



Corporate Social Responsibility and Corporate Bonds Coupon Rate

Ting-Wei Hu,¹ Ting-Hua Lin,¹ Yun-Chen Yu,¹ Yuan Chang^{1,#}

1. Department of Finance, National Changhua University of Education, Taiwan

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ABSTRACT

This study uses corporate bonds issued by nonfinancial listed firms from 2007 to 2013 as the research sample to examine whether a firm's corporate social responsibility (CSR) performance affects the cost of corporate bonds, using the coupon rate as a proxy measurement. Existing research on CSR has indicated that firms can achieve better performance, value, reputation, lower funding costs and financing constraints by investing resources in stakeholder management. However, there is relative lack of research on whether CSR performance affects the coupon rate of corporate bonds, which motivates this research. This study collects the issuing data (including bond specification, issuance conditions, financial characteristics and corporate governance condition of issuers) of sample firms on the Taiwan Economics Journal (TEJ). The data on CSR performance is constructed and quantified based on the annual CSR-award winner lists from the *Common Wealth* and the *Global Views Monthly*, as well as the inclusion standards of the Shanghai Stock Exchange's Social Responsibility Index constituents, i.e., social contribution value, social returns on assets and social contribution value per share. Empirical results from correlation analysis and regression estimation show that, while the evidence of CSR performance negatively correlated with coupon rate is weak, firms with lower coupon rate are more significantly and economically negatively affected by better CSR performance, implying that firms with better issuance conditions tend to benefit from CSR engagement.

Keywords: Corporate Social Responsibility, Coupon Rate

Corresponding author, Department of Finance, National Changhua University of Education, No.2, Shi-Da Road, Changhua City, Taiwan, R.O.C. Tel.: 047-232105 ext. 7350; Fax: 047-211290; e-mail: ychang@cc.ncue.edu.tw

1. Introduction

With the globalization of the economy and financial markets, firms face increasing competition and continuously strive to explore up-to-date operational strategies to maintain competitive advantage and achieve sustainable development. In recent years, Corporate Social Responsibility (CSR) has been viewed as a key issue for sustainable business operations. In a broad sense, CSR refers to a firm engaging in ethical and honest social behaviors, particularly that the firm is responsible for the interests of stakeholders at all levels, including employees, creditors, consumers, upstream and downstream suppliers, governments, and the environment, not just shareholders. International organizations, governments, and large corporations have advocated for fulfilling social responsibilities, and more and more stakeholders are paying attention to a firm's performance in social responsibility, which affects their valuation toward firm. If CSR can be combined with business strategies, it will bring benefits to both the firm and the society, enhance organizational performance, and maintain the rights of shareholders and stakeholders.

The academic interest in CSR is increasing. Even a profit-oriented firm, in the face of global climate change, public and media awareness, and frequent reporting on social issues, increase firm's responses and involvement in issues such as environmental pollution prevention and improvement, employee salary and welfare improvement, maintenance of diversity and human rights protection, and compliance with corporate governance and regulations. This echoes Elkington's (1997) Triple Bottom Line, in which a firm not only needs to perform well financially, but must also win social respect to achieve sustainability. At the same time, an increasing number of investors, even government regulatory agencies and large pension funds, emphasize firm's social responsibility performance, and the CSR performance becomes as an important consideration and selection criterion for investing in securities issued by the firm.

The development of the aforementioned issues has raised concerns about whether the resources invested by firms can actually help generate better operational results and higher growth, or whether the CSR investment simply represent a cost to the firm or a misallocation of resources that creates potential conflicts of interest among the management, shareholders, creditors, and other stakeholders. The concern of the merits of engagement in CSR becomes a focal point of the research on CSR. Many studies have investigated how a firm's social responsibility performance affects its economic consequences at different levels. For example, an increase in stakeholder management can lead to improved operational performance (Waddock and Graves, 1997), which in turn can result in better stock market performance (Griffin and Mahon, 1997; Margolis and Walsh, 2003; Orlitzky, Schmidt and Rynes, 2003). A firm's social responsibility performance also affects specific risk indicators, such as earnings volatility, leverage usage, and market risk of stock returns (Orlitzky and Benjamin, 2001). Some studies have also suggested that a firm's social responsibility performance can help lower its financing costs, including equity capital costs (El Ghouli, Guedhami, Kwok, and Mishra, 2011) and bank loan costs (Goss and Roberts, 2011). Recent research can be found in Shen and Chang (2009), Wu and Shen (2013), Kim, Li, and Li (2014), and Lins, Servaes, and Tamayo (2017).

One stream of research on CSR suggests that a firm's CSR engagement or CSR performance can serve as a risk management tool, both before and after a risk event (Godfrey, 2005; Godfrey, Merrill and Hansen, 2009; Koh, Qian and Wang, 2014). Some studies have found that firms with better CSR performance have greater firm value and lower stock price crash risk (Kim, Li, and Li, 2014). Guo (2015) pointed out that CSR performance helps increase firm value and mitigate the risk of earnings management. Liu (2014) found significant differences in credit risk ratings between firms with good and poor CSR performance. In addition, some studies suggest that CSR can be interpreted as a form of reputational capital that

acts as insurance or buffer against potential losses when negative events occur (Peloza, 2006; Gupta and Krishnamurti, 2018; Jia, Gao and Julian, 2020). Good CSR performance can help firms establish a positive image and reputation, which can lead to greater level of public forgiveness and lower levels of punishment when negative events occur, resulting in smaller degree of declines in financial and stock market performance.

Some research has explained the relationship between corporate social responsibility (CSR) and funding costs from the perspective of risk management (Godfrey, 2005; Godfrey, Merrill and Hansen, 2009). However, there have been relatively few studies on how CSR performance affects a firm's debt funding costs. Goss and Roberts (2011) analyzed the relationship between CSR performance and bank loan costs (private debt) and found that while firms with good CSR performance did not necessarily enjoy lower bank loan costs, firms with poor CSR performance did pay higher bank loan rates than others. The study by Goss and Roberts (2011) focused on private debt, such as bank loans, where the decision on loan rates was largely determined by the banks. In contrast, the price of issuing public debt, such as the coupon rate of corporate bonds, is determined by a larger pool of funders. Unlike equity securities, public and private debts are more concerned with downside risk, meaning that the holders of debt securities will incur losses when the value of a firm's assets is lower than its liabilities. Therefore, holders of corporate bonds are more concerned about the downside risk of a firm's operations than the upside risk. This makes the insurance effect of CSR performance relatively important in the valuation of debt securities.

Although the stock market receives more attention from the media and investors in Taiwan, the issuance of debt instruments still plays a role in corporate financing (according to the Central Bank's statistics on fund flows and balances, the outstanding amount of corporate bonds accounts for about 3.5% to 4.1% of the total amount of financing issued) (<https://www.cbc.gov.tw/tw/np-521-1.html>). Some existing research (Hsieh, Lin and Chang, 2019; Chang, Hsieh, Wang and Hsieh, 2014) has collected data on loans from banks to listed firms in Taiwan to examine the impact of CSR performance on the cost (interest rate) of private debt (bank loans). This study attempts to fill the gap by analyzing whether the cost (coupon rate) of public debt in corporate debt financing is affected by CSR performance and whether bond investors take CSR performance into account in their decision to purchase corporate bonds, thus affecting the coupon rate of corporate bonds. Previous research has indicated that firms with good CSR performance tend to have lower risk premiums because they invest in stakeholders' management at various levels, which reduces risk propensity from all stakeholders and thus provides insurance effects from CSR. Based on this argument, this study hypothesizes that firms with better CSR performance enjoy lower financing costs, i.e., lower coupon rates, when issuing corporate bonds.

