

# *Research on the Impact of ESG Performance on the Financing Outcomes of Enterprises*

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**Abstract:** As societal expectations for corporate sustainability and social responsibility continue to rise, ESG (Environmental, Social, and Governance) factors have garnered significant attention from scholars in the fields of economics and finance. Practitioners frequently associate corporate value with the performance of sustainable development-linked bonds. However, it remains unclear whether a positive or negative correlation exists between enterprises' ESG performance and their debt financing costs. Understanding the extent to which ESG performance impacts debt financing costs is crucial for companies considering issuing such bonds. Consequently, this paper analyzes issuance data from sustainable development-linked bonds issued by listed companies on the Shanghai Stock Exchange in China from 2018 to 2022 to investigate the relationship between enterprises' ESG performance and their debt financing costs. The empirical findings indicate that there is a negative correlation between enterprises' ESG performance, and their debt financing costs, with credit ratings serving as an intermediary factor that reduces these costs when accompanied by high ESG ratings.

**Keywords:** ESG performance, Debt financing cost, Negative correlation, Mediating effect.

## **1. Introduction**

In recent years, more and more scholars and financial practitioners have discussed the influence of ESG performance on debt financing costs, and previous research results have become increasingly abundant. Most scholars have argued that the favorable ESG performance may greatly enhance firms' financial performance [1]. Since enterprises establish long-term relationships with major stakeholders through ESG practices, information disclosure of ESG can improve corporate information transparency, reducing financing costs, establishing a good corporate social responsibility image, strengthening the relationship between the company and stakeholders, and enhancing corporate reputation [2]. The sustainable global economy also gains support from international organizations, industry institutions and governments, and SSE collaborates with exchanges to promote the sustainable development agenda [3]. According to the SSE, more than half of the member stock exchanges have released ESG reporting guidelines [4]. Among the research achievements of scholars on ESG and corporate performance, although most of them have recently discovered positive results, some papers have arrived at negative ones. This article will continue to discuss this connection, study the role of ESG performance in debt financing costs, promote the deepening of ESG concepts,

enhance the enterprises' ability to ESG practice, and stimulate the internal impetus of enterprises [5]. The contribution of this research is that previous studies have mainly concentrated on advanced countries, and the studies on developing ones are not too much, hence this paper mainly focus on Chinese listed companies, and makes researches on the relationship between them, which will expands the existing studies, and promotes the research of ESG performance in China.

## **2. Theoretical Analysis and Research Hypothesis**

### **2.1. ESG Ratings and the Financing Costs of Green Bonds**

ESG is a new concept proposed by UNGC in 2004 to address the interdependent issues of society, environment, and economy [6]. The core viewpoint is that while considering financial performance, the influence of enterprises' activities on the environment, society, and multiple stakeholders should also be taken into account, thus facilitating the sustainable development of human society [7]. Upon analyzing 2,200 scholarly articles researching ESG, it was discovered that approximately 90% of the studies indicated ESG performance has a beneficial impact on financial performance.

Therefore, we proposed the following hypothesis:

H1: ESG ratings significantly influence green bonds' financing costs. Enterprises can lower green bonds' financing costs by enhancing their ESG ratings.

### **2.2. The Moderating Effect of Green Certified Bonds**

To manage the green bond, The International Capital Market Association (ICMA) released the GBP, which constitutes a comprehensive framework of guidelines. ICMA and other third-party organizations assess green bonds' environmental standards. Issuers are required to exhaustively reveal the risk and environmental contribution in order to gain the certification. Subsequently, the third parties will handle the information in order to determine its bonds comply with climate related standards, which will be offered additional confidence to investors who fund these projects [8]. Yan and Liu took the monthly bond data from 2011 to 2013 as samples, the influencing factors of credit spreads were investigated from both macro and micro levels. Among them, positive correlation was found between financial leverage level and credit spreads [9]. Kliger and Sarig pointed out in their research that bond ratings negatively affect credit spreads. That is, when bond rating decreases, the credit spread will increase accordingly [10]. Therefore, the following hypothesis is proposed:

H2: ESG rating negatively influence debt financing costs for the green certification of bonds

