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## The Impact of ESG Performance on Bond Financing Costs: Evidence from China's Corporate Bond Market

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## Abstract

This study investigates the impact of environmental, social, and governance (ESG) performance on firms' bond financing costs in China, based on stakeholder, signaling, and agency theories. While research exists on ESG performance and bond financing costs in mature markets, little research has been conducted on emerging markets and unlisted firms. To address this gap, our analysis incorporates bond financing costs of both listed and unlisted Chinese companies and employs a unique regression model.

The empirical findings reveal that firms with better ESG performance have lower bond financing costs. This effect is more pronounced in small firms. Furthermore, we find that improved ESG performance reduces operational and default risk while enhancing cash flow, which serves as an underlying mechanism. The results demonstrate robustness through the use of alternative measurements, different samples, and the inclusion of endogeneity tests.

**Keywords:** ESG performance; Bond financing costs; Stakeholder theory; Signaling theory

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# 1. Introduction

Environmental, social, and governance (ESG) is used to assess the sustainable development performance and responsibility of companies (Cheung, 2016; Mishra and Modi, 2012). In light of global challenges such as climate change, resource scarcity, and the COVID-19 pandemic, ESG has gained widespread attention from governments, companies, and investors.

Companies are facing the challenge of balancing short-term and long-term interests, with increasing pressure to "do good" (Huang, 2021). Scandals involving Chinese listed companies, such as the Changsheng Biological Vaccine Fraud (2018), Luckin Coffee Financial Data Fraud (2020), and the Evergrande Debt Crisis (2021), have damaged the image and reputation of these companies, resulting in negative consequences. However, listed companies with better information disclosure and stricter adherence to regulations still underperform in ESG, and unlisted companies face greater information asymmetry issues. Therefore, this study aims to examine the ESG practices of Chinese companies, including unlisted ones.

While research exists on ESG performance and bond financing costs in mature markets, little research has been conducted on emerging markets and unlisted firms. This study fills this gap by examining the impact of ESG performance on the bond financing costs of Chinese companies, including those of unlisted companies.

First, we investigate the relationship between firms' ESG performance and bond financing costs. Our findings show that the better a company's ESG performance, the lower its bond financing costs. Specifically, for every one percent increase in a company's ESG score, its bond spread decreases by an average of 0.149 percent when other variables are held constant. Second, the negative influence of ESG performance on bond financing is stronger for small companies, indicating that ESG performance effectively mitigates credit risk for smaller firms. Third, we examined two potential mechanisms through which ESG practices influence bond financing costs. One mechanism is to reduce firms' principal risk; our results show that ESG scores have a significant positive effect on management discipline and higher credit ratings, which leads to lower operational and default risks. The other mechanism is that a firm's ESG performance can impact its cash flow from financing activities (CFF) and, consequently, affects bond financing costs; the empirical results show that ESG scores have a significant positive effect on CFF. Fourth, we used an instrumental variable approach to alleviate endogeneity concerns. Finally, we

use alternative measurements and different samples to repeat our baseline regression, and the results hold.

This study contributes to the literature on corporate bonds and ESG. First, unlike previous studies that focused on the equity market, this study focuses on the bond market. Bond issuers often need refinancing compared with equity issuers, which may result in a greater need to meet the needs of various stakeholders to avoid paying higher financing costs (Jang et al., 2020).

Second, compared to previous research, this study goes beyond the study of debt ratings by examining the channels of operational and default risks and the role of cash flow from firm financing activities. Our study provides a more detailed analysis of the relationship between ESG performance and bond financing costs for Chinese firms, in alignment with stakeholder and signaling theories.

Finally, this study extends the scope of analysis beyond Chinese listed companies to include unlisted companies, enhancing the market guidance of the findings. A more comprehensive understanding of the relationship between ESG performance and bond financing costs can be achieved by considering both listed and unlisted companies.

The remainder of this paper is structured as follows: the second section comprises a literature review and hypothesis development; the third section covers the data, model, and variables; the fourth section presents the empirical results; and the fifth section concludes the study.

## 2. Literature review and hypothesis development.

### 2.1 ESG literature

ESG investing is an investment concept and corporate evaluation criterion introduced by the United Nations Environment Program in 2004. It encompasses a company's ESG performance, going beyond traditional financial performance. Third-party rating agencies rely primarily on ESG ratings or scores to quantify and assess a company's ESG performance and alignment with sustainability goals. Numerous studies have examined the impact of ESG on corporate performance/value (Cheung, 2016; Mishra and Modi, 2012), but conclusive findings are lacking. Overall, most of the literature suggests that ESG performance has a positive impact on firms (Friede et al., 2015).

The impact of ESG on firm performance can be summarized as "doing well by doing good" (Huang, 2021). Studies have found that ESG is an effective way to improve firm value and M&A performance (Benabou and Tirole, 2010; Ferrell et al., 2016; Esteban-Sanchez et al., 2017; Deng et al., 2013). However, there is also the argument that ESG results in inefficient allocation of resources, leading to a reduction in shareholder value and damage to stakeholder relationships (Barnett, 2007; Jensen, 1993). Additionally, research suggests that the positive relationship between ESG and firm value is more significant in the long term than in the short term, because ESG activities take time to have an effect (McWilliams et al., 2006; Dhaliwal et al., 2011; Lu and Taylor, 2015; Sun et al., 2019). Most studies align with the notion that ESG positively impacts firm performance and value, although a few hold the opposite view.

In addition to the literature that explores the relationship between ESG performance and firm performance/value, mainstream studies have also investigated the connection between ESG performance and the cost of corporate capital, with a focus on equity market research. ElGhoul et al. (2011) found a negative relationship between the issuance of sustainability reports and the cost of capital. Goss and Roberts (2011) presented robust evidence that socially irresponsible companies pay 7 to 18 basis points higher interest rates on loans than socially responsible companies. In China, Zhou et al. (2016) documented a negative relationship based on their study of listed companies issuing debt in Shanghai and Shenzhen.

In short, the literature offers various perspectives on the relationship between ESG and firm performance and value. Most studies support the idea that “doing good can be better,” and emphasize the long-term effects. However, few view ESG as an agency problem or as being responsible for the misallocation of resources. Additionally, the literature has examined the relationship between ESG and firms’ cost of capital, primarily in equity markets. These studies find that ESG practices reduce information asymmetry, resulting in a lower cost of equity. Some studies have also investigated the cost of debt capital and observed a negative correlation between ESG and loan rates.

