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Article

Corporate Social Responsibility and Bond Price at Issuances: U.S. Evidence

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Abstract: Bondholders are arm's-length lenders with limited insider information. In this paper, we explore whether corporate social responsibility (CSR) activities could work as an information channel for bondholders to better understand the riskiness of bond-issuing firms. We find a significant negative relation between CSR scores and corporate bond yield spread, especially for firms which invest heavily in diversity and community relations, suggesting that CSR firms are less risky. The result is robust to different model specifications and endogeneity issues. In addition, the negative relation between the CSR score and bond yield spread is significant only if a firm has a strong internal governance mechanism.

Keywords: corporate social responsibility; bond yield spread; business risk; stakeholder management



Citation: Zhao, H.; Du, W.; Shen, H.; Zhen, X. Corporate Social Responsibility and Bond Price at Issuances: U.S. Evidence. *Sustainability* **2021**, *13*, 13123. <https://doi.org/10.3390/su132313123>

Academic Editor: Andrea Pérez

Received: 17 October 2021

Accepted: 16 November 2021

Published: 26 November 2021

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1. Introduction

Corporate social responsibility (CSR) has become a common practice in the operation of firms over the past three decades. In the year 2020, 96 percent of the world's largest 250 companies issued a yearly CSR report [1]. Although being socially responsible could be costly and sometimes mean abandoning positive NPV projects [2], CSR strategies could also be rewarding for shareholders in the long run in terms of profitability, financial performance, and corporate sustainability [3–8]. From an instrumental perspective, companies take CSR-related stakeholder relationships as a way to achieve their ultimate objective of maximizing shareholder values [9–11].

Recently, the research focus of the CSR literature has turned beyond the traditional interactive interests between social stakeholders and shareholders. For instance, El Ghouli et al. [12] showed that investors are favorable to firms with better CSR scores, especially for those with CSR investment in employee relations, environmental policies, and product strategies, by asking for lower cost of capital. Goss and Roberts [13] showed that banks take CSR as a second-order determinant of bank loan spread and may require an additional 7 to 18 basis points for firms with socially responsible concerns. Zhao et al. [14] found that bank equity holding and board representation on corporations affects corporate environmental responsibility.

In this paper, we study the relation between CSR and bond financing costs. Compared to other investors, bondholders are unique as they are the arm's length lenders with very limited insider information. Their investment choice and decision rely on public information. We are interested in showing whether CSR activities could work as the information channel to help bondholders better understand the riskiness of the bond-issuing firms and make investment decisions. This idea, to our best knowledge, has not been extensively explored by the literature.

Corporate social responsibility refers to the economic, legal, moral, and philanthropic actions of firms that have an influence on the quality of life of relevant social stakeholders [15]. Social stakeholders include employees and their families, consumers, local community, society, and others. They are parties who are, in most cases, not necessarily the owners of the company, but their interests may have a significant influence on the risk profile of the company.

The existing literature suggests that investment in socially responsible activities is related to the riskiness of a corporation. This relation could be through two channels. First, the CSR policy reflects the riskiness of a company. The CSR policy may work as a signal and convey information from managers to outside investors where the firm's management team attaches a high value to the implicit contracts among the various stakeholders, and may have a strong incentive to keep their implicit contracts and maintain their reputation [16–18]. Second, CSR activities could reduce the firm's risk themselves. For instance, the CSR strategy may have a significant impact on human capital. The inalienability of human capital is a basic human right [19], but the mobility of human capital may incur a huge loss to the company, especially for those who are willing to invest heavily in employee training and those who intensively rely on innovation, and is therefore an important part of the firm's operating risk. A feasible solution is to achieve great employee satisfaction through a diversified, friendly working environment with great respect to human rights, which is one of the major contents of CSR. In addition, the riskiness of CSR firms may also be reduced because of the increasing popularity of ethical investing. Ethical investors may boycott investment in firms operating in a way that is against those investors' ethical standards. Heinkel et al. [20] argued that the growing size of ethical investors may lead to a smaller number of neutral investors following non-CSR firms, and therefore hurt the trading liquidity of the security and increase the risk of liquidity. To conclude, both of the above two channels imply that CSR firms are less risky, regardless of the causality. The yield spread of corporate bonds is not only determined by credit risk, but also by other types of risks, such as liquidity risk and idiosyncratic risk [21–23]. If CSR firms are less risky, as we expected, and such risks are priced by the corporate bond market, we expect that the yield spreads of the bonds issued by CSR firms are lower on average.

Based on a sample of 2145 corporate bonds issued by 348 companies from 1993 to 2013, we perform several tests to evaluate the validity of our hypothesis. We find strong evidence that firms with a higher level of CSR investments may have lower bond credit yield spread. We employ propensity score matching (PSM) and 2SLS to address the potential endogeneity problem arising from firms' self-selecting issues. Our results are consistent and robust to a variety of model specifications. We also perform a Rosenbaum bounds sensitivity analysis [24] and conclude that a hidden bias is unlikely to drive our results. In addition, we find that the effects of CSR remain after 2002 when KLD expands the sample coverage to small firms. In terms of the dimensions of CSR, our empirical results suggest that the negative effects of CSR on corporate bond yield spread are mainly driven by diversity and community relations. We also separate the CSR score into two parts: CSR strength and CSR concerns to further explore the mechanism behind the significant empirical result, and find that firms may face lower bond market financial costs when CSR strength is higher but may not be related to CSR concerns, suggesting that the bond market may reward firms with high CSR strengths with lower financing costs, but not punish firms with high CSR concerns with a higher premium.

