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Does Corporate Social Responsibility Reduce Financial Distress Risk? *

Sabri Boubaker

EM Normandie Business School, Paris, France

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IRG, Université Paris-Est Créteil, France (EA2354)

sboubaker@em-normandie.fr

Alexis Cellier

IRG, Université Paris-Est Créteil, France (EA2354)

cellier@u-pec.fr

Riadh Manita

NEOMA Business School, France

Riadh.manita@neoma-bs.fr

Asif Saeed

FSM, National University of Computer and Emerging Sciences Lahore, Pakistan

asif.saeed@nu.edu.pk

Abstract

This paper examines how corporate social responsibility (CSR) affects the level of financial distress risk (FDR). Using a sample of 1,201 US-listed firms during 1991–2012, our results indicate that firms with higher CSR levels have lower FDR, suggesting that a better CSR performance makes firms more creditworthy and have better access to financing, which is rewarded with less financial defaults. This finding is robust to using alternative proxies of FDR, to controlling for potential endogeneity, and is mainly driven by the community, diversity, employee relations, and environmental dimensions of CSR. Moreover, this relationship is more prevalent in firms with strong governance mechanisms and high product market competition. It is also more exacerbated for less distressed firms and during non-crisis periods. Overall, our findings suggest that the adoption of CSR practices comes with less distress and default risks, likely leading to a more attractive corporate environment, better financial stability and more crisis-resilient economies

JEL classification: G30, G33, G34, M14

Keywords: Corporate social responsibility, Financial distress risk, Default, Z-score

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Abstract

This paper examines how corporate social responsibility (CSR) affects the level of financial distress risk (FDR). Using a sample of 1,201 US-listed firms during 1991–2012, our results indicate that firms with higher CSR levels have lower FDR, suggesting that a better CSR performance makes firms more creditworthy and have better access to financing, which is rewarded with less financial defaults. This finding is robust to using alternative proxies of FDR, to controlling for potential endogeneity, and is mainly driven by the community, diversity, employee relations, and environmental dimensions of CSR. Moreover, this relationship is more prevalent in firms with strong governance mechanisms and high product market competition. It is also more exacerbated for less distressed firms and during non-crisis periods. Overall, our findings suggest that the adoption of CSR practices comes with less distress and default risks, likely leading to a more attractive corporate environment, better financial stability and more crisis-resilient economies.

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1. Introduction

Over the last few three decades, corporate social responsibility (CSR) has become an appealing instrument for modern firms to attract potential investors and connect with stakeholders (Xu and Lee, 2019; Yang et al; 2019). Sun and Cui (2014) note that 90% of Fortune 500 firms communicate about their CSR efforts. Adams (2011) reports that one out of each nine dollars of professionally managed assets in the United States is invested in firms with high CSR ranking.¹ Along with practitioners, CSR has attracted academic researchers to investigate its effects on firm performance (Wu and Shen 2013, Shen et al. 2016), firm risk (Ameur et al. 2019, Jo and Na 2012), cost of equity capital (El Ghouli et al. 2011), shareholders wealth (Krüger 2015), and credit ratings (Jiraporn et al. 2014). Additional studies show that the economic benefits of CSR translate into better firm financial performance (Lins et al. 2017) and reduced firm risk (Mishra and Modi 2013). Investigating CSR is still an ongoing concern in economic and finance research because of its great importance to investors, stakeholders, and policymakers.

The role of CSR is increasingly recognized in the literature, but some areas remain so far unexplored. Recent studies have been conducted on CSR and the availability of credit showing that firms with a high CSR ranking can encash their reputation to obtain financing at lower borrowing costs (e.g., Jiraporn et al. 2014). According to Attig et al. (2013), many CSR attributes are positively related to firm credit ratings. In the same vein, Sun and Cui (2014) find that firms ranking high in CSR mitigate their risk with their high credit rating. All these studies consider that firms with high CSR engagement can mitigate their risk of falling into default and enjoy high credit ratings because of their strong corporate image.

¹ Source, Susan Adams, 2011, The Most Responsible Companies: Another Ranking, Forbes Magazine.

During the last five decades, many advances have been made to better understand corporate default risk. Altman (1968) pioneered the use of accounting- and market-based models to predict firm financial distress risk.² In a recent paper, Altman et al. (2017) find that the Z-score outperforms hazard- and market-based models in the prediction of financial distress risk (FDR). However, there is still no answer to the question of whether a firm's socially responsible policies are associated with FDR.

Prior literature has evidenced the role of CSR in mitigating different types of risk and improving credit ratings (e.g, Harjoto and Laksmana 2018, Husted 2005, and Jiraporn et al. 2014). For instance, Kim et al. (2014) show that firms with highly CSR-oriented policies are more transparent and less involved in bad news hoarding, leading to lower stock price crash risk. Sun and Cui (2014) shows that an increased interest in CSR improves creditworthiness while Cheng et al. (2014) provide evidence that engagement in CSR eases access to finance. Goss and Roberts (2011) find that firms with CSR concerns pay 7–18 basis points more interest than socially responsible firms. Attig et al. (2013) show that more socially responsible firms enjoy higher credit ratings and argue that credit rating agencies are likely to use CSR information to evaluate firm creditworthiness. All these empirical studies indicate that CSR improves credit ratings and leads to better access to finance. It thus plays a role in mitigating business risk, which prompts the need to explore the link between CSR and FDR.

This study extends the above stream of research by assessing the effect of CSR on a firm's FDR. To do so, we compile data from MSCI ESG, Datastream, and Worldscope for 1,201 unique U.S. firms from 1991 to 2012. To measure CSR, we use all qualitative dimensions of the MSCI ESG index, except the corporate governance one, since it has distinct characteristics from CSR (El Ghouli et al. 2011). We measure the risk of financial

² Accounting-based models also include Ohlson (1980) O-score and Zmijewski (1984) ZM-score. Market-based models include Black and Scholes (1973) option to default, Merton (1974) model and Shumway (2001) simple hazard model.

distress FDR using the Z-score of Altman (1968). The empirical findings show a negative relationship between CSR and FDR, suggesting that firms with high CSR profiles exhibit low FDR levels and are considered creditworthy with a better access to financing. The results confirm that firms can reduce their FDR by increasing their CSR performance. CSR strengths are associated with low levels of FDR. Consistent with Attig et al. (2013), we find that the community, diversity, employee relations, and environmental dimensions of CSR help reduce FDR.

Furthermore, to ensure the reliability of our findings, we conduct a battery of sensitivity checks. We use two alternative FDR accounting-based measures, the O-score and ZM-score. We also control for additional variables that could affect FDR and address endogeneity concerns, using propensity score matching (PSM) technique, two-stage least squares (2SLS) regression, and the generalized method of moments (GMM). In additional analyses, we find that high CSR quality firms can mitigate their financial distress risk only when they exhibit strong internal corporate governance mechanisms, face a strong product market competition, are not already facing financial distress, or during a non-crisis period.

This article makes several contributions to the literature. First, while prior research explores the effects of CSR on firm decisions and market outcomes, to the best of our knowledge, this work is among the first to examine the link between CSR and FDR. The empirical results support prior evidence that firm CSR-oriented policies mitigate firm risk, shedding more light on the financial benefits the firm gains through CSR-oriented strategies (Breuer et al., 2018; Eliwa et al., 2019; among others). Second, our study adds to the large body of research that analyzes factors explaining financial distress by showing that socially responsible behaviors matter in reducing FDR. Third, it extends and complements the literature on the association between CSR and access to finance. These studies suggest that credit rating agencies

incorporate nonfinancial information about corporate CSR activities to measure firm creditworthiness. They also show higher CSR levels are associated with lower cost of equity capital, lower cost of debt, and lower financial constraints. This study consistently shows that firms benefit from a lower financial distress risk through CSR actions, due to better access to finance and creditworthiness.

The rest of the manuscript is organized as follows. Section 2 discusses the literature and develops the hypotheses. Section 3 describes the data and the methodological approach. Section 4 presents the results on the effect of CSR on FDR and the robustness checks. Section 5 performs additional analyses. Section 6 concludes.

2. Literature review and hypothesis development

Two main mechanisms can explain the reasons why CSR should affect FDR³. First, CSR can lower firm risk leading to a negative impact on FDR. Prior studies document an inverse relationship between CSR and firm risk. For instance, Herremans et al. (1993) find that U.S. manufacturing companies with better CSR reputation earn better stock returns with lower risk for investors. Jo and Na (2012) find a negative relationship between CSR and firm risk in controversial industries, supporting the risk reduction hypothesis. Lee and Faff (2009) find that socially responsible firms have a lower idiosyncratic risk due to better market portfolio performance. Studying Taiwanese listed firms, Lee and Yeh (2004) show that organizational governance risk measures are positively related to FDR.⁴ Albuquerque et al. (2018) conclude that CSR performance increases firm value and decreases systematic risk. Husted (2005) uses real options theory to suggest that CSR has a negative effect on ex ante

³ Literature suggests a third possible indirect way. CSR improves performance, which in turn lowers the FDR. The discussion of the relationship between CSR and performance is beyond the scope of this paper. An interested reader can refer to the meta-analysis of Margolis and Walsh (2003).

⁴ The authors use three measures for governance risk, namely, the percentage of board seats occupied by the controlling shareholder, the percentage of ownership held by the controlling shareholders pledged for bank loans, and the control-ownership wedge.

downside business risk of firms. Kim et al. (2014) find that socially responsible firms refrain from bad news hoarding and maintain a high level of transparency, which reduces their stock price crash risk. Mishra and Modi (2013) find that firm CSR engagement is negatively and significantly related to idiosyncratic risk, with negative (positive) CSR increasing (decreasing) risk levels. In sum, the above-mentioned evidence documents that firms can mitigate their risk exposure through effective CSR policies.

Second, CSR can improve the financing conditions of firms thus lowering their FDR. Prior empirical studies consider that the effect of CSR strategies on firms' ability to access financing depends on the degree of risk exposure. For instance, Sharfman and Fernando (2008) study the impact of CSR on the cost of capital. They find that improvements in environmental risk management lower the cost of capital and improve the market's risk perception of a firm. El Ghouli et al. (2011) find that firms with better CSR scores exhibit lower cost of equity capital because of their lower perceived risk. Using data for U.S. loan facilities, Goss and Roberts (2011) document that improved CSR performance reduces the cost of bank loans according to the risk mitigation view. The last years have witnessed an increasing literature showing that higher levels of CSR engagement improve firm credit ratings. Attig et al. (2013), for example, show that credit rating agencies are more inclined to award high ratings to firms that socially perform well. These agencies include CSR performance as an important non-financial information in evaluating firms' creditworthiness. Jiraporn et al. (2014) provide evidence that a one standard deviation increase in CSR increases credit ratings by 4.5% and reduces default risk. Overall, this literature highlights that, for a given level of risk, more socially responsible firms enjoy higher credit ratings along with lower costs of equity and debt.

Existing literature shows that CSR attributes are not homogenous and do not have the same effects on risk⁵. They are also not all associated in the same manner with firm financial attributes. For example, Cai et al. (2015) and El Ghouli et al. (2011) show that the human rights dimension is not associated with credit ratings and cost of equity capital. Attig et al. (2013) find that all attributes of CSR (i.e., community, diversity, employee relations, the environment, and product quality/safety) have a positive relationship with credit ratings except the human rights dimension that has an insignificant negative effect. Verwijmeren and Derwall (2010) identify that employee well-being significantly reduces bankruptcy risk through a lower debt ratio and leads to better credit ratings. Salama et al. (2011) investigate the differential impact of the community and environmental responsibility of UK listed firms on systematic risk and find an inverse relationship between them. Bouslah et al. (2013) show that employee and human rights attributes of CSR have a negative association with firm idiosyncratic risk and that toxic (or gray) firms in employee relations exhibit increased idiosyncratic risk.⁶ Cheng et al. (2014) suggest that all three Asset4 factors (i.e., environmental, social, and governance) of CSR have a negative association with capital constraints. In view of these findings, the effects of CSR attributes are different and show the need to study the separate effect of each dimension on FDR.

