Corporate Social Responsibility and Credit Risk

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Abstract

We examine the relationship between corporate social responsibility (CSR) and credit risk. We test how CSR strengths and concerns impact credit default swap (CDS) spreads during the global financial crisis period (2008–2009) and non-crisis periods (2001–2007 and 2010–2011). We empirically find that CDS spreads capture additional effect of CSR on credit risk that credit ratings miss, implying that CDS spreads have advantages over credit ratings for studying CSR. Our empirical results show the asymmetric effects of CSR concerns and strengths on credit risk. CSR concerns increase and CSR strengths reduce CDS spreads during the non-crisis period, whereas their effects change during the financial crisis. CSR strengths during an adverse economic environment can indicate agency problems and overinvestment. The effect of CSR concerns becomes much larger during the financial crisis, while that of CSR strengths can even increase CDS spreads. These results are supported by a 2SLS analysis used to mitigate endogeneity problems.

Keywords: Corporate social responsibility, Credit Risk, Credit default swap (CDS) spreads, Financial crisis

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Introduction

A corporation has traditionally been regarded as an entity whose main objective is to maximize the interests of shareholders (Fama and Jensen 1985). Jensen and Meckling (1976) describe a firm as a nexus of contracts among parties related to the firm in their seminal paper, but their focus is on the relations or contracts between shareholders and other interested parties such as bondholders or managers. However, as the impact of corporations on society has become critically important, corporate social responsibility (CSR) has drawn increasing attention from the public and media. Firms have accordingly increased investments related to social responsibility. The Global Sustainable Investment Alliance (GSIA) reports that, in 2016, socially responsible investment (SRI) assets accounted for 21.6% and 26.3% of total managed assets in the United States and the world, respectively.[1] The financial industry is showing growing recognition of and support for corporate social responsibility. For instance, several market indices based on CSR criteria have appeared (e.g., Dow Jones Sustainability Indexes, Domini 400 Social Index, FTSE4Good Index, S&P 500 Environmental & Socially Responsible Index).

In response to the increasing attention paid by investors to firms engaging in CSR, the link between CSR and corporate financial performance (CFP) has been extensively researched. Nevertheless, the longstanding debate on the financial implications of CSR remains inconclusive. Friedman (1970) argues that increasing shareholder value is the only responsibility of a corporation. He worries that managers' pursuit of social responsibility can detract from firm performance, leading to losses for shareholders. His argument represents the agency view that managers overinvest in CSR to extract private benefits such as individual reputations (Barnea and Rubin

2010). Cespa and Cestone (2007) provide a model in which CEOs can strategically exploit CSR policies to gain stakeholders' support and thus protect their positions. Contrariwise, Freeman (1984) proposes the stakeholder theory whereby managers should care about not only shareholders but also stakeholders, who are important to a corporation's value creation. Jones (1995) suggests that firms can increase their competitive advantage through efficient contracting; they can reduce contracting costs by enhancing trusting relations with their stakeholders. Moreover, Baron (2001) provides a model in which a firm uses CSR strategically to maximize its profit; he coins the phrase "strategic CSR." Godfrey (2005) proposes that CSR can protect firms' relationship-based intangible assets in ways that traditional insurance cannot. Vogel (2007) is skeptical of CSR, however, and argues that the influence and success of CSR are limited and exaggerated; he regards CSR as a secondary issue for firms.

Most empirical studies tend to find positive or neutral relationships between CSR and CFP. Orlitzky and Benjamin (2001) perform a meta-analysis on the empirical link between CSR and firm risk. They show that CSR seems to reduce firm risk and that measures of market risk are correlated with CSR more strongly than are those of accounting risk. Orlitzky et al. (2003) also report positive results for CSR in their meta-analysis on the relationship between CSR and CFP. They find a positive correlation between CSR and CFP and a seemingly bidirectional and simultaneous relationship. Margolis et al. (2009) report that the relationship between CSR and CFP is positive but weak in their comprehensive meta-analysis covering 251 studies. Malik (2015) reviews the CSR literature and lists various studies reporting that CSR activities enhance firm value. However, several studies have found that CSR has negative impacts. Laffer et al. (2004) reject the argument that CSR improves firm profitability. Surroca and Tribo (2008) find that

managerial entrenchment is closely and positively related to CSR. They also show that entrenchment strategies, combined with high CSR, negatively affect financial performance. Barnea and Rubin (2010) show that CSR ratings are high when insiders' ownership is low. Since low ownership implies low alignment with firm value, insiders can overinvest in CSR to gain private benefits, which can harm the interests of other shareholders. Fabrizi et al. (2014) report that non-monetary incentives such as entrenchment and power drive CEOs toward increased CSR engagement, whereas monetary incentives aligned with shareholders' interests reduce CSR engagement.

This literature stream covers not only financial return but also financial risk, which is crucial in evaluating firm performance (e.g. McGuire et al. 1988; Orlitzky and Benjamin 2001; Husted 2005; Godfrey 2005; Oikonomou et al. 2010; Jo and Na 2012). Risk reduction protects a firm against deadweight losses from financial distress and lowers the cost of capital. Several studies focus on credit risk, a critical concern of firms. For instance, Attiget et al. (2013) argue that CSR positively affects credit ratings. Jiraporn et al. (2014), Sun and Cui (2014), and Hsu and Chen (2015) also show that firms with high CSR have favorable credit ratings. Although credit ratings remain the most widely used measure of firms' credit quality, credit rating agencies are consistently criticized (e.g., Mathis et al. 2009; Benmelech and Dlugosz 2010). Campbell et al. (2008) show that credit ratings carry less information about financial distress risk than does a combination of market-based and accounting variables. Hilscher and Wilson (2016) argue that credit ratings are inaccurate as measurements of default probability.

We investigate the relationship between CSR and credit risk using data on credit default swap (CDS) spreads instead of credit ratings. CDS is a financial instrument that pays in the event of a

firm default. Corporate bond investors employ CDS contracts to protect against the loss caused by default. Investors pay premium to CDS issuers and CDS issuers guarantee the face value of the debt. The premium is called "spread", and CDS spreads are actively priced in the CDS market. Thus, CDS spreads are considered the most direct measure of credit risk. Hull et al. (2004) show that CDS spreads are negatively related to credit ratings but that they vary widely among firms with the same credit ratings, suggesting that they carry more information than credit ratings. Flannery et al. (2010) state that CDS spreads reflect credit information more accurately and quickly than credit ratings. Norden (2017) also shows that the CDS market efficiently incorporates information prior to credit rating changes. Based on previous studies, we expect that using CDS spreads illustrates the relationship between CSR and credit risk more clearly. Despite the advantage of CDS spreads over credit ratings, studies on CSR have rarely used them to measure credit risk. To the best of our knowledge, Kölbel et al. (2017) is the only study to use CDS spreads. They examine the relationship between CDS spreads and negative media coverage, showing that a higher number of news articles criticizing a firm's socially irresponsible actions significantly increases the firm's CDS spreads. Instead, we use KLD ratings, generally accepted data in CSR research, as a proxy of CSR engagement.

