Corporate Financing Costs and ESG Disclosure: Evidence from Chinese A-Share Listed Companies

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ABSTRACT

The management of environmental, social, and governance (ESG) challenges by firms, which have an impact on their ability to create long-term value, is of increasing importance to investors. To inform stakeholders about their ESG performance and strategies, companies frequently disclose ESG data. Using data from China's A-share listed companies from 2013 to 2022, this study used a fixed effect model to assess how ESG information disclosure effected corporate financing costs. The results showed that the company's ESG disclosure, in particular equity funding, is related to the reduction in financing costs, and the 2018 update to the "Guidelines for Corporate Governance of Listed Companies" significantly contributed to this relationship. The study also examined the mechanism by which the publication of ESG information impacted financing costs and discovered that it decreases information asymmetry and enhanced stakeholder perception of the company. The study also demonstrated that businesses in high-profit, polluting industries had greater financing costs than those in low-pollution industries. This study emphasized the importance of incorporating ESG principles into current financial decision-making and sustainable corporate practices, as well as the value of doing so to boost social responsibility while decreasing spending.

Keywords: ESG Disclosure, Corporate Financing Costs, Equity Financing, Debit Financing, Fixed-effects Model

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INTRODUCTION

Businesses have increasingly recognized the importance of balancing financial returns with social welfare and environmental sustainability. While profits were once the sole priority, scholars have argued that long-term economic success depended on also considering social and environmental impacts (Drucker, 1974; Porter & Linde 1995). As stakeholder expectations have evolved, corporate social responsibility (CSR) and sustainable development have grown in prominence.

The concept of environmental, social, and governance (ESG) factors was first introduced by the United Nations Environment Program in 2004 to evaluate how companies managed non-financial risks and opportunities. ESG reporting is now mandatory in over ten jurisdictions worldwide as stakeholders demand greater transparency into sustainability performance. In China, guidelines published by regulatory agencies have also encouraged voluntary ESG disclosure among listed companies. For example, the 2018 Guidelines on Corporate Governance of Listed Companies by the China Securities Regulatory Commission recommended disclosing ESG risks and performance. Subsequent guidelines provided frameworks for assessing ESG practices in the banking, insurance and asset management industries.

Despite its potential for providing holistic corporate sustainability assessments, ESG disclosure remains predominantly voluntary and lacks uniform reporting standardization (Berg et al., 2022).This poses challenges as some firms struggle to effectively implement and communicate ESG strategies, increasing costs. At the same time, the benefits of ESG in facilitating sustainable growth and competitive advantages are not fully realized.

A growing body of research has examined the relationship between ESG practices and corporate financial performance or value. However, the impact of ESG disclosure itself on financing costs warrants further investigation. This study aimed to fill this gap and make two key contributions. First, it analyzed the effects of ESG disclosure, as measured through the Bloomberg data, on both total financing costs and equity financing costs. Second, it developed a novel text analysis approach to more precisely quantify disclosure levels based on ESG information frequency

relative to reporting frequency. Insights will enhance understanding of how transparency regarding non-financial factors shapes cost of capital.

LITERATURE REVIEW

ESG disclosure has gained importance for businesses in recent years. ESG disclosure is the practice of businesses telling stakeholders, such as investors, consumers, and employees, about their ESG practices. ESG disclosure and its impact on corporate financing costs has also become an increasingly important area of research in recent years. A growing body of literature has examined how ESG disclosure affects various aspects of corporate financing such as bond yields, equity costs, and institutional ownership. However, there are still gaps that warrant further investigation.

This study drew on the Signaling Theory and Stakeholder Theory to examine the mechanisms through which ESG disclosure impacts corporate financing costs. The Signaling Theory suggests that by disclosing ESG information, companies can signal their quality and commitment to sustainability, which can reduce information asymmetry and enhance their perceived creditworthiness, leading to lower financing costs. The Stakeholder Theory posits that ESG disclosure can improve a firm's relationships with its various stakeholders, including investors, lenders, and the general public, which in turn can reduce the firm's cost of capital. These theoretical frameworks provided the underpinnings for the study's investigation of how ESG disclosure affected equity and debt financing costs.

Recent scholarly investigations have demonstrated the substantial impact of ESG disclosure on corporate financing costs. Eccles et al. (2014) illuminated that Asian enterprises exhibited enhanced economic, environmental, and social sustainability performance through strategic ESG data exchange. Goss and Roberts (2020) substantiated the critical utility of ESG data for business managers seeking to optimize lending relationships and attract diverse debt financing channels.Liu et al. (2023) found that the corporate accountability and social responsibility data in the ESG system significantly affected financing costs, and he estimated the regression using a panel data model. Gonçalves et al. (2022) also found that corporate ESG performance disclosures had a considerable impact on a firm's cost of capital

and idiosyncratic risk. Cheng et al. (2022) unveiled that ESG disclosure potentially influenced sustainable growth through financial discipline mechanisms. Firms experiencing substantial financial constraints were more likely to experience sustainable growth trajectories through strategic ESG disclosure. Giese et al. (2021) meticulously documented ESG disclosure's profound implications for European corporate stock performance. Chava (2021) identified nuanced correlations between ESG disclosure and corporate bond credit spreads, with non-state-owned enterprises and companies in low-pollution, energy-efficient sectors demonstrating more pronounced credit spread reductions. Eccles et al. (2014) synthesized existing literature, concluding that comprehensive ESG data provision potentially mitigated financing costs and enhances organizational value. Ellili, (2020) found that ESG disclosure had a considerable and detrimental effect on institutional ownership, insider ownership, and the cost of financing.

Contemporary research presents nuanced perspectives regarding ESG disclosure's influence on financing expenses. Grewal et al. (2022) empirically illustrated that ESG disclosure might not consistently diminish corporate financing costs. Downar et al. (2021) conducted a comprehensive examination of United States capital markets, revealing insignificant market responses to corporate sustainability reporting. Flammer (2021) demonstrated approximately equivalent yield rates between green and traditional bonds, suggesting persistent financing cost challenges for sustainable initiatives. Albuquerque et al. (2020) discovered that positive ESG events minimally impacted corporate returns, whereas negative ESG events significantly depreciated firm valuation.

This study made two key contributions to the existing literature. First, it aimed to provide novel insights on the mechanisms through which ESG disclosure impacted the price of equity and debt financing. While prior studies have established a link between ESG disclosure and financing costs, the underlying transmission channels are not fully understood. This study sought to address this gap by developing theoretical frameworks to explain how ESG data disclosure can lower equity and debt costs. Second, it examined the differential effects of ESG disclosure on the cost of debt financing versus the cost of equity financing. Some studies have found ESG disclosure reduced both costs equally, but others showed asymmetric effects depending on the type of financing. This study systematically reviewed this

debate in the literature and aimed to provide clarity on whether and how ESG disclosure differently impacted debt versus equity financing costs.

THEORETICAL EXAMINATION AND RESEARCH HYPOTHESES

ESG Disclosure's Effect on Financing Costs

Debt finance and equity financing are the two main external funding sources for listed companies, and they both depend on how the capital provider assesses business risk and value. Capital providers have recently become aware of effective ESG practices in the areas of corporate governance, social responsibility, and environmental preservation. This greater awareness can be ascribed to the companies publishing ESG data more frequently and the availability of ESG evaluations from other organizations. As a result, to evaluate a company's value, risk, and long-term survival, investors and debt holders are increasingly includingESG disclosures in their analyses.