## **3. Data Sources and Research Design**

### **3.1. Data Collection and Processing**

This paper's research sample is the bonds from listed enterprises on the SSE from 2018 to 2022. All ESG rating results of the samples, green bond data, and treasury bond data are gathered from CSMAR, Wind, Choice database, and the China Bond Information Network. The following treatments are done to the data in order to improve the results' accuracy. Firstly, delete the bonds lacking major variables such as ESG ratings and bond coupon rates. Secondly, eliminate the green bond samples issued by financial enterprises and only select the data of ordinary enterprises for research. Next, exclude asset securitization bonds. Finally, exclude the guaranteed bonds, since guaranteed bonds have a significant external credit enhancement effect on green bonds' financing cost when studying factors of the issuing entity itself.

Due to the fact that the information contained by third-party rating agencies is more specific and the results are more accurate, its results are chosen as the main variable. As there are multiple third-

party agencies and each agency has different evaluation indicators, after drawing on previous literature, the ESG rating results of Huazheng are determined as the independent variable in this paper. Referring to Huazheng's AAA-C ratings, this paper assigns values of 1-9 respectively to the AAA-C ratings, where the C rating is given a numerical value of 1, the CC rating is given a numerical value of 2, and accordingly, the AAA rating is given a numerical value of 9. These are converted into numerical values for empirical analysis, as shown in Table 1 [11].

Table 1: ESG Rating Assignment

ESG Rating Assignment	AAA	AA	A	BBB	BB	B	CCC	CC	C
Value	9	8	7	6	5	4	3	2	1

### 3.2. Variables and Measurements

In terms of the control variables, this paper takes considerations on relevant studies of ESG and green bonds, and selects seven indicators, including firm size (size), leverage ratio (lev), return on equity (ROE), operating profit margin (Profit), bond issuance scale (scale), bond maturity (term), and risk-free interest rate (Yield), as control variables to construct the model. The clear definitions of these variables are shown in Table 2. Equations should be placed on a separate line, numbered and justified. Format the line using the “Equation” style, and then add a tab before and after the equation. Type the round brackets and number in the end of the line [11].

Table 2: Description of variables.

Type	Variable	Symbol	Variable definition
Dependent Variable	Financing costs	Spread	The coupon rate of green bonds - the interest rate of treasury bonds (the same maturity)
Independent Variables	ESG ratings	ESG	HuaZheng ESG rating assignment
	Return On Equity	ROE	Net income / average shareholders' equity
	Asset scale	size_1	Ln(total assets)
	Leverage	Lev	Total liabilities / total assets
Control Variables	Operating Profit Margin	Profit	Operating profit / total operating revenue
	The scale of bond issuance	scale	Ln(assets in the bond issuance scale)
	Risk-free interest rate	Yield	Yield to maturity of government bonds
	Bond maturity	term	Bond maturity period
	industry	industry	Fixed
	year	year	Fixed

### 3.3. Research Design

To delve into the association between ESG rating and debt financing costs, Formula 1 is established to test Hypothesis 1:

$$\text{Spread}_{i,t} = \beta_0 + \beta_{1\text{esg}_{i,t}} + \beta_2 \text{ROE}_{i,t} + \beta_3 \text{Lev}_{i,t} + \beta_4 \text{Profit}_{i,t} + \beta_5 \text{size\_1}_{i,t} + \beta_6 \text{scale}_{i,t} + \beta_7 \text{term}_{i,t} + \beta_8 \text{Yield}_{i,t} + \text{industry} + \text{year} + \epsilon_{i,t} \quad (1)$$

Spread represents the credit spread of green bonds; Esg indicates the ESG value; ROE represents the return on equity, measuring the enterprise's profit ability; Lev represents the asset-liability ratio; Profit is the operating profit margin; size reflects enterprise' asset scale, which is included in the model after taking the natural logarithm; scale represents the scale of green bonds issued, which is included to the model after taking the natural logarithm; term represents the term of green bonds issued; Yield represents the treasury bond interest rate matched by green bonds; industry and year represent fixed industries and years [11].

