International Journal of World Economic Research
ISSN: 3080-9886 (Print), ISSN: 3080-9894 (Online) | Vol. 4, No. 1, 2026

Research on the Impact and Mechanism of ESG on Financial Risk of Enterprises

Tianhao Ding *

School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China

* **Corresponding author**

Abstract: Global environmental, social and governance issues have become increasingly prominent, and combined with the domestic green and low-carbon development policy orientation, ESG investment has gradually become the mainstream in the capital market. This paper selects A-share listed companies from 2015 to 2024 as the sample, builds a fixed effect model to explore the impact of ESG performance on corporate financial risks, and examines the mediating role of financing constraints. The research findings are as follows: First, high-quality ESG performance can effectively reduce corporate financial risks; second, financing constraints have a mediating effect between the two. Heterogeneity analysis shows that this risk mitigation effect is more obvious in non-state-owned enterprises, small-scale enterprises and heavily polluting enterprises. The research conclusions can provide references for enterprises to operate stably and sustainably and build brand reputation, and also provide empirical support for capital market investment decisions.

Keywords: ESG, Financial Risk, Financing constraints, Mediating effect.

1. Introduction

With the global ecological environment under pressure, various social conflicts and corporate governance issues frequently emerging, the concept of sustainable development has deeply permeated the economic field. The ESG (Environment, Social and Governance) evaluation system has increasingly become an important benchmark for assessing the quality of corporate development. China is unwaveringly implementing the green and low-carbon development strategy, and its economic development model has gradually shifted from solely pursuing economic benefits to achieving synergy in economic, ecological and social benefits. Corporate operations and development no longer aim solely at maximizing profits. Environmental responsibility fulfillment, social responsibility assumption and internal governance levels have become key elements defining a company's long-term competitiveness and sustainability.

At the policy level, ESG standardization construction has been continuously strengthened, and the regulatory system has become increasingly refined. In 2018, the China Securities Regulatory Commission revised the corporate governance standards for listed companies, establishing a basic framework for ESG information disclosure. Subsequently, the State-owned Assets Supervision and Administration Commission of the State Council successively issued multiple documents, continuously raising the ESG disclosure standards for central enterprises and listed companies, promoting the steady formation of the domestic ESG system, and also prompting market entities to pay increasing attention to the comprehensive performance of enterprises' ESG. At the practical level, many enterprises have exposed negative incidents due to environmental negligence, governance loopholes, and lack of social responsibility, which not only damaged brand reputation but also triggered regulatory penalties, capital withdrawals, and customer losses, directly increasing the financial risks of the enterprises, fully demonstrating the close relationship between ESG construction and corporate financial security.

Looking at the existing academic research, most domestic literature tends to separately study the influence of the environment, society, and governance dimensions. Research on the financial risks of enterprises based on the comprehensive performance of ESG is relatively scarce, and the internal interaction path between the two also needs to be further explored. Therefore, this paper selects the data of A-share listed companies from 2015 to 2024, uses the fixed effect model to empirically test the impact of ESG performance on corporate financial risks, and introduces financing constraint analysis to explore the mediating transmission effect, while conducting heterogeneity tests based on the nature of enterprise property rights, scale, and industry type.This research not only enriches the theoretical boundaries of ESG and corporate risk management, but also provides practical guidance for enterprises to improve ESG construction and prevent and resolve financial risks, and provides empirical evidence for investors to make rational decisions. It also helps the capital market and the real economy achieve high-quality and sustainable development.

2. Related Literature and Hypothesis Development

2.1. Related Literature

Domestic and foreign academic circles generally believe that excellent ESG performance can significantly reduce the financial risks of enterprises. The development of ESG investment in China is still in its infancy and overall development is lagging behind. This is mainly due to the insufficient attention paid by investors and management to ESG-related indicators.

