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Impact of ESG Rating Disagreement on Debt Financing Costs

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Abstract: Using the data of China's A-share non-financial listed enterprises from 2015 to 2022 as a sample, this study empirically tests the impact of ESG rating disagreement on corporate debt financing cost. The results show that ESG rating disagreement significantly increases the debt financing costs of enterprises, and this result still holds after a series of robustness tests such as replacing the dependent and independent variables and PSM approach. Meanwhile, the heterogeneity analysis reveals that non-state-owned enterprises and enterprises in non-heavily polluting industries are more sensitive to ESG ratings disagreement. In addition, mechanism analysis shows that corporate financing constraints mediate the relationship between ESG rating disagreements and debt financing costs. The findings of this study provide important evidence for understanding the impact of ESG rating disagreement on the costs of debt financing, enrich the meaning of ESG rating disagreement, and reveal the significance of unifying ESG rating standards.

Keywords: ESG; ESG rating disagreement; debt financing costs; mechanism analysis

1. Introduction

The rapid development of the economics has promoted the progress of science and technology and the improvement of social civilization, but at the same time, it has also brought about increasingly serious environmental problems. The concept of socially responsible investment has gradually attracted widespread attention, and sustainable development has become an important reference for investors' investment decisions. In the traditional concept, obtaining profits and maximizing the interests of shareholders is the ultimate goal of the company, but this old model can no longer fully adapt to the new social requirements now. Under the condition of traditional financial analysis, ESG (Environmental, Social, and Governance) investment, which takes environment, social and corporate governance as new evaluation indexes to measure corporate value and development potential, has emerged. In recent years, the concept of ESG investment has been widely spread globally, and ESG investment has developed rapidly. More and more investors have started to pay attention to the social and environmental impacts of enterprises, rather than just their financial performance. Currently, ESG ratings provided by professional organizations have gradually become an important reference standard for measuring the contribution of enterprises in terms of sustainable development [1]. However, due to the different information collected by each ESG rating agency and the differences in rating methodology, the ESG rating reports issued to enterprises have disagreement. By combing through the previous literature, it can be found that ESG rating disagreement increases the search cost of investors [2], reduces corporate value, and also hinders corporate social investment [3].

This study argues that ESG rating disagreement often reflects the different views of rating agencies on ESG performance. When an enterprise's ESG rating disagreement is large, it implies that there is greater uncertainty and controversy in the market about this enterprise's ESG performance. For investors, this information asymmetry can make it more difficult to assess an enterprise's future

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financial health and default risk, thus demanding a higher risk premium and leading to higher debt financing costs for the enterprise. What's more, ESG ratings are an important reference for investors and creditors in assessing corporate social responsibility fulfillment and sustainable development capabilities. When different rating agencies give very different ratings to the ESG performance of the same enterprise, it may make market participants skeptical about the actual ESG performance of the enterprise, which in turn reduces market confidence. This uncertainty triggers cautious behavior in the capital market, and creditors may demand higher financing rates to compensate for potential risks. However, little literature has yet examined the impact of ESG rating disagreement on the cost of debt financing.

Based on this, this study explores the relationship between ESG rating disagreement and the cost of debt financing with a sample of A-share listed companies from 2015 to 2022. The findings show that ESG rating disagreement significantly increases the debt financing costs of enterprises, and this result still holds after a series of robustness tests such as replacing explanatory variables, replacing explanatory variables and PSM test. Heterogeneity analysis reveals that ESG rating disagreement is more likely to increase enterprises' debt financing costs for non-state-owned enterprises and enterprises in non-heavily polluted industries. The mediating mechanism test shows that corporate financing constraints mediate the relationship between ESG rating disagreement and debt financing costs, which suggests that ESG rating disagreement increases corporate debt financing costs by increasing corporate financing constraints.