### 2.2 Literature related with bond financing costs

Bond financing costs are crucial in the financial market and play a significant role in promoting industrial growth. However, China's bond market lags behind mature markets in Europe and the US by a substantial margin. Therefore, studying the factors

that affect bond financing costs is important for companies' risk management and investors' investment decisions.

The study of bond spreads originated with Fisher (1959), who argued that bond spreads depend on the default risk and marketability of corporate bonds. Later, Merton (1974) applied an option pricing model to demonstrate that bond spreads are influenced by the risk-free rate, a firm's gearing, and bond maturity. Additionally, researchers examined three perspectives: macro factors, firm characteristics, and bond characteristics. At the macro level, factors such as the economic growth rate, inflation expectations, risk-free interest rate, and economic volatility (Tang and Yan, 2006) impact bond financing costs. At the micro level, factors such as firm size (Longstaff and Schwartz, 1995), gearing ratio (Chen and Fanara, 1992), operating conditions, and the nature of property rights (Fang Hongxing et al., 2013) affect bond financing costs. Regarding bond characteristics, factors such as credit rating, issue size, and maturity influence bond financing costs.

In addition to these factors, qualitative factors can influence the "soft" aspects of a company's solvency, such as its willingness to pay interest, information transparency, and reputation. Companies are recognizing the significance of ESG performance in improving these "soft" strengths. Some studies have found that strong ESG performance in developed countries such as the US is associated with lower debt costs. Therefore, in a transitioning economy such as China, it is worth exploring whether the ESG performance of debt issuers also affects bond financing costs.

### 2.3 Hypothesis development

ESG factors are believed to increase company costs and weaken competition. However, the concept of sustainable ESG has attracted increasing public attention in recent years. Consequently, many researchers have challenged the view that ESG is a "waste of resources," arguing that improved ESG performance can lead to better economic or financial performance (Edmans, 2011; Guiso et al., 2015), without necessarily increasing costs (Porter and van der Linde, 1995; Zhu et al., 2021; Ge and Liu, 2015). However, there is no consistent conclusion regarding the relationship between ESG performance and bond financing costs.

On one hand, firms’ strong ESG performance can help reduce issues such as information asymmetry (Cui et al., 2016), future adverse events (Ng and Rezaee, 2015), business risk (Wen et al., 2021), and monitoring costs (Healy and Palepu, 2001), which

can lower bond financing costs. Additionally, ESG performance can provide companies with reputational insurance (Benlemlih et al., 2016), enhancing stakeholder trust and support. On the other hand, companies' involvement in ESG activities requires significant investments that may lead to wasteful expenditures, inefficiencies, credit risks, and other factors that increase bond financing costs.

This study assumes that ESG performance reduces bond financing costs. On one hand, a sustainable economy is increasingly valuable in the context of China's dual carbon goals and the need for a green economic transition. Thus, ESG-performing companies can adapt to future market demands and policy orientations to improve their competitiveness and profitability. On the other hand, ESG is voluntary for most companies, and ESG disclosure is not strictly required by governments and regulators. However, companies with more robust ESG disclosure may gain higher visibility to the government and market participants. This suggests that companies with good ESG performance can reduce their bond default and reputation risks by establishing strong stakeholder relationships. Accordingly, we propose the following hypothesis:

*H1: The better the ESG performance of the bond-issuing company, the lower the financing cost of the bond.*

Prior research found that companies with high corporate social responsibility (CSR) have lower risks and returns (Lee and Faff, 2009). Attig et al. (2013) demonstrated that credit rating agencies consider CSR and assign higher ratings to companies with strong social performance. This implies that companies with solid ESG performance can earn recognition and trust from credit rating agencies, enhancing their credibility and credit quality, while lowering bond financing costs. Companies with high ESG scores are expected to experience fewer and less severe negative events and defaults, which influences the credit quality and financing costs of bonds. Consequently, we propose the following hypothesis:

*H2: A company's strong ESG performance can reduce bond financing costs by decreasing the company's operational and default risks.*

The stakeholder theory posits that a firm's social capital fosters stakeholder cooperation and enhances economic efficiency (Amiraslani et al., 2017). This implies that companies with strong ESG performance are more adept at addressing the needs and expectations of all parties and boosting their satisfaction and loyalty, which in turn leads to increased

revenues and profits. Moreover, highly qualified companies can lower their refinancing costs by frequently issuing new debt to repay old debt. For companies with substantial CFF, there is also reduced pressure to repay debt, and consequently, a lower risk of default. Consequently, the bond financing costs are likely to be lower. We hypothesize that ESG performance negatively affects bond financing costs, partially through the influence of ESG on CFF.

*H3: A company's strong ESG performance can reduce bond financing costs by increasing the cash flow from the company's financing activities.*

# 3. Data, model and variables

## 3.1. Data sources

Our sample includes all bond-issuing firms, both listed and unlisted, from the beginning of 2010 to the end of 2022 to ensure a comprehensive representation of the research population. ESG data were obtained from China Bond Valuation sourced from the China Bond ESG Database, whereas the remaining variables were obtained from the Wind database, both of which are reputable and professional financial data providers in China. To ensure the validity of the analysis results, the original data underwent several processing steps: (1) exclusion of companies in the financial sector; (2) exclusion of samples with missing data, such as ESG scores and bond credit ratings; (3) retention of only the earliest bond issued by the same issuer in a year, in cases where multiple bonds were issued; and (4) application of a 1% tail shrinkage to all continuous variables to mitigate the influence of outliers. These processing steps were undertaken with the aim of enhancing the quality and robustness of the data. Following the initial sample processing, a final sample of 3485 corporate bonds was obtained, covering diverse industries and regions within the Chinese bond market, thus ensuring high representation and diversity.