The agency theory [25] suggests that one of the possible motivations for managers to conduct CSR investment is to build a personal reputation, rather than maximize shareholders' value. If the decision to conduct CSR investment is due to this reason, an over-investment problem could be incurred and firms' risk should be increased, rather than decreased. As bondholders are not inside investors, their ability to tell the motivation of managers is very limited. Therefore, we argue that bondholders may rely on insiders to tell the motivation of managers. If a firm has a strong internal governance mechanism and has a CSR policy, bondholders may take CSR positively and ask for less bond yield spread.

If a firm has a CSR policy but does not have a strong internal governance mechanism, it will be hard for them to understand the motivation of CSR policy, and therefore, they may not respond to the CSR policy. Using the block holdings and number of block holders as a proxy for the level of internal governance, we find that the negative relation between CSR score and bond yield spread is only significant when internal governance is strong.

This paper is organized as follows. We review the related literature and build our hypothesis in Section 2. In Section 3, we describe the data and provide descriptive statistics for the variables of interest. In Section 4, we present empirical results for the relation between CSR and bond yield spread. We report the robustness test results in Section 5 and summarize the paper in Section 5.

2. Literature Review and Hypotheses

In this section, we review the literature that may link CSR, firm risk, and bond yield spread, and put forward our hypothesis based on those links.

The modern firm theory treats a firm as a set of interrelated contracts among the various stakeholders who play a role as factor input suppliers and the purchasers of the final outputs [26–28]. As some contracts are too nebulous and state-contingent to reduce at a reasonable cost, it will be very costly and risky for firms to take them as explicit claims, such as the commitment of being environmentally friendly. Therefore, firms may externalize these contracts as implicit contracts with stakeholders. The value of these implicit contracts largely depends on stakeholders' expectations on the probability and quality that a firm may honor its commitments. If a firm has a strong reputation for its implicit contracts at its best effort, stakeholders are more likely to accept more implicit contracts. Otherwise, firms have to either internalize back or give up these contracts. Neither of these two choices is favorable to the firm, as the former means that risks have been explicitly shifted back to the firm, while the latter means that the value of the products and services the firm provides may be reduced and the profitability of the firm may be hurt [16]. In fact, certain implicit contracts are so crucial that they are related to the survival of the company and could not be given up, and firms have to pay the high costs to internalize these contracts. Examples could be the safety commitment made by the food producer and the liquidity commitment on deposits by banks.

Given the importance of such implicit contracts, firms may have a strong incentive to keep their commitments and maintain their reputation. Heal [17] argues that one of the possible ways for firms to show their willingness to consistently stick to their commitment ex-ante is through signaling: firms who invest heavily in CSR activities may send a signal to stakeholders that these firms attach a high value to the implicit contracts or reputation with stakeholders. If the signaling mechanism works, firms with less business risk tend to have a stronger ability to externalize the business risk through implicit contracts and are likely to invest more in CSR activities.

Another channel through which a CSR strategy may be related to firm risk is human capital. Human capital has been widely recognized as a core asset of most firms. The increased competition worldwide makes the continuous business success of a corporation increasingly rely on innovation and quality improvement, which can only be generated by talented employees [29]. However, as noted by Hart and Moore [19], the inalienability of human capital is a basic human right. A firm may have higher risk exposure if it is unable to manage the mobility of human capital well. For instance, Donangelo [30] shows that firms in an industry with mobile workers have higher systematic risk loadings and higher expected asset returns. By examining the labor market consequences of corporate diversification, Tate and Yang [31] find that the diversification discount of diversified firms is related to the premium required for greater worker mobility in diversified firms. Human relations theories argue that in order to make people show their talents during their work and reduce the exposure to human capital risk, it is economically wise to create a pleasant working environment. One of the most important contents of CSR is to create a diversified, friendly working environment with great respect to human rights. Therefore, CSR firms,

especially those who have good scores in diversity, employee relations, and human rights, tend to have higher employee loyalty and therefore less exposure to human capital risk.

Further, the securities issued by CSR firms tend to be more liquid. In recent years, the concept of ethical investing is getting more and more popular among investors. A total of \$3.31 trillion in US-domiciled assets at the year-end of 2011 was held by 443 institutional investors, 272 money managers, and 1043 community investment institutions that apply various environmental, social, and governance (ESG) criteria in their investment analysis and portfolio selection [32]. The popularity of ethical investing changes the risk-sharing opportunities in the market. By taking green investors as an example, Heinkel et al. [20] argued that green investors' boycott on investing in unreformed firms with polluting technologies may lead to a smaller number of neutral investors following, which may hurt the trading liquidity of the security. Moreover, high-CSR firms tend to disclose more information, as these firms want to project their positive image as a responsible corporate citizen to investors and other stakeholders [12]. With more information asymmetry as well as a smaller number of investors, the securities issued by low-CSR firms are expected to be riskier, and a higher liquidity risk premium should be asked by neutral investors to compensate for bearing additional risk.

There has been a long debate in academics concerning the determinants of the corporate bond yield spread. The literature shows that the yield spread of corporate bonds over Treasury bonds cannot be fully explained by credit risk [22,23]. In addition, Campbell and Taksler [33] argue that the volatility in Merton [34] should be the total firm volatility, including both idiosyncratic volatility and systematic volatility. Using panel data for the late 1990s, they show that idiosyncratic volatility can explain as much cross-sectional variation in yields as can credit ratings, suggesting that idiosyncratic risk, such as human capital risk and business risk, is priced in the corporate bond market. Moreover, Longstaff et al. [35] empirically showed that corporate spread is strongly and positively related to measures of bond-specific illiquidity as well as to macroeconomic measures of bond market liquidity. Because socially responsible firms may have less business risk, human capital risk, and liquidity risk, if these risks are priced in the bond market, then the bond yield spread of CSR firms is expected to be lower.

