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# Corporate Social Responsibility and Credit Spreads—An Empirical Study in Chinese Context*

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Using samples composed of bond-issuing firms publicly traded on Shanghai Stock Exchange, this article examines the relationship between corporate social responsibility and credit spreads and makes the following findings: first, corporate social responsibility can significantly reduce credit spreads, and more corporate social responsibility leads to more reduction in credit spreads; all of the five aspects of corporate social responsibility (i.e., environment, employees, consumers, communities and other stakeholders) are significantly negatively correlated with credit spreads. Second, in companies with weak corporate governance, corporate social responsibility can result in more reduction in credit spreads, which suggests that corporate social responsibility performance contains more information when corporate governance is weak. Third, the correlation between corporate social responsibility and credit spreads tends to become weaker as institutional ownership increases. Fourth, corporate social responsibility is positively correlated with firm's market value and negatively correlated with firm's risks.

*Key Words*: Corporate social responsibility; Credit spreads; Investor base; Idiosyncratic risks.

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## 1. INTRODUCTION

In recent years, corporate social responsibility (CSR) has attracted the attention of all sides from governments, business leaders to the general public around the world. For example, Article 5 of China's Corporate Law enacted in 2006 explicitly stipulates that corporations "should undertake social responsibility". Among the firms publicly traded on China's domestic stock markets, the number of firms that published annual CSR reports has increased significantly from 47 in 2007 to 592 in 2012. A survey on "sustainability" which encompasses issues on or closely related to CSR including environment, human rights, labor standards and anti-corruption, 93% of the 700 top managers across 100 countries surveyed believe that sustainability issues will be critical to the future successes of their businesses.[1] Investors have also begun to take CSR into consideration when making investment decisions (CICA, 2010). As CSR has become an important principle guiding the investment strategies of various funds, socially responsible investing is becoming an increasingly booming market in both the United States and Europe (Lemke and Lins, 2013). According to 2012 Report on Sustainable and Responsible Investing Trends published by the U.S. Social Investment Forum (SIF) Foundation, as of year-end 2011, more than one out of every nine dollars under professional management in the United States, that is, about $3.74 trillion or more, is involved in socially responsible investing.[2] There is also plenty of evidence that retail investors are also inclined to invest in socially responsible companies (Guenster, et al., 2011).

Since Sheldon (1924) put forth the concept of CSR, CSR has been one of the subjects that have been frequently examined in academic researches. Literature review by Li, et al. (2014) and Li and Wei (2014) finds that in the large and growing literature on CSR, a wide range of issues related to CSR have been raised and examined and these issues include reasons for/against CSR, the relationship between CSR and corporate financial performance (CFP), the mechanisms by which CSR may affect CFP, etc.. Li, et al. (2014) and Li and Wei (2014) also find that as a result of global financial crisis of 2008, companies around the world are challenged with new CSR-related issues. For example, the question how "too-big-to-fail" financial institutions should strike a balance between profit-maximization

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[1]P. Lacy, T. Cooper, R. Hayward, and L. Neuberger, 2010, "A new era of sustainability UN Global Compact- Accenture CEO study 2010". Available at: http://www.accenture.com/sitecollectiondocuments/pdf/accenture_a_new_era_of_sustainability_ceo_study.pdf. Accessed October 11, 2014.

[2]The report is available at: http://www.ussif.org/files/Publications/12_Trends_Exec_Summary.pdf. Accessed October 11, 2014.

and self-disciplining so as to maintain the stability of global financial system has become more salient than ever before.

This article sets out to investigate the impact of CSR on firms' credit spreads in Chinese context, a subject worthy of investigation for the following reasons: first, examine the relationship between CSR and corporate cost of capital can help understand how CSR can affect CFP (Renneboog, et al., 2008). While the relationship between CSR and cost of equity has been well examined, the relationship between CSR and credit spreads has received little attention. Second, in China, as Chinese government pushes for the development of corporate bond markets, corporate bonds will become an increasingly important source of financing for China's companies. An examination of the relationship between CSR and CFP in Chinese context will help Chinese firms improve financial performance by reducing cost of capital.

Within the theoretical framework of Merton (1987) and Heinkel, et al. (2001), this article uses a sample of 450 companies that are publicly traded on Shanghai Stock Exchange (SSE) and issued bonds during 2010-2012 to examine the relationship between CSR and credit spreads. The main findings of this article are summarized as follows: first, CSR can significantly reduce credit spreads, and more CSR leads to more reduction in credit spreads; all of the five aspects of CSR (i.e., environment, employees, consumers, communities and other stakeholders) are significantly negatively correlated with credit spreads. Second, in companies with weak corporate governance, CSR can result in more reduction in credit spreads, which suggests that CSR performance contains more information when corporate governance is weak. Third, the correlation between CSR and credit spreads tends to become weaker as institutional ownership increases.

This article contributes to the literature on CSR in the following ways: first, unlike exsiting studies that examine the impact of CSR on cost of equity (e.g., Dhaliwal, et al., 2011) or cost of bank credits (e.g., Goss and Roberts, 2011), this study extends the literature to the relationship between CSR and cost of bonds. Second, unlike existing studies that examine the impact of CSR on cost of capital in developed economies, this study examines the subject in the context of China, a major developing economies with market and institutional background different from those of developed countries. Third, compared with existing studies, this article is one step further in that it examines how each of the five major aspects of CSR (i.e., environment, employees, consumers, communities and other stakeholders) affects credit spreads. Fourth, by relating corporate governance to CSR and cost of capital, this article demonstrates how CSR can function as an alternative to internal corporate governance mechanisms for reducing cost of capital. Fifth, based on information theory, this study analyzes the im-

pact of the heterogeneity of investors on the relationship between CSR and cost of capital.

The rest of this article proceeds as follows: Section 2 presents theoretical analyses and the hypotheses to be tested; Section 3 describes the data, variables and models; Section 4 provides the results of empirical tests and robustness checks; Section 5 concludes the article.

## 2. LITERATURE REVIEW, THEORETICAL ANALYSES AND HYPOTHESES

### 2.1. Literature Reveiw

There is a large and growing literature on the relationship between CSR and CFP. Although the relationship between CSR and CFP is still a matter for debate, most existing studies have come to the conclusion that CSR is positively correlated with CFP (Li, et al., 2014; Li and Wei, 2014).

Previous studies have demonstrated that CSR may lead to better CFP by helping reduce cost of capital (Cheng, Ioannou and Serafeim, 2014; Dhaliwal, et al., 2011; El Ghoul, et al., 2011; Goss and Roberts, 2011; Sharfman and Fernando, 2008). For example, Goss and Roberts (2011) shows that in bank credit markets, firms with poor CSR records pay up to 23 basis points more than firms regarded as socially responsible.

