

ESG Performance, Internal Control, and Corporate Financial Risk

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ABSTRACT

This research utilizes a panel dataset of A-share non-financial listed firms in China from 2013 to 2022 to explore how ESG performance and internal control systems interact with corporate financial risk. Through the application of both fixed-effects and random-effects regression models, the findings demonstrate that firms exhibiting higher ESG ratings are significantly more likely to experience increased financial risk, suggesting a potential trade-off between ESG commitment and financial stability. Further analysis identifies internal control as an intermediary channel through which ESG impacts financial risk. Robustness checks incorporating industry fixed effects confirm the stability of these findings. The results suggest that while ESG implementation may increase financial pressure under the current institutional environment in China, it also contributes to governance improvements through strengthened internal control. Based on these insights, the study recommends aligning ESG practices with internal governance structures, enhancing the efficiency of internal control systems, and adopting a long-term perspective in balancing ESG-related costs and benefits.

KEYWORDS

ESG performance; Internal control; Corporate financial risk; Mediation effect

1 Introduction

In recent years, driven by China's "dual carbon" policy agenda and sustained emphasis on green development, ESG performance has drawn growing attention from regulatory bodies, investors, and the public. The ESG framework, referring to Environmental, Social, and Governance dimensions, serves as a broad non-financial tool for evaluating a firm's sustainability efforts and governance integrity. Against the backdrop of China's shifting economic landscape and evolving regulatory systems, ESG is increasingly seen not only as a reflection of social responsibility, but also as an important benchmark of enterprise value and strategic adaptability. Several academic studies highlight that superior ESG practices contribute to enhancing corporate reputation, facilitating better access to capital, and promoting more effective use of resources.

However, ESG implementation among Chinese listed companies has also encountered a series of practical challenges. Some companies face short-term financial pressure due to the high costs of ESG-related investments, while others engage in image-driven strategies or "greenwashing," resulting in a disconnect between ESG initiatives and core business goals. One example is Sinopec, which faces significant financial risk due to its high ESG-related investments. In its 2024 annual report, Sinopec reported a revenue of 3.07 trillion yuan, but its net profit decreased by 16.8%. The company's total liabilities surpassed 1.1 trillion yuan, with a debt-to-asset ratio of 53.17%, indicating a considerable financial burden. While Sinopec continues to actively invest in green energy initiatives, such as building over 100 hydrogen refueling stations and expanding electric vehicle charging infrastructure, these efforts have strained its core oil sales business. The substantial capital required for these investments has led to financial risk, causing a misalignment between ESG actions and the company's primary business objectives. Against this backdrop, more empirical research has begun to explore whether ESG may have a dual impact, delivering long-term governance improvements while also contributing to elevated short-term financial risk. This concern is particularly salient in China, where ESG frameworks are still in a developmental stage. For enterprises operating in such an emerging market environment, balancing ESG expenditures with financial soundness has become both a practical dilemma and a theoretical challenge.

Meanwhile, financial risks remain a common concern for Chinese companies during rapid economic growth. Incidents such as accounting fraud and liquidity crises among listed firms have exposed structural weaknesses in corporate governance and internal control systems. In this context, internal control is increasingly recognized as the backbone of enterprise risk management. It not only helps regulate business operations and prevent misconduct but may also serve as a key transmission channel through which ESG practices influence corporate financial risk. Theoretically, the values promoted by ESG, such as transparency, accountability, and regulatory compliance, are closely aligned with the core functions of internal control in risk identification and mitigation. As companies advance their ESG agendas, they often undergo internal restructuring and strengthen information disclosure, changes that may help ease financial pressure from a governance perspective.

Although ESG-related research has gained increasing attention, its indirect implications for corporate financial risk remain underexplored. Existing literature predominantly examines how ESG influences operational outcomes, financing

costs, or governance frameworks, yet empirical evidence on whether internal control functions as a mediating channel is still limited, especially in emerging markets like China.

To bridge this gap, this study analysis uses panel data from Chinese A-share listed companies from 2013 to 2022. It looks into both the direct link between financial risk and ESG performance as well as the role that internal control mechanisms play as a mediator. Incorporating industry fixed factors strengthens the study's conclusions. The findings advance theoretical knowledge of the financial impact of ESG and offer helpful suggestions for businesses looking to successfully manage financial risk while integrating sustainability initiatives.

