



# The Impact of Corporate ESG Performance on Its Cost of Green Bond Financing: An Empirical Study

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**Abstract.** Within the framework of sustainable development, the Environmental, Social, and Governance (ESG) metrics of corporate entities have emerged as vital indicators for assessing long-term viability and serve as a crucial reference for the assessment of companies by investors and other stakeholders. It has been posited that entities exhibiting a superior ESG profile are more likely to adhere to responsibility standards and enhance their corporate reputation, potentially resulting in reduced costs of capital when seeking funds through green debt instruments. To evaluate the veracity and reliability of this hypothesis, the study endeavors to elucidate the specific influences of ESG performance on the green bond financing costs incurred by corporations. As a basis for empirical inquiry, an initial dataset comprising firms listed on the Shanghai, Shenzhen, and Beijing stock exchanges from 2015 to 2023 was utilized. The ESG performance scores provided by *SynTao Green* Consulting Company served as a metric for evaluating the ESG standings of these listed entities. Findings from the research indicate a correlation whereby corporations with heightened ESG performance are subject to reduced costs associated with green bond financing. Furthermore, results suggest that variations across different industries may lead to divergent outcomes regarding the influence of ESG performance on financing costs. This analysis underscores the significance of ESG considerations in the financial strategizing of firms, particularly in relation to sustainable finance instruments.

**Keywords:** ESG performance; Green bond; Financing cost; *SynTao Green*; Panel regression analysis

## 1 Introduction

The Chinese government has always placed green development in a vital position. The report of the 20<sup>th</sup> National Congress of the Communist Party of China (2022) stressed the importance of respecting, adapting to and protecting nature [1]. In order to improve the level of Chinese ecological civilization construction and achieve the goal of “Carbon peak and Carbon neutrality” earlier, the government vigorously promoted green credit policy, actively built green financial system, so as to promote the green transformation of the industry (Chen et al., 2021) [2]. In the context of this reality, the ultimate

goal of enterprise gradually shifts from profit maximization to the enterprise value maximization (Chen & Zhang, 2022) [3]. To promote the sustainable development ability, many enterprises began to take the initiative to shoulder more social responsibilities, and hence improve their ESG performance.

The conception of ESG was first proposed in the study “Who Cares Wins” published by the United Nations Global Compact (UNGC) in 2004, which is still the most authoritative tool of measure enterprise green development level of international community [4]. With the widespread dissemination of green and environmental protection concept, there is an increasing focus on the ESG performance of enterprises (Deng & Bai, 2022) [5]. In 2015, the General Administration of Quality Supervision, Inspection and Quarantine of China and the Standardization Administration of China issued a number of corporate social responsibility guidelines, and initially established the standard of corporate social responsibility Report (*State-owned Assets Supervision and Administration Commission of the State Council*, 2016) [6]. In 2017, the Group for Deepening Reform of the CPC Central Committee adopted the Guiding Opinions on Accelerating the Construction of a Green Financial System, which further promoted the ESG information disclosure of listed companies (Chai et al., 2018) [7].

However, the key factor that determines whether a company is willing to proactively improve its ESG performance is whether the behavior can promote its own business development. In the contemporary competitive market landscape, it is posited that robust ESG performance may significantly enhance corporate revenue streams and diminish the cost of capital. Should this hypothesis hold true, it would likely augment the intrinsic motivation of corporations to bolster their ESG profiles. Conversely, absent the economic incentives tied to ESG advancement, the impetus for corporate green development may wane, potentially exerting a deleterious effect on the industry’s transition towards sustainability.

Qiu and Yin (2019) estimated that the annual investment capital needs of China’s green industry could be more than 2 trillion yuan, and the government might only meet 10% to 15% of the total green investment needs [8]. As one of the important sources of funds for the green development of Chinese enterprises, green bonds have become an important means of financing for enterprises to invest in green industry with lower financing cost and more lenient issuance conditions than ordinary creditors’ rights (Wu et al., 2022) [9]. Therefore, the impact of corporate ESG performance on the financing cost of green bonds and the degree of impact have become one of the hot spots paid attention by many scholars.