We construct a measure for credit risk based on CDS transactions and use the yearly CSR scores of MSCI ESG (formerly KLD) to measure firms' CSR performance. We explore the effects of both CSR strengths and concerns separately. We construct another CDS spread measure that controls for credit ratings from Standard & Poor (S&P) to test whether CDS spreads provide more meaningful information than credit ratings for studying CSR. Stock return data and accounting information from CRSP and COMPUSTAT are employed to construct control variables closely

related to credit risk. Our sample period covers 2001 to 2011. For each year, our sample includes firms with KLD scores and CDS spreads recorded for more than 10 months. Our final sample comprises 3,816 firm-year observations, representing 743 unique firms. The global financial crisis period (2008–2009) is included in our sample period. The global financial crisis provides a natural setting in which to examine the effect of CSR on credit risk in economic recessions. Considerations of credit risk become more important in economic recessions. We include a dummy variable reflecting the financial crisis period as well as interaction terms in our analyses. First, following Bouslah et al. (2018), we classify our sample into four groups based on KLD CSR ratings and check for differences in the groups' CDS spread measures through difference-in-difference tests. Next, we regress the CDS spread measures on the CSR variables and control variables. Furthermore, to mitigate potential endogeneity problems between CSR and credit risk, we adopt a simultaneous equation system, following Mishra and Modi (2013) and Bouslah et al. (2018), and perform a 2SLS analysis.

Our major empirical results are the following. First, after the accounting and stock market-based variables related to credit risk are controlled for, an aggregate measure of CSR (CSR_S) decreases CDS spreads overall. An aggregate measure of CSR strengths (STR) decreases CDS spreads, while that of CSR concerns (CON) increases them. These findings are consistent with most previous studies, which tend to report a positive relationship between CSR and CFP. Second, in the financial crisis period, the effect of CSR_S on CDS spreads remains qualitatively unchanged, that of CON becomes much stronger, but that of STR is reversed. We conjecture that CSR strengths during adverse macroeconomic conditions can indicate an agency problem and overinvestment. Third, we find that CDS spreads seem to carry more information related to CSR than credit ratings based on

the test using excess spreads. These results are supported by the 2SLS analysis.

We contribute to the ongoing debate on the relationship between CSR and CFP in several ways. First, we clarify the relationship between CSR and credit risk, employing CDS spreads which have been rarely used in the CSR literature. CDS spreads are considered the most direct measure of credit risk and reflect credit quality information more accurately and quickly than credit ratings. In addition, we empirically find that CDS spreads capture additional effect of CSR on credit risk that credit ratings miss, justifying our use of them. CDS spreads have advantages over credit ratings for studying CSR. Second, we find the negative relationship between CSR and credit risk, supporting the results of previous studies. CSR concerns increase and CSR strengths reduce CDS spreads. Finally, we find how CSR concerns and strengths affect credit risk during the financial crisis. Although risk management is especially important in economic recessions, few studies focus on the relationship between CSR and credit risk during the financial crisis. We show that CSR concerns increase CDS spreads larger, while the effect of CSR strengths is reversed during the financial crisis; CSR strengths increase CDS spreads. Our results provide practical advice to companies. They need to make sure to avoid CSR concerns, especially in economic recessions, while also being careful not to overinvest in CSR.

The remainder of this paper is organized as follows. In the "Hypotheses" section, we explain the theoretical framework and put forth our hypotheses. In the "Methodology" section, we present our datasets and introduce the measurement of our key concepts (e.g., CSR, credit risk) and the empirical framework. In the "Empirical Results" section, we present the empirical results of the impacts of CSR on credit risk and discuss the results of robustness checks. The "Conclusions" section provides concluding remarks and potential directions for future research.

Hypotheses

Previous studies report that CSR has a positive effect on credit ratings (Attig et al. 2013; Jiraporn et al. 2014; Sun and Cui 2014; Hsu and Chen 2015). CSR engagement consumes corporate resources but also has beneficial effects. Based on the literature, we propose three channels through which CSR can reduce firms' credit risk. First, CSR helps firms increase their incoming cash flow. CSR activities improve relations with firm stakeholders, leading to persistent superior profitability (Choi and Wang 2009). The positive effect of CSR on marketing is a representative case. CSR helps build up brand power (Simmons and Becker-Olsen 2006; Nan and Heo 2007), while corporate social irresponsibility (CSI) can critically harm it (Grappi et al. 2013; Sweetin et al. 2013). CSR positioning promotes customers' purchase intention, providing competitive advantage (Du et al. 2007). Bhattacharya and Sen (2004) argue that CSR enhances customers' long-term loyalty and satisfaction, and Du et al. (2007) and Luo and Bhattacharya (2006) empirically support their argument. Customer satisfaction increases future cash flow and leads to long-term profitability (e.g., Gruca and Rego 2005; Mittal et al. 2005). Furthermore, Gregory et al. (2014) directly examine the relationship between CSR and cash flow and argue that CSR positively affects expected future cash flow.

Second, CSR engagement helps firms to cope with negative events. Godfrey (2005) proposes an insurance hypothesis whereby moral capital generated by CSR provides insurance-like protection for relationship-based intangible assets. Intangible assets such as reputation, goodwill, employee morale, and customer loyalty substantially affect overall firm performance. Thus, it is crucial to

protect them and prevent stakeholder sanctions. Through moral capital, CSR mitigates the impacts of negative events related to intangible assets, which cannot be protected through traditional insurance contractions. Peloza (2006) also points out CSR's potential to provide insurance that mitigates negative events. Godfrey et al. (2009) empirically support the insurance hypothesis through an event study, showing that high CSR reduces losses after firms experience negative events. Moreover, Koh et al. (2014) report that CSR enhances firm value by mitigating litigation risk *ex ante*. The risk-mitigating potential of CSR is valued even before negative events actually occur.

Finally, high CSR can act as a positive signal to investors. Attig et al. (2013) suggest that CSR can signal the efficient use of internal resources and solid financial performance. For instance, Robinson et al. (2011) show that a firm experiences a sustained increase in stock price following its addition to the Dow Jones Sustainability World Index (DJSI), mainly due to reputational effects. Ioannou and Serafeim (2015) find that analysts view CSR strengths negatively in the early 1990s but that this tendency disappears for the full sample (1993–2007), implying that they come to view CSR strengths favorably. In addition, Cui et al. (2018) show that both enhancing CSR strengths and avoiding CSR concerns reduce information asymmetry and that this effect is amplified in high-risk firms. The signaling role of CSR helps firms avoid adverse selection and be properly valued. Benlemlih and Bitar (2018) report that CSR increases investment efficiency.

It has been reported that CSR strengths and concerns have asymmetric effects. For example, Lankoski (2009) argues that reducing negative externalities produces more positive economic impacts than does generating positive externalities. Goss and Roberts (2011) and Jiraporn et al. (2014) show that CSR concerns increase loan spreads and lower credit ratings, respectively.