On the other hand, Jensen [25] argues that managers, as the agents of shareholders, may have incentives to use the firm's free cash-flow to make the investment beyond the optimal level. One of the possible motivations for managers to overinvest could be investing in CSR to build their personal reputation at the cost of shareholders' value, which may increase the risk profile of the company. This impact is in the opposite direction of the impact of CSR on the idiosyncratic risk that we assumed. Therefore, in a firm with a weak governance mechanism, meaning that the firm managers may have sufficient freedom to overinvest, it is hard for outsider investors such as bondholders to expect the direction of the impact of CSR on firm risk. If a firm has strong governance, agency problems could be alleviated and the change of idiosyncratic risk may dominate the firm risk change regarding the application of CSR policy.

3. Data and Methods

In this section, we describe our sample-building process and provide a summary of the sample characteristics, the variables of interest, and the research methodology.

3.1. Sampling Procedure

We built our initial sample based on all the bonds issued between 1993 and 2013. We made the following four criteria to build the final sample: (1) The issuing firm was tracked with complete information in the KLD SOCRATES database one year before the bond was issued, and in CRSP and Compustat at the bond was issue year; (2) the issuing firm was a U.S. public company; (3) the issuing firm was not in the financial services industry (SIC code 6000–6900) and the utility industry (SIC code 4900–4999); and (4) bond characteristics

and accounting variables were not missing. Our sampling procedure yielded a final sample of 2145 corporate bonds issued by 348 unique firms.

3.2. Variable Definitions

3.2.1. Dependent Variable

In order to test our hypothesis, we used a corporate bond yield spread at issuance as our proxy for bond issuance costs. The Thomson Financial SDC Platinum (SDC) New Issuance Database contains the price and descriptive information for all corporate bonds at issuance. We obtained corporate bond yield spread directly from SDC, which is defined as the difference in basis points between the yield-to-maturity of a corporate bond at issuance and a comparable maturity Treasury issued on the same date.

3.2.2. Measures of CSR

Our main explanatory variable is an index of CSR derived from the KLD Research and Analytics' SOCRATES database, and we used the Index to reflect a firm's level of involvement in CSR activities. The KLD ratings were assigned based on a variety of sources, including company filings, government and nongovernment data, and general media press and direct communications with company officers, and are widely used by academics and practitioners as a source of information on CSR [12,36–39].

Companies in the KLD database are evaluated in seven major dimensions: environment, community relations, corporate governance, diversity, employee relations, human rights, and product quality and safety. Six out of seven categories emphasize key stakeholder relations. We exclude the "corporate governance" category because this qualitative category does not explicitly deal with stakeholder groups [12]. In each dimension, a set of strengths and concerns are evaluated. For instance, the strengths for employee relations include (having) no-layoff policy, cash profit-sharing, professional development, and so forth. The concerns for employee relations include (efforts to prevent) collective bargaining and unions, child labor, and so forth. A binary (0/1) rating is assigned to each strength and concern.

Given that there is no theoretical underpinning for and consensus of applying a weighting scheme to different categories [40,41], we build a CSR dimension score by subtracting the total number of concerns from the total number of strengths in each dimension, and the CSR index as the sum of all six CSR dimension scores [42]. To separately examine the strengths and concerns in CSR, we measure CSR strengths (concerns) as the total number of strengths (concerns) across six dimensions.

3.2.3. Other Variables

In addition to our CSR activities measure, we further control bond characteristics, firm characteristics, and industry and time factors in the regression analysis. Our bond characteristics variables are from SDC, including the bond rating, years to maturity, and issue size. Bond ratings use Moody's bond ratings on the date of bond issuance. Similar to Klock et al. [43], we compute bond ratings using a numeric linear conversion process in which Aaa ratings receive a value of 10 and C ratings receive a value of 0. The issue size is the amount raised during the bond issuance. Years-to-maturity is the number of years till bond maturity, which is a proxy for the credit yield curve [44]. We expect that bonds with a higher rating should have lower default probability and therefore lower bond financing costs. Larger issues tend to have less information asymmetry and are also a common proxy for higher bond liquidity [45,46], which may both help reduce the yield spread of bonds. Bonds with longer years-to-maturity are expected to have a higher yield spread due to the greater interest rate risk investors may bear.

Following Campbell and Taksler [33], we also control four accounting variables: pretax interest coverage, operating income to sales, long-term debt to assets, and total debt to capitalization. We build these variables through Compustat. Pretax interest coverage is the sum of operating income after depreciation (item 178) and interest expense (item 15) to in-

terest expense (item 15). Operating income to sales is operating income before depreciation (item 13) to net sales (item 12). Long-term debt to assets is total long-term debt (item 9) to total assets (item 6). Total debt to capitalization is total debt over total capitalization. Total debt is the sum of total long-term debt (item 9), debt in current liabilities (item 34) and average short-term borrowings (item 104). Total capitalization is the sum of total liabilities (item 181) and the market value of equity one year before the bond issue date. Market value of equity is from CRSP.

Campbell et al. [47,48] found that part of the corporate bond yield spread could be explained by idiosyncratic volatility. Following the literature, we further add idiosyncratic volatility as our explanatory variables. Idiosyncratic volatility is measured as the root mean squared residuals of individual stocks computed from a market model based on the monthly return. We require that the stocks should at least have 60 monthly trading records in CSRP before bond issuance (as a robustness check, we build 3 additional measures of idiosyncratic volatility: (1) the root mean squared residuals of individual stocks computed from a market model based on the daily return in one month. (2) the root mean squared residuals of individual stocks computed from the 4-factor model based on the monthly return. The 4-factor model is based on the three factors in Fama and French [49] plus an additional factor capturing one-year momentum anomaly [50]. (3) the root mean squared residuals of individual stocks computed from the 4-factor model based on the daily return in one month).