Taken together, prior literature shows that better CSR leads to lower firm risk and improvements in financing conditions, which is expected to reduce FDR. Several studies find that CSR practices benefit not only to society but also to investors and to the firms themselves (Becchetti et al. 2012, Porter and Kramer 2002). CSR engagement is mostly for the betterment of the organization, including an increase in shareholder wealth (Krüger

⁵ CSR dimensions are community, diversity, employee relations, the environment, human rights, corporate governance, and product.

⁶ The authors categorize firms into four groups, namely, green, toxic, gray (or ambiguous), and neutral. Green (toxic) firms have only strengths (concerns). Gray (or ambiguous) firms have both strengths and concerns, whereas neutral firms have neither strengths nor concerns.

2015), improved transparency (Kim et al. 2014), reduced firm risk (Jo and Na 2010), and cheaper access to financing (Cheng et al. 2014). In light of all prior arguments, we expect a negative relation between CSR performance and FDR.

3. Sample construction and data description

3.1. Sample composition

We obtain data on CSR measures from MSCI ESG⁷. Financial data are retrieved from Datastream and Worldscope. The MSCI ESG database is widely used in the CSR literature (see, Jiraporn et al. 2014, Krüger 2015, and Lins et al. 2017, among others). We focus on US-listed firms to construct our sample and merge data from these three databases. To be included in our sample, we require all firms to have complete information for all variables.⁸ Our final sample is an unbalanced panel of 9,262 firm–year observations representing 1,201 unique firms from 1991 to 2012.⁹

3.2. Measuring CSR

To measure CSR, researchers commonly use two data sources, the MSCI ESG Ratings (e.g., Deng et al. 2013, and Luo et al. 2015) and Asset4 (e.g., Chen et al. 2016, Stellner et al. 2015, Krüger 2015, Liang and Renneboog 2017, Lins et al. 2017, and Lys et al. 2015). We collect CSR data from MSCI ESG. This database began in 1991 and initially rated only S&P 500 and DSI 400 firms then in 2001 it extended the coverage to the Russell 1000 firms and to the Russell 3000 firms in 2003. The ESG analysis relies on publicly available information (e.g., organization press releases, corporate event stories, the news, and

⁷ MSCI ESG Ratings was formerly known as Kinder, Lydenberg, and Domini's (KLD), which was acquired by MSCI in 2010. Following this acquisition, the CSR rating methodology drastically changed in 2013.

⁸ We exclude from our sample observations that do not have complete data. Moreover, we also exclude firm–year observations which have no data for the past five years, to calculate volatility.

⁹ In 2013, the KLD database introduced significant methodology changes in rating firms. For instance, the human rights dimension has dramatically dropped and ceased in 2014. To have homogeneous CSR measures, we end our sample period in 2012.

newspaper articles). For example, a newspaper article about CO₂ emission and a non-governmental organization's report on the relationship between management and labor are used as information to rate firms. Analysts incorporate these events, among other information, into an ESG-related factor according to their importance.

MSCI rates each firm on seven qualitative issue areas and six exclusionary screens. These qualitative issue areas are: community, corporate governance, employee relations, environment, human rights, and product. Each dimension is composed of a number of strengths and concerns. The six exclusionary screens are alcohol, gambling, firearms, military, tobacco, and nuclear power. For each strength and concern in a dimension, the MSCI ESG gives a binary (zero or one) rating. See, Appendix A, for the detail of strengths and concerns by CSR attribute.

Following prior literature (see, among others, Attig et al. 2013, Cahan et al. 2015, and Kim et al. 2014), we exclude the corporate governance dimension from the CSR score calculation because the definition of CSR that is adopted here does not consider the agency conflicts of interest between firm insiders and external shareholders. We follow Manescu (2011) to measure the CSR score. For each of the six attributes, we compute a relative index by subtracting relative concerns from relative strengths. These measures range from -1 when a firm only scores on all concerns to $+1$ when a firm only scores on all strengths. It takes the value of 0 when the relative strengths are equal to the relative concerns. Finally, the overall CSR score is the average of these six attributes (see, Appendix B).

3.3. Measuring FDR

The literature presents two approaches to estimate FDR. The first approach uses accounting-based data (Altman et al. 2017, Tykvová and Borell 2012) whereas the second one is based on market data along with accounting data (Bharath and Shumway 2008,

Shumway 2001). Common accounting-based measures include the Z-score (Altman 1968), the O-score (Ohlson 1980), and the ZM-score (Zmijewski 1984). Market-based measures include option to default based on the model of Black and Scholes (1973), distance to default based on the KMV model (Merton, 1974), and a simple hazard model such as in Shumway (2001). A large body of literature predicts financial distress using accounting- and market-based measures (see, e.g., Campbell et al. 2008, Richardson et al. 2015, Tykvová and Borell 2012). Agarwal and Taffler (2008) use an international dataset to show that the Z-score model outperforms the hazard and market-based models in predicting bankruptcy. In a more recent longitudinal study, Altman et al. (2017) confirm the usefulness of the Z-score as a predictor of bankruptcy risk. We therefore privilege the use of accounting-based models to measure financial distress.

Following Bugeja (2015) and Richardson et al. (2015), we calculate FDR using the three main accounting-based measures, namely, the Z-score (Altman 1968; Equation 1), O-score (Ohlson 1980; Equation 2 from Griffin and Lemmon 2002), and ZM-score (Zmijewski 1984; Equation 3). A high Z-score is associated with low FDR while a high O-score (ZM-score) is associated with high FDR.

$$Z = 0.012 \frac{WC}{TA} + 0.014 \frac{retEARNINGS}{TA} + 0.033 \frac{EBIT}{TA} + 0.006 \frac{MV}{TL} + 0.999 \frac{SAL}{TA} \quad (1)$$

$$O = -1.32 - 0.407 \log(TA) + 6.03 \frac{TL}{TA} - 1.43 \frac{WC}{TA} + 0.076 \frac{CL}{CA} - 1.72 TLdummy - 2.37 \frac{NI}{TA} - 1.83 \frac{FFO}{TL} + 0.285 NLdummy - 0.521 \frac{NI_t - NI_{t-1}}{|NI_t| + |NI_{t-1}|} \quad (2)$$

$$ZM = -4.336 - 4.513 \frac{NI}{TA} + 5.679 \frac{TL}{TA} + 0.004 \frac{CA}{CL} \quad (3)$$

where; *WC* is working capital, *TA* is total assets, *retEARNINGS* is retained earnings, *EBIT* is earnings before interest and taxes, *MV* is the market value of equity, *TL* is total liabilities, *SAL* is sales, *CL* is current liabilities, *CA* is current assets, *TLdummy* is a dummy variable that takes the value of one if *TL* is greater than *TA* and zero otherwise, *NI* is net income, *FFO* is funds from operations, and *NLdummy* is a dummy variable that takes the value of one if the company has had a net loss in the last two years and zero otherwise.

3.4. Empirical model

To gauge the effect of CSR on FDR, we run the following multivariate regression model after controlling for factors that are likely to affect FDR.

$$\begin{aligned} FDR_{i,t} = & \beta_0 + \beta_1 CSR_{i,t} + \beta_2 MTB_{i,t} + \beta_3 VOL_{i,t} + \beta_4 RET_{i,t} + \beta_5 SLACK_{i,t} + \beta_6 SIZE_{i,t} \\ & + \beta_7 TANG_{i,t} + \beta_8 DIV_{i,t} + \beta_9 R\&D_{i,t} + \beta_{10} DEP_{i,t} + \beta_Y Year_D_{i,t} \\ & + \beta_I Industry_D_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

where, for firm *i* and year *t*, *FDR* is a measure of financial distress risk (*Z*-score) and *CSR* is the score of corporate social responsibility. Following prior studies (Hsu et al. 2015, Sharpe and Stadnik 2007, Verwijmeren and Derwall 2010),¹⁰ we include the following set of control variables that influence FDR:

- i. *MTB* (market-to-book) is the ratio of the market value of equity to the book value of equity. *MTB* has been used in prior studies as a proxy for firm's growth opportunities. Hsu et al. (2015) state that firms with higher growth opportunities are more attractive

¹⁰ Sharpe and Stadnik (2007) find that more profitable firms have a lower probability of financial distress. Hsu et al. (2015) show that firms are financially distressed when they have highly volatile stock and high research and development (R&D) expenses. Verwijmeren and Derwall (2010) consider a firm's growth opportunities, slack ratio, size, tangibility, dividend dummy, and depreciation ratio as important determinants of firm bankruptcy risk.

to investors. Thus, one would expect these firms to have a better access to external finance and lower financial constraints. We therefore expect a negative association between MTB and financial distress risk.

- ii. VOL (volatility) is defined as the standard deviation of monthly stock returns over the year. Investors perceive these firms as being riskier. Thus, we expect VOL to be positively associated with financial distress risk.
- iii. RET (stock returns) is defined as the firm's average monthly stock return over the year. This measure reflects a firm's ability to maximize its shareholders' wealth. Sharpe and Stadnik (2007) argue that firms with higher returns are less exposed to financial distress. Accordingly, RET is expected to be negatively associated with financial distress risk.
- iv. SLACK (financial slack) is the ratio of cash and cash equivalents to total assets. The pecking order theory suggests that firms holding higher financial slack tend to be less dependent on external financing and exhibit less debt (Verwijmeren and Derwall, 2010). Accordingly, we expect SLACK to be negatively associated with financial distress risk.
- v. SIZE is defined as the natural logarithm of total assets. Larger firms tend to have higher debt ratios and, thus, higher probability of bankruptcy (Hsu et al. 2015). Thus, we expect the variable SIZE to be positively related to financial distress risk.
- vi. TANG (asset tangibility) is the ratio of total fixed assets to total assets. Sharpe and Stadnik (2007) argue that more tangible assets increase the firm's ability to collateralize its debt, which may result in more debt financing. We thus expect a positive association between TANG and financial distress risk.
- vii. DIV is a dummy variable that indicates whether a firm pays dividends in the current year. Dividend-paying firms tend to have better access to external finance than their non-dividend paying counterparts. Thus, one would expect dividend-paying firms to be less dependent on debt financing (Verwijmeren and Derwall, 2010). Consequently, we expect DIV to be negatively related with financial distress risk.
- viii. R&D is a dummy variable that equals one if the firm has R&D expenses during the year, and zero otherwise. Becchetti et al. (2015) stress that firms with higher R&D expenses are more interested in risky innovative projects, which increases their idiosyncratic volatilities. Accordingly, we expect R&D to be positively related with financial distress risk.

- ix. DEP is the ratio of total depreciation to total assets. Prior studies find that firms with higher depreciation and amortization ratios tend to have more available funds, which reduces their dependence on external financing (Verwijmeren and Derwall, 2010). Hence, DEP is expected to have a negative association with financial distress risk.

Year_D (Industry_D) is a set of year (industry) dummy variables. Industry dummies are constructed based on Fama–French 49 industry classification scheme.

4. Empirical results

4.1. Summary statistics

Table 1 reports the sample distribution by year. This table shows a noticeable increase in sample size in 2001 and in 2003, when MSCI ESG incorporated the Russell 1000 and 3000 into their database, respectively. The average value of CSR scores is close to zero, showing that US firms' overall CSR strengths are equal to their overall CSR concerns. The average Z-scores is 1.58. Higher Z-score values correspond to low levels of financial distress risk. We observe that FDR of US firms dramatically increased a first time in the 2001–2002 during the dot.com crisis and a second time in the 2008–2009 during the financial crisis. Figure 1 illustrates the average Z-score per decile of CSR. The average Z-score for firms in the lowest CSR decile is almost 1.39 (high financial distress risk) compared to an average Z-score of 1.64 (low financial distress risk) for firms in the highest decile of CSR.

[Insert Table 1 & Figure 1 about here]

Table 2 summarizes the sample distribution by industry. In our sample, the coal industry (Code 29) has no observations. The wholesale and retail industries have the highest Z-score (lowest FDR). Firms in the consumer goods industry are the most CSR-oriented whereas those in the precious metals, petroleum and natural gas are those that are the least CSR-oriented. Almost 10 percent of our total sample consists of the electronic equipment

industry. Other dominant industries are machinery (7.23%), retail (6.19), and chemicals (5.85).