A number of mechanisms by which CSR may lead to lower cost of capital have been identified in the literature. First, CSR can reduce informational asymmetry between firms and investors due to increased transparency (Cheng, Ioannou and Serafeim, 2014; Dhaliwal, et al., 2011; Eccles, et al., 2012; Hong and Kacperczyk, 2009). Studies have found that socially responsible firms tend to voluntarily disclose more information to markets. There is also evidence that stock analysts are more inclined to follow socially responsible firms, which can enhance transparency (Hong and Kacperczyk, 2009). Second, CSR can help reduce agency costs due to enhanced stakeholder engagement in corporate affairs. Various studies (e.g., Benabou and Tirole, 2010; Cheng, Ioannou and Serafeim, 2014; Eccles, et al., 2012) find that good CSR performance can foster better mutual trust and cooperation between firms and their stakeholders (e.g., employees, customers, consumers and creditors), enhance external governance and thus curb managerial opportunism. Third, CSR can help firms reduce idiosyncratic risks (Goss and Roberts, 2011; Lee and Faff, 2009; Luo and Bhattacharya, 2009; Mishra and Modi, 2013; Sun and Cui, 2014). Studies (e.g., Merton, 1987; Fu, 2009) find that idiosyncratic risks are positively correlated with expected returns when investors do not diversify their portfolios. Reduction in idiosyncratic risks can thus lead to lower cost of capital. Goss and Roberts (2011) finds that CSR can help firms reduce idiosyncratic risks such as the risk of being sued by consumers.

### 2.2. Theoretical analyses

In this article, the interaction between CSR and credit spreads is first analyzed within a theoretical framework including the following theories: investor base, perceived risks and informationl asymmetery.

**Investor base**. Investor base theoy which was first proposed in Merton (1987) reasons as follows: investors usually make investments only in firms of which they have good knowledge. As more investors get to know of a firm, the investor base of the firm is likely to expands, which will increase the demand for the stock shares of the firm. Increase in demand for stock shares will in turn lead to higher stock prices and accordingly lower cost of capital. Heinkel, et al. (2001) extends investor base theory of Merton (1987) to bond markets and proposes that as the investor base of a firm's bonds expands, the risks of the bonds will decrease and investors will be satisfied with lower expected returns. In other words, expansion of investor base will lead to lower credit spreads. Hong and Kacperczyk (2009) attests to Merton (1987) and Heinkel, et al. (2001) by finding that institutional investors subject to social norm pressures are inclined to exclude socially irresponsible firms from their portfolios and that securities analysts are less likely to follow firms in so-called "sin" industries including alcohol, tobacco and gaming.

Previous researches (e.g., Diamond and Verrecchia, 1991; Welker, 1995) propose that firms can attract more investors to expand investor base by enhancing corporate transparency. On the other hand, as discussed above, CSR can reduce informational asymmetry between firms and investors as socially responsible firms tend to voluntarily disclose more information to markets. As such, it is no surprise that Cox and Wicks (2011) finds that there is a positive correlation between CSR and institutional investors demand for stocks.

To sum up, investor base theory suggests that firms actively undertaking social responsibility are likely to attract more investors and have relatively larger investor bases, which will ultimately lead to lower credit spreads.

**Perceived risks**. There is evidence that investors tend to regard socially irresponsible firms as riskier than firms with good CSR performance records (Starks, 2009). A number of studies (e.g., Hong and Kacperczyk, 2009; Waddock and Graves, 1997) have found that investors are generally correct in perceiving that socially irresponsible firms are riskier. For example, Hong and Kacperczyk (2009) finds that firms in the so-called "sin" industries are faced with higher risk of being sued by consumers.

More important, as mentioned above, various studies (e.g., Schober et al., 2014; Singh, 2014) have found that idiosyncratic risks such as being sued by consumers for unsafe products are priced into assets. Hong and Kacperczyk (2009) also finds that the risk that socially irresponsible firms are more likely to be sued cannot be diversified away. Socially responsible

firms are thus perceived to be less risky and the demand for their bonds will likely to be greater, which will lead to smaller credit spreads. In other words, CSR can mitigate investors' perceived risks of firms and thus lower credit spreads.

**Informational asymmetry**. The literature to date has argued that market frictions such as informational asymmetry are among the main factors that affect the pricing of assets (Copeland and Galai, 1983). A number of studies have applied the theories about the impact of informational asymmetry on asset pricing to the relationship between informational asymmetry and credit spreads. For example, Duffie and Lando (2001) finds that informational asymmetry can affect credit spreads on corporate bonds. Zhou, et al. (2012, 2014) and Lin, et al. (2013) have identified a positive correlation between informational asymmetry and credit spreads on corporate bonds. Cheng, et al. (2011) uses credit spread on corporate bonds as the variable measuring informational asymmetry.

One of the mechanisms by which CSR may help firms reduce credit spreads is that CSR can reduce informational asymmetries between firm managers and investors. There are plenty of studies finding that firms with better CSR performance records are more transparent than otherwise comparable firms. Gelb and Strawser (2001) finds that the financial statements of socially responsible firms tend to be more informative. Cheng, et al. (2014) finds that firms with better CSR performance records are more transparent and accountable. Kim, et al. (2012) shows that CSR can improve the quality of the earning information published in firms' financial statements. In addition, existing studies (e.g., Zhou, et al, 2014) have found the existence of informational asymmetry among investors. Cho, et al. (2013) and Lu and Chueh (2015) have shown that disclosure on CSR can help mitigate the informational asymmetry among investors.

Based on literature on the relationship between CSR and cost of capital and theories presented above, this article proposes the first hypothesis as follows:

**H1a:** Companies that undertake CSR have lower credit spreads than companies that don't undertake CSR.

**H1b:** Compared with otherwise comparable companies, companies with better CSR performance records have lower credit spreads.

The literature on social norms has showed that social norms are important determinants of economic behavior and market outcomes, and that economic agents may be sanctioned by loss of reputation for disregarding norms (e.g., Akerlof, 1980; Romer, 1984). Social norms may even override profit motive. Social norms are usually defined as acts whose utilities to the agent performing them depend largely on the beliefs or actions of other members of the community (Akerlof, 1980). In a study on the impact of social norms on the expected returns of firms in so-called "sin" industries,

Hong and Kacperczyk (2009) treats social norms against "sin" industries as the synonyms of CSR and finds that social norms affect firms' cost of capital.