Starting from the ESG performance of enterprises, at the environmental level, the environmental performance of enterprises is positively correlated with the quality of environmental information disclosure, and external environmental regulations can strengthen this relationship. High-quality substantive environmental information disclosure can effectively reduce corporate risks and ensure

sustainable development of enterprises (Zhu et al., 2019) [1]. At the social responsibility level, corporate social responsibility can be decomposed into moral capital and exchange capital, both of which can alleviate corporate financial risks: the former shortens the bankruptcy cycle of distressed enterprises, and the latter increases the probability of obtaining debt financing when enterprises go bankrupt (Gupta and Krishnamurti, 2018) [2]. At the corporate governance level, although concentrated equity can improve decision-making efficiency, excessive concentration of power will exacerbate corporate financial risks (Qian, 2009) [3], while a complete internal control system can effectively prevent and reduce corporate financial risks (Yuan, 2021) [4].

In the research related to ESG and financing constraints, the academic community generally believes that high-quality ESG performance can alleviate corporate financing constraints and reduce financing costs. After controlling for other risk factors, good ESG performance can significantly lower corporate financing costs (Apergis et al., 2022) [5]. Companies that release comprehensive reports can demonstrate their social responsibility and operational transparency, strengthening the inhibitory effect of ESG on financing costs. This effect is more prominent in low-ESG enterprises (Gerwanski, 2020) [6].

Financing constraints are a key factor influencing the financial stability and growth of enterprises. Enterprises constrained by financing have higher financial risks. These enterprises are significantly restricted in areas such as fundraising, fund management, and investment decisions, and may encounter problems of unbalanced fluctuations in operating cash flow (Wang and Chen, 2010; Lin and Paravisini, 2013) [7, 8]. At the same time, financing constraints will intensify the aggressive financing behavior of enterprises with short-term loans and long-term investments, further increasing financial risks (Zuo, 2024) [9]. They will also squeeze the R&D investment of enterprises, damaging their long-term financial health, and this negative impact is more significant for small-sized enterprises and private enterprises (Hao, 2020) [10].

2.2. Hypothesis Development

The ESG performance is closely linked to the financial risks of enterprises. The former covers the performance of enterprises in terms of environment, society and governance, while the latter represents the potential uncertainty of losses in the financial activities of enterprises. From the perspective of stakeholder theory, enterprises no longer solely pursue the interests of shareholders, but instead take into account environmental and social responsibilities, which can effectively reduce external related risks. According to the theory of information asymmetry, there are differences in information acquisition among all parties, which may lead to adverse selection and moral hazard, thereby harming the rights and interests of the disadvantaged party. Based on this, this paper proposes the following hypothesis:

Hypothesis 1: ESG performance is significantly negatively correlated with corporate financial risks. The higher the ESG level, the lower the corporate financial risks.

Enterprise financing constraints are influenced by multiple factors such as its own strength, market environment, policies, and the macroeconomy. Based on the reputation trading theory, when enterprises fulfill ESG-related responsibilities, they can establish a good reputation, maintain cooperative relationships with all parties, and effectively alleviate financing constraints. After the financing pressure is relieved, the difficulty and cost of financing for the enterprise decrease, which helps to optimize the capital structure and stabilize the financial situation. Therefore, the following hypothesis is proposed:

Hypothesis 2: Good ESG performance can alleviate financing constraints and reduce the financial risks of enterprises.

3. Research Design

3.1. Sample

This paper selects A-share listed companies from 2015 to 2024 as the research sample, using the annual financial data and ESG-related data as the research basis. To ensure the scientificity and standardization of the sample, this paper excludes enterprises with ST or PT labels, financial industry enterprises, enterprises with insurmountable debts, and samples with missing financial data. At the same time, to avoid the interference of extreme values and ensure the reliability and robustness of the research results, this paper conducts tail trimming at the 1% and 99% levels for all continuous variables.

3.2. Variables

3.2.1. Dependent Variable: Financial Risk

Financial risk refers to the potential economic losses that an enterprise may face due to various factors during its capital management and operation. These factors include market changes, economic cycles, policy adjustments, etc. Altman's modified Z-score index is selected as the indicator to measure Corporate financial risk, denoted as A_Zscore [11]. This indicator is based on financial data and is a comprehensive metric, and it is negatively correlated with Corporate financial risk; that is, the higher the modified Z-score index, the smaller the Corporate financial risk. The calculation method is as shown in Formula 1.

$$A_Zsocore = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.42X_4 + 0.998X_5 \quad (1)$$

X_1 is operating capital/total assets, X_2 is retained earnings/total assets, X_3 is earnings before interest and taxes/total assets, X_4 is stock market value/total liabilities, X_5 is sales revenue/total assets.

