

Research on the Impact of Corporate ESG Performance on Debt Financing Costs

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Abstract: With the development of the global economy and the maturity of capital markets, corporate financing costs have become an important indicator for measuring a company's financial health and market competitiveness. This paper selects the panel data of China's A-share listed companies from 2012 to 2022 and uses the fixed effects model and instrumental variable method to empirically analyze the relationship between corporate ESG performance and debt financing costs. This paper mainly draws the following three conclusions: (1) There is a negative correlation between corporate ESG performance and debt financing costs, that is, an improvement in ESG performance helps to reduce corporate debt financing costs. (2) Corporate ESG performance reduces corporate debt financing costs through channels such as increasing corporate value, and green technology innovation plays a positive regulatory role in the impact of ESG performance on corporate financing costs, which can promote the reduction of debt financing costs. (3) The impact of corporate ESG performance on debt financing costs is heterogeneous among different types of companies. For example, the ESG performance of non-state-owned enterprises and enterprises in central and eastern regions has a more obvious effect on reducing corporate debt financing costs.

Keywords: ESG performance, Debt financing costs, Green technology innovation, Corporate governance.

1. Introduction

With the development of the global economy and the maturity of capital markets, corporate financing costs have become an important indicator for measuring a company's financial health and market competitiveness. Especially in China, debt financing is the main way for enterprises to obtain funds, and the level of its cost directly affects the profitability and sustainable development capabilities of enterprises. In recent years, with the rise of environmental, social, and governance (ESG) investment concepts, the relationship between ESG performance and corporate debt financing costs has received extensive attention. Investors and creditors are increasingly inclined to regard a company's ESG performance as an important factor in assessing its debt financing costs. Exploring the impact of corporate ESG performance on debt financing costs has important theoretical and practical significance for optimizing corporate financing structures, reducing financing costs, and promoting corporate sustainable development.

This paper selects the panel data of China's A-share listed companies from 2012 to 2022 and uses the fixed effects model and instrumental variable method to empirically analyze the relationship between corporate ESG performance and debt financing costs. The study finds that an improvement in corporate ESG performance significantly reduces its debt financing costs. In addition, this paper further explores the mechanism by which ESG performance affects the debt financing costs of enterprises. The results show that an improvement in ESG performance can also indirectly affect corporate debt financing costs by increasing corporate value. Moreover, green technology innovation has a positive regulatory effect on the inhibitory effect of ESG on corporate debt financing costs. Green technology innovation can improve a company's resource utilization efficiency, reduce its dependence on the environment, thereby reducing corporate operating costs and risks, which helps enterprises

obtain lower financing costs in the financing market.

Therefore, this paper mainly draws the following three conclusions: (1) There is a negative correlation between corporate ESG performance and debt financing costs, that is, an improvement in ESG performance helps to reduce corporate debt financing costs. (2) Corporate ESG performance reduces corporate debt financing costs through channels such as increasing corporate value, and green technology innovation plays a positive regulatory role in the impact of ESG performance on corporate financing costs, which can promote the reduction of debt financing costs. (3) The impact of corporate ESG performance on debt financing costs is heterogeneous among different types of companies. For example, the ESG performance of non-state-owned enterprises and enterprises in central and eastern regions has a more obvious effect on reducing corporate debt financing costs.

This paper not only provides a new perspective and evidence for understanding the relationship between ESG performance and debt financing costs but also has important theoretical and practical significance for promoting corporate sustainable development and optimizing financing structures. In the context of the global economy's increasing emphasis on sustainable development, in-depth research on the relationship between corporate ESG performance and debt financing costs has important strategic value for guiding corporate practice, optimizing the allocation of financial resources, and promoting high-quality economic development.