To examine how the green certification "Green" affects the financing cost "Spread" of enterprises in ESG, the formula 2 is constructed for Hypothesis 2 to be tested:

$$\text{Spread}_{i,t} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_2 \text{Green}_{i,t} + \alpha_3 \text{ESG}_{i,t} * \text{Green}_{i,t} + \sum \text{Control} + \sum \text{IND} + \sum \text{YEAR} + \varepsilon_{i,t} \quad (2)$$

$\sum \text{Control}$  functions as a collection of control variables, encompassing the relevant control variables referred to previously.  $\sum \text{IND}$  and  $\sum \text{YEAR}$  respectively represent industry and time fixed effects.  $\varepsilon_{i,t}$  for random perturbation terms. It encompasses various other factors that could impact the ESG's effect on the financing cost spread of enterprises, pay particular attention to the interplay term between ESG and green certification. The regression coefficient of  $\text{ESG}_{i,t} * \text{Green}_{i,t}$  is  $\alpha_3$ . If it is negative, it implies that green certification contributes to enhancing the inverse influence of ESG on enterprises' financing cost.

## 4. Empirical Findings

### 4.1. Descriptive Statistics

In this paper, each indicator's descriptive statistics are done. The findings are exhibited in Table 3. Based on the calculated outcomes, the mean for the financing cost indicator stands at 0.967, and the standard deviation is 0.939, revealing that the mean of the credit spread of green bonds is marginally below 1%. The mean of the ESG rating indicator stands at 4.454, and the standard deviation is 1.384, suggesting that green bonds' average rating level is between B and BB.

Table 3: Descriptive statistics

Variable	Count/N	mean	S.D.	Min.	p50	Max.
Spread	306	0.967	0.939	-0.174	0.647	4.250
ESG	306	4.454	1.384	0.000	5.000	7.000
ROE	306	0.094	0.075	-0.137	0.095	0.297
Size	306	25.767	1.864	22.486	25.598	31.175
Lev	306	0.657	0.151	0.334	0.641	0.933
Profit	306	0.199	0.183	-0.111	0.129	0.689
Scale	306	2.158	1.187	-0.431	2.146	5.704
Yield	306	2.346	0.459	1.129	2.370	3.303
Term	306	2.349	1.469	0.104	3.000	5.000

### 4.2. Correlation analysis

The calculation of the Pearson correlation coefficient encompasses all indicators, the outcomes have been tabulated in Table 4 for presentation. From these results, it can be seen that the coefficient of Spread and ESG is significantly -0.250 at the 0.05 level, which can reject the original hypothesis. This calculation outcome initially indicates a negative correlation between the two, providing a preliminary verification of the research hypothesis. Regarding the coefficients of the explanatory variables and control ones, except for the relatively high correlation coefficients between Size and

Lev, as well as between Scale and Yield, the correlation coefficients of most indicators are at a relatively low level.

Table 4: Correlation Matrix

Variable	Spread	ESG	ROE	Size	Lev	Profit	Scale	Yield	Term
Spread	1.000								
ESG	-0.250***	1.000							
ROE	0.020	0.062	1.000						
Size	-0.415***	0.324***	0.063	1.000					
Lev	-0.103*	0.083	-0.013	0.640***	1.000				
Profit	-0.234***	0.038	0.378***	0.361***	0.233***	1.000			
Scale	-0.394***	0.174***	0.071	0.601***	0.423***	0.295***	1.000		
Yield	0.187***	-0.038	-0.116**	0.146**	0.228***	0.109*	0.116**	1.000	
Term	0.088	0.035	-0.162***	0.159***	0.175***	0.141**	0.256***	0.720***	1.000

### 4.3. Regression Results

#### 4.3.1. Corporate ESG Ratings and the Financing Cost of Green Bonds

A benchmark regression model is established, and control variables are incorporated one by one to form Columns (1) to (7) of Table 5. After evaluating the computation outcomes, it is evident that all the projected coefficients associated with the ESG indicators are negative. The null hypothesis can be rejected at the significance level of 0.05, which validates H1. Based on these calculation results, it can be inferred that enhancing ESG ratings of firms can lower green bonds' financing cost.