3.2.2. Independent Variable: ESG Performance

The ESG rating system is a comprehensive evaluation standard designed to measure a company's performance in three areas: environmental sustainability, social responsibility fulfillment, and corporate governance. This article selects the Huazheng ESG rating to measure the ESG performance of enterprises. The ESG comprehensive rating is mainly divided into 9 grades from AAA to C, with values ranging from 9 to 1. The larger the value, the better the ESG performance of the enterprise. The higher the rating, the better the ESG performance of the enterprise.

3.2.3. Mediating Variable: Financing Constraints

In the financial field, financing constraints is a complex concept that is difficult to quantify. It involves various restrictions and obstacles that enterprises face when obtaining funds. The KZ value is selected as an indicator to measure the level of financing constraints [12], in order to test the mediating effect of financing constraints between ESG performance and corporate financial risks. Moreover, the KZ index has a positive correlation with the degree of financing

constraints of listed companies.

3.2.4. Controls

Based on the relevant studies on ESG performance and financial risks [13], we set five control variables, namely enterprise size (Size), total asset turnover rate (Turnover), net asset return rate (ROE), price-earnings ratio (PE), and proportion of independent directors (Dire). Additionally, this paper incorporates year-fixed effects and individual fixed effects in the model.

3.3. Empirical Design

To examine the impact of ESG performance on the financial risks of enterprises, the following model is constructed:

$$A_Zsocore_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \alpha_2 Size_{i,t} + \alpha_3 Turnover_{i,t} + \alpha_4 ROE_{i,t} + \alpha_5 PE_{i.t} + \alpha_6 Dire_{i.t} + Year + ID + \varepsilon_{i,t} \quad (2)$$

Where subscripts i and t represent firm i and year t, respectively. $A_Zscore_{i,t}$ and $ESG_{i,t}$ are corporate financial risk and ESG performance. The control variables $Size_{i,t}$, $Turnover_{i,t}$, $ROE_{i,t}$, $PE_{i,t}$, and $Dire_{i,t}$ respectively represent the enterprise size, total asset turnover rate, net asset return rate, price-earnings ratio, and proportion of independent directors. Year represents the time fixed effect and ID represents the individual fixed effect.

To further verify the mediating effect of financing constraints throughout the entire causal path, the following model is constructed:

$$KZ_{i,t} = b_0 + b_1 ESG_{i,t} + b_2 Size_{i,t} + b_3 Turnover_{i,t} + b_4 ROE_{i,t} + b_5 PE_{i.t} + b_6 Dire_{i.t} + Year + ID + \varepsilon_{i,t} \quad (3)$$

$$A_Zsocore_{i,t} = c_0 + c_1 ESG_{i,t} + c_2 KZ_{i,t} + c_3 Size_{i,t} + c_4 Turnover_{i,t} + c_5 ROE_{i,t} + c_6 PE_{i.t} + c_7 Dire_{i.t} + Year + ID + \varepsilon_{i,t} \quad (4)$$

Where $KZ_{i,t}$ is the corporate financing constraint, and the remaining variables are the same as in in the previous model. The definitions of the variables are listed in Table 1.

Table 1. Definition of variables

Type of variable	Variable Name	Variable symbol	Variable definition
Dependent variable	Corporate financial risk	A_Zscore	It can be calculated according to Formula (1)
Independent variable	ESG performance	ESG	AAA-C has 9 levels, assigned values from 9 to 1 respectively
Mediating variable	Financing constraints	KZ	Construct an indicator that includes operating cash flow, cash dividends, Tobin's Q, cash holdings, and debt-to-equity ratio.
Control variables	Enterprise size	Size	The natural logarithm of total assets
	Total asset turnover rate	Turnover	Operating income / Average total assets
	Net asset return rate	ROE	Net profit / Average total assets
	Price-earnings ratio	PE	Market price per share / Earnings per share (This variable is divided by 100 to reduce the dimension)
	Proportion of independent directors	Dire	Number of independent directors / Number of board members

3.4. Descriptive Statistics

Table 2 reports descriptive statistics on the variables used in the main analyses. The minimum observed value of A_Zscore is -0.038, while the maximum is as high as 39.12. Its average value is 4.77, indicating significant differences in financial risks among different enterprises. The average value of ESG performance is 4.135, which is higher than the median of 4, suggesting that the performance of the sample enterprises in ESG is generally above the medium level. However, its minimum value is 1, which differs greatly from the maximum value of 9. This also indicates significant differences in ESG performance among different enterprises.