In order to test the interaction effect between CSR investment and internal governance on bond yield spread, we also calculate the percentage of blockholdings and the number of blockholders to proxy for internal governance. The percentage of blockholdings is the total percentage equity holdings of institutional shareholders with more than 5 percent shareholdings at the bond issuance date. The number of blockholders is the total number of institutional shareholders with more than 5 percent shareholdings at the bond issuance date. Both of these two variables are from SDC.

3.3. Research Methods

We use STATA to carry out empirical analyses throughout this paper. We test our main hypothesis by examining the relation between the CSR score and corporate bond yield spread. Specifically, we regress the corporate bond yield spread over the benchmark on the CSR Index and a number of common variables known to be determinants of the bond yield spread. We pool all 2145 observations and employ ordinary least square (OLS) regression to perform this analysis. Year dummies are included in the regression models to control for economy-wide shocks and timely trends, and industry dummies are included to control for the error dependence at the industry level. To account for heteroskedasticity, we use the robust standard error to calculate the t-statistics of the regression models.

Given that CSR investment is an endogenous choice, the estimated coefficients of CSR measures could be biased without controlling for endogeneity issues. An example is that both the bond yield spread and CSR score are affected by the same set of omitted variables, so that there is actually no causality relation between the yield spread and CSR score. To alleviate the concerns over the endogeneity problem, we further perform 2SLS regressions and propensity score matching (PSM) to check the consistency of our results.

Though we did not conduct a pilot study in this research project, our research hypothesis is consistent with anecdotal evidence in the financial market. For instance, a study shows that bonds issued by socially responsible firms generally have small but steady performance benefits [51]. In addition, there were discussions by practitioners about using the CSR index to access the risk level of corporate bonds, especially for the high-yield bonds with a high level of uncertainty [52]. This anecdotal evidence, combined with the existing literature, provides the critical theory and context for our work centering on linking CSR activities to the riskiness of bond-issuing firms.

3.4. Sampling Distribution and Summary Statistics

Table 1 presents information on the sampling distribution. In panel A of Table 1, we sort our sample according to Moody's credit rating and CSR Index score by year. A total of 1638 bonds were issued before the year 2002 (as of 2002, the academic spreadsheets are a summary of strengths and concerns assigned to approximately 1100 Socrates companies listed on the S&P 500, Domini 400 Social Index, Russell 1000, or KLD Large Cap Social Indexes as of December 31st of each year. Prior to 2002, the spreadsheets contain data from approximately 650 companies listed on the S&P 500 or Domini 400 Social Indexes as of August of each year), which account for 76.36% of the total sample. A total of 2020 bonds had investment grades, while the remaining 125 bonds were classified as speculative bonds. Almost half of the bonds had an A credit rating. Further, 750 bonds were issued by firms with positive CSR Index scores in the issue year and 380 bonds by firms with zero scores, which in total account for almost half of the total sample. In panel 2, we further group the sample based on the Moody's rating, CSR Index score, and years to maturity. Following Campbell and Taksler [33] and Duffee [53], we classified bonds with 1 to 7 years of maturity as short-term, 8 to 15 years of maturity as medium-term, and more than 16 years of maturity as long-term. In total, we had 884 short-term, 710 medium-term, and 551 long-term corporate bonds. The distribution of the CSR Index is quite similar in each of the three maturity groups, with bonds with negative CSR ratings accounting for around 50% of the bonds in the group. Overall, Table 1 suggests a relatively balanced distribution of our sample.

Table 1. Sample distribution.

Panel A											
	Credit Ratings							CSR Index			Total
	AAA	AA	A	BBB	BB	B	CCC	+	0	–	
1992	8	42	85	54	6	2	0	59	31	107	197
1993	11	55	84	53	7	2	0	65	48	99	212
1994	3	21	41	30	3	0	0	50	11	37	98
1995	5	21	88	46	9	1	0	64	28	78	170
1996	2	30	94	21	2	0	0	67	21	61	149
1997	2	23	128	52	0	1	0	47	52	107	206
1998	1	27	143	94	5	1	0	90	53	128	271
1999	4	11	68	46	2	0	0	48	3	80	131
2000	1	15	50	15	15	0	0	38	6	52	96
2001	5	17	45	22	19	0	0	42	6	60	108
2002	27	47	75	17	5	1	0	14	73	85	172
2003	6	2	14	23	3	0	0	11	11	26	48
2004	5	5	14	21	4	3	1	19	5	29	53
2005	0	6	6	4	0	2	0	10	5	3	18
2006	1	4	6	5	4	4	1	14	6	5	25
2007	2	6	4	4	1	5	0	11	1	10	22
2008	0	6	3	3	0	0	0	5	1	6	12
2009	3	3	4	0	0	0	0	2	0	8	10
2010	4	14	9	2	1	1	0	19	1	11	31
2011	3	5	10	5	1	0	0	7	6	11	24
2012	0	7	16	4	1	2	0	3	5	22	30
2013	0	10	30	12	5	5	0	20	7	35	62
Total	93	377	1017	533	93	30	2	705	380	1060	2145

Panel B											
	Credit Ratings							CSR Index			Total
	AAA	AA	A	BBB	BB	B	CCC	+	0	–	
Short-term	24	145	431	225	53	5	1	278	163	443	884
Medium-term	29	135	319	171	32	23	1	243	118	349	710
Long-term	40	97	267	137	8	2	0	184	99	268	551
Total	93	377	1017	533	93	30	2	705	380	1060	2145

Table 2 presents the summary statistics of our sample. The average CSR Index Score is 0.716, which is the sum of average CSR strengths of 3.017 and average CSR concerns of 2.301. The highest CSR Index Score is 15 and the lowest score is -8 . On average, the sample firms are good at diversity, community relations, and employee relations, but have a negative score at environment, product quality and safety, and human rights. We also calculate the pairwise correlations among all of our explanatory variables and do not find a high correlation, suggesting that multicollinearity should not be a big concern in our empirical tests.