Table 5: Benchmark Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Spread	Spread	Spread	Spread	Spread	Spread	Spread
ESG	-0.115***	-0.114***	-0.114***	-0.113***	-0.094***	-0.092***	-0.092***
	(-3.304)	(-3.305)	(-3.289)	(-3.253)	(-2.863)	(-2.887)	(-2.877)
ROE		-1.107*	-1.065	-1.488*	-1.231	-0.731	-0.491
		(-1.724)	(-1.628)	(-1.794)	(-1.566)	(-0.948)	(-0.630)
Lev			0.184	0.424	0.833	1.090**	1.041*
			(0.355)	(0.714)	(1.471)	(1.973)	(1.891)
Profit				0.404	0.421	0.503	0.366
				(0.830)	(0.915)	(1.124)	(0.811)
Scale					-0.251***	-0.261***	-0.281***
					(-5.895)	(-6.308)	(-6.590)
Yield						0.543***	0.292
						(4.367)	(1.579)
Term							0.089*
							(1.825)
cons	2.102***	2.195***	2.081***	1.907***	1.985***	0.034	0.587
	(7.206)	(7.424)	(4.761)	(3.933)	(4.326)	(0.054)	(0.842)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	306	306	306	306	306	306	306
R2	0.354	0.361	0.361	0.362	0.431	0.467	0.473

t statistics in parentheses

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

#### 4.3.2. The Moderating Effect of Green Bond Eertification

This paper integrates Green certification and the interaction term between ESG and Green certification (ESG\_Green) into the benchmark regression model. The results are presented as the following Table 6. From the calculation outcomes, it can be seen that the ESG Green estimation is significantly negative at the 0.05 level, which can reject the original hypothesis. It implies Green certification enhances the influence of ESG ratings on green bonds' financing cost. This is because Green ESG rating serves as a vital benchmark for assessing corporate performance in environmental stewardship, social accountability, and governance practices, especially within the realms of green and sustainable development. When enterprises perform outstandingly in these aspects and obtain a higher Green ESG rating, they convey a positive signal to the market that the enterprise is dedicated to green and sustainable development and attaches importance to environmental protection and social responsibility. Such a signal can strengthen investors' trust in the enterprise, reduce investment risks, and subsequently lower green bonds' financing cost. Simultaneously, improving Green ESG rating is conducive to establishing a green and sustainable brand image for enterprises.

Table 6: Regression Results of Moderating Effects - Considering Green ESG

	(1)	(2)
	Spread	Spread
ESG	-0.033 (-0.741)	-0.031 (-0.750)
Green	0.897*** (2.612)	0.822** (2.540)
ESG_Green	-0.211*** (-2.829)	-0.154** (-2.199)
ROE		-0.373 (-0.479)
Lev		1.232** (2.190)
Profit		0.262 (0.581)
Scale		-0.272*** (-6.346)
Yield		0.343* (1.851)
Term		0.087* (1.805)
_cons	1.955*** (6.489)	0.098 (0.134)
Industry	Yes	Yes
Year	Yes	Yes
N	306	306
R <sup>2</sup>	0.372	0.486

### 4.3.3.Sensitivity Analysis

In order to ascertain the robustness of the research findings, this paper mainly considers adjusting both the dependent variable and the explanatory one. First, the credit spread Spread is adjusted to Spread\_1, green bonds' issuance rate, included in the benchmark regression for calculation, as shown in Table 7. From the calculation outcomes, the ESG coefficient is significantly negative at the 0.05 level.

Table 7: Replace variables - consider the coupon rate

	(1)	(2)
	Spread	Spread
ESG	-0.092***	-0.096***
	(-2.877)	(-2.902)
Green	-0.491	-0.734
	(-0.630)	(-0.908)
ESG_Green	1.041*	1.025*
	(1.891)	(1.794)
ROE	0.366	0.447
	(0.811)	(0.954)
Lev	-0.281***	-0.290***
	(-6.590)	(-6.554)
Profit	0.292	1.289***
	(1.579)	(6.719)
Scale	0.089*	0.080
	(1.825)	(1.584)
Yield	0.587	0.588
	(0.842)	(0.813)
Term	Yes	Yes
	Yes	Yes
_cons	306	306
	0.473	0.606
Industry	-0.092***	-0.096***
	(-2.877)	(-2.902)
N	-0.491	-0.734
R <sup>2</sup>	(-0.630)	(-0.908)