ESG Disclosure's Effect on Debt Financing Costs

The degree of knowledge asymmetry between the company and the lender is one factor that affects the cost of debt financing. Lenders often charge higher interest rates when borrowers have more knowledge than they have about their risks and performance in order to avoid issues with moral hazard and adverse selection. This information asymmetry can be lessened with the help of ESG disclosures, which provide a more complete and accessible information about businesses' environmental, social, and governance practices. ESG disclosures can reduce the expenses associated with data collection and verification while also enhancing lenders' capacity to predict future cash flows and default risk for a corporation. ESG disclosure can therefore help businesses obtain debt financing at a cheaper cost (Raimo et al., 2021; Eliva et al., 2021).

The ability to improve a company's reputation among stakeholders like customers, suppliers, employees, and regulators is another advantage of ESG disclosure. A solid reputation can improve a company's resilience to

adverse shocks and lessen the likelihood and severity of financial distress and legal risk. As a result of the lender's increased confidence in the company's dependability and responsibility as a result of its strong reputation, the cost of debt financing may be reduced as a result. Companies can develop a positive reputation and share it with lenders by using ESG ratings, which assess a company's performance on ESG dimensions (Maaloul et al. (2023); Wang et al., 2022).

ESG Disclosure's Effect on Equity Financing Costs

ESG disclosures lower borrowing costs by bridging the information gap between businesses and investors by clearly sharing publicly accessible information. ESG information disclosed by corporations, as well as ESG-related news and ratings provided by rating agencies, are significant signals for investors, according to the Signaling Theory and Information Asymmetry Theory. By improving the accuracy of investors' risk and value assessments and lowering the cost and effort of information gathering and analysis, this signal lowers the demand for risk premiums from investors.

The concept of "be good at yourself when you are poor and be good at both sides when you are rich" is another component of traditional Chinese culture. In this instance, proactive ESG disclosures convey to investors the company's commitment to sustainable development, reflecting the idea of a "cashable" corporation. As a result, investor preference rises and the cost of equity borrowing declines.

The Reputation Theory provides more evidence for the positive benefits of higher ESG disclosure ratings on a company's reputation. A solid reputation helps clients trust a company's brand and increases its long-term viability. It is an important form of social capital. A high ESG score can assist sustain business stability, lessen investment risk, and lessen the effects of adverse events. Therefore, a higher ESG disclosure rating can increase investor trust, lower the necessary risk premium, and lower the cost of borrowing equity.

Considering the findings, the following research hypotheses were formulated:

1. Hypothesis 1A: ESG disclosure decreases the information asymmetry between businesses and debt holders, lowering the risk premium related to loan repayments. Debt holders can more correctly predict the firm's default risk because to the reduction in information asymmetry.

2. Hypothesis 1B: ESG disclosure also narrows the knowledge gap between companies and investors, lowering risk premiums and enhancing company reputation. Increased investor trust and lower equity financing costs can both be a result of improved corporate reputation. Lower debt financing costs are therefore advantageous for businesses with higher ESG disclosure scores.

ESG Disclosure and the Costs of Debt and Equity Financing: Differential Effects

Depending on a number of variables, including the accessibility of information, risk management, and investor preferences, ESG disclosures can have a variety of effects on the costs of debt and equity financing. The information risk premium for various funding sources is influenced by these variables.

For instance, when entering into loan agreements, banks have better access to a company's confidential information, enabling them to evaluate a company's actual cash flow and potential default risk. Additionally, during the financing process, organizations are more willing to divulge sensitive information to a small number of lenders. In these situations, a third party evaluating ESG disclosures can supplement shareholders' limited information processing skills and aid in a more accurate assessment of the risks facing the company. This shows that lenders are relying increasingly on third-party evaluations and ESG disclosures.

A debt contract is a deal made between a company and a bank or other financial institution to lend the company money in order to decrease risk. Interest rates, maturity dates, and covenants are just a few of the clauses in these contracts that assist manage and reduce risk. Lenders have the authority to oversee and regulate company operations as well as defend their interests thanks to restrictive covenants in debt contracts. Banks and other financial institutions can reduce losses in the case of bankruptcy or

liquidation by using collateral clauses. Lenders more frequently utilise risk management terms in debt contracts as a result.

Unlike creditors, who are mostly worried about a company's capacity to pay back its obligations, investors are more interested in a company's long-term potential. Investors now place a greater emphasis on ESG disclosure because it can improve a company's reputation and draw in more funding. ESG disclosures can also show how a firm handles opportunities and risks related to its governance, social, and environmental performance. However, creditors could not be influenced by these elements and instead pay attention to the firm's financial health and creditworthiness. Due to this, we recommend the following:

The second hypothesis held that investors had less access to data, analysis, risk-reduction strategies, and incentives for excess profits than creditors have. As a result, they reliedmore on ESG disclosures to assess businesses. Compared to companies with low ESG disclosure ratings, companies with good ESG disclosure scores will pay less for equity financing than debt financing.

The Effect of the Updated Guidelines on ESG Disclosure

In 2018, the CSRC updated the Corporate Governance Guidelines and the Corporate Governance Report, requiring listed firms to disclose data on corporate governance, social responsibility, and the environment. This improvement increased the impact of ESG disclosure by raising awareness of how to evaluate non-financial performance and helping investors and businesses comprehend sustainability.

The revised advice placed a strong emphasis on how crucial it was, from a corporate finance standpoint, to incorporate environmental protection into business strategy and governance procedures. They created a structure for the publication of ESG data and placed a focus on the accomplishment of corporate social obligations.

The new requirements hadincreased the value of ESG information for investors and enhanced the quantity and quality of ESG-related information disclosure from the perspective of capital providers. Gaining a thorough

grasp of the dangers and possibilities a company faces is made possible by increased openness, which also helped investors analyze a firm's sustainable operations and lower information risk. The price of corporate finance could be lower as a result. Therefore, Hypothesis 3 was advanced: the updated standards increased the value of ESG information disclosure for businesses and investors, increasing its applicability. This has then significantly affected how much it costs to finance enterprises.

RESEARCH METHODOLOGY

Source of the Data

This study used a sample of A-share listed companies from the Shanghai and Shenzhen stock exchanges between 2013 and 2022 to assess the impact of ESG information disclosure on financing costs. The sample excluded companies with special designations (ST or PT), financial and insurance corporations, and companies with insufficient financial data. In total, 6015 observations were present in the dataset. To lessen the impact of extreme values, all continuous variables were favored at the upper and lower 1st percentile. The ESG ratings for the corporations were based on data from a Bloomberg database that assessed ESG disclosures in relation to a number of variables, including as climate change, air quality, water management, energy management, diversity in the workforce, employee health and safety, and board compensation and structure. Additional data was acquired from the CSMAR database.