Based on data from the issuance of corporate bonds by non-financial listed firms in Taiwan's financial market from 2007 to 2013, this study examines the relationship between CSR performance and the coupon interest rates of corporate bonds issued by sample firms, complementing existing literature on the relationship between CSR performance and various financial consequences. The basic empirical results show that after controlling factors affecting coupon rates such as financial characteristics, corporate governance variables, bond issuance conditions, and macroeconomic variables, although the relationship between CSR performance and coupon rate is weak and insignificant, firms with lower coupon rates tend to negatively affected by CSR performance, implying that firms with better financial soundness tend to enjoy benefits from engaging in CSR. The organization of the study is as follows. The next section is literature review and hypothesis development. The third section describes variables, econometric model, research samples and data source. The fourth section is empirical result and discussion, and the last section is conclusion and suggestion.

2. Literature Review and Hypothesis Development

This study presents two main reasons for how a firm's CSR performance affects the valuation of its capital market financing instruments. First, the development of socially responsible investment (SRI) is becoming increasingly common, whether in equity markets or debt markets. The main idea behind SRI is to invest in firms with high CSR standards while avoiding securities issued by so-called "sin industries" firms, through the practice of both shareholder activism and stakeholder activism in investment screening. The implementation of these ideas can affect a firm's decision on its CSR engagement, as no firm wants its issued securities to be unpopular with investors in the market, leading to difficulties in financing and a lack of financing availability. Conversely, firms with good CSR performance will have higher investor demand, leading to higher security prices and returns. The increasing prevalence of SRI philosophy makes firms with good CSR performance increasingly preferred by investors and reflected in higher security demand.

Second, the ratio of institutional investors participating in the financial market is increasing year by year. In the case of corporate bonds, where the face value and trading volume are relatively large, institutional investors have a higher proportion of buying and trading corporate bonds, and their abilities in information collection, investment analysis expertise, and financial credit analysis are generally better than that of individual investors. Financial institutions or banks are also major participants in the purchase and trading of corporate bonds, and these investment institutions increasingly focus on the engagement and performance of environmental and social issues by the securities issuers in their investment instrument selection, which is also known as the Equator Principles. When a firm fails to fulfill its social responsibility or its CSR performance is notorious, the securities issued by such firms will not be favored by institutional investors or banks. This naturally creates positive pressure on a firm's CSR strategy or CSR engagement, leading the firm to correct improper actions and increase corresponding resources and commitments to stakeholders. Therefore, the increasing proportion of institutional investors relative to individual investors has led firms to pay more attention to CSR issues, and through CSR, help to enhance their security demand, thereby reducing financing costs and gaining competitive advantage from capital markets.

The credit spread of corporate bonds or other debt instruments is actually a compensation for investors who choose not to invest their funds in risk-free investment tools, such as U.S. government bonds, which would otherwise not have any risk. This compensation consists mainly of default risk, which arises from the possibility that the firm may not be able to pay interest and principal on its debts due to poor management. Other risks such as liquidity risk, which arises from less trading activity by investors. The systematic risk, which is arises from market or macroeconomic factors. All of the risks is compensated by what is known as a risk premium, of which the credit spread is a part. Firms that have a good record of CSR have better relationships with stakeholders at all levels, including maintaining good employee rights to improve productivity, maintaining good relationships with the environment and communities, paying taxes honestly, sound corporate governance, transparent and honest accounting reports, and fair treatment of upstream and downstream suppliers. These CSR responsibilities, which are not only responsible to shareholders but also to stakeholders, naturally help reduce the probability of negative events occurring in the firm and thus reduce the firm's risks. This study summarizes four main reasons, based on the work of El Ghouli, Guedhami, Kwok and Mishra (2011) and Goss and Roberts (2011) of how firm's CSR performance affect its risks.

First, firms with good CSR performance tend to have a larger investor base. Merton (1987) suggests that investors tend to invest in securities issued by firms that have better information,

and as investors become more knowledgeable or have easier access to information, the firm's investor base may grow larger. This increases the demand for the firm's securities, which in turn increases stock price and stock returns, leading to lower funding costs and required rates of return by investors (Heinkel, Kraus and Zechner, 2001). When a firm has good CSR performance, it tends to attract investors with higher ethical standards who are not willing to invest in firms with poor CSR performance. This makes the investor base of firms with good CSR performance relatively larger compared to those with poor CSR performance. Additionally, some existing studies suggest that firms can increase their investor base by increasing information transparency, including the disclosure and dissemination of financial and non-financial reports. By proactively disclosing some financial and non-financial decision-making and planning to the market, more investors can understand the firm's current operating conditions and future growth prospects, and by reducing information asymmetry problems, the firms then have a larger investor base. Cox and Wicks (2011) specifically point out that transparency in firms is positively related to institutional investors' demand for their company stocks. Therefore, this study argues that firms with good CSR performance have a larger investor base for both equity and debt securities, with lower required rates of return, reflected in lower credit spreads in the bond market.

Second, investors perceive firms that are socially irresponsible as having a higher risk (Frederick, 1994, 1995; Robinson, Kleffner, Bertels and Arbor, 2008; Starks, 2009; Albuquerque, Durnev and Koskinen, 2014). Waddock and Graves (1997) suggest that socially irresponsible firms may face uncertain claims in the future, such as legal suits arising from inadequate product safety control, which can increase the firm's operating costs. Investors perceive firms with good CSR performance as having lower perceived risk. Research shows that firms with good CSR performance have better relationships with stakeholders and are less likely to experience stakeholder claims for damages. These firms also have lower audit risk, litigation risk, and probability of negative news (such as product recalls) disclosures, which reduces the perceived risk for investors compared to firms with worse performance on CSR. As a result, firms with good CSR performance have lower idiosyncratic risk, which translates into a lower risk premium that investors demand for their funding. This lower risk premium is reflected in lower credit spreads for debt instruments.

Third, firms that have good CSR performance tend to have smaller downside risk. Pelozo (2006) mentioned that a firm's CSR performance can act as an insurance factor when the firm faces negative events that cause a decline in its business operations consequence. When similar negative events occur, firms with good CSR performance tend to be evaluated by the public as having bad luck, resulting in relatively lower declines in their stock prices and performance, while firms with poor CSR performance tend to be evaluated as having poor management, resulting in relatively higher declines in their stock prices and performance. The philanthropic activities that firms engage in during normal times can form intangible assets or reputational capital, which can help buffer the negative impact of adverse events. Lins, Servaes and Tamayo (2017) also found that firms with good CSR performance have higher levels of trust from the financial market, which forms a significant advantage that can be highlighted when the public loses trust in the financial market. Even though firms with good and poor CSR performance have similar performance during non-financial crisis periods, during financial crises, firms with good CSR performance reflect relatively higher profitability, higher sales per employee, and are able to obtain relatively more loan opportunities. By investing in CSR, firms can build trust with investors, which can prevent them from being severely impacted when negative events occur. Therefore, CSR is a function of risk management tool or an insurance, which helps to reduce the damage caused by negative events. As bonds are investment instruments that focus more on a firm's downside risk, firms that have good CSR performance can enjoy lower

downside risk, which reduces the required rate of return for investors and results in lower credit spreads.

Fourth, due to the existence of asymmetric information in financial markets, a firm's engagement in social responsibility may lead to agency costs and conflicts of interests (Jensen and Meckling, 1976). Some scholars have questioned whether a firm's social responsibility is simply a form of greenwashing or window dressing (Kim, Park and Wier, 2012; Kim, Li and Li, 2014). According to agency theory, investing in CSR initiatives may lead to agency conflicts between managers and shareholders, whereby a firm's managers may overspend on social responsibility projects for personal gain while the costs are borne by shareholders. Barnea and Rubin (2010) suggest that firms may overinvest in CSR projects because managers receive credit for the social responsibility activities while shareholders bear the costs. Goss and Roberts (2011) argued that weaker firms may overinvest in social responsibility in order to obtain lower borrowing costs, but this may lead to banks penalizing the firms by requiring additional compensation to compensate for the increased risk, thereby resulting in higher loan interest rates and shorter loan periods, creating a positive relationship between social responsibility investment and loan rates. From the perspective of overinvestment, a firm's CSR performance may increase its financing costs.