## 3.2. Models and variables

To test **the first hypothesis**—that is, higher the ESG performance of the bond-issuing company, the lower the bond financing costs—we constructed Model (1). To avoid the problem of error correlation among different bonds of the same issuer in the data, while the errors among different issuers are independent of each other, we use

clustering-robust standard errors with issuers as clustering variables. Consistent with the previous literature on the relationship between CSR/ESG and firm value/cost of capital, the firm-valued independent variables in all models are lagged by one period. This is done for the following reasons. First, it helps avoid potential endogeneity issues and clarifies the direction of impact (Godfrey et al., 2009). Second, this helps capture the lagged effect of ESG performance on bond financing costs (Chen et al., 2014). Finally, it helps reduce measurement errors and missing data issues (Cheng et al., 2014).

$$\begin{aligned} Spread_{i,t} = {} & \alpha + \beta_1 ESG_{i,t-1} + \beta_2 CreditScore_{i,t} + \beta_3 Size_{i,t} + \beta_4 Maturity_{i,t} \\ & + \beta_5 Maturity_{2_{i,t}} + \beta_6 Age_{i,t} + \beta_7 lnTA_{i,t-1} + \beta_8 NetPrf_{i,t-1} \\ & + \beta_9 ROA_{i,t-1} + \beta_{10} AssLiaRatio_{i,t-1} + \beta_{11} CashRatio_{i,t-1} \\ & + \beta_{12} IntCov_{i,t-1} + \beta_{13} dum\_List_{i,t} + \beta_{14} dum\_Nat_{i,t} \\ & + \beta_{15} Industry_{i,t} + \beta_{16} Year_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

To test **the second hypothesis**—that is, one of the mechanisms by which a firm's ESG performance reduces bond financing costs is that good ESG performance reduces a firm's risk (both operational and default risks)—we developed Model (2), where risk is replaced by management specification (MgtStd) and firm credit rating (IsserScore):

$$\begin{aligned} Risk_{i,t} = {} & \alpha + \beta_1 ESG_{i,t-1} + \beta_2 CreditScore_{i,t} + \beta_3 Size_{i,t} + \beta_4 Maturity_{i,t} \\ & + \beta_5 Maturity_{2_{i,t}} + \beta_6 Age_{i,t} + \beta_7 lnTA_{i,t-1} + \beta_8 NetPrf_{i,t-1} \\ & + \beta_9 ROA_{i,t-1} + \beta_{10} AssLiaRatio_{i,t-1} + \beta_{11} CashRatio_{i,t-1} \\ & + \beta_{12} IntCov_{i,t-1} + \beta_{13} dum\_List_{i,t} + \beta_{14} dum\_Nat_{i,t} \\ & + \beta_{15} Industry_{i,t} + \beta_{16} Year_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

To test **the third hypothesis**—that is, one of the mechanisms by which a firm's ESG performance reduces bond financing costs is that good ESG performance increases a firm's CFF—Model (3) was developed:

$$\begin{aligned} CFF_{i,t} = {} & \alpha + \beta_1 ESG_{i,t-1} + \beta_2 CreditScore_{i,t} + \beta_3 Size_{i,t} + \beta_4 Maturity_{i,t} \\ & + \beta_5 Maturity_{2_{i,t}} + \beta_6 Age_{i,t} + \beta_7 lnTA_{i,t-1} + \beta_8 NetPrf_{i,t-1} \\ & + \beta_9 ROA_{i,t-1} + \beta_{10} AssLiaRatio_{i,t-1} + \beta_{11} CashRatio_{i,t-1} \\ & + \beta_{12} IntCov_{i,t-1} + \beta_{13} dum\_List_{i,t} + \beta_{14} dum\_Nat_{i,t} \\ & + \beta_{15} Industry_{i,t} + \beta_{16} Year_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

**Dependent variable:** The dependent variable in Model (1) is the financing cost of bonds (*Spread*), and we adopt the common academic approach of using the difference between the bond yield to maturity and the yield of a treasury bond of the same maturity issued at the same time as the credit spread (Campbell and Taksler, 2003; Chen et al., 2007; Huang and Huang, 2012). Because the practice in the Chinese bond market is to

issue bonds at par, we use the coupon rate instead of the yield to maturity to simplify the calculation. If comparable treasury bonds cannot be found, we complement them using linear interpolation. In the robustness test, we use the difference between the coupon rate and annual risk-free rate of return as bond financing costs, where the risk-free rate of return is obtained from banks' one-year fixed interest from the Cathay Capital database.

**Independent variable**: The main independent variable is the ESG performance of debt-issuing companies using data from the China Bond ESG Valuation Center. For the robustness test, we adopted data from the SynTao Green Finance ESG evaluation database.

**Control variables:** Based on the literature on domestic corporate bond pricing (Huang et al, 2018), we constructed a regression model to analyze the factors influencing bond financing costs. In this study, non-financial information (e.g., age, size, whether private enterprise, listed, etc.), financial information (e.g., return on total assets, net profit, etc.), and debt characteristics (e.g., bond size, maturity, etc.) of corporate bond issuers were selected as control variables.

**Intermediate variables:** Company credit rating (IsserScore) reflects the size of the company's default risk. The data, obtained from the Wind database, is presented in text type. To facilitate model analysis, we convert the IsserScore into a numerical variable, rating from low to high, given a value from small to large. CFF represents the cash flow generated from the company's financing activities. Data for CFF was sourced from Wind.

Appendix Table 1 presents the definitions and calculations of each variable in the regression model.

**Appendix Table 1. Definition of Variables**

| Variable Name | Variable Symbols | Variable Description |
|---|---|---|
| Bond Credit Spreads | *Spread* | The coupon rate of the bond minus the yield of the government bond in the same period, and if the two cannot be matched one by one, the linear interpolation method is used to make up the difference |
| ESG Score | *ESG* | From China Debt Valuation Database |
| Issuer's main rating | *IsserScore* | From Wind database, higher ratings give higher values |
| Debt Ratings | *CreditScore* | From Wind database, higher ratings give higher values |
| Bond Issue Size | *Size* | Data from Wind database, in billion yuan |
| Remaining maturity of bonds | *Maturity* | Data from Wind database, in years |
| Company Age | *Age* | 2022 minus the year the company was founded plus 1 |
| Company Nature | *dum_Nat* | Dummy variable, take 1 if the company is a private enterprise, otherwise take 0, data from Wind database |

| | | |
|---|---|---|
| Whether the company is listed or not | *dum_List* | Dummy variable based on whether the company is listed or not, listed takes 1, otherwise takes 0 |
| The area where the company is located | *Region* | Dummy variables. According to the province where the debt issuing company is located, it is divided into three regions, East, West and Central |
| Total Assets | *lnTA* | Logarithm of total assets, total assets data from Wind database |
| Net Profit | *NetPrf* | Data from Wind database |
| Return on Total Assets | *ROA* | Net income divided by average balance of total assets |
| Gearing ratio | *AssLiaRatio* | Total liabilities / total assets |
| Cash Ratio | *CashRatio* | Ratio of company's cash flow assets to current liabilities |
| Cash flows from financing activities | *CFF* | Data from Wind database |
| Management standardization degree | *MgtStd* | Data from China Debt Valuation Database |
| Industry | *Ind* | Industry dummy variables |
| Year | *Year* | Year dummy variables |