Dependent Variables

The cost of equity capitalization (COE) is the lowest rate of return a company can receive on the stock market. In order to estimate COE, both ex-ante and ex-post projections were utilized, albeit ex-ante forecasts were preferred. The PEG model put forward by Easton & Monahan (2005) was used in this study to determine the cost of equity capitalization.

$$COE_{PEG} = \sqrt{\frac{EPS_{t+2} - EPS_{t+1}}{P_t}} \quad (1)$$

In formula (1), EPS_{t+1} is the forecast value of net earnings per share at the end of period t+1 of the company, EPS_{t+2} was expected to represent the company's net earnings per share at the end of period t+2, and P_t was the closing price of the enterprise's stock in period t.

The cost of debt financing (COD) was the minimal interest rate that a company must pay to debt holders in order to get debt financing. The cost of debt financing is commonly calculated as the interest expense divided by the sum of all short- and long-term commitments. Long-term liabilities consist of long-term borrowings due after and within a year, whereas short-term liabilities consist of short-term borrowings.

Independent Variable

ESG Disclosure: To gauge ESG transparency, Bloomberg had released an ESG score for Chinese listed companies. The fraction was multiplied by 100 to provide an index from 0 to 1.

Control Variables

The following factors that may affect the costs of corporate financing were taken into account in this study: the size of the company (SIZE), the size of the board (DSIZE), the leverage ratio (lev), the return on assets (ROA), the potential for growth of the business (GROWTH), the dual role of the chairman and CEO (DUAL), the executive financial background (FC), systematic risk (Beta), and the price-to-book ratio (MTB). Additionally, fixed effects for the year and industry were included in this analysis. Table 1 presents the values and descriptions of the variables.

Table 1: Definitions of Variables

Type of Variable	Variable Name	Variable Symbol	Definition of Variable
Dependent variable	Cost of Equity	COE	Based on a PEG model calculation
	Cost of Debt	COD	Total interest expenses / Total debt (long-term and short-term)
Independent variable	ESG Disclosure	ESG	ESG score (Environmental, Social, and Governance) / 100
Moderator variable	Policy Revision	POLICY	Takes the value 1 if the year of the policy is after 2018, otherwise 0
Control variable	Size	SIZE	Total asset natural logarithm

Type of Variable	Variable Name	Variable Symbol	Definition of Variable
Control variable	Leverage	LEV	The ratio of total liabilities to total assets at the end of the year
Control variable	Return on Assets	ROA	Net profit / Total assets
Control variable	Growth Potential	GROWTH	Rate of Main Revenue Growth
Control variable	Board Size	DSIZE	Number of board members
Control variable	Dual Role	DAUL	Equals 1 if the chairman also serves as CEO; otherwise, it equals 0.
Control variable	Financial Background of Executives	FC	Equals 1 if executives have financial background, otherwise 0
Control variable	Market-to-Book Ratio	MTB	Book value divided by equity market value
Control variable	Systematic Risk	BETA	Calculated using the previous year's daily trading data
Control variable	Year	YEAR	Dummy variable for the year
Control variable	Industry	INDUSTRY	Dummy variable for the industry

Model Specification

In order to examine the long-term implications of ESG disclosure on corporate financing costs, a fixed-effects model was used in this study. The model's specifications were as follows:

$$Cost_{i,t} = \alpha + \beta_1 ESD_{I,t-1} + \Sigma\beta Control_{i,t-1} + Year + Industry + \varepsilon \quad (2)$$

The letters "i" and "t" in Equation (2) stood for the company and the year, respectively. The response variable, "$Cost_{i,t}$," was the price of debt or equity financing for firm "i" in year "t."" The phrase "$ESG_{I,t-1}$" referred to the firm "i's" overall ESG disclosure score for the year "t-1" prior. The random disturbance term was indicated by "ε" while the control variables were denoted by "$Control_{i,t-1}$". The coefficient β_1 the main subject of this inquiry. If it was significantly unfavourable, ESG disclosure might reduce a company's financing costs.

This study used a Choice-based conjoint analysis model based on the work of Bharath et al. (2008), Jiang (2009), Raghavarao et al. (2010), and Eggers et al. (2021) to assess the various implications of ESG disclosure on

the cost of equity and debt financing. According to the precise approach, the explanatory variable was the ESG disclosure score, and the financing cost was the dependent variable. The cost of equity financing was represented by the first half of the model, and the cost of debt financing was represented by the second half. The phrase "$ESG_{i,t-1}$* D_{λ}" was provided as the interaction between the ESG disclosure score and a dummy variable. When the cost of equity financing was the dependent variable, the dummy variable D1 is set to 1, and when the cost of debt financing is the dependent variable, it was set to 0. The exact form of the model was as follows:

$$\begin{cases} Y_{it}(Cost_{\lambda it,}\lambda = 1,2) = ESG_{i,t-1} + ESG_{i,t-1} * D_{\lambda} + Control_{i,t-1} + Year + Industry + \varepsilon \\ if\ \lambda = 1, then\ \ Cost_{\lambda it} = COE, D_1 = 1 \\ if\ \lambda = 2, then\ Cost_{\lambda it,} = COD, D_2 = 0 \end{cases} \quad (3)$$

When the "ESG" interaction factor's coefficient in equation (3) was noticeably positive, it suggested that ESG disclosure had a greater impact on the price of equity financing. On the other hand, when the coefficient was highly negative, it was shown that ESG disclosure had a greater impact on the cost of debt financing.

The following regression model was developed in this study to examine how the 2018 revision of the "Guidelines" affected the relationship between ESG disclosure and financing costs:

$$Cost_{i,t} = \alpha + \beta_1 ESG_{I,t-1} + \beta_2 ESG_{I,t-1} * Policy_t + \sum \beta Control_{i,t-1} + Year + Industry + \varepsilon \quad (4)$$

The policy dummy variable "$Policy_t$" on the other hand showed whether the "Guidelines" were revised in year t. This study focused on the coefficient of the interaction term $ESG_{i,t-1}$* $Policy_t$. If the coefficient β_2 value was noticeably negative, the "Guidelines" adjustment had intensified the effect of ESG disclosure on financing costs. The earlier writing was consistent with the definitions of other variables.

Descriptive Statistics

For the variables, Table 2 gives descriptive statistics. The standard deviations for the sample companieswere 0.051 and 0.048, respectively, and the average costs of debt and equity financing were 0.117 and 0.061, respectively. This implied that although borrowing costs differed amongst firms, they were often within a reasonable range. With an average ESG score of 0.212 and a standard deviation of 6.902, Chinese enterprises had low overall ESG scores and significant company-to-company variation. The outcomes of the descriptive analysis of the control variables agreed with those of past studies.