In summary, the first three of above four points can be collectively referred to as the risk mitigating view, and the fourth point is the over investment view. The first three expect a negative relationship between CSR performance and coupon rate, meaning that the better the CSR performance, the lower the bond coupon rate. The last one predicts a positive relationship, meaning that better CSR performance leads to higher bond coupon rate. Although the relative strength of these two forces depends on the overall evaluation of the firm's investment in CSR by market participants, this study argues that the over investment view is becoming less applicable in Taiwan's financial market and government policies, which are increasingly aligned with international CSR norms. Not only are more benchmark firms across various industries investing in CSR, but government agencies' policies and requirements are also becoming more common and strict. Additionally, in practice, firms rarely receive negative evaluations from the financial market or protests from investors or shareholders for investing in sustainable business strategies. Therefore, this study concludes that in Taiwan's current financial market, the benefits of good CSR performance for firms still outweigh the costs. The study hypothesizes that good CSR performance is beneficial to a firm's bond financing costs, with a negative relationship between CSR performance and corporate bond coupon rate.

Hypothesis: *the performance of CSR is negatively correlated with the cost of corporate bonds. The better the performance of corporate social responsibility, the lower the coupon rate of corporate bonds.*

3. Variables, Econometric Model, Research Samples and Data

3.1 Research variables

3.1.1 Explained variable: the coupon rate of corporate bonds

The bond coupon rate referred to in this study is the rate disclosed in the bond issuance announcement by the issuing entity, which is an annualized interest rate. The level of the coupon rate determines the amount of interest payments required for each period of the corporate bond. Unlike Menz (2010), who used the bond yield (i.e., the implied return rate of the bond's trading price) of the firm each year, this study uses the coupon rate as the proxy for cost of corporate bond. Due to the lower liquidity and transparency of Taiwan's corporate bonds in the secondary

market, this study cannot obtain the average trading price of each year and calculate the annual yield of each firm bond before maturity. Therefore, the coupon rate of the firm bond is used as a second best variable for the cost of corporate bond. Thus, this study explores whether a firm's CSR performance is evaluated by primary market investors in the bond issuance market, rather than considering whether CSR performance generates utility in the secondary or circulation market.

3.1.2 The main explanatory variable: the CSR performance

Referring to existing studies such as Cheng, Chang and Chen (2022) and Chang and Chen (2022), this study uses seven proxy variables to measure a firm's CSR performance. First, a dummy variable of the current performance of CSR (*csrkd*), which measures the performance of a firm based on the list of firms that have won the *Common Wealth's* "Corporate Citizenship" and the *Global Views Monthly's* "CSR Award". If a bond issuing firm wins either or both of the awards at the year of issuance, the value of *csrkd* is equal to 1, otherwise, if the firm does not win either award, the value *csrkd* is 0. The second variable is the cumulative performance in CSR (*csrcu*), which measures the total number of years a bond issuing firm has been win either or both of the awards (either award is sufficient). For example, if a firm has been win either or both of the awards for four years (missing one year) at the year of bond issuance, the value of *csrcu* is set to 4. The third variable is the continuous performance in CSR (*csrcont*), which is set to 1 if a bond issuing firm wins either or both of the awards every year during the data period (7 years). If the firm fails to win either award in any given year during the data period, *csrcont* is set to 0. The fourth variable is the overlap effect of CSR performance (*csrolp*), which is set to 1 if a bond issuing firm wins both awards at the year of issuance. If the firm wins only one award or none at all at the year of issuance, *csrolp* is set to 0.

To reduce the discontinuity of the four variables mentioned above, this study refers to the Shanghai Stock Exchange Social Responsibility Index and its constituent stock inclusion criteria to calculate the total social contribution made by the corporate bond issuing firm in the year of issuance. This includes the earnings created for shareholders, taxes paid to the government, salaries and benefits paid to employees, interest paid to creditors, and external donations for a specific year. The sum of these amounts yields the firm's social contribution value (*scv*). To consider the effect of firm's size, the study divides the social contribution value by the total asset to obtain the social returns on assets (*sroa*). The study divides the social contribution value by the number of shares outstanding to obtain the social contribution value per share (*scvps*). Larger amount in *scv*, *sroa* and *scvps* means greater contribution to firm's stakeholders, and means better performance in CSR.

3.1.3 Control variables

Based on the existing research (Menz, 2010), this study summarizes a number of variables that affect the bond coupon rate level, including the variables of bond issuance conditions, financial characteristics of issuers, corporate governance variables and the macroeconomic variables in the year of issuance. First, the amount of corporate bonds issued (*amount*), in thousands of N.T.D. Second, the maturity of bond (*maturity*), in years. Third, whether the bond rate it is fixed or floating interest rate (*fix*), it is 1, otherwise it is 0; fourth, whether it has collateral (*coll*), it is 1, otherwise it is 0; fifth, whether the corporate bonds are convertible corporate bonds (*convert*), it is 1, otherwise it is 0.

In addition to the CSR performance variables of bond issuing firms, which may affect the coupon rates of corporate bonds, this study summarizes several variables that affect bond yield levels based on existing research (Menz, 2010; Ge and Liu, 2015; Amiraslani, Lins, Servaes and Tamayo, 2019). These variables include bond issuance condition variables, issuing firm

characteristic variables, and corporate governance variables, which may also affect the coupon rates of corporate bonds. Regarding bond issuance variables, first, the amount of corporate bond issuance (*amount*), which is measured in thousands of N.T.D. Second, the bond maturity (*maturity*), which is measured in years. Third, whether the bond has a fixed interest rate (*fix*) is indicated by 1 for yes and 0 for no. Fourth, whether the corporate bond is collateralized (*coll*) is indicated by 1 for yes and 0 for no.

To consider issuing firm's characteristic variables, first, the firm size (*asset*) is measured by the natural logarithm of total assets. Firms with larger size tend to have lower default risk and are better able to withstand potential negative impacts, so they tend to have lower default risk and enjoy lower debt funding costs. Second, the debt ratio (*debtr*) evaluates a firm's ability to repay its debts. The higher the debt ratio, the lower the long-term debt repayment ability, the higher the financial risk and the higher the risk of bankruptcy, which is disadvantageous to creditors. McWilliams and Siegel (2000) indicated that the debt ratio affects the financial performance of a firm. If the debt ratio is too high, it will affect the firm's capital utilization and allocation, which will have a negative impact on the firm's profitability, leading to higher corporate bond rates. However, some studies have also shown that debt financing has a tax-deductible effect, which lowers the cost of debt compared to equity financing, and debt can also be used to reduce agency costs between shareholders and managers to increase the value of the firm (Weng, Tseng and Cheng, 2019). The debt ratio is measured as the total debt divided by total assets. Third, Goss and Roberts (2011) pointed out that the market-to-book ratio (*pbr*) implies a firm's growth opportunities. When the market-to-book ratio is higher, the firm's growth opportunities are greater, and the corporate bond rate tends to be lower. This study measures the market value of common stock divided by the book value of common stock. Fourth, earnings before interest and taxes (*ebit*) is a profitability indicator. Higher profitability can help reduce the coupon rate of corporate bonds.