Compared with the existing literature, the research contribution of this study may have the following aspects: (1) Most of the previous studies focus on the impact of ESG performance on enterprise value and cost of equity, and it has been found that the cost of debt financing is correlated with the scores of enterprises' ESG ratings [2], but no literature has yet considered the impact of enterprises' ESG rating disagreement on the cost of debt financing. And this study explores the impact of ESG rating disagreement on corporate debt financing costs, which enriches the content of ESG research, expands its application area, and fills the gap in the research on the relationship between debt financing cost and ESG rating disagreement. (2) Our findings reveal the importance of ESG rating disagreement in the capital market. This study shows that ESG rating disagreement is not only an information asymmetry problem faced by investors, but also has a substantial impact on the corporate financing environment. This finding highlights the role of rating agencies in the capital market and demonstrates the importance of unifying rating standards. (3) The findings of this study have important practical implications for policymakers and corporate managers. By understanding the impact of ESG rating disagreement on the cost of debt financing, policy makers can formulate more reasonable regulatory measures and promote the standardization of rating standards; while corporate managers can reduce rating disagreement by optimizing ESG performance, thus reducing the cost of financing. (4) This study reveals the mediating role of corporate financing constraints between ESG rating disagreement and debt financing costs, deepening the academic understanding of corporate financing constraints. New ideas and theoretical basis are also provided for further research on how enterprises can mitigate financing constraints by improving ESG performance.

The rest of the paper is organized as follows: Section 2 illustrates the literature review; Section 3 proposes the theoretical analysis and research hypotheses; Section 4 demonstrates the research design; Section 5 presents the empirical analysis; Section 6 conducts further analysis; Section 7 concludes with policy recommendations.

2. Literature Review

2.1. ESG Rating Disagreement

Existing research focuses on the causes of ESG rating disagreement and its economic consequences. In terms of the causes, differences in the ESG evaluation systems of different rating agencies and the uneven quality of corporate ESG disclosure are two major factors. On the one hand, the different understanding of the scope of ESG evaluation at home and abroad has led to the disagreement of ESG ratings. Currently China's ESG rating is still in the development stage, and a unified and localized ESG evaluation system has not yet been established. In addition, domestic and

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foreign ESG rating agencies have large differences in the understanding of the environment, social responsibility, etc. Differences in the ESG evaluation system in terms of the scope of the indicators and the method of measuring the indicators [4], as well as different weights assigned to the rating indicators by different agencies have led to the phenomenon of disagreement in ESG rating [5]. For example, foreign studies believe that state-owned enterprises set too many non-economic goals will reduce the level of corporate governance and damage the ESG performance of enterprises [6], while domestic rating agencies will focus on the social responsibility of enterprises, which is the main reason for the large differences in the ESG rating reports issued by different Chinese and foreign rating agencies for the same listed enterprises [7]. On the other hand, the quality of enterprises' ESG disclosure has led to the disagreement of ESG rating [8]. Currently, the widely used ESG disclosure indicator system in the international arena is the "Global Reporting Initiative Guidelines" developed by the Global Reporting Initiative (GRI). It has been found that in the public annual reports of listed companies in 2020, only 111 listed companies in the CSI 300 index have followed the Guidelines. The irregularity in ESG disclosure is an important factor leading to the disagreement of ESG rating [1].

Research on the economic consequences of ESG rating disagreement has achieved some results. From the point of view of foreign research, ESG rating disagreement has become one of the most critical factors hindering ESG investment [9]. Abhayawansa et al. found that ESG rating disagreement can prevent ESG information from conveying information [10]. On the one hand, it weakens the risk aversion function of ESG information and increases the difficulty for investors to reasonably assess the value of enterprises; on the other hand, it increases the difficulty for managers to judge the reasons for the discrepancies, which in turn affects their investment decisions [7]. As a result, ESG rating disagreement significantly reduces the efficiency of the capital market [2]. In domestic studies, ESG rating disagreement may undermine the positive effect of good ESG performance on reducing corporate debt financing [11]; ESG rating disagreement negatively affects stock returns by reducing investor sentiment, which in turn reduces trading activity [12], and significantly reduces enterprises' ability to innovate [13]; and ESG rating disagreement reduces the accuracy of analysts' earnings forecasts [14] and increases the audit risk premium [15].

