that asserts that firms engage in profit maximizing CSR (e.g., Baron, 2001, and McWilliams and Siegel, 2001). According to this view, firms undertake CSR activities because they expect a net benefit from them.[4] Our

[4] According to Bénabou and Tirole (2010), the other motivations for CSR policies are delegated philanthropy, where stakeholders delegate social activities they would like to do themselves to corporations, and

paper fits in particular to a line of research whereby profit maximizing CSR is a product differentiation strategy to gain competitive advantage over one's rivals (see Navarro, 1988, Webb, 1996, Bagnoli and Watts, 2003, and Siegel and Vitalino, 2007). If CSR is a successful product differentiation strategy, then consumers should be willing to buy more or pay higher prices for products with CSR features.[5] Creyer and Ross (1997), Auger et al. (2003), and Pelsmacker et al. (2005) present survey or experimental evidence that social product features affect positively consumers' purchase intentions and willingness to pay a premium price. Ailawadi et al. (2013) provide evidence that actual consumers increase spending when a grocery store is selling local products, treats employees fairly or supports the local community. Elfenbein and McManus (2010) and Elfenbein et al. (2012) show, using data from eBay auctions, that customers pay more for products sold through charity auctions, than those in non-charity auctions.

CSR has received scant attention in theoretical finance literature. A notable exception is Heinkel et al. (2001), who assume that some investors choose not to invest in non-CSR stocks. This market segmentation leads to higher expected returns for non-CSR stocks, which must be held by only a fraction of the investors (as in Errunza and Losq, 1985, and Merton, 1987). Gollier and Pouget (2012) build a model where socially responsible investors can take over non-CSR companies and create value by turning those into CSR companies. These papers assume that a class of investors have a preference for CSR stocks. However, as pointed out by Starks (2009), investors seem to care more about corporate governance than CSR. Our paper does not assume that investors explicitly care about CSR and instead offers a complementary view based on the role of consumers and their actions.

Our paper is related to the empirical literature on the association of CSR and firm

agency costs, where managers engage in CSR because of private benefits.

[5] The UN Global Compact-Accenture CEO Study on Sustainability 2013 surveyed over 1000 CEOs about their sustainablity policies. According to the study, 81% of CEOs believe that the sustainability reputation of their company is important in consumers' purchasing decisions (http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-UN-Global-Compact-Acn-CEO-Study-Sustainability-2013.PDF.)

value. Margolis et al. (2010) review 35 years of evidence and show that there is on average a small positive effect. Galema et al. (2008) provide evidence that CSR stocks have higher valuations, measured by market-to-book ratios. Besides showing that environmental and governance scores are positively related to Tobin's Q, Gillan et al. (2010) also demonstrate that CSR firms have higher return on assets. Servaes and Tamayo (2013) provide evidence of a positive association between CSR and firm value for firms with high advertising expenditures. Deng et al. (2013) show that acquirers with high CSR scores experience higher merger announcement returns and better post-merger operating performance. Krüger (2013) analyses a larger sample of CSR events and shows that both negative and positive CSR news lead to stock price declines. However, in Krüger's study, the wealth effect of positive CSR news depends on the motivation of the management: there is a negative effect on stock prices if management is likely to receive private benefits from CSR adoption, but a positive effect if CSR policies are adopted to improve relations with stakeholders.[6] Dimson et al. (2012) analyze large institutional investor activism and show that, consistent with Krüger's study, engagements that lead to changes in firms' CSR policies are followed by positive abnormal returns.

A recent empirical literature documents a link between CSR, systematic risk and cost of equity capital. Using a panel data set of S&P 500 firms, Oikonomou et al. (2012) find that CSR is negatively related to systematic risk. Sharfman and Fernando (2008) show that firm-level environmental performance is negatively associated with the cost of equity capital. El Ghoul et al. (2011), calculating an *ex-ante* measure for cost of equity that utilizes analyst estimates, find that firms with higher CSR scores exhibit lower cost of capital.[7]

[6] Fisher-Vanden and Thorburn (2011) find negative abnormal returns on the announcement of membership in the Environmental Protection Agency's Climate Leaders, a program intended to reduce greenhouse gas emissions, but they do not control, as Krüger does, for management motivation. Cheng et al. (2013) and Masulis and Reza (2014) provide evidence that the Tax Reform Act of 2003 and the consequent increase in after-tax effective managerial ownership lead to decrease in CSR activities and corporate giving. This is a marginal effect and does not show that on average CSR activities are due to agency costs.

[7] Renneboog et al. (2008) show that socially responsible mutual funds underperform their benchmarks, though by not more than conventional mutual funds, except for a small number of countries.

Our model predicts that the effect of CSR on returns occurs through firm's systematic risk. Some papers study the performance of CSR stocks after controlling for risk. The evidence is mixed. Brammer et al. (2006) and Hong and Kacperczyk (2009) find that least socially desirable stocks have higher expected returns after controlling for risk. However, Becchetti and Ciciretti (2009) find no difference in risk-adjusted returns of CSR firms relative to a control sample and Derwall et al. (2005) and Kempf and Osthoff (2007) find that their respective CSR measures are associated with higher returns controlling for risk.

We contribute significantly and provide novel insights to the existing literature on CSR, risk, returns and firm value. First, our paper builds a model of CSR based on customer loyalty and employs a standard consumption based asset pricing model. Thus, we provide a novel theoretical justification for several of the existing empirical findings. Second, we derive new testable implications and find empirical support for these implications. Third, we utilize a larger data set than previous studies and control for other possible effects carefully. Fourth, we consider the possibility of reverse causality and construct two new sets of instruments for CSR that can help us mitigate the endogeneity concern.

Lastly, our paper is related to the work on brand assets and firm risk. Rego et al. (2009) find a negative relation between a firm's brand capital and firm risk. Belo et al. (2014) find that firms with higher investments in brand capital, measured by advertising expenditures, exhibit lower stock returns. In our empirical tests, we control for advertising expenditures and conclude that CSR has an independent role in affecting firm risk.

3 The Model

3.1 The model setup

Consider an economy where production, asset allocation, and consumption decisions are made over dates 1 and 2. There is a representative investor and a continuum of firms with unit mass. We present an extension to infinite horizon in an online appendix.

Household sector: There is a representative investor with preferences

$$U\left(C_1, C_2\right) = \frac{C_1^{1-\gamma}}{1-\gamma} + \delta E\left[\frac{C_2^{1-\gamma}}{1-\gamma}\right]. \tag{1}$$

The relative risk aversion coefficient is $\gamma > 0$ and the parameter $\delta < 1$ is the rate of time preference. The expectations operator is denoted by $E[.]$.

There are two types of goods in the economy. Low elasticity of substitution goods, which we associate with goods produced by socially responsible firms (CSR goods), and high elasticity of substitution goods, which we associate with other firms (non-CSR goods).[8] We label these using the subscripts G and P, respectively, for green and polluting. A convenient analytical way to model differences in the elasticity of substitution across goods is to use the Dixit-Stiglitz aggregator,

$$C_2 = \left(\int_0^{\mu} c_i^{\sigma_G} di\right)^{\frac{\alpha}{\sigma_G}} \left(\int_{\mu}^{1} c_i^{\sigma_P} di\right)^{\frac{1-\alpha}{\sigma_P}}.$$

Accordingly, $0 < \sigma_j < 1$ is the elasticity of substitution within $c_j = c_G, c_P$ goods. A lower elasticity of substitution implies lower price elasticity of demand and a more "loyal" demand. We therefore are interested in the case $\sigma_G < \sigma_P$. This mathematical formulation of demand loyalty captures two important dimensions of consumer behavior: consumers that actively seek out firms they see as being good at CSR and consumers that respond negatively to businesses that fall below expected ethical standards (e.g. Creyer and Ross, 1997). The parameter α is the share of expenditure allocated to CSR goods and is exogenous. In the context of our representative agent model, α captures the market size for CSR goods.[9] The variable μ measures the fraction of CSR firms and is determined in equilibrium.

Investor optimization is subject to two single-period budget constraints. At date 1, the investor is endowed with stocks and with cash $W_1 > 0$ expressed in units of the aggregate

[8] Gourio and Rudanko (2014) provide a search-theoretic microfoundation for long-term customer relationships that are sluggish to adjust, i.e., customer loaylty.

[9] High income consumers may have a higher demand for CSR goods. These consumers have a more stable total consumption that also leads to a more loyal demand over the business cycle. We view α as capturing the fraction of income that comes from these consumers as well as from those that actively seek out CSR goods independently of their income.

good, which can be used for consumption and investment. The investor decides on the date 1 consumption, C_1, stock holdings, D_i, and the total amount of lending to firms, B, subject to the date 1 budget constraint,

$$\int_0^1 Q_i di + W_1 \geq C_1 + \int_0^1 Q_i D_i di + B, \tag{2}$$

and given the stock prices Q_i and the interest rate r. The presence of $\int_0^1 Q_i di$ on the left hand side of the budget constraint (2) indicates, as is usual in models with a representative investor, that the representative investor is both the seller and the buyer of stocks.

The investor decides on the date 2 consumption, c_i, subject to the budget constraint:

$$W_2 \equiv \int D_i \left(\pi_i - B_i \left(1+r\right)\right) di + wL + B\left(1+r\right) \geq \int p_i c_i di. \tag{3}$$

In the budget constraint, π_i is the operating profit generated by firm i and $B_i\left(1+r\right)$ is the debt repayment by firm i so that $\pi_i - B_i\left(1+r\right)$ is the net profit, and in this two-period model it is also a liquidating dividend. W_2 denotes the consumer's wealth at the beginning of date 2, w is the wage rate, L is the amount of labor inelastically supplied and p_i is the price of good i. The investor behaves competitively and takes prices as given.

Production sector: At date 1, firms choose which production technology to invest in. The decision is based on expected operating profitability and fixed adoption costs. Each firm is endowed with a technology-adoption cost. Firm i faces a cost of f_{Gi} if it chooses to invest in the CSR technology or a cost $f_P > 0$ if it chooses the non-CSR technology. The distribution of costs f_{Gi} across firms is a uniform that takes values between 0 and 1. Firm i finances f_i by raising debt B_i and therefore has zero cash flow at date 1.

Note that a higher cost f_{Gi} does not translate into a higher benefit for CSR firms. Instead, all CSR firms have access to the same elasticity of substitution, σ_G, independently of their fixed cost of investment. This assumption captures the idea that CSR adoption is not equally costly to all firms.[10] Technically, it introduces decreasing returns to CSR at the industry level, which helps in the derivation of equilibria with interior values for μ.

At date 2, firm i chooses how much to produce of x_i in order to maximize operating profits. Firms act as monopolistic competitors solving:

$$\pi_i = \max_{x_i} \left\{ p_i\left(x_i\right) x_i - w l_i \right\}, \tag{4}$$

subject to the equilibrium inverse demand function $p_i\left(x_i\right)$ as well as the constant returns to scale production technology,

$$l_i = A^{\eta_i} \kappa_i x_i. \tag{5}$$

Production of one unit of output requires $A^{\eta_i}\kappa_i$ units of labor input. η_i measures the sensitivity of firm i's labor to the productivity shock A and κ_i measures the resource intensity of each technology. We make no assumption regarding the relative magnitudes of η_G and η_P and of κ_G and κ_P, though some views of CSR might be associated with the assumptions that CSR firms foster employee loyalty, i.e., $\eta_G < \eta_P$, or are more resource intensive, i.e., $\kappa_G > \kappa_P$. Our model thus encompasses several other dimensions of CSR.

There is an aggregate productivity shock, A, realized at date 2 before production takes place. The productivity shock changes the number of labor units needed to produce consumption goods and thus high productivity is characterized by low values of A. The shock A is assumed to have bounded support in the positive real numbers.

Market clearing: At date 1, asset markets clear, $D_i = 1$, for all i, and $B = \int B_i di$. At date 2, goods markets clear, $x_i = c_i$, for all i, and the labor market clears, $\int l_i di = L$.

[10] An alternative formulation that delivers identical results regarding firm risk is to assume that all firms adopting the CSR technology have the same fixed cost as the marginal CSR firm. However, there may be several reasons why fixed costs of adopting CSR technologies differ between firms. For example, costs of converting to organic farming may depend on past chemical use; younger firms, using newer and cleaner technologies, may have lower costs of adopting additional green measures and targets relative to older firms that may be more likely to use older and more polluting legacy technologies; government subsidies may help promote the use of alternative energies and firms with stronger R&D teams may be better positioned to take advantage of these subsidies; and firms with higher quality corporate governance may have better organizational capabilities of adopting green technologies (Amore and Bennedsen, 2013).

3.2 Equilibrium

We start by solving the equilibrium at date 2.

Date-2 equilibrium: Let $\mu \in (0,1)$ denote the fraction of CSR firms determined in date 1. The outcome of the date-2 equilibrium is given as a function of μ.

Consider the consumer's problem. Let λ denote the Lagrange multiplier associated with the date-2 budget constraint (3). The first order condition for each CSR good c_l is

$$\alpha C_2^{-\gamma} \left(\int_0^{\mu} c_i^{\sigma_G} di \right)^{\frac{\alpha}{\sigma_G}-1} \left(\int_{\mu}^{1} c_i^{\sigma_P} di \right)^{\frac{1-\alpha}{\sigma_P}} c_l^{\sigma_G - 1} = \lambda p_l. \tag{6}$$

There is a similar condition for each non-CSR good. Multiplying both sides of each first order condition by the respective c_j and integrating over the relevant range gives

$$\alpha C_2^{1-\gamma} = \lambda \int_0^{\mu} p_i c_i di, \tag{7}$$

$$(1-\alpha)\, C_2^{1-\gamma} = \lambda \int_{\mu}^{1} p_j c_j dj. \tag{8}$$

By taking the ratio of these two conditions, it is straightforward to see that the parameter α gives the expenditure share of CSR goods. The appendix provides the remaining steps that allow us to solve for the demand functions,

$$c_l = \alpha \frac{p_l^{\frac{1}{\sigma_G - 1}}}{\int_0^{\mu} p_i^{\frac{\sigma_G}{\sigma_G - 1}} di} W_2, \tag{9}$$

$$c_k = (1-\alpha) \frac{p_k^{\frac{1}{\sigma_P - 1}}}{\int_{\mu}^{1} p_i^{\frac{\sigma_P}{\sigma_P - 1}} di} W_2, \tag{10}$$

for CSR and non-CSR goods, respectively. Firm j's demand elasticity equals $-\frac{1}{1-\sigma_j}$. Thus, a lower elasticity of substitution (lower σ_j) is associated with a demand that is less sensitive to price fluctuations and is therefore more loyal.

It remains to find the value of λ as a function of goods prices and date 2 wealth. Adding up (7) and (8) gives $C_2^{1-\gamma} = \lambda W_2$. Finally, replacing the demand functions into the consumption aggregator gives the value of λ.

We now turn to the firms' problem. Each firm acts as a monopolistic competitor and chooses x_i according to equation (4). The first order conditions are:

$$\begin{aligned}\sigma_G p_l &= wA^{\eta_l}\kappa_l, \\ \sigma_P p_k &= wA^{\eta_k}\kappa_k.\end{aligned}$$

The second order condition for each firm is met because $0 < \sigma_j < 1$. Using these first order conditions, we get the optimal value of operating profits,

$$\pi_j = (1 - \sigma_j)\, p_j x_j. \tag{11}$$

Goods with lower elasticity of substitution σ_j, i.e. goods with more loyal demand, allow producers to extract higher profits per unit of revenue, all else equal.

To solve for the equilibrium, Walras' law requires that a price normalization be imposed. We impose that the price of the aggregate consumption good is time invariant, so its price at date 2 equals the price at date 1, which is 1. This normalization imposes the following implicit constraint on prices p_l:

$$1 = \min_{c_i \in \{c_i : C_2 = 1\}} \int_0^1 p_i c_i di.$$

The price normalization implies that $W_2 = \int p_l c_l dl = C_2$, from which we obtain the usual condition for the marginal utility of date-2 wealth with constant relative risk aversion preferences, $\lambda = C_2^{-\gamma}$. The next proposition describes the date-2 equilibrium as a function of μ. The proof is relegated to the Appendix.

Proposition 1 *For any interior value of μ and any aggregate shock A, a symmetric date-2 equilibrium exists and is unique with goods prices,*

$$\begin{aligned}p_G &= \bar{p}A^{(1-\alpha)(\eta_G - \eta_P)}\frac{\sigma_P}{\sigma_G}\frac{\kappa_G}{\kappa_P}, \\ p_P &= \bar{p}A^{-\alpha(\eta_G - \eta_P)},\end{aligned}$$

consumption,

$$
\begin{aligned}
c_G &= \frac{\kappa_P}{\sigma_P}\frac{\sigma_G}{\kappa_G}\bar{x}\frac{\alpha}{\mu}A^{-\eta_G}, \\
c_P &= \bar{x}\frac{1-\alpha}{1-\mu}A^{-\eta_P},
\end{aligned}
$$

wage rate, $w = \bar{p}A^{-\bar{\eta}}\sigma_P/\kappa_P$, *operating profits,*

$$
\begin{aligned}
\pi_G &= \bar{p}\bar{x}\left(1-\sigma_G\right)\frac{\alpha}{\mu}A^{-\bar{\eta}}, \\
\pi_P &= \bar{p}\bar{x}\left(1-\sigma_P\right)\frac{1-\alpha}{1-\mu}A^{-\bar{\eta}},
\end{aligned}
$$

and marginal utility of wealth,

$$
\lambda = \left[\bar{p}\bar{x}\right]^{-\gamma} A^{\gamma\bar{\eta}},
$$

where $\bar{p}, \bar{x} > 0$ *are functions of exogenous parameters given in the Appendix, and* $\bar{\eta} = (1-\alpha)\,\eta_P + \alpha\eta_G$.