2. Literature Review

2.1. Research on the Impact of ESG Performance on the Economy

Regarding the impact of ESG performance on financial performance, numerous studies have shown that the two are closely related. Crook [1] et al. found that the higher a

company's achievements in corporate social responsibility, the more excellent its financial performance. Friede [2] et al.'s literature review shows that about 90% of the data indicates that ESG has no negative impact on corporate financial performance. Wang Shuangjin's [3] research found that there is a U-shaped non-linear relationship between the ESG responsibility fulfillment of industrial enterprises and their financial performance, and competitive strategies play an enhancing role. In terms of the impact of ESG performance on corporate innovation, Fang Xianming et al.'s research shows that there is a positive relationship between corporate ESG performance and innovation. Enterprises with good ESG performance usually have stronger resource allocation and risk management capabilities, which are crucial for promoting innovation. Mbanye et al. found that enterprises that disclose corporate social responsibility have higher green innovation output efficiency and quality.

2.2. Research on the Influencing Factors of Debt Financing Costs

Corporate debt financing costs are affected by internal and macro factors. Internal factors include corporate financial status, capital structure, corporate internal governance, accounting policies, and information disclosure quality. Hu Yiming and Xie Shilei's [4] research pointed out that corporate loan interest rates are positively correlated with the asset-liability ratio and negatively correlated with corporate size, operating cash flow, etc. Jensen and Meckling's [5] research showed that companies with concentrated ownership can reduce debt financing costs. Li Zhijun and Wang Shanping [6] emphasized the importance of information disclosure quality in reducing debt financing costs. Macro factors involve political, legal, economic, and other levels, such as the legal environment, government policies, economic environment stability, and inflation levels. La Porta [7] et al. pointed out that good legal protection can encourage investment and reduce corporate financing constraints. Borisova [8] et al. found that government equity investment can reduce corporate debt financing costs. Kang and Pflueger's [9] research show that economic recessions or changes in inflation can increase corporate debt financing costs.

2.3. Research on the Relationship between Corporate ESG Performance and Debt Financing Costs

The mainstream view in academia is that corporate ESG performance can reduce corporate debt financing costs. Ng's [10] empirical research found that enterprises with good ESG performance can reduce their debt financing costs. Zhou Hong's [11] research found that enterprises with better ESG performance have lower bond issuance costs, and this effect is more obvious in private enterprises. Shi Min [12] et al. proved that there is a significant negative correlation between the ESG performance of private enterprises and debt financing costs. Eliwa's [13] research using panel data of 15 EU countries found that enterprises with excellent ESG performance have relatively lower debt financing costs.

2.4. Literature Review

Existing research has provided a basis for understanding the relationship between corporate ESG performance and debt financing costs, but there are still deficiencies. First, the analysis of the mechanisms by which each dimension of ESG

affects debt financing costs is not in-depth enough. Second, cross-industry and cross-market comparative research is relatively lacking. Third, issues such as the quality, consistency, and comparability of ESG information disclosure affect the accuracy of research. Follow-up research can be carried out from these aspects to deepen the understanding of the relationship between the two.

3. Theoretical Basis and Research Hypotheses

3.1. Theoretical Basis

The stakeholder theory holds that an enterprise is a collection of a series of contracts and needs to consider the interests of all stakeholders. Corporate ESG performance reflects its commitment to the environment, society, and governance. Good performance can obtain strategic resources, reduce operating risks, ease financing constraints, enhance the trust of stakeholders, and thus reduce debt financing costs.

The signaling theory points out that in an information-asymmetric market, corporate ESG performance can be used as a signal to convey the long-term value and risk management capabilities of the enterprise, reduce information asymmetry, enhance market trust, obtain more favorable financing conditions, and reduce debt financing costs.

The agency theory emphasizes that corporate ESG performance is an important part of corporate governance. Good ESG performance can reduce agency costs, improve transparency and accountability, enhance the trust of investors and creditors, and reduce debt financing costs.

The resource-based theory believes that corporate ESG performance is an important resource and ability of the enterprise, reflecting the enterprise's advantages in many aspects and helping the enterprise obtain lower debt financing costs in the capital market.

3.2. Research Hypotheses

Based on the above theories, the following hypotheses are proposed:

Hypothesis 1, corporate ESG performance can reduce debt financing costs. Good ESG performance can reduce corporate risks through various channels, enhance market trust, and thus reduce debt financing costs.