However, the effect of CSR strengths is found to be insignificant in both studies. We thus develop the following two hypotheses on CSR strengths and concerns based on the above channels:

H1 CSR concerns increase credit risk

H2 CSR strengths decrease credit risk

Under adverse macroeconomic conditions, it becomes more difficult to invest resources in CSR. However, risk management also becomes more important, and CSR may reduce a firm's risk exposure (e.g. Godfrey 2005; Godfrey et al. 2009). Thus, deciding how much a firm should invest in CSR is especially important in economic recessions. Exploring the effect of CSR strengths and concerns in economic recessions will help firms in their approach to CSR. The global financial crisis provides a natural setting in which to test the effect.

During the global financial crisis, ethical concerns among related parties such as mortgage brokers, credit rating agencies, and investment banks constituted a central issue (Schoen 2017). "We witnessed an erosion of standards of responsibility and ethics that exacerbated the financial crisis" (FCI Report 2011, p. xxii).[2] Since ethical issues are highlighted during the crisis, the public is likely to become more sensitive to ethical concerns. Thus, firms with high CSR concerns tend to confront stakeholder sanctions more frequently, and stakeholder sanctions that a firm can bear during normal periods can exert enormous financial pressure during a crisis. For example, CSI has strongly negative effect on brand power (Grappi et al. 2013; Sweetin et al. 2013), which can be more critical when consumers reduce consumption. CSI can be a noticeable negative signal when investors are skeptical of firms generally. Therefore, we expect that the negative impact of CSR concerns, which increases credit risk, becomes larger during financial crises. We thus propose the

following hypothesis:

H3 The effect of CSR concerns on credit risk becomes stronger during the global financial crisis.

Bouslah et al. (2018) argue that CSR strengths significantly reduce firms' idiosyncratic risk in the stock market and that the effect is stronger than that of CSR concerns during the financial crisis. They conjecture that high CSR signals high-quality management and that a flight to safety occurs during economic recessions. Nevertheless, previous studies generally report a stronger effect of CSR concerns and that CSR strengths can indicate overinvestment during an adverse economic environment. Giannarakis and Theotokas (2011) report that CSR performance increased from 2007 to 2008 and from 2008 to 2009 despite the financial crisis. Managers may worry that decreasing CSR engagement can signal that firms are financially distressed. Managers may respond to poor financial results by increasing CSR engagement in order to maintain their positions with stakeholders' help (e.g., Cespa and Cestone 2007). Barnea and Rubin (2010) suggest that insiders tend to overinvest in CSR for their private benefit. Furthermore, a proper level of CSR investment in a normal period can constitute overinvestment in a crisis period. Ye and Zhang (2011) study the relationship between CSR and debt financing costs in China and suggest that an optimal CSR level exists. They report that increasing CSR heightens debt financing costs after CSR investment exceeds the optimal level. Several studies motivate us to doubt the effect of high CSR during an adverse economic environment, when cost saving becomes more important. Gregory et al. (2014) report that the decrease in systematic risk exposure due to high CSR is small. This means that the beneficial effect of high CSR against adverse macroeconomic conditions may be small. Edmans (2011) studies the relationship between employee satisfaction and stock returns and finds that investors do not fully value intangibles. Investors may consider tangibles more important during

economic recessions, strengthening this tendency. Shiu and Yang (2017) argue that the insurance-like protection of CSR works for the first negative event but does not work for subsequent negative events. They expect a decrease in the insurance-like effect by the global financial crisis. Goss and Roberts (2011) report that CSR strengths increase loan spreads for low-quality borrowers. Based on these views, we develop the following hypothesis:

H4 The effect of CSR strengths on credit risk becomes weaker, or is even reversed, during the global financial crisis.

Methodology

Dataset and Data Sources

Our social performance data are drawn from the MSCI ESG STATS (formerly KLD, constructed by KLD Research and Analytics Inc.) database ("KLD" hereafter). Data on one-year CDS spreads are obtained from Markit. We use stock price information from CRSP and accounting information from COMPUSTAT to construct the control variables. Our credit ratings data are provided by Standard & Poor (S&P). We exclude financial and utility firms. The sample period covers 2001 to 2011. For each year, our sample includes firms with KLD scores and CDS spreads recorded for more than 10 months. Our final sample consists of 3,816 firm-year observations representing 743 unique firms.

CDS spreads and Credit Risks

We employ CDS spreads as a primary measure of credit risk to analyze the relationship between CSR and financial distress risk more effectively than previous studies have done. CDS spreads

directly represent the firms' credit risk, while credit spreads from bonds are affected by other risk factors, especially liquidity risk. As the main dependent variable, we use annual CDS spreads, obtained by averaging monthly CDS spreads, the average of daily observed values in a month. We include only cases where CDS spreads are observed for more than 10 months in a year.

Table 1 reports the descriptive statistics of the CDS spreads of firms with CSR scores for each year. In 2001, the CDS market had just begun, and only 58 companies are in the sample, but more than 300 companies have been included since 2003. The total number of companies examined is 743. CDS spreads exhibit large variation across both time and firms, ranging from 0.009 to 64.591. The average spread is lowest, at 0.534, in 2006. In 2009, during the financial crisis, the average spread rises to 3.162. As Table 1 shows, CDS spreads are highly skewed in each year. To mitigate the statistical problem caused by the highly skewed distribution of CDS spreads, we take the natural logarithm of our annual CDS spread.

Measuring Corporate Engagement in CSR

We use the KLD CSR rating as a proxy for CSR. KLD data have been provided since 1991 and cover more than 3,000 companies, including Russell 3000 from 2003 and 650 companies from the domain 400 social SM index and S&P 500. MSCI ESG Research and its predecessor, KLD Research & Analytics Inc., have evaluated social activities based on corporate records, government data, NGO data, and more than 14,000 global media sources. KLD data have served as one of the best ways to measure corporate social responsibility and are extensively used in empirical research (e.g., Goss and Roberts 2011; Attig et al. 2013; Jiraporn et al. 2014; Bouslah et al. 2018; Lins et al. 2017; Sun et al. 2018). Waddock (2003) calls this data the "*de facto* research standard." KLD data include seven qualitative dimensions, to which strength and concern binary indicators are

assigned; there are about 80 indicators overall. The seven dimensions are: the environment, diversity, employee relations, human rights, corporate governance, community, and product quality and safety. The binary indicator ratings are 1 or 0, indicating presence or absence.