In terms of corporate governance variables, first, Jensen (1993) believes that larger boards of directors lead to less efficient board functioning and managerial monitoring and advising, and the size of the board negatively affects firm's performance (Yermack, 1996; Kiel and Nicholson, 2003). This study measures the size of the board of directors by the total number of director seats. Second, the higher the independence of the board, the better the efficiency of the board to play monitoring function (Fama and Jensen, 1983) on the management to form decisions. This study uses independent director ratio (the percentage of independent directors in the board of directors) to measure board independence. Third, Jensen and Meckling (1976) argue that the higher the director's shareholdings (*dirhold*), the more aligned the director's interests are with those of the firm, and the better the director will perform their monitoring and advising duties, thereby influencing the costs of debt through its impacts on management decision quality. Director's shareholding is defined as the number of shares held by directors divided by the total number of shares outstanding. Fourth, Jensen and Meckling (1976) believe that the higher the shareholdings of the management (*manahold*), the private interests of the management become more aligned with the interests of the firm and shareholders. This alignment encourages the management to work harder and do their best to improve the firm's performance. Management's shareholding is defined as the number of shares held by the management divided by the total number of shares outstanding.

Fifth, Pound (1988) points out that institutional investors have more incentives and abilities to monitor firm's operations than individual shareholders, such as requiring firms to fully disclose information, and working with market forces to pressure management to act more cautiously, thereby enhancing the firm's value. Institutional investor shareholdings (*insthold*) is defined as the total number of shares held by institutional investors divided by the total number of shares outstanding. Sixth, whether the firm's financial statements are audited by the big four

accounting firms (*big4*) indicates the firm's higher quality financial reporting, with a value of 1, otherwise it is 0. Seventh, whether the issuing firm is family-controlled (*family*), if a issuing firm is controlled by a single family, the value of *family* is 1, and 0 otherwise. In summary, the variable definitions and abbreviations are summarized in Table 1.

Table 1 The Abbreviation and Definition of Variables

Variable	Abbreviation	Definition
Main explanatory variable— CSR Performance		
Current performance of CSR	<i>csrctd</i>	A dummy variable of the current performance of CSR (<i>csrctd</i>), which measures the performance of a firm based on the list of firms that have won the <i>Common Wealth's</i> "Corporate Citizenship" and the <i>Global Views Monthly's</i> "CSR Award". If a bond issuing firm wins either or both of the awards at the year of issuance, the value of <i>csrctd</i> is equal to 1, otherwise, if the firm does not win either award, the value <i>csrctd</i> is 0.
Cumulative performance of CSR	<i>csrcu</i>	The total number of years a bond issuing firm has been win either or both of the awards (either award is sufficient). For example, if a firm has been win either or both of the awards for four years (missing one year) at the year of bond issuance, the value of <i>csrcu</i> is set to 4.
Continuous performance of CSR	<i>csrcont</i>	Set to 1 if a bond issuing firm wins either or both of the awards every year during the data period (7 years). If the firm fails to win either award in any given year during the data period, <i>csrcont</i> is set to 0.
Overlap performance of CSR	<i>csrolp</i>	Set to 1 if a bond issuing firm wins both awards at the year of issuance. If the firm wins only one award or none at all at the year of issuance, <i>csrolp</i> is set to 0.
Social contribution value	<i>scv</i>	The sum of interest expense, tax , employee salary and after tax net income, and then take the natural logarithm
Social return on assets	<i>sroa</i>	(Social contribution value / total assets)*100%
Social contribution value per share	<i>scvps</i>	(Social contribution value / number of shares outstanding)
Explained variable— corporate bond cost		
Coupon rate	<i>rate</i>	The rate disclosed in the bond issuance announcement by the issuing entity, which is an annualized interest rate.
Control variable #1 — bond issuing condition variable		
Issuing amount	<i>amount</i>	The amount of corporate bonds issued
Maturity	<i>maturity</i>	The Maturity of corporate bond
Whether the rate is fixed	<i>Fix</i>	Whether the bond has a fixed interest rate, yes with 1 and 0 otherwise
With collateral asset	<i>coll</i>	Whether the bond has collateral asset, yes with 1 and 0 otherwise
Control variable #2— corporate characteristic variables		
Firm size	<i>asset</i>	Natural logarithm of total assets
Debt ratio	<i>debtr</i>	Total liabilities divided by total assets.
Market to Book Ratio	<i>pbr</i>	Market value of common equity divided by book value of common stock
Earnings before interest and tax to total assets	<i>ebit</i>	Earnings before interest and tax divided by total assets
Control variable #3— corporate governance variables		
Board size	<i>board</i>	Number of total seats on the board of directors
Independent director ratio	<i>idr</i>	The number of independent directors divided by the total number of seats on the board of directors
Directors' shareholdings	<i>dirhold</i>	Number of shares held by directors divided by the number of shares outstanding
Managerial shareholdings	<i>manahold</i>	Number of shares held by the management divided by the number of shares outstanding

Corporate Social Responsibility and Corporate Bonds Coupon Rate

Institutional investors' shareholdings	<i>insthold</i>	Number of shares held by the institutional investors divided by the number of shares outstanding
Audit by big4 accounting firm	<i>Big4</i>	Whether the firm's financial statements are audited by the big four accounting firms, yes with a value of 1, otherwise it is 0.
Family-controlled firm	<i>family</i>	Whether the issuing firm is family-controlled, if a issuing firm is controlled by a single family, the value of family is 1, and 0 otherwise.

Note: Description: This table reports the English abbreviations and definitions of the variables. The variable definitions are based on the Taiwan Economic Journal (TEJ) database and the author's own definitions.

3.2 Econometric Model

This paper uses multiple regression to estimate how firm's CSR performance affects the level of its bond coupon rate. The estimated regression equation is as follows:

$$\begin{aligned}
 rate_i = & \beta_0 + \beta_1 CSR_i \\
 & + \beta_2 amount_i + \beta_3 maturity_i + \beta_4 fix_i + \beta_5 coll_i \\
 & + \beta_6 asset_i + \beta_7 debtr_i + \beta_8 pbr_i + \beta_9 ebit_i \\
 & + \beta_{10} board_i + \beta_{11} idr_i + \beta_{12} dirhold_i + \beta_{13} manahold_i \\
 & + \beta_{14} insthold_i + \beta_{15} big4_i + \beta_{16} family_i + u_i
 \end{aligned} \tag{1}$$

where in Equation (1), the subscript i after each variable represents the i -th bond sample, and $rate$ is the coupon rate of the corporate bond. CSR is a vector of variables representing CSR performance of the issuing firm, including the current CSR performance (csr_{cd}), cumulative CSR performance (csr_{cu}), continuous CSR performance (csr_{cont}), overlap performance of CSR (csr_{olp}), social contribution value (scv), social return on assets ($sroa$), and social contribution value per share ($scvps$). $amount$ is the amount of bond issuance, $maturity$ is the maturity of the bond, fix indicates whether the bond has a fixed interest rate, $coll$ indicates whether the bond is secured by collateral assets, $asset$ is the size of the bond issuer, $debtr$ is the debt-to-asset ratio, pbr is the market-to-book ratio of common equity, $ebit$ is the ratio of earnings before interest and taxes to total assets, $board$ is the size of the board of directors, idr is independent director ratio, $dirhold$ is the directors' shareholdings, $manahold$ is the managerial shareholdings, $insthold$ is the institutional investors' shareholdings, big is a dummy variable indicating whether the financial statements of the bond issuer are audited and certified by one of the big four accounting firms, and $family$ is a dummy variable indicating whether the bond issuer is controlled by a family. The regression estimation follows the least squares criterion and also considers corrections for heteroskedasticity.

3.3 Samples and Data

This study employ non-convertible corporate bonds issued by non-financial industry listed firms on the Taiwan Stock Exchange and the Taipei Exchange between 2007 and 2013 as the research sample. Data on the specifications of bond issuance, issuer characteristics, and corporate governance variables are all extracted from the Taiwan Economic Journal (TEJ) database. The data of variables for calculating the social contribution value of each bond-issuing firms also comes from the TEJ database. The construction of the first four variables on CSR performance is based on the annual firm name lists of the "Best Corporate Citizen" by the *Common Wealth* magazine (<https://topic.cw.com.tw/csr/report.aspx>) and "Corporate Social Responsibility Award" by the *Global Views Monthly* magazine (<https://csr.gvm.com.tw/2023/award.html?v=1>).