Table 2: Descriptive Statistics of Variables

Variable	Mean	Standard Deviation	Median	Minimum	Maximum
Equity Financing Cost	0.117	0.051	0.108	0.019	0.301
Debt Financing Cost	0.061	0.048	0.054	0.022	0.552
ESG Disclosure	0.212	6.902	0.199	0.870	0.513
Company Size	23.256	1.503	23.125	19.017	28.014
Leverage	0.495	0.214	0.482	0.034	1.710
Return on Assets	0.026	0.079	0.030	-0.732	0.251
Growth Ability	0.211	7.821	-0.101	-78.755	59.703
Board Size	8.723	1.901	9.112	0.000	19.000
Dual Role	0.311	0.470	0.000	0.000	1.000
Financial Background of Executives	0.289	0.451	0.000	0.000	1.000
Market-to-Book Ratio	0.673	0.271	0.663	0.057	1.304
Systematic Risk	1.601	0.299	1.103	0.049	2.302

EMPIRICAL RESULTS AND ANALYSIS

ESG Disclosure's Effect on Corporate Financing Costs

Table 3 of the empirical analysis displays the regression results for the effect of company ESG disclosure on financing costs. For the findings of the univariate regression on the costs of debt financing, see column (1); for the control variables, see column (2). Columns (3) and (4), respectively, show comparable findings for the cost of equity financing both with and without control factors.

The findings indicated that the debt and equity financing costs for ESG disclosure had substantial negative coefficients at the 5% and 1% levels. This implied that lower funding costs were related to increased ESG disclosure. The results provided credence to the idea that corporate ESG disclosure can lower borrowing costs. This showed that in order for investors to evaluate the risk and value of a firm, ESG-related information is essential. Positive signals are sent to investors by higher ESG scores, which also lower the cost of equity financing. Additionally, they can lower information risk and boost investor faith in the business's long-term viability and worth, which will lower financing costs.

Columns (5) and (6) in Table 3 display the outcomes of including control variables. The interaction term's coefficient was still positive and statistically significant at the 1% level. This implied that the extent of ESG disclosure was important. It is more difficult for shareholders to effectively estimate organizational risk and value than it is for banks and other financial organizations because they have less access to information and may not be as skilled at processing and analyzing it. Shareholders can access efficient information channels and expert research to assess the investment worth of the company thanks to third-party ESG ratings. As a result, shareholders are increasingly aware of and susceptible to influence from ESG-related information. A high ESG disclosure score contributes to the company's positive image, improving its value and, in turn, investor confidence in future business growth, lowering the necessary risk premium. The empirical analysis highlighted the significance of ESG-related information for investors and its potential to lower corporate financing costs by demonstrating that ESG disclosure had a considerable negative influence on financing costs.

Table 3: The Effect of Disclosure of ESG Information on Corporate Financing Costs

Variable	Debt Financing Cost		Equity Financing Cost		Impact Difference	
	1	2	3	4	5	6
	-0.0087*	-0.0212**	-0.0349***	-0.0350***	-0.1701***	-0.1472***
	(-1.721)	(-2.242)	(-6.899)	(-5.701)	(-67.899)	(-30.011)
					0.2790***	0.2747***
					(197.04)	(106.21)
		0.0003		-0.0023***		-0.0002
		(-0.468)		(-6.601)		(-0.169)

Variable	Debt Financing Cost		Equity Financing Cost		Impact Difference	
		-0.0026		0.0088***		-0.0070
		(-0.829)		(-3.463)		(-0.514)
		-0.0211***		-0.0371***		-0.0032*
		(-2.623)		(-5.112)		(-1.799)
		-0.0002**		-0.0002*		-0.0026
		(-2.218)		(-1.742)		(-0.866)
		0.0004		0.0007***		-0.0002
		(1.599)		(2.873)		(-0.814)
		-0.0013		0.0003		0.0056
		(-1.098)		(0.198)		(1.072)
		0.0003		-0.0007***		-0.0007
		(1.289)		(-4.275)		(-0.910)
		0.0004		-0.0076***		-0.0025**
		(0.270)		(-4.820)		(-2.260)
		-0.0006		0.0236***		0.0196***
		(-0.480)		(13.79)		(67.061)
Industry/Year	Control	Control	Control	Control	Control	Control
Constant Term	0.0221***	0.0133	0.0940***	0.120***	0.0601***	0.0729***
	(20.37)	(1.161)	(85.35)	(12.60)	(119.53)	(9.876)
Sample Size	6015	6015	6015	6015	6015	6015
	0.0490	0.141	0.0392	0.231	0.661	0.702

Note. The values in parentheses represent clustered t-values at the company level. *** , ** , and * indicate significance levels at 1%, 5%, and 10%, respectively.

Corporate Financing Costs and ESG Disclosure: The Impact of the 2018 Guidelines Revision

Table 4 displays the regression results for the effect of the revised criteria on the relationship between corporate ESG disclosure and financing costs. The coefficients of the interaction term are notably negative at the 1% level for both debt and equity financing charges. This shows that the updated criteria are what led to the improved impact of corporate ESG disclosure on financing costs.

The test results supported the premise that increased attention to ESG management and performance was a result of the amended guideline, which was influenced by external government direction. It elevated corporate governance, ESG performance disclosure, and environmental protection to priority business operations. Because of this, businesses are urged to aggressively enhance their ESG management and information disclosure.

Additionally, the updated advice offered useful ESG data to external investors, empowering them to make wise investment choices. It made it easier to estimate the return on a company's investment and aided investors in evaluating a company's long-term performance. Therefore, the updating of the rules is crucial in supporting investors in using ESG data to assess the investment value of firms, promoting the disclosure of ESG-related data, and encouraging enterprises to follow ESG management principles.

Table 4: The Effect of ESG Disclosure on the Costs of Corporate Financing: The Role of the 2018 Guidelines Revision

Variable Name	Debt Financing Cost		Equity Financing Cost	
	(1)	(2)	(3)	(4)
	-0.0037	-0.0035	0.0260	0.019
	(-0.568)	(-0.536)	(0.678)	(1.130)
	-0.0062***	-0.0048***	-0.0714***	-0.0602***
	(-3.020)	(-3.229)	(-33.382)	(-15.70)
Control Variables	Uncontrolled	Controlled	Uncontrolled	Controlled
Industry/Year	Controlled	Controlled	Controlled	Controlled
Constant	0.0229***	0.0125	0.0880***	0.0837***
	(19.124)	(1.083)	(79.819)	(10.340)
Sample Size	6015	6015	6015	6015
	0.143	0.145	0.151	0.315

Note. t-statistics are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Robustness Tests

In this study, the robustness of the findings was tested by remeasuring the explanatory variables using text analysis. Python technology was used to track the frequency of terms associated with environmental, social, and governance issues in annual reports and social responsibility reports from 2013 to 2022. By dividing the total number of words by the frequency of the pertinent word, the quantity of ESG disclosure was calculated.

The Global Reporting Initiative (GRI), the Environmental, Social, and Governance Reporting Guidelines, ISO 26000, and the rating systems of several ESG rating databases were all taken into consideration when developing the keyword dictionary framework. It comprised of 12 auxiliary indicators in addition to the three primary ones: corporate governance, social

responsibility, and environmental responsibility. A web crawler program was created to download annual reports and reports on social responsibility, and then 220 were chosen randomly to study. It was assessed what percentage of the report's words were used for ESG disclosure.

The remeasured ESG disclosure indicators were then used as the explanatory variables, and regression analysis was carried out. The findings were in line with those in the preceding section and lentsupport to the conclusions about the effect of ESG disclosure on financing costs. The findings were more reliable and the connection between financing costs and the disclosure of ESG information was strengthened thanks to this robustness test utilizing textual analysis. A generalized least squares (GLS) measurement of equity financing costs and a division of net finance charges by total liabilities used in the study served as stand-ins for the dependent variable, respectively. The results of a second regression study were consistent with those of earlier ones.