Existing literature on social norms/CSR has taken a two-pronged approach to connect social norms/CSR to corporate governance. First, normative studies by legal scholars (e.g., Avi-Yonah, 2005; Jackson, 2010) argue that the emergence of CSR has posed a challenge to the conventional corporate governance framework centered on shareholder primacy and that because economic agents such as employees and consumers also contribute to the firm, they are thus entitled to legal recognition of their residual interests in the assets of the firm. Accordingly, these scholars advocate expanding corporate governance framework to include the interests of corporate stakeholders such as employees along with those of shareholders. Second, empirical studies have shown that social norms/CSR have indeed played a role in shaping corporate governance structure. For example, Boytsun, Deloof, and Matthyssens (2011) finds that firms operating in communities with stronger social norms tend to have more open corporate governance, i.e., more likely to take into consideration the interests of stakeholders such as employees. Using data of German listed stock companies and of economic media coverage between 2001 and 2010, Galander, Walgenbach, and Rost (2015) finds that public sanctioning positively influences a firm's compliance with soft law such as German Corporate Governance Code. In a study on the impact of social norms on CEO compensations, Rost and Weibel (2013) demonstrates when publicly shared fairness norms are infringed, enforcement of social norms by the public will become likely, particularly when the enforcement is of low cost to the public.

Putting all these together, this article treats CSR and social norms as synonyms and proposes that CSR can serve as an external corporate governance mechanism. Based on such analyses, this article proposes the second hypothesis as follows:

**H2:** In firms with weak internal corporate governance, the negative relationship between CSR and credit spreads is statistically stronger than in firms with strong internal corporate governance.

Investors are heterogeneous with regard to possession of information. Institutional investors and securities analysts are insiders who are in possession of inside information on firms. Compared with retail investors, insiders have both more resources to acquire information and better capabilities to process information (Merton, 1987; Shleifer and Vishny, 1986). Recent studies have showed that institutional investors also have advantages over retail investors in that the former can obtain firms' CSR information from various sources including the management, non-governmental organizations and research institutions while the latter usually can obtain such information from only public sources (CICA, 2010; Cohen, et al., 2011). The

trading activities by informed institutional investors will cause information to be disseminated into the market and thus reduce informational asymmetry between firm managers and investors. As a result, the financial benefits of CSR for public firms will become less significant. Accordingly, the third hypothesis is proposed as follows:

**H3:** The more ownership the institutional investors hold in a firm, the weaker the negative correlation between CSR and credit spreads.

## 3. DATA, VARIABLES AND MODELS

### 3.1. Data

Data used in this study are collected from the following databases: data on corporate governance (i.e., duality of the positions of president and CEO, independent directors as a percentage of total number of directors, stock shares held by board of directors as percentage of all outstanding stock shares, stock shares held by managers as percentage of all outstanding stock shares, stock shares held by the largest shareholder as a percentage of all outstanding stock shares, size of board of directors, size of board of supervisors, and total compensation of top three managers), stock markets (i.e., stock market volatility) and firms financial performance (i.e., total assets, total liabilities, return on equity, and so on) are collected from CSMAR; data on institutional ownership and corporate bonds (i.e., bond ratings, number of remaining years to maturity, number of years since issuance) are from WIND; data on Chinese macro economy such as GDP growth rates are from the database of State Information Center (available at: db.cei.gov.cn); data on CSR are manually collected from firms' financial statements and corporate social responsibility reports. All data are winsorized at $1^{\text{st}}$ and $99^{\text{th}}$ percentiles so as to reduce the impact of outlier data.

### 3.2. Samples

The sample includes bonds issued during 2010-2012 by firms publicly traded on SSE. The year of 2010 is chosen as the starting point of the samples because it was only until 2007 that Chinese firms started to publish CSR reports and it was until 2008 that publicly traded firms were allowed to issue exchange-traded bonds. As a result, before 2010, firms that both published CSR reports and issued exchange-traded bonds virtually did not exist. The year of 2012 is chosen as the ending point for the following reasons: first, there is a time lag in the publication of CSR reports; second, data on CSR have to be collected manually, which is very resources- and time-consuming, and as a result, we are not able to update them.

Bonds issued by financial companies, firms dually listed on both domestic and foreign stock markets, and firms which are the members of SSE

corporate governance sector are excluded. Dually listed firms are excluded for the following reason: China Securities Regulatory Commissions, the stock market regulatory authority in China, makes it mandatory for dually traded firms to publish CSR reports, while this article focuses on impact of voluntary disclosure of CSR on cost of debt. The mandatory disclosure of CSR by dually traded firms does not serve the purpose of this study.

With firms with missing or duplicate data[3] being excluded, the sample has a total of 244 publicly traded firms and a total of 450 firm-bond observations.

### 3.3. Models and Variables

The model for baseline regressions used in this study is specified in Equation (1).

$$\begin{aligned} CS_u &= \alpha + \beta_1 CSR_u + \beta_2 LNZZC_u + \beta_3 LEV_u + \beta_4 CREDIT_u \\ &+ \beta_5 AGE_u + \beta_6 SYQX_u + \beta_7 VAR_u + YEAR + INDUSTRY + \varepsilon_u \end{aligned} \tag{1}$$

In Equation (1), $CS$, the dependent variable measuring firm's credit spreads, is the credit spread on a corporate bond. Specifically, $CS$ is defined as the difference between the yield to maturity of a corporate bond and the yield to maturity of treasury bond issued by China's central government of the same maturity as the corporate bond. All of the credit spreads are calculated using the closing yield to maturity on bonds on the last trading day of the year. Previous studies have shown that the larger the $CS$, the higher the credit spreads (e.g., Anderson, et al., 2004).

The independent variables are defined as follows:

$CSR01$ and $CSRSCORE$ are two alternative variables used to measure firms' CSR performance. $CSR01$ is a dummy variable. If a firm has voluntarily published CSR report, the firm is regarded to have voluntarily undertaken social responsibility and accordingly has a score of 1 on $CSR01$; otherwise, $CSR01$ is equal to 0. $CSRSCORE$, a CSR index, is constructed using the method proposed in Lanis and Richardson (2012) as follows: if a firm has reported any of the five components of CSR, i.e., environment ($CSRHJ$), employees ($CSRYG$), consumers ($CSRXF$), communities ($CSRSQ$) and other stakeholders ($CSRQT$), in its CSR report, it gets a score of 1 on that component; if a firm has provided detailed infor-

[3]Duplicate data refer to two or more bonds issued by the same firm in a given year. When a firm issued two or more bonds in a given year, only one of them is randomly chosen and retained in the sample and the remaining are deleted. We believe that in general, the financial condition of a firm is unlikely to experience significant changes in a span of one year. A close review of the data shows that all of the bonds issued by the same firms in a given years are virtually of the same ratings. It is therefore not necessary to include into the sample all bonds issued by the same firms in a given year.

mation on any of these five components of social responsibility in its CSR report, it then gets a score of 2 on that component. $CSRSCORE$ is the sum of the scores on all of the five components, with 10 being the highest a firm can possibly receive. Each of the five components represents the social responsibility that a firm has undertaken to one of the five different types of stakeholders (i.e., environment, employees, consumers, communities, and other stakeholders). When each of the five components is used separately as alternative measure for CSR, it measures a firm's performance on social responsibility to a given type of stakeholder. $CSRSCORE$ measures a firm's overall performance on social responsibility.