2.2. Debt Financing Costs

Debt financing is an important external financing channel for enterprises, how to increase the scale of financing, reduce the cost of financing and thus improve the profitability of enterprises is of great significance, so there is a wealth of domestic and international research on debt financing. From a theoretical point of view, the cost of corporate debt financing is determined by the default risk, agency cost and the level of information asymmetry. Merton's research has changed the pricing model of traditional Black Scholes option pricing model for risk-discounted debt [16], and it believes that the cost of debt financing mainly depends on three factors: (1) the risk-free interest rate, such as government debt or high-grade corporate debt; (2) the terms and conditions embedded in the debt contract, such as maturity, coupon rate, and redemption terms; and (3) the probability of default of the enterprise, given the maturity structure, the difference in the price of the debt product depends on the difference in the risk of default of the enterprise. In addition, Jensen combined property rights theory, agency theory and financial theory, put forward the agency cost point of view. Due to the existence of information asymmetry between the enterprise and the creditor, the creditor will increase the requirements for the return on investment to pay the cost of supervising and restrain the enterprise's behaviour [17]. The existing research on the influencing factors of debt financing costs mainly focuses on the aspects of internal business conditions, external environment and debt characteristics.

2.3. ESG Rating Disagreement and Debt Financing Costs

By reviewing the literature on ESG rating disagreement and debt financing costs, this study finds that current research by both domestic and international scholars has rarely explored their relationship. The ESG score reduces information asymmetry [18], while ESG score disagreement generates chaos and uncertainties. Wang et al. (2024) showed that ESG scores disagreement has a

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significant negative correlation with stock returns [19]. However, the role of ESG divergence in influencing default risk and the cost of debt has received only limited attention [20–22]. Although there has been little direct exploration of the impact of ESG rating disagreement on debt financing costs, related literature provides valuable perspectives and approaches for this study. Some scholars have indicated that ESG rating disagreement can negatively impact corporate operations and development directly, creating uncertainty that acts as market friction, thus adversely affecting enterprises. For instance, ESG rating disagreement may increase the likelihood of greenwash by enterprises [23] and reduce their opportunities to obtain external financing [24,25]. Moreover, ESG rating disagreement can harm corporate development by weakening the positive effects of ESG performance [2,10]. This uncertainty introduced by ESG rating disagreement undermines the advantages of strong ESG performance in promoting corporate development, indirectly influencing corporate operations. For example, ESG rating disagreement may diminish the risk mitigation function of ESG information, increasing the costs of information gathering for investors, which in turn raises the enterprise's financing costs. These impacts of ESG rating disagreement on corporate behavior subsequently affect debt financing costs, suggesting a discernible link between ESG rating disagreement and debt financing costs.

Based on the literature in the study of ESG rating and its disagreement, it is evidenced that while many scholars have conducted relevant research on ESG rating disagreement and debt financing costs, there has been little direct investigation into the relationship between the two. However, as the concept of ESG investing gains widespread traction globally, the influence of ESG rating disagreement is growing. Exploring this issue from the perspective of debt financing costs is of significant practical importance for a deeper understanding of how ESG rating disagreement impacts corporate debt financing costs and for a more profound comprehension of the nature of ESG rating disagreement.

3. Theoretical Analysis and Research Hypothesis

The ESG rating is a crucial tool for assessing a company's ESG performance. When faced with differing ESG ratings, investors tend to focus on the ratings from agencies they perceive as more credible and widely recognized by institutions and companies. However, the ESG rating market in China is highly fragmented and relatively underdeveloped, lacking established rating agencies like ISS-ESG and Sustainalytics, whose rating quality is acknowledged by both investors and companies. In this context, consistent ESG ratings can enhance the information conveyed to the market by multiple ratings from different perspectives, thereby reducing the uncertainty surrounding the rated company's sustainability and ESG performance, ultimately lowering the company's debt financing costs. Conversely, while divergent ESG ratings can provide additional information, they may also create challenges for investors in determining a reliable reference, thereby weakening the relationship between multiple ESG ratings and debt financing costs. Research by Christensen suggests that ESG disagreement seems to introduce uncertainty regarding a company's sustainability [24], potentially acting as market friction that hinders the company's access to external capital. Therefore, the uncertainty caused by ESG rating disagreement may exacerbate information asymmetry, increasing the risks associated with sustainable investment and, consequently, raising a company's debt financing costs. ESG rating disagreement implies incomplete corporate information disclosure and high information uncertainty, making it difficult for banks to timely assess environmental risks and provide financial support. Additionally, banks consider environmental and social responsibility factors during credit evaluations, and ESG rating disagreement leads to higher risk premiums demanded by banks. Based on this, ESG rating disagreement can heighten a company's financing constraints, thereby increasing its debt financing costs.