Discussion of Endogeneity Issues

To address the endogeneity problem and guarantee the validity of the results, two extra tests were run in this study.

In the first test, substitute measurements were used in place of explanatory factors. The debt financing cost variable was calculated by dividing net financing expenses by total liabilities, whereas the equity financing cost variable was calculated using the generalized least squares (GLS) approach. These surrogate variables were used in regression analyses, and the results were consistent with earlier findings.

The second test made use of instrumental variables to attempt to explain any possible endogeneity between ESG disclosures and financing costs. The annual industry average ESG score and Confucian culture were chosen as the independent variables. These factors were connected to ESG disclosure but not directly to financing costs. ESG disclosure can improve Chinese listed businesses' financing costs by decreasing those costs, according to empirical data from regression analysis utilizing instrumental variables, which revealed that the coefficient of ESG disclosure was negative.

The study improved the validity and reliability of its findings by conducting these robustness tests and resolving any endogeneity problems, hence arguing in favor of a positive correlation between financing costs and ESG disclosures.

The Effect of ESG Disclosure on the Cost of Financing: A Path Analysis ESG Disclosure, Information Asymmetry, and Financing Costs

Investors are unable to completely comprehend the company's true operational conditions because of information asymmetry. Investors demand larger returns because of severe information asymmetry, which raises the cost of funding for businesses. Allocating resources to ESG projects in a scenario when a company's overall resources are constrained might convey to investors that the company's financial health and operational performance are strong. The Signaling Theory states that ESG information disclosure can successfully address the issue of information asymmetry by assisting investors in assessing the company's worth and potential dangers in the future. This will lower the necessary rate of return and lower the cost of financing. Considering this, the following regression model was created to investigate whether disclosing ESG information had the effect of lowering financing costs through the reduction of information asymmetry:

$$ABSDA_{i,t} = \alpha + \beta_1 ESG_{i,t\text{-}1} + \Sigma\beta Control_{i,t} + \varepsilon \quad (5)$$

$$\text{Cost}_{i,t} = \alpha + \beta_1 ESG_{i,t\text{-}1} + \beta_2 ABSDA_{i,t} + \Sigma\beta Control_{i,t\text{-}1} + \varepsilon \quad (6)$$

While model (6) also considered information asymmetry and further investigated the influence of ESG information disclosure on financing costs, model (5) examined the impact of ESG information disclosure on information asymmetry. If in model (5) was considerably different from zero, it implied that ESG information disclosure had a considerable impact on information asymmetry, and model (6) continued the regression analysis. This is known as the mediation effect regression approach. Information asymmetry is a complete intermediary variable between the disclosure of ESG information and financing costs if in model (6) was significantly different from zero and _1 was not significant. When both β_1 and β_2 were statistically distinct from zero, information asymmetry may be acting as a partial mediator.

Following Chowdhury et al. (2018), information asymmetry factors were calculated using absolute values of discretionary accruals (ABSDA). The greater the absolute value of this indicator, which measured how much managers manipulated profits, the greater the degree of information asymmetry between capital market investors and corporations. Regression analysis was performed using a modified Jones model (Dechow et al., 1995), with estimated residuals matching to discretionary accruals.

ESG information disclosure was considerably negative at 5%, as shown in column (1) of Table 5, which suggested that the decreased knowledge asymmetry between businesses and outside investors was a result of greater quality ESG information disclosure. After considering information asymmetry, columns (2) and (3), respectively, listed the effects of ESG information disclosure on debt and equity financing costs. The ESG information disclosure coefficient and information asymmetry coefficient were -0.0160 and -0.0271, respectively, which were both less than the ESG information disclosure coefficient in model (2). This showed that information asymmetries played a role in mediating the effect of ESG disclosure on financing costs. The findings of this study implied that companies' disclosure of ESG data may encourage investors, lower the risk premium brought on by information asymmetry, and consequently lower financing costs.

Table 5: ESG Information Disclosure's Effect on Reducing the Cost of Corporate Financing: A Path Analysis

Variable	Information Asymmetry Path			Corporate Reputation Path		
	(1)	(2)	(3)	(4)	(5)	(6)
	Information Asymmetry	Debt Financing Cost	Equity Financing Cost	Corporate Reputation	Debt Financing Cost	Equity Financing Cost
	-0.0321**	-0.0160**	-0.0271***	0.2801**	-0.0098**	-0.0140**
	(-2.156)	(-2.238)	(-4.230)	(-2.120)	(-1.991)	(-2.412)
		0.0046**	0.0131**			
		(1.913)	(2.061)			
					-0.0025***	-0.0036**
					(-3.370)	(-3.521)

Variable	Information Asymmetry Path			Corporate Reputation Path		
Control Variables	Control	Control	Control	Control	Control	Control
Industry/Year	Control	Control	Control	Control	Control	Control
Constant	0.0660**	0.0130	0.120***	-0.0661	-0.0110	0.0598***
	(-2.331)	(-1.067)	(12.80)	(-0.672)	(-1.331)	(-7.35)
Sample Size	6015	6015	6015	6015	6015	6015
	0.055	0.150	0.228	0.761	0.180	0.273

Note. t-statistics are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

ESG Disclosure, Reputation Effect, and Financing Cost

In this section of the study, we examined how ESG disclosures, financing costs, and firm reputation were related. Implementing ESG ideas and disclosing pertinent data can enhance a company's reputation, raise brand awareness, and influence public perception. Reputation was viewed in the Reputation Theory as a valuable corporate resource that increased a firm's allure. It is essential for establishing market credibility and trust, which attracts investors via social networks (Mishina et al., 2010). A solid reputation also functioned as a sort of insurance that lesseneds the negative effects of unfavorable events on the firm, enhanced investors' view of the viability of the company, and lowereds the risk of debt.

The study used regression models to examine this association. While model (7) examined the influence of ESG disclosure on business reputation, model (8) examined the impact of ESG disclosure on financing costs while controlling for corporate reputation. The methodology used in mechanism testing was like that of earlier research. Data from Fortune's (Chinese translation) list of the "Most Admired Chinese Companies" was used to gauge corporate reputation. Give the corporation a value of 1 if it was included in the ranking; otherwise, given a value of 0.

$$Repu_{i,t} = \alpha + \beta_1 ESG_{i,t\text{-}1} + \Sigma\beta Control_{i,t} + \varepsilon \quad (7)$$

$$\text{Cost}_{i,t} = \alpha + \beta_1 ESG_{i,t\text{-}1} + \beta_2 Repu_{i,t\text{-}1} + \Sigma\beta Control_{i,t\text{-}1} + \varepsilon \quad (8)$$

ESG disclosure was notably negative at the 5% level, according to the data in column (4) of Table 5, which suggested that greater ESG disclosure can enhance business reputation. While accounting for corporate reputation, the ESG disclosure regression findings for debt and equity financing costs are displayed in columns (5) and (6), respectively. ESG disclosure and business reputation had lower model (2) coefficients of -0.0098 and -0.0140, respectively. This showed that firm reputation may act as a partial mediating factor in the relationship between ESG disclosure and financing costs. According to the study's findings, revealing ESG data can improve a company's brand, draw in outside funding, and raise investor expectations for operational stability while lowering risk assessments.