### 3.3. Descriptive Statistics

Table 1 presents the descriptive statistics for the key variables. The mean spread (versus same-period treasury bonds) is 1.31% with a standard deviation of 1.03, showing a small difference between corporate bond financing costs and treasury yields. Spread2's mean is 2.55, with a standard deviation of 1.12. The average ESG score is 5.05 (out of 10), with a standard deviation of 0.94, indicating poor ESG performance and room for improvement among Chinese bond issuers. The mean bond issuance size is 1.181 billion yuan, with a standard deviation of 7.6, indicating variations in issuance size. The average remaining bond maturity is 4.67 years, with a standard deviation of 1.87, suggesting medium-term maturities. The mean firm age was 22.93 years, with a standard deviation of 8.36, indicating established firms of varying ages. Finally, the mean logarithm of total assets (lnTA) is 7.32, with a standard deviation of 1.28, indicating little difference in company size.

**Table 1. Descriptive Statistics**

| Variables | N | Average value | Standard deviation | 25% quantile | Median value | 75% percentile | Minimum value | Maximum value |
|---|---|---|---|---|---|---|---|---|
| *Spread* | 4338.00 | 1.31 | 1.03 | 0.67 | 0.99 | 1.52 | -0.23 | 4.90 |
| *Spread2* | 4339.00 | 2.55 | 1.12 | 1.81 | 2.27 | 2.97 | 0.31 | 8.51 |
| *ESG* | 4339.00 | 5.05 | 0.94 | 4.00 | 5.00 | 6.00 | 3.00 | 7.00 |
| *Size* | 4339.00 | 11.81 | 7.60 | 6.00 | 10.00 | 15.00 | 2.00 | 40.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Maturity* | 4339.00 | 4.67 | 1.87 | 3.00 | 5.00 | 5.00 | 2.00 | 10.00 |
| *Maturity_2* | 4339.00 | 25.27 | 22.51 | 9.00 | 25.00 | 25.00 | 4.00 | 100.00 |
| *Age* | 4313.00 | 22.93 | 8.36 | 16.00 | 23.00 | 29.00 | 6.00 | 42.00 |
| *lnTA* | 4191.00 | 7.32 | 1.28 | 6.37 | 7.26 | 8.28 | 4.47 | 10.42 |
| *NetPrf* | 4191.00 | 53.68 | 96.42 | 4.31 | 17.34 | 54.42 | -20.96 | 567.35 |
| *CFF* | 4190.00 | 90.90 | 213.04 | -4.33 | 27.62 | 111.83 | -333.38 | 950.87 |
| *ROA* | 4173.00 | 3.44 | 2.69 | 1.51 | 2.88 | 4.58 | -1.24 | 14.51 |
| *AssLiaRatio* | 4184.00 | 65.16 | 11.80 | 58.44 | 66.38 | 73.49 | 30.08 | 89.80 |
| *CashRatio* | 4157.00 | 0.34 | 0.28 | 0.18 | 0.27 | 0.40 | 0.04 | 1.78 |
| *IntCov* | 3859.00 | 7.14 | 14.74 | 1.74 | 3.04 | 5.99 | -2.04 | 112.38 |

The Pearson correlation coefficient method was then used to analyze the variable correlations, and the results are shown in Table 2. The results reveal a significant negative correlation (at the 1% level) between a company's spread and ESG performance, suggesting that good ESG performance reduces bond financing costs, supporting the core hypothesis. The control variables, including bond rating (credit score), bond size (size), remaining bond maturity, firm age, firm size (lnTA), firm net profit (NetPrf), return on total assets (ROA), cash ratio (CashRatio), and interest coverage multiple (IntCov) show a negative correlation with bond spread. However, the square of the bond maturity (Maturity_2) and the company's gearing ratio (AssLiaRatio) are positively correlated. These correlations align with real-world scenarios and explain economic phenomena.

**Table 2 Correlation Analysis**

This table shows the table of Pearson correlation coefficients between the main variables of the model, ***, ** and * indicate that the regression coefficients are significant at 1%, 5% and 10% statistical levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Spread(1)* | 1.0000 | | | | | | | | | | | | |
| *ESG(2)* | -0.1817*** | 1.0000 | | | | | | | | | | | |
| *CreditScore(3)* | -0.4205*** | 0.1155*** | 1.0000 | | | | | | | | | | |
| *Size(4)* | -0.1628*** | 0.0413*** | 0.1072*** | 1.0000 | | | | | | | | | |
| *Maturity(5)* | -0.0755*** | -0.0076 | 0.0292* | 0.0295* | 1.0000 | | | | | | | | |
| *Maturity_2(6)* | 0.0741*** | -0.0054 | 0.0497*** | 0.0493*** | 0.7859*** | 1.0000 | | | | | | | |
| *Age(7)* | -0.0334** | 0.1864*** | -0.0306* | 0.0544*** | 0.0118 | -0.0143 | 1.0000 | | | | | | |
| *lnTA(8)* | -0.1557*** | 0.1116*** | 0.1876*** | 0.4172*** | 0.0574*** | 0.1097*** | 0.0342** | 1.0000 | | | | | |
| *NetPrf(9)* | -0.1389*** | 0.1113*** | 0.0685*** | 0.2908*** | 0.0737*** | 0.1246*** | 0.0751*** | 0.6368*** | 1.0000 | | | | |
| *ROA(10)* | -0.0496*** | 0.1346*** | 0.0304* | 0.0530*** | -0.0227 | -0.0310** | 0.1633*** | -0.0717*** | 0.3454*** | 1.0000 | | | |
| *AssLiaRatio(11)* | 0.0828*** | -0.0052 | -0.0003 | 0.0986*** | 0.0315** | 0.0587*** | 0.0633*** | 0.4054*** | 0.2144*** | -0.2404*** | 1.0000 | | |
| *CashRatio(12)* | -0.0857*** | -0.0658*** | -0.0117 | -0.0687*** | 0.0822*** | 0.0620*** | -0.1205*** | -0.3130*** | -0.1708*** | 0.0293* | -0.4946*** | 1.0000 | |
| *IntCov(13)* | -0.0650*** | -0.0679*** | 0.0161 | 0.0323** | -0.0181 | -0.0128 | 0.0286* | 0.0169 | 0.1933*** | 0.1520*** | -0.0152 | 0.0350** | 1.0000 |

Note: *** indicates significant at 1% level of significance, ** indicates significant at 5% level of significance, * indicates significant at 10% level of significance.