In equilibrium, a higher productivity shock (lower A) increases the demand for labor and thus also increases the wage rate. The sensitivity of the wage rate to the productivity shock is given by the weighted average of the sensitivities, $\bar{\eta}$, where the weights are the expenditure shares. Prices of goods increase or decrease in response to a productivity shock depending on which types of goods are more sensitive to the productivity shock, as given by $\eta_G - \eta_P$. When $\eta_G - \eta_P < 0$, the production of non-CSR goods increases in expansions as unit labor costs decrease more for those firms, leading to an increase in the relative price of CSR goods. The opposite occurs if $\eta_G - \eta_P > 0$. While the relative price of CSR goods depends on the sign of $\eta_G - \eta_P$, operating profits for both firm types, π_i, and the marginal utility of date-2 wealth, λ, depend only upon the weighted average of the sensitivities, $\bar{\eta}$.

Date-1 equilibrium: To solve for the date-1 equilibrium, we need to determine the rate used by the representative investor to discount future profits. Imposing the equilibrium conditions, the date-1 budget constraint gives $C_1 = W_1 - B$, so that the intertemporal marginal rate of substitution, or stochastic discount factor, becomes:

$$m \equiv \delta \left(\frac{C_2}{C_1}\right)^{-\gamma} = \bar{m}\left[\bar{p}\bar{x}\right]^{-\gamma} A^{\gamma\bar{\eta}}, \tag{12}$$

where $\bar{m} = \delta (W_1 - B)^{\gamma}$. States of the world with low productivity (high A), and therefore low consumption, have higher marginal utility of consumption and higher discount factor.

The date-1 equilibrium respects the familiar pricing conditions for bonds,

$$1 = E\left[m(1+r)\right], \tag{13}$$

and stocks,

$$Q_i = E\left[m\pi_i\right] - f_i. \tag{14}$$

In equilibrium, if there is an interior solution for μ, then $Q_j \geq 0$ and the price of the marginal CSR firm, Q_G^*, obeys

$$Q_P = Q_G^*.$$

This equality determines the cut-off f_G^* by imposing that the marginal firm be indifferent between investing or not investing in CSR:

$$E\left[m\pi_G\right] - f_G^* = E\left[m\pi_P\right] - f_P. \tag{15}$$

At an interior solution for μ, because π_G is equal for all CSR firms, infra-marginal CSR firms, with $f_{Gi} < f_G^*$, have prices higher than Q_G^*. At a corner solution with $\mu = 1$, $Q_P \leq Q_G$, for all f_G. At a corner solution with $\mu = 0$, $Q_P \geq Q_G$, for all f_G. Given an equilibrium threshold level f_G^*, the equilibrium mass of CSR firms is $\mu = \int_0^{f_G^*} di = f_G^*$.

Existence of date-1 equilibrium for μ cannot be proved analytically.[11] The next proposition offers a characterization of the solution when an equilibrium exists and states that the proportion of CSR firms is related to the expenditure share of CSR goods.

[11] We have verified existence of an interior equilibrium for μ in numerical examples. That the mass of firms is bounded by 1 implies the possibility of an equilibrium with $\mu = 0$ and $Q_P > Q_G > 0$. The constraint $\mu \leq 1$ can be motivated by the existence of a fixed factor of production, e.g., land. However, the results are not sensitive to this assumption.

Proposition 2 *At an interior equilibrium for μ, the proportion of CSR firms in the industry $\mu < f_P$ if, and only if, $\alpha < \bar{\alpha}$, where*

$$\bar{\alpha} = \frac{(1 - \sigma_P) f_P}{1 - \sigma_G - f_P (\sigma_P - \sigma_G)}.$$

Moreover, the constant $\bar{\alpha}$ is increasing in σ_G and $\bar{\alpha} < f_P$ if, and only if, $\sigma_P > \sigma_G$.

The constant $\bar{\alpha}$ is the expenditure share at which $\mu = f_P$. Any expenditure share $\alpha < \bar{\alpha}$ leads to a proportion $\mu < f_P$. A more loyal demand for CSR firms, $\sigma_P > \sigma_G$, implies that the threshold expenditure share $\bar{\alpha} < f_P$. Intuitively, if $\sigma_P > \sigma_G$, then CSR firms are able to extract higher rents for the same expenditure share α and the proportion of CSR firms grows. To place an upper bound on μ, a sufficiently smaller expenditure share α is required.

4 CSR and Risk in Equilibrium

In this section, we analyze the properties of CSR firms' risk and of the proportion of CSR firms in the industry. For simplicity, in what follows, we use the notation $\alpha_j = \alpha$ if $j = G$, and $\alpha_j = 1 - \alpha$ if $j = P$. Likewise, $\mu_j = \mu$ if $j = G$, and $\mu_j = 1 - \mu$ if $j = P$.

4.1 Profitability and aggregate shocks

We start by describing the properties of net profits in response to aggregate shocks. Consider the elasticity of net profits to the aggregate shock for a generic firm j,

$$\frac{d \ln (\pi_j - f_j (1 + r))}{d \ln A^{-1}} = \frac{\bar{\eta} \bar{p} \bar{x} (1 - \sigma_j) \frac{\alpha_j}{\mu_j} A^{-\bar{\eta}}}{\bar{p} \bar{x} (1 - \sigma_j) \frac{\alpha_j}{\mu_j} A^{-\bar{\eta}} - f_j (1 + r)}.$$

This is a measure of a firm's operating leverage.[12] We compute the elasticity with respect to A^{-1} so that operating leverage is positive (recall that a high value of A^{-1} is an upturn).

The sensitivity of firms' profits to aggregate shocks depends on the degree of customer loyalty. To see this, consider the partial equilibrium effect that increased customer loyalty

[12] In the model financial leverage and operating leverage are the same as the firm uses only debt to finance the entirety of the fixed adoption costs. Without loss of generality we discuss our results in terms of operating leverage. However, in practice operating leverage need not subsume the effect of the fixed costs if a portion of the costs are financed with equity.

(lower σ_j) has on operating leverage holding μ constant. The partial derivative of operating leverage with respect to σ_j is positive, implying that a firm with a more loyal demand (lower σ_j) has profits that are less sensitive to aggregate shocks. The intuition for the result is that a more loyal demand generates greater profit margins for the firm, which dilute the effect of the fixed adoption costs and lower the firm's operating leverage. This partial equilibrium result captures the widely held view that a less price elastic demand gives the firm the ability to smooth out aggregate fluctuations better.

The next proposition extends this partial equilibrium result by considering the equilibrium implications of productivity shocks on the net profits of CSR and non-CSR firms.

Proposition 3 *Define the ratio of net profits evaluated at the marginal CSR firm:*

$$R_\pi \equiv \frac{\pi_G - f_G^* (1+r)}{\pi_P - f_P (1+r)}.$$

R_π is increasing with A if, and only if, $\alpha < \bar{\alpha}$.

For a sufficiently small expenditure share in CSR, $\alpha < \bar{\alpha}$, or for $\mu < f_P$, the profits of CSR firms are less sensitive to productivity shocks than those of non-CSR firms. That is, net profits of CSR firms decrease in recessions (high A) but by less than the profits of non-CSR firms, and as a result R_π increases.

4.2 CSR and systematic risk

To see how the results on profits translate to systematic risk, define the gross return to firm j as the ratio of its net profits, or liquidating dividend, to its stock price, $1 + r_j \equiv (\pi_j - f_j (1+r)) / Q_j$. Using equations (13) and (14), we obtain the usual pricing condition in a consumption-CAPM model:

$$\begin{aligned} E(r_j - r) &= -E(m)^{-1} Cov(m, r_j) \\ &= -E(m)^{-1} Q_j^{-1} Cov(m, \pi_j). \end{aligned}$$

The expected excess return is determined by the covariance of the stock return with the intertemporal marginal rate of substitution, $Cov\left(m, r_j\right)$. This covariance depends on how aggregate productivity affects both variables. In the Appendix, we prove that:

Proposition 4 *Firm j's equilibrium expected stock return in excess of the risk free rate is:*

$$E\left(r_j - r\right) = \frac{\bar{p}\bar{x}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}}{\bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}E\left[A^{(\gamma-1)\bar{\eta}}\right]-f_j}\frac{-Cov\left(A^{-\bar{\eta}}, A^{\gamma\bar{\eta}}\right)}{E\left(A^{\gamma\bar{\eta}}\right)}. \tag{16}$$

The expected excess return is increasing in σ_j. Furthermore, at an interior solution for μ, the marginal CSR firm has

$$E\left(r_P - r\right) > E\left(r_G^* - r\right) \text{ if, and only if, } \bar{\alpha} > \alpha.$$

The proposition gives an expression for firm j's expected excess return. The first term in the expression is an operating leverage effect. It amplifies the term $Cov\left(A^{-\bar{\eta}}, A^{\gamma\bar{\eta}}\right)$ that captures how profits co-vary with the stochastic discount factor. This covariance is negative for any risk aversion parameter $\gamma > 0$ and thus $E\left(r_j - r\right) > 0$.[13]

The partial derivative of expected excess returns with respect to σ_j describes the impact of changes in demand loyalty. Holding μ constant, $E\left(r_j - r\right)$ increases with σ_j. Intuitively, increased loyalty (lower σ_j) reduces the sensitivity of the firm's net profits to aggregate shocks. Such a firm pays a relatively higher dividend in states of lower consumption and high marginal utility, and is thus less risky to a risk averse investor and worth more.

The more loyal demand, by increasing firm profits and stock prices, produces a feedback equilibrium effect via an increase in the proportion of CSR firms, μ. The proposition gives a stark result regarding the equilibrium riskiness of CSR versus non-CSR firms. We show that the proportion of CSR firms determines the relative riskiness of CSR versus non-CSR firms: if $\mu \leq f_P$ (or $\alpha \leq \bar{\alpha}$) then the marginal CSR firm has $E\left(r_G^* - r\right) \leq E\left(r_P - r\right)$. In this case, infra-marginal CSR firms also have higher prices and lower expected returns than non-CSR

[13] If investors are risk neutral, i.e., $\gamma = 0$, then $E\left(r_j - r\right) = 0$, that is, there is no priced risk.

firms. Therefore, if $\mu \leq f_P$, then on average CSR firms have lower expected excess returns. When $\mu > f_P$ (or $\alpha > \bar{\alpha}$), then $E(r_P - r) < E(r_G^* - r)$ and the marginal CSR firm has higher fixed adoption costs, operating leverage and systematic risk than non-CSR firms. By continuity, infra-marginal firms with fixed costs close to $f_G^* = \mu$ also have higher expected returns, but there may be firms with low enough f_{Gi} such that $E(r_P - r) > E(r_{Gi} - r)$.

Systematic risk can also be measured with respect to the market return. Define the value-weighted market return as $1 + r_M \equiv \int (\pi_i - f_i (1 + r))\, di / \int Q_i di$.

Proposition 5 *Consider firm j's market $\beta_j = Cov(r_j, r_M) / Var(r_M)$. We have,*

$$\beta_j = \frac{(1 - \sigma_j)\,\alpha_j}{(1 - \sigma_G)\,\alpha + (1 - \sigma_P)(1 - \alpha)} \frac{\int Q_i di}{\mu_j Q_j}.$$

At an interior solution for μ, $\beta_P > \beta_G^*$ if, and only if, $\bar{\alpha} > \alpha$.

This proposition compares the *level* of systematic risk between CSR and non-CSR firms. Consider an equilibrium where the fraction of CSR firms is not too large, i.e., $\mu \leq f_P$ (or $\alpha \leq \bar{\alpha}$). In such an equilibrium, the marginal CSR firm has lower β than a non-CSR firm. In addition, because $Q_j \geq Q_G^*$ for any infra-marginal CSR firm j, then $\beta_j \leq \beta_G^*$. Therefore, if $\mu \leq f_P$, then the average CSR firm has lower market β than the average non-CSR firm. Now consider an equilibrium where the fraction of CSR firms is sufficiently large, i.e., $\mu > f_P$. When $\mu > f_P$ (or $\alpha > \bar{\alpha}$), the marginal CSR firm has higher market β than non-CSR firms. The reason is that when the proportion of CSR firms is larger, the marginal CSR firm has high fixed adoption costs and high operating leverage. Hence, high systematic risk.[14]

The next proposition indicates the determinants of systematic risk for CSR and non-CSR firms. We are able to derive general analytical results for average betas, $\bar{\beta}_G \equiv \int_0^\mu \beta_j \frac{Q_j}{\int Q_i di} dj$,

$$\bar{\beta}_G = \frac{(1 - \sigma_G)\,\alpha}{(1 - \sigma_G)\,\alpha + (1 - \sigma_P)(1 - \alpha)}. \tag{17}$$

[14] Idiosyncratic volatility is zero in the model because we allow for only one source of uncertainty, which is aggregate in nature.

The weighted average market β of non-CSR firms is $\bar{\beta}_P = 1 - \bar{\beta}_G$. If a determinant leads to lower betas for CSR firms, it must lead to higher betas for non-CSR firms and a wider gap between $\bar{\beta}_G$ and $\bar{\beta}_P$. Straightforward differentiation of expression (17) yields:

Proposition 6 *The weighted average market β of CSR firms decreases with:*

1) lower elasticity of substitution in the industry (decrease in σ_G and σ_P, keeping $\sigma_P - \sigma_G$ constant); and,

2) lower expenditure share for CSR goods (decrease in α).

Together, Propositions 5 and 6 imply that if firm-level beta for CSR firms is lower than for non-CSR firms in two industries, then that difference is larger in the industry with lower elasticity of substitution and with a lower expenditure share for CSR goods.

4.3 Testable Predictions

In this subsection, we collect the model predictions discussed above. The first main model prediction is obtained from Proposition 5.

Prediction 1 Firm-level CSR is associated with lower firm-level systematic risk.

We test this prediction using the sign and the significance of the slope coefficient on a regression of firm-level systematic risk on the firm's CSR attributes. In this regression, we control for known determinants of systematic risk. In addition, we control for determinants of customer loyalty associated with other product characteristics to emphasize the independent effect from CSR.

In the next prediction, we emphasize the aspect of the model that relates to the degree of substitutability across goods, which is used to construct our model of customer loyalty (Proposition 6). We use measures of product and industry differentiation and assume that greater differentiation is a proxy for lower elasticity of substitution.

Prediction 2 Firm-level CSR is associated with lower firm-level systematic risk, particularly with greater product differentiation.

While our model predictions build on the notion of customer loyalty, we do not differentiate between consumer industries and business-to-business industries in testing our model. The main reason is that consumers are aware of firms' supply chains, which creates an incentive for firms in other industries to also engage in CSR. That is, consumers demand better CSR policies from the firms they buy from, from the firms that supply to these firms, and so on. For example, Fortune magazine recently quoted Ma Jun, a noted Chinese environmental activist, about Apple's turnaround in their sustainability policies and their efforts motivating key suppliers ("Apple does a 180 with suppliers in China", June 2013). This distinguishing feature of CSR is likely to be critical to identify its effects vis-à-vis other ways that firms use to acquire customer loyalty, such as advertising.

The third main model prediction is also obtained from Proposition 6. Strictly speaking, the proposition says that the CSR-risk relation is weaker in industries where the expenditure share of CSR goods is higher. Intuitively, when consumers spend more on CSR goods, then CSR firms capture a greater share of the market and have higher profit margins. This in turn leads more firms to adopt CSR policies, attracting firms with higher adoption costs. These higher adoption costs increase operating leverage and systematic risk. This prediction captures the idea of decreasing returns to CSR. In the absence of an industry panel of data on CSR expenditure shares, we restate the result in Proposition 6 in terms of the stock market capitalization of the higher-rated CSR firms. In the model, industries with higher CSR expenditure shares have higher relative market capitalization for CSR firms. Thus,

Prediction 3 Firm-level CSR is associated with lower firm-level systematic risk, but the effect is weaker in industries with higher relative market capitalization of CSR firms.

The next prediction is obtained from Proposition 3. This proposition describes how the ratio of CSR profits to non-CSR profits co-moves with aggregate productivity shocks, which are the sole driver of business cycle fluctuations in the model. Formally:

Prediction 4 The ratio of CSR firm profits relative to non-CSR firm profits decreases in business cycle expansions.

It is interesting to contrast this prediction with the prediction from the alternative view that CSR goods are superior goods. Under this alternative view, CSR firms' profits should co-move more with the business cycle, increasing at a faster pace with improving economic conditions than non-CSR firms' profits. This would also make CSR firms riskier.

The last prediction is about the valuations of CSR versus non-CSR firms. In equilibrium $Q_P = Q_G^*$, so that firm values are equal for the marginal CSR firm and all non-CSR firms. Recall that the firm value for the marginal CSR firm is $Q_G^* = E\left(m\pi_G\right) - f_G^*$. Because infra-marginal CSR firms have lower fixed costs of adopting the CSR technology, the net benefits of CSR adoption are higher for those firms. Thus the firm values have to be higher for the infra-marginal firms, i.e. $Q_{Gi} = E\left(m\pi_G\right) - f_{Gi} \geq Q_G^* = Q_P$. Therefore,

Prediction 5 Firm-level CSR is associated with higher firm value.

In addition to these model predictions, we also run tests using excess stock returns as our dependent variable. Since our model is a single-factor risk-based asset-pricing model, higher CSR is related to lower expected excess returns. The model generates other predictions but current data limits our ability to test them. For example, when $\eta_G < \eta_P$, which can be interpreted as CSR firms having greater employee loyalty, the relative price of CSR goods to non-CSR goods increases in expansions (Proposition 1).