ESG disclosure can enhance corporate reputation and save financing costs, according to studies. Increasing ESG disclosure can boost reputation, draw investors, lessen risk perception, and ultimately lower financing costs, as claimed in the intermediate function of corporate reputation.

The Effect of ESG Disclosure on Firm Financing Costs in Different Scenarios: Robustness Tests

A. Based on the sensitivity of investors to industry environments

This section of the study examined how ESG disclosures impacted borrowing costs for businesses engaged in a variety of industries with varied auditors. The sample companies were split into industries that produced serious pollution and industries that do not produce serious pollution based on their sensitivity to the environment. The goal was to ascertain whether there are any variations in how ESG disclosures affected financing costs across these various sector groups. Results are listed in Table 6.

Table 6: Impact of Investor Sensitivity to Industry Environment

Variable	Debt Financing Cost			Equity Financing Cost		
	Group Regression			Group Regression		
	(1) Heavy Pollution Industry Group	(2) Non-Heavy Pollution Industry Group	(3) Interaction Term Test	(4) Heavy Pollution Industry Group	(5) Non-Heavy Pollution Industry Group	(6) Interaction Term Test
	-0.0269***	-0.0160**		-0.0420***	-0.0330***	
	(-2.753)	(-2.371)		(-3.814)	(-4.280)	
			-0.0150*			-0.0300***
			(-1.744)			(-3.120)
Control Variables	Control	Control	Control	Control	Control	Control
Industry/Year	Control	Control	Control	Control	Control	Control
Constant	-0.0088	0.0212**	0.0138*	0.127***	0.124***	0.120***
	(-0.661)	(2.501)	(1.930)	(7.113)	(10.49)	(14.71)
Sample Size	2406	3609	6015	2406	3609	6015
	0.161	0.142	0.139	0.232	0.231	0.221

Note. t-statistics are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

We utilized the data in Table 6 to research how ESG disclosure affected financing costs between groups of industries that produce a lot of pollution and groups of industries that did not produce a lot of pollution. The distinctions were contrasted as follows:

Debt financing costs: The significantly polluting industrial group's ESG disclosure coefficient was -0.0269, which wasstatistically significant at the 1% level. This showed that reduced debt financing costs were related to increasing ESG disclosure for this particular group of companies.

The non-heavy polluting industrial group's ESG disclosure coefficient was -0.0160, which was statistically significant at the 5% level. This showed that higher ESG disclosure was similarly linked to lower borrowing costs for this group of companies, though the association was not as strong as it was for companies in the significantly polluting industry group.

The difference in coefficients (-0.0269 vs. -0.0160) showed that heavily polluting business groups were more likely to profit from the potential of ESG disclosure to lower debt financing costs than non-heavy polluting sector groups.

Cost of equity financing: The significantly polluting industrial groups' ESG disclosure coefficient was -0.0420, which was statistically significant at the 1% level. This showed that lower equity financing costs were related to increasing ESG disclosure for this particular group of companies.

The non-heavy polluting industrial group's ESG disclosure coefficient, which was -0.0330, was likewise statistically significant at the 1% level. This implied that lower equity financing costs were related to increased ESG disclosure for companies in this group. According to the difference in coefficients (-0.0420 vs. -0.0330), heavily polluting business groups may gain more from ESG disclosure than non-heavy polluting sector groups in terms of lowering equity financing costs.

The observed differential effects of ESG disclosure across industry groups warranted deeper theoretical examination. Several complementary theoretical frameworks helped explain why heavily polluting industries experienced stronger benefits from ESG disclosure:

First, from an information asymmetry perspective, heavily polluting industries faced greater environmental uncertainties and regulatory risks that created significant information gaps between firms and capital providers. ESG disclosure had greater marginal value in reducing these information asymmetries in high-environmental-risk industries compared to sectors with lower environmental exposure (Clarkson et al., 2013; Plumlee et al., 2015). When a heavily polluting firm provides transparent ESG information, it significantly reduces investor uncertainty about potential environmental liabilities, regulatory compliance, and risk management strategies.

Second, the Legitimacy Theory provides insights into the differential effects. Heavily polluting industries experienced stronger social license pressures and faced greater legitimacy challenges regarding their environmental impacts (Patten, 2002; Cho and Patten, 2007). ESG disclosure served as a critical legitimacy-building tool for these firms, potentially yielding greater financing benefits when investors perceived the disclosure as enhancing organizational legitimacy. The stronger coefficient for heavily polluting industries suggested that ESG disclosure more effectively addressed their heightened legitimacy needs.

Third, the Stakeholder Theory helps explain the industry differences through the lens of stakeholder salience. Environmental stakeholders (regulators, environmental NGOs, community groups) are particularly attentive to heavily polluting industries, creating stronger external pressures (Mitchell et al., 1997). Comprehensive ESG disclosure helps these firms demonstrate responsiveness to stakeholder concerns, potentially reducing stakeholder-related risk premiums that investors apply to their securities.

The underlying mechanisms driving the stronger ESG disclosure effected in heavily polluting industries likely operate through several channels:

1. Risk Premium Differential: Investors typically applied higher environmental risk premiums to heavily polluting industries due to perceived regulatory, litigation, and reputational risks. Our findings suggested that ESG disclosure was more effective at reducing these risk premiums in environmentally sensitive sectors compared to less environmentally impactful industries. The quantitative difference in coefficients (approximately 0.0109 for debt financing and 0.0090 for equity financing) represented the differential risk premium reduction.

2. Signaling Intensity: The signaling value of ESG disclosure appeared stronger in heavily polluting industries. When firms in environmentally sensitive sectors voluntarily disclosed detailed ESG information, this signalled stronger environmental risk management capabilities compared to similar disclosures from firms in less environmentally sensitive industries. This finding aligned with Connelly et al. (2011), who suggested that signals had greater impact when addressing more salient concerns.

3. Disclosure Credibility Effect: The credibility of ESG disclosure may be evaluated more stringently for heavily polluting industries, but when deemed credible, yielded greater financing benefits. This potentially explains why the ESG disclosure coefficient was more strongly negative for these industries, as credible disclosure more effectively counteracts the environmental risk perception.

These industry-specific findings have important implications for market participants and corporate strategy. For firms in heavily polluting industries, our results suggest that comprehensive ESG disclosure represents a particularly valuable financial strategy that can yield meaningful financing cost reductions (estimated at 2.69 basis points for debt financing and 4.20 basis points for equity financing per standard deviation increase in disclosure quality).

The differential impact across industry groups also suggested that capital markets didnot uniformly price ESG information, but rather incorporated industry context in their assessment of disclosure value. This nuanced market response indicated sophisticated information processing by investors who recognized that environmental transparency had varying relevance across different industry settings.

In general, the financing cost and ESG disclosure of heavily polluting business groups and non-heavy polluting industry groups had a poor association. However, the cost of equity and loan financing may be slightly more impacted by industrial groupings that produce large amounts of pollution.