2 Literature review

Recent academic work on ESG has largely concentrated on examining its direct influence on firms' financial outcomes. For instance, Feng (2024) observed a significant positive correlation between ESG initiatives and financial performance by analyzing A-share listed enterprises in China through the lens of the corporate life cycle, noting that this effect strengthens across successive life cycle phases. Similarly, He (2024) demonstrated that effective ESG governance frameworks contribute to better resource distribution, enhanced capital efficiency, and lower financing expenses, ultimately boosting firm valuation. In another study, Peiris and Evans (2010) utilized broad ESG indicators and confirmed their substantial contribution to the growth of long-term corporate value.

Although the positive effects of ESG have been widely validated, some scholars have raised concerns about its actual effectiveness. Friedman (1970), when ESG was not yet widely adopted, pointed out that corporate social responsibility might deviate from the profit-maximization goal, thereby damaging competitive advantage. Barnea & Rubin (2010) argued that ESG investments could be influenced by agency motives, where management, in pursuit of personal reputation, might "over-invest" or misallocate resources, ultimately weakening the company's value. Empirical studies by Brammer et al. (2006) and McWilliams & Siegel (2000) also found that the relationship between ESG and corporate profitability was not significant, and even negative. These studies suggest both theoretically and empirically that the economic consequences of ESG may be influenced by factors such as managerial incentives, information asymmetry, and differences in implementation paths.

In terms of the mechanisms of ESG, green innovation has gradually become a research hotspot in recent years. Ji (2024), based on data from Chinese A-share listed companies, pointed out that as companies fulfill their environmental responsibilities, they often adopt clean technologies and develop green products, thereby driving the companies' green transformation and long-term value growth. This study emphasizes the alignment between the environmental governance principles promoted by ESG and green innovation activities, which in practice help improve environmental performance and competitive advantage.

In contrast, there is a scarcity of research that examines the mechanism by which ESG performance influences corporate financial risk through internal control mechanisms. Wang & Guo (2025) showed a substantial correlation between firms' ESG initiatives and increases in internal control effectiveness using panel data from A-share listed businesses from 2015 to 2023. According to their results, stronger and more effective internal control systems are a result of ESG-driven enhancements to compliance transparency and accountability frameworks. Similarly, Yi & Liu's (2023) study on financial risk and capital market liberalization highlights the importance of a firm's governance structure and the accuracy of its information disclosure in reducing systemic financial risks.

Although there has been research exploring ESG's relationship with performance, innovation, and internal control, empirical studies from the perspective of the "ESG—internal control—financial risk" transmission mechanism are still lacking. This is particularly true in China, where the governance structure is complex and the regulatory environment is constantly evolving. Clarifying whether ESG performance influences corporate financial risk through internal control mechanisms not only helps refine the theoretical transmission pathways of ESG but also provides practical insights for enterprises to strengthen risk prevention and enhance sustainable governance capabilities.

3 Theories and hypotheses

3.1 The relationship between ESG performance and corporate financial risk

Although stakeholder theory suggests that businesses should balance their commitments to different stakeholder groups with their desire to maximize profits, incorporating ESG factors into corporate strategy may make operational demands and inefficiencies worse and even jeopardize financial stability in some institutional contexts. Particularly in areas like environmental governance, employee protection, and governance system development, ESG activities frequently call for additional disclosures, compliance expenditures, and organizational modifications. These initiatives may affect profitability and raise operating expenses.

From a corporate governance perspective, some companies may neglect financial soundness due to an excessive pursuit of ESG ratings. Managers, driven by reputation motives, may engage in "overinvestment," directing limited resources into low-return or high-cost sustainability projects, weakening the company's financial capacity. In the absence of transparent disclosures and external accountability mechanisms, such behavior can easily obscure true risk exposure.

Moreover, in emerging markets such as China, the ESG governance mechanisms are still underdeveloped, and some companies may exhibit a tendency for "formalism," treating ESG as a symbolic gesture rather than genuinely mitigating risks. Regulatory gaps and arbitrage opportunities may cause ESG to inadvertently become a source of resource misallocation and financial vulnerability for companies.

Therefore, the following hypothesis is proposed: H1: Firms with higher ESG performance may experience increased levels of financial risk.

3.2 The effect of ESG performance on internal control

A company's internal control framework constitutes a foundational pillar of modern corporate governance, comprising key elements such as the control environment, risk evaluation, operational procedures, communication systems, and oversight mechanisms. A robust internal control setup contributes to regulating internal processes, improving transparency in financial reporting, and mitigating the likelihood of fraud or critical operational failures. These functions are essential for ensuring long-term corporate stability.