We can measure social performance reflecting the aggregate effect of each indicator by simply adding the strength ratings and subtracting the concern ratings. However, this simple sum has a disadvantage in that the number of indicators in each dimension can change every year. We thus give equal weight to each dimension by dividing the sum of the strength and concern scores by the number of strength and concern indicators, respectively (Bouslah et al. 2018). The formulas for the CSR measures are shown below. In calculating $\mathrm{STR_{it}}$ ($\mathrm{CON_{it}}$), we sum the scores of the strength (concern) indicators and divide the sum by their number over the six dimensions (except corporate governance) for year t and firm i. We exclude corporate governance, following El Ghoul et al. (2011) and Attig et al. (2013), since we do not cover conflicts between shareholders and insiders in our definition of CSR. $\mathrm{CSR_S_{it}}$ is defined as the difference between $\mathrm{STR_{it}}$ and $\mathrm{CON_{it}}$:

$$\mathrm{STR_{it}} = \sum_{d=1}^{6} \left[\frac{1}{N_{Str_t}} \sum_{j=1}^{N_{Str_t}} Strength_j \right]_{it} \tag{1}$$

$$\mathrm{CON_{it}} = \sum_{d=1}^{6} \left[\frac{1}{N_{Con_t}} \sum_{j=1}^{N_{Con_t}} Concern_j \right]_{it} \tag{2}$$

$$\mathrm{CSR_S_{it}} = \mathrm{STR_{it}} - \mathrm{CON_{it}} \tag{3}$$

where *d* indicates the KLD dimension, $Strength_j$ and $Concern_j$ are the CSR indicators with a binary value (0 or 1), and N_{Str_t} and N_{Con_t} are the total maximum possible number of strength and concern indicators for a given KLD dimension and year, respectively. The adjusted CSR score CSR_S is an aggregate measure of CSR. We use not only CSR_S but also STR and CON due to

the asymmetric effects of CSR strengths and concerns (e.g., Lankoski 2009; Goss and Roberts 2011; Jiraporn et al. 2014).

Following Bouslah et al. (2018), we classify the firms into four groups based on CSR as follows: firms with positive Strength and zero Concern are Toptier firms; firms with zero Strength and positive Concern are Lowtier firms; firms with zero Strength and Concern are Zerotier firms; and all other firms are Medtier firms. Table 2 reports the average CSR_S and the number of firms in the sample for each group and year. Overall, 71% of the firms in the sample have both strengths and concerns, 9% have only strengths, 16% have only concerns, and only 4% have neither strengths nor concerns. Since the distribution is similar to that of the KLD data overall, the firms with CDS contracts seem to reflect the KLD data as a whole.

Control Variables

To isolate the impact of CSR, we employ accounting and market-based variables generally used in the financial distress literature. First, research based on hazard model-type estimation shows that default probabilities are well-predicted by using accounting variables (Altman 1968; Ohlson 1980; Zmijewski 1984; Shumway 2001; Chava and Jarrow 2004; Campbell et al. 2008). Second, studies using Merton's structural model recommend employing firm leverage and the volatility of stock returns (Merton 1974; Black and Scholes 1973). Finally, credit ratings have been widely used as a financial distress measure (Kaplan and Urwitz 1979; Blume et al. 1998; Molina 2005). These variables are appropriate measures with which to control for firm-specific distress in that they do not represent a direct assessment of credit risk while serving as a good predictor of credit events. As our CSR dataset is annual, we also use a set of accounting variables generally accepted

in the literature on credit ratings and default (Blume et al. 1998; Bhojraj and Sengupta 2003; Ashbaugh-Skaife et al. 2006).

The expected signs of the control variables are Liquid (-), Profit (-), Oper_Eff (-), Turnover (-), Lsize (-), Lever (+), Sigma (+), and Beta (+). Liquid measures a firm's liquid assets. We define Liquid as the ratio of working capital to total asset. Profit measures a firm's profitability. It is measured as the ratio of retained earnings to total assets. Oper_Eff reflects a firm's operational efficiency, apart from tax and leveraging factors, defined as EBIT over total assets. Turnover is the ratio of sales to total assets. Lsize is the natural logarithm of the market capital of common stock in the most recent fiscal year. The structural model suggested by Merton (1974) indicates that stock return volatility and leverage are key determinants of credit default. Lever is measured as total liabilities over equities. We measure market volatility as the standard deviation of daily returns and denote it by "Sigma." Beta is the stock return beta, following Dimson (1979). In Appendix A, we list the control variables and their data sources. Previous studies suggest that CDS spreads are determined by common factors (Collin-Dufresne et al. 2001; Avramov et al. 2007; Ericsson et al. 2009; Galil et al. 2014). To control for annual variation in the common factors, we include year fixed effects to reflect time series variation in CDS spreads. We also include industry fixed effects using the industry classification of Fama and French (1997).

As an additional dependent variable, we use a measure that represents the additional information of CDS spreads relative to credit ratings. Specifically, we derive daily index spreads by averaging all CDS spreads with the same credit ratings each day and calculate the daily log excess spread as the difference between the individual log CDS spread and the log index spread.[3] Both CDS spreads and credit ratings are needed to calculate the daily log excess spread. The monthly log

excess spread is obtained by averaging the daily log excess spreads in a month. We define the annual log excess spread as the average of monthly log excess spreads, where the monthly values exist for more than 10 months in a year.

Table 3 presents the descriptive statistics for log annual CDS spreads (SPR), annual log CDS excess spreads (Excess), and the key control variables. The skewness and kurtosis of SPR are much closer to zero than are those of pure CDS spreads, indicating that SPR partially overcomes the skewed distribution problem that pure CDS spreads present. While the observation number of SPR is 3816, that of Excess is 1696 due to the absence of credit ratings. Table 4 presents the pairwise correlation coefficients between the key variables. Since the correlation coefficients among CSR and the control variables are generally low, the multicollinearity problem is not severe in our regressions. The correlation coefficient between SPR and Sigma is 0.678, indicating that Sigma plays an important role as a control variable. It is reasonable to separate CSR strengths and concerns because these CSR components are not strongly correlated at 0.369 of the correlation coefficient.

Empirical Results

Difference-in-Difference Tests

We first check differences in SPR among the groups and how they change during the financial crisis. We classify our sample based on two dimensions, the crisis period and CSR score. CRISIS is a dummy variable equal to 1 if the year is 2008 or 2009 and 0 otherwise. We also define a dummy variable, Group, as follows. In model 1, Group equals 1 if a firm is included in Toptier and 0 otherwise. In model 2, Group equals 1 if a firm is included in Toptier and 0 if a firm belongs to

Medtier or Zerotier. In model 3, Group equals 1 if a firm is included in Lowtier and 0 otherwise. In model 4, Group equals 1 if a firm is included in Lowtier and 0 if a firm belongs to Medtier or Zerotier. In each model, we define the firms with a Group value of 0 as a benchmark group.

Table 5 shows the results of simple regressions using the two dummy variables. The coefficients on Group are associated with the difference in average SPR by credit group when the crisis factor is controlled for. In models 1 and 2, the coefficients on Group have positive values of 0.144 and 0.286, respectively, indicating that the average SPR of the Toptier group is higher than that of the benchmark groups. In models 3 and 4, the coefficients on Group have higher positive values of 0.713 and 0.746. Since this analysis does not control for firm-specific credit risk factors, the results merely show that the firms in the Toptier and Lowtier groups tend to be riskier than those in the benchmark groups. In the next subsection, we deal with the impact of engaging in CSR by controlling for the firm-specific risk factors. The coefficients on CRISIS indicate an average change of SPRs for all firms. The coefficients range from 1.03 to 1.13, indicating an increase in credit risk during the financial crisis.