The research contribution of this paper lies in: firstly, it refines the research object. Unlike most papers, which comprehensively examine the impact of corporate ESG performance score on corporate debt financing cost, this paper divides corporate financing cost into two categories: green bond financing cost and conventional (non-green) bond financing cost, and further discusses the exact impact of corporate ESG performance on corporate green bond financing cost. This paper provides Chinese evidence on the effect of good ESG performance on effectively reducing corporate green bond financing costs, and enriches ESG system related literature; secondly, from the perspective of creditors, this paper expounds the positive impact of ESG performance on the financing

cost of green bonds, which provides a theoretical basis for enterprises to have the internal motivation to actively improve ESG performance.

## 2 Rational and Research Hypotheses

Firstly, according to the theory of Information Asymmetry, it is difficult for investors to obtain all the information of a company thorough investigation due to their limited energy and resources (Haeberle, 2019) [10]. Information asymmetry hence has become one of the important factors to increase the capital cost of enterprises.

Secondly, according to the Stakeholder Theory, the development of any enterprise is contingent upon the participation of various stakeholders (Ramoglou et al., 2023) [11]. Therefore, enterprises that give due consideration to the legitimate interests of their stakeholders and proactively undertake their societal responsibilities tend to align more closely with investor expectations (Ibid). Firms that exhibit superior ESG performance are likely to encounter lower difficulties in securing financing.

Thirdly, according to the Principal-agent problem, the inconsistency of interests between shareholders and creditors will lead to the generation of debt agency costs (Cerqueti et al., 2021) [12]. In order to safeguard their own interests, creditors will raise the cost of corporate debt financing. At this point, the disclosure of the company's ESG performance score can effectively reduce the debt agency cost, and lower the expenses associated with debt financing (Lian et al., 2023) [13].

The above theoretical analysis shows that it is particularly important for enterprises to disclose non-financial information such as their corporate environmental behavior. Meanwhile, companies with better ESG performance would have higher corporate value and lower default risk (Deng et al., 2023; Li et al., 2022) [14-15]. At present, the academia holds different attitudes on the direction of the effect of ESG performance on the cost of corporate debt financing. Xue et al. (2022) proved through empirical research that improving ESG performance of enterprises can help reduce their debt financing costs [16]. Li et al. (2023) further proved that the effect of ESG performance on debt financing cost varies among different enterprises [17]. Therefore, the following hypotheses can be put forward.

H1a: Controlling for other factors, there is an inverse relationship between corporate ESG performance and the cost of green financing, whereby improved ESG performance is associated with lower costs of obtaining green financing.

H1b: The adverse effect of enhancement of corporate ESG performance on green bond financing costs might be relatively mitigated in heavily polluting industries compared to general industries.

## 3 Empirical Tests

### 3.1 Sample Selection and Data Sources

This paper selects the annual data of A-share listed companies in Shanghai, Shenzhen and Beijing from 2015 to 2023 as the initial sample. The ESG score data of this paper

are provided by *SynTao Green* Finance Consulting Company. The financial data are from CSMAR database, and the industry classification is according to the industry classification standard of China Securities Regulatory Commission in 2012. To ensure the reliability of the research results, the initial samples were screened as follows: (1) eliminating the samples with missing variable data; (2) excluding financial listed companies; (3) avoiding the abnormal company samples treated by ST and \*ST during the sample period. After the above processing, the data of 96 sample companies were finally obtained for analysis.

### 3.2 Variable Definition and Measurement

#### 3.2.1 Explained Variable – Corporate Green Bond Financing Cost (*Green\_fin*)

This paper uses the index *Green\_fin* to measure the financing cost of corporate green bond, the higher the value is, the higher the financing cost of corporate green bond could be. The difference between the annualized interest rate of green bonds and national bonds was used to measure the green bond financing cost of listed companies.

#### 3.2.2 Explanatory Variable - ESG Performance (*ESG*)

The ESG score of *SynTao Green* Finance was used as the explanatory variable to represent the ESG performance of the sample companies in the current year. To avoid endogeneity problems, this paper uses the value of ESG lagged by one period.