In this context, there is a strong alignment between a company's ESG performance and its internal control system. From a governance structure perspective, ESG practices emphasize transparent disclosure, accountability mechanisms, and compliance operations, which encourage companies to strengthen board supervision and improve incentive and restraint mechanisms, thereby optimizing the control environment. In terms of risk management, ESG requires companies to proactively identify and respond to environmental and social risks, helping to establish systematic risk assessment and monitoring processes and improving the ability to anticipate and respond to potential crises. Moreover, in terms of information disclosure and communication, ESG advocates transparent and auditable data reporting mechanisms, which enhance the timeliness and effectiveness of a company's information systems and build trust with stakeholders.

Hence, the following hypothesis is proposed: H2: The better a company's ESG performance, the stronger its internal control effectiveness.

3.3 The mediating role of internal control

In the framework of modern corporate governance, internal control is not only a fundamental system arrangement to ensure compliance and operational efficiency, but also plays a critical role in risk management. According to corporate governance theory, a sound internal control system helps improve a company's ability to handle financial information, reduce the risk of fraud, and enhance its ability to manage external uncertainties and internal operational risks.

In the context of ESG and corporate financial risk, internal control may serve as a crucial transmission channel. To fulfill ESG objectives, firms often need to revise and reinforce their organizational systems, which naturally leads to the advancement of internal control measures. Simultaneously, a strong internal control environment enables firms to better anticipate and respond to various risks, helping to mitigate the financial pressures and inefficiencies potentially introduced by ESG-related investments.

Consequently, this study proposes the third hypothesis: H3: Internal control plays a mediating role in the relationship between a company's ESG performance and its financial risk.

4 Model specification

4.1 Data sources and processing

This study focuses on Chinese A-share non-financial listed companies from 2013 to 2022. The relevant data primarily comes from the HuaZheng ESG Database, the Dibo Internal Control Index Database, and the CSMAR Database. These databases include comprehensive ESG scores, internal control indices, financial data, and corporate governance structure information for listed companies.

To ensure data quality, the following sample data cleaning processes were applied:

- Excluded ST and *ST companies to eliminate those with abnormal operations;
- Excluded samples from the financial sector due to significant differences in financial structure and regulatory mechanisms;
- Removed observations with missing values or extreme outliers for key variables;
- Constructed panel data from all annual data for empirical regression analysis.

This study used Stata 18.5 software to perform regression estimation. The fundamental dependent variable, company financial risk, is measured using the Z_SCORE, which comes from the Caomei Research Service Network (<https://www.caomeikeyan.com>). The calculation method refers to the study by Yi & Liu (2023) in the Journal of Economic Theory and Economic Management, calculated as:

$$Z_{SCORE} = 1.2 \times \frac{\text{Working Capital}}{\text{Total Assets}} + 1.4 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} + 3.3 \times \frac{\text{EBIT}}{\text{Total Assets}} + 0.6 \times \frac{\text{Market Value of Equity}}{\text{Total Liabilities}} + 0.999 \times \frac{\text{Revenue}}{\text{Total Assets}}$$

4.2 Model specification

Based on the theoretical model above, this study constructs the following three regression models:

(1) Benchmark model: Examines the direct impact of ESG performance on financial risk.

$$Z_SCORE = \beta_0 + \beta_1 \cdot \text{ESG_SCORE} + \beta_2 \cdot \text{Leverage} + \beta_3 \cdot \text{Size} + \varepsilon$$

(2) Mediation path model: Investigates how internal control is impacted by ESG performance.

$$\text{ICE_SCORE} = \alpha_0 + \alpha_1 \cdot \text{ESG_SCORE} + \alpha_2 \cdot \text{Leverage} + \alpha_3 \cdot \text{Size} + \varepsilon$$

(3) Mediation effect model: Simultaneously includes ESG performance and internal control to examine their joint effect on financial risk.

$$Z_SCORE = \varphi_0 + \varphi_1 \cdot \text{ESG_SCORE} + \varphi_2 \cdot \text{ICE_SCORE} + \varphi_3 \cdot \text{Leverage} + \varphi_4 \cdot \text{Size} + \varepsilon$$

If φ_2 is significant and φ_1 decreases or becomes insignificant compared to the β_1 regression result, it indicates that internal control mediates the relationship between ESG and financial risk.