## 5. Conclusion

The empirical analysis on how ESG ratings affect enterprises' debt financing costs, and indicates that there is a notable inverse link between the ESG ratings and the cost associated with green bond issuance. This means improvement of ESG ratings can effectively lower green bonds' financing cost. By balancing stakeholder relationships, improving corporate governance levels, enhancing corporate reputation and brand influence, etc., Enhancing ESG ratings can contribute to the improvement of overall business performance and bolster competitiveness. Therefore, ESG-performing enterprises are more likely to attract the attention of investors and market analysts. In addition, the tracking, analysis, and valuation of listed companies by securities analysts, not only serves as an information intermediary to provide investors with more information, but also monitors the management and



information disclosure of companies. At the same time, it also helps investors rationally evaluate the value of corporate bonds and alleviate the risk premium arising from information asymmetry.

Secondly, the results show that how green certification affects the effect of ESG ratings on green bonds' financing cost, the conclusion drawn through empirical research is that under the influence of current environmental issues. Therefore, whether a company has obtained green certification can indicate whether its green projects are genuinely green and whether the raised funds are truly applied to green projects. Thus, investors can judge the level of investment risk of an enterprise based on whether it has obtained green certification and then make more accurate investment decisions. To a certain extent, an enterprise's investment in green projects reflects its sense of social responsibility. Meanwhile, a relatively high sense of social responsibility may to some extent reflect the governance ability, management ability, and moral level of managers of the enterprise. Therefore, investors can also evaluate the company's potential for future growth through this lens, reducing their own risk compensation. From the above analysis, compared with financial performance, investors could be inclined to devote greater attention to the non-monetary achievements of state-owned firms, like comprehensively considering factors such as enterprise environment, society, and enterprises' governance. ESG ratings have been a more critical influencing factor for investors in making investment decisions. In the absence of independent third-party certification, investors may consider that there is a risk of "greenwashing" for enterprises, and even if the ESG rating is high, they may think that there is a certain error in the rating result [11].

ESG ratings serve as a significant criterion for assessing an enterprise's ESG performance. When an enterprise excels in these aspects, its ESG rating naturally ascends, conveying a signal to the market that the enterprise is actively fulfilling its social responsibilities and emphasizing sustainable development. Such a signal contributes to enhancing investors' trust in the enterprise, thereby alleviating investors' apprehensions regarding the enterprise's future risks and subsequently lowering the required risk premium, namely the financing cost. Secondly, enhancing the ESG rating is beneficial to enabling enterprises to establish a favorable social image and brand credibility. As the notions of green consumption and sustainable investment gain prevalence, an increasing number of investors are inclined to select enterprises with superior ESG performance for investment. The elevation of ESG rating is capable of attracting more investors who focus on sustainable development, thereby expanding the sources of funds and reducing financing costs. Finally, the enhancement of ESG rating also implies that enterprises have adopted more stringent management measures in the aspects of ESG, which is beneficial to lowering enterprises' operational risks [12]. For instance, the investment and governance measures of enterprises in environmental protection can decrease environmental accidents and compliance costs; the efforts made by enterprises in social responsibility can enhance employee satisfaction and loyalty, and reduce labor disputes and litigation risks. All these measures are beneficial to enhancing the stability and profitability of firms, and subsequently lowering green bonds' financing costs. In contemporary society, an more and more investors and consumers are taking care of the green and sustainability performance of enterprises. An firm with a relatively high green ESG rating is more prone to attract those investors who attach importance to green investment, thereby expanding the issuance market of green bonds and reducing financing costs. Moreover, enhancing the green ESG rating also implies that the enterprise has made greater investment and innovation in environmental management and green technology. These investments and innovations not only assist the enterprise in reducing environmental risks and enhancing operational efficiency but also bring more green development opportunities for it. All these positive changes will boost the enterprise's market competitiveness and thereby lower the financing costs of green bonds.



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