In addition, the research also referred to previous empirical research on corporate investment behavior to control other factors that may affect corporate investment behavior, including enterprise size (*lnasset*), fixed asset ratio (*FAR*), leverage ratio (*Lev*), price-to-book ratio (*PB*), financing scale (*IS*), proportion of female directors (*fdn\_dn*), nature of corporate ownership (*nature*), and the industry of the enterprise (*pol*), with highly-polluted industry assigned a value of 1, and other industries assigned a value of 0.

### 3.3 Empirical Model

Based on the research hypotheses established above, a multiple regression model is constructed to test the impact of economic policy uncertainty on corporate innovation.

The regression formula is as follows:

$$Green\_fin_{i,t} = \beta_0 + \beta_1 * ESG_{i,t-1} + \beta_2 * lnasset_{i,t-1} + \beta_3 * FAR_{i,t-1} + \beta_4 * Lev_{i,t-1} + \beta_5 * PB_{i,t-1} + \beta_6 * IS_{i,t} + \beta_7 * fdn\_dn_{i,t-1} + \beta_8 * nature_{i,t} + \beta_9 * pol_{i,t} + \varepsilon_{i,t} \quad (1)$$

## 4 Findings and Analyses

### 4.1 Descriptive Statistics

To calculate the basic descriptive characteristic of each variable, descriptive statistical analysis was performed. Table 1 shows the descriptive statistical results of the main variables.

According to the results: (1) the average value of ESG performance index is 53.46, and the standard deviation is 6.615, indicating that the ESG performance varies greatly among sample companies; (2) the distribution of other variables is within a reasonable range.

**Table 1.** Descriptive statistical results

Variable	Sample size	Mean value	Standard deviation	Minimum value	Maximum value
Green fin	94	0.974	0.896	-0.174	4.364
ESG	94	53.460	6.615	40.500	70.030
lnasset	94	7.495	1.132	5.113	10.130
FAR	94	0.458	0.285	0.007	0.833
Lev	94	0.602	0.113	0.238	0.797
PB	94	1.798	1.611	0.160	10.520
IS	94	10.460	8.090	1.500	50.000
fdn_dn	94	0.111	0.097	0.000	0.533
nature	94	1.277	0.754	0	2
pol	94	0.713	0.455	0	1

### 4.2 Correlation Analysis

In order to preliminary judge whether there is a large correlation among the variables, correlation analysis was conducted. The result shows that: (1) The correlation coefficient between corporate performance and corporate green debt financing cost is -0.205, which indicates that corporate ESG performance may have an inhibitory effect on corporate green bond financing cost, which is consistent with Hypothesis 1a; (2) the VIF values of the control variables are all less than 10, so that there is no significant covariation, and all variables can be retained.

### 4.3 Panel Regression Analysis

Based on the above hypotheses, the full sample was tested. Table 2 shows the main multiple regression results.

According to the regression results of the full sample, column (1) of Table 2 shows that the coefficient of ESG performance of enterprises is negative and significant at the 5% significance level. This shows that corporate ESG performance has a negative impact on corporate green bond financing cost, that is, enterprises with commendable ESG

performance are generally considered to represent investments of lower risk. Such entities tend to adhere strictly to environmental regulations, uphold social responsibilities, and engage in sound governance practices, thereby mitigating the risks associated with regulatory non-compliance, reputational damage, and potential legal liabilities, and hence, the lower the corporate green bond financing cost could be. Column (2) of Table 2 shows that after the control variables were added, the coefficient of ESG performance of enterprises remains negative and significant at the 5% significance level. Hypothesis 1a holds.

The interaction term ( $ESG \times pol$ ) between ESG performance and the industry nature of the enterprise is introduced into the regression equation, and Table 3 shows the regression results after introducing the interaction term. The coefficient of this variable is 0.043, which is significant at the 5% significance level. While the coefficient of ESG performance is still negative and significant at the 1% significance level. This shows that a robust ESG performance can effectively reduce the cost of financing for corporations through green bonds. Nonetheless, this adverse impact is attenuated within industries characterized by high pollution levels. Firms operating within these heavy-polluting sectors, despite enhancing their ESG scores, experience a comparatively smaller reduction in their cost of capital than firms in less-polluting industries. Hypothesis 1b holds.