[Insert Table 2 about here]

Table 3 provides descriptive statistics of the key variables. This table shows that the average value and standard deviation of the Z-scores are 1.516 and 0.943, respectively. The average CSR score is -0.009 in our sample firms (similar to Cheung 2016). Firms seem to do, on average, better for community (0.029) and environment (0.020) than human rights (-0.015), employee relations (-0.022), product (-0.024), and diversity (-0.039). All the control variables are winsorized at the 1st and 99th percentiles to minimize the effects of outliers. Our sample comprises large firms (SIZE = 6.292) with a high market-to-book ratio (MTB = 3.276), high volatility (VOL = 0.111), and an average return (RET) of 1.4%. In our sample, firms have 26.1% tangible assets (TANG) and a 4.3% depreciation charge on their assets per year. Almost 56% of sample firms pay dividends (DIV) and almost three-quarter (73.5%) of them have R&D expenses.

[Insert Table 3 about here]

Table 4 reports Pearson pairwise correlations to detect problems of multicollinearity between independent variables. The correlation matrix shows no correlation that exceeds 0.42 between control variables. Multicollinearity is therefore unlikely to be an issue among the explanatory variables. In addition, we compute the variance inflation factor (VIF) to confirm the absence of multicollinearity. In untabulated results, the largest VIF value observed in our full model is 2.61 (SIZE) and the VIFs of all the other variables are below 2. A common rule of thumb is that a VIF above 10.0 indicates a multicollinearity problem, which is not the case in our study (Liu and Ritter 2011). All the CSR attributes have a high positive correlation with

firm aggregate CSR performance, indicating that all individual CSR factors contribute to firms' overall CSR behavior.

[Insert Table 4 about here]

4.2. Regression results

4.2.1. CSR and FDR

This study examines the relationship between CSR practices and FDR. Our variable of interest is CSR score. It uses the Z-score of Altman (1968) as a dependent variable to proxy for the financial distress risk and adjusts standard errors in all regressions for heteroscedasticity, serial and cross-sectional correlations using two-dimensional clustering at the year and firm levels (Petersen 2009). Table 5 provides the results of the relationship between CSR and financial distress risk using different estimation methods. Following prior literature, our regressions control for different firm characteristics, namely, market-to-book, firm volatility, stock returns, financial slack, firm size, asset tangibility, dividend distribution, R&D expenses, and asset depreciation, that are deemed to affect the risk of financial distress (Hsu et al. 2015, Verwijmeren and Derwall 2010). They also control for year- and industry-fixed effects using year and industry dummies based on the Fama–French 49-industry classification.

[Insert Table 5 about here]

Column 1 (Table 5) presents the results of an ordinary least squares regression of the Z-score against CSR performance and other control variables. The standard errors are robust and clustered by firm and year to control for cross-sectional and time-series dependence. The results show that CSR has a positive relationship with the Z-score (FDR).¹¹ In other words,

¹¹ Table 5 uses the Z-score as a financial default risk measure. The higher the Z-score, the lower the financial default risk the firm is facing. The expressions financial distress risk and financial default risk are used interchangeably.

more socially responsible firms exhibit a lower financial distress risk than other firms. This result supports the hypothesis that better CSR practices reduce the risk of financial distress. It is also consistent with prior literature suggesting that firms with high CSR standards are considered more creditworthy (Attig et al. 2013) and have better access to finance (Cheng et al. 2014). They are also consistent with the findings of Jiraporn et al. (2014) and Sun and Cui (2014). The coefficient of CSR is positive and economically significant. Everything else being equal, a one standard deviation increase in CSR performance induces a $0.034 [0.322 * 0.106 = 0.034]$ decrease in FDR, representing a 2.24% [$0.034/1.516 = 0.0224$] decrease over the sample average FDR, proxied by the Z-score. Turning to the control variables, market to book, stock returns, and dividend dummy show a significant positive association with Z-score, while volatility, financial slack, firm size, asset tangibility, and the R&D dummy are negatively associated with Z-score. All coefficients are statistically significant at the 1% level. Only asset depreciation does not seem to affect FDR (Verwijmeren and Derwall, 2010).

Column 2–4 (Table 5) reruns the same regression using alternative estimation approaches to check the robustness of our conclusion to other ways of estimating standard errors. Column 2 (Table 5) uses a Fama and MacBeth (1973) regression model to compute standard errors and mitigate cross-sectional dependence concerns. The results show that Z-score increases with CSR performance, suggesting that firms with better CSR scores exhibit lower risk of financial distress (higher Z-scores). All the coefficients of the control variables, except financial slack, remain statistically significant and keep the same sign. Our evidence regarding the role of CSR in reducing FDR also holds when we use a weighted least squares regression to account for heteroscedasticity across observations using the inverse number of firm–year observations in each industry as weights (Column 3) and Newey–West specifications to account for the serial correlation of standard errors (Column 4). Overall, our results are in line with the risk mitigation of CSR and in consistency with Albuquerque et

al. (2018) and Lee and Faff (2009), among others. Firms with CSR-oriented strategies are expected to have better access to financing sources and are considered more creditworthy, reducing the likelihood of financial distress.

4.2.2. *CSR dimensions and FDR*

Table 6 reports the results of the effect of individual CSR attributes on FDR. Our CSR measure is the average of community, diversity, employee relations, the environment, human rights, and product dimensions. We rerun our baseline model while including one CSR dimension at once instead of the average overall CSR performance measure. Taken individually, the coefficients on community, diversity and employee relations are positive and statistically significant at the 1% level, suggesting that firms that perform well on these three dimensions exhibit low likelihood of financial distress (high Z-scores). The coefficient on the environmental dimension is positive and statistically significant only at the 10% level whereas those on the human rights and product strategy dimensions do not seem to affect the level of financial distress risk. These results are to a large extent in line with the conclusions of Attig et al. (2013) for the community, diversity, employee relations, and the environment dimensions of CSR. Our findings are also supported by Hillman and Keim (2001), who conclude that primary stakeholders (e.g., community relations, diversity issues, employee relations, and environmental issues) are effective in increasing firm value while, on the contrary, investments in social issues (e.g., human rights) do not seem to create firm value.

[Insert Table 6 about here]

Column (7) of Table 6 displays the results of the effect of all the attributes of CSR on FDR. The regression includes all the CSR dimensions to assess the net effect of each of them on the likelihood of financial distress. All CSR attributes (community, diversity, and employee relations) show results similar to those in the first columns, except for the

environmental dimension whose coefficient is not statistically significant at conventional levels. Overall, these results suggest that a CSR strategy towards favoring primary stakeholders reduces the financial distress risk.

4.2.3. CSR strengths and concerns and FDR

Next, we investigate the effect of CSR strengths and concerns on FDR.¹² In Table 7, Column (1), we find that the coefficient on CSR strengths is positively and statistically significant at the 1% level with a magnitude of 0.551. In Column (2), however, CSR concerns do not seem to affect FDR. The same results hold when we include CSR strengths and CSR concerns in the same regression (Column (3)). The effect of CSR strengths and concerns on FDR is asymmetric. Only CSR strengths significantly increase (reduce) Z-score (firm FDR), which supports the view that firms that actively invest in CSR activities (i.e. many strength factors) reduce their risk exposure (Jiraporn et al. 2014).

[Insert Table 7 about here]

In Column (4) of Table 7, we estimate the regression for three different levels of CSR strengths and concerns, namely, high strengths and high concerns, high strengths and low concerns, and low strengths and high concerns (Goss and Roberts 2011).¹³ The empirical results show that, ceteris paribus, firms with high CSR strengths and low CSR concerns are expected to exhibit higher Z-scores (lower FDR) than firms with high CSR strengths and high CSR concerns. The presence of low CSR strengths and high CSR concerns does not seem to

¹² To calculate the average CSR strengths, we use the following equations: $ESG_s_t^j = \frac{\sum_{s=1}^{u_t^j} strength_s^j}{u_t^j}$,

$CSR\ strength\ average_{i,t} = \sum_{j=1}^6 \frac{ESG_s_t^j}{6}$. The same approach is used to compute the average CSR concerns.

¹³ Following Goss and Roberts (2011), we split our sample into three different categories based on the following CSR strength and concern levels: high strengths and high concerns, high strengths and low concerns, and low strengths and high concerns. The firm values for strengths (concerns) are compared to the average value of strengths (concerns) of the industry in the period.

have a significant effect on FDR. Collectively, these findings also support our main result, that CSR strengths play a significant role in reducing FDR.

4.2.4. *CSR and alternate FDR measures*

Table 8 tests the robustness of our results to alternative proxies of FDR. Our main analysis uses the Z-score of Altman (1968). Altman et al. (2017) provide evidence that the Z-score performs well and gives reasonably high prediction accuracy. Two other common measures of FDR, the O-Score and the ZM-score, are frequently used in the literature (Megginson et al. 2016, Richardson et al. 2015, Tykvová and Borell 2012).¹⁴ We replace the Z-score with the O- and ZM-scores as alternative FDR measures in our main regression. The empirical results confirm our prior findings. CSR reduces O-score and ZM-score, suggesting that CSR-oriented firms exhibit lower levels of financial distress (Columns 1 and 3). More interestingly, CSR strengths (concerns) show a negative (positive) relationship with the O- and ZM-scores at the 1% level, suggesting that more CSR strengths (concerns) lower (increase) the risk of financial distress (Columns 2 and 4).

[Insert Table 8 about here]

4.2.5. *Robustness checks*

We perform several additional tests to check whether our findings are driven by the omitted variables bias and endogeneity concerns.¹⁵

First, we separately include additional control variables that have been shown in prior literature to affect the risk of financial distress, one at a time, to reduce potential omitted

¹⁴ We use O- and ZM-scores as financial default risk measures. Lower values of the O- and ZM-scores indicate that firms are facing less risk of financial distress. The signs of the coefficients of O- and ZM-scores are expected to be the opposite of that of the Z-score as lower values of Z-score indicate high financial distress risk.

¹⁵ Following prior studies, we also check the robustness of our results after excluding utilities and the financial crisis period. Untabulated results show the same positive relationship between CSR and FDR.

variables bias. More specifically, we control for the market value of equity, firm debt, excess returns, loss occurrence, the coverage ratio, Tobin's Q, leverage, and the current ratio (see, Appendix B). For instance, Hsu et al. (2015) suggest that loss occurrence and the coverage ratio explain FDR. Kane et al. (2005) and Lee and Yeh (2004) consider that Tobin's Q, leverage, and the current ratio explain the risk of financial distress. The results are portrayed in Table 9. All regressions in this table show that CSR has a significantly positive effect on the Z-score, suggesting that firms with socially responsible practices have a lower risk of financial distress. Our results thus remain qualitatively the same and are consistent with those of our main regression. Overall, the signs of the additional control variables are consistent with prior literature. Firms with a heavy debt burden (Columns 2 and 7) and those experiencing losses (Column 4) exhibit lower Z-scores and higher FDR. However, firms with high Tobin's Q (Column 6), high coverage ratio (Column 5) and those with more equities (Column 1) have, on average, higher Z-scores and lower risk of financial distress.

[Insert Table 9 about here]

Second, we use propensity score matching (PSM) technique to alleviate endogeneity concerns and to make sure that our conclusions are not driven by confounding effects due to observable covariates. This technique controls for observable differences in characteristics between firms with high and low CSR. To implement PSM, we use a matched sample with similar firm characteristics to isolate the effect of CSR on FDR. PSM matches each firm with high CSR-score (above the median) to a firm with a low CSR-score (below the median), based on a propensity score computed using a probit regression that estimates the likelihood that a firm has a high-CSR score. We use the following firm characteristics: market-to-book ratio, volatility, stock return, firm size, a lagged distress dummy along with year- and industry dummies, as explanatory variables in the probit model. This model uses a dummy

variable for CSR as a dependent variable that takes the value of 1 if the CSR-score of the firm is above the median, and 0 otherwise.