Table 2. Descriptive Statistics

Variables	N	Mean	SD	Min	Max	p25	p50	p75
A_Zscore	37306	4.770	6.090	-0.038	39.120	1.592	2.778	5.271
ESG	37306	4.135	1.176	1.000	9.000	3.000	4.000	5.000
Size	37306	22.307	1.301	20.008	26.388	21.373	22.096	23.029
Turnover	37306	0.607	0.409	0.074	2.516	0.343	0.520	0.753
ROE	37306	0.048	0.151	-0.780	0.358	0.021	0.066	0.115
PE	37306	0.566	1.750	-6.672	10.49	0.160	0.336	0.679
Dire	37306	0.379	0.055	0.300	0.571	0.333	0.364	0.429

4. Results

4.1. Baseline Estimation

Table 3 reports the results of the benchmark regression. Firstly, the (1) and (2) columns are the results without including control variables and fixed effects, respectively. The regression coefficients of ESG and A_Zscore are 0.262, showing a significant positive correlation at the 1% level. After adding control variables, the coefficient rises to 0.45, and the positive correlation remains significant. On this basis, individual fixed effects and time fixed effects are successively introduced. The results in columns (3)-(5) show that the coefficients are 0.192 and 0.506 respectively. In the case of bidirectional fixed effects, the coefficient is 0.187. All the column results pass the 1% significance test. Since the higher the A_Zscore value, the lower the financial risk, it can be confirmed that the ESG performance is better, and the Corporate financial risk is lower. Therefore, Hypothesis 1 is established. The excellent ESG performance of enterprises

plays a significant role in improving the quality and clarity of information disclosure, which has a positive impact on reducing information asymmetry between enterprises and stakeholders, thereby lowering potential financial risks. Moreover, excellent ESG performance can also help enterprises establish a good public image, enhance customer loyalty and improve corporate reputation. This not only helps enterprises reduce operational risks but may also bring higher market share and more stable revenue streams, thereby alleviating financial risks.

Table 3. Basic results: effect of ESG performance on corporate financial risk

	(1)	(2)	(3)	(4)	(5)
	A_Zscore	A_Zscore	A_Zscore	A_Zscore	A_Zscore
ESG	0.262***	0.450***	0.192***	0.506***	0.187***
	(9.787)	(17.838)	(7.539)	(22.306)	(7.306)
Size		-1.892***	-3.617***	-1.869***	-2.550***
		(-84.848)	(-29.481)	(-80.329)	(-19.211)
Turnover		-0.629***	0.709***	-0.667***	0.818***
		(-8.958)	(3.450)	(-10.529)	(4.144)
ROE		9.480***	6.317***	8.810***	5.074***
		(48.512)	(26.826)	(48.375)	(22.890)
PE		0.181***	0.089***	0.166***	0.074***
		(11.207)	(4.396)	(7.979)	(3.864)
Dire		2.334***	-2.679***	2.798***	-1.261
		(4.599)	(-3.095)	(5.812)	(-1.514)
_cons	3.686***	44.065***	84.892***	45.762***	63.069***
	(32.019)	(84.786)	(30.746)	(78.640)	(21.477)
Year	No	No	No	Yes	Yes
ID	No	No	Yes	No	Yes
N	37306	37306	37306	37306	37306
R^2	0.003	0.208	0.183	0.238	0.235
***p<0.01, **p<0.05, *p<0.10					