# 4. Empirical results

## 4.1 Impact of ESG performance on bond financing costs

This study investigates the relationship between a firm's ESG performance and its bond financing costs. A regression analysis was conducted using Model (1), and the results are

presented in Table 3. Specifically, Columns (1) and (4) show the impact of ESG score as the only explanatory variable after controlling for other influences on bond spread. As shown in Table 3, the regression coefficient of the ESG score is negative in both univariate and multivariate regressions, passing the statistical test at the 1% level of statistical significance. This finding supports our hypothesis that the better a company's ESG performance, the lower its bond financing costs. Specifically, according to the results in Column (4), for every 1-point increase in a company's ESG score, its bond spread decreases by an average of 0.149 percentage points when the other variables are held constant.

Regarding the control variables, higher values for CreditScore, Size, lnTA, NetPrf, CashRatio, and IntCov are associated with lower bond financing costs, supporting our hypothesis. Maturity has a negative coefficient, whereas its squared term has a positive coefficient, implying a nonlinear relationship with bond financing costs. Age has a small negative coefficient, suggesting some influence on financing costs. AssLiaRatio and dum_Nat have positive coefficients, indicating higher debt ratios and private companies facing higher financing costs. These findings provide insights into the relationship between ESG performance and bond financing costs, as well as the impact of the control variables.

**Table 3: Impact of Corporate ESG Performance on Bond Financing Costs**

| Variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *ESG* | -0.201*** | -0.104*** | -0.113*** | -0.149*** |
| | (-12.17) | (-6.95) | (-7.15) | (-7.98) |
| *CreditScore* | | -0.990*** | -1.019*** | -0.853*** |
| | | (-37.34) | (-33.80) | (-29.70) |
| *Size* | | -0.007*** | -0.009*** | -0.008*** |
| | | (-3.71) | (-4.10) | (-4.01) |
| *Maturity* | | -0.307*** | -0.272*** | -0.264*** |
| | | (-9.44) | (-7.80) | (-8.20) |
| *Maturity_2* | | 0.023*** | 0.020*** | 0.021*** |
| | | (8.54) | (7.05) | (7.82) |
| *Age* | | | -0.005*** | -0.006*** |
| | | | (-2.76) | (-3.62) |
| *lnTA* | | | -0.048** | -0.052*** |
| | | | (2.57) | (2.90) |
| *NetPrf* | | | -0.001*** | -0.001*** |
| | | | (-4.87) | (-6.09) |
| *ROA* | | | -0.026*** | -0.003 |
| | | | (3.85) | (-0.50) |
| *AssLiaRatio* | | | 0.009*** | 0.005*** |
| | | | (5.63) | (3.43) |

| | | | | |
|---|---|---|---|---|
| *CashRatio* | | | -0.295*** | -0.276*** |
| | | | (-4.58) | (-4.63) |
| *IntCov* | | | -0.004*** | -0.003*** |
| | | | (-3.63) | (-3.14) |
| *dum_List* | | | | 0.205*** |
| | | | | (4.83) |
| *dum_Nat* | | | | 1.282*** |
| | | | | (23.33) |
| *Constant* | 2.321*** | 17.377*** | 17.080*** | 14.971*** |
| | (27.41) | (43.23) | (38.41) | (35.22) |
| Year | Yes | Yes | Yes | Yes |
| Ind | Yes | Yes | Yes | Yes |
| F | 148.097 | 353.548 | 145.212 | 188.813 |
| N | 4338 | 3922 | 3485 | 3485 |
| $R^2$ | 0.033 | 0.311 | 0.334 | 0.432 |

Note: t-values are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively. Columns (1) to (4) of the model use mixed regression models with clustering robust standard errors selected with the issuing entity as the clustering variable.

### 4.2 The effect of company size on the relationship between ESG and bond financing costs

Bond financing costs are influenced by a combination of bond and firm characteristics, and information asymmetry plays a crucial role. Smaller firms typically experience greater information asymmetry than larger ones, resulting in increased credit risk and limited access to financing. Consequently, bond financing is more appealing to smaller firms, although it requires additional credit signals to mitigate information asymmetry. ESG performance serves as an effective credit signal that reflects a firm's ESG responsibilities and achievements. We hypothesize that the impact of ESG performance on reducing bond financing costs is more pronounced for smaller companies. To test this hypothesis, the methodology of Bharath et al. (2008) was employed, ranking all sample companies by size from smallest to largest. The smallest 33% of the companies were designated as the small-company group, and the largest 33% were designated as the large-company group for basic regressions. The regression results are presented in Table 4.

The regression results in Table 4 reveal that ESG performance significantly reduces bond financing costs for both the large and small groups, with a more substantial effect observed for the small group. This finding indicates that ESG performance mitigates credit risk more effectively in smaller firms. Specifically, for small firms, each one-point increase in ESG performance, controlling for other variables, corresponds to an average

relative reduction of 0.171% in bond financing costs. For large firms, a one-point increase in ESG performance results in a 0.128% reduction in bond financing costs, after controlling for other variables. Furthermore, this study identifies a significant negative relationship between cash ratio and bond financing costs for the small group, suggesting that cash ratio is another vital credit signal for smaller firms. In conclusion, the results in Table 4 confirm that ESG performance has a heterogeneous impact on bond financing costs for companies of various sizes.

**Table 4. Subsample Regressions Based on Different Company Sizes**

| Variables | (1) | (2) |
|---|---|---|
| *ESG* | -0.171*** | -0.128*** |
| | (-3.15) | (-5.16) |
| *CreditScore* | -0.419*** | -0.168*** |
| | (-13.06) | (-9.46) |
| *Size* | -0.012* | -0.012*** |
| | (-1.96) | (-5.29) |
| *Maturity* | -0.176*** | -0.061*** |
| | (-2.95) | (-3.46) |
| *Maturity_2* | 0.013*** | 0.003*** |
| | (2.69) | (2.88) |
| *Age* | -0.007* | -0.004* |
| | (-1.86) | (-1.72) |
| *lnTA* | -0.027* | -0.203*** |
| | (-0.40) | (3.60) |
| *NetPrf* | -0.010** | -0.003*** |
| | (-2.09) | (-7.45) |
| *ROA* | -0.016 | -0.039*** |
| | (-0.76) | (2.93) |
| *AssLiaRatio* | 0.009*** | 0.006*** |
| | (2.95) | (2.76) |
| *CashRatio* | -0.281*** | 0.142 |
| | (-2.72) | (1.07) |
| *IntCov* | -0.002 | -0.001 |
| | (-1.21) | (-1.23) |
| *dum_List* | 0.255*** | 0.300*** |
| | (2.70) | (5.32) |
| *dum_Nat* | 1.476*** | 1.286*** |
| | (12.23) | (15.06) |
| *Constant* | 8.725*** | 2.535*** |
| | (13.21) | (4.17) |
| Year | Yes | Yes |
| Indu | Yes | Yes |
| F | 61.578 | 54.908 |
| N | 1143 | 1155 |