4. Empirical results

4.1 Descriptive Statistics and Correlation Analysis

Table 2 reports the descriptive statistics of each variable, where Panel A presents full sample result, Panel B presents the bond samples issued by firms that have won CSR awards in the current period ($csrca=1$), Table C presents the bond samples issued by firms that did not win CSR awards in the current period ($csrca=0$), and Table D presents the mean differences (the samples with $csrca=1$ minus the samples with $csrca=0$) of each variable between the two groups of samples. From the results of the mean difference test in Panel B, C and D, the average coupon rate of the firms that received CSR awards ($csrca=1$) in the current period is 1.3062%, which is lower than the coupon rate of the firms that did not receive CSR awards ($csrca=0$) in the current period (average rate of 1.3702%), yet the difference (-0.0639) is statistically insignificant. This indicates that although better CSR performance of the bond issuer is corresponding to lower coupon rate, but this effect lacks of statistical and economic significance. Investors take this benefit into account when evaluating bonds, and under other conditions remaining constant, companies can issue bonds at a lower yield and use cheaper financing costs for public debt financing.

This study also found that the issuance conditions of the firms receiving the social responsibility award were significant different from those that did not receive the award. The former issued bonds with greater amount, which had longer maturities, and a lower proportion of mortgaged bonds. The control variables of the two groups of firms were also observed. The firms that received the social responsibility award had lower debt ratios, higher market-to-book ratios, higher ratios of earnings before tax and interest to total assets, smaller board size, higher independent director ratio, higher proportion of institutional investors' shareholdings, higher ratio of firms audited by the big-four accounting firms, and a lower proportion of family-controlled firms. This suggests that among all bonds, those that perform well in CSR tend to be firms with better profitability and sound corporate governance.

Table 3 reports the pairwise correlation coefficients of each variable. By observing the first column, it can be found that the correlation coefficients between the bond coupon rate and the CSR performance variables are almost all negative, indicating that firms with better CSR performance tend to have lower bond coupon rates. However, the negative correlation coefficients did not reach statistical significance, which is similar to the findings in Table 2. Although firms with better CSR performance correspond to lower bond rates, the degree is relatively mild and not significant, both statistically and economically. The hypothesis is weakly hold by the evidence from pairwise correlation.

In addition, by observing the first column of the correlation coefficient matrix, it can be found that the correlation coefficients between the firm's coupon rate and various control variables are as follows: the correlation coefficient between the coupon rate and whether the bond has collateralized assets is significantly negative (-0.0786), the correlation coefficient of coupon rate and independent director ratio is significantly positive (0.1186), the correlation coefficient between coupon rate and director's shareholding is significantly negative (-0.1046), the correlation coefficient between coupon rate and managerial shareholdings is significantly positive (0.1050), and the correlation coefficient between coupon rate and institutional investors' shareholdings is significantly negative (-0.1145). This indicates that bonds with collateralized assets, the lower the independent director ratio, the lower the managerial shareholdings, the higher the directors' shareholding, the higher the institutional investors' shareholding, and the lower the coupon rate.

Corporate Social Responsibility and Corporate Bonds Coupon Rate

Table 2 Descriptive Statistics

variable	Panel A. Full samples					Panel B. Samples with <i>csrcd</i> =1					Panel C. Samples with <i>csrcd</i> =0					
	No. of obs	Mean	St. dev.	Min.	Max.	No. of obs	Mean	St. dev.	Min.	Max.	No. of obs	Mean	St. dev.	Min.	Max.	Mean diff.
<i>rate</i>	717	1.3602	0.6367	0.0000	4.5000	112	1.3062	0.7964	0.0000	4.5000	605	1.3702	0.6029	0.0000	3.9000	-0.0639
<i>csrcd</i>	719	0.1558	0.3629	0.0000	1.0000	112	1.0000	0.0000	1.0000	1.0000	607	0.0000	0.0000	0.0000	0.0000	1.0000
<i>csrcu</i>	719	0.7636	1.3802	0.0000	6.0000	112	3.1161	1.3406	1.0000	6.0000	607	0.3295	0.8464	0.0000	5.0000	2.7866***
<i>csrcont</i>	718	0.0237	0.1521	0.0000	1.0000	112	0.1518	0.3604	0.0000	1.0000	606	0.0000	0.0000	0.0000	0.0000	0.1518***
<i>csrolp</i>	719	0.0153	0.1228	0.0000	1.0000	112	0.0982	0.2989	0.0000	1.0000	607	0.0000	0.0000	0.0000	0.0000	0.0982***
<i>scv</i>	692	16.291	4.4764	-16.242	19.416	109	15.025	8.8744	-16.196	19.209	583	16.528	2.9698	-16.242	19.416	-1.5027*
<i>sroa</i>	692	6.4854	6.9422	-9.4973	30.601	109	8.9186	9.4141	-9.4973	30.601	583	6.0305	6.2816	-5.3333	29.079	2.8881***
<i>scvps</i>	419	6.5206	4.5987	-4.2186	28.918	87	5.7278	3.7843	-4.2186	11.921	332	6.7283	4.7725	-1.6128	28.918	-1.0006**
<i>amount</i>	719	3030.7	2775.1	3.2750	20000.0	112	4159.8	3575.4	100.00	20000.0	607	2822.3	2550.3	3.2750	20000.0	1337.5***
<i>maturity</i>	719	6.3539	3.9443	2.0000	40.000	112	6.9911	5.0193	2.0000	30.000	607	6.2363	3.7053	2.0000	40.000	0.7548
<i>fix</i>	719	0.9138	0.2809	0.0000	1.0000	112	0.8929	0.3107	0.0000	1.0000	607	0.9176	0.2752	0.0000	1.0000	-0.0248
<i>coll</i>	719	0.3255	0.4689	0.0000	1.0000	112	0.2768	0.4494	0.0000	1.0000	607	0.3344	0.4722	0.0000	1.0000	-0.0576
<i>asset</i>	694	20.029	1.2279	14.779	22.141	109	20.113	1.0127	18.335	22.141	585	20.013	1.2641	14.779	22.123	0.0998
<i>debt</i>	694	74.184	24.028	18.370	96.600	109	60.850	28.844	19.500	96.120	585	76.668	22.178	18.370	96.600	-15.818***
<i>pbr</i>	438	1.7820	0.9638	0.3900	6.8300	87	2.2905	1.2430	0.7500	6.8300	351	1.6560	0.8367	0.3900	4.0000	0.6344***
<i>ebit</i>	685	6.8068	9.3340	-8.0400	39.360	109	12.434	14.324	-8.0400	39.360	576	5.7419	7.6134	-7.6000	33.950	6.6923***
<i>board</i>	683	12.025	3.7543	5.0000	19.000	109	10.624	3.3632	7.0000	19.000	574	12.291	3.7682	5.0000	19.000	-1.6671***
<i>idr</i>	683	15.375	13.810	0.0000	55.556	109	22.365	19.264	0.0000	55.556	574	14.048	12.083	0.0000	55.556	8.3171***
<i>dirhold</i>	683	48.487	40.020	0.3900	100.00	109	41.490	39.418	6.0300	100.00	574	49.815	40.030	0.3900	100.00	-8.3253**
<i>manahold</i>	683	0.1829	0.4418	0.0000	3.5800	109	0.1572	0.2540	0.0000	0.9300	574	0.1878	0.4690	0.0000	3.5800	-0.0306
<i>insthold</i>	674	77.337	22.621	4.5400	100.00	109	85.351	13.894	47.520	100.00	565	75.791	23.640	4.5400	100.00	9.5600***
<i>big</i>	684	0.9956	0.0661	0.0000	1.0000	109	1.0000	0.0000	1.0000	1.0000	575	0.9948	0.0721	0.0000	1.0000	0.0052*
<i>family</i>	679	0.6082	0.4885	0.0000	1.0000	109	0.3761	0.4867	0.0000	1.0000	570	0.6526	0.4766	0.0000	1.0000	-0.2765***

Note: This table reports the basic descriptive statistics of the variables, including the number of observations, mean, standard deviation, minimum and maximum. The data period is from 2007 to 2013. The mean differences in the right column of Table 1 indicate the mean differences of each variable between the samples with better social responsibility performance (*csrcd*=1) and the samples with ordinary and poorer social responsibility performance (*csrcd*=0), and the *t*-test results of the mean differences. *, **, and *** indicate that the mean differences reached significant levels of 10%, 5%, and 1%, respectively.