5 Data Description

We obtain firm-level CSR data from 2003 to 2011 from the MSCI's ESG (Environmental, Social and Governance) database, formerly known as KLD Research & Analytics.[15] ESG ratings aim to identify social and environmental risk factors that may affect a firm's financial performance and its management of risk. A detailed description of the data is provided in Table A.I in the Appendix. Firms are rated on a variety of strengths and concerns on seven attributes: community, diversity, employee relations, environment, product, human rights, and governance. For every attribute, MSCI assigns a "1" for each of the criteria in the attribute (both strengths and concerns criteria) and assigns a "0" otherwise. We compute a firm-level score as the difference between the strengths and concerns on each attribute and define seven corresponding variables. Following Hillman and Keim (2001), we construct a measure of aggregate CSR by adding the scores of the individual attributes. In our main results, we exclude governance from the aggregate CSR score to focus on non-governance aspects of CSR. Our results remain robust if governance is included in the CSR score.

Panel A of Table I reports summary statistics for each of the CSR attributes and also for the aggregate CSR score. The aggregate CSR score displays greater variance than the sum of the variances of the individual attributes, because the individual attributes are positively correlated. Panel B of Table I reports the distribution of companies covered by the CSR score over time and a breakdown by year of the mean value of the scores in each attribute. For every year, the data contain about 2,600 publicly listed U.S. companies. In total, the sample has 23,803 firm-year observations from 4,462 distinct companies.[16] There is some time series variation even in mean values that we explore in some of our tests.

In addition to rating firms on the various CSR attributes, MSCI identifies six "sin"

[15] MSCI ESG coverage for years prior to 2003 is reduced to about 1,100 firms in 2001 and 2002, and to 650 firms before 2001.

[16] The sample we obtain from MSCI has 26,559 firm-year observations from 4,577 distinct companies from 2003 to 2011. After matching this sample with Compustat and CRSP and constructing our main variables, we end up with 23,803 firm-year observations.

concerns, or controversial business issues: firearms, gambling, military, nuclear, tobacco, and alcohol. The sin dummy variable takes the value of one if a firm has one of the sin concerns and 0 otherwise. We will use it as a control variable to account for the effect of "sin" stocks on firm risk (Hong and Kacperczyk, 2009).

[**Insert Table I here**]

We match social responsibility data with Compustat using CUSIPs as firm identifiers. We manually check stock ticker and company name for every data point to confirm that the matching is correct. Panel C of Table I reports the number of firms and average CSR score per industry. To conserve on space, we report in the table the statistics by one-digit SIC code and report here the top and bottom CSR industries by two-digit SIC code. The industries with highest CSR score are Hotels (SIC = 70) with an aggregate CSR score of 0.981, Credit Institutions (SIC = 61) with an aggregate CSR score of 0.804, and Printing and Publishing (SIC = 27) with a score of 0.489. The industries with lowest CSR scores are Coal Mining (SIC = 12) with a CSR score of -3.309, Petroleum Refining (SIC = 29) with a score of -2.413, and Agricultural Production Crops (SIC = 1) with a score of -1.897.

Table II reports pairwise correlation coefficients between the aggregate CSR score, its various attributes, and the sin dummy variable. Most CSR attributes are positively correlated with other attributes except for the product and human attributes that are negatively correlated with the attributes community and diversity. The product score covers such things as antitrust and access to capital and the human score covers concerns about business dealings in countries with poor human rights records. We interpret these negative correlations as reflecting the many facets of CSR. The sin dummy is negatively correlated with the aggregate CSR score and with each of the CSR attributes, except for diversity. This is somewhat surprising as we expect these firms to compensate for their controversial business issues by building up other aspects of CSR. At the same time it highlights the importance of controlling for the sin dummy.

[**Insert Table II and Figure 1 here**]

To illustrate the time series variation of the CSR score by firm, Figure 1 plots the histogram of the standard deviation of the time series of firm-level CSR. For the purpose of this figure only, we exclude the firms with fewer than three years of CSR data, resulting in a sample of 3,264 unique firms. In this subsample, there are 430 firms (about 13%) that have a zero standard deviation. Of these, only 30 firms are in our data for the entire sample period.[17] So while there are firms that see no change in CSR during the sample, the histogram shows that there is significant positive skewness, that is, a significant fraction of firms experience changes in their CSR policies that are several standard deviations larger than the regular change (average standard deviation is 0.95).

We match these data with stock return data from CRSP in order to obtain an estimate of systematic risk. To construct an estimate of systematic risk that better proxies for our model's main variable, we run a market model regression that accounts for known empirical asset pricing regularities: the Fama-French factors and a correction for short-run autocorrelation in market returns (e.g., Scholes and Williams, 1977). Our estimate of systematic risk, β_{it}, is obtained by running the following time-series regression for every stock i in year t using weekly data:

$$r_{i,s} - r_s = h_i + \beta_i^1 (r_{M,s} - r_s) + \beta_i^2 (r_{M,s-1} - r_{s-1}) + h_i^1 SMB_s + h_i^2 HML_s + \varepsilon_{i,s}, \quad (18)$$

where $r_{i,s}$ is the weekly return for stock i at week s, r_s is the one-month T-Bill rate at time s transformed into a weekly rate, $r_{M,s}$ is the return on the CRSP value-weighted index

[17] For example, NIC, Inc., is a fairly large company that processes federal and state government payments. It is present in our sample for all nine years of data and always displays a CSR score of "-1". This score comes from one concern on the diversity attribute. NIC has a concern regarding women representation in senior management.

at time s, and SMB_s and HML_s are the Fama-French factors at time s. We adjust the estimate of β for autocorrelation in market returns by including both current and lagged excess market returns in the regression. The value of systematic risk for stock i at year t used in subsequent analysis is,[18]

$$\hat{\beta}_{it} = \frac{1}{2}\left(\hat{\beta}_i^1 + \hat{\beta}_i^2\right).$$

Finally, we match our data with Compustat. We calculate a measure of firm value, *Tobin's Q*, as the ratio of the market value of equity plus book value of debt to total assets. Table A.I in the Appendix provides a detailed description of the remaining variables used in the analysis and Table III provides summary statistics. All of the variables (except for the CSR score) are winsorized at the 1% and 99% levels. The results are robust if an alternative outlier detection methods is used, such as Cook's D statistic.

[Insert Table III here]

In addition to these variables, we use the following variables in our tests. *Differentiated goods industries* dummy (24% of the sample) is taken from Giannetti et al. (2011). *Hoberg and Phillips product similarity* is a firm-level variable that is inversely related to product differentiation (Hoberg and Phillips, 2010). *Industry top-CSR market cap* is defined at the two-digit SIC industry as the market capitalization share of the top-third CSR firms relative to the industry's market capitalization. *Profit ratio* is defined at the two-digit SIC industry as the ratio of the mean net income of the firms in the top-third CSR score to the mean net income of the firms in the bottom-third CSR score.

[18] In an online appendix we also report a full set of results when β is the coefficient on the contemporaneous market excess return, β_i^1, and also when β is estimated using Equation (18) without the FF factors. Our main results are largely unaffected in either case.

6 Empirical Results

6.1 Empirical Strategy

To test the model predictions, we run a variety of regressions using yearly data of firm-level β, excess stock returns and *Tobin's Q*. In these regressions, we control for factors that drive variation in the explained variable, including firm and year fixed effects, besides controlling for the main variable of interest, firm CSR. In firm-level regressions, we do not include industry fixed effects as these are likely to be absorbed by the firm fixed effects due to limited switching of firms between industries. We report two-dimensional clustered standard errors (see Petersen, 2009) in all cross-sectional tests, clustered by firms and years to adjust for arbitrary heteroskedasticity, cross-sectional, and time-series correlation.

The firm characteristics used as control variables in the systematic risk and expected excess return regressions are: *Operating leverage*; *Profitability*; *R&D* expenditures; *Advertising* expenditures; long term debt to assets (*Leverage*); *CAPEX*; *Cash*; *Sales growth*; market equity-to-book (*ME*); *Size*; *Dividend yield*; log of firm age (*Age*); *Earnings variability*; *Diversification*; and State corporate tax rate (*State tax*). Leverage, sales growth, size, earnings variability, and the dividend yield have been shown to affect systematic risk by Beaver et al. (1970). McAlister et al. (2007) show that R&D expenditures and firm age have an impact on systematic risk. Melicher and Rush (1973) show that conglomerate firms have higher βs than stand-alone firms. Palazzo (2012) shows that firms with higher levels of cash holdings display higher systematic risk. Novy-Marx (2011) shows that operating leverage predicts cross-sectional returns. A subset of these variables is used in the valuation regressions (see e.g. Durnev and Kim, 2005). Our results are robust to inclusion of other control variables, for example governance factors such as institutional ownership.

6.2 Results

To test Prediction 1, we examine how CSR and its attributes are related to firm systematic risk. Table IV reports panel regressions where we control for firm-level variables as well as firm and year fixed effects.[19] Of the various controls, we highlight the inclusion of *Advertising* expenditures that also increase customer loyalty. If customer loyalty originated only through advertising, then we would not expect CSR to be related to risk. Likewise, if customer loyalty arises because of loyalty to the firm's technology (e.g., Apple or Microsoft), then controlling for *R&D*, *CAPEX* and *Sales growth* should help capture this additional channel. Specification 1 shows the results with control variables only. The control variables mostly display the expected signs: *Profitability*, *Leverage*, *Cash*, *ME*, *Dividend yield*, and *Diversification* are positively related to systematic risk, whereas *R&D* is associated with lower systematic risk. The other controls, including *Advertising* expenditures, *Operating leverage*, and *State tax* are not significant across specifications.

In the remaining specifications of Table IV, we include both a CSR proxy and the various controls. Specification 2 shows that the level of systematic risk is statistically significantly lower for firms with higher aggregate CSR scores (coefficient of -0.0159 with t-statistic of -6.59). Economically, this effect is significant as well: an increase in CSR of one standard deviation of the sample CSR (equal to 2.162 from Table III) reduces β by $0.0159 \times 2.162 = 0.034$, which is close to a 4% decrease relative to the sample mean of systematic risk of 0.914 (from Table III). Community, diversity, employee, environment and human attributes of CSR, when entered separately, also are negatively and statistically significantly linked to firm β. While the effect of CSR appears to not be driven by a single attribute, among the various attributes, diversity and environment have the strongest impact on firm systematic risk. A one standard deviation increase in each of these attributes decreases β

[19] The online appendix reports results of a similar set of regressions that exclude the control variables while keeping the firm and year fixed effects.

by $0.0192 \times 1.377 = 0.026$ and $0.034 \times 0.715 = 0.024$, respectively. The governance attribute of CSR in MSCI's ESG is not related to β (specification 9), and the significance of CSR is preserved if the aggregate CSR score incorporates the governance component (specification 10).[20] Finally, firm CSR remains significant if the sin dummy is controlled for (specification 11).[21] Note that the R^2 of the regressions does not change noticeably from one specification to another because firm fixed effects absorb most of variation in β.

In the model CSR has an effect on firm beta through operating leverage. But as we discussed before, in the model, operating leverage coincides with financial leverage. In practice, the effect of the fixed adoption costs on operating leverage depends on how much gets financed through debt versus equity and how much of the adoption costs carry on past the initial investment stage. We therefore, do not believe that operating leverage subsumes the empirical effect of CSR on risk. Our interpretation is that changes in CSR are likely to lead to changes in operating leverage, but because many other variables also affect operating leverage, using CSR directly is a better approach to evaluating its impact on firm risk.[22]

[Insert Table IV here]

One potential alternative explanation for our finding is that firms spend more in CSR in economic expansions (as in the agency view of CSR that we return to below) when risk tends to be lower. While we note that the effect of economic expansions on β should be captured

[20] ESG's governance attribute differs from traditional governance metrics. For example, it does not contain information on the firm's anti-takeover provisions. Instead, it contains information on activities that are not typically included in governance metrics, such as equity stakes in other firms having social concerns, or information about the firm's transparency record concerning its political involvement. Parigi et al. (2013) show that for traditional corporate governance metrics there is a positive relation between the level of corporate governance and systematic risk.

[21] We have also conducted the regressions in Table IV with CSR strengths and CSR concerns entering separately as independent variables. We find that the coefficient on CSR strengths is estimated to be negative and significant, as expected. The coefficient on CSR concerns is positive, as expected, but marginally significant.

[22] In the model $\mu = f_G^*$. Therefore, when $\mu \leq f_P$ and CSR firms have lower β, $f_G^* \leq f_P$ and CSR firms also have lower operating leverage. Consistent with the model, we find that higher CSR firms have lower operating leverage (univariate correlation coefficient of -0.054 with p-value of 0.0, untabulated), but the multivariate results in Table IV suggest that operating leverage does not subsume the effect of CSR.

by the year fixed effects, we further examine how the relation between firm systematic risk and CSR changes through time to alleviate this concern. In the online appendix, we repeat the analysis in Table IV by year. We find that firms with higher CSR have significantly lower βs in most years in the sample, with uniformly high t-statistics, implying that our results are not unique to economic expansions. On the contrary, the years 2003 and especially 2009, where the model performs poorly, coincide with strong stock market recoveries.

The results of testing Predictions 2 and 3 are displayed in Table V. Prediction 2 states that firm-level CSR is associated with lower firm-level systematic risk, particularly for differentiated goods. To test this prediction, we interact firm CSR with the *Differentiated goods industry* dummy and the *Hoberg-Phillips product similarity* variable (specifications 1 and 2 of Table V, respectively). In specification 1, we drop firm fixed effects because they sum up to the industry dummy variable. In both specifications, the coefficients on the interaction terms have the predicted signs and are statistically significant. The impact (in absolute value) of CSR on firm risk goes up from 0.0170 when the *Differentiated goods industries* dummy is zero to 0.0236 when the firm belongs to a differentiated goods industry, an increase in economic significance of 38%. Likewise, the impact (in absolute value) of CSR on firm risk goes up from 0.0152 (equal to $0.022 - 0.0882 \times 0.0773$) for a firm with mean product similarity of 0.0773 (see Table III) to 0.022 for a firm with zero product similarity, an increase in economic significance of 44%.

Prediction 3 states that firm-level CSR is associated with lower firm-level systematic risk, but the effect is weaker in industries with higher *Industry top-CSR market cap.* We find that firm CSR remains negative and significant with the coefficient of -0.0192 and t-statistic of -4.53 and that the coefficient of the interaction between *Industry top-CSR market cap* and firm CSR score is positive and significant, as expected.

Prediction 4 states that the ratio of CSR firm profits relative to non-CSR firm profits is counter-cyclical, decreasing (increasing) in economic expansions (contractions), that is, CSR net profits do not increase as much as those of non-CSR firms in economic upturns. To test this prediction, we construct, for each industry and for each year, the mean net income of the firms in the top-third CSR score divided by the mean net income of the firms in the bottom-third CSR score, called *Profit ratio*. Specification 4 in Table V shows that the relation between *Profit ratio* and GDP growth expressed in 2003 dollars (as a proxy for economic cycles) is negative (coefficient of −0.122) and statistically significant.[23] Therefore, the ratio of profits decreases during the periods of relatively higher GDP growth.

[Insert Table V here]

Table VI presents the results of the tests of Prediction 5 that firm-level CSR is associated with higher firm valuation as measured by *Tobin's Q*. We find that the effect of CSR score on *Tobin's Q* is positive and highly significant (coefficient of 0.0599 and t-statistic of 8.22), consistent with Prediction 5 (specification 1). A one standard deviation increase in CSR is associated with a 6.7% (equal to $0.0599 \times 2.162/1.927$) increase in *Tobin's Q* relative to its sample average value of 1.927 (see Table III). We also find in specifications 2 and 3 that CSR is more strongly related to *Tobin's Q* with differentiated goods, consistent with the model (coefficient of CSR interacted with *Differentiated goods industry* dummy is 0.0249 with t-statistic of 3.17 and coefficient of CSR interacted with *Hoberg-Phillips product similarity* variable is −0.0817 with t-statistic of −2.30). The impact of CSR on firm value goes up from 0.048 when the *Differentiated goods industries* dummy is zero to 0.073 otherwise, an increase in economic significance of 52%. The impact of CSR on firm value goes up from 0.0409 (equal to $0.0472 - 0.0817 \times 0.0773$) for a firm with mean product similarity of 0.0773 to 0.0472 for a firm with zero product similarity, an increase of 15%.[24] Specification 4 shows

[23] The regressions include industry fixed effects. Using median net income produces similar result. Further, the results are not changed if we de-trend growth in GDP.

[24] We find that the coefficient on the *Differentiated goods industries* dummy is negative. Differentiated goods industries spend more money on advertising and R&D and those have a positive effect on valuation, so while the marginal effect of differentiation might be negative, the total effect of differentiation may still be positive.

that firm CSR increases *Tobin's Q* by less if a firm belongs to an industry with a larger share of top-CSR market capitalization also consistent with the model (coefficient on the interaction term is -0.0086 with t-statistic of -1.92).