CRISIS*Group is the main variable in this analysis. The coefficient on the interaction term CRISIS*Group shows the average difference in SPR change between the groups during the financial crisis period. In model 1, the coefficient on CRISIS*Group is positively significant at the 1 % level, suggesting that SPR in the Toptier group increases significantly more than in other groups during the financial crisis period. A similar result is observed in model 2 as well. In model 3, the coefficient on CRISIS*Group is positively significant at the 1 % level, implying that SPR in the Lowtier group increases significantly more than in other groups during the financial crisis period. The result seems robust in model 4, where we exclude the Toptier group. The results of

Table 5 support hypotheses *H3* and *H4*. We test our hypotheses while controlling for firm-specific credit risk in the next subsection.

Multivariate Results

Table 6 displays the results of regressing SPR on the CSR scores and the control variables. We set up panel regression models of SPR where the dependent variables are CSR_S in model 2, CSR strengths in model 3, CSR concerns in model 4, and both CSR strengths and concerns in model 5. The standard errors in models 1 through 5 are clustered by industry classification and are robust to autocorrelation and heteroskedasticity. We also include year fixed effects and industry effects, following Fama and French (1997).

We first regress SPR on the control variables without CSR variables in model 1 of Table 6. The control variables are Liquid, Turn, Profit, Oper_Eff, Lsize, Lever, Sigma, and Beta. We expect that Liquid, Turn, Profit, Oper_Eff, Lsize, and Lever have negative effects and that Sigma and Beta have positive effects, in accordance with the literature. The result of model 1 shows that the coefficients on all the explanatory variables are significant at the 5 % level and that their signs are consistent with the prior research. In the other models, we add CSR measures to model 1 to test the relationship between CSR and SPR. The coefficient on CSR_S in model 2 of Table 6 is significantly negative at the 1 % level, implying that CDS investors consider CSR in assessing corporate credit risk. Models 3 and 4 in Table 6 present the impact of the aggregate measure of strengths (STR) and the aggregate measure of concerns (CON) on SPR, respectively. The coefficient on STR is significantly positive in model 3 and that on CON is significantly negative in model 4. In model 5 in Table 6, we simultaneously control for CSR strengths and concerns and

find that the impacts of the CSR measures remain qualitatively unchanged. These results support *H1* and *H2* and are consistent with prior research reporting positive effect of CSR on credit ratings (Attig et al. 2013; Jiraporn et al. 2014; Sun and Cui 2014; Hsu and Chen 2015).

In Table 7, we investigate whether the effect of the CSR variables become larger or smaller during the financial crisis by adding interaction variables to the regressions shown in Table 6. We divide our sample into two periods: the financial crisis period (2008–2009) and non-crisis period (2001–2007 and 2010–2011). Dummy variable CRISIS has a value of 1 if the year is 2008 or 2009 and 0 otherwise. The interaction variables CRISIS*CSR_S, CRISIS* STR, and CRISIS*CON are our main variables of interest. Table 7 shows that the financial crisis affects the coefficients on the CSR measures differentially. In model 1, the coefficient on CSR_S is significantly negative, and the coefficient on CRISIS*CSR_S is negative but not significant. This result is consistent with Lins et al. (2017), who report positive effects of CSR during the financial crisis. While only observing the aggregate CSR score does not reveal the effect of the financial crisis, dividing CSR into strengths and concerns provides different results. Model 2 shows that the coefficient on CRISIS*STR and the sum of the coefficients on STR and CRISIS*STR are positively significant. This result indicates that the effect of CSR strengths on credit risk reverses during the financial crisis, supporting *H4*: CSR strengths do not reduce credit risk during the financial crisis. Lins et al. (2017) do not examine the separate effect of CSR strengths. Model 3 shows that the coefficient on CRISIS*CON is also significantly positive and much larger than the coefficient on CON. This result indicates that the negative effect of CSR concerns on credit risk becomes much more severe during the financial crisis, supporting *H3*. In model 4, we include STR, CON, and their interaction variables and find that the result remains qualitatively unchanged.

Our results contrast with those in Bouslah et al. (2018), who find that CSR strengths decrease firms' idiosyncratic risk. However, our results are in line with studies showing a stronger effect of CSR concerns (e.g., Goss and Roberts 2011; Jiraporn et al. 2014). Kölbel et al. (2017) show that negative media coverage of social responsibility increases CDS spreads more powerfully than positive media coverage decreases them. Bouslah et al. (2013) show that CSR concerns positively affect firms' risk in more KLD dimensions than CSR strengths negatively affect it. Diversity and corporate governance strengths are even found to positively affect firms' risk. Bouslah et al. (2013) surmise that market participants do not agree on the value of CSR strengths. Our results provide evidence that CSR strengths indicate overinvestment during the financial crisis.

Table 8 shows the regression of Excess on CSR_S. In model 1, the coefficient on CSR_S is negative at the 10 % significance level during the non-crisis period. The effect of CSR_S is similar during the financial crisis, as the coefficient on the interaction term is small and non-significant. Model 2 shows that the coefficient on STR is negative at the 1 % significance level. On the other hand, the effect of CSR strengths is reversed during the financial crisis, similar to the results shown in Table 7. The sum of the coefficients on STR and CRISIS*STR is 0.122 at the 1 % significance level. In model 3, the coefficient on CON is statistically insignificant; however, the coefficient on the interaction term CRISIS*CON is positive at the 1 % significance level. The results in model 4 show that the effects of STR and CON on Excess are consistent when both the variables are included simultaneously. In sum, Excess is significantly correlated with the CSR measures, and the regression coefficients show a pattern similar to that shown in Table 7. Since Excess reflects the additional information of CDS spreads relative to credit ratings, these results indicate that CDS spreads capture information related to CSR that credit ratings miss. CDS spreads reveal the

relationships between CSR and credit risk more clearly, justifying our use of them.

Robustness Checks

In this section, we check the robustness of our empirical results. Endogeneity is a severe challenge in the empirical literature on CSR because it prevents researchers from analyzing the causality between variables. For instance, Waddock and Graves (1997) argue that CSR is both a predictor and consequence of financial performance, indicating a simultaneous relationship. We thus perform additional tests to check the robustness of our results to a potential endogeneity problem between CSR and CDS spreads. Following Mishra and Modi (2013) and Bouslah et al. (2018), we adopt a simultaneous equation system. We estimate the following equations, where CSR variables and SPR affect each other, using a two-stage least squares method (2SLS):

$$STR_{it} = \alpha_1 + \gamma_{11}STR_{it-1} + \gamma_{12}CON_{it-1} + X_{it}\beta_1 + \theta_{1j} + \eta_{1t} + \omega_{1it} \quad (4)$$

$$CON_{it} = \alpha_2 + \gamma_{21}STR_{it-1} + \gamma_{22}CON_{it-1} + X_{it}\beta_2 + \theta_{2j} + \eta_{2t} + \omega_{2it} \quad (5)$$

$$SPR_{it} = \alpha_3 + \gamma_{31}STR^*_{it} + \gamma_{32}STR^*_{it} \times crisis_t + \gamma_{33}CON^*_{it} + \gamma_{34}CON^*_{it} \times CRISIS_t + X_{it}\beta_3 + \delta CRISIS_t + \theta_{3j} + \eta_{3t} + \varepsilon_{it} \quad (6)$$

where SPR is log annual CDS spreads, STR(CON) is the CSR strength (concern) score, and X_{it} denotes the control variables for firm i at time t. These three equations have the same set of control variables and hold simultaneously. To control for the unobserved time-invariant industrial effect ($\theta_{.j}$), we employ industry fixed effects. In addition, we include time-dummy variables ($\eta_{.t}$) in all equations.