Furthermore, research has found that ESG rating disagreement can decrease corporate value [3]. High corporate value typically indicates favorable business conditions, strong profitability, and ample operating cash flow—all factors that directly enhance a company's debt repayment capacity. Moreover, an increase in corporate value signifies greater recognition in the capital market, reducing the risks of control transfer and stock crashes. These positive market outcomes instill greater

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confidence in creditors regarding the financial stability of the company, thereby lowering its debt financing costs. However, when ESG ratings diverge, investors and creditors may harbor doubts about the company's ESG performance, making it difficult to ascertain its true environmental, social, and governance performance. This uncertainty can elevate the company's non-financial risks and potentially lead to a market reassessment of the company's value, resulting in a decline in corporate value. Such a decline would directly impair the company's debt repayment ability, increasing the risks of control transfer and stock crashes. Given that creditors typically consider the overall risk profile of the company in their lending decisions, a decrease in corporate value may lead to concerns about the company's future debt repayment capacity. As a result, the company may need to pay higher interest rates to compensate creditors for the increased risk, thereby raising its debt financing costs.

Moreover, ESG rating disagreement may also lead to reduced attention from the capital market, with some investors potentially opting to exit due to the uncertainty, further weakening the company's market position and increasing the difficulty of financing. Therefore, ESG rating disagreement not only affects a company's market performance but also raises its debt financing costs through various channels.

Based on the above analysis, this paper proposes the following testable hypothesis:

H1: ESG rating disagreement is positively correlated with debt financing costs.

4. Research Design

4.1. Data and Sample Selection

Based on the principle of data availability, this paper takes Chinese listed enterprises as the research objects, and the sample period is from 2015 to 2022. To ensure data accuracy, the sample data were screened based on the following criteria:(1) Due to the unique characteristics of the financial industry, companies in the insurance, banking, and securities sectors were excluded; (2) Companies with incomplete data were eliminated; (3) ST and *ST companies, as well as companies that were classified as ST or *ST during the sample period, were excluded. (4) The sample data are winsorized by 1 % and 99 % to eliminate the influence of extreme values and outliers.

This study primarily selected ESG ratings from six agencies—China Securities Index (CSI), WIND, SynTao Green Finance, Susallwave, FTSE Russell, and Bloomberg—as basic indicators for calculating ESG rating disagreement. Among them, the CSI ESG, Susallwave ESG, FTSE Russell ESG, and WIND ESG ratings are obtained from the Wind database, the Bloomberg ESG rating is from the Bloomberg database, and the Sustainalytics ESG rating is from the SynTao Green Finance ESG rating data platform. All other financial data were derived from the CSMAR database.

4.2. Variables

4.2.1. Independent Variable: ESG Rating Disagreement

With the development and deepening of ESG concepts, multiple ESG rating agencies have emerged, each with its own unique calculation indicators and measurement methods. This study selects six representative ESG rating agencies: China Securities Index (CSI), WIND, SynTao Green Finance, Susallwave, FTSE Russell, and Bloomberg. Two methods are used to measure ESG rating disagreement: drawing from the methodology of Hu et al. [26–28], the CSI ESG rating, WIND ESG rating, and Susallwave FIN-ESG rating are each divided into nine levels, ranging from low to high as C, CC, CCC, B, BB, BBB, A, AA, and AAA. Based on the aforementioned assignment method, the nine levels of ratings from C to AAA are assigned values from 1 to 9, respectively, such that when the rating is C, ESG = 1; when the rating is CC, ESG = 2; when the rating is CCC, ESG = 3, and so on.

The SynTao Green Finance ESG rating is divided into 10 levels, ranging from low to high as D, C-, C, C+, B-, B, B+, A-, A, and A+. The 10 levels of ratings from D to A+ are assigned values from 0 to 9, respectively, such that when the rating is D, ESG = 0; when the rating is C-, ESG = 1; when the rating is C, ESG = 2, and so on. The Bloomberg ESG rating rounds the specific scores to the nearest 10%, while the FTSE Russell ESG rating doubles the specific scores for use as sample data. Through this

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assignment method in the sample data, the score ranges of the six ESG ratings are similar, ensuring comparable weight in their impact on ESG rating disagreement. After organizing the six types of ESG ratings as described above, this study calculates the standard deviation of the ESG ratings across the six indicators to obtain *ESGdif6*, and the range of the six ESG ratings to obtain *ESGrange6*. *ESGdif6* and *ESGrange6* are used as independent variables to measure the level of ESG rating disagreement.