Hypothesis 2, corporate value is one of the channels through which corporate ESG performance reduces debt financing costs. Corporate ESG performance can enhance corporate value, thereby reducing debt financing costs.

Hypothesis 3, the moderating effect of corporate green technology innovation plays an important role in the relationship between corporate ESG performance and debt financing costs. Green technology innovation can improve the adaptability and profitability of enterprises, attract long-term capital, obtain policy support, and reduce debt financing costs.

4. Model Specification and Data Description

4.1. Model Specification

To investigate the relationship between corporate ESG performance and debt financing costs, the following econometric model is established:

$$\ln Y_{it} = \alpha + \beta_1 \ln X_{it} + \beta_2 C + u_i + v_t + \varepsilon_{it} \quad (1)$$

Where, i represents the enterprise, t represents the year,

α represents the constant term, u_i and v_t reflect individual fixed effects and time fixed effects, ε_{it} is the random disturbance term, lnY_{it} is the debt financing cost of each enterprise in each year, lnX_{it} is the ESG rating of each enterprise in each year, and X represents a series of control variables, including Size (enterprise size), Loss (whether there is a loss), Growth (operating income growth rate), Turnover (total asset turnover rate), Cash (cash holdings), PPE (fixed asset intensity), Intangible (intangible asset intensity), and Dual (dual positions). Some variables are in natural logarithm form to reduce the volatility of variables.

4.2. Variable Explanation

The explained variable is the corporate debt financing cost (Y). Referring to previous studies, the ratio of corporate financial expenses to total liabilities at the end of the period (Y1) is used as the debt financing cost. At the same time, the ratio of the total of corporate interest expenses, handling fees, and other financial expenses to total liabilities at the end of the period (Y2) and the ratio of corporate interest expenses to the average of long - and short - term liabilities in the current year (Y3) are used for robustness tests. The core explanatory variable is corporate ESG performance (X), which is measured by Huazheng ESG rating data. The nine-level ratings from "AAA~C" are assigned values from 9 to 1, and the annual average ESG rating results are calculated. Control variables include enterprise size (Size), enterprise age (Inage), asset-liability ratio (Lev), cash holdings (Cash), etc.

4.3. Data Source

The data sample of Shanghai and Shenzhen A-share listed companies from 2012 to 2022 is selected, and the data comes from the CSMAR database. The descriptive statistical results show that there are significant differences in the debt financing costs of sample enterprises, and the overall ESG performance of Chinese listed companies needs to be improved.

4.4. Multicollinearity Test

A VIF test is conducted on the selected data, and the results show that there is no serious multicollinearity problem among the explanatory variables, and regression can be carried out.

Table 1. Results of Multicollinearity Test

Variable	VIF	1/VIF
size	1.41	0.707316
Inage	1.28	0.779377
roa	1.15	0.866018
X1	1.13	0.881887
Cash	1.11	0.898323
top1	1.08	0.926372
Lev	1.03	0.974425
Indep	1.01	0.992041
growth	1.00	0.998911
ipm	1.00	0.999742
Mean VIF	1.12	

5. Empirical Analysis

5.1. Baseline Regression

A baseline regression model is constructed, and the fixed effects method is used to control unobservable factors. Control variables are introduced to examine other influencing

factors. The results show that there is a negative correlation between corporate ESG performance and debt financing costs, and this relationship remains significant after controlling for time effects. Among the control variables, enterprise age, asset-liability ratio, etc. have a significant impact on debt financing costs.

Table 2. Benchmark Regression of Corporate ESG Performance on Debt Financing Costs