Table 9 presents the results of the first-stage regression. STR and CON are highly correlated with their own lagged values. CSR strengths and concerns are well-explained in the models, since the adjusted R-squared values are above 0.7. Lsize is significantly correlated with both STR and CON at the 1 % level. STR is also significantly and negatively correlated with Sigma and Beta at the 1 % level, indicating that STR is high when financial risk is low.

Table 10 presents the second-stage regression results. To confirm the previous results in Table 7, we employ the same control variables. The results in Table 10 are consistent with those in Table 7, supporting the robustness of our empirical results. We confirm the effect of the CSR measures on SPR through models 1 to 4. The coefficient on CSR_S is significantly negative in model 1, and the coefficient on CON is significantly positive in model 3. The coefficient on STR is negative but not significant in model 2, but it becomes significant in model 4 where CON is also included. These results support *H1* and *H2*. We also confirm how the financial crisis changes the relationship between CSR and credit risk. In model 5, the coefficient on the interaction term CRISIS*CSR_S is positive but not significant and is much smaller than the absolute value of the coefficient on CSR_S. The sum of the coefficients on CSR_S and CRISIS*CSR_S is negative at the 5 % significance level. In models 6 and 7, the coefficients on the interaction terms CRISIS*STR and CRISIS*CON are both significantly positive. The sum of the coefficients on STR and CRISIS*STR and the sum of the coefficients on CON and CRISIS*CON are positive at the 1 % significance level. We include STR, CON, and their interaction variables in model 8 and obtain a qualitatively similar result. These results support *H3* and *H4*.

Table 11 confirms the previous results shown in Table 8 using the same dependent variable, Excess. We substitute the CSR variables with the estimated CSR variables from the first-stage

regression. The results shown in Table 11 are consistent with the results shown in Table 8, indicating that CDS spreads provide more information related to CSR than credit ratings do. Overall, the results in Tables 10 and 11 confirm the robustness of the results shown in Tables 7 and 8.

Conclusion

This study examines the relationship between CSR and credit risk, employing CDS spreads as a measure of credit risk. Although CDS spreads have advantages over credit ratings in assessing credit risk, studies on CSR have rarely used them. Our empirical results indicate the significantly negative relationship between CSR and credit risk, consistent with previous studies. CSR concerns increase and CSR strengths decrease CDS spreads. We also find that CDS spreads have more information related to CSR than credit ratings do, using excess spreads.

Furthermore, we explore the relationship between CSR and credit risk during the global financial crisis period (2008–2009). Although risk management is especially important in economic recessions, there are few studies on the relationship between CSR and financial risk under adverse macroeconomic conditions. We observe the asymmetric effects of CSR concerns and strengths on credit risk during the financial crisis. Whereas the effect of CSR concerns strengthens during the financial crisis, that of CDS strengths can even increase CDS spreads, in contrast to the findings in Bouslah et al. (2018). Our results are supported by the 2SLS analysis. CSR strengths during an adverse economic environment can indicate agency problems and overinvestment. “It pays to be good, but not too good” (Mintzberg 1983). These results have crucial implications for firms. Companies need to ensure that they avoid CSR concerns, especially

in economic recessions, while also being careful not to overinvest in CSR. More research is needed on the relationship between CSR and financial risk amid economic recessions.

[1] http://www.gsi-alliance.org/wp-content/uploads/2017/03/GSIR_Review2016.F.pdf

[2] https://fcic-static.law.stanford.edu/cdn_media/fcic-reports/fcic_final_report_full.pdf

[3] We use the original 22-rating scale of Standard & Poor's long-term issuer. For example, the top grade is AAA, the second grade is AA+, the third grade is AA, and so on.

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Appendix A

Variable	Expected sign	Description	Data source
Liquid	-	Ratio of working capital to total assets	COMPUSTAT
Profit	-	Ratio of retained earnings to total assets	COMPUSTAT
Oper_Eff	-	Ratio of EBIT to total assets	COMPUSTAT
Turnover	-	Ratio of sales to total assets	COMPUSTAT
Lsize	-	Natural logarithm of the market capital of common stock at the most recent fiscal year	COMPUSTAT
Lever	+	Ratio of liabilities to equities	COMPUSTAT
Sigma	+	Standard deviation of daily stock returns	CRSP
Beta	+	Stock return beta, following Dison (1979)	CRSP

Table 1 Descriptive statistics and distribution of CDS spreads by year

This table presents the descriptive statistics of CDS spreads for each year. The data sample consists of 3,816 firm-year observations, representing 743 unique firms ranging from 2001 to 2011.

YEAR	Mean	Std	Min	P5	P25	Median	P75	P95	Max	N
2001	1.327	1.617	0.122	0.149	0.394	0.695	1.481	5.200	8.384	58
2002	2.460	4.732	0.096	0.176	0.417	0.809	2.193	11.222	32.360	221
2003	1.661	2.688	0.045	0.115	0.239	0.515	2.246	6.338	20.480	305
2004	1.017	2.877	0.040	0.086	0.159	0.282	0.864	3.744	45.243	371
2005	0.586	1.394	0.025	0.045	0.078	0.131	0.575	2.113	15.377	411
2006	0.534	2.779	0.009	0.033	0.056	0.100	0.354	1.487	52.792	431
2007	0.562	2.496	0.020	0.038	0.066	0.121	0.406	2.029	48.540	426
2008	2.369	4.994	0.043	0.140	0.357	0.773	2.098	10.718	49.985	409
2009	3.162	6.210	0.078	0.300	0.502	1.205	3.169	13.679	64.591	404
2010	1.169	3.084	0.090	0.183	0.299	0.597	1.274	3.607	57.597	399
2011	0.986	1.643	0.104	0.153	0.258	0.474	0.999	3.472	16.298	381
total	1.390	3.641	0.009	0.051	0.160	0.424	1.208	5.076	64.591	3816

Table 2 Sample distribution by year and CSR ratings

This table presents average CSR_S (Panel A) and the number (Panel B) of firms (except financial and utility firms) with KLD scores and CDS transactions by year and group. The sample is divided into four groups based on strength and concern ratings. Firms with positive strength rating and zero concern rating are included in Toptier. Firms with zero strength rating and positive concern rating are included in Lowtier. Firms with zero strength and concern rating are included in Zerotier. The other firms are included in Medtier.