Table 2. Descriptive statistics.

Variables	N	Mean	Median	St Dev	Min	Max
<i>CSR Measures:</i>						
CSR index	2145	0.716	0	3.117	-8	15
CSR index (strengths)	2145	3.017	2	2.876	0	21
CSR index (concerns)	2145	2.301	2	2.493	0	14
Diversity	2145	0.971	1	1.419	-2	7
Environment	2145	-0.343	0	1.177	-5	4
Community relations	2145	0.406	0	0.939	-2	4
Employee relations	2145	0.157	0	1.043	-4	4
Product quality and safety	2145	-0.275	0	0.890	-4	2
Human rights	2145	-0.199	0	0.489	-2	1
<i>Bond issuance characteristics:</i>						
Yield spread	2145	101.178	82	69.564	11	437
Credit ratings	2145	7.303	7.5	1.369	2	10
Maturity	2145	12.941	10.139	12.054	1.014	101.478
Issue size	2145	4.501	5	1.608	-1.204	8.513
<i>Firm characteristics:</i>						
Idiosyncratic volatility	2145	0.066	0.061	0.022	0.023	0.212
Dividend dummy	2145	0.924	1	0.266	0	1
Leverage	2145	0.253	0.249	0.107	0.008	0.537
Interest coverage	2145	7.667	5.659	6.757	-0.565	44.124
Total debt to capitalization	2145	0.213	0.192	0.125	0.020	0.581
Operating income to sales	2145	0.199	0.179	0.102	0.020	0.512
Blockholders ownership	806	0.111	0.078	0.098	0.002	1
Blockholders number	1641	1.027	1	1.169	0	6

Note: This table presents the summary statistics (number, mean, median, standard deviation, minimum and maximum) of our sample corporate bonds. CSR index (strengths/concerns) is the total number of strengths (concerns) across six CSR dimensions. CSR index is the difference between CSR index (strengths) and CSR index (concerns). Environment, community relations, corporate governance, diversity, employee relations, human rights, and product quality and safety is the CSR index in each dimension. Yield spread is the difference in basis points between the yield-to-maturity of a corporate bond at issuance and a comparable maturity treasury issued on the same date. Credit ratings are Moody's bond ratings on the date of bond issuance. Similar to Klock et al. [43], we compute bond ratings using a numeric linear conversion process in which Aaa ratings receive a value of 10 and C ratings receive a value of 0. The issue size is the amount raised during the bond issuance. Years-to-maturity is the number of years till bond maturity. Idiosyncratic volatility is measured as the root-mean-squared residuals of individual stocks computed from a market model based on the monthly return. We require that the stocks should at least have 60 monthly trading records in CSRP before bond issuance. The dividend dummy equals one if the dividend is distributed in the bond issue year, and zero otherwise. Interest coverage is the sum of operating income after depreciation and interest expense to interest expense. The operating income to sales is the operating income before depreciation to net sales. Long-term debt to assets is the total long-term debt to total assets. Leverage is total debt over total assets. Total debt is the sum of total long-term debt, debt in current liabilities and average short-term borrowings. Blockholders ownership is the total percentage equity holdings of institutional shareholders with more than 5 percent shareholdings at the bond issuance date. Blockholders number is the total number of institutional shareholders with more than 5 percent shareholdings at the bond issuance date.

4. Empirical Results

4.1. CSR Index and Bond Yield Spread at Issuance

In this section, we examine the relation between CSR score and corporate bond yield spread. The result is shown in Table 3. In Regressions 1–2, we test the effects of CSR on bond yield spread using the whole sample. We first report the result of OLS by taking the CSR score as the only explanatory variable. We document that high-CSR firms have significantly lower bond yield spread ($p < 0.01$). Second, we control the bond and firm characteristics, as well as the time and industry fixed effects. We still find a negative and

significant relation between CSR score and bond yield spread. In addition, consistent with our expectations, bonds with higher Moody's ratings and lower time-to-maturity may have lower bond financing costs. We further confirm the findings of Campbell and Taksler [33] that firms with more idiosyncratic risk tend to have higher bond yield spread, suggesting that idiosyncratic risk is priced [20]. However, our data show that the coefficients of bond issue size, interest coverage and operating income to sales are insignificant. To use the coefficient in Regression 2, one point increase in the CSR Index score may lead to a decrease of 0.78 basis points in the bond yield spread. This result is consistent with our argument that CSR activities may reduce firm risk. It also suggests that the capital market recognizes the risk change associated with the CSR activities, and may factor such risks into the bond price at issuance.

Table 3. CSR index and corporate bond yield spread at issuance.