4.2.2. Dependent Variable: Debt Financing Costs

The dependent variable is the debt financing costs (DebtCost1). This study uses (interest expenses / total liabilities) *100% as a proxy variable for the cost of debt financing, based on the following considerations: (1) Firms do not typically disclose the cost of debt financing directly, so the true cost is not accessible; (2) there are often missing values in the interest-bearing debt data in the financial notes of firms; (3) total liabilities include both interest-bearing and non-interest-bearing liabilities; if non-interest-bearing liabilities are substantial, this can reflect the firm's strong financing ability and low financing costs.

4.2.3. Control Variables

Referring to common practices in existing literature [29], this study controls for a series of financial characteristics as well as year fixed effects (Year) and industry fixed effects (Industry) that may influence the cost of debt financing. The financial characteristics include firm size (Size), leverage (Lev), return on assets (ROA), cash flow ratio (Cashflow), revenue growth rate (Growth), inventory ratio (INV), number of directors (Board), and listing age (ListAge). Specific variable definitions and descriptions are provided in Table 1.

Table 1. Variable definitions.

Variables	Symbol	Definition
Debt financing costs	DebtCost1	(Interest expenses / Total liabilities) * 100%
ESG rating disagreement 1	ESGdif6	The overall standard deviation of scores across the six ESG rating agencies
ESG rating disagreement 2	ESGrange6	The range of scores across the six ESG rating agencies
Firm size	Size	Ln(Total Assets at Year-End)
Leverage	Lev	Total Liabilities at Year-End/Total Assets at Year-End
Return on assets	ROA	Net Profit / Average Balance of Total Assets
Cash flow ratio	Cashflow	Cash Flow from Operating Activities
Revenue growth rate	Growth	(Current Year Revenue/Previous Year Revenue) - 1
Inventory ratio	INV	Ratio of Net Inventory to Total Assets.
Number of directors	Board	Ln(Number of Board Members).
Listing age	ListAge	Ln(Current Year - Year of Listing + 1).
Industry fixed effects	Industry fe	Industry Dummy Variables.
Year fixed effects	Year fe	Year Dummy Variables.

4.3. Empirical Design

To test whether ESG rating disagreement impacts corporate debt financing costs, this study uses the following benchmark models:

$$\mathrm{DebtCost}_{i,t} = \beta_0 + \beta_1 \mathrm{ESGdif6}_{i,t-1} + \beta_2 \mathrm{Controls}_{i,t} + \mathrm{Year} + \mathrm{Ind} + \varepsilon_{i,t} \quad (1)$$

$$\mathrm{DebtCost}_{i,t} = \beta_0 + \beta_1 \mathrm{ESGrange6}_{i,t-1} + \beta_2 \mathrm{Controls}_{i,t} + \mathrm{Year} + \mathrm{Ind} + \varepsilon_{i,t} \quad (2)$$

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Given the potential lag effect of ESG rating disagreement on debt financing costs and to alleviate endogenous interference, the independent variable in the model is lagged by one period. In this model, *i* represents the firm; and *t* represents the year. The dependent variable *DebtCost* denotes the debt financing cost of company *i* in year *t*; the independent variables *ESGdif6* and *ESGrange6* represent the ESG rating disagreement of company *i* in year *t*; *Controls* represents the control variables; and ε is the disturbance term that varies with both firm and year.

5. Empirical Analysis

5.1. Correlation Analysis

Table 2 presents the Pearson correlation coefficient matrix for the variables used in this study. As shown in Table 2, the correlation coefficients between corporate debt financing costs and ESG rating disagreement are 0.023 and 0.037, respectively, with positive correlations observed between the independent variables and the dependent variable. This result provides preliminary support for the validity of Hypothesis 1. Additionally, the absolute values of the correlation coefficients among the explanatory variables are generally below 0.5, indicating that the probability of multicollinearity among the explanatory variables in this study is relatively low.