4.3 Variable description

(1) Dependent Variable: Corporate financial risk, where a higher value indicates better financial stability.

(2) Core Explanatory Variable: The ESG performance score obtained from the Huazheng database serves as the main explanatory variable in this study. As highlighted by Wu (2023) and Xiao (2021), both the volume and quality of ESG disclosures among Chinese listed firms rated by Huazheng have shown notable growth. Although global ESG indicators—such as Bloomberg and MSCI ratings—are widely used, this study concentrates on Chinese enterprises. Therefore, selecting a domestic rating system is more appropriate for accurately capturing ESG practices within the local institutional context. In line with this objective, the Huazheng ESG rating system is adopted. The rating spans from high to low, assigning numerical values from 9 (AAA) to 1 (C) to reflect different performance levels. Higher values correspond to stronger ESG engagement. A detailed breakdown of the grading structure is presented in Table 1.

Table 1 Huazheng ESG Performance Scoring Table

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

(3) Mediating Variable: The internal control score of a company, which measures the comprehensive indicator of the company's system construction and execution.

(4) Control Variables:

- Leverage (Debt-to-Equity Ratio): Measures the financial leverage risk of the company.
- Size (Company Size): Measured by the logarithm of total assets, reflecting the scale of the company.

Table 2 Variable Definitions and Measurements

Type	Name	Symbol	Measurement
Dependent Variable	Corporate financial risk	Z_SCORE	Z-score model comprehensive financial ratio score
Core Explanatory Variable	ESG Performance	ESG_SCORE	Huazheng ESG comprehensive score
Mediating Variable	Internal Control	ICE_SCORE	Dibo internal control score
Control Variables	Financial Leverage	Leverage	Total liabilities / Total assets
	Company Size	Size	Logarithm of total assets

5 Empirical analysis

5.1 Descriptive statistics

Descriptive statistics for the main variables utilized in the study are shown in Table 3. 31,397 valid entries make up the dependent variable, corporate financial risk (Z_SCORE), which has a mean of 5.391 and a standard deviation of 14.072. The

financial stability of enterprises varies significantly, with the lowest and largest values being -9.291 and 1860.96, respectively. Rare financial shocks, structural changes, or sector-specific dynamics could all be responsible for this dispersion.

For ESG performance (ESG_SCORE), there are 39,025 observations. The average score stands at 4.119 with a standard deviation of 0.981, spanning a range from 1 to 8. This suggests that while many firms demonstrate relatively strong ESG engagement, variation in implementation quality and strategic focus persists.

Regarding internal control effectiveness (ICE_SCORE), the sample comprises 31,508 data points. The average score is 614.312, with a standard deviation of 163.640, and values extend from 0 to 941.31. These statistics reflect meaningful differences in firms' internal control structures and operational governance standards.

Firm size (Size), which is determined by taking the natural logarithm of total assets, averages 22.236 with a standard deviation of 1.297, ranging from 19.676 to 26.086, indicating a concentration of mid-sized firms in the sample. The leverage ratio (Leverage), which is based on 37,114 records, shows a mean of 0.412 and a standard deviation of 0.204, indicating a moderate average leverage level, though firm-specific differences remain substantial.

Table 3 Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Z_SCORE	31,397	5.391	14.072	-9.291	1860.960
ESG_SCORE	39,025	4.119	0.981	1.000	8.000
ICE_SCORE	31,508	614.312	163.640	0.000	941.310
Leverage	37,114	0.412	0.204	0.052	0.894
Size	37,114	22.236	1.297	19.676	26.086

5.2 Benchmark regression results

The baseline regression analysis's findings are shown in Table 4. A substantial negative connection is found in the empirical analysis of the relationship between company financial risk, as measured by Z_SCORE, and ESG performance.

The ESG_SCORE shows statistical significance in Model (1) with a coefficient of -0.2600, a standard error of 0.0849, and a p-value of 0.002. According to this finding, companies that do well in terms of ESG typically have lower Z_SCORE ratings, which indicates higher levels of financial risk. After accounting for control variables like firm size and leverage ratio, the evidence still supports Hypothesis H1.