Independent Variables	Dependent Variable: Corporate Bond Yield Spread at Issuance						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>CSR measures:</i>							
CSR index	−3.519 *** (−7.513)	−0.863 *** (−2.604)			−1.246 *** (−3.372)	−2.247 *** (−2.607)	−10.027 ** (−1.961)
CSR index (strengths)			−1.123 *** (−2.757)				
CSR index (concerns)				0.017 (0.036)			
<i>Bond characteristics:</i>							
Credit ratings		−25.141 *** (−19.016)	−24.790 *** (−18.728)	−25.436 *** (−19.392)	−17.001 *** (−12.694)	−36.375 *** (−12.678)	−17.534 *** (−3.369)
Maturity		0.976 *** (10.279)	0.964 *** (10.130)	0.984 *** (10.299)	0.899 *** (8.937)	0.993 *** (4.385)	0.596 ** (2.494)
Issue size		0.017 (0.023)	0.264 (0.364)	0.054 (0.074)	1.082 (1.456)	−0.537 (−0.301)	−0.123 (−0.045)
<i>Firm characteristics:</i>							
Idiosyncratic volatility		400.462 *** (5.230)	395.406 *** (5.177)	395.609 *** (5.157)	384.378 *** (4.657)	265.527 ** (2.219)	1007.391 *** (4.385)
Dividend dummy		−27.959 *** (−4.150)	−28.110 *** (−4.184)	−28.007 *** (−4.158)	−15.449 ** (−2.219)	−47.384 *** (−3.127)	−29.381 ** (−2.027)
Leverage		−27.372 * (−1.702)	−32.103 ** (−1.978)	−28.446 * (−1.741)	21.399 (1.255)	−97.211 *** (−3.316)	48.590 (1.094)
Interest coverage		0.118 (0.523)	0.138 (0.606)	0.075 (0.330)	0.236 (0.851)	0.967 *** (2.640)	1.453 *** (3.700)
Total debt to capitalization		73.521 *** (5.336)	81.372 *** (5.753)	75.966 *** (5.261)	61.724 *** (5.080)	154.439 *** (4.010)	57.733 (1.092)
Operating income to sales		−7.270 (−0.425)	−11.078 (−0.657)	−11.702 (−0.680)	−1.937 (−0.096)	−40.236 (−0.985)	36.223 * (1.665)
Constant	103.698 *** (64.552)	238.773 *** (15.661)	238.694 *** (16.000)	244.437 *** (16.214)	161.565 *** (11.012)	444.693 *** (13.462)	146.775 *** (2.609)
Observations	2145	2145	2145	2145	1530	615	2145
Adjusted R-squared	0.024	0.672	0.672	0.671	0.633	0.738	0.345
Year FE	N	Y	Y	Y	Y	Y	Y
Industry FE	N	Y	Y	Y	Y	Y	Y

Note: Robust t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note: This table test the relation between CSR Index and corporate bond yield spread. In Regressions 1–2, we test the effects of CSR on bond yield spread using the whole sample. In Regression 3–4, we separate the CSR Index into two parts: CSR strengths and CSR concerns. In Regression 5–6, we separate our sample into two parts: pre-2002 (1993–2001) and post 2002 (2002–2013). In Regression 7, we perform the 2SLS regression by using a blue state dummy as an instrumental variable for the CSR scores. We perform two additional tests to alleviate the concerns over the endogeneity problem. First, we perform the 2SLS regressions. Following Deng, Kang and Low [54], we use a blue state dummy as an instrumental variable for the CSR scores. Blue state dummy equals one if a firm headquarter is in a blue state (democratic state) when the bond is issued. A state is defined as blue if the Democratic Party won the two closest presidential elections. We use blue state dummy as our instrumental variable because Rubin [55] finds that firms with high CSR ratings tend to be located in the blue state, but it is hard to link bond yield spread with the blue state directly. The result is shown in Regression 7 of this table. As the instrumental variable is not very strong, the coefficient of CSR Index has changed a lot, but it remains negative and significant, suggesting that our result is subject to a strong endogeneity issue.

We further check the mechanism through which the market factors CSR. We separate the CSR Index into two parts: CSR strengths and CSR concerns, to see whether the negative impact of the CSR score on bond yield spread is driven by a rewarding mechanism that the market may reward firms with more CSR strengths or a punishment mechanism that the market may punish firms with more CSR concerns, or may do both. The result is shown in Regression 3–4 of Table 3. The coefficient of CSR strengths is negative and significant, while the coefficient of CSR concerns is insignificant. This finding implies that only CSR strength is priced in the corporate bond market.

In the next two regressions, we separate our sample into two parts: pre-2002 (1993–2001) and post-2002 (2002–2013). We set the year 2002 as a breakpoint because KLD has expanded the sample to add more small firms since the year 2002, and testing the post-2002 sample may help us understand whether our result remains in a more general sample. The regression result for the pre-2002 sample is shown in Regression 5, and that for the post-2002 sample is shown in Regression 6. From the result shown, we find that even though the level of significance is reduced in both of these two regressions, and the negative effects of the CSR Index remain negative and significant. This result further implies that the risk impact of CSR investment is widely accepted and valued by bond market participants much earlier than the year 2002.

Second, we employed a propensity-score matching (PSM) method to form a matched sample [56,57]. The PSM method is widely applied in empirical research to pair treatment and nontreatment groups on a set of observable characteristics in order to remove relevant differences [58], which provides a natural weighting scheme that yields unbiased estimates of the treating impact [56].

Specifically, we used a Probit model to estimate the propensity score (the conditional treatment probability of having a positive KLD rating). Following Bae et al. [59], we chose a multidimensional set of variables including the market-to-book ratio, log of sales, ratio of fixed assets to total assets, return on assets, ratio of sales to total assets, pension and retirement expenses per worker, and dividend-paying dummy [3]. We added the bond issue year as the additional control criteria. The first-stage Probit model yielded a log-likelihood of -1104.8 and a McFadden's pseudo-R-squared of 0.0854. These statistics indicate the appropriateness of the choice of independent variables and the overall fit of our first-stage Probit model. As for the matching stage, we used three different matching techniques: nearest neighborhood, Gaussian kernel, and local linear regression.