4.2. Endogeneity Discussion

Table 4. Endogeneity analysis

Variables	(1)	(2)	(3)	(4)
	first	second	first	second
	ESG	A_Zscore	ESG	A_Zscore
LESG	0.352***			
	(45.515)			
ESG3			0.098***	
			(50.030)	
ESG		0.392***		0.180***
		(5.545)		(5.957)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
ID	Yes	Yes	Yes	Yes
Kleibergen-Paap rk LM	934.615		1415.676	
Kleibergen-Paap rk Wald F	2070.355		2501.589	
N	31548	31548	37008	37008
R^2	0.131	0.171	0.550	0.235
*** p<0.01, ** p<0.05, * p<0.1				

Endogeneity is manifested as the correlation between the explanatory variables and the error term, which can lead to estimation bias and undermine the credibility of the conclusions. To address this issue, this paper selects the lagged one-period ESG as a proxy variable. Additionally, following the method of Lewbel (1997) [14], another proxy variable is constructed by cubing the difference between ESG and its mean value, denoted as LESG and ESG3. The two-stage least squares method is employed to conduct the endogeneity test. Table 4 presents the results of the two-stage regression. The first-stage regression results shown in columns (1) and (3) indicate that there is a correlation between the instrumental variables and ESG. In the second stage of columns (2) and (4), the instrumental variable is replaced by ESG for regression, and the coefficients are all positive. Furthermore, through the Kleibergen-Paap rk LM test and the Kleibergen-Paap rk Wald F test, the problems of non-identification and weak instrumental variables were excluded. Both tests were successfully passed, indicating that after considering the endogeneity issue, ESG performance

can still alleviate the financial risks of enterprises, and Hypothesis 1 holds.

4.3. Robustness Tests

4.3.1. Alternative Measure of ESG Performance

Redefine the assignment method for ESG ratings. Assign AAA, AA, and A a value of 3, BBB, BB, and B a value of 2, and CCC, CC, and C a value of 1. The assigned ESG performance is recorded as ESG1. Column (1) of Table 5 shows the regression results after replacing the explanatory variables. The regression coefficient of ESG1 for A_Zscore is 0.373, which is significantly positive at the 1% level. Since A_Zscore is negatively correlated with financial risk, enterprises with excellent ESG performance can reduce their financial risks. This conclusion still supports Hypothesis 1, that is, through robustness tests.

4.3.2. Alternative Measure of Financial Risk

There are many methods for measuring enterprise financial risks. We use the Z-score index (Zscore) proposed by Altman initially and the debt-to-asset ratio (Lev) as alternative variables for the dependent variables. Among them, the Z-score index is inversely proportional to the financial risk of the enterprise. The debt-to-asset ratio is also one of the important tools for assessing the financial status of the enterprise. This indicator can comprehensively reflect the debt level, debt-paying ability and business strategy of the enterprise, thereby measuring the financial risk of the enterprise, and it is directly proportional to the financial risk of the enterprise. The formula for calculating Zscore is as follows:

$$Zscore = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5 \quad (5)$$

X_1 is operating capital/total assets, X_2 is retained earnings/total assets, X_3 is earnings before interest and taxes/total assets, X_4 is stock market value/total liabilities, X_5 is sales revenue/total assets.

In Table 5, the dependent variable in the (2) column is Zscore, and the dependent variable in the (3) column is Lev. The regression coefficients are 0.272 and -0.013 respectively, and both are significant at the 1% level, indicating that the better the ESG performance, the lower the financial risk of the enterprise. This is consistent with the conclusion in the previous paragraph and has passed the robustness test.

Table 5. Robustness tests

	(1)	(2)	(3)
	A_Zscore	Zscore	Lev
ESG1	0.373***		
	(6.697)		
ESG		0.272***	-0.013***
		(7.457)	(-17.578)
_cons	62.683***	89.772***	-1.482***
	(21.350)	(21.326)	(-16.593)
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
ID	Yes	Yes	Yes
N	37306	37306	37306
R^2	0.234	0.231	0.255
***p<0.01, **p<0.05, *p<0.10			