$MCSRSCORE$, the average of $CSRSCORE$ of each industry, is an instrument variable that will be used in robustness checks for endogeneity.

$LNZZC$ denotes the logarithms of firms' year-end total assets. In general, larger firms have less restrictive financial constraints and are less likely to default on debts. $LNZZC$ is thus expected to be negatively correlated with $CS$.

$LEV$ denotes firms' year-end leverage ratios, i.e., the ratios of year-end long-term liabilities to year-end total assets. Highly leveraged firms are more likely to default on debts. $LEV$ is thus expected to be positively correlated with $CS$.

$CREDIT$ represents credit ratings of corporate bonds. Scores are assigned to bond of various credit ratings as follows: $AAA = 8$, $AAA- = 7$, $AA+ = 6$, $AA = 5$, $AA- = 4$, $A+ = 3$, $A = 2$ and $A- = 1$. $CREDIT$ is supposed to be negatively correlated with $CS$.

$SYQX$ denotes the numbers of remaining years to maturity of corporate bonds measured in years. Previous studies (e.g., Helwege and Turner, 1999) have found that longer remaining years means more uncertainties and thus higher likelihood of default. $SYQX$ is thus expected to be negatively correlated with $CS$.

$AGE$ denotes the ages of corporate bonds, i.e., the numbers of years since the bonds were issued till they are sampled for this study. Yu (2005) argues that the ages of corporate bonds would be negatively correlated with credit spreads on corporate bonds because corporate bonds tend to become less liquid as they approach maturity. However, an argument opposite to Yu (2005) may also be made as follows: the longer corporate bonds have been publicly traded in the markets, the more information about them has been published. Informational asymmetry between bond issuers and investors is thus likely less severe, which will lead to smaller credit spreads.

$VAR$ denotes the annualized stock market volatility and is calculated using the daily volatility of SSE Composite Index. There is evidence that stock markets are negatively correlated with bond markets. $VAR$ is thus expected to be negatively correlated with $CS$.

$IQ$, year-end ownership held by institutional investors in a firm, is calculated as the ratio of stock shares held by institutional investors to all outstanding stock shares issued by a firm. The sign of the coefficient of $IQ$ is unclear.

Two dummy variables, $YearDum$ and $IndustDum$, are created to control for potential time and industry effects.

The following three variables are to be used in robustness checks.

$SCORE$ is an index measuring the overall quality of corporate governance of publicly traded companies. The index is constructed in accordance with the following procedures: first, eight variables about corporate governance are selected and firms in the sample are rated on each of these eight variables. Firms' scores on the eight variables are standardized. Second, principal component analysis is carried out on the eight variables and three factors (i.e., management size, ownership by the management, management compensation) are extracted. Using the contributions of these three factors to total variances as the weights, $SCORE$ is calculated as the weighted average scores.

$ROE$ denotes firms' year-end returns on equity. Firms with higher returns on equity are in general less cash-constrained and thus less likely to default on debts. $ROE$ is thus expected to be negatively correlated with $CS$.

$GDPrate$ is the annual GDP growth rate of Chinese economy. Generally speaking, higher GDP growth rates imply better macro-economic conditions and less restrictive financial constraints for firms. $GDPrate$ is thus assumed to be negatively correlated with $CS$.

## 4. TEST RESULTS

### 4.1. Descriptive statistics

Table 1 presents descriptive statistics on key variables discussed above. Several points are worthy of notice. First, with a mean of 2.85% and a standard deviation of 1.14%, credit spreads on corporate bonds vary significantly across firms. Second, an average of 0.273 on $CSR01$ suggests that roughly only one-fourth of publicly traded firms have undertaken social responsibility. This is consistent with the fact that of the about 2,500 firms publicly traded on China's domestic stock markets in 2012, only 592 published $CSR$ reports. Third, a mean of only 1.81 for $CSRSCORE$ on a scale of 1 to 10 with 10 being the highest suggests that publicly traded firms in China have not been very keen on social responsibility[4].

[4]Details on the construction of $SCORE$ are as follows: principal component analyses which are carried out on the eight variables on corporate governance using SPSS yield a value of 0.763 for KMO. The value is greater than 0.7, which suggests that the original eight variables are suitable for principal component analyses. A value of 1386 for Bartlett

**TABLE 1.**

Descriptive statistics

| Variables | Obs. | Mean | Median | S.D. | Min. | Max. |
|---|---|---|---|---|---|---|
| $CS$ (%) | 450 | 2.85 | 2.65 | 1.14 | 0.138 | 6.39 |
| $CSR01$ | 450 | 0.273 | 0 | 0.446 | 0 | 1 |
| $CSRSCORE$ | 450 | 1.81 | 0 | 3.07 | 0 | 10 |
| $LNZZC$ | 450 | 14.1 | 13.9 | 1.19 | 11.9 | 17.8 |
| $LEV$ | 450 | 0.578 | 0.58 | 0.137 | 0.256 | 0.842 |
| $CREDIT$ | 450 | 5.96 | 6 | 1.16 | 5 | 8 |
| $AGE$ (years) | 450 | 1.9 | 2.3 | 1.46 | 1 | 6 |
| $SYQX$ (years) | 450 | 5.07 | 5 | 1.71 | 2 | 10 |
| $VAR$ (%) | 450 | 19.08 | 18.08 | 0.024 | 17.07 | 22.11 |
| $GDPrate$ (%) | 450 | 8.66 | 7.7 | 1.04 | 7.7 | 10.4 |
| $SCORE$ | 360 | −0.075 | 0.012 | 0.557 | −1.26 | 1.02 |
| $IQ$ (%) | 446 | 50.6 | 52.9 | 21.4 | 0.027 | 98.1 |
| $ROE$ (%) | 448 | 8.57 | 8.65 | 8.98 | −27.3 | 33.2 |

### 4.2. Univariate tests results

Univariate test results on correlations between key variables are displayed in Table 2. Table 2 shows that both $CSR01$ and $CSRSCORE$ are significantly negatively correlated with $CS$, which provides preliminary supports for **H1a** and **H1b**. In addition, the correlation coefficients of explanatory variables are rather small and the VIF is less than 3, which suggests that multicollinearity is unlikely to be a serious problem in this study.