In Table 4, we report the average bond yield spread of the firms with positive CSR scores and that of the matching firms, their difference, and the *t*-statistics. The *t*-test result shows that the negative relation between CSR Index and bond yield spread remains very significant in PSM. Rosenbaum [24] argues that unobservable variables may bias the qualitative and quantitative inferences of the PSM method. Following Bharath et al. [60], we perform a Rosenbaum bounds sensitivity analysis to test whether hidden bias alters our inferences about the treatment effect [5]. We calculate the bounds on the point estimate of the treatment effect and conduct the sensitivity analysis by examining the intervals of point estimates at a given confidence level. We are particularly interested in determining the magnitude of possible hidden biases that would lead us to revise our conclusion of causal effects. Given the negative relation between the CSR Index and corporate bond yield spread in our estimation, an interval containing positive values for the coefficient of the CSR Index reflects the magnitude of hidden biases that can challenge our conclusion. We then examine what corresponding change in each variable in the first-stage Probit model is equivalent to the same magnitude of hidden bias. For example, according to our sensitivity analysis, the log value of sales would have to change by 53.9 standard deviations in order to question our results. Using firm fixed assets to total assets as another example, the magnitude of the hidden bias is equivalent to a change of 6.1 standard deviations for firm size. Therefore, we conclude that it is unlikely that an unobserved factor can lead to the rejection of the causal direction from CSR Index and bond yield spread.

Table 4. Propensity score matching.

		Group 0: CSR Index \leq 0; Group 1: CSR Index $>$ 0.				
		1-1 Match	Nearest Neighborhood (N = 5)	Nearest Neighborhood (N = 10)	Gaussian Kernel	Local Linear Regression
Spread	Treated	92.988	92.988	92.988	92.988	92.988
	Untreated	111.050	109.026	104.302	105.305	105.872
	Difference	−18.062 **	−16.038 ***	−11.314 **	−12.316 ***	−12.884 ***
t-value		−1.98	−3.36	−2.58	−3.31	−3.28

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.2. CSR Dimensional Index and Bond Yield Spread at Issuance

The CSR Index is the summation of six dimensional indexes: environment, community relations, corporate governance, diversity, employee relations, human rights, and product quality and safety. We further check which of these six dimensions may be the driver of the negative effects of the CSR Index on corporate bond yield spread. We regress the yield spread on these dimensional indexes separately. We control bond characteristics, accounting information, and year and industry fixed effects. The result is shown in Table 5. Among the six dimensions, only diversity and community relation have negative and significant coefficients, implying that the negative effects of CSR Index on corporate bond yield spread are majorly driven by these two dimensions.

Table 5. CSR dimensional index and corporate bond yield spread at issuance.

Independent Variables	Dependent Variable: Corporate Bond Yield Spread at Issuance					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>CSR measures:</i>						
Diversity	−2.408 *** (−2.966)					
Environment		−0.232 (−0.238)				
Community relations			−2.226 ** (−2.217)			
Employee relations				−1.032 (−1.015)		
Product quality and safety					−0.381 (−0.300)	
Human rights						1.860 (0.967)
<i>Bond characteristics:</i>						
Credit ratings	−24.744 *** (−18.682)	−25.418 *** (−19.243)	−25.258 *** (−19.152)	−25.418 *** (−19.278)	−25.440 *** (−19.341)	−25.290 *** (−19.035)
Maturity	0.960 *** (10.068)	0.984 *** (10.326)	0.976 *** (10.258)	0.988 *** (10.389)	0.984 *** (10.330)	0.982 *** (10.314)
Issue size	0.192 (0.265)	0.053 (0.073)	0.143 (0.197)	0.041 (0.056)	0.022 (0.030)	0.072 (0.099)
<i>Firm characteristics:</i>						
Idiosyncratic volatility	394.166 *** (5.175)	396.230 *** (5.182)	390.543 *** (5.096)	397.437 *** (5.176)	396.893 *** (5.168)	395.652 *** (5.172)
Dividend dummy	−28.184 *** (−4.194)	−27.991 *** (−4.161)	−27.993 *** (−4.153)	−28.017 *** (−4.161)	−28.011 *** (−4.160)	−28.110 *** (−4.171)
Leverage	−29.180 * (−1.820)	−28.186 * (−1.751)	−28.489 * (−1.768)	−30.271* (−1.856)	−28.105 * (−1.741)	−29.889 * (−1.838)
Interest coverage	0.121 (0.532)	0.077 (0.338)	0.130 (0.564)	0.075 (0.331)	0.075 (0.330)	0.074 (0.325)
Total debt to capitalization	79.590 *** (5.711)	75.463 *** (5.325)	76.675 *** (5.525)	76.839 *** (5.559)	75.427 *** (5.429)	77.807 *** (5.554)
Operating income to sales	−14.042 (−0.829)	−11.578 (−0.678)	−10.909 (−0.643)	−8.369 (−0.484)	−11.467 (−0.676)	−13.207 (−0.774)

Table 5. Cont.

Independent Variables	Dependent Variable: Corporate Bond Yield Spread at Issuance					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	239.349 *** (15.849)	244.032 *** (16.204)	242.644 *** (16.136)	242.436 *** (16.012)	244.448 *** (16.300)	244.079 *** (16.292)
Observations	2145	2145	2145	2145	2145	2145
Adjusted R-squared	0.672	0.671	0.671	0.671	0.671	0.671
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y

Note: Robust t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note: In this table, we regress corporate bond yield spread on 6 CSR dimensional indexes (environment, community relations, corporate governance, diversity, employee relations, human rights, and product quality and safety) separately.