Table 3 Correlation Matrix

variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
(1) rate	1.0000																							
(2) csrca	-0.0365	1.0000																						
(3) csrca	-0.0091	0.7327*	1.0000																					
(4) csrcont	0.0354	0.3622*	0.3983*	1.0000																				
(5) csrolp	-0.0271	0.2902*	0.1692*	0.2043*	1.0000																			
(6) scv	-0.0134	-0.1224*	-0.0632	0.0424	0.0297	1.0000																		
(7) sroa	-0.0296	0.1517*	0.2243*	-0.0326	0.1699*	0.3458*	1.0000																	
(8) scvps	-0.0990*	-0.0884	-0.1071*	-0.0268	0.0630	0.4472*	0.6129*	1.0000																
(9) amount	0.0273	0.1749*	0.1459*	0.0497	0.0338	0.1447*	0.1927*	0.1470*	1.0000															
(10) maturity	-0.0659	0.0694	0.1421*	0.0429	-0.0342	0.0367	0.0430	-0.0200	0.0227	1.0000														
(11) fix	-0.0285	-0.0320	-0.0239	0.0153	0.0383	-0.0448	0.0247	0.1099*	-0.0622	-0.3023*	1.0000													
(12) coll	-0.0786*	-0.0446	0.0394	-0.0101	-0.0140	0.0731	0.1405*	0.1044*	0.0426	-0.2488*	0.0971*	1.0000												
(13) asset	-0.0209	0.0296	-0.0461	0.1464*	-0.0837*	0.2853*	-0.3616*	0.1491*	0.2973*	0.0100	-0.0705	-0.0500	1.0000											
(14) debtr	0.0005	-0.2397*	-0.3654*	0.0771*	-0.1063*	-0.0779*	-0.7554*	-0.1762*	-0.2849*	-0.0786*	0.0826*	-0.0864*	0.4190*	1.0000										
(15) pbr	-0.0145	0.2629*	0.2496*	0.0906	0.2634*	0.2363*	0.6353*	0.2435*	0.3093*	0.1082*	-0.0442	0.0430	-0.0481	-0.5480*	1.0000									
(16) ebit	-0.0096	0.2625*	0.3303*	-0.0255	0.1450*	0.2620*	0.9240*	0.4052*	0.2642*	0.0907*	-0.0604	0.0964*	-0.3206*	-0.8300*	0.7314*	1.0000								
(17) board	0.0456	-0.1627*	-0.2050*	0.0140	-0.0784*	-0.1629*	-0.3568*	-0.2699*	0.0660	0.0120	-0.0319	-0.1990*	0.3035*	0.1849*	-0.1588*	-0.3356*	1.0000							
(18) idr	0.1186*	0.2207*	0.2298*	0.2070*	0.0504	0.0544	0.1946*	-0.0049	0.3542*	0.0860*	-0.1863*	0.0298	0.1431*	-0.3106*	0.3033*	0.3469*	-0.0135	1.0000						
(19) dirhold	-0.1046*	-0.0762*	-0.1871*	-0.1175*	-0.0302	-0.0810*	-0.4463*	-0.2196*	-0.1057*	-0.0755*	0.0600	-0.0397	0.3634*	0.5279*	0.0552	-0.4454*	0.1198*	-0.2229*	1.0000					
(20) manahold	0.1050*	-0.0254	-0.0569	-0.0355	-0.0119	0.0188	0.1232*	0.2429*	-0.0430	0.0224	-0.0257	-0.0366	-0.1736*	-0.0528	0.1349*	0.1055*	0.0400	0.2105*	-0.3647*	1.0000				
(21) insthold	-0.1145*	0.1557*	0.0688	-0.0132	0.0539	0.0216	-0.1449*	-0.0315	0.1161*	-0.0260	-0.0001	0.0114	0.4496*	0.1768*	0.3633*	-0.0833*	0.0055	0.0339	0.7499*	-0.5719*	1.0000			
(22) big	0.0182	0.0289	0.0370	0.0106	0.0085	0.0358	-0.0013	0.0519	0.0371	0.0118	-0.0200	0.0459	0.1705*	0.0183	0.0703	0.0284	0.0654	-0.0614	0.0281	-0.1560*	0.0608	1.0000		
(23) family	0.0508	-0.2079*	-0.1918*	0.0707	-0.0165	0.0552	0.1070*	0.1705*	-0.1013*	-0.0537	0.0399	0.1237*	-0.2539*	-0.1561*	0.0821	0.0479	-0.1483*	-0.0845*	-0.2744*	0.1196*	-0.2226*	-0.0080	1.0000	

Note: This table reports pair-wise Pearson correlation coefficients among variables. See Table 1 for the definition of variables. Yearly data is ranged from 2007 to 2013. Correlation coefficients followed by an asterisk means that it reaches at least 5% significance level.

4.2 Regression Result

Table 4 reports the results of the least square regression estimates of the effect of CSR performance on the coupon rate (*rate*) of corporate bonds. The main explanatory variable in each of the estimation models (1)~(7) is the CSR performance, which is measured using the current CSR performance (*csrca*), cumulative CSR performance (*csrcu*), continuous CSR performance (*csrcont*), overlap effect of CSR performance (*csrolp*), social contribution value (*scv*), social return on assets (*sroa*), and social contribution value per share (*scvps*). Observing the estimated coefficients of each CSR performance variable in models (1)~(7), it is found that five of the seven coefficients are negative. However, only the estimated coefficient of the social contribution value per share in model (7) is significantly negative (-0.0201), indicating that firms with higher social contribution values per share have lower coupon rate on their corporate bonds. The results of the regression estimates provide only limited evidence supporting the hypothesis that CSR performance helps to reduce the coupon rate of corporate bonds. Therefore, the hypothesis of this study only receives limited evidence, but there is no evidence that contradicts it (i.e., the coefficient is positive) and reaches a statistically significant level.

In addition, by observing the estimation results of control variables in Table 4 for each model, it can be seen that, generally, the estimated coefficient for the maturity of corporate bonds is significantly negative, this indicates that as the maturity of corporate bonds increases, the coupon rate of the bonds becomes lower. For the majority of the models, the estimated coefficient for the dummy variable indicating whether a corporate bond has collateralized assets is significantly negative, indicating that when a corporate bond has collateralized assets, the coupon rate of the bond becomes lower. The estimated coefficient for the earnings before interest and tax to assets is significantly negative, indicating that when a firm's profitability is better, the coupon rate its corporate bonds is lower. The estimated coefficient for board size is significantly negative, indicating that as the number of members on a firm's board decreases, the coupon rate of its corporate bonds becomes lower. The estimated coefficient for the independent director ratio is significantly positive, indicating that as the ratio of independent director's decreases, the coupon rate becomes lower.