### 4.3. Multivariable regression results

#### *4.3.1. Regression results on CSR and credit spreads*

Table 3 presents test results of regressions using the baseline model specified in Equation (1). Test results show that in all of the models, the coefficients of variables measuring CSR are negative and statistically significant.

Column 1 of Table 3 shows that the coefficient of $CSR01$ is negative and statistically significant at 1%. Such a result confirms **H1a**, i.e., companies that undertake CSR have lower credit spreads than companies that don't undertake CSR. Results on other control variables are largely consistent with expectations.

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test shows that the coefficient matrix is significantly different from the unit matrix at 1% level. Finally, the cumulative contribution of the three factors obtained from principal component analyses (i.e., management size, ownership by the management, management compensation) to total variance is 0.816, which shows that the three factors provide most of the information contained in the original eight variables.

**TABLE 2.**

Correlation between key variables

| | $CS$ | $CSR01$ | $CSR$ $SCORE$ | $LNZZC$ | $LEV$ | $CREDIT$ | $AGE$ | $SYQX$ |
|---|---|---|---|---|---|---|---|---|
| $CS$ | 1 | | | | | | | |
| $CSR01$ | $-0.288^{***}$ | 1 | | | | | | |
| $CSRSCORE$ | $-0.285^{***}$ | $0.963^{***}$ | 1 | | | | | |
| $LNZZC$ | $-0.504^{***}$ | $0.266^{***}$ | $0.262^{***}$ | 1 | | | | |
| $LEV$ | 0.006 | $0.102^{**}$ | $0.102^{**}$ | $0.448^{***}$ | 1 | | | |
| $CREDIT$ | $-0.507^{***}$ | $0.169^{***}$ | $0.165^{***}$ | $0.64^{***}$ | 0.074 | 1 | | |
| $AGE$ | $-0.143^{***}$ | $0.224^{***}$ | $0.207^{***}$ | $0.38^{***}$ | $0.186^{***}$ | $0.279^{***}$ | 1 | |
| $SYQX$ | $-0.108^{**}$ | 0.015 | 0.001 | 0.028 | 0.061 | $-0.027$ | $-0.418^{***}$ | 1 |

Note: $^{***}$, $^{**}$ and $^{*}$ denote significance at 1%, 5% and 10%, respectively.

Column 2 of Table 3 shows that the coefficient of $CSRSCORE$ is negative and statistically significant at 1%, which confirms **H1b**, i.e., compared with otherwise comparable companies, companies with better CSR performance records have lower credit spreads. Column 2 also shows that in economic terms, an increase of one standard deviation in $CSRSCORE$ will lead to a decrease of 0.18 percentage points in firms' credit spreads.

Columns 3-5 of Table 3 display the coefficients of the five components of CSR (environment, employee, consumer, community and other stakeholder, respectively). All of the five coefficients are negative and statistically significant at 1%, which means all of the five components of CSR can help firms reduce credit spreads. **H1a** is thus confirmed again by tests on the five components of CSR.

*4.3.2. Regression results on the difference in the impact of CSR on credit spreads between sub-samples of different corporate governance quality*

Testing of differences in the impact of CSR on credit spreads between sub-samples of different corporate governance quality is conducted in accordance with the following procedures: first, the sample is divided into two sub-samples along the median of $SCORE$ of the full sample, i.e., a sub-sample with $SCORE$ being greater than the median of $SCORE$ of the full sample and a sub-sample with $SCORE$ being less than the median of $SCORE$ of the full sample. Second, regressions of $CS$ on the two variables measuring CSR performance (i.e., $CSRSCORE$ and $CSR01$) are carried out on the two sub-samples. Third, the coefficients of $CSRSCORE$ and $CSR01$ obtained from regressions on the two sub-samples are compared and tested for significance in differences. Test results are presented in Panel A

**TABLE 3.**

Test results on correlation between CSR and credit spreads

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| *Constant* | 7.485*** | 7.527*** | 7.548*** | 7.499*** | 7.680*** | 7.622*** | 7.754*** |
| | (9.23) | (9.36) | (9.15) | (9.36) | (9.50) | (9.51) | (9.54) |
| *CSR*01 | −0.461*** | | | | | | |
| | (−4.80) | | | | | | |
| *CSRSCORE* | | −0.065*** | | | | | |
| | | (−4.80) | | | | | |
| *CSRHJ* | | | −0.203*** | | | | |
| | | | (−3.66) | | | | |
| *CSRYG* | | | | −0.278*** | | | |
| | | | | (−4.90) | | | |
| *CSRXF* | | | | | −0.348*** | | |
| | | | | | (−4.20) | | |
| *CSRSQ* | | | | | | −0.268*** | |
| | | | | | (−4.85) | | |
| *CSRQT* | | | | | | | −0.271*** |
| | | | | | | | (−4.17) |
| *LNZZC* | −0.325*** | −0.325*** | −0.329*** | −0.326*** | −0.337*** | −0.332*** | −0.340*** |
| | (−4.82) | (−4.82) | (−4.80) | (−4.85) | (−5.00) | (−4.95) | (−5.02) |
| *LEV* | 1.178*** | 1.208*** | 1.171*** | 1.211*** | 1.230*** | 1.198*** | 1.221*** |
| | (3.00) | (3.07) | (2.97) | (3.07) | (3.12) | (3.04) | (3.07) |
| *AGE* | −0.021 | −0.022 | −0.030 | −0.028 | −0.026 | −0.017 | −0.029 |
| | (−0.52) | (−0.54) | (−0.73) | (−0.67) | (−0.62) | (−0.42) | (−0.70) |
| *SYQX* | −0.019 | −0.021 | −0.013 | −0.017 | −0.021 | −0.028 | −0.016 |
| | (−0.41) | (−0.46) | (−0.29) | (−0.37) | (−0.46) | (−0.60) | (−0.36) |
| *CREDIT* | −0.243*** | −0.245*** | −0.246*** | −0.244*** | −0.246*** | −0.234*** | −0.247*** |
| | (−4.20) | (−4.23) | (−4.21) | (−4.21) | (−4.25) | (−4.07) | (−4.21) |
| *VAR* | 0.007 | 0.006 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 |
| | (1.56) | (1.48) | (1.59) | (1.58) | (1.51) | (1.36) | (1.39) |
| *YearDum* | Included | Included | Included | Included | Included | Included | Included |
| *IndustDum* | Included | Included | Included | Included | Included | Included | Included |
| Obs. | 450 | 450 | 450 | 450 | 450 | 450 | 450 |
| F | 21.56*** | 21.74*** | 20.96*** | 21.86*** | 21.46*** | 21.73*** | 21.76*** |
| Adj. $R^2$ | 0.435 | 0.433 | 0.422 | 0.434 | 0.429 | 0.437 | 0.427 |

Note: ***, **, * denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests.

of Table 4. Test results presented in Column 1 and Column 2 show that although both of the two coefficients of *CSRSCORE* are negative and statistically significant at 1%, the coefficient in Column 2 is significantly

smaller than that in Column 1. Such a result is consistent with **H2** that in firms with weak internal corporate governance, the negative relationship between CSR and credit spreads is statistically stronger than in firms with strong internal corporate governance. The test results displayed in Column 3 and Column 4 are similar to these displayed in Column 1 and Column 2.