4.3. CSR Index, Internal Governance Mechanism and Bond Yield Spread at Issuance

On the other hand, managers may have the motivation to overinvest to build their personal reputation and therefore change the risk profile of the company. The reduced idiosyncratic risk resulting from the CSR investment may be offset, or even reversed by the increased risk associated with the overinvestment activities. We argue that the internal governance mechanism may play an important role to reduce overinvestment risk because the parties who conduct internal governance may have the inside information and be able to tell an activity with long-term value to the firm from activity to hurt the firm value but build the managers' personal reputation. We expect that the relation between the CSR Index and corporate bond yield spread may be stronger for firms with a stronger internal governance mechanism, and weaker for those with a weaker mechanism.

We test this hypothesis in Table 6. We use two variables to proxy for the internal governance: a high institutional blockholdings dummy, and high blockholders dummy. A high institutional blockholdings dummy equals one if the sum of all institutional blockholdings in one company is higher than or equal to the sample medium value, and zero otherwise. A high blockholders dummy equals to one if the number of blockholders is higher than or equal to the sample medium value, and zero otherwise. The result in Table 6 shows that the negative effect of CSR Index on corporate bond yield spread is only significant when there are more institutional blockholdings and a higher number of institutional blockholdings, suggesting that good internal governance is an important criteria for the market to tell the motivation of the managers to conduct CSR-related investments.

Table 6. Internal governance, CSR, and corporate bond yield spread at issuance.

Independent Variables	Dependent Variable: Corporate Bond Yield Spread at Issuance	
	Model 1	Model 2
<i>CSR measures:</i>		
CSR Index	−0.149 (−0.342)	−0.12 (−0.294)
<i>Internal governance measures:</i>		
High Institutional Blockholdings Dummy	−0.667 (−0.238)	
High Institutional Blockholdings Dummy * CSR Index	−1.273 * (−1.696)	
High Blockholders Dummy		−0.38 (−0.128)
High Blockholders Dummy × CSR Index		−2.502 ** (−2.535)
<i>Bond characteristics:</i>		
Credit ratings	−24.122 *** (−15.910)	−24.003 *** (−15.989)
Maturity	1.059 ***	1.071 ***
Issue size	−10.544 (−0.512) (−0.634)	−10.864 (−0.435) (−0.539)

Table 6. Cont.

Independent Variables	Dependent Variable: Corporate Bond Yield Spread at Issuance	
	Model 1	Model 2
<i>Firm characteristics:</i>		
Idiosyncratic volatility	290.691 *** −3.19	304.631 *** −3.314
Dividend dummy	−47.101 *** (−5.440)	−47.074 *** (−5.436)
Leverage	−48.051 *** (−2.777)	−55.216 *** (−3.192)
Interest coverage	0.324 −1.451	0.268 −1.204
Total debt to capitalization	141.815 *** −7.827	142.637 *** −7.66
Operating income to sales	3.981 −0.213	4.296 −0.232
Constant	248.204 *** −13.501	249.181 *** −13.799
Observations	1641	1641
Adjusted R-squared	0.703	0.704
Year FE	Y	Y
Industry FE	Y	Y

Note: Robust t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note: In this table, we test how the relation between CSR Index and corporate bond yield spread changes with internal governance mechanism. We use high institutional blockholdings dummy and high blockholders dummy to proxy for stronger internal governance. High institutional blockholdings dummy equals one if the sum of the all institutional blockholdings in one company is higher than or equal to the sample medium value, and zero otherwise. High blockholders dummy equals one if the number of block-holders is higher than or equal to the sample medium value, and zero otherwise.

5. Discussion and Conclusions

Even though social responsibility is only an option for corporations, the popularity of the CSR strategy increased a lot in the recent three decades. More and more finance literature shows that the rationale behind this popularity is the instrumental stakeholder theory; the CSR strategy is taken as a way to achieve the ultimate goal of maximizing shareholder value [9]. However, an underlying assumption for the instrumental stakeholder theory is that the CSR strategy is in the interests of other stakeholders. In this paper, rather than look from the perspective of shareholders, we chose to study the possible linkage between the CSR strategy and the interests of another type of stakeholder—bondholders.

Empirically, we found a negative relation between a firm's CSR Index and corporate bond yield spread. We argued that the causality could be in two ways. The bond market may take a high CSR index as a commitment from the managers to keep the implicit contract and value the commitment for a lower-risk premium. On the other hand, a high CSR index may reduce the business risk, as employee loyalty may increase and the firm's securities may not be on the blacklist of ethical investment funds. Our result shows that the negative relation between the CSR score and bond yield spread is driven by diversity and community relations. In addition, we found that as arm's-length investors, the ability for bondholders to directly tell whether the motivation of CSR investment is for the instrumental move, rather than as an agency issue, is limited. They rely on the internal governance mechanism to make inferences, and may only value CSR investment when the internal governance is strong.

From a methodological point of view, we cautiously controlled for the endogeneity problem in the sense that our sample is not random. We employed Propensity Score Matching and 2SLS, and found a consistent result. In addition, we performed a Rosenbaum bounds sensitivity analysis to test for hidden bias. Our econometric treatment allowed us to establish a robust connection between the CSR score and bond yield spread.

Author Contributions: Funding acquisition, H.Z.; Methodology, W.D.; Writing-Original Draft, H.S. and W.D.; Data collection, X.Z.; Supervision, H.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Chinese Ministry of Education Humanities and Social Sciences Fund, grant number 18YJA790112.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Written informed consent has been obtained from the patient(s) to publish this paper.

Data Availability Statement: Our data mainly comes from the KLD Research and Analytics' SOCRATES database.

Conflicts of Interest: The authors declare no conflict of interest.

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