| | | |
|---|---|---|
| $R^2$ | 0.340 | 0.407 |

Note: t-values are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively. Models (1) and (2) show the regression results for the group of small-sized firms and the group of large-sized firms, respectively. Both columns (1) and (2) of the model use mixed regression models, and cluster robust standard errors with the issuing entity as the clustering variable are chosen.

### 4.3 Mechanism test: corporate risk

One argument in favor of ESG/CSR investing is its ability to reduce corporate risk, known as the risk-mitigation view. This argument suggests that ESG/CSR investing helps mitigate the environmental, social, and governmental risks faced by companies. These risks can negatively affect a company's reputation and credit rating, leading to lower bond prices and returns. Therefore, according to the risk mitigation theory, we anticipate that companies with strong ESG/CSR performance will have lower credit risk, higher credit ratings, and ultimately lower bond financing costs. Several empirical studies support this theory, including those of Attig et al. (2013).

This section focuses on one potential mechanism by which ESG practices influence bond financing costs by reducing a firm's principal risk. Principal risk refers to the uncertainties a company faces in its operations and debt repayment, which can affect bond investors' confidence and expectations of the company, thereby influencing the demand and price of bonds. Principal risk can be divided into operational and default risks. Operational risk encompasses the negative events a company may encounter during its operations, such as litigation, arbitration, and regulatory penalties. These events can harm the company's reputation, profits, and cash flow, thereby increasing its financial stress and instability. On the other hand, default risk refers to the possibility that a company will be unable to repay its debts on time and is dependent on factors such as the company's financial position and solvency.

To measure these two risks, this study utilizes the management normative score provided by China’s Debt Valuation Center as an indicator of operational risk, and the company's credit rating provided by Wind as an indicator of default risk. Subsequently, we examine the impact of ESG scores as explanatory variables on normative management scores and credit ratings through regression analysis. The objective of this study was to investigate whether ESG practices effectively reduce risk. Table 5 presents the regression analysis results. It is apparent that ESG scores have a significant positive effect on both risk indicators, implying that companies with better ESG performance exhibit stronger

management discipline and higher credit ratings, indicating lower operational and default risks. These findings validate the regression model constructed in this study. Figure 1 shows that debt-issuing companies' credit ratings are positively correlated with ESG performance, supporting the hypothesis of a corporate risk channel that ESG performance can influence bond financing costs by reducing corporate risk.

**Table 5: Mechanism Test: Corporate Risk**

| Variables | *MgtStd* | *IsserScore* |
|---|---|---|
| *ESG* | 0.188*** | 0.059*** |
| | (6.40) | (5.59) |
| *CreditScore* | -0.003 | 0.123*** |
| | (-0.06) | (15.51) |
| *Size* | -0.006** | 0.009*** |
| | (-2.12) | (7.54) |
| *Maturity* | 0.171*** | 0.008 |
| | (3.38) | (0.83) |
| *Maturity_2* | -0.013*** | -0.001 |
| | (-3.21) | (-0.50) |
| *Age* | -0.009*** | -0.001 |
| | (-3.23) | (-0.54) |
| *lnTA* | -0.281*** | 0.357*** |
| | (-9.99) | (35.70) |
| *NetPrf* | -0.001*** | -0.002*** |
| | (-3.65) | (-12.09) |
| *ROA* | 0.019* | 0.054*** |
| | (1.91) | (13.82) |
| *AssLiaRatio* | -0.010*** | -0.005*** |
| | (-4.12) | (-5.56) |
| *CashRatio* | 0.201** | 0.092*** |
| | (2.14) | (2.78) |
| *IntCov* | -0.006*** | 0.001** |
| | (-4.11) | (2.54) |
| *dum_List* | -0.574*** | -0.070*** |
| | (-8.57) | (-2.90) |
| *dum_Nat* | 0.158* | -0.161*** |
| | (1.82) | (-5.14) |
| *Constant* | 10.790*** | -0.023 |
| | (16.11) | (-0.16) |
| Year | Yes | Yes |
| Indu | Yes | Yes |
| F | 58.38 | 370.090 |
| N | 3485 | 3242 |
| $R^2$ | 0.1906 | 0.529 |

Note: t-values are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively.

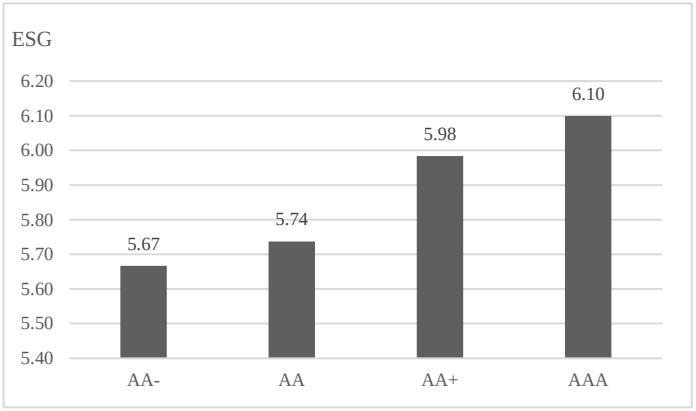


**Figure 1 Debt Issuer Ratings and ESG Performance**
**Source: China Debt Valuation Center**

### 4.4 Mechanism test: cash flow

Another hypothesis in this study suggests that a firm's ESG performance can impact its CFF, and consequently, its bond financing costs. CFF refers to the net cash inflow that a firm receives from both creditors and shareholders, reflecting its financing capacity. The literature suggests that a firm's social capital can foster stakeholder cooperation, leading to economic benefits in the form of higher cash flows (Amiraslani et al., 2017; Edmans, 2011; Guiso et al., 2015). When a company encounters financial difficulties, stakeholders are more likely to provide additional support to facilitate recovery, such as extending repayment terms. These behaviors increase a company's CFF. We argue that a company's strong ESG performance enhances its stakeholders' willingness and ability to cooperate, resulting in increased CFF, more secure financing sources, reduced debt service pressure, and lower bond financing costs.