[Insert Table 10 about here]

We match, without replacement, each firm with high CSR-score (treated firm) to a firm low CSR-score (control firm), using the nearest neighbor matching method with a maximum distance of 1%. The PSM technique results in a matched sample of 4,778 firm–year observations. Column (1) of Table 10 reruns the main regression using the matched sample. As expected, the CSR still shows a positive relationship with the Z-score, suggesting that firms that integrate CSR into their operations and business strategies have a significantly lower FDR. Consistent with our prior findings, untabulated results show that only CSR strengths positively affect the Z-score using the matched sample. Overall, the PSM-matched sample analysis yields similar conclusions as in our main analysis.

We also use a two-stage least squares (2SLS) regression analysis to address potential endogeneity issues. Jiraporn et al. (2014) argue that firms follow their industry and geographical peers in CSR-related policies. We rely on this study in choosing our instruments. The first step uses two instruments for CSR, namely, the average CSR score of geographically close firms based on the three-digit zip codes and the average CSR score for industry peers using the three-digit standard industrial classification codes. The results in Column (2) support the choice of the instruments and show that firm CSR increases with that of geographically close firms and industry peers. To provide further support for the use of these instruments, we run the Sargan (1958) overidentification test and find that they do not violate the assumption of overidentification. Our results from the second-stage regression (Column (3)) shows that the coefficient estimate on the instrumented CSR is positive and statistically significant at the 1% level, suggesting that our conclusions do not seem to be

driven by endogeneity. In other words, CSR remains negatively and significantly (at the 1% level) related to FDR.

The last column of Table 10 estimates our model using a system generalized method of moments (GMM) approach that considers the right-hand side variables as endogenous (except year dummies) and orthogonally uses their prior values as respective instruments. Our model is a dynamic panel data model, in the sense that it includes a one-year lagged Z-score in the regression. The results in Column (4) show a positive and statistically significant relationship between CSR and Z-score, suggesting that FDR is lower in socially responsible firms.¹⁶ Taken together, these empirical findings further suggest that our conclusions remain qualitatively the same after accounting for potential endogeneity concerns.

5. Additional analyses

5.1 Cross-sectional analyses

Our empirical analysis shows so far that CSR-oriented firms have a lower financial distress risk, suggesting that these firms are regarded more creditworthy and deemed to have better access to financing. Our main result implicitly assumes that the association between CSR and FDR is uniform across all firms. This section runs several cross-sectional analyses to better understand the relationship between CSR and FDR. In particular, it tests whether this relationship depends on the quality of corporate governance, product market competition, financial distress, and whether a firm operates in a crisis period or not.

[Insert Table 11 about here]

¹⁶To test our equation with dynamic panel GMM estimation, we use second, third and fourth period lags as instrument variables of the level and differences of CSR following El Ghouli et al. (2018). The Hansen J-statistic is not statistically significant (p-value = 0.304), indicating that our instruments used in the GMM regression are valid. The AR(1) test is statistically significant at conventional levels (p-value=0.000) whereas AR(2) is statistically insignificant (p-value=0.527), confirming the absence of serial correlation of order 2two.

We start by investigating how the effects of CSR on the risk of financial distress vary across firms depending on the quality of the internal corporate governance system. Prior literature shows that corporate governance plays a key role in achieving business success and shapes managerial behavior including in terms of CSR strategies. In this respect, Laeven and Levine (2009) argue that different corporate governance structures have different effects on risk-taking strategies under the same regulations. We use the entrenchment index, E-index¹⁷, as a proxy for the quality of corporate governance (Bebchuk et al. 2009). We run our main regression after splitting our sample into two groups depending on the E-index. Columns (1) and (2) of Table 11 show the regression results for the subsample of firms with high shareholders rights (i.e., strong corporate governance with $E\text{-index} \leq 3$) and that with weak shareholder rights ($E\text{-index} > 3$), respectively. Managers can promote CSR-oriented policies either to maximize shareholder wealth (more likely when corporate governance is strong) or to extract private rents for career advancement and to pursue personal agenda (more likely when corporate governance is weak). The empirical results show that CSR has a positive and significant effect on Z-score (i.e., reduces FDR) only in the presence of a strong governance structure (Column (2)) as CSR strategies are not likely to be aimed to extract private benefits.

Second, we investigate the effect of the external governance role of product market competition on the relation between CSR and FDR. As with internal governance, this relation is expected to be more pronounced for firms with stronger external governance. Following prior studies, we use sales-based Herfindahl–Hirschman index (HHI) to measure the level of product market competition. We then divide our sample into two subsamples according to whether the HHI is high (above 0.15) or low (below 0.15) following the U.S. Federal Trade Commission’s guidelines to distribute our sample into high and low competition. We split our sample into low ($HHI > 0.15$) and high ($HHI \leq 0.15$) levels of competition. The regression

¹⁷ The E-index ranges from zero to six, based on six provisions of the IRRC Institute. A low E-index score denotes a high level of corporate governance.

results using the two subsamples are displayed in columns (3) and (4) of Table 11. As expected, Table 11 shows a significantly positive relation between CSR and FDR only for the subsample of firms with higher levels of product market competition. This result implies that the role of CSR is more important in reducing the risk of financial distress in the presence of high external governance pressure. The results remain qualitatively the same when we split the sample using the industry median HHI.

Third, we divide the entire sample into two different regimes (crisis and non-crisis periods) based on the global financial crisis of 2008–2010. The subprime financial crisis started in 2007, with the bursting of the housing bubble and continued with the collapse of many businesses. To examine the effect of the global financial crisis, we split our sample into crisis and non-crisis samples. The results in Column (5) of Table 11 are consistent with those of prior studies and show that the effect of CSR on firm financial health is no longer significant during financial crises (Love et al. 2007). However, CSR strategies lead to lower risk of financial distress during non-crisis period (Column (6)).

Fourth, we examine whether the effect of CSR on the level of FDR is influenced by the extent to which firms are already financially-distressed. We split our sample into two subsamples (i.e., distressed and non-distressed firms). The Z-score of distressed (non-distressed) firms is lower (higher) than 1.81 following Chen et al. (2016). On the contrary to the findings for non-distressed firms, Column (7) shows that there is no association between CSR and FDR when firms are already distressed. The results from columns (7) and (8) suggest that investment in CSR activities is effective in reducing FDR only when firms are not already financially-distressed.

5.2 How does CSR affect distress risk?

The premise of this paper is that CSR reduces the risk of financial distress. Corporate social responsibility strategies can be viewed as a hedging device that mitigates firm financial distress risk by reducing the likelihood and the costs of adverse harmful events. We argue that this relation is driven by socially responsible firms having better access to finance. La Rosa et al. (2018) provide evidence that socially responsible firms are more attractive to lenders, enjoy lower cost of debt, and exhibit better credit ratings. García-Sánchez et al. (2019) argue that CSR initiatives ease access to financing sources and that this relationship is stronger when firms disclose more information about their CSR practices. In the same spirit, Breuer et al., (2018) show that cost of equity falls when firms invest in CSR in countries where investors are well protected. Similar conclusions were reached earlier by El Ghouli et al. (201), Attig et al. (2013), Jiraporn, et al. (2014), and El Ghouli et al. (2018), among others.

To test this channel, we first assess the effect of CSR on firm cost of equity capital.¹⁸ As in El Ghouli et al. (2018), we use the average of four different implied cost of equity models (K_{CT} , K_{GLS} , K_{OJ} and K_{ES}), where K_{CT} , K_{GLS} , K_{OJ} , and K_{ES} is the implied cost of equity capital following the approach of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Ohlson and Juettner-Nauroth (2005), respectively. Column 1 (Table 12) provides the results of regressing the cost of equity capital on CSR. The finding shows that better CSR performance reduces firms' cost of equity capital, hence improving the firm's overall financial access (Chen et al., 2019). Second, we assess the effect of CSR on firm cost of debt. As a proxy for the cost of debt, we use the ratio interest expenses to total debt.

¹⁸ As in El Ghouli et al. (2018), we use the average of four different implied cost of equity models (K_{CT} , K_{GLS} , K_{OJ} and K_{ES}), where K_{CT} , K_{GLS} , K_{OJ} , and K_{ES} is the implied cost of equity capital following the approach of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Ohlson and Juettner-Nauroth (2005), respectively.

Column 2 (Table 12) regresses the cost of debt on CSR. The results consistently show that socially responsible firms are considered more creditworthy and benefit from lower cost of debt (e.g., Eliwa et al. 2019).¹⁹ Collectively, these findings show that firms with improved CSR performance benefit from lower cost of equity and lower cost of debt (e.g., Xu et al., 2019; Zhao et al., 2019), suggesting that they are more creditworthy, enjoy better access to finance, and hence exhibit lower financial distress scores.

We delve more deeply into this channel by examining how CSR interacts with financial constraints in shaping the risk of financial distress. We augment Equation 5 by including a proxy for financial constraints and its interaction term with CSR. We proxy for financial constraints using a KZ dummy (Kaplan and Zingales, 1997) and a WW dummy (Whited and Wu, 2006), respectively, in columns 3 and 4. KZ (WW) is an indicator variable that is equal to 1 if the firm's KZ-index (WW-index) is above the industry mean; and 0 otherwise. Our model is the following.

$$\begin{aligned}
FDR_{i,t} = & \beta_0 + \beta_1 CSR_{i,t} + \beta_2 MTB_{i,t} + \beta_3 VOL_{i,t} + \beta_4 RET_{i,t} + \beta_5 SLACK_{i,t} + \beta_6 SIZE_{i,t} \\
& + \beta_7 TANG_{i,t} + \beta_8 DIV_{i,t} + \beta_9 R\&D_{i,t} + \beta_{10} DEP_{i,t} + \beta_{11} FC_{i,t} + \beta_{12} CSR_{i,t} \\
& \times FC_{i,t} + \beta_Y Year_D_{i,t} + \beta_I Industry_D_{i,t} \\
& + \varepsilon_{i,t}
\end{aligned} \tag{5}$$

The definitions of all variables including the KZ-index and that of the WW-index are provided in Appendix B. *FC* is a financial constraint dummy that equals KZ (WW) dummy in Column 3 (4). The results in Column 3 are consistent with our prior findings. More specifically, we find that financial constraints, proxied by KZ, increase (reduce) the likelihood of financial distress (Z-score) and that this relationship is less pronounced for

¹⁹ We rerun our regression without Z-score as a determinant of the cost of debt to avoid potential endogeneity. The results remain qualitatively the same.

socially responsible firms. In other words, financially-constrained firms are less likely to suffer from financial distress when they perform well on the CSR front. The same conclusion is reached when we proxy for financial constraints using WW instead of KZ (See, Column 6 of Table 12). Overall, these results are consistent with the argument that socially responsible firms exhibit lower cost of equity, lower cost of debt, and mitigate the effect of financial constraints on FDR, which improves access to finance and reduces the likelihood of financial distress.

[Insert Table 12 about here]

6. Conclusions

Prior literature suggests that firms can mitigate their business risk through better management of social and environmental issues (e.g., Jo and Na, 2012). It also shows that socially responsible firms are considered more creditworthy (e.g., Jiraporn et al. 2014) and have better access to finance (e.g., Cheng et al. 2014). This study complements this strand of prior research by investigating whether CSR is effective in reducing the financial distress risk.

To answer this question, we use a sample of 9,262 firm-year observations representing 1,201 unique US-listed firms over the period from 1991 to 2012. We use the Z-score as a main proxy of FDR. Consistent with the risk-mitigating view of CSR, we find that FDR decreases with CSR. This finding supports our hypothesis that CSR-oriented firms exhibit low levels of FDR. In other words, firms that adopt better CSR practices can mitigate their risk exposure through effective CSR policies. These results are mainly driven by a few social performance attributes as only CSR-related actions in the areas of community, diversity, and employee relations lower FDR. The findings are robust to, among others, the use of alternative proxies of FDR, additional control variables, a matched sample (PSM), and

endogeneity concerns (2SLS, GMM). Additional analyses further reveal that the negative impact of CSR on FDR only exists when firms have better corporate governance practices, operate in a competitive industry, are in a non-crisis period, and are non-financially distressed and constrained.