[Insert Table VI here]

To test the impact of CSR on excess returns, we first obtain factor loadings (β^1_{it}, β^2_{it}, h^1_{it}, and h^2_{it}) from regression (18) as in Ang et al. (2009). Then, we regress firm annual excess returns on firm factor loadings and control variables using a firm-year panel regression,

$$r_{i,t} - r_t = \text{fixed effects} + \alpha_1\beta^1_{it} + \alpha_2\beta^2_{it} + \alpha_3 h^1_{it} + \alpha_4 h^2_{it} + \text{controls} + u_{i,t}. \tag{19}$$

Table VII presents the results. Specification 1 extends equation (19) by including as a regressor the lagged value of firm CSR. We find that higher CSR is associated with lower expected excess returns.[25] A one standard deviation increase in CSR score is associated with a 9.27 basis points decrease in expected excess returns (equal to -0.0429×2.162) which represents a 7.6% reduction relative to its sample average value of 1.215% (see Table III). We also find that the effect of CSR on expect returns is more pronounced in differentiated goods industries and in firms with less similar products but that the coefficients are not statistically significant (specifications 3 and 4). Consistent with Prediction 3, we find that CSR has a stronger effect on expected excess returns in industries where the top CSR firms have relatively lower market capitalization (specification 5). In the model CSR impacts expected returns only through beta. In specification 6 we employ a two-stage estimation as in Almeida and Wolfenzon (2005) to help separate the impact of firm risk on returns that is due to CSR from that of other factors unrelated to CSR. In the first stage, our estimate of firm β is regressed on CSR. In the second stage, the fitted and residual values enter the regression. We find that both explained (by CSR) and unexplained parts of firm systematic

[25] The signs associated with the factor loadings are consistent with those found in Ang et al. (2009).

risk contribute to lower expected excess returns but the reduction in firm β through CSR (*Explained* β) matters more. Further the coefficients on the *Explained* and *Unexplained* βs are statistically different with a p-value of 0.0. Thus expected excess returns are lower largely because CSR lowers firm beta.

[Insert Table VII here]

The quantitative results we find are reasonably consistent across the different tests. Consider first the relation between the results on firm value and firm systematic risk. Note that *Tobin's Q* can be decomposed as the product of the ratio of income (including interest payments) to total assets and the ratio of the market value of the firm to income. Assume that the market value of the firm to income ratio is the inverse of the WACC minus the growth rate and that CSR affects *Tobin's Q* through the firm's WACC only. We may then ask what is the impact of CSR on Q? It can be shown that the effect of CSR on *Tobin's Q* should be about five times larger than the effect of CSR on firm β (using from Table III the facts that equity is 80% of total assets, *Tobin's Q* is 1.927, and the ratio of income (including interest payments) to total assets in our sample is 0.029 (untabulated), and assuming an equity premium of 5%). Considering specifications 1 in Table VI and 2 in Table IV, we see that in our estimations the effect of CSR on *Tobin's Q* is about four times larger than the effect of CSR on firm β (or 0.0599 divided by 0.0159). Consider next the results between expected excess returns and firm systematic risk and assume that CSR affects expected excess returns through the firm's beta only. The impact of CSR on firm expected excess returns should equal the equity risk premium (5%) times the impact of CSR on firm beta (-0.0159 from specification 2 in Table IV), or -0.08%. From specification 1 in Table VII we estimate an effect of CSR on expected excess returns of -0.043%. We conclude that our results across the different metrics, firm systematic risk, excess stock returns and firm value, are reasonably quantitatively consistent.

6.3 Endogeneity in the CSR-Risk and CSR-Valuation Relations

One concern with our analysis, and in fact with most other studies of CSR, is that of endogeneity, particularly for tests of Predictions 1 and 5. Consider the following possible mechanisms for reverse causality in the CSR-risk relation. Hong et al. (2011) present evidence showing that financially constrained firms are less likely to spend resources on CSR and that when these firms' financial constraints are relaxed spending on CSR also increases consistent with the slack hypothesis of Waddock and Graves (1997). Extending the slack hypothesis, it could be that firms with low levels of systematic risk have higher valuations and more resources to spend in CSR, or have fewer growth options and again more resources to dedicate to CSR. In addition, it may be that firms that traditionally build customer loyalty through advertising or other means, and have lower systematic risk, also do more CSR. Finally, firms with low level of systematic risk or higher valuation may even have certain management styles, or cater to certain groups of investors, or be in industries that are more prone to developing more aggressive CSR policies.

To alleviate these important concerns, we proceed in two ways. First, we control for a long list of lagged variables that capture some of the above mentioned effects. For example, when we control for *Cash*, *CAPEX* and *R&D* we (partly) control for the slack hypothesis. When we control for *Advertising* and *R&D*, we control for the other types of investment in customer loyalty. Finally, firm fixed effects capture a great deal of unobserved firm characteristics that can be correlated with the error term and result in endogeneity.

Second, we deal with endogeneity by creating two novel sets of instruments for CSR. The first set of instruments follows Di Giuli and Kostovetsky (2014) who find that firms headquartered in Democratic party-leaning states are more likely to spend resources on CSR.[26] At the same time, we expect that the political inclination of a state is unrelated

[26] In addition, Gromet et al. (2013) demonstrate that more politically conservative individuals are less in favor of investment in energy efficient technology than are those who are more politically liberal. See also Costa and Kahn (2013).

to systematic risk, expected returns and firm valuation. We therefore use this set of instruments for systematic risk, excess returns and valuation regressions. Note that political inclination of a state could be related to the geographic clustering of industries (see Almazan et al., 2010), and thus indirectly to firm systematic risk. However, since we include firm fixed-effects in our first-stage regression, and industry effects are captured by the firm fixed-effects, geographic clustering of industries should not be a concern.[27] Note also that if democratic states have higher taxes as shown by Heider and Ljungqvist (2014), our political instruments may be correlated with firm value. However, according to Di Giuli and Kostovetsky (2014), firms do more CSR in democratic states, which then should lead to *higher* firm value, not *lower* firm value as should be the case according to the tax story. Nonetheless, our regressions include state taxes to account for any omitted correlation. Appendix A.I gives the details of the variables we use: *President vote, democrats* is the proportion of votes in the state received by the Democratic candidate for president; *Congress, democrat* captures House and Senate Democratic representation from each state; and *State government, democrats* captures state chambers' representation by Democrats.[28]

The second set of instruments is based on an hand-collected sample. The first variable, *Industry disasters*, contains information on environmental and engineering disasters. The second variable, *Product recalls*, contains information on company product recalls. Disasters are largely unexpected and we adjust them for how important they are based on the number of deaths caused. Product recalls are also often unexpected. We weight them by the media coverage during the five days subsequent to the announcement of the recall (see Appendix

[27]Similarly, it may be argued that technology firms with high growth options have low firm risk and are also more likely to both invest in CSR and to locate in Silicon Valley or in Boston, which are in traditionally democratic states. However, this argument goes against the evidence in Campbell and Vulteenaho (2004) that suggests that high growth options firms have high firm beta. In the online appendix we document the robustness of our results in a sample without firms headquartered in Massachusetts and California.

[28]We use Compustat data for the location of firms' headquarters (or actual firm 10K reports when information is missing). It can be argued that firms may change their headquarter location in response to changes in a state's political attitude. In our sample, we did not find a significant number of companies that changed the location of their headquarters. Our results are also robust if we keep only companies headquartered in the state for more than 20 years.

A.I for details).[29] We argue that these are good instruments for firm β because (i) MSCI's construction of the CSR index relies on some of the same information, (ii) the perception of CSR is likely to decrease following a natural disaster, such as, an oil spill, or a product recall, and (iii) because the likelihood of these events may increase idiosyncratic risk and lower firm value, while it is unlikely that firm β is related to these exogenous incidents. Consequently, we use the disasters instrument only in the firm beta regressions. Note that industry disasters and product recalls may have an indirect effect on beta through lower profitability. For this reason we control for profitability in our regressions.

Table VIII reports the results of the IV estimation. We discuss first the results with the political instruments. Specification 1 displays the first stage, and specifications 3, 5 and 6 display the second stages for the β, *Tobin's Q*, and expected excess return regressions, respectively. In the first stage, we regress the firm CSR score on the instruments and all the control variables. As expected, firms headquartered in more Democratic-leaning states have higher CSR scores (the first and the third instruments are positive and significant). In the second stage, we use the fitted values of CSR as an independent regressor to explain firm systematic risk, *Tobin's Q*, and expected returns. In specification 3, when firm β is the dependent variable, the regression coefficient on the instrumented CSR variable remains negative and significant. The magnitude of the coefficient (-0.13) implies a reduction of β of 0.083 for an increase in instrumented CSR of one standard deviation equal to 0.64 (untabulated), which is more than double the effect in the OLS regression in Table IV. In specifications 5 and 6, the coefficients on instrumented firm CSR are significant with the predicted sign, again consistent with the model's predictions.

[Insert Table VIII here]

We discuss next the results with the second set of instruments reported in specifications

[29] Our results are robust if do not apply any weighting scheme for the accidents.

2 and 4. From the first-stage regression (specification 2), firms in industries with more disasters and product recalls score lower on CSR (both instruments are negative and statistically significant). The second-stage regression for firm risk is presented in specification 4. The regression coefficient on the instrumented CSR variable remains negative and significant (-0.1580 with t-statistic of -2.34). This coefficient leads to a decrease in β of 0.1014 for an increase in instrumented CSR of one standard deviation of 0.642 (untabulated), an effect that is more than double that of the OLS estimate in Table IV.

We run two specification tests reported in the last rows of Table VIII. First, we run a test on the joint significance of the excluded instruments. The first-stage regression of CSR on the political instruments and other exogenous variables produces an F-statistic of joint significance of the excluded instruments of 23.488 with a p-value of 0.0, indicating that the excluded, political instruments are significant. Similar specification test performed on the industry disaster and product recall instruments cannot reject that they are relevant (F-statistic of 10.105 with a p-value of 0.0). Second, we run Hansen's (1982) test of overidentifying restrictions that tests for the exogeneity of the instruments. To perform the test, we first collect IV regression residuals and then use them as dependent variables in regressions with the instruments and control variables. The test results reveal that the independent variables are jointly insignificant with p-values greater than 0.10 in all cases and that the instruments can be treated as exogenous. We conclude that the instruments are relevant and that our results survive the endogeneity concerns.

7 Conclusion

This paper studies a mechanism through which CSR policies affect a firm's systematic risk and valuation based on the premise that CSR is an investment in customer loyalty. Our theory and evidence point to consumers as important agents in influencing firm policies and their risk profiles, highlighting a driver of corporate social responsibility in line with survey evidence that consumers, not investors, are more concerned about firms' CSR policies (see also Servaes and Tamayo, 2013). In contrast, the same survey evidence suggests that for corporate governance choices, it is investor preferences that appear to matter more. This paper thus fills a gap in the literature by formalizing a channel through which CSR policies affect firm systematic risk and returns. The paper also contributes to the literature by offering an instrumental variables estimation that tries to deal with potential endogeneity concerns on the relations between CSR and firm systematic risk and CSR and valuation.

Modeling consumers that are heterogenous in wealth and where CSR goods are superior goods is a potential avenue for extending our CSR. We believe that such a model would offer similar predictions to our current model, if wealthy consumers, who buy the superior CSR goods, have also more stable demands across the business cycle. Moreover, not all CSR activities are geared towards customer loyalty. In a richer model, it may be interesting to study the link between CSR, employee loyalty and other firm variables.

Our results have practical capital budgeting, portfolio selection and policy implications. Beta is the major parameter used in estimating the cost of equity. Given our results on beta and expected excess returns, CSR companies have lower cost of equity than non-CSR firms. Also, the choice of securities to include in a portfolio relies partly on the degree to which the securities co-move with the market. Including CSR stocks would have the effect of lowering the overall riskiness of the portfolio. In addition, projects that increase firms' reputation for CSR should be discounted with lower cost of equity, compared to otherwise similar projects. However, our theory cautions that the benefits from investing in CSR are tied to the proportion of firms already doing CSR relative to the total demand for CSR.

Appendix

The Appendix contains proofs of the propositions in the paper and also an infinite horizon extension of the model.

A Proofs

Proof of Proposition 1. Consider the date-2 investor optimization problem:

$$\max_{c_l} \frac{C_2^{1-\gamma}}{1-\gamma},$$

subject to the budget constraint,

$$W_2 = \int_0^1 p_i c_i di. \tag{A.1}$$

Letting λ_2 be the Lagrange multiplier associated with equation (A.1). The first order sufficient and necessary conditions for an interior solution are equations (A.1) and

$$\begin{aligned}
\alpha C_2^{-\gamma} \left(\int_0^\mu c_i^{\sigma_G} di\right)^{\frac{\alpha}{\sigma_G}-1} \left(\int_\mu^1 c_i^{\sigma_P} di\right)^{\frac{1-\alpha}{\sigma_P}} c_l^{\sigma_G - 1} &= \lambda_2 p_l, \qquad \text{all } 0 \le l \le \mu, \\
(1-\alpha) C_2^{-\gamma} \left(\int_0^\mu c_i^{\sigma_G} di\right)^{\frac{\alpha}{\sigma_G}} \left(\int_\mu^1 c_j^{\sigma_P} dj\right)^{\frac{1-\alpha}{\sigma_P}-1} c_k^{\sigma_P - 1} &= \lambda_2 p_k, \qquad \text{all } \mu \le k \le 1.
\end{aligned}$$

Multiplying both sides of the equations above by the respective consumption level and integrating over the relevant range gives

$$\alpha C_2^{1-\gamma} = \lambda_2 \int_0^\mu p_i c_i di,$$

$$(1-\alpha) C_2^{1-\gamma} = \lambda_2 \int_\mu^1 p_j c_j dj.$$

Eliminating λ_2 we see that α is the expenditure share of CSR goods:

$$\int_0^\mu p_i c_i di = \frac{\alpha}{1-\alpha} \int_\mu^1 p_j c_j dj.$$

Also, $C_2^{1-\gamma} = \lambda_2 W_2$. Take the ratio of two conditions for $0 \le i, l \le \mu$ to get

$$c_i = \left(\frac{p_i}{p_l}\right)^{\frac{1}{\sigma_G - 1}} c_l, \tag{A.2}$$

and the ratio of two conditions for $\mu \le j, k \le 1$ to get

$$c_j = \left(\frac{p_j}{p_k}\right)^{\frac{1}{\sigma_P - 1}} c_k. \tag{A.3}$$

Replacing (A.2) and (A.3) back in the first order conditions

$$\begin{aligned}
\alpha C_2^{-\gamma}\left(\int_0^\mu p_i^{\frac{\sigma_G}{\sigma_G-1}}di\right)^{\frac{\alpha}{\sigma_G}-1}\left(\int_\mu^1 p_i^{\frac{\sigma_P}{\sigma_P-1}}\right)^{\frac{1-\alpha}{\sigma_P}} p_l^{\frac{1-\alpha}{\sigma_G-1}} c_l^{\alpha-1} p_k^{-\frac{1-\alpha}{\sigma_P-1}} c_k^{1-\alpha} &= \lambda_2 \\
(1-\alpha)\, C_2^{-\gamma}\left(\int_0^\mu p_i^{\frac{\sigma_G}{\sigma_G-1}}\right)^{\frac{\alpha}{\sigma_G}}\left(\int_\mu^1 p_j^{\frac{\sigma_P}{\sigma_P-1}}dj\right)^{\frac{1-\alpha-\sigma_P}{\sigma_P}} p_l^{-\frac{\alpha}{\sigma_G-1}} c_l^{\alpha} p_k^{\frac{\alpha}{\sigma_P-1}} c_k^{-\alpha} &= \lambda_2.
\end{aligned}$$

The ratio of these two equations yields:

$$\frac{\alpha\left(\int_\mu^1 p_i^{\frac{\sigma_P}{\sigma_P-1}}\right)}{(1-\alpha)\left(\int_0^\mu p_i^{\frac{\sigma_G}{\sigma_G-1}}\right)}\frac{p_l^{\frac{1}{\sigma_G-1}}}{p_k^{\frac{1}{\sigma_P-1}}}c_k = c_l.$$

Replacing all in the budget constraint:

$$\begin{aligned}
W_2 &= \int p_i c_i \\
&= \int_0^\mu p_i\left(\frac{p_i}{p_l}\right)^{\frac{1}{\sigma_G-1}} c_l di + \int_\mu^1 p_j\left(\frac{p_j}{p_k}\right)^{\frac{1}{\sigma_P-1}} c_k dj \\
&= \frac{1}{1-\alpha}\left(\int_\mu^1 p_i^{\frac{\sigma_P}{\sigma_P-1}}\right)\frac{c_k}{p_k^{\frac{1}{\sigma_P-1}}},
\end{aligned}$$

from which we get the demand functions:

$$c_k = (1-\alpha)\frac{p_k^{\frac{1}{\sigma_P-1}}}{\int_\mu^1 p_i^{\frac{\sigma_P}{\sigma_P-1}}di}W_2,$$

and

$$c_l = \alpha\frac{p_l^{\frac{1}{\sigma_G-1}}}{\int_0^\mu p_i^{\frac{\sigma_G}{\sigma_G-1}}di}W_2.$$

Turn now to the firms' problems. Using the demand functions from the investor's problem, the first order necessary and sufficient conditions for firms are:

$$\begin{aligned}
\sigma_G p_j x_j &= w A^{\eta_G}\kappa_G x_j \\
\sigma_P p_k x_k &= w A^{\eta_P}\kappa_P x_k,
\end{aligned}$$

so that profits are

$$\pi_j = (1-\sigma_j)\, p_j x_j.$$

By Walras' law, the equilibrium requires a price normalization. We normalize prices such that the price level of the aggregate consumption good equals 1. Define

$$P = \min_{c_l\in\{c_l:C_2=1\}}\int_0^1 p_l c_l dl.$$

It can be shown that the solution yields

$$P=\alpha^{-\alpha}\left(1-\alpha\right)^{-(1-\alpha)}\left(\int_0^{\mu}p_i^{\frac{\sigma_G}{\sigma_G-1}}di\right)^{-\alpha\frac{1-\sigma_G}{\sigma_G}}\left(\int_{\mu}^{1}p_k^{\frac{\sigma_P}{\sigma_P-1}}dk\right)^{-(1-\alpha)\frac{1-\sigma_P}{\sigma_P}}.$$

If $P=1$, and setting $p_k=p_P$ for all $k\in[\mu,1]$ and $p_l=p_G$ for all $l\in[0,\mu]$, then

$$p_P=\left(\alpha\mu^{\frac{1-\sigma_G}{\sigma_G}}\right)^{\alpha}\left(\left(1-\alpha\right)\left(1-\mu\right)^{\frac{1-\sigma_P}{\sigma_P}}\right)^{(1-\alpha)}\left(\frac{p_G}{p_P}\right)^{-\alpha}.$$

From the firms' problem

$$\frac{p_P}{p_G}=\frac{\sigma_G}{\sigma_P}\frac{A^{\eta_P}\kappa_P}{A^{\eta_G}\kappa_G},$$

and we arrive at

$$\begin{aligned}p_P &= \bar{p}A^{-\alpha(\eta_G-\eta_P)},\\ p_G &= \frac{\sigma_P}{\sigma_G}\frac{\kappa_G}{\kappa_P}\bar{p}A^{(1-\alpha)(\eta_G-\eta_P)},\end{aligned}$$

where

$$\bar{p}=\left(\alpha\mu^{\frac{1-\sigma_G}{\sigma_G}}\right)^{\alpha}\left(\left(1-\alpha\right)\left(1-\mu\right)^{\frac{1-\sigma_P}{\sigma_P}}\right)^{(1-\alpha)}\left(\frac{\sigma_P}{\sigma_G}\frac{\kappa_G}{\kappa_P}\right)^{-\alpha}.$$

By construction this solution obeys $P=1$.