So far, this study has only obtained weak evidence of the impact of CSR performance on bond coupon rates. The possible explanation for this is that the effect of CSR performance on bond coupon rates may be heterogeneous across different bond samples, meaning that CSR performance may be helpful for certain types of firms but not as effective for others. By estimating all the samples together, the utility of CSR is weakened. To investigate whether this inference is valid, this study attempt to explore whether the effect of CSR performance on bond coupon rates differs at different levels of bond rates. Lower bond rates indicate a group of samples in which the issuing firms may have relatively better operating performance and sound corporate governance, there are fewer agency problems (Jensen and Meckling, 1976) or concerns about conflicts of interest in the literature on CSR. The investment in CSR in this type of firm may have a relatively larger impact in reducing bond rates. Conversely, higher bond rates indicate a group of samples in which the issuing companies may have relatively poorer operating performance or weaker corporate governance, it is relatively more likely to have a greenwashing or window-dressing effect (Kim, Li and Li, 2014). The investment in CSR in this type of firm may have a less efficient or even counterproductive effect, resulting in a relatively smaller impact on bond rates or no impact at all.

Table 4 Regression Result of the Effect of CSR Performance on Coupon Rate

Explanatory variables	Explained variable: corporate bond coupon rate (<i>rate</i>)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>csrkd</i>	-0.0392 (-0.44)						
<i>csrcu</i>		0.0175 (0.74)					
<i>csrcont</i>			-0.0470 (-0.25)				
<i>csrolp</i>				-0.265 (-1.24)			
<i>scv</i>					0.00264 (0.30)		
<i>sroa</i>						-0.00939 (-0.84)	
<i>scvps</i>							-0.0201** (-2.17)
<i>amount</i>	-0.00000326 (-0.24)	-0.00000266 (-0.19)	-0.00000374 (-0.27)	-0.00000371 (-0.27)	-0.00000357 (-0.26)	-0.00000310 (-0.22)	-0.0000115 (-0.82)
<i>maturity</i>	-0.0169** (-2.23)	-0.0175** (-2.30)	-0.0168** (-2.22)	-0.0176** (-2.33)	-0.0169** (-2.23)	-0.0168** (-2.23)	-0.0276*** (-3.41)
<i>fix</i>	0.0727 (0.62)	0.0668 (0.57)	0.0748 (0.64)	0.0774 (0.66)	0.0737 (0.63)	0.0907 (0.76)	0.0942 (0.78)
<i>coll</i>	-0.193** (-2.59)	-0.192** (-2.59)	-0.189** (-2.55)	-0.193*** (-2.61)	-0.188** (-2.54)	-0.181** (-2.43)	-0.226*** (-2.98)
<i>asset</i>	-0.0196 (-0.50)	-0.0231 (-0.59)	-0.0195 (-0.50)	-0.0231 (-0.59)	-0.0258 (-0.60)	-0.0202 (-0.52)	0.00460 (0.11)
<i>debttr</i>	-0.000185 (-0.07)	0.000454 (0.18)	0.0000675 (0.03)	-0.0000665 (-0.03)	-0.000181 (-0.07)	0.0000911 (0.04)	-0.000316 (-0.12)
<i>pbr</i>	0.0487 (0.87)	0.0411 (0.73)	0.0503 (0.87)	0.0667 (1.14)	0.0474 (0.84)	0.0451 (0.80)	0.0426 (0.74)
<i>ebit</i>	-0.0123* (-1.69)	-0.0111 (-1.50)	-0.0123* (-1.68)	-0.0134* (-1.82)	-0.0130 (-1.64)	-0.00504 (-0.45)	-0.00849 (-1.06)
<i>board</i>	-0.0240** (-2.15)	-0.0219* (-1.94)	-0.0236** (-2.13)	-0.0249** (-2.24)	-0.0231** (-2.07)	-0.0236** (-2.13)	-0.0298** (-2.55)
<i>idr</i>	0.00879*** (2.90)	0.00857*** (2.83)	0.00895*** (2.81)	0.00868*** (2.87)	0.00883*** (2.89)	0.00795** (2.52)	0.00641** (2.02)
<i>dirhold</i>	-0.00139 (-0.71)	-0.00114 (-0.58)	-0.00131 (-0.67)	-0.00143 (-0.74)	-0.00124 (-0.64)	-0.00130 (-0.67)	-0.00305 (-1.43)
<i>manahold</i>	0.0160 (0.16)	0.0193 (0.19)	0.00975 (0.09)	0.0127 (0.12)	0.0188 (0.18)	0.0247 (0.24)	0.0812 (0.77)
<i>insthold</i>	-0.000704 (-0.22)	-0.00140 (-0.45)	-0.00111 (-0.36)	-0.000736 (-0.24)	-0.000834 (-0.27)	-0.00122 (-0.40)	0.00127 (0.39)
<i>big</i>	0.597 (1.46)	0.584 (1.43)	0.590 (1.45)	0.600 (1.47)	0.609 (1.48)	0.567 (1.39)	0.615 (1.53)
<i>family</i>	-0.00116 (-0.01)	0.0224 (0.27)	0.00773 (0.10)	-0.00675 (-0.08)	-0.000176 (-0.00)	0.0100 (0.12)	0.0375 (0.45)
constant	1.551** (2.17)	1.580** (2.22)	1.542** (2.15)	1.609** (2.26)	1.610** (2.21)	1.597** (2.24)	1.222 (1.59)
No. of Obs.	431	431	431	431	431	431	409
Adjust R^2	0.027	0.028	0.027	0.031	0.027	0.029	0.066
<i>p</i> -value of <i>F</i> -stat.	0.0347	0.0314	0.0359	0.0237	0.0357	0.0300	0.0003

Note: This table reports least square regression estimation result of the effect of CSR performance on corporate bond coupon rate (*rate*). In model (1)~(7), CSR performance is measured by the current CSR performance (*csrkd*), cumulative CSR performance (*csrcu*), continuous CSR performance (*csrcont*), overlap effect of CSR performance (*csrolp*), social contribution value (*scv*), social return on assets (*sroa*), and social contribution value per share (*scvps*). Controls variables include bond issuing amount (*amount*), bond maturity (*maturity*), whether the bond rate is fixed (*fix*), with collateral asset (*coll*), firm size (*asset*), debt ratio (*debttr*), market to book ratio (*pbr*), earnings before interest and tax to total assets (*ebit*), board size (*board*), independent director ratio (*idr*), directors' shareholdings (*dirhold*), managerial shareholdings (*manahold*), institutional investors' shareholdings (*insthold*), audit by big4 accounting firm (*big4*) and family-controlled firm (*family*). Sample period is yearly ranged from 2007 to 2013. The parentheses are *t*-values of estimated coefficients (based on White's consistent robust standard errors), while *, **, and *** mean that estimated coefficients reach at least 10%, 5%, and 1% significance level, respectively.

Table 5 Quantile Regression Results of the Effects of CSR Performance on Coupon Rate