All in all, our results suggest that firms with higher CSR levels do enjoy lower risk of financial distress, suggesting that a better CSR performance is rewarded with less financial defaults. The adoption of CSR-oriented behavior comes with less financial distress and default risks, likely leading to a more attractive corporate environment, better financial stability and more crisis-resilient economies. This study has several practical implications. For policymakers, it suggests that they should continue encouraging firms to adopt socially-responsible behavior as it comes with less distress risk and defaults, more likely leading to a better corporate investment environment, less financial bankruptcies, and stronger and more stable economies. For managers, this study shows that, beyond its “societal benefit”, there is also an economic benefit for firms that are socially-responsible since CSR enables them to reduce their financial distress through, among other, lower cost of equity capital, lower cost of debt and less financial constraints. Our conclusions are based on listed firms from the U.S. context. An interesting research avenue would be to study whether our conclusions hold in another legal system (e.g., a civil-law country), in bank-oriented economies or in private firms.

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Appendix A: MSCI ESG dimensions

The MSCI ESG Ratings use several parameters for the strengths and concerns for each dimension. The sum of all the dimensions represents the firm's total CSR score. This table summarizes the main strengths and concerns in the six ESG dimensions. Analyzing the MSCI ESG data, we find that ESG issue areas change every year. For example, Indigenous Peoples Relations (COM-con-C) started in 2000. South Africa (HUM-con-A) and Northern Ireland (HUM-con-B) issues were assigned between 1991 and 1994. In 2002, the Indigenous Peoples Relations (COM-str-E) issue was moved from the community to the human rights dimension.

<i>Dimension</i>	<i>Strength</i>	<i>Concern</i>
<i>Community</i>	Charitable Giving Innovative Giving Support for Housing Support for Education Non-US Charitable Giving Volunteer Programs Other Strength	Investment Controversies Negative Economic Impact Tax Disputes Other Concern
<i>Diversity</i>	CEO, Promotion Board of Directors Work/Life Benefits Women & Minority Contracting Employment of the Disabled Gay & Lesbian Policies Other Strength	Controversies Non-Representation Other Concern
<i>Employee relations</i>	Union Relations No-Layoff Policy Cash Profit Sharing Employee Involvement Retirement Benefits Strength Health and Safety Strength Other Strength	Union Relations Health and Safety Concern Workforce Reductions Retirement Benefits Concern Other Concern
<i>Environment</i>	Beneficial Products and Services Pollution Prevention, Recycling Clean Energy, Communications Property, Plant, and Equipment Management System Other Strength	Hazardous Waste Regulatory Problems Ozone Depleting Chemicals Substantial Emissions Agricultural Chemicals Climate Change Other Concern
<i>Human rights</i>	Positive Record in South Africa Indigenous Peoples Relations Strength Labor Rights Strength Other Strength	South Africa Northern Ireland Mexico, Labor Rights Concern Indigenous Peoples Relations Concern Other Concern
<i>Product</i>	Quality R&D/Innovation Benefits to Economically Disadvantaged Other Strength	Product Safety Marketing/Contracting Concern Antitrust Other Concern

Appendix B: Definitions and sources of variables

<i>Variable</i>	<i>Definition</i>	<i>Source</i>
<i>Financial distress risk</i>		
<i>Z-score</i>	The Z-score from Altman (1968): $Z = 0.012 \times (\text{working capital divided by total assets}) + 0.014 \times (\text{retained earnings divided by total assets}) + 0.033 \times (\text{earnings before interest and taxes divided by total assets}) + 0.006 \times (\text{Market value of equity divided by book value of total liabilities}) + 0.999 \times (\text{sales divided by total assets})$ <i>Increase in Z-score means a decrease in Financial distress risk.</i>	Author's calculation, Datastream, and Worldscope
<i>O-score</i>	The O-score from Ohlson (1980): $O = -1.32 - 0.407 \times \log(\text{total assets}) + 6.03 \times (\text{total liabilities divided by total assets}) - 1.43 \times (\text{working capital divided by total assets}) + 0.076 \times (\text{current liabilities divided by current assets}) - 1.72 \times (\text{dummy variable that takes the value of one if TL is greater than TA and zero otherwise}) - 2.37 \times (\text{net income divided by total assets}) - 1.83 \times (\text{funds from operations divided by total liabilities}) + 0.285 \times (\text{dummy variable that takes the value of one if the company has had a net loss in the last two years and zero otherwise}) - 0.521 \times (\text{change in net income: } \frac{NI_t - NI_{t-1}}{ NI_t + NI_{t-1} })$ <i>Increase in O-score means an increase in Financial distress risk.</i>	Same
<i>ZM-score</i>	The ZM-score from Zmijewski (1984): $ZM = -4.336 - 4.513 \times (\text{net income divided by total assets}) + 5.679 \times (\text{total liabilities divided by total assets}) + 0.004 \times (\text{current assets divided by current liabilities})$ <i>Increase in ZM-score means an increase in Financial distress risk.</i>	Same
<i>Corporate social responsibility</i>		
<i>CSR</i>	Corporate social responsibility score First, we calculate the average score of each of the 6 CSR dimension: $ESG_t^j = \frac{\sum_{s=1}^{u_t^j} strength_s^j}{u_t^j} - \frac{\sum_{r=1}^{k_t^j} concern_r^j}{k_t^j}$ where, for dimension j and year t , u (k) represents the number of strengths (concerns) in dimension j . According to this measure (total strengths divided by total number of strengths minus total concerns divided by total number of concerns), each dimension ranks between -1 to +1. Finally, the	Author's calculation, MSCI ESG

overall CSR score is the average of these six dimensions: $CSR_{average_{i,t}} = \sum_{j=1}^6 \frac{ESG_t^j}{6}$ for firm i , year t .

Control variables

<i>MTB</i>	The market value of the firm scaled by book value of the firm.	Worldscope
<i>VOL</i>	Volatility is the standard deviation of monthly stock returns.	Datastream
<i>RET</i>	Annual return is the average of monthly stock returns.	Datastream
<i>SLACK</i>	Cash and equivalents divided by total assets.	Worldscope
<i>SIZE</i>	The natural logarithm of total assets.	Worldscope
<i>TANG</i>	Tangibility is total fixed assets scaled by total assets	Worldscope
<i>DIV</i>	Dividend dummy variable either company paying a dividend in the current year or not.	Worldscope
<i>R&D</i>	R&D dummy variable either company incurred R&D expenses in a current year or not.	Worldscope
<i>DEP</i>	Depreciation is total depreciation over the year scaled by total assets.	Worldscope

Additional variables

<i>Log(Equity)</i>	The natural logarithm of total equity.	Worldscope
<i>Log(Debt)</i>	The natural logarithm of total debt.	Worldscope
<i>Excess Return</i>	Excess returns are equal to the total return index minus the total return index of the market.	Datastream
<i>Loss</i>	Loss is a dummy variable equal to one if net income is negative.	Worldscope
<i>Coverage</i>	The coverage ratio is equal to earnings before interest and taxes divided by total interest expenses.	Worldscope
<i>Tobin's Q</i>	Total assets minus book value of total equity plus market value of equity divided by total assets.	Worldscope, Datastream
<i>Leverage</i>	Long term debt scaled by total assets.	Worldscope
<i>Current Ratio</i>	Current assets scaled by current liabilities.	Worldscope
<i>Growth</i>	The percentage change in sales from the previous year.	Worldscope
<i>Cash_flow</i>	Cash flow is a ratio of operating cash flow scaled by total assets	Worldscope
<i>KZ-index</i>	KZ-index is measured by following the Kaplan and Zingales, (1997). KZ Index = $-1.002 \times CF_{it}/TA_{it-1} - 39.368 \times DIV_{it}/TA_{it-1} - 1.315 \times C_{it}/TA_{it-1} + 3.139 \times LEV_{it} + 0.283 \times Q_{it}$ where CF_{it}/TA_{it} is cash flow over lagged total assets; DIV_{it}/TA_{it} is cash dividends over lagged total assets; C_{it}/TA_{it} is cash balances over lagged total assets; LEV_{it} is leverage; and Q_{it} is the market value of equity (stock price \times shares outstanding) plus assets minus the book value of equity) over lagged assets.	Author's calculation, Worldscope

	Financial constraints increase with the KZ index.	
<i>WW-index</i>	WW-index is measured by following the Whited and Wu, (2006). $\text{WW index} = (-0.091 \times \text{CF}) - (0.062 \times \text{DIVPOS}) + (0.021 \times \text{TLTD}) - (0.044 \times \text{LNTA}) + (0.102 \times \text{ISG}) - (0.035 \times \text{SG})$ where CF is the ratio of cash flow to total assets; DIVPOS is an indicator that takes the value of '1' if the firm distributes cash dividends; TLTD is the ratio of the long-term debt to total assets; LNTA is the natural log of total assets; ISG is the firm's three-digit industry sales growth; and SG is firm sales growth.	Author's calculation, Worldscope
<i>KZ</i>	An indicator variable that is equal to 1 if the firm's KZ-index is above the industry mean; and 0 otherwise.	Author's calculation, Worldscope
<i>WW</i>	An indicator variable that is equal to 1 if the firm's WW-index is above the industry mean; and 0 otherwise.	Author's calculation, Worldscope
<i>Cost of Equity</i>	The average of four different implied cost of equity models (K_{CT} , K_{GLS} , K_{OJ} and K_{ES}) (El Ghouli et al., 2018), where K_{CT} , K_{GLS} , K_{OJ} , and K_{ES} is the implied cost of equity capital following the approach of Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Ohlson and Juettner-Nauroth (2005), respectively.	Author's calculation Worldscope ; Datastream
<i>Cost of Debt</i>	Total interest expenses scaled by total debt.	Worldscope

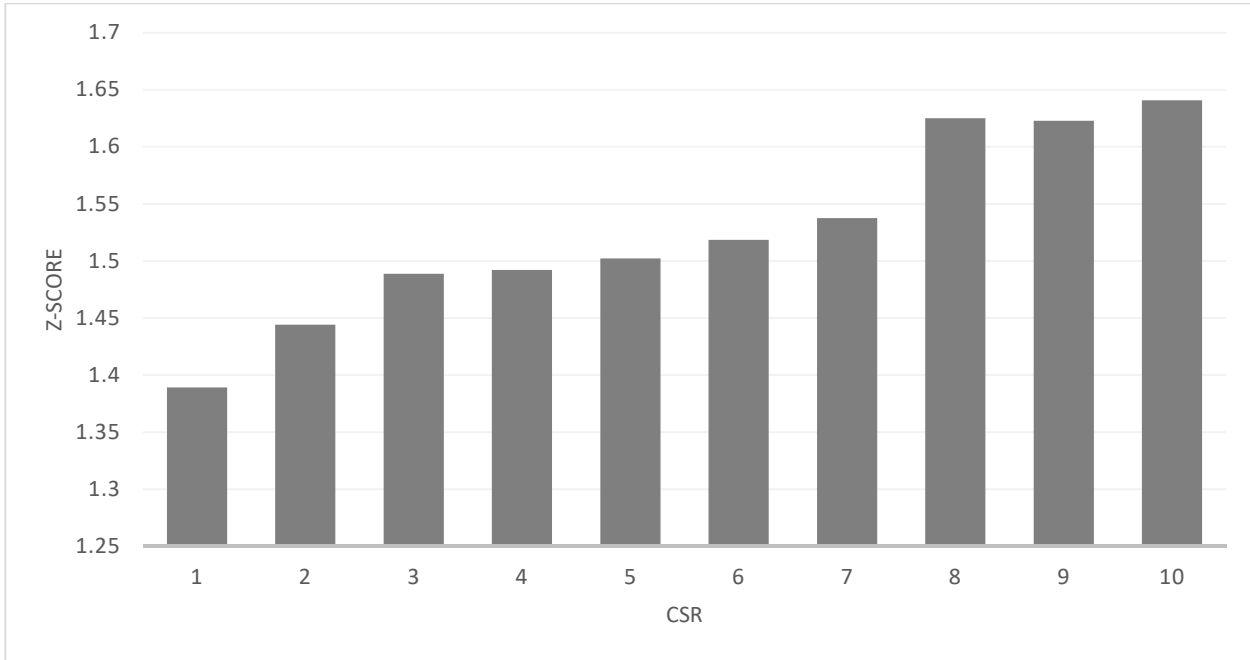


Figure 1: Z-score performance by deciles of CSR

This figure shows the average Z-scores depending on CSR deciles. The X-axis shows the CSR deciles and the Y-axis shows the Z-scores. High Z-scores correspond to low levels of financial distress risk (FDR).