B. Based on the heterogeneous impact of auditor types

An external monitoring and assurance system for corporate governance is independent auditing. They offer independent third-party verification of the accuracy of a company's disclosures and give investors "insurance" data to evaluate the veracity of the disclosures. This study grouped corporations based on whether or not their auditors are from one of the "Big Four" audit firms and investigated whether investors' perceptions of a company's risk differ depending on how credible the information disclosure is. Table 7 displays the outcomes.

Table 7: Heterogeneous Impact Based on Whether the Auditor is from the "Big Four"

Variable	Debt Financing Cost			Equity Financing Cost		
	Group Regression			Group Regression		
	(1) "Big Four" Auditor Group	(2) Non-"Big Four" Auditor Group	(3) Interaction Term Test	(1) "Big Four" Auditor Group	(2) Non-"Big Four" Auditor Group	(6) Interaction Term Test
	-0.061**	-0.0140*		-0.0621***	-0.0268*	
	(-2.380)	(-1.701)		(-4.080)	(1.992)	
			-0.0125*			-0.0150**
			(-1.941)			(-1.987)
Control Variables	Control	Control	Control	Control	Control	Control
Industry/Year	Control	Control	Control	Control	Control	Control
Constant	0.0811*	0.00851	0.0112	0.110	0.129***	0.0515***
	(1.740)	(0.688)	(1.511)	(1.154)	(14.04)	(18.40)
Sample Size	568	5447	6015	568	5447	6015
	0.670	0.138	0.148	0.576	0.243	0.161

Note. t-statistics are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

We may compare and analyze the heterogeneity of impact based on whether the auditors are from the Big Four or non-Big Four firms using the information supplied in Table 7's data. The analysis was as follows:

Debt financing expenses: The "Big Four" auditor groups' ESG disclosure coefficient wasa -0.061, which was statistically significant at the 5% level. Thus, increased ESG disclosure was linked to lower debt financing costs for businesses certified by the "Big Four" auditors.

Non-Big Four auditor groups had an ESG disclosure coefficient of -0.0140, which was statistically significant at the 10% level. This showeds that more ESG disclosure and lower debt financing costs were both related, though perhaps not to the same extent as in the case of companies audited by the "Big Four" audit firms. Companies audited by the "Big Four" auditors appeared to have a proportionate rise in the impact of ESG disclosure on lowering debt financing costs based on the difference in coefficients (-0.061 vs. -0.0140).

Equity Financing Cost: The "big four" auditor groups' ESG disclosure coefficient, which was -0.0621, was statistically significant at the 1% level. This implied that increased ESG disclosure was linked to lower equity financing costs for companies audited by the "Big Four" auditors. The non-"Big Four" auditor groups' ESG disclosure coefficient was -0.0268, which was statistically significant at the 10% level. This implied that lowered equity financing costs for companies audited by non-Big Four auditors were also a result of increasing ESG disclosure.

The effectiveness of ESG disclosure in lowering the cost of equity financing may be somewhat improved for companies audited by the "big four" auditors, as indicated by the difference in coefficients (-0.0621 vs. -0.0268).

The substantial difference in ESG disclosure effectiveness between Big Four and non-Big Four audited firms can be explained through several theoretical lenses. First, the Signaling Theory suggests that high-quality auditors enhanced the credibility of corporate disclosures by providing a more reliable verification mechanism (DeAngelo, 1981). The larger coefficient magnitudes for Big Four audited firms (-0.061 vs. -0.0140 for debt; -0.0621 vs. -0.0268 for equity) suggested that the market perceived ESG disclosures verified by prestigious auditors as more reliable signals of actual ESG performance.

Second, the Agency Theory provides insights into why Big Four audited ESG disclosures might yield greater financing benefits. Big Four auditors, with their stronger reputational capital and more extensive resources, likely provide more effective monitoring that reduces agency costs between managers and capital providers (Jensen and Meckling, 2019). This enhanced monitoring role appeared to translate into greater investor confidence in ESG disclosures, resulting in more substantial financing cost reductions.

The interaction between auditor quality and ESG disclosure effectiveness suggested a complementary relationship whereby high-quality auditing amplified the value of transparency. This complementarity was particularly evident in the debt market, where the coefficient difference between Big Four and non-Big Four groups (-0.047) was especially

pronounced, suggesting debt providers were more sensitive to verification quality than equity investors.

Both the Big Four and non-Big Four audit groups found a negative correlation between financing costs and ESG disclosures overall. The size of this effect in terms of loan and equity financing costs was probably going to be relatively high for companies audited by the "Big Four" auditors.

C. Heterogeneous Test Based on Corporate Profitability

This section of the study examined how different ESG disclosures had an impact on financing costs based on firm profitability. The study focused on the question of whether financing costs for less successful companies might be decreased by good ESG disclosure. In order to assess the effect of ESG disclosure on financing costs at various degrees of profitability, the sample companies were categorized according to the median return on total assets using group tests and cross-products. Table 8 displays the findings.

Table 8: Heterogeneous Impact Based on Corporate Profitability

Variable	Debt Financing Cost			Equity Financing Cost		
	Group Regression		(3) Interaction Term Test	Group Regression		(6) Interaction Term Test
	(1) High Profitability Group	(2) Low Profitability Group		(1) High Profitability Group	(2) Low Profitability Group	
	-0.0170**	-0.0097		-0.0341***	-0.0035	
	(-2.451)	(-1.448)		(-3.643)	(-0.470)	
			-0.0061***			-0.0121**
			(-2.243)			(-2.579)
Control Variables	Control	Control	Control	Control	Control	Control
Industry/Year	Control	Control	Control	Control	Control	Control
Constant	0.00772	0.0151*	0.0327*	0.122***	0.0671***	0.110***
	(0.848)	(1.720)	(1.812)	(8.765)	(7.122)	(12.03)
Sample Size	2980	3035	6015	2980	3035	6015
	0.150	0.132	0.695	0.240	0.533	0.221

Note. t-statistics are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

We can compared and examined the heterogeneity of affects on businesses' profitability based on the information presented. The analysis was as follows:

Debt financing costs: The high profitability group's ESG disclosure coefficient was -0.0170, which was statistically significant at the 5% level. Therefore, higher ESG disclosure was linked to lower debt financing costs for highly profitable companies. The poor profitability group's ESG disclosure coefficient was -0.0097, although at conventional levels, it was not statistically significant. This implied that there was not a lot of data to support the claim that ESG disclosure influenced the cost of debt financing for low-profitability companies. According to the difference in coefficients (-0.0170 vs. -0.0097), high-profit enterprises were more likely to profit from the possible reduction in debt financing costs associated with ESG disclosure than low-profitability firms.

Equity financing cost: The high profitability group's ESG disclosure coefficient, which was -0.0341, was statistically significant at the 1% level. This implied that greater ESG disclosure was linked to lower equity financing costs for highly profitable companies.

The low profitability group's ESG disclosure coefficient, which was -0.0035, was not statistically significant. This implied that there was little proof that ESG disclosure affected how much equity financing was required for low-profitability companies.

According to the difference in coefficients (0.0341 vs. -0.0035), high-profit companies are more likely to gain from the potential of ESG disclosure to lower equity financing costs than low-profit companies.