Table 2. Correlation analysis.

Variables	DebtCost1	ESGdif6	ESGrange6	Size	Lev	ROA	Cashflow
DebtCost1	1.000						
ESGdif6	0.023***	1.000					
ESGrange6	0.037***	392***	1.000				
Size	-0.105***	0.182***	0.343***	1.000			
Lev	-0.381***	0.052***	0.070***	0.454***	1.000		
ROA	0.272***	-0.011	0.031***	0.062***	-0.339***	1.000	
Cashflow	0.222***	0.074***	0.106***	0.083***	-0.167***	0.425***	1.000
Growth	-0.007	-0.005	-0.008	0.029***	0.025***	-0.001	-0.020***
INV	-0.092***	-0.003	-0.004	0.103***	0.252***	-0.044***	-0.162***
Board	-0.025***	0.012*	0.052***	0.261***	0.116***	0.018**	0.053***
ListAge	-0.144***	0.090***	0.153***	0.420***	0.299***	-0.148***	-0.002
	Growth	INV	Board	ListAge			
Growth	1.000						
INV	0.027***	1.000					
Board	0.022***	-0.030***	1.000				
ListAge	0.006	0.113***	0.174***	1.000			

5.2. Descriptive Statistics

Table 3 provides the descriptive statistics of the main variables. The mean of DebtCost1 is 0.0687, with a standard deviation (SD) of 0.1182, a maximum value (Max) of 5.4587, and a minimum value (Min) of 0.0000, indicating a certain disparity in the financing abilities of different companies. The mean of ESGdif6 is 0.9803, with a standard deviation of 0.7148, a maximum value of 4.2426, and a minimum value of 0.0000. The mean of RSGrange6 is 1.8106, with a standard deviation of 1.4068, a maximum value of 8.0000, and a minimum value of 0.0000, indicating significant differences in ESG rating divergence among firms, with most companies having relatively small divergences, while a few exhibits large divergences. The descriptive statistical characteristics of the other control variables are generally consistent with those reported in the existing literature.

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Table 3. Descriptive Statistics.

Variables	N	Mean	S.D.	Max	p50	Min
DebtCost1	19,894	0.0687	0.1182	5.4587	0.0395	0.0000
ESGdif6	19,894	0.9803	0.7148	4.2426	1.0000	0.0000
ESGrange6	19,894	1.8106	1.4068	8.0000	2.0000	0.0000
Size	19,894	22.5647	1.3298	28.6365	22.3647	17.6413
Lev	19,894	0.4531	0.1950	1.9566	0.4490	0.0174
ROA	19,894	0.0346	0.0768	1.2848	0.0346	-0.9869
Cashflow	19,894	0.0487	0.0720	0.8759	0.0468	-0.7418
Growth	19,894	0.4010	14.2507	1,878.3720	0.1010	-1.3092
INV	19,894	0.1364	0.1293	0.9312	0.1069	0.0000
Board	19,894	2.1167	0.1980	2.8904	2.1972	1.0986
ListAge	19,894	2.2982	0.7669	3.4965	2.3979	0.6931

5.3. Baseline Regression Result

The baseline regression results examining the relationship between corporate ESG rating disagreement and debt financing costs are presented in Table 4. The regression results in columns (1) and (3) show that without controlling for industry and year, the regression coefficients of the lagged ESG rating disagreement on debt financing costs are 0.0048 and 0.0034, respectively, and are significant at the 1% level. Columns (2) and (4) present the regression results after controlling for industry and year fixed effects, where the dependent variable and independent variables still exhibit a significant positive correlation at the 5% level. This indicates that the greater the ESG rating disagreement of a company, the higher its debt financing costs, and conversely, the lower the disagreement, the lower the costs, thereby confirming Hypothesis 1.

Table 4. Baseline Regression Result.