Table 1 Sample distribution by year

Year	N	Percentage	Z-score		CSR	
			Mean	Median	Mean	Median
1991	139	1.50	1.79	1.77	-0.012	0.000
1992	137	1.48	1.78	1.77	-0.010	0.000
1993	133	1.44	1.71	1.68	-0.020	-0.014
1994	133	1.44	1.73	1.76	-0.006	-0.004
1995	167	1.80	1.76	1.74	0.010	0.000
1996	176	1.90	1.76	1.68	0.020	0.011
1997	180	1.94	1.70	1.64	0.016	0.000
1998	186	2.01	1.67	1.60	0.013	0.008
1999	206	2.22	1.67	1.66	0.013	0.020
2000	216	2.33	1.73	1.65	0.017	0.021
2001	296	3.20	1.38	1.36	0.005	0.000
2002	330	3.56	1.37	1.35	0.000	0.000
2003	688	7.43	1.40	1.35	-0.019	0.000
2004	711	7.68	1.49	1.43	-0.027	-0.026
2005	683	7.37	1.57	1.50	-0.028	-0.028
2006	689	7.44	1.56	1.52	-0.027	-0.033
2007	707	7.63	1.54	1.47	-0.028	-0.033
2008	729	7.87	1.44	1.47	-0.026	-0.033
2009	734	7.92	1.31	1.27	-0.027	-0.033
2010	711	7.68	1.51	1.45	-0.018	-0.056
2011	703	7.59	1.53	1.47	0.008	-0.056
2012	608	6.56	1.44	1.40	0.073	0.000
Total	9,262	100	1.58	1.54	-0.003	-0.012

This table presents summary statistics by year for the dependent (Z-score) and variable of interest (CSR) used in our regressions. High Z-scores correspond to low levels of financial distress risk (FDR). The sample comprises 9,262 US firm-year observations covering 1,201 unique firms for the period spanning 1991 through 2012. The list of variables, definitions, and data sources are provided in Appendix B.

Table 2 Sample distribution by industry

Code	Industry	#	%	Z-score		CSR		Code	Industry	#	%	Z-score		CSR	
				Mean	Median	Mean	Median					Mean	Median	Mean	Median
1	Agriculture	44	0.48	1.81	1.79	-0.009	0.000	25	Shipping, Railroad Equipment	20	0.22	1.54	1.58	-0.061	-0.056
2	Food Products	164	1.77	1.68	1.61	0.039	0.015	26	Defense	18	0.19	1.83	1.86	-0.019	0.000
3	Candy and Soda	80	0.86	1.71	1.83	0.028	0.029	27	Precious Metals	17	0.18	0.55	0.69	-0.098	-0.113
4	Beer and Liquor	14	0.15	0.92	0.91	-0.004	0.000	28	Metallic and Industrial Metal Mining	63	0.68	1.22	1.23	-0.031	-0.028
5	Tobacco Products	31	0.33	1.30	1.22	-0.070	-0.108	30	Petroleum and Natural Gas	263	2.84	1.37	1.24	-0.097	-0.089
6	Recreation	97	1.05	1.72	1.78	0.035	0.042	31	Utilities	175	1.89	0.67	0.60	-0.032	-0.028
7	Entertainment	71	0.77	1.13	0.96	-0.034	-0.049	32	Tele Communication	121	1.31	0.72	0.68	-0.022	-0.033
8	Printing and Publishing	112	1.21	1.29	1.33	0.043	0.023	33	Personal Services	58	0.63	1.59	1.52	-0.020	-0.019
9	Consumer Goods	266	2.87	1.89	1.86	0.073	0.054	34	Business Services	529	5.71	1.01	1.05	-0.003	0.000
10	Apparel	77	0.83	1.83	1.85	-0.022	-0.042	35	Computers	186	2.01	1.47	1.39	0.053	0.021
11	Healthcare	91	0.98	1.44	1.49	-0.026	-0.021	36	Computer Software	489	5.28	1.08	1.13	0.009	0.000
12	Medical Equipment	474	5.12	1.38	1.42	0.002	0.000	37	Electronic Equipment	935	10.10	1.21	1.30	-0.003	-0.022
13	Pharmaceutical Products	532	5.74	0.98	1.15	0.006	-0.003	38	Measuring and Control Equipment	343	3.70	1.42	1.45	0.009	0.000
14	Chemicals	542	5.85	1.51	1.45	-0.036	-0.033	39	Business Supplies	210	2.27	1.75	1.62	0.020	0.000
15	Rubber and Plastic Products	70	0.76	1.67	1.52	-0.010	-0.013	40	Shipping Containers	99	1.07	1.33	1.42	-0.025	-0.042
16	Textiles	4	0.04	1.71	1.73	-0.050	-0.056	41	Transportation	144	1.55	1.42	1.11	-0.040	-0.041
17	Construction Materials	280	3.02	1.49	1.44	-0.028	-0.033	42	Wholesale	312	3.37	2.69	2.56	0.001	0.000
18	Construction	122	1.32	1.59	1.69	-0.056	-0.052	43	Retail	573	6.19	2.80	2.68	-0.010	0.000
19	Steel Works Etc.	156	1.68	1.64	1.53	-0.039	-0.035	44	Restaurants, Hotels, Motels	132	1.43	1.86	1.80	0.002	-0.013
20	Fabricated Products	4	0.04	1.64	1.71	-0.056	-0.056	45	Banking	45	0.49	1.292	1.19	-0.067	-0.068
21	Machinery	670	7.23	1.63	1.60	-0.013	-0.019	46	Insurance	19	0.21	2.06	2.09	-0.016	-0.035
22	Electrical Equipment	151	1.63	1.62	1.62	-0.020	-0.014	47	Real Estate	13	0.14	0.72	0.98	-0.061	-0.057
23	Automobiles and Trucks	300	3.24	1.82	1.77	-0.031	-0.028	48	Trading	26	0.28	1.02	0.79	-0.076	-0.089
24	Aircraft	114	1.23	1.36	1.30	-0.053	-0.056	49	Other	6	0.06	0.69	0.66	-0.083	-0.083

This table shows summary statistics by industry for the dependent variable (Z-score) and the variable of interest (CSR) used in our regressions. High Z-scores correspond to low levels of financial distress risk (FDR). The sample comprises 9,262 US firm-year observations covering 1,201 unique firms for the period spanning 1991 through 2012. Industry code 29 has no observation in our sample. The list of variables, definitions, and data sources are provided in Appendix B.

Table 3 Descriptive statistics

	Mean	Standard deviation	First percentile	First quartile	Median	Third quartile	99th percentile
<i>Dependent variable</i>							
<i>Z-score</i>	1.516	0.943	-7.501	1.018	1.475	1.962	7.587
<i>Independent variables</i>							
<i>CSR</i>	-0.009	0.106	-0.500	-0.063	-0.013	0.028	0.836
<i>Community</i>	0.029	0.188	-1.000	0.000	0.000	0.000	1.000
<i>Diversity</i>	-0.039	0.298	-1.000	-0.333	0.000	0.125	1.000
<i>Employee relations</i>	-0.022	0.190	-0.800	-0.200	0.000	0.000	1.000
<i>Environment</i>	0.020	0.180	-0.833	0.000	0.000	0.000	1.000
<i>Human rights</i>	-0.015	0.128	-1.000	0.000	0.000	0.000	1.000
<i>Product</i>	-0.024	0.216	-1.000	0.000	0.000	0.000	1.000
<i>Control variables</i>							
<i>MTB</i>	3.276	3.229	0.530	1.570	2.330	3.620	21.760
<i>VOL</i>	0.111	0.060	0.029	0.068	0.096	0.136	0.356
<i>RET</i>	0.014	0.036	-0.092	-0.004	0.014	0.031	0.131
<i>SLACK</i>	0.150	0.163	0.001	0.032	0.091	0.209	0.743
<i>SIZE</i>	6.292	0.684	4.883	5.803	6.267	6.744	7.943
<i>TANG</i>	0.261	0.194	0.013	0.114	0.209	0.362	0.898
<i>DIV</i>	0.558	0.497	0.000	0.000	1.000	1.000	1.000
<i>R&D</i>	0.735	0.441	0.000	0.000	1.000	1.000	1.000
<i>DEP</i>	0.043	0.023	0.006	0.028	0.040	0.054	0.138
<i>Additional variables</i>							
<i>O</i>	-1.622	1.817	-11.908	-2.601	-1.515	-0.532	18.289
<i>ZM</i>	-1.583	1.256	-6.372	-2.413	-1.593	-0.816	8.771
<i>Log(Equity)</i>	13.641	1.496	10.209	12.584	13.568	14.564	17.374
<i>Log(Debt)</i>	12.578	2.289	5.602	11.435	12.860	14.100	16.878
<i>Excess returns</i>	-0.008	0.05	-0.125	-0.038	-0.005	0.021	0.119
<i>Loss</i>	0.162	0.37	0	0	0	0	1
<i>Coverage</i>	26.165	81.8	-102.256	2.708	7.105	18.127	582.074
<i>Tobin's Q</i>	2.030	1.14	0.793	1.284	1.677	2.367	6.979
<i>Leverage</i>	32.464	21	0.120	16.570	31.300	45.470	90.100
<i>Current ratio</i>	2.328	1.59	0.398	1.359	1.875	2.703	9.840

This table presents summary statistics for the variables used in our regressions. High Z-scores correspond to low levels of financial distress risk (FDR). The sample comprises 9,262 US firm-year observations covering 1,201 unique firms for the period spanning 1991 through 2012. Appendix A details the computation method of CSR dimensions. The list of variables, definitions, and data sources are provided in Appendix B.

Table 4 Pearson correlation coefficients between regression variables

<i>Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) <i>CSR</i>	1															
(2) <i>Community</i>	0.60***	1														
(3) <i>Diversity</i>	0.60***	0.23***	1													
(4) <i>Employee relations</i>	0.46***	0.16***	0.11***	1												
(5) <i>Environment</i>	0.60***	0.29***	0.17***	0.10***	1											
(6) <i>Human rights</i>	0.34***	0.09***	-0.02***	0.05***	0.219***	1										
(7) <i>Product</i>	0.49***	0.15***	-0.02**	0.07***	0.26***	0.15***	1									
(8) <i>MTB</i>	0.12***	0.07***	0.15***	0.08***	0.05***	-0.00	-0.01	1								
(9) <i>VOL</i>	-0.12***	-0.10***	-0.19***	-0.04***	-0.04***	0.05***	0.04***	-0.04***	1							
(10) <i>RET</i>	-0.03***	-0.01	-0.04***	-0.01***	-0.02**	-0.00	0.02*	-0.15***	0.17***	1						
(11) <i>SLACK</i>	0.04***	0.01**	-0.08***	0.07***	0.08***	0.07***	0.05***	0.18***	0.24***	0.07***	1					
(12) <i>SIZE</i>	0.20***	0.14***	0.44***	0.04***	0.07***	-0.12***	-0.17***	0.04***	-0.33***	-0.08***	-0.29***	1				
(13) <i>TANG</i>	-0.08***	-0.06***	0.04***	-0.04***	-0.13***	-0.07***	-0.05***	-0.06***	-0.11***	0.00**	-0.40***	0.16***	1			
(14) <i>DIV</i>	0.10***	0.08***	0.25***	0.02	0.00	-0.08***	-0.08***	-0.00	-0.38***	-0.05***	-0.39***	0.41***	0.25***	1		
(15) <i>R&D</i>	0.08***	0.06***	0.03***	0.13***	0.05***	-0.03***	0.02*	0.11***	0.02*	0.01	0.21***	0.01	-0.30***	-0.02*	1	
(16) <i>DEP</i>	0.03***	0.02**	0.02*	0.04***	-0.03***	-0.04***	0.05***	0.03***	0.13***	0.00	-0.15***	-0.05***	0.42***	-0.02**	0.00	1