**Table 2.** Regression results of Hypothesis 1a

VARIABLES	(1) Green_fin	(2) Green_fin	VARIABLES	(1) Green_fin	(2) Green_fin
ESG	-0.028**	-0.022**	nature		-0.534***
lnasset		-0.370***	pol		0.447**
FAR		-0.631	Constant	2.461***	4.382***
Lev		2.431***	Observations	94	94
PB		0.050	R-squared	0.042	0.603
IS		-0.017*	F	4.045	14.19
fdn_dn		-1.429*			

t-statistics in parentheses

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

**Table 3.** Regression results of Hypothesis 1b

VARIABLES	(1) Green_fin	VARIABLES	(1) Green_fin
ESG	-0.048***	fdn_dn	-1.132
ESG×pol	0.043**	nature	-0.531***
lnasset	-0.363***	pol	-1.955
FAR	-0.401	Constant	5.720***
Lev	2.310***	Observations	94
PB	0.061		

IS	-0.020**	R-squared	0.622
		F	13.65

t-statistics in parentheses

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

### 5 Robustness Test

This paper conducts robustness test by replacing the explanatory variable, and Table 4 shows the result of the robustness test. ESG performance score provided from *Morgan Stanley Capital International* was used to replace scores of *SynTao Green*. According to the results, the coefficient of new ESG is -0.020, which is significantly negative at the 1% significance level.

Therefore, the results in Table 4 show that the benchmark regression is robust, which further proves the correctness of hypothesis 1a.

**Table 4.** Regression results of robustness test

VARIABLES	(1) Green fin	VARIABLES	(1) Green fin
ESG	-0.020***	nature	-0.225
lnasset	0.125	pol	0.353
FAR	-2.178***	Constant	0.628
Lev	2.435**	Observations	51
PB	0.437***	R-squared	0.696
IS	-0.063***	F	10.44
fdn dn	-1.056		

t-statistics in parentheses

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

### 6 Conclusion

Based on the annual data of A-share listed companies in Shanghai, Shenzhen and Beijing from 2015 to 2023, this paper measures the ESG performance of listed companies by using the ESG performance score of listed companies provided by *SynTao Green Finance Consulting Company*, and explores the relationship between the ESG performance and the financing cost of green bond of enterprises. This paper further analyzes this inhibitory effect considering industry differences. The following sound conclusions can be drawn:

(1) Active disclosure of a company’s ESG performance can effectively mitigate issues of information asymmetry and the principal-agent dilemma, thereby facilitating a reduction in the cost of green bond financing. A plausible explanation for this phenomenon is that investors, as external users of information, rely on a variety of corporate data to make informed investment decisions. The disclosure of ESG performance addresses the limitation of overly simplistic financial data by providing a more comprehensive view of the corporation’s operations. The better the ESG performance of a

company, the less pronounced the problem of information asymmetry becomes. This results in heightened market recognition and an enhanced corporate reputation, which in turn bolsters investor confidence. Consequently, this can lead to easier and less expensive access to financing, manifested in lower costs associated with green bond financing.

(2) Enhancing ESG scores in industries characterized by significant pollution does not necessarily lead to a commensurate decrease in the cost of green bond financing as observed in other sectors. Enterprises within these heavily polluting industries typically encounter elevated baseline environmental risks. Consequently, even with improved ESG performance, the persistent concerns regarding long-term environmental risks may not be entirely alleviated in the minds of investors. Furthermore, industries with substantial pollution often confront stricter environmental regulations and policy constraints. This regulatory landscape could result in persistently high financing costs for entities that have achieved higher ESG scores, due to the ongoing uncertainty associated with compliance and regulatory oversight.

Combined with the actual situation of Chinese financial market and the research conclusions, the following policy suggestions can be made:

(1) Enterprises should actively improve their ESG performance, actively undertake social responsibilities, and promote industrial green transformation.

(2) The government should strongly support the construction of enterprise ESG management and create a good policy environment for enterprise ESG. Actively establish relevant policies to stimulate the subjective initiative of enterprises to improve their ESG performance is essential.

(3) The government may contemplate instituting differentiated financing support mechanisms tailored to various industries, particularly by provisioning targeted green credit facilities for heavily polluting sectors to underpin their adoption of eco-friendly technologies and transition in business models

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