Now we solve the labor market clearing condition. From the investor's problem:

$$\begin{aligned}c_G &= \frac{\alpha\left(1-\mu\right)}{\left(1-\alpha\right)\mu}\frac{p_P}{p_G}c_P\\ &= \frac{\alpha\left(1-\mu\right)}{\left(1-\alpha\right)\mu}\frac{\sigma_G}{\sigma_P}\frac{A^{\eta_P}\kappa_P}{A^{\eta_G}\kappa_G}c_P. \qquad \text{(A.4)}\end{aligned}$$

Replacing these expressions in the labor market clearing condition, $\int_0^1 l_i di=L$, gives

$$\mu A^{\eta_G}\kappa_G c_G+\left(1-\mu\right)A^{\eta_P}\kappa_P c_P=L.$$

Using equation (A.4) again:

$$\begin{aligned}c_P &= \bar{x}\frac{1-\alpha}{1-\mu}A^{-\eta_P} \qquad \text{(A.5)}\\ c_G &= \bar{x}\frac{\sigma_G}{\sigma_P}\frac{\alpha\kappa_P}{\mu\kappa_G}A^{-\eta_G}, \qquad \text{(A.6)}\end{aligned}$$

where

$$\bar{x}=\frac{L\sigma_P/\kappa_P}{\alpha\sigma_G+\left(1-\alpha\right)\sigma_P}.$$

We then use one of the first order conditions from the firms' problem to get the wage rate,

$$w=\bar{p}\frac{\sigma_P}{\kappa_P}A^{-\bar{\eta}},$$

where $\bar{\eta} = (1-\alpha)\,\eta_P + \alpha\eta_G$. Profits are

$$\pi_G = \bar{p}\bar{x}\,(1-\sigma_G)\,\frac{\alpha}{\mu}A^{-\bar{\eta}},$$

for CSR firms and

$$\pi_P = \bar{p}\bar{x}\,(1-\sigma_P)\,\frac{1-\alpha}{1-\mu}A^{-\bar{\eta}},$$

for non-CSR firms. Finally, under our price normalization, $C_2 = W_2$, and

$$\lambda_2 = C_2^{-\gamma} = [\bar{p}\bar{x}]^{-\gamma}\,A^{\gamma\bar{\eta}}.$$

■

Proof of Proposition 2. This proposition discusses conditions under which $\mu < f_P$, in terms of exogenous model parameters. Before we show the main result in the proposition, we show that the sign, but not the magnitude of $\mu - f_P$ is independent of any heterogeneity in κ_j and η_j. To show this, note that the expenditure shares of CSR and non-CSR goods are α and $1-\alpha$, respectively, so that

$$\mu p_G c_G = \frac{\alpha}{1-\alpha}\,(1-\mu)\,p_P c_P.$$

Because operating profits are $\pi_j = (1-\sigma_j)\,p_j c_j$, the difference in profits $\pi_G - \pi_P$ is proportional to

$$\Delta \equiv (1-\sigma_G)\,\frac{\alpha}{\mu} - (1-\sigma_P)\,\frac{1-\alpha}{1-\mu}. \tag{A.7}$$

Inserting this result into the equilibrium condition (15) proves that the sign of $\mu - f_P$ is given only by the sign of Δ, which is independent of any heterogeneity in κ_j and η_j. This is surprising because η_j describes the sensitivity of firm j's labor demand to the aggregate shock (i.e., employee loyalty) and yet heterogeneity in η_j does not affect the relative proportion of CSR firms in the industry or their relative riskiness. The main reason is that with fixed expenditure shares and homogeneity of operating profits to sales revenue, the sensitivity of revenues to the productivity shock must in equilibrium be equal across types of consumption goods, i.e., it responds to $\bar{\eta}$. This result is helpful in isolating the effect of demand loyalty on systematic risk studied in this paper.

To show the main result in the proposition note that $\Delta > 0$ if, and only if,

$$\frac{(1-\sigma_G)\,\alpha}{1-\sigma_P + (\sigma_P - \sigma_G)\,\alpha} > \mu.$$

The left hand side of the inequality is strictly increasing in α varying between 0 and 1. Define $\bar{\alpha}$ implicitly as

$$\frac{(1-\sigma_G)\,\bar{\alpha}}{1-\sigma_P + (\sigma_P - \sigma_G)\,\bar{\alpha}} = f_P.$$

We can solve for $\bar{\alpha}$ to get the expression in the proposition. Let $\alpha < \bar{\alpha}$ and assume by way of contradiction that $\mu > f_P$. Then, by definition of $\bar{\alpha}$,

$$f_P > \frac{(1-\sigma_G)\,\alpha}{1-\sigma_P + (\sigma_P - \sigma_G)\,\alpha}.$$

But, $\mu > f_P$, or equivalently, $\Delta > 0$, implies that the right hand side of this inequality is larger than μ, which is a contradiction. Now, let $\mu < f_P$. Then,

$$\frac{(1-\sigma_G)\,\alpha}{1-\sigma_P+(\sigma_P-\sigma_G)\,\alpha} < \mu < f_P = \frac{(1-\sigma_G)\,\bar{\alpha}}{1-\sigma_P+(\sigma_P-\sigma_G)\,\bar{\alpha}}.$$

The inequalities imply $\alpha < \bar{\alpha}$. ■

Proof of Proposition 3. Write R_π using the equilibrium values of π_j and noting that $\mu = f_G^*$:

$$R_\pi = \frac{(1-\sigma_G)\,\frac{\alpha}{\mu}\bar{p}\bar{x}A^{-\bar{\eta}} - \mu\,(1+r)}{(1-\sigma_P)\,\frac{1-\alpha}{1-\mu}\bar{p}\bar{x}A^{-\bar{\eta}} - f_P\,(1+r)}.$$

Before continuing, note that stock prices are

$$\begin{aligned} Q_j &= E\left[m\pi_j\right] - f_j \\ &= \bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}(1-\sigma_j)\,\frac{\alpha_j}{\mu_j}E\left[A^{-(1-\gamma)\bar{\eta}}\right] - f_j. \end{aligned} \tag{A.8}$$

Define

$$\Delta \equiv (1-\sigma_G)\,\frac{\alpha}{\mu} - (1-\sigma_P)\,\frac{1-\alpha}{1-\mu}.$$

At an interior solution, the price of the marginal CSR firm obeys $Q_G^* = Q_P$, which can be written as

$$\bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}E\left[A^{-(1-\gamma)\bar{\eta}}\right]\Delta = f_G^* - f_P. \tag{A.9}$$

Now take the derivative of R_π with respect to $A^{-\bar{\eta}}$:

$$\begin{aligned} \frac{dR_\pi}{dA^{-\bar{\eta}}} &= (1+r)\,\bar{p}\bar{x}\frac{-(1-\sigma_G)\,\frac{\alpha}{\mu}f_P + \mu\,(1-\sigma_P)\,\frac{1-\alpha}{1-\mu}}{\left[(1-\sigma_P)\,\frac{1-\alpha}{1-\mu}\bar{p}\bar{x}A^{-\bar{\eta}} - f_P\,(1+r)\right]^2} \\ &\propto -(1-\sigma_G)\,\frac{\alpha}{\mu}f_P + \mu\,(1-\sigma_P)\,\frac{1-\alpha}{1-\mu} \\ &= (1-\sigma_G)\,\frac{\alpha}{\mu}\,(\mu - f_P) - \mu\Delta \\ &= \left\{(1-\sigma_G)\,\frac{\alpha}{\mu}\bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}E\left[A^{-(1-\gamma)\bar{\eta}}\right] - \mu\right\}\Delta \\ &= Q_G^*\Delta. \end{aligned}$$

The third line uses the definition of Δ and combines the terms with $(1-\sigma_G)\,\frac{\alpha}{\mu}$. The fourth line uses equation (A.9) to eliminate $\mu - f_P$ and the last line uses the equilibrium value of Q_G^* in equation (A.8). It follows that $\frac{dR_\pi}{dA^{-\bar{\eta}}} \gtreqless 0$ if, and only if, $\Delta \gtreqless 0$. From (A.9), and noting that $\mu = f_G^*$ in equilibrium, then $\Delta \gtreqless 0$ if and only if $f_P - \mu \lesseqgtr 0$. From Proposition 2, $f_P - \mu \lesseqgtr 0$ if and only if $\bar{\alpha} \lesseqgtr \alpha$. ■

Proof of Proposition 4. The investor's stochastic discount factor is,

$$m = \bar{m}\left[\bar{p}\bar{x}\right]^{-\gamma}A^{\gamma\bar{\eta}}.$$

Then, we have

$$\begin{aligned} Cov\left(m, \pi_j\right) &= Cov\left(\bar{m}\left[\bar{p}\bar{x}\right]^{-\gamma} A^{\gamma\bar{\eta}}, \bar{p}\bar{x}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}A^{-\bar{\eta}}\right) \\ &= \bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}Cov\left(A^{\gamma\bar{\eta}}, A^{-\bar{\eta}}\right). \end{aligned}$$

Using equation (A.9), and substituting in the various terms, expected stock excess returns for firm j are

$$E\left(r_j - r\right) = \frac{\bar{p}\bar{x}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}}{\bar{m}\left[\bar{p}\bar{x}\right]^{1-\gamma}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}E\left[A^{-(1-\gamma)\bar{\eta}}\right] - f_j}\frac{-Cov\left(A^{\gamma\bar{\eta}}, A^{-\bar{\eta}}\right)}{E\left(A^{\gamma\bar{\eta}}\right)}.$$

For any CSR firm, the ratio of expected excess returns to that of a non-CSR firm is:

$$\frac{E\left(r_G - r\right)}{E\left(r_P - r\right)} = \frac{\left(1-\sigma_G\right)\frac{\alpha}{\mu}}{\left(1-\sigma_P\right)\frac{1-\alpha}{1-\mu}}\frac{Q_P}{Q_G}.$$

The the marginal CSR firm:

$$\frac{E\left(r_G^* - r\right)}{E\left(r_P - r\right)} = 1 + \frac{\Delta}{\left(1-\sigma_P\right)\frac{1-\alpha}{1-\mu}}.$$

Therefore,

$$E\left(r_P - r\right) \gtreqless E\left(r_G^* - r\right) \text{ if, and only if, } f_P - \mu \gtreqless 0.$$

From Proposition 2, $f_P - \mu \lesseqgtr 0$ if and only if $\bar{\alpha} \lesseqgtr \alpha$. ■

Proof of Proposition 5. Recall that the gross return on firm i is defined as $1 + r_i \equiv \left(\pi_i - f_i\left(1+r\right)\right)/Q_i$ and that the value-weighted market return is $1+r_M \equiv \int\left(\pi_i - f_i\left(1+r\right)\right)di/\int Q_j dj$. We wish to solve for $\beta_j = Cov\left(r_j, r_M\right)/Var\left(r_M\right)$. Consider first solving for $Cov\left(r_j, r_M\right)$. Because f_i and r are constants

$$Cov\left(r_j, r_M\right) = Cov\left(\frac{\pi_j}{Q_j}, \int\frac{\pi_i}{Q_i}\frac{Q_i}{\int Q_l dl}di\right).$$

Taking $Q_j \int Q_l dl$ out of the covariance operator and substituting in for the value of π_i gives:

$$Cov\left(r_j, r_M\right) = \frac{\left(\bar{p}\bar{x}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}\right)\left(\int\bar{p}\bar{x}\left(1-\sigma_i\right)\frac{\alpha_i}{\mu_i}di\right)}{Q_j\int Q_j dj}Var\left(A^{-\bar{\eta}}\right).$$

Consider now solving for $Var\left(r_M\right)$. Following similar steps as above

$$Var\left(r_M\right) = \frac{\left(\int\bar{p}\bar{x}\left(1-\sigma_i\right)\frac{\alpha_i}{\mu_i}di\right)^2}{\left(\int Q_j dj\right)^2}Var\left(A^{-\bar{\eta}}\right).$$

Thus,

$$\beta_j = \frac{\bar{p}\bar{x}\left(1-\sigma_j\right)\frac{\alpha_j}{\mu_j}}{Q_j}\left[\frac{\int\bar{p}\bar{x}\left(1-\sigma_i\right)\frac{\alpha_i}{\mu_i}di}{\int Q_i di}\right]^{-1}$$

or solving the integral,

$$\beta_j = \frac{(1-\sigma_j)\,\alpha_j}{(1-\sigma_G)\,\alpha_G + (1-\sigma_P)\,\alpha_P} \frac{\int Q_i di}{\mu_j Q_j}.$$

For completeness, calculate total stock market value:

$$\begin{aligned} \int Q_i di &= \int_0^{\mu} Q_i di + (1-\mu)\,Q_P \\ &= \int_0^{\mu} \left(E\,(m\pi_G) - f_{Gi}\right) di + (1-\mu)\,Q_P. \end{aligned}$$

Note that $\int_0^{\mu} f_{Gi} di = \frac{1}{2}\mu^2$ and $E\,(m\pi_G) = Q_G^* + f_G^* = Q_G^* + \mu$. Therefore,

$$\int Q_i di = Q_G^* + \frac{1}{2}\mu^2.$$

■

B Variable Definitions

[Insert Table A.I here]

References

[1] Ailawadi, K. L., Luan, Y. J., Neslin, S. A., and Taylor, G. A., 2013, Does Retailer CSR Enhance Behavioral Loyalty: A Case for Benefit Segmentation, *International Journal of Research in Marketing*, forthcoming.

[2] Almazan, A., De Motta, A., Titman, S., and Uysal, V., 2010, Financial Structure, Acquisition Opportunities, and Firm Locations, *Journal of Finance* 65, 529-563.

[3] Almeida, H., and Wolfenzon, D., 2005, The Effect of External Finance on the Equilibrium Allocation of Capital, *Journal of Financial Economics* 25, 133–164.

[4] Amore, M. D., and Bennedsen, M., 2013, Corporate Governance and the Environment: Evidence from Green Innovations, working paper, INSEAD.

[5] Ang, A., Hodrick, R. , Xing, Y., and Zhang, X., 2009, High Idiosyncratic Volatility and Low Returns: International and Further U.S. Evidence, *Journal of Financial Economics* 91, 1-23.

[6] Auger, P., Burke, P., Devinney, T. M., and Louviere, J. J., 2003, What Will Consumers Pay for Social Product Features?, *Journal of Business Ethics* 42, 281-304.

[7] Bagnoli, M., and Watts, S.G., 2003, Selling to Socially Responsible Consumers: Competition and the Private Provision of Public Goods, *Journal of Economics and Management Strategy* 12, 419-445.

[8] Baron, D.P., 2001, Private Politics, Corporate Social Responsibility, and Integrated Strategy, *Journal of Economics and Management Strategy* 10, 7–45.

[9] Beaver, W., Kettler, P., and Scholes, M., 1970, The Association Between Market Determined and Accounting Determined Risk Measures, *Accounting Review,* October, 654-682.

[10] Becchetti, L., and Ciciretti, R., 2009, Corporate Social Responsibility and Stock Market Performance, *Applied Financial Economics* 19, 1283-1293.

[11] Belo, F., Lin, X., and Vitorino, M. A., 2014, Brand Capital and Firm Value, *Review of Economic Dynamics* 117, 150-169.

[12] Bénabou, R., and Tirole, J., 2010, Individual and Corporate Social Responsibility, *Economica* 77, 1-19.

[13] Bhattacharya, C.B. and Sen, S., 2003, Consumer-Company Identification: A Framework for Understanding Consumers' Relationships with Companies, *Journal of Marketing* 67, 76-88.

[14] Brammer, S., Brooks, C., and Pavelin, S., 2006, Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures, *Financial Management* 35, 97-116.

[15] Campbell, J., and Vuolteenaho, T., 2004, Bad Beta, Good Beta, *American Economic Review* 94, 1249-1275.

[16] Cheng, I-H, Hong, H., and Shue, K., 2013, Do Managers Do Good With Other People's Money?, working paper, University of Chicago.

[17] Costa, D. L., and Kahn, M. E., 2013, Energy Conservation "Nudges" and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment, *Journal of the European Economic Association* 11, 680-702.