The stark contrast in ESG disclosure effectiveness between high and low profitability firms can be understood through the lens of Resource-based Theory and Signaling Theory. According to the Resource-based Theory, firms with superior financial performance possessed the resources necessary to develop and implement high-quality ESG initiatives (Waddock & Graves, 1997). Consequently, ESG disclosures from profitable firms likely reflected substantive ESG investments rather than mere symbolic gestures, explaining the stronger market response.

From a signaling perspective, ESG disclosure operated differently in high versus low profitability contexts. For high-profitability firms, ESG disclosure served as a complementary signal that reinforced market

perceptions of managerial quality and organizational capability (Spence, 1973). Conversely, for low-profitability firms, ESG disclosure might be viewed with skepticism as potentially diverting resources from core business needs or representing "greenwashing" rather than genuine commitment.

These findings carry important implications for a corporate disclosure strategy. For high-profitability firms, comprehensive ESG disclosure represented an effective strategy for further reducing capital costs. The significant coefficients (-0.0170 for debt; -0.0341 for equity) suggested meaningful economic benefits from enhanced transparency.

For low-profitability firms, however, our results suggested that ESG disclosure alone may not yield the same financing benefits. These firms might need to first establish financial credibility before investors will significantly reward ESG transparency. The non-significant coefficients for low-profitability firms suggested that capital markets applied different evaluation criteria to ESG information depending on the firm's financial health.

The interaction term results (ESG Disclosure × ROA) further confirmed that profitability positively moderated the relationship between ESG disclosure and financing costs, suggesting a "virtuous circle" whereby financial success enhanced the value of non-financial disclosure. This finding aligned with the "good management theory" that posited that financially successful firms can better afford and implement substantive ESG practices (Orlitzky et al., 2003).

Overall, the data demonstrated that high-margin businesses were more impacted by ESG disclosure's capacity to lower financing costs than low-profitability businesses. For debt financing costs, ESG disclosure and fees for high-profit enterprises had a significant negative association, but there was no statistically significant relationship for low-profitability firms. The cost of equity financing was also significantly impacted by ESG disclosure for highly lucrative businesses, but not for lowly profitable ones.

Examining the three dimensions of heterogeneity collectively revealed important patterns in how ESG disclosure effectiveness varied across different firm contexts. The most pronounced effects were observed in

environmentally sensitive industries, firms audited by Big Four auditors, and highly profitable companies. These findings suggested that ESG disclosure effectiveness was contingent on: (1) the salience of environmental concerns to the firm's operations, (2) the credibility of information verification mechanisms, and (3) the firm's financial capability to implement substantive ESG practices.

The varying coefficients across these dimensions suggested that capital markets applied sophisticated evaluation frameworks to ESG information, rather than treating all disclosures equally. Notably, the differential effects were generally stronger for equity financing than debt financing, suggesting equity investors may be more sensitive to these contextual factors when pricing ESG information.

These heterogeneity analyses extended beyond simply documenting that ESG disclosure affected financing costs and provided nuanced understanding of when and why this relationship was stronger or weaker. The findings contribute to the growing literature on the contextual factors that moderate ESG disclosure effects, moving beyond the question of whether ESG disclosure matters to understanding under what conditions it matters most.

DISCUSSIONS

The findings provided several theoretical and practical implications. Regarding the relationship between ESG disclosure and financing costs, the results corroborated prior studies that found transparency into non-financial risks and performance can lower the cost of capital (Eccles et al., 2014; Dhaliwal et al., 2011). By reducing information asymmetry, disclosure improved investor confidence and lowers perceived risk (Healy and Palepu, 2001).

Our results indicated that pollution-intensive industries experienced greater benefits from ESG disclosure, suggesting sensitivity to environmental issues varied significantly across sectors. Specifically, our heterogeneity analysis showed that ESG disclosure significantly reduced financing costs for high-pollution industries, while the effect was weaker in low-pollution

industries. Notably, the negative effect of disclosure on equity financing costs was more pronounced than for total financing, suggesting transparency particularly impacts the shareholder base. This contrasts with Berg et al., (2022) who did not distinguish between debt and equity markets. The results also indicated that pollution-intensive industries experienced greater benefits from disclosure, implying sensitivity to environmental issues varies across sectors.

These findings merit deeper consideration of the underlying mechanisms. For pollution-intensive industries, ESG disclosure likely provided a stronger signaling effect by addressing the heightened environmental risks that investors associate with these sectors (El Ghoul et al., 2018). The information asymmetry reduction through ESG disclosure appeared more valuable in these high-risk contexts. From a practical perspective, the findings emphasized the importance of standardized and mandatory ESG reporting frameworks. Currently disclosure remains fragmented without common definitions or metrics (Eccles and Klimenko, 2019). Mandating disclosure could help level the playing field and allow for more accurate company comparisons (Dhaliwal et al., 2011).

For corporate managers, particularly those in pollution-intensive industries, ESG disclosure is not just a compliance measure but a strategic financial tool. Our findings suggested that firms in these sectors can significantly lower their financing costs by adopting more transparent ESG reporting practices. This includes not only providing comprehensive environmental impact data but also demonstrating proactive sustainability initiatives.

For investors, these results highlight the importance of incorporating industry context when evaluating ESG disclosures. Our findings suggested that investors should place greater emphasis on ESG transparency in high-pollution sectors, where the impact on financial risk and cost of capital is most pronounced.

For policymakers, our findings suggested that disclosure regulations may need to consider industry-specific factors rather than adopting a one-size-fits-all approach.

The results also highlighted the need to consider both financial performance and ESG practices for a holistic evaluation of corporate sustainability. While disclosure impacts costs, profitability remains fundamental to investor decisions (Eccles et al., 2014).

CONCLUSIONS

This study investigated the relationship between ESG disclosure and corporate financing costs for Chinese listed companies from 2013 to 2022. The key findings demonstrated that enhanced ESG disclosure was associated with lower financing costs, particularly for equity funding, by reducing information asymmetry and improving stakeholder perception, thereby decreasing the risk premium demanded by investors. This added to evidence linking transparency into non-financial risks and performance to the cost of capital and underscored the importance of standardized and mandatory ESG reporting frameworks from both theoretical and practical perspectives.

This study made contributions through the novel text analysis approach and examination of differential effects across equity and debt markets as well as industry groups. The industry-specific analysis contributed to the growing literature on contextual factors that moderate the relationship between ESG performance, disclosure, and financial outcomes.

However, limitations include the cross-sectional research design and focus on a single country. Future work could utilize longitudinal or experimental methods and expand the sample internationally to further validate these findings. Further research could also explore how firms in different industries tailored their ESG disclosure strategies to maximize financial benefits, and whether certain ESG disclosure dimensions (e.g., environmental vs. social vs. governance) played a more significant role in reducing financing costs. Overall, the study underscored the value of ESG disclosure in facilitating more efficient capital allocation towards sustainable businesses while highlighting important nuances in how this relationship manifests across different market segments and industry contexts.

In conclusion, this study highlighted the significance of ESG disclosure for corporate access to affordable financing and sustainable investment

decision making. As sustainability issues rise up the global agenda, transparency into non-financial performance will be increasingly critical for companies to demonstrate their resilience and attract responsible capital. Standardized reporting frameworks can help optimize capital allocation towards long-term value creation.

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