To evaluate the validity of Hypothesis H2 regarding the enhancement of internal governance via ESG, a separate regression was conducted using ESG_SCORE as the independent variable and ICE_SCORE as the dependent variable. As displayed in Table 5, ESG_SCORE exhibits a positive and highly significant coefficient of 27.3571 (standard error = 0.8664, $z = 31.58$, $p < 0.001$). This suggests that firms with better ESG performance also tend to exhibit more effective internal control systems, reinforcing the argument for Hypothesis H2 and laying the groundwork for the mediation analysis detailed in section 5.4.

Control variables also demonstrate significance across models. Leverage shows a negative and significant effect on Z_SCORE, indicating that increased leverage levels are associated with greater financial risk. Similarly, Firm Size has a coefficient of -0.3811, which is significantly negative, suggesting that larger firms in the sample may face lower Z_SCOREs, potentially due to the elevated risk exposures associated with expansion or restructuring strategies.

Table 4 Benchmark Regression Results

Variable	Coefficient	Std. Err.	z	P> z	[95% conf. interval]
ESG_SCORE	-0.2600094	0.0849384	-3.06	0.002	[-0.4265, -0.0935]
Leverage	-18.72984	0.4624912	-40.51	0.000	[-19.6361, -17.8236]
Size	-0.3811216	0.0738158	-5.16	0.000	[-0.5258, -0.2364]
_cons	22.64436	1.497828	15.12	0.000	[19.7087, 25.5801]

Table 5 Regression Results of ESG_SCORE on ICE_SCORE

Variable	Coefficient	Std. Err.	z	P> z	[95% conf. interval]
ESG_SCORE	27.35711	0.8663911	31.58	0.000	[25.6590, 29.0552]
Leverage	-111.105	4.945418	-22.47	0.000	[-120.7978, -101.4121]
Size	17.21784	0.8244333	20.88	0.000	[15.60198, 18.8337]
_cons	180.5752	17.00033	10.62	0.000	[147.2552, 213.8952]

5.3 Robustness test

To enhance the credibility of the benchmark regression findings, this study incorporates industry fixed effects by treating industry codes (industry_num) as panel-level identifiers. Both fixed-effects and random-effects regression models

are employed to reassess the core relationships.

In the fixed-effects model (Table 6, row 1), the regression coefficient for ESG_SCORE is -0.1543, the standard error is 0.0923, the t-value is -1.67, and it is marginally significant at the 10% level ($p = 0.094$), with the direction consistent with the main regression. This result suggests that after controlling for industry heterogeneity, a higher ESG score still leads to a decrease in Z_SCORE, indicating an increase in financial risk. The control variables Leverage and Size remain significant at the 1% level, further strengthening the model's explanatory power.

The regression coefficient for ESG_SCORE in the random-effects model (Table 6, row 2) is -0.2722, the standard error is 0.0833, the z-value is -3.27, and the p-value is 0.001, indicating even greater importance. This confirms that ESG may result in increased financial risks and further supports the negative correlation between Z_SCORE and ESG performance.

A highly significant z-value of 37.84 ($p < 0.001$), a standard error of 0.798, and a coefficient of 30.19 are also displayed by the regression analysis that looks at the impact of ESG_SCORE on ICE_SCORE. The mediating mechanism suggested in Hypothesis H2 is empirically supported by this substantial positive association.

Table 6 Robustness Test Results

Model Type	ESG_SCORE	Std. Error	z/t Value	p Value
Fixed Effects (FE)	-0.1543402	0.0922826	-1.67	0.094
Random Effects (RE)	-0.2722253	0.0833434	-3.27	0.001
ICE_SCORE Regression	30.18997	0.7978451	37.84	0.000

5.4 Mediation effect

To further examine whether ESG performance indirectly affects corporate financial risk (Z_SCORE) through improvements in internal control (ICE_SCORE), this study constructs a mediation effect analysis model, which is divided into the following three steps:

(1) Model 1 (Total Effect):

$$Z_SCORE = \beta_0 + \beta_1 \cdot ESG_SCORE + \beta_2 \cdot Leverage + \beta_3 \cdot Size + \varepsilon$$

This model examines the direct impact of ESG performance on corporate financial risk.

(2) Model 2 (Mediating Path):

$$ICE_SCORE = \alpha_0 + \alpha_1 \cdot ESG_SCORE + \alpha_2 \cdot Leverage + \alpha_3 \cdot Size + \varepsilon$$

This model tests whether ESG performance affects the level of internal control (ICE_SCORE).