Explanatory Variable	Explained variable: corporate bond coupon rate (<i>rate</i>)			
	Quantile (15%) (1)	Quantile (45%) (2)	Quantile (75%) (3)	Quantile (90%) (4)
<i>scvps</i>	-0.0214*** (-3.04)	-0.0206** (-2.22)	-0.0160 (-1.28)	0.00328 (0.12)
<i>amount</i>	-0.0000222 (-0.20)	-0.0000247 (-0.18)	-0.0000679 (-0.37)	-0.0000296 (-0.75)
<i>maturity</i>	-0.0189** (-2.30)	-0.00549 (-0.62)	0.0274*** (3.28)	-0.00255 (-0.14)
<i>fix</i>	0.382*** (5.15)	0.431*** (3.51)	-0.538*** (-3.30)	-0.347 (-1.07)
<i>coll</i>	0.0235 (0.37)	-0.0626 (-0.81)	-0.320*** (-3.31)	-0.565** (-2.38)
<i>asset</i>	-0.0392 (-1.24)	-0.0112 (-0.25)	0.0607 (1.15)	0.0130 (0.13)
<i>debt</i>	0.00506** (2.40)	0.00190 (0.72)	-0.000215 (-0.07)	0.0000628 (0.01)
<i>pbr</i>	-0.0930** (-2.39)	0.0386 (0.65)	-0.0193 (-0.24)	0.0361 (0.30)
<i>ebit</i>	0.0120** (1.97)	-0.00772 (-0.94)	0.00510 (0.49)	-0.00857 (-0.38)
<i>board</i>	0.000550 (0.06)	-0.0185 (-1.52)	-0.0384*** (-2.60)	-0.0377 (-1.16)
<i>idr</i>	0.00669*** (2.94)	0.000759 (0.23)	0.00492 (1.32)	0.0172** (2.41)
<i>dirhold</i>	0.00278* (1.80)	-0.00335 (-1.49)	-0.000559 (-0.20)	-0.00553 (-0.96)
<i>manahold</i>	0.0540 (0.65)	0.114 (1.07)	-0.0249 (-0.21)	-0.0277 (-0.15)
<i>insthold</i>	-0.00362 (-1.32)	0.00146 (0.42)	0.00138 (0.38)	0.00292 (0.43)
<i>big4</i>	0.710*** (4.36)	0.689* (1.78)	0.0124 (0.04)	0.924** (1.97)
<i>family</i>	0.145** (2.23)	0.0477 (0.55)	0.0917 (0.86)	0.205 (1.02)
constant	0.446 (0.82)	0.579 (0.75)	1.285 (1.45)	1.625 (1.06)
No. of obs.	409	409	409	409
Pseudo R ²	0.1577	0.0584	0.0994	0.1294

Note: This table reports the results of quantile regression (Koenker and Bassett, 1978) estimating the effects of CSR performance, measured by social contribution value per share (*scvps*), on corporate bond coupon rate at different levels of coupon rate. Four quantiles (15%, 45%, 75%, and 90%) are used to estimate regressions. Controls variables include bond issuing amount (*amount*), bond maturity (*maturity*), whether the bond rate is fixed (*fix*), with collateral asset (*coll*), firm size (*asset*), debt ratio (*debt*), market to book ratio (*pbr*), earnings before interest and tax to total assets (*ebit*), board size (*board*), independent director ratio (*idr*), directors' shareholdings (*dirhold*), managerial shareholdings (*manahold*), institutional investors' shareholdings (*insthold*), audit by big4 accounting firm (*big4*) and family-controlled firm (*family*). Sample period is yearly ranged from 2007 to 2013. The parentheses are *t*-values of estimated coefficients (based on White's consistent robust standard errors), while *, **, and *** mean that estimated coefficients reach at least 10%, 5%, and 1% significance level, respectively.

Table 5 reports the results of quantile regression (Koenker and Bassett, 1978) estimating the effects of CSR performance, measured by social contribution value per share (*scvps*), on corporate bond coupon rate at different levels of coupon rate. Quantile regression estimation helps to capture the heterogeneity of the effect of the explanatory variable on the explained variable (i.e., coupon rate) across different levels of the explained variable (coupon rate). While Table 4 shows that coupon rate is significantly negatively affected by *scvps*, this study further investigates which types (different levels of coupon rate) of firms are more likely to be impacted by *scvps*. Four quantiles (15%, 45%, 75%, and 90%) are used to estimate regressions for models (1)~(4) in Table 5.

In Table 5, the estimated coefficients of *scvps* in models (1)~(4) show a decreasing in magnitude of negative effects and statistical significance as the coupon rate becomes lower. This implies that firms with lower coupon rate are more likely to be negatively affected by *scvps* and the effect is also statistically significant. Conversely, for firms with higher coupon rate, their CSR performance is less likely to have a lowering effect on coupon rate and lacks of statistical significance. This result suggests that the mechanism of the benefits of CSR, such as risk management, insurance, performance enhancement, and corporate reputation, only occurs in firms with lower coupon rate, better performance and sound governance. For firms with higher coupon rates with weaker performance and worse governance, the benefits from engaging in CSR on coupon rate is less pronounced.

5. Conclusions and Suggestions

Existing research on CSR suggests that a firm's CSR performance can lead to better financial performance, reputation, and lower risk and expected losses, resulting in relatively more favorable financing conditions and fewer financing restrictions for the firm. However, there has been no investigation into whether the cost of corporate bonds in the Taiwan financial market is also affected by issuing firm's CSR performance, which is the main research motivation of the study. This study collects data on straight corporate bonds (excluding convertible bonds) issued by non-financial industry listed firms in Taiwan from 2007 to 2013, including bond issuance conditions, corporate financial characteristics, and corporate governance variables. The annual CSR award name list from the *Common Wealth* magazine and the Global Views Monthly magazine as well as the inclusion criteria for the Shanghai Stock Exchange's CSR Index, social contribution value are used to quantify a firm's CSR performance.

The results of univariate analysis and regression estimation show that although there is not much evidence to suggest that CSR performance significantly reduces the coupon rate of corporate bonds, the negative impact of CSR performance on the coupon rate is greater for firms with lower coupon rates, and the statistical significance is also higher. This implies that only firms with better initial bond issuance conditions are more likely to benefit from good CSR performance. The favorable conditions for obtaining a return on investment from CSR performance in the primary bond market are based on the firm's own good issuance conditions.

Some policy implications of the empirical result are emerged. For the management, CSR is already an important aspect that needs to be invested in the current financial market that values environmental, social, and governance issues. The determination of the coupon rate of corporate bonds clearly affects a firm's interest expenses, and lower debt funding costs lead to lower interest burdens and help ensure the firm's long-term stability and development. CSR performance during the issuance of corporate bonds is something that needs to be paid attention to and maintained. For regulatory authorities, good CSR performance helps to reduce corporate bond interest rates and has a lowering effect on corporate debt expenditures. Therefore, continuing to guide and regulate public-traded firms to fulfill their CSR responsibilities in the financial market has a dual benefit of promoting social cohesion and enhancing the stability of

the financial market. For investors, firms with good CSR performance have lower interest burdens and also have higher sustainability, so allocating funds to securities issued by firms with good CSR performance and high sustainability provides investors with relatively high security for their wealth.

Regarding suggestions for follow-up research on this study, first, the current empirical design of the study belongs to cross-sectional estimation, with sample data consisting of corporate bonds issued in different years and their corresponding bond contract conditions, financial characteristics, and governance variables. If data on the quoted prices of corporate bonds in the secondary market after issuance can be collected (and the corresponding bond's yield to maturity can be derived), and the level of how the firm's CSR performance in different years affects the bond yield (or credit spread) can be examined. This will allow for a more comprehensive assessment of the impact of CSR performance on the cost of corporate bonds, rather than just evaluating the coupon rate at the time of issuance. Second, currently, the measurement of CSR performance is aimed at the overall performance of a firm's CSR. In fact, firms can quantify their social responsibility performance at different levels or among different stakeholder groups, such as employee welfare and rights, corporate governance and information disclosure, environmental protection and community participation, and consumer rights, among other aspects. The degree to which a firm's CSR performance in different aspects affects the coupon rate of bonds may be different. Therefore, subsequent research may examine the impact of CSR performance in different areas on the coupon rate.

Third, future research could consider using the TESG Sustainability Development Index constructed and published by the TEJ database in 2022 for public-traded firms in Taiwan (<https://tesg.tej.com.tw/>) to quantify CSR performance, including TESG rating scores (1-7 points), TESG scores (0-100 points), TESG scores ranked among the main industries of SASB (Sustainability Accounting Standards Board), TESG scores ranked among the sub-industries of SASB, and environmental, social, and corporate governance scores as variables to quantify CSR performance. Fourth, the endogeneity and samples self-selection problems related to CSR performance can be corrected using two-stage least squares instrumental variable estimation (Angrist and Krueger, 2001) and propensity score matching (Rosenbaum and Rubin, 1983, 1985a,b). Finally, the macroeconomic condition and industry effect may affect the coupon rate of corporate bonds, and controlling for industry and year effects in regression analysis could be considered.

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