To test the hypothesis regarding the CFF channel, we conducted a regression analysis between ESG performance and CFF. The results are presented in Table 6. They indicate that ESG scores have a significant positive effect on CFF, implying that companies can secure more financing from the external market. This finding is consistent with previous studies (Wang et al., 2022; Gregory, 2022).

**Table 6: Mechanism Test: Cash Flow**

| Variables | *CFF* | *Spread* |
|---|---|---|
| *ESG* | 48.797*** | -0.161*** |
| | (10.88) | (-7.91) |
| *CFF* | | -0.001** |

| | | |
|---|---|---|
| | | (-2.34) |
| *CreditScore* | -6.201 | -0.256*** |
| | (-0.90) | (-17.92) |
| *Size* | 0.536 | -0.013*** |
| | (1.16) | (-5.62) |
| *Maturity* | -1.180 | -0.058*** |
| | (-0.15) | (-3.33) |
| *Maturity_2* | -0.287 | 0.003** |
| | (-0.45) | (2.37) |
| *Age* | -2.997*** | -0.008*** |
| | (-7.35) | (-4.48) |
| *lnTA* | 80.801*** | -0.034* |
| | (18.83) | (-1.69) |
| *NetPrf* | -0.260*** | -0.001*** |
| | (-4.97) | (-4.16) |
| *ROA* | -2.464 | -0.019** |
| | (-1.64) | (-2.57) |
| *AssLiaRatio* | -0.522 | 0.006*** |
| | (-1.46) | (3.50) |
| *CashRatio* | 67.639*** | -0.299*** |
| | (4.71) | (-4.72) |
| *IntCov* | 0.424* | -0.002*** |
| | (1.87) | (-3.01) |
| *dum_List* | -83.869*** | 0.177*** |
| | (-8.20) | (3.82) |
| *dum_Nat* | -43.235*** | 1.353*** |
| | (-3.27) | (22.48) |
| *Constant* | -528.151*** | 6.479*** |
| | (-5.17) | (23.96) |
| Year | Yes | Yes |
| Indu | Yes | Yes |
| F | 209.548 | 177.605 |
| N | 3485 | 3,485 |
| $R^2$ | 0.283 | 0.349 |

Note: t-values are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively.

### 4.5 Endogeneity test

To further alleviate endogeneity concerns, this study adopted the instrumental variables approach employed by Chen et al. (2022) and Gao et al. (2021), selecting the annual industry ESG score as the instrumental variable for a company's ESG performance. The main regression analysis was conducted, and the results are presented in Table 7. As shown in the table, there is a significant negative effect at the 1% level between the instrumental variables and the bond financing cost spread. The significance and signs of the coefficients for the other control variables are largely consistent with their economic implications, indicating that the endogeneity test is satisfied and the model's endogeneity

problem is effectively mitigated. Specifically, the coefficient of the instrumental variable is -0.203, which is larger in absolute value than the ESG coefficient of the main regression. This result suggests that, on average, a one-unit increase in the instrumental variable leads to a 0.203% decrease in bond spread, after controlling for other variables.

**Table 7. Endogeneity Test**

| Variables | *Spread* |
|---|---|
| *IV* | -0.203*** |
| | (-2.93) |
| *CreditScore* | -0.867*** |
| | (-30.01) |
| *Size* | -0.006*** |
| | (-3.36) |
| *Maturity* | -0.269*** |
| | (-8.27) |
| *Maturity_2* | 0.021*** |
| | (7.86) |
| *Age* | -0.007*** |
| | (-4.21) |
| *lnTA* | 0.027 |
| | (1.52) |
| *NetPrf* | -0.001*** |
| | (-5.33) |
| *ROA* | -0.003 |
| | (-0.43) |
| *AssLiaRatio* | 0.006*** |
| | (4.27) |
| *CashRatio* | -0.294*** |
| | (-4.89) |
| *IntCov* | -0.003*** |
| | (-2.71) |
| *dum_List* | 0.006 |
| | (0.16) |
| *dum_Nat* | 1.323*** |
| | (24.02) |
| *Constant* | 15.613*** |
| | (28.38) |
| Year | Yes |
| Indu | Yes |
| F | 182.011 |
| N | 3485 |
| $R^2$ | 0.423 |

Note: t-values are in parentheses. *** , **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively.

### 4.6 Other robustness tests

We also conducted several robustness tests to ensure the validity of our results. We employed the SynTao Green Finance ESG indicator as an alternative measure of ESG performance by repeating the main regression model to evaluate the robustness of the regression results. The ESG_sd variable in the model is selected from the SynTao Green Finance ESG rating database because SynTao Green Finance provides ESG ratings rather than scores. We numericize the ESG ratings, and the higher the rating the higher the assigned value. Columns (1) and (2) of Table 8 show the results of the final regression. As the table shows, the coefficient of ESG is negative and significant in both the univariate and multivariate regressions. Specifically, for the multivariate regression model in the second column, all other things being equal, each unit increase in ESG performance is associated with a 0.186% decrease in bond financing costs on average.The shortcoming of using SynTao Green Finance ESG evaluation data is that the companies evaluated by SynTao Green Finance ESG data are listed companies, and the ESG evaluation of non-listed companies is lacking. This study examines the corporate bond market, which includes more non-listed issuers, and the final sample size obtained using SynTao Green Finance ESG data is smaller (81); however, the regression results can provide stronger support for the conclusions of this study.

Second, we use an alternative measure of bond financing costs to repeat our baseline regression. Specifically, the risk-free rate provided by the CSMAR database is used as the benchmark, and the difference between the coupon rate of the bond and the risk-free rate is used to obtain *Spread2* as an alternative expression of bond financing costs. *Spread2* is brought into the main regression model to re-evaluate our regression results, as shown in columns (3) and (4) in Table 8. The dependent variable in the first column is *Spread2* and the dependent variable in the second column is the original *Spread*. From Table 8, we can observe that the variable after differencing bond financing costs from the risk-free rate of return as the dependent variable has the effect of having a greater degree of impact than the original model. On average, the bond spread (*Spread2*) decreases by 0.192% for each unit increase in ESG, after controlling for other variables.