4.4. Heterogeneity Analysis

4.4.1. Heterogeneous Impact on Firms with Different Ownership

Regarding whether the nature of an enterprise's property rights will be reflected in the impact of ESG performance on the financial risks of the enterprise, we divided all enterprises into two categories: state-owned enterprises and non-state-owned enterprises based on the nature of property rights. We conducted a regression analysis on this. The results in Column (1) and Column (2) of Table 6 show that the ESG coefficients for the two types of enterprises are 0.108 and 0.185 respectively, both being significantly positive at the 1% level, indicating that ESG can reduce financial risks. The inter-group coefficient difference test showed that there was a significant difference between the two groups of samples, and the impact was more pronounced on non-state-owned enterprises. On the one hand, since state-owned enterprises often enjoy more policy support and resource allocation, they may have stronger resilience and risk tolerance when facing environmental, social, and governance challenges. In contrast, non-state-owned enterprises rely more on market competition and their own strength, so they need to pay more attention to ESG factors to gain market trust, enhance brand image, and reduce potential financial risks. On the other hand, non-financial factors such as environmental friendliness and social responsibility in ESG are crucial for the reputation and brand image of non-state-owned enterprises. Non-state-owned enterprises usually pay more attention to these issues because their survival and development rely more on market recognition and consumer trust. Their investment and performance in ESG may have a more direct impact on their financial situation and market performance, while state-owned enterprises may place more emphasis on social responsibility and public interests, which makes ESG factors relatively less important in their financial risk assessment. Therefore, non-state-owned enterprises have more motivation to implement ESG strategies to reduce financial risks and enhance the long-term value of the enterprise.

Table 6. Heterogeneity analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	State-owned	Non-state-owned	Large-scale	Small-scale	High pollution	Low pollution
	A_Zscore	A_Zscore	A_Zscore	A_Zscore	A_Zscore	A_Zscore
ESG	0.108***	0.185***	-0.024	0.247***	0.254***	0.159***
	(3.204)	(5.357)	(-1.200)	(5.160)	(5.715)	(5.401)
_cons	40.414***	70.756***	26.091***	122.909***	68.839***	62.825***
	(10.384)	(18.850)	(11.880)	(23.859)	(9.415)	(19.980)
P-value	0.066*		0.000***		0.073*	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
ID	Yes	Yes	Yes	Yes	Yes	Yes
N	12289	25017	18653	18653	7787	29519
R^2	0.166	0.278	0.157	0.343	0.251	0.235

The p-value was calculated using the Fisher's combined test. ***p<0.01, **p<0.05, *p<0.10

4.4.2. Heterogeneous Impact on Firms with Different Size

Further research will be conducted to determine whether the size of the enterprise will lead to differences in the results of the impact of ESG performance on financial risks. Based on the median of the total assets of enterprises as the dividing criterion, all enterprises are divided into large-scale enterprises and small-scale enterprises. Then, a regression analysis is conducted. The results in columns (3) and (4) of Table 6 show that ESG performance has a significant inhibitory effect on the financial risks of small-scale enterprises, with a coefficient of 0.247. However, it has no obvious effect on large-scale enterprises. The resources and capabilities of small-scale enterprises are relatively limited, and their market visibility and influence are relatively small. When facing environmental, social, and governance challenges, large-scale enterprises may have more resources and capabilities to deal with and mitigate these risks. However, small-scale enterprises are often more vulnerable and more sensitive to changes in the external environment. Therefore, when small-scale enterprises actively adopt ESG practices to enhance their corporate image and market recognition, they can more effectively manage and reduce financial risks related to these factors, achieving more significant results.

4.4.3. Heterogeneous Impact on Firms with Different Levels of Pollution

Finally, we classified the enterprises into two categories based on their pollution levels: high-pollution enterprises and low-pollution enterprises. We then conducted regression analyses separately for each category. In Table 6, the (5) and (6) columns show that the ESG coefficients for the two types of enterprises are 0.254 and 0.159 respectively, both of which are significantly positive at the 1% level. And the p-value of the Fisher's combined test is less than 0.1. This indicates that ESG can reduce financial risks, and its effect is stronger on high-pollution enterprises. High-pollution enterprises themselves face strict environmental protection regulations, with many potential financial risks such as violation fines, production suspension for rectification, and policy restrictions. Improving ESG levels can not only actively comply with regulations to avoid penalty losses, but also reverse the negative market image and alleviate problems such as financing restrictions and credit tightening. Low-pollution enterprises have a better environmental foundation and relatively low original financial risks. The risk reduction brought by ESG optimization is limited, so the role of ESG in reducing financial risks is more prominent in high-pollution enterprises.