To further test the impact of CSR on credit spreads between sub-samples of different corporate governance quality, $DDRS$, a variable denoting the ratio of independent directors to all directors in boards of directors, is substitute for $SCORE$. The test procedures are the same as described above. Test results which are displayed in Panel B of Table 4 are similar to those obtained from tests with $SCORE$ being the variable measuring the strength of corporate governance.

*4.3.3. Regression results on impact of institutional ownership on the relationship between CSR and credit spreads*

Testing of the impact of institutional ownership on the relationship between CSR and credit spreads is completed by adding $IQ$ and an interactive variable, $CSR01 * IQ$ (or $CSRSCORE * IQ$), to Equation (1) as independent variables. Test results are displayed in Table 5. The coefficients of both $CSR01$ and $CSRSCORE$ are negative and statistically significant at 1%, while the coefficients of both $CSR01 * IQ$ and $CSRSCORE * IQ$ are positive and statistically significant at 5% and 1%, respectively. Test results suggest that as institutional ownership increases, the negative correlation between CSR and credit spreads tends to become weaker. **H3b** is thus confirmed.

### 4.4. Robustness checks

Robustness checks of our baseline test results are carried out in the following several different ways.

*4.4.1. Omission of variables*

Omission of variables and endogeneity are two common problems that can cause test results to be biased. There are studies (e.g., Brown, et al., 2006) suggesting that corporate governance quality and corporate profitability are simultaneously related to both CSR and cost of debts. It is therefore possible that in this study, variables (such as corporate governance quality and corporate profitability) which are related to both CSR and cost of debts may have been omitted and that the direction of causation may also run from cost of debts to CSR.

**TABLE 4.**

Test results on the differences in the impact of CSR on credit spreads between sub-samples of different corporate governance quality

| Panel A: $SCORE$ (corporate governance index) | | | | |
|---|---|---|---|---|
| | Sub-sample 1: $SCORE < median$ | Sub-sample 2: $SCORE > median$ | Sub-sample 1: $SCORE < median$ | Sub-sample 2: $SCORE > median$ |
| Constant | $6.559^{***}$ | $10.941^{***}$ | $6.497^{***}$ | $11.020^{***}$ |
| | (4.73) | (10.61) | (4.7) | (10.46) |
| $CSRSCORE$ | $-0.090^{***}$ | $-0.062^{***}$ | | |
| | $(-3.97)$ | $(-2.66)$ | | |
| | Prob. (different) $= 0.09^{*}$ | | | |
| $CSR01$ | | | $-0.731^{***}$ | $-0.364^{**}$ |
| | | | $(-4.64)$ | $(-2.26)$ |
| | | | Prob. (different) $= 0.08^{*}$ | |
| Control variables | Included | Included | Included | Included |
| Obs. | 180 | 180 | 180 | 180 |
| Adj. $R^2$ | 0.377 | 0.412 | 0.377 | 0.411 |
| Panel B: $DDRS$ (ratio of independent directors to all directors) | | | | |
| | Sub-sample 1: $DDRS < median$ | Sub-sample 2: $DDRS > median$ | Sub-sample 1: $DDRS < median$ | Sub-sample 2: $DDRS > median$ |
| Constant | $9.431^{***}$ | $4.258^{***}$ | $9.328^{***}$ | $4.240^{***}$ |
| | (5.74) | (4.57) | (5.69) | (4.55) |
| $CSRSCORE$ | $-0.103^{***}$ | $-0.046^{***}$ | | |
| | $(-3.42)$ | $(-3.27)$ | | |
| | Prob. (different) $= 0.06^{*}$ | | | |
| $CSR01$ | | | $-0.763^{***}$ | $-0.315^{***}$ |
| | | | $(-3.67)$ | $(-3.29)$ |
| | | | Prob. (different) $= 0.04^{**}$ | |
| Control variables | Included | Included | Included | Included |
| Obs. | 180 | 180 | 180 | 180 |
| Adj. $R^2$ | 0.219 | 0.483 | 0.224 | 0.484 |

Note: $^{***}$, $^{**}$, $^{*}$ denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests. To save space, results on control variables are not presented in the table, but they are available from the authors upon request. Control variables include firms' size measured in firms' total assets ($LNZZC$), leverage ratios ($LEV$), bonds' ratings ($CREDIT$), ages of bonds ($AGE$), remaining years to maturity of bonds ($SYQX$), and stock market volatility ($VAR$).

To address the potential biases resulted from omission of variables, this study includes some additional variables into the baseline model specified in Equation (1). Columns 1-2, Columns 3-4 and Columns 5-6 of Table 6 display test results with $IQ$, $SCORE$ and $ROE$, respectively, being included

**TABLE 5.**

Test results on the impact of institutional ownership on the relationship between CSR and credit spreads

| | (1) | (2) |
|---|---|---|
| Constant | $7.293^{***}$ | $7.355^{***}$ |
| | (8.94) | (9.09) |
| $IQ$ | $-0.008^{***}$ | $-0.008^{***}$ |
| | $(-3.63)$ | $(-3.63)$ |
| $CSR01$ | $-1.005^{***}$ | |
| | $(-3.80)$ | |
| $CSR01 * IQ$ | $0.010^{**}$ | |
| | (2.34) | |
| $CSRSCORE$ | | $-0.151^{***}$ |
| | | $(-4.22)$ |
| $CSRSCORE * IQ$ | | $0.002^{***}$ |
| | | (2.72) |
| Control variables | Included | Included |
| Obs. | 446 | 446 |
| Adj. $R^2$ | 0.448 | 0.446 |

Note: ***, **, * denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests. To save space, results on control variables are not presented in the table, but they are available from the authors upon request. Control variables include firms' size measured in firms total assets ($LNZZC$), leverage ratios ($LEV$), bonds' ratings ($CREDIT$), ages of bonds ($AGE$), remaining years to maturity of bonds ($SYQX$), and stock market volatility ($VAR$).

into our baseline model. Test results with all of the three additional variables being included are presented in Columns 7-8. Test results obtained from the augmented models show that all of the coefficients of $CSR01$ and $CSRSCORE$ are still negative and statistically significant at 1%, which suggests that inclusion of additional variables doesn't result in changes to the baseline results presented in Table 3.