Variables	(1) DebtCost1	(2) DebtCost1	(3) DebtCost1	(4) DebtCost1
ESGdif6	0.0048***	0.0055***		
	(4.2323)	(4.6190)		
ESGrange6			0.0034***	0.0043***
			(4.2723)	(4.8095)
Size	0.0043***	0.0041***	0.0034***	0.0029***
	(6.5751)	(6.1051)	(4.6761)	(3.7899)
Lev	-0.2067***	-0.2059***	-0.2048***	-0.2039***
	(-27.5589)	(-28.0123)	(-27.8817)	(-28.1583)
ROA	0.1468***	0.1343***	0.1475***	0.1342***
	(8.1227)	(7.5036)	(8.1115)	(7.5013)
Cashflow	0.1986***	0.1877***	0.1971***	0.1863***
	(15.6213)	(14.4381)	(15.4948)	(14.3576)
Growth	0.0000	0.0000	0.0000	0.0000
	(0.7172)	(0.3158)	(0.8163)	(0.4253)
INV	0.0173***	-0.0117*	0.0175***	-0.0121**
	(4.5549)	(-1.9290)	(4.5982)	(-1.9965)
Board	0.0023	0.0006	0.0027	0.0006
	(0.6480)	(0.1678)	(0.7453)	(0.1576)
ListAge	-0.0083***	-0.0108***	-0.0083***	-0.0110***
	(-5.4201)	(-7.0248)	(-5.4897)	(-7.2487)
Constant	0.0584***	0.0749***	0.0755***	0.0990***
	(4.7369)	(5.6549)	(5.7043)	(6.8000)
Industry fe	No	Yes	No	Yes

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Year fe	No	Yes	No	Yes
Observations	19,894	19,894	19,894	19,894
R-squared	0.184	0.203	0.185	0.203

5.3. Robustness Test

5.3.1. Alternative Dependent Variables

This study draws on the methods of Zhou et al. and He et al. [29,30], calculating the cost of debt financing (DebtCost2) using the ratio of corporate interest expenses to the average value of short-term and long-term liabilities for the year. By replacing DebtCost1 with DebtCost2 in the regression analysis, the regression results are shown in columns (1) and (2) of Table 5. The coefficients on ESG rating disagreement remain intact and the findings are consistent with those previously reported.

5.3.2. Alternative Independent Variables

Referring to prior research [2,13], this study constructs the variable ESG_rank using the standard deviation of standardized rankings from six rating agencies—China Securities Index (CSI), WIND, SynTao Green Finance, Susallwave, FTSE Russell, and Bloomberg. ESG_rank is used as an explanatory variable to recalculate ESG rating disagreement. The regression results, shown in columns (3) and (5) of Table 5, indicate that ESG rating disagreement remains significantly positively correlated with debt financing costs.

Table 5. Replacement Dependent Variables.

Variables	**(1)**	**(2)**	**(3)**	**(4)**
	DebtCost2	**DebtCost2**	**DebtCost1**	**DebtCost2**
ESGdif6	0.0059***			
	(4.3799)			
ESGrange6		0.0047***		
		(4.5053)		
ESG_rank			0.0137***	0.0145***
			(3.5459)	(3.2771)
Size	0.0044***	0.0031***	0.0036***	0.0039***
	(5.8236)	(3.5064)	(4.7588)	(4.5375)
Lev	-0.2350***	-0.2328***	-0.2040***	-0.2330***
	(-26.9149)	(-27.0436)	(-27.3764)	(-26.2469)
ROA	0.1429***	0.1428***	0.1299***	0.1382***
	(7.2414)	(7.2353)	(7.3829)	(7.1456)
Cashflow	0.2017***	0.2001***	0.1889***	0.2031***
	(14.1880)	(14.0979)	(14.5088)	(14.2655)
Growth	0.0000	0.0000	0.0000	0.0000
	(0.3659)	(0.4763)	(0.3771)	(0.4245)
INV	-0.0205***	-0.0209***	-0.0116*	-0.0204***
	(-2.9787)	(-3.0483)	(-1.9146)	(-2.9694)
Board	0.0023	0.0023	0.0004	0.0020
	(0.5522)	(0.5428)	(0.1034)	(0.4906)
ListAge	-0.0110***	-0.0112***	-0.0101***	-0.0103***
	(-6.1479)	(-6.3610)	(-6.3373)	(-5.5275)

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Constant	0.0844***	0.1108***	0.0844***	0.0944***
	(5.6878)	(6.7422)	(5.8144)	(5.8016)
Industry fe	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes
Observations	19,894	19,894	19,894	19,894
R-squared	0.197	0.197	0.202	0.196