[18] Creyer, E. H. and Ross, W.T., 1997, The Influence of Firm Behavior on Purchase Intention: Do Consumers Really Care About Business Ethics?, *Journal of Consumer Marketing* 14, 412-432.

[19] Deng, X., Kang, J-K, and Low, B.S., 2013, Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from Mergers, *Journal of Financial Economics* 110, 87-109.

[20] Derwall, J., Guenster, N., Bauer, R., and Koedjik, K., 2005, The Eco-Efficiency Premium Puzzle, *Financial Analysts Journal,* March/April, 51-63.

[21] Di Giuli, A. and Kostovetsky, L., 2014, Are Red or Blue Companies More Likely to Go Green? Politics and Corporate Social Responsibility, *Journal of Financial Economics* 111, 158-180.

[22] Dimson, E., Karakas, O., and Li, X., 2012, Active Ownership, working paper, London Business School.

[23] Durnev, A., and Kim, E. H., 2005, To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation, *Journal of Finance* 60, 1461-1493.

[24] El Ghoul, S., Guedhami, O., Kwok, C. C. Y., and Misra, D., 2012, Does Corporate Social Responsibility affect the Cost of Capital?, *Journal of Banking and Finance* 35, 2388-2406.

[25] Elfenbein, D.W., Fisman, R., and McManus, B., 2012, Charity as a Substitute for Reputation: Evidence from an Online Marketplace, *Review of Economic Studies* 79, 1441-1468.

[26] Elfenbein, D.W. and McManus, B., 2010, A Greater Price for a Greater Good? Evidence that Consumers Pay More for Charity-Linked Products, *American Economic Journal: Economic Policy* 2, 28-60.

[27] Errunza, V., and Losq, E., 1985, International Asset Pricing under Mild Segmentation: Theory and Test, *Journal of Finance* 40, 105-124.

[28] Fisher-Vanden, K., and Thorburn, K. S., 2011, Voluntary Corporate Environmental Initiatives and Shareholder Wealth, *Journal of Environmental Economics and Management* 62, 430-445.

[29] Galema, R., Plantinga, A., and Scholtens, B., 2008, The Stocks at Stake: Return and Risk in Socially Responsible Investment, *Journal of Banking and Finance* 32, 2646-2654.

[30] Giannetti, M., Burkart, M., and Ellingsen, T., 2011, What You Sell Is What You Lend? Explaining Trade Credit Contracts, *Review of Financial Studies* 24, 1261-1298.

[31] Gillan, S. L., Hartzell, J. C., Koch, A., and Starks, L. T., 2010, Firm's Environmental, Social and Governance (ESG) Choices, Performance and Managerial Motivation, working paper, University of Texas at Austin.

[32] Gollier, C., and Pouget, S., 2012, Asset Prices and Corporate Behavior with Socially Responsible Investors, working paper, Toulouse School of Economics.

[33] Gourio, F., and Rudanko, L., 2014, Customer Capital, *Review of Economic Studies*, forthcoming.

[34] Gromet, D.M., Kunreuther, H., and Larrick, R,P., 2013, Political Ideology Affects Energy-Efficiency Attitudes and Choices, *Proceedings of the National Academy of Sciences* 110, 9314-9319.

[35] Hansen, L., 1982, Large Sample Properties of Generalized Method of Moments Estimators, *Econometrica* 50, 1029-1054.

[36] Heider, F., and Ljungqvist, A., 2014, As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage from State Tax Changes, working paper, New York University.

[37] Heinkel, R., Kraus, A. , and Zechner, J., 2001, The Effect of Green Investment on Corporate Behavior, *Journal of Financial and Quantitative Analysis* 35, 431-449.

[38] Hillman, A. J., and Keim, G. D., 2001, Shareholder Value, Stakeholder Management, and Social Issues: What's the Bottom Line?, *Strategic Management Journal* 22, 125–139.

[39] Hoberg, G., and Phillips, G., 2010, Text-Based Network Industries and Endogenous Product Differentiation, working paper, University of Maryland.

[40] Hong, H., Kubik, J.D., and Scheinkman, J.A., 2011, Financial Constraints on Corporate Goodness, working paper, Princeton University.

[41] Hong, H., and M. Kacperczyk, 2009, The Price of Sin: The Effects of Social Norms on Markets, *Journal of Financial Economics* 93, 15-36.

[42] Kahl, M., Lunn, J., and Nilsson, M., 2012, Operating Leverage and Corporate Financial Policies, working paper, University of Colorado.

[43] Kempf, A., and Osthoff, P., 2007, The Effect of Socially Responsible Investing on Portfolio Performance, *European Financial Management* 13, 908-922.

[44] Krüger, P., 2013, Corporate Goodness and Shareholder Wealth, *Journal of Financial Economics*, forthcoming.

[45] Luo, X., and Bhattacharya, C.B., 2006, Corporate Social Responsibility, Customer Satisfaction, and Market Value, *Journal of Marketing* 70, 1-18.

[46] Luo, X., and Bhattacharya, C. B., 2009, The Debate over Doing Good: Corporate Social Performance, Strategic Marketing Levers, and Firm-Idiosyncratic Risk, *Journal of Marketing* 73, 198–213.

[47] Margolis, J. D., Elfenbein, H. A., and Walsh, J. P., 2010, Does it Pay to be Good? A Meta-Analysis and Redirection of Research on the Relationship Between Corporate Social and Financial Performance, working paper, Harvard University.

[48] Masulis, R.W., and Reza, S.W., 2014, Agency Problems of Corporate Philanthropy, working paper, Australian School of Business.

[49] McAlister, L., Srinivasan, R., and Kim, M., 2007, Advertising, Research and Development, and Systematic Risk of the Firm, *Journal of Marketing* 71, 35-48.

[50] McWilliams, A., and Siegel, D., 2001, Corporate Social Responsibility: A Theory of the Firm Perspective, *Academy of Management Review* 26, 117-127.

[51] Melicher, R., and Rush, D., 1973, The Performance of Conglomerate Firms: Recent Risk and Return Experience, *Journal of Finance* 28, 381-388.

[52] Merton, R., 1987, A Simple Model of Capital Market Equilibrium with Incomplete Information, *Journal of Finance* 42, 483-510.

[53] Navarro, P., 1988, Why Do Corporations Give to Charity?, *Journal of Business* 61, 65-93.

[54] Novy-Marx, R., 2011, Operating Leverage, *Review of Finance* 15, 103-134.

[55] Oikonomou, I., Brooks, C., and Pavelin, S., 2012, The Impact of Corporate Social Performance on Financial Risk and Utility: A Longitudinal Analysis, *Financial Management*, Summer, 483-515.

[56] Opler, T., Pinkowitz, L., and Stulz, R., 1999, The Determinants and Implications of Corporate Cash Holdings, *Journal of Financial Economics* 52, 3-46.

[57] Palazzo, D., 2012, Cash Holdings, Risk, and Expected Returns, *Journal of Financial Economics* 104, 162-185.

[58] Parigi, B.M., Pelizzon, L., and von Thadden, E-L., 2013, Stock Market Returns, Corporate Governance and Capital Market Equilibrium, ECGI working paper no. 362/2013.

[59] Pelsmacker, P., Driesen, L., and Rayp, G., 2005, Do Consumers Care About Ethics? Willingness to Pay for Fair-Trade Coffee, *Journal of Consumer Affairs* 39, 363-385.

[60] Petersen, M., 2009, Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches, *Review of Financial Studies* 22, 435-480.

[61] Rego, L. L., Billett, M. T., and Morgan, N. A., 2009, Customer-Based Brand Equity and Firm Risk, *Journal of Marketing* 73, 47-60.

[62] Renneboog, L., ter Horst, J., and Zhang, C., 2008, The Price of Ethics and Stakeholder Governance: The Performance of Socially Responsible Mutual Funds, *Journal of Corporate Finance* 14, 302-322.

[63] Scholes, M., and Williams, J., 1977, Estimating Betas from Nonsynchronous Data, *Journal of Financial Economics* 5, 309-328.

[64] Sharfman, M. and Fernando, C., 2008, Environmental Risk Management and the Cost of Capital, *Strategic Management Journal* 29, 569-592.

[65] Servaes, H. and Tamayo, A., 2013, The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness, *Management Science* 59, 1045-1061.

[66] Siegel, D., and Vitaliano, D., 2007, An Empirical Analysis of the Strategic Use of Corporate Social Responsibility, *Journal of Economics and Management Strategy* 16, 773-792.

[67] Starks, L. T., 2009, EFA Keynote Speech: "Corporate Governance and Corporate Social Responsibility: What Do Investors Care About? What Should Investors Care about?", *Financial Review* 44, 461-468.

[68] Webb, N. J., 1996, Corporate Profits and Social Responsibility: "Subsidization" of Corporate Income Under Charitable Giving Tax Laws, *Journal of Economics and Business* 48, 401-421.

Table A.I. Variables, definitions, and sources.

This table presents the variable definitions and sources of data. Compustat and CRSP items are in brackets.

Variable	Definition	Source
Corporate Social Responsibility		
Aggregate CSR	It is the sum of the following CSR attributes: community, diversity, employee, environment, product, and human, all defined below. It is measured annually from 2003 through 2011.	MSCI's ESG ratings.
Community	It is the difference between community strengths and weaknesses. Community lists 3 concerns (investment, economic impact, and tax disputes) and 7 strengths (charitable giving, innovative giving, support for housing, support for education, non-US charitable giving, volunteer programs, and community engagement). It is measured annually from 2003 through 2011.	
Diversity	It is the difference between diversity strengths and weaknesses. Diversity has 3 concerns (controversies, non-representation, and board diversity) and 8 strengths (CEO quality, promotion, board of directors, work-life benefits, women and minority contracting, employment of disabled, gay and lesbian policies, and underrepresented groups). It is measured annually from 2003 through 2011.	
Employee	It is the difference between employee relations strengths and weaknesses. Employee relations has 5 concerns (union relations, health concerns, workforce reductions, retirement benefits, and supply chain) and 7 strengths (union relations, no-layoff policy, profits sharing, employee involvement, retirement benefits, health and safety, and supply chain policies). It is measured annually from 2003 through 2011.	
Environment	It is the difference between environment strengths and weaknesses. Environment lists 9 concerns (waste, regulatory problems, ozone issues, emissions, agriculture chemicals, climate change, negative impact of product, biodiversity, and non-carbon releases) and 6 strengths (beneficial product, pollution prevention, recycling, clean energy, impact of property, and management system). It is measured annually from 2003 through 2011.	
Product	It is the difference between product strengths and weaknesses. Product has 3 concerns (product safety, marketing concerns, and antitrust) and 4 strengths (quality, innovation, benefits to economically disadvantaged, and access to capital). It is measured annually from 2003 through 2011.	
Human	It is the difference between human relations strengths and weaknesses. Human rights has 7 concerns (South Africa, Northern Ireland, Burma, Mexico, Sudan, labor rights, and indigenous people relations) and 3 strengths (South Africa, indigenous people relations, and labor rights strength). It is measured annually from 2003 through 2011.	
Governance	It is the difference between governance strengths and weaknesses. Governance lists 7 concerns (high compensation, ownership, accounting, transparency, political accountability, public policy, and governance structure) and 5 strengths (limited compensation, ownership structure, transparency, political accountability, and public policy). It is measured annually from 2003 through 2011.	
Sin dummy	This is a dummy variable that takes the value of one if a firm is involved in a controversial business issue, and zero otherwise. Controversial business issues are: firearms, gambling, military, nuclear, tobacco, and alcohol. Firearms concerns include producer of civilian arms, forearms retailer or distributor, ownership of a firearms company, ownership by a firearms company. Gambling concerns include operations, support, licensor, ownership of a gambling company, ownership by a gambling company. Military concerns include weapon systems, support systems, ownership of a military company, ownership by a military company. Nuclear concerns include builders and designers, suppliers, consulting, uranium mining, distributors, repairs. Tobacco concerns include licensor, producer, distributor, retailer, supplier, ownership of a tobacco company, ownership by a tobacco company. Alcohol concerns include producer, distributor, retailer, licensor, supplier, ownership of an alcohol company, ownership by an alcohol company. It is measured annually from 2003 through 2011.	
Firm and Industry Variables		
Firm β	It is defined as the average value of estimation coefficients on market excess return and lagged market excess return in the regression of firm weekly excess return on market excess return, lagged market excess return, and the SMB and HML Fama-French factors. Each regression contains 52 observations. It is measured annually from 2004 through 2012.	CRSP.
Tobin's Q	It is measured as the ratio of the market value of equity (fiscal year-end price [PRCC_F] times number of shares outstanding [CSHO]) plus book value of debt (total assets [AT] less book value of equity [CEQ]) to total assets [AT]. It is measured annually from 2004 through 2012.	Compustat.
Firm excess return	It is firm realized annual excess return (firm return minus one-year T-Bill rate). It is measured annually from 2004 through 2012.	CRSP.
Ratio of CSR firm profits to non-CSR firm profits	It is measured at the two-digit SIC industry level as mean net income [IB] of the firms in the top-third CSR score divided by the mean net income of the firms in the bottom-third CSR score. It is measured annually from 2004 through 2012.	Compustat.
Operating leverage	We follow Kahl et al. (2012) in measuring operating leverage. Operating leverage is measured as the sensitivity of growth in total operating costs to growth in sales. To calculate the measure, for every firm and year, we calculate ex-ante expectations of operating costs [XOPR] and sales [SALE] based on the geometric growth rate over the previous two years. Then, we generate the innovations to the growth rates. Operating leverage is -1 multiplied by the regression coefficient of the time-series regression of innovations in growth rates of operating costs on innovations in growth rates of sales. It is measured annually from 2003 through 2011.	
Profitability	It is measured by RoA (return on assets), which is defined as net income [IB] over total assets [AT]. It is measured annually from 2003 through 2011.	

R&D	It is defined as R&D expenditure [XRD] over total assets [AT]. It is measured annually from 2003 through 2011.	Compustat.
Advertising	It is defined as advertising expenditures [XAD] over total assets [AT]. It is measured annually from 2003 through 2011.	
Leverage	It is defined as long-term debt [DLTT] over total assets [AT]. It is measured annually from 2003 through 2011.	
CAPEX	It is defined as capital expenditures [CAPX] over total assets [AT]. It is measured annually from 2003 through 2011.	
Cash	It is defined as the ratio of cash and marketable securities [CHE] to total assets [AT] net of cash and marketable securities (Opler et al., 1999). It is measured annually from 2003 through 2011.	
Sales growth	It is defined as annual growth in sales [SALE]. It is measured annually from 2003 through 2011.	
ME	It is the ratio of market value of equity ([PRCC_F] ×[CSHO]) to total assets [AT]. It is measured annually from 2003 through 2011.	
Size	It is defined as the log of total assets [AT]. It is measured annually from 2003 through 2011.	
Dividend yield	It is defined as the dividend [DVC] per share [CSHO] over fiscal year-end price [PRCC_F]. It is measured annually from 2003 through 2011.	
Age	It is measured as the log of the number of years since IPO. It is measured annually from 2003 through 2011.	
Earnings variability	It is defined as the standard deviation of earnings [IB] per share [CSHO] using a five-year rolling window. It is measured annually from 2003 through 2011.	
Diversification	It is measured as the number of three-digit SIC industries a firm operates in. It is measured annually from 2003 through 2011.	
State tax	It is defined as the highest-bracket state corporate income tax rate. State affiliation is determined by the location of firm headquarters. It is measured annually from 2003 through 2011.	Tax Foundation.
Hoberg&Phillips product similarity	For every firm, Hoberg and Phillips (2010) perform a textual analysis of parts of 10K where companies describe their products. For every possible pair of firms *i* and *j* in Compustat, they form a vector of words describing the products and derive their similarity index. This measure is then aggregated for every firm across all other possible competitors. Larger values of this index indicate greater product similarity. The original index is divided by 10,000. It is measured annually from 2003 through 2008.	Hoberg and Phillips data website, http://www.rhsmith.umd.edu/industrydata.htm. See Hoberg and Phillips (2010) for more details.
Differentiated good industry	This dummy takes the value of 1 if the firm is in industries defined in Giannetti et al. (2011) as differentiated-product industries, and zero otherwise. The differentiated-product industries are: furniture and fixture; printing and publishing; rubber and plastic products; stone, glass, and clay products; fabricated metal products; machinery; electrical equipment; transportation equipment; instruments; miscellaneous products.	Giannetti et al. (2011).
Industry top-CSR market capitalization	Industry top-CSR market capitalization is defined at the two-digit SIC industry as market share [PRC×SHROUT] of top-third CSR firms relative to industry total market share. It is measured annually from 2003 through 2011.	
GDP growth rate	It is measures as GDP growth expressed in 2003 dollars. It is measured annually from 2003 through 2011.	World Bank's World Development Indicators.
Instrumental Variables		
President vote, democrats	This variable is the proportion of votes in the state received by the Democratic candidate for president. It is measured annually from 2003 through 2011.	Stateline database (http://www.stateline.org) and the CQ Electronic Library (http://library.cqpress.com).
Congress, democrat	It is equal to 0.5 x proportion of Senators who are Democrats + 0.5 x proportion of Congressmen who are Democrats from a particular state. It is measured annually from 2003 through 2011.	
State government, democrat	It is equal to 0.5 x dummy if a governor is Democrat + 0.25 x dummy if upper Chamber is controlled by Democrats + 0.25 x dummy if lower Chamber is controlled by Democrats. It is measured annually from 2003 through 2011.	
Disasters	This variable takes the value of one for a two-digit SIC industry that experienced a disaster in a given year, and zero otherwise. We obtain data on environmental and engineering disasters. Except for the oil and nuclear leakages, we include only those disasters that resulted in at least 1 death. There is a total of 53 disasters in our sample years. The type of disasters we consider include oil spills (26), nuclear leakages (6), mine accidents (3), air carrier crashes (3), train (and other transportation) accidents (4), shipwrecks (2), structural failures (3), industrial explosions (2), fires (3), and building collapses (1). The total number of deaths is 423. To differentiate events by their impact, we weight each disaster by the number of deaths. To give an example, Comair Flight 5191 (Delta Airlines) crash on August 27, 2006, resulted in 47 deaths. Therefore, 32 companies that belong to the two-digit SIC industry 45 (Transportation by air) in 2006 are assigned a weight of 47/423=0.11. Because there were no deaths in the oil and nuclear accidents, we conservatively assign the death toll in each of these events to equal one death. It is measured annually from 2002 through 2010.	Center for Research on the Epidemiology of Disasters and newspaper articles from the Lexis-Nexis Database.
Product recalls	This variable takes the value of one for companies whose product was recalled in a given year, and zero otherwise. We consider those recalls that were covered in at least one newspaper article. For the entire sample of 4,462 companies we identify 922 product recalls for 726 companies. To assign a greater weight to more important recalls, we weight each recall by the number of newspaper articles coverage during the five days subsequent to each event. If more than one disaster occurs in an industry, or recall in a firm, in one year, we add the weights from each incident, respectively. It is measured annually from 2002 through 2010.	U.S. Consumer Product Safety Commission and newspaper articles from the Lexis-Nexis Database.