This study argues that institutional ownership can help reduce credit spreads by affecting informational asymmetry between firms and investors. However, there may be other explanations for the impact of institutional ownership on the relationship between CSR and credit spreads. Studies (e.g., Shleifer and Vishny, 1986) have found that monitoring of the management by institutional investors can serve as an external corporate gov-

**TABLE 6.**

Test results with potentially omitted variables

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Constant | $7.192^{***}$ | $7.239^{***}$ | $8.011^{***}$ | $8.016^{***}$ | $7.536^{***}$ | $7.582^{***}$ | $7.658^{***}$ | $7.661^{***}$ |
| | (8.93) | (9.05) | (8.34) | (8.42) | (8.97) | (9.11) | (7.61) | (7.68) |
| $CSR01$ | $-0.434^{***}$ | | $-0.477^{***}$ | | $-0.491^{***}$ | | $-0.484^{***}$ | |
| | $(-4.49)$ | | $(-4.24)$ | $(-5.12)$ | | $(-4.29)$ | | |
| $CSR$ | | $-0.060^{***}$ | | $-0.067^{***}$ | | $-0.069^{***}$ | | $-0.068^{***}$ |
| $SCORE$ | $(-4.43)$ | | $(-4.18)$ | | $(-5.07)$ | | $(-4.24)$ | |
| $IQ$ | $-0.006^{***}$ | $-0.006^{***}$ | | | | | $-0.005^{*}$ | $-0.005^{*}$ |
| | $(-3.04)$ | $(-3.02)$ | | | | | $(-1.93)$ | $(-1.72)$ |
| $SCORE$ | | | $-0.020^{**}$ | $-0.016^{**}$ | | | $-0.041^{**}$ | $-0.041^{*}$ |
| | | | (2.20) | (2.16) | | | $(-2.01)$ | $(-1.87)$ |
| $ROE$ | | | | | $-0.020^{***}$ | $-0.019^{***}$ | $-0.019^{***}$ | $-0.019^{***}$ |
| | | | | | $(-4.41)$ | $(-4.41)$ | $(-3.89)$ | $(-3.91)$ |
| Control variables | Included | Included | Included | Included | Included | Included | Included | Included |
| Obs. | 446 | 446 | 360 | 360 | 448 | 448 | 359 | 359 |
| Adj. $R^2$ | 0.450 | 0.441 | 0.446 | 0.449 | 0.457 | 0.455 | 0.467 | 0.465 |

Note: $^{***}$, $^{**}$, $^{*}$ denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests. To save space, results on control variables are not presented in the table, but they are available from the authors upon request. Control variables include firms' size measured in firms' total assets ($LNZZC$), leverage ratios ($LEV$), bonds' ratings ($CREDIT$), ages of bonds ($AGE$), remaining years to maturity of bonds ($SYQX$), and stock market volatility ($VAR$).

ernance mechanism. It is therefore possible that institutional ownership helps reduce credit spreads not because it affects informational asymmetry between firms and investors but because it can reduce agency costs by effectively monitoring the management. Test results presented in Table 6 show when $IQ$ and $SCORE$ are simultaneously entered into the model, although the coefficients of $IQ$ (displayed in Columns 7-8) are larger than those when only $IQ$ is entered into the model (displayed in Columns 1-2), the formers are still negative and statistically significant. Based on such results, it can be safely concluded while the monitoring role of institutional ownership on credit spreads may indeed exist, informational asymmetry theory about the relationship between institutional ownership and credit spreads is also firmly supported by test results. Such results are consistent with Zhou, Li, and Lin (2015) in that the impact of institutional investors on corporate credit spreads depends on their investment horizons. Zhou, Li, and Lin (2015) examines the relationship between institutional ownership and credit spreads from the perspective of informational asymmetry and

finds that the impact of institutional investors on corporate credit spreads depends on their investment horizons. Specifically, long-term institutional investors are inclined to closely monitor firm managers and such a monitoring role serves as an external corporate governance mechanism, while at the same time, the presence of long-term institutional investors tends to exacerbate the problem of informational asymmetry. The presence of short-term institutional investors has the opposite impact on informational asymmetry and thus on corporate credit spreads.

*4.4.2. Endogeneity*

To further address the endogeneity concern, this study employs instrumental variable estimations. In a study on the correlation between corporate ownership structure and bank loan syndicate structure, Lin, et al. (2011) proposes the following method for choosing instrumental variables: first, categorize observations in the full sample into industry-region groups and every observations will fall into a particular industry-region group; second, choose a variable and calculate the averages of the variable of the observations in all industry-region groups; third, use the average as the instrument variable. In the spirit of Lin, et al. (2011), Column 1 of Table 7 uses $MCSRSCORE$, the average of $CSRSCORE$ of each industry, as the instrument variable. Columns 2-3 present test results on the correlation between $CSRSCORE$ and $CS$ using 2SLS, while Columns 4-5 present test results on the correlation between $CSR01$ and $CS$ using 2SLS. Column 2 and Column 4 display the test results obtained from the first stage regression with $CSRSCORE$ and $CSR01$ being the dependent variable, respectively. The independent variables includes $CR5$ (denoting industry concentration ratio) and $YYLRL$ (denoting operating profit ratio) while $IQ$ and $SCORE$ are exogenous variables. Column 3 and Column 5 display the test results obtained from the second stage regression with $CS$ being the dependent variable. In Column 5, the variable $LAMBDA$ is added to control selection biases.

Firms' decision to undertake social responsibility or not may be subject to the influence of firms' characteristics (for example, profitable firms are more likely to undertake social responsibility because they have more resources). Such characteristics maybe remain in the error term of Equation (1), which may cause the test results presented in Table 3 to be biased. To address such a concern, this study employs propensity matched study (PSM) method to construct a sample that matches the sample used in baseline regression in every aspect except that firms in this matched sample did

not undertake social responsibility. Test results on these two samples are presented in Columns 4-5 of Table 7.

Table 7 displays test results of regressions with instrument variables. The coefficients of instrument variables are negative and significant at 1%, which are consistent with the baseline test results presented in Table 3.

*4.4.3. Further robustness checks*

This study conducts the following two more tests to check the robustness of the baseline test results.

First, because there is evidence that CSR performance varies across industries (e.g., Waddock and Graves, 1997; McWilliams and Siegel, 2001), this study replaces $CSRSCORE$ and $CSR01$ with $TCSRSCORE$, a variable denoting industry-adjusted CSR performance, as the explanatory variable. $TCSRSCORE$ is calculated as the difference between an individual firm's $CSRSCORE$ and the average $CSRSCORE$ of the industry to which the individual firm belongs. Test results which are displayed in Column 1 of Table 8 show that the correlation between $CS$ and $TCSRSCORE$ is negative and significant at 1%.