	(1)	(2)	(3)	(4)
	Y1	Y1	Y1	Y1
X1	-0.275***	-0.275***	-0.049**	-0.049**
	(-15.28)	(-10.75)	(-2.16)	(-2.09)
size			-0.043	-0.043
			(-0.56)	(-0.38)
Inage			0.783***	0.783***
			(8.10)	(6.02)
Lev			-0.010**	-0.010***
			(-1.97)	(-3.11)
cash			-0.716***	-0.716**
			(-3.14)	(-2.13)
growth			0.000	0.000***
			(0.66)	(9.41)
top1			-0.008*	-0.008*
			(-1.90)	(-1.66)
roa			-2.545***	-2.545**
			(-3.84)	(-2.45)
ipm			0.000***	0.000***
			(3.53)	(18.59)
Indep			0.970*	0.970**
			(1.92)	(2.04)
_cons	1.767***	1.767***	1.162	1.162
	(17.33)	(14.68)	(0.52)	(0.47)
N	34964	34964	28507	28507
R ²	0.051	0.051	0.135	0.135
F	126.014	47.255	194.655	44.235
Individual Fixed Effects	Yes	Yes	Yes	Yes
Time Fixed Effects	No	Yes	No	Yes

5.2. Robustness Test

To ensure the accuracy of the empirical results, multiple methods are used for robustness tests. First, a new scoring method is used for the Huazheng ESG rating of the explanatory variable, and the lagged first period of ESG performance is introduced as an explanatory variable. Second, the explained variable is changed and re-regressed. The results show that the negative correlation between ESG performance and corporate debt financing costs is robust regardless of the method used.

5.3. Endogeneity Test

The instrumental variable method is used for the endogeneity test. The ESG averages of other enterprises in the same province and year, etc. are selected as instrumental variables. The results show that there is a negative correlation between corporate ESG performance and debt financing costs, and this relationship becomes more significant after controlling for endogeneity problems.

6. Further Analysis

6.1. Moderating Effect Based on Corporate Green Technology Innovation

A moderating effect model is used to analyze the moderating role of corporate green technology innovation. The results show that corporate ESG performance is negatively correlated with debt financing costs, and the moderating role of green technology innovation affects the impact of ESG performance on debt financing costs. The cross-term of the moderating variable and the core explanatory variable is significant.

6.2. Mediating Effect Based on Corporate Value

A mediating effect model is constructed to examine the mediating role of corporate value. The results show that corporate ESG performance reduces corporate debt financing costs by increasing corporate value, and corporate value plays a mediating role.

6.3. Regional Heterogeneity Test

The results of the regional heterogeneity test show that in the central and eastern regions, the ESG level of enterprises can significantly reduce corporate debt financing costs, but there is regional heterogeneity, and the regression coefficient of the ESG level in the eastern region is greater than that in the central and western regions.

6.4. Dimensional Heterogeneity Test

The dimensional scores in the ESG information disclosure scores of Bloomberg are used for analysis. The results show that the environmental dimension in corporate ESG performance has a significant impact on corporate debt financing costs, while the impacts of the social and governance dimensions are not significant.

6.5. Enterprise Heterogeneity Test

The heterogeneity test of enterprise nature and industry characteristics shows that the ESG performance of state-owned enterprises has a significant alleviating effect on debt financing costs, the ESG performance of non-polluting industries has a relatively weak impact on debt financing costs, and the ESG performance of polluting industries has an insignificant alleviating effect on debt financing costs.

7. Conclusions and Suggestions

7.1. Conclusions

There is a significant negative correlation between corporate ESG performance and debt financing costs. Improving ESG performance can effectively reduce debt financing costs. ESG performance indirectly affects debt financing costs by increasing corporate value, and green technology innovation plays a positive regulatory role in reducing corporate debt financing costs by ESG. The relationship between ESG performance and debt financing costs is heterogeneous among different types of enterprises. The ESG performance of non-state-owned enterprises and enterprises in central and eastern regions has a more obvious effect on reducing debt financing costs.

7.2. Suggestions

Enterprises should take improving ESG performance as the core of their long-term development strategy, strengthen environmental management, fulfill social responsibilities, optimize corporate governance structures, reduce debt financing costs, and enhance market competitiveness. Enterprises should deeply understand the reduction effect of ESG performance on debt financing costs, comprehensively consider its channels of action, increase R & D investment, adopt green technology innovation, and improve information disclosure transparency. Policy makers should consider the heterogeneity of corporate ESG performance, implement targeted fiscal and financial policies, promote the establishment of a unified ESG information disclosure and evaluation system, strengthen supervision, and promote enterprises to improve their ESG performance and promote sustainable economic development.

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