4.5. Mechanism Test

The previous empirical results have confirmed that good ESG performance can significantly reduce the financial risks of enterprises. On this basis, to further clarify the internal transmission path of ESG affecting the financial risks of enterprises, this paper conducts an intermediary mechanism test. From a theoretical perspective, financing constraints are an important factor that restricts the development of enterprises and intensifies financial risks. The higher the financing barriers faced by enterprises, the more restricted the capital allocation and business decisions will be, and the larger the financial risk exposure will be. However, excellent ESG performance can convey positive signals of strong compliance, good governance, and sustainable development capabilities to the capital market, enhancing the market reputation and investor recognition of enterprises, and effectively alleviating the financing difficulties of enterprises.

Based on this, this paper constructs an intermediary effect model with financing constraints as the mediating variable to test its mediating role between ESG and enterprise financial risks. Table 7 shows the results. Column (1) shows the benchmark regression results, which are consistent with the previous conclusions. Column (2) takes the KZ index of financing constraints as the dependent variable and ESG as the core explanatory variable. The regression results show that the ESG coefficient is significantly negative, indicating that the better the ESG performance of enterprises, the lower the degree of financing constraints, which is consistent with the theoretical expectation. Column (3) includes ESG and financing constraints simultaneously in the model and conducts a regression on enterprise financial risks. The results show that the ESG coefficient is significantly positive and the KZ index coefficient is significantly negative. These results indicate that ESG not only can directly reduce enterprise financial risks, but also can indirectly inhibit financial risks by alleviating financing constraints, verifying that financing constraints play a significant mediating role in the process of ESG affecting enterprise financial risks, clarifying the internal transmission mechanism between the two, and the hypothesis 2 is established.

Table 7. Channel analysis

	(1)	(2)	(3)
	A_Zscore	KZ	A_Zscore
ESG	0.187***	-0.105***	0.134***
	(7.306)	(-10.575)	(5.445)
KZ			-0.500***
			(-19.932)
_cons	63.069***	-2.966***	61.586***
	(21.477)	(-2.992)	(20.900)
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
ID	Yes	Yes	Yes
N	37306	37306	37306
R^2	0.235	0.282	0.261
***p<0.01, **p<0.05, *p<0.10			

In order to conduct a more comprehensive assessment of the mediating effect, this paper first performed a Sobel test on the mediating effect. Table 8, Panel A reports that the total effect coefficient is 0.187, the mediating effect coefficient is 0.052, and the proportion of the mediating effect is 0.278. Additionally, a Bootstrap test was conducted, and Table 8, Panel B shows that the effect coefficients are the same as those in the Sobel test. The confidence intervals of the direct effect and the mediating effect do not include 0, indicating the existence of the mediating effect, and that financing constraints play a partial mediating role in the transmission mechanism.

Table 8. Sobel and Bootstrap test

Panel A	Coef	Std Err	Z	P>|Z|	
Sobel	0.052	0.006	8.665	0.000	
Total effect	0.187	0.028	6.777	0.000	
Mediating effect	0.052	0.006	8.665	0.000	
Direct effect	0.134	0.027	5.050	0.000	
Proportion of mediating effect	0.278				
Panel B	Coef	Std Err	Z	P>|Z|	Normal-based [95% conf. interval]
Mediating effect	0.052	0.005	9.87	0.000	0.042-0.063
Direct effect	0.134	0.021	6.39	0.000	0.093-0.176

5. Conclusion

This paper takes A-share listed companies from 2015 to 2024 as the research sample. Based on the empirical analysis method, it systematically explores the impact effect and internal mechanism of enterprises' ESG performance on financial risks. Through multiple robustness tests such as variable replacement and lagged independent variable processing, the validity and reliability of the research conclusion are verified. The empirical results show that enterprises with good ESG performance can significantly inhibit the occurrence of financial risks and effectively enhance the stability of enterprise operation. At the same time, financing constraints play a partial mediating role in the relationship between ESG performance and enterprise financial risks, that is, ESG performance can alleviate enterprise financing constraints and further reduce the level of financial risks. Heterogeneity analysis further reveals that the risk suppression effect of ESG has significant situational differences. Compared with state-owned enterprises, large-scale enterprises, and low pollution enterprises, non-state-owned enterprises, small-scale enterprises, and high pollution enterprises have a more prominent role in mitigating financial risks by enhancing ESG levels.