Second, some studies have found that credit spreads on corporate bonds are related to macro-economic risks. For example, Tang and Yan (2006) uses corporate cash flows as a variable measuring macro-economic risks and finds that the inclusion of the variable into models can significantly increase the predictive power of credit spreads on corporate bonds for default probabilities. Columns 2-3 of Table 8 present the test results with $GDPrate$ as the variable measuring macro-economic risks. The coefficients of $CSRSCORE$ (Column 2) and $CSR01$ (Column 3) are negative and significant at 1%.

## 5. CONCLUSIONS

Using data on corporate bonds issued by Chinese corporations, this study sets out to investigate the relationship between CSR and corporate credit spreads and makes the following findings: first, CSR can significantly reduce corporate credit spreads, and more CSR leads to more reduction in credit spreads; all of the five aspects of CSR (i.e., environment, employees, consumers, communities and other stakeholders) are significantly negatively correlated with credit spreads. Second, in companies with weak corporate governance, CSR can result in more reduction in credit spreads, which suggests that social responsibility can send more information to investors when internal corporate governance is weak. Third, the correlation

**TABLE 7.**

Test results with instrumental variable

| Variables | (1) CS Industry IV | (2) CS 2SLS | | (3) CS 2SLS | | (4) CS PSM | (5) CS PSM |
|---|---|---|---|---|---|---|---|
| Constant | $9.573^{***}$ | $-0.582^{**}$ | $5.484^{***}$ | $-0.589^{***}$ | $-9.616$ | $5.859^{***}$ | $5.862^{***}$ |
| | (12.05) | (1.97) | (10.21) | (−4.97) | (−1.06) | (6.16) | (6.18) |
| MCSRSCORE | $-0.069^{***}$ | | | | | | |
| | (−2.84) | | | | | | |
| $CSRSCORE$ | | | $-0.248^{**}$ | | | | $-0.068^{***}$ |
| | | | (−2.01) | | | | (−3.68) |
| $CSR01$ | | | | | $-1.172^{*}$ | $-0.481^{***}$ | |
| | | | | | (−1.81) | (−3.52) | |
| $LNZZC$ | $-0.469^{***}$ | $0.596^{**}$ | $-0.299^{**}$ | $0.363^{***}$ | $-0.327^{***}$ | −0.129 | −0.123 |
| | (−6.10) | (2.39) | (−2.19) | (3.65) | (−2.80) | (−1.35) | (−1.30) |
| $LEV$ | $1.770^{***}$ | −0.131 | $1.984^{***}$ | 0.155 | $1.585^{***}$ | $1.014^{*}$ | $1.068^{**}$ |
| | (4.12) | (−0.79) | (3.29) | (0.20) | (2.89) | (1.94) | (2.03) |
| $AGE$ | 0.035 | $0.324^{*}$ | 0.116 | | −0.032 | −0.018 | −0.017 |
| | (0.72) | (1.80) | (1.49) | | (−0.51) | (−0.42) | (−0.38) |
| $SYQX$ | $-0.100^{*}$ | −0.044 | $-0.125^{**}$ | | 0.149 | −0.006 | −0.012 |
| | (−1.90) | (−0.26) | (−1.99) | | (0.24) | (−0.14) | (−0.25) |
| $CREDIT$ | $-0.220^{***}$ | −0.034 | $-0.281^{***}$ | | $-0.201^{***}$ | $-0.388^{***}$ | $-0.396^{***}$ |
| | (−3.59) | (−0.18) | (−3.68) | | (−2.97) | (−5.14) | (−5.28) |
| $VAR$ | −0.003 | −0.022 | −0.008 | | $0.011^{*}$ | $0.010^{*}$ | 0.009 |
| | (−0.61) | (−1.33) | (−1.21) | | (1.91) | (1.81) | (1.64) |
| $IQ$ | | $0.022^{**}$ | | $0.010^{**}$ | | | |
| | | (2.48) | | (2.22) | | | |
| $SCORE$ | | $0.326^{*}$ | | $0.302^{*}$ | | | |
| | | (1.89) | | (1.93) | | | |
| $CR5$ | | $-0.144^{*}$ | | $-0.956^{*}$ | | | |
| | | (−1.69) | | (−1.84) | | | |
| $YYLRL$ | | −0.166 | | 0.615 | | | |
| | | (−0.12) | | (1.00) | | | |
| $LAMBDA$ | | | | | 0.459 | | |
| | | | | | (1.19) | | |
| $YearDum$ | Included | Not Included | Included | Not Included | Included | Included | Included |
| $IndustDum$ | Not Included | Not Included | Included | Not Included | Included | Included | Included |
| Obs. | 450 | 318 | 318 | 318 | 318 | 248 | 248 |
| Adj. $R^2$ | 0.371 | 0.116 | 0.280 | $Wald = 232.9$ | | 0.523 | 0.522 |

Note: ***, **, * denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests. $MCSRSCORE$ is the average of $CSRSCORE$ of each industry.

**TABLE 8.**

Test results with alternative explanatory variables

| | (1) | (2) | (2) |
|---|---|---|---|
| Constant | $7.395^{***}$ | $-11.357^{**}$ | $-11.316^{**}$ |
| | (9.08) | (−2.18) | (−2.17) |
| $TCSRSCORE$ | $-0.060^{***}$ | | |
| | (−4.36) | | |
| $CSRSCORE$ | | $-0.065^{***}$ | |
| | | (−4.80) | |
| $CSR01$ | | | $-0.461^{***}$ |
| | | | (−4.80) |
| $GDPrate$ | | $-1.309^{***}$ | $-1.306^{***}$ |
| | | (−3.62) | (−3.62) |
| Control variables | Included | Included | Included |
| Obs. | 450 | 450 | 450 |
| Adj. $R^2$ | 0.430 | 0.433 | 0.435 |

Note: ***, **, * denote significance at 1%, 5% and 10%, respectively. t-values, which are in parentheses, are obtained from Huber-white tests. To save space, results on control variables are not presented in the table, but they are available from the authors upon request.

between CSR and credit spreads tends to become weaker as ownership held by institutional investors in the firms increases. Findings of this study can provide empirical evidence supporting the argument that corporation can benefit from undertaking social responsibility.

This study finds that in firms with weak internal corporate governance, the negative relationship between CSR and credit spreads is statistically stronger than in firms with strong internal corporate governance. Such a finding suggests the possibility of CSR as an external corporate governance mechanism. This is a subject worthy of investigation in future studies.

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