This table reports correlation coefficients between CSR, CSR dimensions and other control variables. The sample comprises 9,262 US firm-year observations covering 1,201 unique firms for the period spanning 1991 through 2012. Appendix A details the computation method of CSR dimensions. The list of variables, definitions, and data sources are provided in Appendix B. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 5 Corporate social responsibility and financial distress risk

<i>Variable</i>	<i>(1) Cluster Effect</i>	<i>(2) Fama-MacBeth</i>	<i>(3) WLS</i>	<i>(4) Newey-West</i>
<i>CSR</i>	0.322*** (4.44)	0.373*** (3.34)	0.186*** (2.82)	0.322*** (3.68)
<i>MTB</i>	0.027*** (5.17)	0.043*** (4.35)	0.038*** (15.07)	0.027*** (4.67)
<i>VOL</i>	-3.765*** (-15.51)	-3.460*** (-12.82)	-3.630*** (-20.66)	-3.765*** (-14.22)
<i>RET</i>	4.198*** (10.63)	3.771*** (6.59)	4.018*** (14.67)	4.198*** (10.57)
<i>SLACK</i>	-0.712*** (-8.52)	0.035 (0.17)	-0.339*** (-5.25)	-0.712*** (-7.14)
<i>SIZE</i>	-0.206*** (-13.29)	-0.296*** (-10.62)	-0.195*** (-14.97)	-0.206*** (-10.90)
<i>TANG</i>	-0.639*** (-8.78)	-0.509*** (-5.37)	-0.491*** (-8.08)	-0.639*** (-7.20)
<i>DIV</i>	0.091*** (4.64)	0.084*** (3.86)	0.111*** (5.65)	0.091*** (3.78)
<i>R&D</i>	-0.194*** (-5.90)	-0.087* (-1.74)	-0.110*** (-4.12)	-0.194*** (-4.73)
<i>DEP</i>	0.188 (0.29)	0.936 (0.95)	0.364 (0.86)	0.189 (0.25)
<i>Constant</i>	3.718*** (21.86)	3.706*** (15.59)	3.644*** (8.16)	3.689*** (24.34)
Year dummies	Yes	No	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	9,262	9,262	9,262	9,262
Adjusted R ²	0.358	0.523	0.391	0.357
F-value	73.47***	143.70***	77.29***	48.59***

This table shows the results of the regressions of the Z-score on CSR using different estimation techniques. High Z-scores correspond to low levels of financial distress risk (FDR). All reported t-values in parentheses are based on robust standard errors clustered by firm and year. The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009)*, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 6 CSR dimensions and financial distress risk

<i>Variable</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Community</i>	0.145*** (4.27)						0.116*** (3.32)
<i>Diversity</i>		0.101*** (3.18)					0.080*** (2.46)
<i>Employee relations</i>			0.161*** (4.04)				0.142*** (3.49)
<i>Environment</i>				0.067* (1.72)			0.007 (0.18)
<i>Human rights</i>					0.029 (0.57)		-0.002 (-0.04)
<i>Product</i>						-0.004 (-0.12)	-0.037 (-1.05)
<i>MTB</i>	0.027*** (5.22)	0.027*** (5.14)	0.027*** (5.27)	0.027*** (5.25)	0.027*** (5.27)	0.027*** (5.27)	0.026*** (5.13)
<i>VOL</i>	-3.787*** (-15.59)	-3.788*** (-15.6)	-3.761*** (-15.50)	-3.787*** (-15.56)	-3.794*** (-15.60)	-3.795*** (-15.61)	-3.756*** (-15.49)
<i>RET</i>	4.205*** (10.64)	4.196*** (10.61)	4.198*** (10.62)	4.201*** (10.61)	4.198*** (10.61)	4.198*** (10.61)	4.204*** (10.65)
<i>SLACK</i>	-0.698*** (-8.42)	-0.705*** (-8.45)	-0.703*** (-8.48)	-0.695*** (-8.38)	-0.692*** (-8.36)	-0.692*** (-8.34)	-0.715*** (-8.55)
<i>SIZE</i>	-0.201*** (-13.21)	-0.214*** (-12.78)	-0.195*** (-12.90)	-0.197*** (-12.94)	-0.195*** (-12.78)	-0.195*** (-12.82)	-0.217*** (-12.78)
<i>TANG</i>	-0.643*** (-8.82)	-0.642*** (-8.82)	-0.653*** (-8.98)	-0.647*** (-8.88)	-0.651*** (-8.95)	-0.651*** (-8.95)	-0.639*** (-8.77)
<i>DIV</i>	0.093*** (4.72)	0.089*** (4.51)	0.096*** (4.86)	0.095*** (4.80)	0.096*** (4.87)	0.096*** (4.85)	0.087*** (4.41)
<i>R&D</i>	-0.194*** (-5.89)	-0.196*** (-5.97)	-0.194*** (-5.90)	-0.193*** (-5.85)	-0.193*** (-5.87)	-0.193*** (-5.88)	-0.197*** (-5.98)
<i>DEP</i>	0.244 (0.38)	0.236 (0.37)	0.284 (0.44)	0.308 (0.48)	0.338 (0.53)	0.339 (0.53)	0.146 (0.23)
<i>Constant</i>	3.675*** (21.68)	3.766*** (21.45)	3.651*** (21.54)	3.655*** (21.69)	3.639*** (21.62)	3.641*** (21.66)	3.796*** (21.40)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9262	9262	9262	9262	9262	9262	9262
Adjusted R ²	0.358	0.357	0.358	0.357	0.357	0.357	0.358
F-value	73.71***	73.51***	72.71***	73.56***	73.44***	73.46***	68.91***

This table provides the results of the regressions of the Z-score on CSR dimensions. High Z-scores correspond to low levels of financial distress risk (FDR). Models 1–6 use average CSR score for each dimension individually (Community, Diversity, Environment, Employee relations, Human rights, and Product). Model 7 uses all dimensions of CSR collectively. All reported t-values in parentheses are based on robust standard errors clustered by firm and year. Appendix A details the computation method of CSR dimensions. The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009). *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 7 Regression of FDR against CSR strengths and concerns

<i>Variable</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
<i>CSR strengths</i>	0.551*** (6.43)		0.546*** (6.36)	
<i>CSR concerns</i>		0.146 (1.16)	0.089 (0.70)	
<i>High str. and Low con.</i>				0.109*** (4.88)
<i>High str. and High con.</i>				0.056** (2.14)
<i>Low str. and High con.</i>				-0.017 (-0.76)
<i>MTB</i>	0.026*** (5.07)	0.027*** (5.26)	0.026*** (5.07)	0.026*** (5.09)
<i>VOL</i>	-3.795*** (-15.68)	-3.795*** (-15.68)	-3.804*** (-15.69)	-3.776*** (-15.55)
<i>RET</i>	4.213*** (10.66)	4.202*** (10.62)	4.215*** (10.67)	4.212*** (10.66)
<i>SLACK</i>	-0.729*** (-8.74)	-0.692*** (-8.37)	-0.729*** (-8.74)	-0.727*** (-8.73)
<i>SIZE</i>	-0.241*** (-13.38)	-0.202*** (-11.72)	-0.244*** (-12.54)	-0.219*** (-12.29)
<i>TANG</i>	-0.655*** (-9.01)	-0.657*** (-8.99)	-0.658*** (-9.02)	-0.653*** (-8.94)
<i>DIV</i>	0.086*** (4.39)	0.095*** (4.83)	0.086*** (4.38)	0.091*** (4.62)
<i>R&D</i>	-0.200*** (-6.09)	-0.195*** (-5.92)	-0.201*** (-6.12)	-0.195*** (-5.94)
<i>DEP</i>	0.134 (0.21)	0.351 (0.55)	0.144 (0.22)	0.228 (0.36)
<i>Constant</i>	3.922 (21.95)	3.678*** (20.96)	3.944*** (21.41)	3.759*** (21.34)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	9,262	9,262	9,262	9,262
Adjusted R ²	0.359	0.357	0.359	0.359
F-value	73.79***	73.40***	72.85***	72.54***

This table presents the results of the regressions of the Z-score on CSR strengths and concerns. High Z-scores correspond to low levels of financial distress risk (FDR). Model 1 uses the average CSR strengths and Model 2 uses the average CSR concerns as variables of interest. Model 3 includes average CSR strengths and CSR concerns together as variable of interest. Model 4 uses several dichotomous indicators for the high and low levels of strengths and concerns. The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009)*, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 8 Regression with alternative proxies FDR (O-score and ZM-score)

<i>Variable</i>	<i>O-score</i>		<i>ZM-score</i>	
	(1)	(2)	(3)	(4)
<i>CSR</i>	-0.884*** (-5.86)		-0.645*** (-6.13)	
<i>CSR strengths</i>		-0.884*** (-4.99)		-0.675*** (-5.4)
<i>CSR concerns</i>		0.885*** (3.55)		0.591*** (3.47)
<i>MTB</i>	0.145*** (20.46)	0.145*** (20.46)	0.119*** (21.19)	0.119*** (21.20)
<i>VOL</i>	9.316*** (21.14)	9.315*** (21.47)	6.819*** (21.36)	6.825*** (21.39)
<i>RET</i>	-4.573*** (-5.77)	-4.573*** (-5.77)	-1.788*** (-3.61)	-1.791*** (-3.61)
<i>SLACK</i>	-2.651*** (-14.47)	-2.651*** (-14.51)	-1.304*** (-11.56)	-1.301*** (-11.52)
<i>SIZE</i>	0.355*** (11.3)	0.355*** (8.85)	0.529*** (25.69)	0.534*** (20.7)
<i>TANG</i>	-0.146 (-1.05)	-0.146 (-1.04)	-0.321*** (-3.37)	-0.318*** (-3.33)
<i>DIV</i>	0.039 (0.97)	0.039 (0.97)	-0.017 (-0.60)	-0.016 (-0.58)
<i>R&D</i>	0.104* (1.80)	0.104* (1.80)	0.029 (0.74)	0.031 (0.77)
<i>DEP</i>	-1.131 (-1.03)	-1.131 (-1.03)	2.325*** (3.07)	2.331*** (3.08)
<i>Constant</i>	-4.913*** (-15.47)	-4.912*** (-14.08)	-5.912*** (-28.96)	-5.942*** (-26.67)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	9,262	9,262	9,262	9,262
Adjusted R ²	0.241	0.2403	0.292	0.292
F-value	49.75***	49.27***	63.38***	62.97***

This table reports the results with two alternate proxies of FDR (O-score and ZM-score). High O-scores and ZM-scores correspond to high levels of financial distress risk (FDR). Models 1 and 2 use CSR score and strengths and concerns with O-score, respectively. Models 3 and 4 use CSR score and strengths and concerns with ZM-score, respectively. The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009) *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 9 Regression with additional control variables