Panel A					
YEAR	Toptier	Lowtier	Medtier	Zerotier	Total
2001	0.350	-0.473	-0.286	0	-0.205
2002	0.475	-0.626	-0.190	0	-0.121
2003	0.384	-0.559	-0.210	0	-0.201
2004	0.401	-0.536	-0.217	0	-0.213
2005	0.368	-0.595	-0.192	0	-0.209
2006	0.380	-0.599	-0.185	0	-0.200
2007	0.420	-0.605	-0.190	0	-0.212
2008	0.391	-0.612	-0.219	0	-0.218
2009	0.412	-0.614	-0.225	0	-0.230
2010	0.698	-0.676	0.014	0	-0.051
2011	0.942	-0.601	0.320	0	0.236
total	0.489	-0.597	-0.129	0	
Panel B					
	Toptier	Lowtier	Medtier	Zerotier	Total
2001	9	7	41	1	58
2002	36	26	145	14	221
2003	31	56	199	19	305
2004	38	79	239	15	371
2005	41	81	275	14	411
2006	39	76	300	16	431
2007	26	69	313	18	426
2008	28	52	312	17	409
2009	26	56	308	14	404
2010	24	61	304	10	399
2011	42	60	269	10	381
total	340	623	2705	148	3816

Table 3 Descriptive statistics of main variables

This table presents the descriptive statistics for CDS spreads (Panel A), CSR measures (Panel B), accounting variables (Panel C), and market info (Panel D) for all firms (except utility and financial firms) with KLD scores and CDS transactions from 2001 to 2011. Except for the CSR measures and dummy variables, the variables are winsorized at the 1st and 99th percentiles.

	Mean	Median	Std	Min	Max	Skew	Kurt	N
Panel A: CDS spread								
SPR	-0.89	-0.96	1.40	-9.388	4.053	0.260	0.069	3816
Excess	-0.22	-0.22	0.61	-2.837	2.417	-0.010	1.542	1696
Panel B: CSR measure								
CSR_S	-0.15	-0.18	0.67	-2.726	3.250	0.614	1.845	3815
STR	0.55	0.33	0.61	0.000	4.000	1.685	3.195	3816
CON	0.70	0.58	0.58	0.000	4.095	1.276	2.208	3815
Panel C: Accounting								
Liquid	0.11	0.09	0.14	-0.428	0.731	0.680	0.957	3121
Profit	0.18	0.19	0.43	-10.011	1.790	-8.783	186.353	3796
Oper_Eff	0.08	0.08	0.10	-0.706	2.095	1.170	46.768	3399
Turnover	0.97	0.79	0.75	-0.052	13.248	3.006	25.024	3428
Lever	1.56	0.78	4.68	0.015	185.609	25.325	875.004	3418
Panel D: Market information								
Sigma	0.36	0.31	0.20	0.104	2.634	2.451	10.852	3815
Beta	0.01	0.01	0.04	-0.217	0.342	0.159	8.079	3816

Table 4 Correlation coefficient among main variables

This table presents the Pearson pair-wise correlation coefficient of the regression variables, including the CSR measures, CDS spread measures, and control variables. The data sample consists of all firms (except utility and financial firms) with KLD scores and CDS transactions from 2001 to 2011.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SPR	(1)	1											
Excess	(2)	0.355	1										
CSR_S	(3)	-0.108	-0.016	1									
STR	(4)	-0.209	-0.020	0.591	1								
CON	(5)	-0.095	-0.002	-0.532	0.369	1							
Liquid	(6)	-0.010	-0.042	0.132	0.033	-0.123	1						
Profit	(7)	-0.319	0.017	0.090	0.205	0.111	0.108	1					
Oper_Eff	(8)	-0.407	-0.172	0.095	0.180	0.079	0.045	0.233	1				
Turnover	(9)	-0.071	-0.081	-0.016	0.019	0.039	0.197	0.147	0.171	1			
Leverage	(10)	0.268	0.053	-0.055	-0.060	0.001	-0.091	-0.176	-0.198	-0.068	1		
Sigma	(11)	0.678	0.193	-0.063	-0.150	-0.084	0.122	-0.240	-0.303	0.007	0.275	1	
Beta	(12)	0.028	-0.050	-0.034	-0.042	-0.005	0.030	-0.040	-0.167	-0.023	0.104	-0.006	1

Table 5 Difference-in-differences test

This table presents results from regressions of SPR on dummy variables, CRISIS and Group. CRISIS is a dummy variable equal to 1 if the year is 2008 or 2009 and 0 otherwise. In model 1, Group equals 1 if a firm is included in Toptier and 0 otherwise. In model 2, Group equals 1 if a firm is included in Toptier and 0 if a firm belongs to Medtier or Zerotier. In model 3, Group equals 1 if a firm is included in Lowtier and 0 otherwise. In model 4, Group equals 1 if a firm is included in Lowtier and 0 if a firm belongs to Medtier or Zerotier. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

VARIABLE	(1) SPR	(2) SPR	(3) SPR	(4) SPR
Group	0.144*	0.286***	0.713***	0.746***
	(0.0824)	(0.0821)	(0.0631)	(0.0638)
CRISIS	1.036***	1.110***	1.126***	1.110***
	(0.0544)	(0.0582)	(0.0556)	(0.0582)
CRISIS*Group	1.597***	1.738***	1.547***	1.580***
	(0.182)	(0.180)	(0.128)	(0.128)
Constant	-1.133***	-1.275***	-1.242***	-1.275***
	(0.0254)	(0.0278)	(0.0262)	(0.0278)
Observations	3,816	3,192	3,816	3,476
adj-R-squared	0.099	0.119	0.128	0.131

Table 6 Regression result of CDS spreads on CSR scores

This table presents results from regressions of SPR on the CSR variables and the control variables. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLE	SPR	SPR	SPR	SPR	SPR
CSR_S		-0.122***			
		(-5.369)			
STR			-0.079**		-0.095***
			(-2.492)		(-2.995)
CON				0.137***	0.146***
				(4.621)	(4.908)
Liquid	-0.300**	-0.287**	-0.289**	-0.304**	-0.291**
	(-2.353)	(-2.264)	(-2.271)	(-2.391)	(-2.296)
Turnover	-0.064**	-0.068***	-0.066**	-0.066***	-0.068***
	(-2.506)	(-2.683)	(-2.572)	(-2.588)	(-2.673)
Profit	-0.250***	-0.237***	-0.249***	-0.238***	-0.236***
	(-7.026)	(-6.682)	(-6.993)	(-6.695)	(-6.634)
Oper_Eff	-0.969***	-0.915***	-0.982***	-0.887***	-0.896***
	(-5.853)	(-5.537)	(-5.929)	(-5.340)	(-5.403)
Lsize	-0.314***	-0.311***	-0.294***	-0.346***	-0.324***
	(-23.929)	(-23.837)	(-19.114)	(-23.380)	(-19.641)
Leverage	0.039***	0.038***	0.041***	0.035***	0.037***
	(4.915)	(4.805)	(5.141)	(4.322)	(4.569)
Sigma	2.651***	2.645***	2.656***	2.636***	2.641***
	(20.025)	(20.067)	(20.077)	(19.968)	(20.030)
Beta	2.074***	2.014***	2.006***	2.126***	2.047***
	(3.675)	(3.584)	(3.553)	(3.778)	(3.639)
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	2,987	2,986	2,987	2,986	2,986
adj R-squared	0.677	0.681	0.678	0.680	0.681