(3) Model 3 (Mediation Model):

$$Z_SCORE = \varphi_0 + \varphi_1 \cdot ESG_SCORE + \varphi_2 \cdot ICE_SCORE + \varphi_3 \cdot Leverage + \varphi_4 \cdot Size + \varepsilon$$

This model introduces both ESG and ICE_SCORE to examine their combined effect on corporate financial risk.

The regression analysis yields the following insights:

ESG performance and internal control show a robust and statistically significant positive correlation in Model 2. The ESG_SCORE coefficient is 27.35711 ($p < 0.001$), suggesting that companies with stronger ESG involvement are probably going to have better internal control systems. By showing that improved risk oversight and internal governance frameworks frequently accompany ESG activities, this result lends credence to the presence of a mediation mechanism.

In Model 3, the internal control variable (ICE_SCORE) also shows a significant positive impact on financial stability, as reflected by its coefficient of 0.0019591 ($p = 0.008$). This suggests that stronger internal control contributes to a higher Z_SCORE, which reflects reduced financial risk. Notably, the coefficient of ESG_SCORE increases from -0.2600 in Model 1 to 0.1006 in Model 3 and loses statistical significance ($p = 0.427$), indicating that the initial direct effect of ESG on financial risk becomes insignificant once internal control is accounted for. This shift points to a classic case of full mediation.

In conclusion, the results suggest that while companies may face initial cost pressures when implementing ESG practices, leading to increased financial risk, enhancing internal control systems allows ESG to effectively improve corporate governance and reduce risk exposure, thus validating Hypothesis H3. This mechanism highlights the dual nature of ESG's financial impact and emphasizes the need for companies to focus on the development of governance systems when advancing their ESG strategies to achieve an internal transformation of risk management.

Table 7 Mediation Effect Model Regression Results

Variable	Coefficient	Std. Err.	z	P> z	[95% conf. interval]
ESG_SCORE	0.1005791	0.126514	0.80	0.427	[-0.1474, 0.3486]
ICE_SCORE	0.0019591	0.0007426	2.64	0.008	[0.0005, 0.0034]
Leverage	-17.40929	0.8908576	-19.54	0.000	[-19.1554, -15.6631]
Size	-1.46788	0.181481	-8.09	0.000	[-1.8236, -1.1122]
cons	43.85098	3.960821	11.07	0.000	[36.0875, 51.6144]

6 Conclusion

This study uses panel data from publicly listed Chinese A-share companies from 2013 to 2022 to investigate the relationship between ESG performance, internal control effectiveness, and company financial risk. Assessing whether internal control acts as a mediating mechanism in this situation is emphasized. The findings imply that more financial risk is related with better ESG performance, which may be explained by the financial costs of ESG adoption under China's current institutional structure. At the same time, ESG engagement appears to enhance the effectiveness of internal control systems. Notably, the analysis identifies a full mediation effect, whereby internal control fully transmits the influence of ESG performance on financial risk. These results imply that ESG strategies, through improvements in governance practices, may contribute to long-term financial stability and reduced risk exposure. Considering these findings, the paper offers the following recommendations:

(1)Enterprises should be cautious of the accumulation of financial pressure when advancing their ESG strategies. Especially in the early stages of ESG implementation, companies should carefully assess the cost-benefit ratio, avoid "over-disclosure" and "greenwashing" that may lead to resource misallocation, and, when necessary, mitigate impacts through phased project implementation and enhanced financial planning.

(2)Focus on the integration of ESG and internal governance capacity. ESG should not be viewed as a "compliance obligation" or "external rating task," but should be deeply integrated with the company's internal control system. It is recommended to strengthen the optimization of control environment, risk assessment, and information disclosure mechanisms, enhancing the institutional capacity to support ESG, and achieving the transformation from "external responsibility to internal resilience."

(3)Policymakers should improve the ESG guidelines system and clarify risk preferences and incentive mechanisms. Consider offering tax incentives and green financing support for ESG compliance investments, guiding companies to steadily advance ESG initiatives while managing risks, and reducing friction between investment costs and returns.

To conclude, this study highlights a dual-pathway through which ESG performance influences corporate financial risk, offering fresh insights into both the financial outcomes and transmission channels of ESG activities. The findings contribute to the theoretical discourse while offering actionable guidance for firms striving to reconcile financial soundness with sustainability objectives. Moving forward, future studies could investigate how this relationship varies across different firm characteristics, such as ownership type, sectoral context, or stages in the corporate life cycle, to enhance the generalizability and depth of the current conclusions.

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