<i>Variable</i>	<i>(1) Log (Equity)</i>	<i>(2) Log (Debt)</i>	<i>(3) Excess Returns</i>	<i>(4) Loss</i>	<i>(5) Coverage</i>	<i>(6) Tobin's Q</i>	<i>(7) Leverage</i>	<i>(8) Current ratio</i>
<i>CSR</i>	0.251*** (3.47)	0.316*** (4.45)	0.321*** (4.42)	0.201*** (2.98)	0.244*** (3.47)	0.232*** (3.26)	0.254*** (3.64)	0.322*** (4.44)
<i>MTB</i>	0.054*** (8.74)	0.032*** (6.26)	0.266*** (5.21)	0.025*** (5.49)	0.245*** (5.18)	-0.008 (-1.30)	0.051*** (9.62)	0.027*** (5.36)
<i>VOL</i>	-3.137*** (-12.13)	-3.409*** (-13.68)	-3.766*** (-15.53)	-1.501*** (-6.62)	-3.076*** (-13.54)	-3.165*** (-12.71)	-2.937*** (-11.61)	-3.763*** (-15.54)
<i>RET</i>	4.484*** (11.33)	4.187*** (10.53)	0.672 (0.24)	2.279*** (6.35)	3.698*** (10.00)	1.733*** (3.96)	4.275*** (10.85)	4.205*** (10.69)
<i>SLACK</i>	-0.959*** (-11.54)	-0.992*** (-11.74)	-0.709*** (-8.50)	-0.473*** (-6.54)	-0.941*** (-11.93)	-0.973*** (-11.59)	-1.043*** (-12.63)	-0.728*** (-6.77)
<i>SIZE</i>	-0.893*** (-16.69)	0.181*** (5.43)	-0.207*** (-13.29)	-0.203*** (-14.53)	-0.158*** (-10.76)	-0.174*** (-11.41)	-0.096*** (-6.03)	-0.205*** (-12.04)
<i>TANG</i>	-0.638*** (-8.86)	-0.602*** (-8.55)	-0.641*** (-8.80)	-0.695*** (-10.28)	-0.696*** (-10.07)	-0.634*** (-8.87)	-0.589*** (-8.45)	-0.639*** (-8.76)
<i>DIV</i>	0.074*** (3.82)	0.086*** (4.50)	0.091*** (4.63)	0.039** (2.13)	0.079*** (4.27)	0.0834*** (4.36)	0.066*** (3.46)	0.092*** (4.66)
<i>R&D</i>	-0.195*** (-6.05)	-0.206*** (-6.42)	-0.193*** (-5.88)	-0.178*** (-5.85)	-0.179*** (-5.63)	-0.216*** (-6.62)	-0.217*** (-6.91)	-0.194*** (-5.89)
<i>DEP</i>	-0.082 (-0.13)	0.007 (0.01)	0.165 (0.26)	2.393*** (4.04)	0.671 (1.09)	0.117 (0.18)	-0.351 (-0.55)	0.206 (0.31)
<i>Additional control</i>	0.333*** (13.31)	-0.139*** (-13.84)	3.519 (1.28)	-0.981*** (-37.51)	0.003*** (20.87)	0.191*** (13.22)	-0.012*** (-22.03)	0.003 (0.27)
<i>Constant</i>	3.378*** (20.23)	3.057*** (17.88)	3.793*** (20.98)	3.657*** (23.08)	3.313*** (19.88)	3.222*** (18.95)	3.316*** (21.31)	3.703*** (20.45)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9262	9262	9262	9262	9262	9262	9262	9262
Adjusted R ²	0.377	0.386	0.358	0.467	0.425	0.381	0.404	0.358
F-value	78.50***	81.16***	72.73***	91.37***	82.08***	77.42***	87.56***	72.55***

This table reports the results of the use of additional control variables on the relationship between Z-score and CSR. High Z-scores correspond to low levels of financial distress risk (FDR). The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009) *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 10 Endogeneity concerns

<i>Variable</i>	PSM	2SLS		GMM
	(1) Matched sample	(2) First stage	(3) Second stage	(4)
<i>CSR</i>	0.373*** (3.30)		0.457*** (3.16)	0.324** (2.25)
<i>MTB</i>	0.014** (2.18)	0.000 (0.91)	0.036*** (10.93)	0.017 (0.83)
<i>VOL</i>	-2.366*** (-6.41)	-0.037* (-1.88)	-3.192*** (-15.30)	-0.463 (-0.38)
<i>RET</i>	1.101* (1.88)	0.018*** (2.60)	-0.618*** (-8.52)	0.092 (0.14)
<i>SLACK</i>	-0.084*** (-3.37)	-0.033 (-1.08)	3.675*** (11.26)	7.037*** (3.72)
<i>SIZE</i>	-0.796*** (-6.17)	0.023*** (14.12)	-0.215*** (-12.32)	-0.197** (-2.06)
<i>TANG</i>	-0.871*** (-8.08)	-0.000 (-0.05)	-0.785*** (-10.25)	-0.111 (-0.20)
<i>DIV</i>	0.068** (2.50)	0.002 (1.02)	0.114*** (4.77)	0.337* (1.66)
<i>R&D</i>	-0.267*** (-5.52)	-0.003 (-0.96)	-0.220*** (-7.00)	-0.009 (-0.05)
<i>DEP</i>	1.077 (1.24)	0.166*** (3.39)	1.262** (2.43)	3.787 (0.95)
<i>Average CSR score Geography close firm (3-digit ZIP)</i>		0.462*** (18.46)		
<i>Average CSR score Industry Peer (2-digit SIC)</i>		0.853*** (62.44)		
<i>Lag (Z-score)</i>				0.503*** (8.26)
<i>Constant</i>	3.075*** (14.56)	-0.133*** (-6.71)	4.232*** (20.01)	
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	No
N	4,778	6687	6687	7712
Adjusted/Centered/Pseudo (R ²)	0.257	0.557	0.373	
F-value	18.61***	107.50***	52.13***	
Chi ² (p-value)				0.00
AR (1) test (p-value)				0.00
AR (2) test (p-value)				0.527
<u><i>Overidentification statistics</i></u>				
Sargan test (p-value)			0.157	
Hansen test (p-value)				0.304

This table shows the results of the estimation of the relationship between Z-score and CSR using a propensity score matching (PSM) method, a two-stage least square (2SLS) regression and a dynamic panel GMM (generalized method of moments). High Z-scores correspond to low levels of financial distress risk (FDR). The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009) *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 11 Additional analysis

<i>Variable</i>	Corporate governance		Product market competition		Financial crisis		Financial distress	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weak governance	Strong governance	Low competition	High competition	Crisis period	Non-crisis period	Distressed firms	Non-distressed firms
<i>CSR</i>	0.131 (1.30)	0.194** (1.97)	0.106 (1.26)	0.411*** (3.65)	0.197 (1.18)	0.355*** (4.40)	0.032 (0.27)	0.231*** (3.77)
<i>MTB</i>	0.057*** (8.03)	0.048*** (8.34)	0.046*** (8.72)	0.013* (1.75)	0.011 (0.90)	0.030*** (5.44)	0.032*** (7.12)	-0.019*** (-3.12)
<i>VOL</i>	-3.781*** (-9.70)	-3.056*** (-8.87)	-2994*** (-8.49)	-3.869*** (-12.57)	-3.864*** (-8.94)	-3.875*** (-12.65)	-0.055 (-0.16)	-3.603*** (-15.43)
<i>RET</i>	3.151*** (5.32)	3.926*** (8.26)	3.911*** (8.17)	4.151*** (7.99)	4.117*** (5.37)	4.124*** (9.09)	1.016** (2.38)	3.099*** (7.56)
<i>SLACK</i>	-0.196 (-1.55)	0.134 (1.26)	0.188* (1.70)	-0.848*** (-8.11)	-0.793*** (-4.19)	-0.667*** (-7.11)	-0.091 (-0.89)	-0.627*** (-7.91)
<i>SIZE</i>	-0.329*** (-12.11)	-0.221*** (-10.93)	-0.303*** (-16.15)	-0.176*** (-7.26)	-0.162*** (-4.96)	-0.226*** (-12.97)	-0.149*** (-6.72)	-0.049*** (-3.32)
<i>TANG</i>	-0.579*** (-4.62)	-0.517*** (-5.19)	-0.345*** (-3.75)	-0.788*** (-7.85)	-0.757*** (-4.75)	-0.602*** (-7.31)	-0.518*** (-3.94)	-0.143** (-2.11)
<i>DIV</i>	0.134*** (4.11)	0.144*** (4.87)	0.059** (1.98)	0.135*** (4.80)	0.138*** (3.16)	0.072*** (3.27)	-0.008 (-0.28)	0.072*** (4.16)
<i>R&D</i>	-0.132** (-2.07)	-0.124*** (-2.76)	-0.065 (-1.49)	-0.286*** (-6.20)	-0.247*** (-3.39)	-0.184*** (-5.12)	-0.211*** (-4.80)	0.011 (0.40)
<i>DEP</i>	-0.411 (-0.45)	0.275 (0.42)	2.125*** (2.98)	-1.230 (-1.35)	-1.902 (1.34)	0.891 (1.23)	-0.429 (-0.50)	-1.059 (-1.55)
<i>Constant</i>	4.059*** (17.01)	4.165*** (19.10)	3.873*** (17.98)	3.611*** (12.24)	3.659*** (11.88)	3.733*** (18.68)	3.749*** (18.70)	1.953*** (15.14)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3143	3828	3951	5311	2174	7088	2905	6357
Adjusted R ²	0.427	0.431	0.422	0.388	0.326	0.381	0.288	0.282
F-value	364.38***	459.71***	50.82***	56.34***	28.16***	65.55***	25.00***	33.70***

This table presents the regression results of subsample analysis on the relation between Z-score and CSR with different firm attributes. High Z-scores correspond to low levels of financial distress risk (FDR). Models 1–2 partition the sample into two subsamples depending on corporate governance quality (weak governance with E-index >3 and strong governance with E-index ≤3). Models 2–3 partition the depending on product market competition: low competition sample (HHI >0.15) and high competition sample (HHI ≤0.15). Models 5–6 partition the sample into two subsamples: crisis period (2008–2010) and non-crisis period (other than 2008–2010) subsamples. Models 7–8 partition the sample depending on the Z-score level: Distress firm sample (Z-score < 1.81) and non-distressed firm sample (Z-score ≥1.81). Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009). The list of variables, definitions, and data sources are provided in Appendix B. *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.

Table 12 Channels

<i>VARIABLES</i>	Cost of equity (1)	Cost of debt (2)	Z-score (3)	Z-score (4)
<i>CSR</i>	-0.016*** (-3.49)	-0.021*** (-5.92)	0.184** (2.34)	0.302*** (4.03)
<i>MTB</i>	-0.001 (-0.93)		0.032*** (6.43)	0.027*** (5.21)
<i>VOL</i>	0.166*** (8.63)		-3.412*** (-14.11)	-3.735*** (-15.35)
<i>RET</i>	-0.079** (-2.50)		4.150*** (10.62)	4.175*** (10.56)
<i>SLACK</i>			-0.874*** (-10.39)	-0.717*** (-8.59)
<i>SIZE</i>	-0.005*** (-3.39)	-0.006*** (-8.38)	-0.224*** (-14.66)	-0.230*** (-13.81)
<i>TANG</i>		-0.002 (-0.80)	-0.607*** (-8.46)	-0.641*** (-8.81)
<i>DIV</i>			0.015 (0.74)	0.074*** (3.66)
<i>R&D</i>			-0.209*** (-6.45)	-0.196*** (-5.97)
<i>DEP</i>			-0.326 (-0.51)	0.197 (0.31)
<i>KZ</i>			-0.271*** (-15.08)	
<i>CSR×KZ</i>			0.399*** (2.71)	
<i>WW</i>				-0.063*** (-2.99)
<i>CSR×WW</i>				0.137* (1.72)
<i>Leverage</i>		-0.000*** (-17.51)		
<i>Growth</i>	-0.002 (-0.25)	-0.013*** (-3.86)		
<i>Cash_flow</i>		-0.027*** (-3.56)		
<i>Z-score</i>		0.003*** (3.36)		
<i>Constant</i>	0.136*** (13.87)	0.134*** (18.62)	3.883*** (22.78)	3.878*** (22.38)
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
N	6,133	7,708	7,708	7,704
Adjusted R ²	0.071	0.133	0.374	0.358

This table reports the relationship between CSR and cost of equity capital (Model 1) and cost of debt (Model 2). Models (3–4) test the joint effect of CSR and financial constraints on Z-score. High Z-scores correspond to low levels of financial distress risk (FDR). Excluding the Z-score from the cost of debt equation does not qualitatively change the results. The list of variables, definitions, and data sources are provided in Appendix B. Robust t-statistics adjusted for clustering by firm and year are reported inside the parentheses (Petersen, 2009) *, ** and *** refer to significance at the 10%, 5% and 1% levels, respectively.