Table 7 Regression results of CDS spreads on changes of CSR scores

This table presents results from regressions of SPR on the CSR variables, the control variables, and dummy variable CRISIS, which equals 1 if the year is 2008 or 2009 and 0 otherwise. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

VARIABLE	(1) SPR	(2) SPR	(3) SPR	(4) SPR
CSR_S	-0.115***			
	(-4.652)			
STR		-0.140***		-0.136***
		(-4.221)		(-4.075)
CON			0.065**	0.086***
			(2.032)	(2.691)
CRISIS*CSR_S	-0.038			
	(-0.704)			
CRISIS*STR		0.371***		0.267***
		(5.639)		(3.876)
CRISIS*CON			0.365***	0.284***
			(5.976)	(4.424)
Liquid	-0.287**	-0.289**	-0.298**	-0.287**
	(-2.260)	(-2.281)	(-2.362)	(-2.282)
Turnover	-0.069***	-0.064**	-0.067***	-0.067***
	(-2.693)	(-2.501)	(-2.627)	(-2.649)
Profit	-0.237***	-0.244***	-0.235***	-0.230***
	(-6.684)	(-6.899)	(-6.651)	(-6.539)
Oper_Eff	-0.916***	-0.996***	-0.919***	-0.933***
	(-5.544)	(-6.046)	(-5.563)	(-5.667)
Lsize	-0.312***	-0.294***	-0.348***	-0.326***
	(-23.841)	(-19.243)	(-23.637)	(-19.895)
Leverage	0.038***	0.040***	0.033***	0.035***
	(4.793)	(5.043)	(4.156)	(4.373)
Sigma	2.642***	2.715***	2.669***	2.709***
	(20.037)	(20.564)	(20.318)	(20.645)
Beta	2.030***	1.924***	2.194***	2.042***
	(3.609)	(3.425)	(3.920)	(3.657)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes

Observations	2,986	2,987	2,986	2,986
adj R-squared	0.681	0.682	0.684	0.686

Table 8 Regression result of excess CDS spreads on changes of CSR scores

This table presents results from regressions of Excess on the CSR variables, the control variables, and dummy variable CRISIS, which equals 1 if the year is 2008 or 2009 and 0 otherwise. All the control variables in Appendix A are included in the regressions but omitted in this table. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. The data sample consists of 1,696 firm-year observations ranging from 2001 to 2011. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

VARIABLE	(1) Excess	(2) Excess	(3) Excess	(4) Excess
CSR_S	-0.047*			
	(-1.704)			
STR		-0.081***		-0.085**
		(-2.611)		(-2.578)
CON			-0.021	0.008
			(-0.689)	(0.251)
CRISIS*CSR_S	-0.005			
	(-0.084)			
CRISIS*STR		0.203***		0.146**
		(2.982)		(1.969)
CRISIS*CON			0.178***	0.129*
			(2.787)	(1.857)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Observations	1,696	1,696	1,696	1,696
adj R-squared	0.094	0.098	0.096	0.100

Table 9 First-stage regression result of CSR scores on lagged CSR scores and CDS spreads

This table presents results from the first-stage regressions of the CSR variables on the lagged CSR variables and the control variables. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. The data sample is from 2001 to 2011. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

	(1)	(2)	(3)
VARIABLE	CSR_S	STR	CON
STR (1 lag)	0.843***	0.838***	-0.005
	(50.942)	(73.490)	(-0.440)
CON (1 lag)	-0.760***	0.027**	0.787***
	(-48.727)	(2.520)	(67.655)
Liquid	0.068	0.091**	0.022
	(1.017)	(1.977)	(0.451)
Turnover	-0.006	-0.000	0.006
	(-0.471)	(-0.049)	(0.586)
Profit	-0.001	-0.008	-0.007
	(-0.046)	(-0.607)	(-0.492)
Oper_Eff	0.088	0.044	-0.043
	(1.006)	(0.729)	(-0.659)
Lsize	0.010	0.064***	0.053***
	(1.128)	(10.138)	(7.796)
Leverage	-0.001	0.005*	0.007**
	(-0.290)	(1.879)	(2.115)
Sigma	-0.243***	-0.213***	0.028
	(-3.300)	(-4.217)	(0.516)
Beta	-0.877***	-1.067***	-0.195
	(-2.974)	(-5.254)	(-0.886)
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Observations	2,985	2,986	2,985
adj R-squared	0.704	0.816	0.740

Table 10 Second-stage regression result of CDS spreads on estimated CSR scores

This table presents results from the second-stage regressions of SPR on the CSR variables, the interaction terms with dummy variable CRISIS, and the control variables. CRISIS equals 1 if the year is 2008 or 2009 and 0 otherwise. All the control variables in Appendix A are included in the regressions but omitted in this table. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

VARIABLE	(1) SPR	(2) SPR	(3) SPR	(4) SPR	(5) SPR	(6) SPR	(7) SPR	(8) SPR
CSR_S	-0.166***				-0.175***			
	(-5.268)				(-5.064)			
STR		-0.058		-0.097**		-0.168***		-0.172***
		(-1.381)		(-2.305)		(-3.803)		(-3.840)
CON			0.211***	0.226***			0.106**	0.153***
			(5.315)	(5.629)			(2.519)	(3.556)
CRISIS*CSR_S					0.045			
					(0.678)			
CRISIS*STR						0.511***		0.379***
						(7.186)		(4.951)
CRISIS*CON							0.495***	0.335***
							(6.784)	(4.237)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,518	2,518	2,518	2,518	2,518	2,518	2,518	2,518
adj R-squared	0.691	0.688	0.691	0.692	0.691	0.694	0.697	0.700

Table 11 Second-stage regression result of excess CDS spreads on estimated CSR scores by credit rating

This table presents results from the second-stage regressions of Excess on the CSR variables, the interaction terms with dummy variable CRISIS, and the control variables. CRISIS equals 1 if the year is 2008 or 2009 and 0 otherwise. All the control variables in Appendix A are included in the regressions but omitted in this table. Robust t-statistics adjusted for clustering at the industry level are reported in parentheses. The data sample consists of 1,696 firm-year observations ranging from 2001 to 2011. ***, **, and * denote statistical significance at the 1, 5, and 10 % levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLE	Excess	Excess	Excess	Excess	Excess	Excess	Excess	Excess
CSR_S	-0.060*				-0.047			
	(-1.696)				(-1.213)			
STR		-0.041		-0.066		-0.118***		-0.114**
		(-1.155)		(-1.623)		(-2.952)		(-2.556)
CON			0.021	0.053			-0.072*	-0.021
			(0.567)	(1.273)			(-1.753)	(-0.453)
CRISIS*CSR_S					-0.057			
					(-0.746)			
CRISIS*STR						0.337***		0.205**
						(4.116)		(2.273)
CRISIS*CON							0.388***	0.305***
							(4.813)	(3.444)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,238	1,238	1,238	1,238	1,238	1,238	1,238	1,238
adj R-squared	0.091	0.090	0.089	0.091	0.091	0.102	0.106	0.112