Based on the above research conclusions, this paper proposes multi-level and targeted optimization strategies. From the perspective of enterprises at the micro level, enterprises should establish an all-round ESG management system, implement green production models in the environmental dimension, optimize resource allocation and pollution control, actively fulfill public welfare responsibilities in the social responsibility dimension, and improve the internal control system and decision-making mechanism in the corporate governance dimension. Through continuous improvement of the comprehensive ESG performance, a solid foundation for risk prevention and control can be established. From the perspective of the government and the regulatory authorities at the meso level, relevant departments should continuously refine and unify the enterprise ESG information disclosure standards and norms, establish a regular supervision and verification mechanism and an enforcement mechanism for violations, strengthen the authenticity, completeness and transparency of enterprise ESG information disclosure, and standardize the order of ESG information disclosure in the market. At the same time, establish a positive incentive mechanism for ESG, give policy recognition and resource allocation to enterprises with excellent ESG performance, help enterprises reduce financing costs, enhance market competitiveness and attract talent. From the macro perspective of the capital market, the ESG investment system should be promoted, encourage financial institutions to innovate characteristic financial products such as ESG funds and ESG bonds, enrich ESG investment categories, and guide investors to establish a long-term value investment concept, incorporate ESG core indicators into the investment decision-making system, accurately identify the long-term development value and potential risks of enterprises, and thereby promote the healthy development of the capital market and help listed companies achieve high-quality, sustainable and stable operations.

References

[1] Zhu, W., Sun, Y. X., & Tang, Q. (2019). Substantive disclosure or selective disclosure: The impact of corporate environmental performance on the quality of environmental information disclosure. Accounting Research, (3), 10–17.

[2] Gupta, K., & Krishnamurti, C. (2018). Does corporate social responsibility engagement benefit distressed firms? The role of

moral and exchange capital. Pacific-Basin Finance Journal, 50, 249–262.

[3] Qian, Z. H. (2009). Corporate governance and enterprise financial distress: An empirical analysis from the perspective of equity structure. Economic and Management Studies, (5), 80–86.

[4] Yuan, Y. (2021). The impact of internal control quality on enterprise financial risks: A case study of companies in the CSI 300 index. Modern Business, (22), 95–99.

[5] Apergis, N., Poufinas, T., & Antonopoulos, A. (2022). ESG scores and cost of debt. Energy Economics, 112, 106186.

[6] Gerwanski, J. (2020). Does it pay off? Integrated reporting and cost of debt: European evidence. Corporate Social Responsibility and Environmental Management, 27(5), 2299–2319.

[7] Wang, J. N., & Chen, Z. C. (2010). Empirical study on financing constraints, financial risk and the growth of small and medium-sized enterprises: An analysis based on 4-year panel data of 273 small and medium-sized companies listed in Shenzhen Stock Exchange. Quest, (9), 15–18, 37.

[8] Lin, H., & Paravisini, D. (2013). The effect of financing constraints on risk. Review of Finance, 17(1), 229–259.

[9] Zuo, Y. W. (2024). Research on the debt risk of enterprises under financing constraints: From the perspective of short-term loans and long-term investments. Finance and Accounting Communication, (7), 68–72.

[10] Hao, Q. M. (2020). A study of the research & development and long term risk under financial constraints. Research Management, 41(10), 54–62.

[11] Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. The Journal of Finance, 23(4), 589–609.

[12] Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? The Quarterly Journal of Economics, 112(1), 169–215.

[13] Zhang, Q., Mei, Y. L., & Wang, K. (2023). Does ESG performance affect corporate financial risk? Evidence from A-share listed companies. Friends of Accounting, (21), 105–114.

[14] Lewbel, A. (1997). Constructing instruments for regressions with measurement error when no additional data are available, with an application to patents and R&D. Econometrica, 65(5), 1201–1213.