Figure 1. Distribution of Standard Deviation of Firm CSR

This figure is the histogram of standard deviation of firm time-series of aggregate social responsibility (CSR). The unit of observation is one firm. The sample years are from 2003 through 2011. The aggregate corporate social responsibility (CSR) score is the sum of six attributes: community, diversity, employee relations, environment, product, and human rights. We exclude governance from the aggregate score calculation. For this graph, we drop 1,198 firms with fewer than three years of data. The remaining number of firms is 3,264. Appendix A provides details on the attributes and aggregate CSR score.

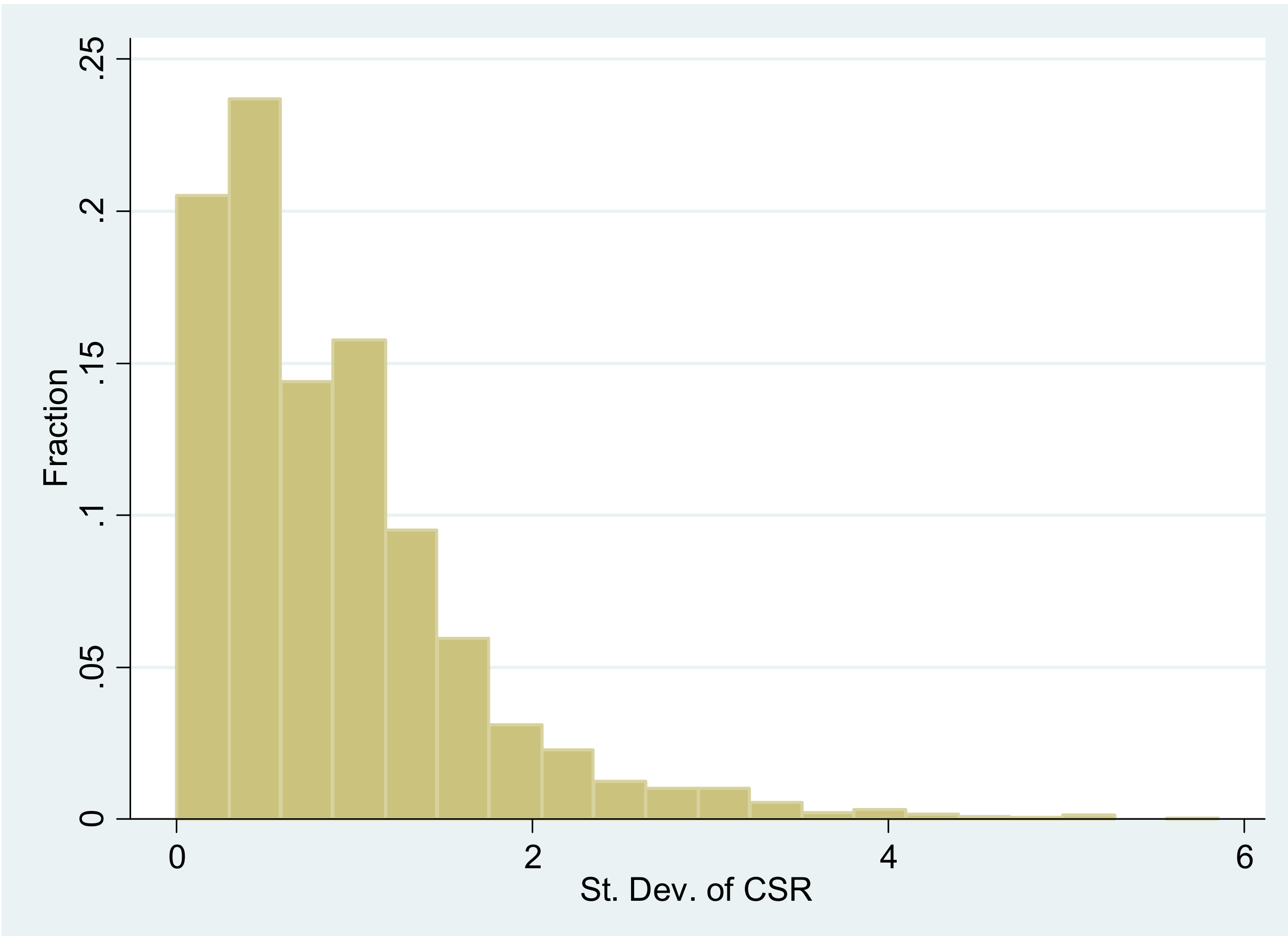

Table I. Summary Statistics for Corporate Social Responsibility

This table presents summary statistics for social responsibility data obtained from MSCI ESG (environment, social, governance), formerly KLD Research & Analytics. The sample years are from 2003 through 2011. The aggregate corporate social responsibility (CSR) score is the sum of six attributes: community, diversity, employee relations, environment, product, and human rights. We exclude governance from the aggregate score calculation. Appendix A provides details on the attributes and aggregate CSR score. Panel A reports summary statistics for CSR attributes and aggregate CSR score. Panel B reports the means for aggregate CSR score and its attributes by year. Panel C reports summary statistics for aggregate CSR score by one-digit SIC codes.

Panel A: Corporate Social Responsibility and its attributes

Variable	Firm-years (2003-2011)	Mean	Std. dev.	Min	25%	Median	75%	Max
CSR	23,803	-0.362	2.162	-9	-2	-1	0	18
Community	23,803	0.051	0.486	-2	0	0	0	5
Diversity	23,803	-0.038	1.377	-3	-1	0	1	7
Employee	23,803	-0.193	0.792	-4	-1	0	0	5
Environment	23,803	0.009	0.715	-5	0	0	0	5
Product	23,803	-0.151	0.560	-4	0	0	0	2
Human	23,803	-0.039	0.228	-3	0	0	0	1
Governance	23,803	-0.261	0.747	-4	-1	0	1	2

Panel B: Distribution by years

Year	Firm-years	CSR	Community	Diversity	Employee	Environ-ment	Product	Human	Gover-nance
2003	2,565	-0.181	0.043	0.206	-0.163	-0.071	-0.138	-0.059	-0.005
2004	2,583	-0.362	0.053	0.170	-0.241	-0.110	-0.142	-0.092	-0.119
2005	2,599	-0.339	0.036	0.190	-0.271	-0.091	-0.164	-0.040	-0.160
2006	2,588	-0.362	0.039	0.181	-0.281	-0.086	-0.176	-0.039	-0.240
2007	2,560	-0.338	0.017	0.198	-0.241	-0.077	-0.192	-0.043	-0.257
2008	2,673	-0.332	0.006	0.176	-0.230	-0.056	-0.187	-0.041	-0.248
2009	2,712	-0.357	0.001	0.173	-0.246	-0.057	-0.189	-0.038	-0.233
2010	2,803	-0.616	0.120	-0.797	-0.068	0.278	-0.142	-0.006	-0.220
2011	2,720	-0.347	0.135	-0.752	-0.014	0.312	-0.033	0.006	-0.842
Total	23,803								

Panel C: Distribution by industries

SIC code	Industry	Firm-years	% of sample	CSR mean	CSR std. dev.	CSR min	CSR max
100-900	Agriculture and Fishing	63	0.26%	-1.651	2.178	-8	3
1000-1700	Mining and Construction	1,278	5.37%	-1.409	1.768	-9	5
2000-2900	Manufacturing I	3,418	14.36%	-0.235	2.636	-8	16
3000-3900	Manufacturing II	5,658	23.77%	-0.309	2.269	-8	18
4000-4900	Transportation and Utilities	2,223	9.34%	-0.695	2.085	-9	9
5000-5900	Wholesale Trade and Retail Trade	2,201	9.25%	-0.396	2.088	-7	12
6000-6700	Finance, Insurance, and Real Estate	5,294	22.24%	-0.162	1.822	-6	14
7000-7900	Services I	2,748	11.54%	-0.107	2.139	-5	14
8000-8900	Services II	883	3.71%	-0.639	1.533	-5	9
9000-9900	Public Administration	37	0.16%	-0.405	3.227	-6	6
Total		23,803	100.00%				

Table II. Correlation Coefficients Between CSR Attributes

This table presents correlation coefficients between aggregate CSR score, its attributes, and the sin dummy variable. The attributes are community, diversity, employee relations, environment, product, and human rights. We also include the attribute governance, which is not part of the aggregate CSR score. The sample years are from 2003 through 2011. The sin dummy variable takes the value of one if a firm has one of the sin concerns and 0 otherwise. The concern categories are: firearms, gambling, military, nuclear, tobacco, and alcohol. Appendix A provides details on the attributes, aggregate CSR score and sin dummy. The numbers in parentheses are probability levels at which the hypothesis of a zero correlation can be rejected. The superscripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Sin	Community	Diversity	Employee	Environ-ment	Product	Human	Gover-nance
Community	-0.026***							
	(0.00)							
Diversity	0.064***	0.287***						
	(0.00)	(0.00)						
Employee	-0.028***	0.113***	0.082***					
	(0.00)	(0.00)	(0.00)					
Environment	-0.120***	0.274***	0.146***	0.100***				
	(0.00)	(0.00)	(0.00)	(0.00)				
Product	-0.120***	-0.068***	-0.211***	0.067***	0.082***			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
Human	-0.087***	-0.004	-0.109***	0.056***	0.144***	0.155***		
	(0.00)	(0.50)	(0.00)	(0.00)	(0.00)	(0.00)		
Governance	-0.019***	-0.003	-0.0220***	-0.002	0.075***	0.153***	0.082***	
	(0.00)	(0.63)	(0.00)	(0.79)	(0.00)	(0.00)	(0.00)	
CSR	-0.055***	0.521***	0.713***	0.500***	0.558***	0.177***	0.143***	0.058***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Table III. Summary Statistics of Main Variables

This table presents summary statistics (mean, standard deviation, minimum, 25th, 50th (median) and 75th percentiles and maximum) for the main variables. The sample is the merged set between COMPUSTAT, CRSP, and MSCI ESG (environment, social, governance) formerly KLD Research & Analytics. Appendix A provides details on the definition of the variables. The sample years are from 2004 through 2012 for Firm β and Tobin's Q, and from 2003 through 2011 for all other variables (independent variables are lagged with respect to the dependent variables). All variables, except for aggregate CSR score, are winsorized at the 1% and 99% levels.

Variable	Firm-years	Mean	Std. dev.	Min	25%	Median	75%	Max
Firm β	23,803	0.914	0.409	0.168	0.572	0.917	1.212	2.205
Tobin's Q	23,803	1.927	1.419	0.524	1.114	1.442	2.215	10.020
Firm excess return, %	23,803	1.215	3.946	-10.359	-0.798	1.232	3.165	14.131
CSR	23,803	-0.362	2.162	-9	-2	-1	0	18
Operating leverage	23,803	-0.986	3.694	-6.440	-0.690	-0.990	-0.280	4.290
Profitability	23,803	0.016	0.134	-0.699	0.005	0.032	0.074	0.267
R&D	23,803	0.035	0.076	0.000	0.000	0.000	0.031	0.455
Advertising	23,803	0.009	0.027	0.000	0.000	0.000	0.004	0.175
Leverage	23,803	0.189	0.202	0.000	0.010	0.132	0.301	0.899
CAPEX	23,803	0.041	0.054	0.000	0.008	0.024	0.053	0.307
Cash	23,803	0.482	1.625	0.000	0.031	0.100	0.335	5.474
Sales growth	23,803	0.158	0.483	-0.734	-0.006	0.086	0.209	5.462
ME	23,803	1.293	1.310	0.037	0.430	0.895	1.655	7.111
Size	23,803	7.232	1.703	3.676	5.996	7.117	8.286	11.964
Dividend yield, %	23,803	1.416	2.500	0.000	0.000	0.000	1.994	15.270
Age	23,803	2.303	0.884	0.000	1.609	2.302	2.639	3.912
Earnings variability	23,803	2.302	0.347	0.332	0.447	2.412	7.816	37.559
Diversification	23,803	4.260	0.450	1.000	2.000	4.000	5.000	16.000
State tax	23,803	0.068	0.038	0.000	0.050	0.071	0.090	0.120
Hoberg&Phillips product similarity	15,001	0.0773	0.143	0.010	0.128	0.216	0.501	10.001

Table IV. Panel Regressions of Firm β on CSR and Its Attributes with Control Variables, Firm Fixed Effects and Year Fixed Effects

This table reports the results of panel regressions of *Firm β* on aggregate CSR score (governance excluded), its attributes (community, diversity, employee relations, environment, product, and human rights) and other controls. Specification 10 includes governance in the CSR score calculation. Specification 11 controls for the sin dummy. The regressions are run using the panel of firm-year observations from 2003 through 2012. All independent variables are lagged by one year. Every regression includes firm and year fixed effects. Standard errors are clustered by firms and years to adjust for arbitrary heteroskedasticity, cross-sectional, and time-series correlation. The numbers in parentheses are *t*-statistics. The superscripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. All variables except for CSR are winsorized at the 1% and 99% levels. Appendix A contains a detailed description of all the variables.

Specification	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Dependent variable						***Firm β***					
CSR variable included in the regression		**CSR**	**Community**	**Diversity**	**Employee**	**Environment**	**Product**	**Human**	**Governance**	**CSR (with Gov.)**	**CSR**
lagged **CSR variable**		-0.0159***	-0.0323***	-0.0192***	-0.0116**	-0.0340***	0.0014	-0.0804***	0.0027	-0.0110***	-0.0154***
		(-6.59)	(-3.32)	(-4.25)	(-2.06)	(-5.84)	(0.15)	(-4.35)	(0.47)	(-5.47)	(-6.43)
lagged **Sin dummy**											0.0330
											(1.35)
lagged **Operating leverage**	0.0058	0.0041	0.0054	0.0052	0.0045	0.0044	0.0050	0.0422	0.0049	0.0040	0.0043
	(0.81)	(0.65)	(0.74)	(0.80)	(0.69)	(0.63)	(0.76)	(0.72)	(0.80)	(0.72)	(0.75)
lagged **profitability**	-0.2518***	-0.2524***	-0.2526***	-02549***	-0.2503***	-0.2508***	-0.2518***	-0.2524***	-0.2523***	-0.2501***	-0.2530***
	(-6.51)	(-6.53)	(-6.53)	(-6.59)	(-6.47)	(-6.49)	(-6.51)	(-6.53)	(-6.52)	(-6.47)	(6.55)
lagged **R&D**	-0.4817***	-0.4783***	-0.4695***	-0.4784***	-0.4860***	-0.4942***	-0.4863***	-0.4830***	-0.4815***	-0.4814***	-0.4916***
	(-3.77)	(-3.68)	(-3.71)	(-3.69)	(-3.63)	(-3.73)	(-3.80)	(-3.81)	(-3.74)	(-3.78)	(-3.80)
lagged **Advertising**	-0.0214	-0.0213	-0.0214	-0.0212	-0.0202	-0.0193	-0.0198	-0.0186	-0.0181	-0.0196	-0.0188
	(-0.46)	(-0.44)	(-0.37)	(-0.39)	(-0.38)	(-0.36)	(-0.33)	(-0.27)	(-0.28)	(-0.26)	(-0.26)
lagged **Leverage**	0.2290***	0.2236***	0.2210***	0.2161***	0.2234***	0.2231***	0.2303***	0.2332***	0.2413***	0.2424***	0.2502***
	(4.60)	(4.59)	(4.59)	(4.65)	(4.58)	(4.59)	(4.66)	(4.70)	(4.61)	(4.58)	(4.64)
lagged **CAPEX**	-0.0657	-0.0748	-0.0749	-0.0708	-0.0641	-0.0578	-0.0667	-0.0747	-0.0702	-0.0787	-0.0824
	(-0.32)	(-0.30)	(-0.25)	(-0.32)	(-0.41)	(-0.49)	(-0.54)	(-0.51)	(-0.60)	(-0.54)	(-0.55)
lagged **Cash**	0.1900***	0.1915***	0.1926***	0.2017***	0.2035***	0.2011***	0.2104***	0.2094***	0.2174***	0.2176***	0.2236***
	(4.44)	(4.48)	(4.40)	(4.30)	(4.27)	(4.34)	(4.41)	(4.45)	(4.40)	(4.38)	(4.40)
lagged **Sales growth**	0.0060	0.0067	0.0144	0.0193	0.0197	0.0090	0.0040	0.0047	-0.0020	0.0044	0.0047
	(1.35)	(1.43)	(1.43)	(1.43)	(1.45)	(1.50)	(1.45)	(1.44)	(1.50)	(1.57)	(1.54)
lagged **ME**	0.0489***	0.0488***	0.0567***	0.0601***	0.0577***	0.0655***	0.0582***	0.0616***	0.0659***	0.0599***	0.0567***
	(6.31)	(6.33)	(6.25)	(6.33)	(6.26)	(6.33)	(6.36)	(6.33)	(6.39)	(6.47)	(6.54)