**Table 8. Robustness Test1: Alternative Measurements**

| Dependent Variables | *Spread1* | *Spread1* | *Spread2* | *Spread2* |
|---|---|---|---|---|
| | (1) | (2) | | |
| *ESG_sd* | -0.319*** | -0.186** | | |

| | | | | |
|---|---|---|---|---|
| | (-3.76) | (-2.11) | | |
| *ESG* | | | -0.192*** | -0.169*** |
| | | | (-8.88) | (-8.43) |
| *CreditScore* | | -1.138* | -0.267*** | -0.259*** |
| | | (-1.61) | (-17.35) | (-18.16) |
| *Size* | | -0.002 | -0.013*** | -0.013*** |
| | | (-0.19) | (-5.28) | (-5.61) |
| *Maturity* | | -0.324 | 0.055*** | -0.057*** |
| | | (-1.27) | (2.94) | (-3.26) |
| *Maturity_2* | | 0.025 | 0.000 | 0.003** |
| | | (1.03) | (0.28) | (2.34) |
| *Age* | | -0.002 | -0.007*** | -0.008*** |
| | | (-0.13) | (-3.49) | (-4.23) |
| *lnTA* | | -0.099 | -0.065*** | -0.045** |
| | | (-0.59) | (-3.12) | (-2.35) |
| *NetPrf* | | 0.002 | -0.001*** | -0.001*** |
| | | (0.89) | (-3.47) | (-4.06) |
| *ROA* | | -0.033 | -0.009 | -0.018** |
| | | (-0.72) | (-1.16) | (-2.47) |
| *AssLiaRatio* | | 0.000 | 0.007*** | 0.006*** |
| | | (-0.00) | (3.79) | (3.54) |
| *CashRatio* | | -0.056 | -0.304*** | -0.310*** |
| | | (-0.10) | (-4.45) | (-4.90) |
| *IntCov* | | -0.014 | -0.003*** | -0.002*** |
| | | (-0.97) | (-3.67) | (-3.06) |
| *dum_List* | | | 0.197*** | 0.191*** |
| | | | (3.95) | (4.14) |
| *dum_Nat* | | 1.229*** | 1.378*** | 1.359*** |
| | | (5.89) | (21.20) | (22.61) |
| *Constant* | 3.080*** | 20.764* | 7.686*** | 6.604*** |
| | (6.58) | (1.98) | (26.81) | (24.90) |
| Year | Yes | Yes | Yes | Yes |
| Indu | Yes | Yes | Yes | Yes |
| F | 14.122 | 6.462 | 167.310 | 188.813 |
| N | 85 | 81 | 3485 | 3485 |
| $R^2$ | 0.145 | 0.556 | 0.330 | 0.348 |

Note: t-values are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively.

Third, to further demonstrate the robustness of the model, all listed debt issuers are selected for validation analysis; the results are shown in Table 9. The results show that for listed debt issuers, there is a significant negative relationship between ESG performance and bond spreads, and for every 1 unit increase in ESG performance, bond spreads fall by 0.199% on average.

**Table 9. Robustness Test1: Small Sample Regression Results**

| Variables | (1) | (2) |
|---|---|---|

| | | |
|---|---|---|
| *ESG* | -0.214*** | -0.199*** |
| | (-5.00) | (-5.58) |
| *CreditScore* | | -0.867*** |
| | | (-15.74) |
| *Size* | | -0.004 |
| | | (-1.06) |
| *Maturity* | | -0.265*** |
| | | (-4.14) |
| *Maturity_2* | | 0.022*** |
| | | (4.10) |
| *Age* | | -0.004 |
| | | (-1.00) |
| *lnTA* | | -0.050 |
| | | (-1.34) |
| *NetPrf* | | -0.001 |
| | | (-1.55) |
| *ROA* | | -0.010 |
| | | (-0.88) |
| *AssLiaRatio* | | 0.014*** |
| | | (4.63) |
| *CashRatio* | | 0.059 |
| | | (0.40) |
| *IntCov* | | -0.002 |
| | | (-0.81) |
| *dum_Nat* | | 1.305*** |
| | | (14.61) |
| *Constant* | 2.575*** | 15.555*** |
| | (9.85) | (17.28) |
| Year | Yes | Yes |
| Indu | Yes | Yes |
| F | 24.973 | 69.847 |
| N | 948 | 857 |
| $R^2$ | 0.026 | 0.519 |

Note: t-values are in parentheses. *** , **, and * indicate significance at 1%, 5%, and 10% statistical levels, respectively.

## 5. Conclusion

This study examined the relationship between a firm's ESG performance and its bond financing costs. Our findings revealed that improved ESG performance is associated with lower bond financing costs. Specifically, for every one percent increase in a company's ESG score, the bond spread decreases by an average of 0.149 percent. Furthermore, we observed that the negative influence of ESG performance on bond financing costs is more pronounced for smaller firms, suggesting that ESG performance effectively mitigates credit risk for these companies.

We also investigated two potential mechanisms through which ESG practices influence bond financing costs. The first reduces a firm's principal risks. Our results indicate that ESG scores have a significant positive effect on management discipline and credit ratings, leading to decreased operational and default risks. The second mechanism posits that a firm's ESG performance can affect its CFF, subsequently affecting bond financing costs. Empirical evidence supports this notion as ESG scores demonstrate a significant positive effect on CFF.

Finally, we employed an instrumental variable approach to address endogeneity concerns. We also used alternative measurements and different samples to replicate our baseline regression, and the results remained robust.

Our study contributes to the literature in three ways. First, it advances the ESG and corporate finance literature by focusing on bond markets, where issuers face greater refinancing needs and stakeholder pressures than in equity markets. Second, this study investigates corporate operational risk, default risk, and CFF providing a thorough analysis in line with stakeholder and signaling theories. Third, this study encompasses both listed and unlisted Chinese companies, offering a more comprehensive understanding of the relationship between ESG bond financing costs.

This study acknowledges certain limitations that warrant consideration. Firstly, the inclusion of both listed and unlisted Chinese firms offers a nuanced perspective specific to the Chinese context; however, this focus may limit the extrapolation of our findings to firms operating in disparate cultural, regulatory, and economic environments. The distinctive attributes of the Chinese bond market, which are not universally applicable, might also shape the dynamics between ESG practices and bond financing costs in ways not representative of other markets. Secondly, the methodological approach, reliant on statistical models, inherently poses constraints on our ability to discern causality from correlation. Given the intricate nature of ESG considerations and their assimilation into the fabric of corporate finance, it is plausible that certain influential variables remain undetected and, thus, unaccounted for within the scope of our analysis.

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