Table IV Continued.

lagged **Size**	0.0075	0.0071	0.0148	0.0122	0.0175	0.0105	0.0104	0.0006	0.0067	0.0056	0.0014
	(0.60)	(0.65)	(0.68)	(0.73)	(0.76)	(0.84)	(0.86)	(0.93)	(0.90)	(1.00)	(1.06)
lagged **Dividend yield**	0.3349**	0.3397**	0.3315**	0.3275**	0.3294**	0.3376**	0.3469**	0.3455**	0.3478**	0.3424**	0.3434**
	(2.45)	(2.37)	(2.34)	(2.36)	(2.42)	(2.48)	(2.39)	(2.38)	(2.43)	(2.33)	(2.26)
lagged **Age**	0.0082	0.0098	0.0090	0.0185	0.0266	0.0203	0.0274	0.0303	0.0373	0.0343	0.0417
	(0.65)	(0.59)	(0.60)	(0.64)	(0.62)	(0.55)	(0.58)	(0.63)	(0.58)	(0.60)	(0.68)
lagged **Earnings variability**	0.0138	0.0214	0.0161	0.0103	0.0140	0.0086	0.0015	0.0059	0.0019	0.0106	0.0094
	(0.35)	(0.41)	(0.41)	(0.49)	(0.40)	(0.35)	(0.41)	(0.44)	(0.47)	(0.51)	(0.52)
lagged **Diversification**	0.0072***	0.0083***	0.0080***	0.0069***	0.0079***	0.0097***	0.0087***	0.0094***	0.0086***	0.0087***	0.0085***
	(3.25)	(3.32)	(3.24)	(3.25)	(3.24)	(3.29)	(3.20)	(3.24)	(3.22)	(3.13)	(3.15)
lagged **State tax**	0.1130	0.1085	0.1006	0.1084	0.1130	0.1114	0.1044	0.0998	0.0942	0.1010	0.0995
	(1.00)	(1.04)	(1.06)	(0.98)	(0.93)	(0.98)	(0.92)	(0.83)	(0.76)	(0.78)	(0.70)
Firm and year fixed effects	Yes	Yes	yes	yes	yes	yes	yes	yes	yes	Yes	yes
Number of firm-years	23,803	23,803	23,803	23,803	23,803	23,803	23,803	23,803	23,803	23,803	23,803
R^2	0.545	0.546	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.546

Table V. Panel Regressions of Firm β on CSR Conditional on Differentiated Goods Industry, Product Similarity, and Industry top-CSR Market Capitalization

In specifications 1-3 we report the results of panel regressions of *Firm β* on aggregate CSR score (governance excluded) and interactions of CSR with *Differentiated goods industry* dummy variable (specification 1), *Hoberg and Phillips product similarity*, (specification 2), and *Industry Top-CSR market capitalization* (specification 3). Specification 4 reports regression of *Profit ratio* on GDP per capita growth and two-digit SIC industry dummies. The sample years are from 2003 through 2012 (independent variables in specifications 1-4 are lagged with respect to the dependent variables). Regressions in specifications 1-3 include all control variables as in Table IV. Differentiated goods industries (24% of the sample) are taken from Giannetti et al. (2011): furniture and fixture; printing and publishing; rubber and plastic products; stone, glass, and clay products; fabricated metal products; machinery; electrical equipment; transportation equipment; instruments; miscellaneous products. Industry top-CSR market capitalization is defined at the two-digit SIC industry as market share of top-third CSR firms relative to industry total market share. Profit ratio is defined at the two-digit SIC industry as the mean net income of the firms in the top-third CSR score divided by the mean net income of the firms in the bottom-third CSR score. Appendix A provides details on the definition of the variables. Except in specification (4), standard errors are clustered by firms and years to adjust for arbitrary heteroskedasticity, cross-sectional, and time-series correlation. The numbers in parentheses are *t*-statistics. Superscripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. All firm variables, except for CSR, are winsorized at the 1% and 99% levels.

Specification	**1**	**2**	**3**	**4**
Dependent variable		***Firm β***		**Profit ratio**
lagged **CSR**	-0.0170**	-0.0220***	-0.0192***	
	(-6.21)	(-5.23)	(-4.53)	
GDP growth				-0.122***
				(-6.15)
Differentiated goods industry dummy	0.1308***			
	(23.04)			
Differentiated goods × lagged **CSR**	-0.0066***			
	(-3.14)			
Hoberg&Phillips similar goods		-0.2417*		
		(-1.67)		
Hoberg&Phillips similar goods×lagged **CSR**		0.0882***		
		(4.40)		
Industry top-CSR market cap			-0.0096**	
			(-1.79)	
Industry top-CSR market cap×lagged **CSR**			0.0072***	
			(3.31)	
All control variables included	yes	yes	yes	no
Firm fixed effects	no	yes	yes	no
Industry fixed effects	no	no	no	yes
Year fixed effects	yes	yes	yes	no
Number of obs.	23,803	15,001	23,803	442
R^2	0.188	0.595	0.547	0.277

Table VI. Panel Regressions of *Tobin's Q*

This table reports the results of panel regressions of *Tobin's Q* on aggregate CSR score (specification 1) and interactions of firm CSR with Differentiated goods industry dummy variable (specification 2), Hoberg-Phillips product similarity (specification 3), and Industry top-CSR market capitalization (specification 4). The regressions are run using the panel of firm-year observations from 2003 through 2012. Independent variables are lagged by one year. Appendix A provides details on the definition of the variables. Specifications 1, 3, and 4 include firm and year fixed effects. Standard errors are clustered by firms and years to adjust for arbitrary heteroskedasticity, cross-sectional, and time-series correlation. The numbers in parentheses are *t*-statistics. The upper scripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. All variables except for CSR are winsorized at the 1% and 99% levels.

Specification	**1**	**2**	**3**	**4**
Dependent variable		***Tobin's Q***		
lagged **CSR**	0.0599***	0.0480***	0.0472***	0.0516***
	(8.22)	(7.19)	(5.32)	(6.20)
Differentiated goods industry dummy		-0.0770**		
		(-2.14)		
Differentiated goods × lagged **CSR**		0.0249***		
		(3.17)		
Hoberg&Phillips similar goods			0.2214***	
			(7.80)	
Hoberg&Phillips similar goods×lagged **CSR**			-0.0817**	
			(-2.30)	
Industry top-CSR market cap.				0.0100
				(0.72)
I**ndustry top-CSR mark cap.** ×lagged **CSR**				-0.0086*
				(-1.92)
lagged **Operating leverage**	0.0037	0.0080	0.0052	0.0062
	(1.30)	(1.61)	(1.42)	(1.60)
lagged **profitability**	0.0987**	0.0821**	0.0940**	0.0936**
	(2.19)	(2.22)	(2.30)	(2.19)
lagged **R&D**	1.9484***	4.2987***	4.1014***	4.2188***
	(4.19)	(11.73)	(11.08)	(12.30)
lagged **Advertising**	1.3390	3.0982***	2.6529***	2.8140***
	(1.18)	(3.22)	(3.30)	(3.14)
lagged **Leverage**	-0.2090**	-0.1260	-0.1148	-0.1152
	(-1.72)	(-0.95)	(-1.10)	(-0.72)
lagged **CAPEX**	1.3034***	1.8254***	1.9821***	1.7468***
	(4.60)	(8.44)	(8.21)	(7.79)
lagged **Sales growth**	0.2139***	0.3068***	0.3019***	0.3329***
	(8.19)	(9.45)	(9.06)	(9.60)
lagged **Size**	-0.5689	-0.1825	-0.1845***	-0.1663***
	(-13.59)	(-14.50)	(-14.43)	(-13.88)
lagged **Age**	-0.1303***	-0.2717***	-0.3000***	-0.2472***
	(4.38)	(6.56)	(6.19)	(6.72)
lagged **Diversification**	-0.0325	-0.0167	-0.03252	-0.0216
	(-1.34)	(-1.11)	(-1.18)	(-1.25)
lagged **State tax**	-0.003	-0.004	-0.005	-0.004
	(1.32)	(1.30)	(1.50)	(1.25)
Firm fixed effects	Yes	no	yes	yes
Year fixed effects	Yes	yes	yes	yes
Number of firm-years	23,803	23,803	15,001	23,803
R^2	0.583	0.273	0.592	0.587

Table VII. Panel Regressions of *Firm Excess Return*

This table reports the results of panel regressions of *Firm excess return* on aggregate CSR score (specification 1) and interactions of firm CSR with Differentiated goods industry dummy variable (specification 3), Hoberg-Phillips product similarity (specification 4), and Industry top-CSR market capitalization (specification 5). In specification 2, we do not control for factor loadings. In specification 6, we first regress firm risk on firm CSR and then use the explained and unexplained parts as regressors. The regressions are run using the panel of firm-year observations from 2003 through 2012. Independent variables (except for factor loadings) are lagged by one year. Appendix A provides details on the definition of the variables. Specifications 1, 2, 4,5, and 6 include firm and year fixed effects. Standard errors are clustered by firms and years to adjust for arbitrary heteroskedasticity, cross-sectional, and time-series correlation. The numbers in parentheses are *t*-statistics. The upper scripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. All variables except for CSR are winsorized at the 1% and 99% levels.

Specification	**1**	**2**	**3**	**4**	**5**	**6**
Dependent variable			***Firm excess return***			
lagged **CSR**	-0.0429***	-0.0512***	-0.0322***	-0.0111***	-0.0105***	
	(-7.17)	(-8.10)	(-5.12)	(-6.08)	(-5.02)	
Explained β						1.7452***
						(7.76)
Residual β						0.3110***
						(6.15)
Differentiated goods industry dummy			0.1884***			
			(12.85)			
Differentiated goods × lagged **CSR**			-0.0035			
			(-1.00)			
Hoberg&Phillips similar goods				-0.1833		
				(-1.62)		
Hoberg&Phillips similar goods×lagged **CSR**				0.0032		
				(1.50)		
Industry top-CSR market cap.					-0.0081**	
					(-1.90)	
Industry top-CSR mark cap. ×lagged **CSR**					0.0066**	
					(2.07)	
factor β_1	0.3201***					
	(6.88)					
factor β_2	0.2220***					
	(3.18)					
factor h_1	0.1106					
	(1.23)					
factor h_2	-0.0524					
	(-0.48)					
lagged **Operating leverage**	0.0198***	0.0235***	0.0265***	0.0355***	0.0143***	0.0140***
	(5.18)	(5.21)	(5.57)	(3.08)	(5.08)	(5.16)
lagged **Profitability**	3.8675***	3.6370***	3.0099***	3.5029***	3.5789***	3.4029***
	(20.75)	(22.14)	(21.80)	(18.16)	(21.13)	(21.39)
lagged **R&D**	-3.2891***	-3.1031***	-3.1154***	-3.4171***	-3.2205***	-3.1618***
	(-8.53)	(-8.56)	(-9.90)	(-5.03)	(-7.15)	(-7.21)
lagged **Advertising**	-6.0061***	-6.5806***	-6.8377***	-5.7583***	-6.0048***	-6.1456***
	(-7.89)	(-8.19)	(-7.94)	(-4.25)	(-7.94)	(-8.92)

Table VII Continued.

lagged **Leverage**	1.1216***	1.1114***	1.1085***	1.2385***	1.1191***	1.4592***
	(10.40)	(10.15)	(10.49)	(7.45)	(10.13)	(10.17)
lagged **CAPEX**	-3.6613***	-3.6682***	-3.6682***	-2.0165***	-3.6653***	-3.6656***
	(-9.28)	(-9.21)	(-9.21)	(-5.21)	(-9.80)	(-9.12)
lagged **Cash**	0.0398***	0.0434***	0.0434***	0.016**	0.0421***	0.0425***
	(2.58)	(2.56)	(2.56)	(1.67)	(2.71)	(2.79)
lagged **Sales growth**	0.1875***	0.1217***	0.1171***	0.1574***	0.1847***	0.1830***
	(4.29)	(4.21)	(4.17)	(3.88)	(4.55)	(4.81)
lagged **ME**	-0.6813***	-0.7142***	-0.6114***	-0.7147***	-0.7124***	-0.7156***
	(-37.34)	(-36.15)	(-35.29)	(-30.50)	(-38.49)	(-38.20)
lagged **Size**	-0.0195	-0.0151	-0.0245	-0.0239	-0.0231	-0.0236
	(-1.41)	(-1.34)	(-1.50)	(-1.17)	(-1.04)	(-1.07)
lagged **Dividend yield**	-15.0576***	-15.0455***	-15.1127***	-14.0192***	-14.8834***	-14.8839***
	(-17.17)	(-17.28)	(-16.05)	(-10.09)	(-17.86)	(-17.12)
lagged **Age**	0.0034	0.0038	0.0020	0.0015	0.0026	0.0026
	(1.10)	(1.60)	(1.18)	(1.57)	(1.19)	(1.21)
lagged **Earnings variability**	0.0100	0.0117	0.0114	0.0234	0.0143	0.0145
	(0.21)	(0.38)	(0.35)	(0.24)	(0.25)	(0.26)
lagged **Diversification**	0.0326	0.0346	0.0380	0.0146	0.0357	0.0358
	(0.14)	(0.25)	(0.20)	(0.29)	(0.17)	(0.25)
lagged **State tax**	-0.0433	-0.0459	-0.0424	-0.0265	-0.0406	-0.0303
	(-0.67)	(-0.34)	(-0.52)	(-0.42)	(-0.72)	(-0.56)
Firm fixed effects	yes	yes	no	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Number of firm-years	23,803	23,803	23,803	15,001	23,803	23,803
R^2	0.667	0.664	0.309	0.664	0.665	0.665

Table VIII. Instrumental Variables Estimation

This table reports the results of Instrumental Variables (IV) estimation for *Firm β* (specifications 3 and 4), *Tobin's Q* (specification 5), and *Firm excess return* (specification 6). The endogenous (instrumented) variable is aggregate firm CSR score. We consider two sets of instruments. The first set of instruments is based on state political environment where a company is headquartered (president vote, democrats; congress, democrats; state government, democrats). President vote, democrats is the proportion of votes received by the democratic candidate for president election. Congress, democrat is 0.5×proportion of senators who are democrats + 0.5×proportion of representatives who are democrats. State government, democrats is 0.5×dummy if a governor is democrat + 0.25×dummy if upper Chamber is controlled by democrats + 0.25 × dummy if lower Chamber is controlled by democrats. The second set of instruments is based on natural disasters and product recalls. A full description of these instruments is in the Appendix. Specifications 1 and 2 report the results of the first-stage regressions. Every regression contains all of the control variables as in Table IV including firm fixed effects and year fixed effects. Standard errors are clustered by firm and year. The numbers in parentheses below the coefficient estimates are *t*-statistics for first-stage regressions and *z*-values for second-stage regressions. The superscripts *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. We also report the following diagnostic tests: Low *p*-values for the *F*-statistics of the weak instruments test indicate that the instruments are non-weak (or that they are relevant). The reported F-test is for instruments only. High *p*-values for the χ^2 stat of the Hansen exogeneity of instruments (overidentifying restrictions) test indicate that the instruments can be treated as exogenous. R^2 for the second-stage regression is not reported because it has no meaning in IV estimation.

Specification	**1**	**2**	**3**	**4**	**5**	**6**
Dependent variable	***CSR***	***CSR***	***Firm β***	***Firm β***	***Tobin's Q***	***Firm excess return***
	First-stage Regression	**First-stage Regression**	**Second-stage Regression**	**Second-stage Regression**	**Second- stage Regression**	**Second- stage Regression**
Instrument Set			**Political instruments**	**Dis./recalls instruments**	**Political instruments**	**Political instruments**
President vote, democrats	1.086***					
	(3.21)					
Congress, democrats	0.3203					
	(1.32)					
State government, democrats	0.1290***					
	(4.41)					
lagged **Disasters**		-6.8733**				
		(2.14)				
lagged **Product recalls**		-3.2913*				
		(1.70)				
lagged **Instrumented CSR**			-0.1302**	-0.1580**	0.3306**	-0.2220***
			(-2.14)	(-2.34)	(11.88)	(-4.77)
All control variables are included	yes	yes	yes	yes	yes	yes
Number of firm-years	23,803	23,803	23,803	23,803	23,803	23,803
R^2	0.452	0.334				
Weak instruments test, F-stat.	23.488***	10.105***				
	(0.00)	(0.00)				
Hansen exogeneity test, χ^2 stat.			1.980	1.114	2.120	2.182
			(0.21)	(0.28)	(0.11)	(0.14)

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities.*

The ECGI produces and disseminates high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It draws on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

european corporate governance institute

Electronic Access to the Working Paper Series

The full set of ECGI working papers can be accessed through the Institute's Web-site (www.ecgi.org/wp) or SSRN:

Finance Paper Series	http://www.ssrn.com/link/ECGI-Finance.html
Law Paper Series	http://www.ssrn.com/link/ECGI-Law.html