5.3.3. PSM Method

To reduce the impact of selection bias and omitted variables on the robustness of the empirical results, this study uses the propensity score matching (PSM) proposed by Rubin et al. [31] to perform 1:1 nearest neighbor matching on the sample. The covariates used include Size, Lev, ROA, Cashflow, Growth, INV, Board, and ListAge to ensure there are no systematic differences between the treatment and control groups. Additionally, ESG rating divergence is ranked from high to low, with the top half classified as the treatment group and the remaining as the control group. Table 6 presents the regression results after matching the sample using the PSM method. As shown in Table 6, the impact of ESG rating disagreement on debt financing costs remains significantly positive. This result further enhances the robustness of the study's conclusions, indicating that even after reducing potential endogeneity issues, an increase in ESG rating disagreement still significantly raises corporate debt financing costs.

Table 6. Replacement Independent Variables.

Variables	**(1)** **DebtCost1**	**(2)** **DebtCost1**
ESGdif6	0.0056***	
	(3.0909)	
ESGrange6		0.0056***
		(3.3173)
Size	0.0036***	0.0013
	(3.8497)	(1.4012)
Lev	-0.2045***	-0.1927***
	(-19.5941)	(-19.3322)
ROA	0.1000***	0.1429***
	(3.8604)	(5.8455)
Cashflow	0.1693***	0.1677***
	(10.5046)	(9.7756)
Growth	0.0002	0.0002
	(0.8000)	(0.7158)
INV	-0.0246***	-0.0114
	(-2.9424)	(-1.3474)
Board	0.0016	-0.0010
	(0.2966)	(-0.1781)
ListAge	-0.0106***	-0.0111***
	(-4.5851)	(-4.6862)
Constant	0.0852***	0.1317***

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	(4.4860)	(6.4933)
Industry fe	Yes	Yes
Year fe	Yes	Yes
Observations	10,372	9,713
R-squared	0.188	0.195

6. Future Analysis

6.1. Heterogeneity Analysis of Corporate Ownership

The impact of ESG rating disagreement on debt financing costs may vary depending on the nature of corporate ownership. From the perspective of government endorsement and implicit guarantees, state-owned enterprises (SOEs) are often perceived as having implicit government backing, meaning that investors' risk preferences towards SOEs primarily depend on government support rather than ESG rating disagreement. In contrast, non-state-owned enterprises (non-SOEs) lack such endorsements and are more susceptible to market conditions such as ESG rating disagreement. From the perspective of information transparency and market signals, SOEs are particular in terms of information disclosure and transparency because of their ownership. The market may not be as sensitive to ESG rating disagreement in SOEs because investors rely more on government support information than on ESG ratings. However, for non-SOEs, ESG rating disagreement may be viewed as important negative market signals, directly affecting their financing costs. To empirically test the above conjectures, this study utilizes heterogeneity analysis based on the nature of corporate ownership.

The regression results shown in Table 7 indicate that for non-SOEs, the coefficient of ESGrange6 on debt financing costs is 0.0065, significant at the 1% level, and the coefficient of ESGdif6 is 0.0082, also significant at the 1% significance level. For SOEs, the coefficient of ESGrange6 on debt financing costs is 0.0009, weakly significant at the 10% level, while the coefficient of ESGdif6 turns out to be insignificant. This suggests that compared to SOEs, ESG rating disagreements in non-SOEs are more likely to increase debt financing costs.

Table 7. Heterogeneity Analysis Corporate Ownership.

Variables	**(1)** **SOEs** **DebtCost1**	**(2)** **Non-SOEs** **DebtCost1**	**(3)** **SOEs** **DebtCost1**	**(4)** **Non-SOEs** **DebtCost1**
ESGdif6	0.0008	0.0082***		
	(0.7810)	(4.6420)		
ESGrange6			0.0009*	0.0065***
			(1.6454)	(4.6592)
Size	0.0048***	0.0034***	0.0045***	0.0015
	(6.9522)	(2.9081)	(6.3777)	(1.1552)
Lev	-0.1277***	-0.2665***	-0.1271***	-0.2637***
	(-13.4288)	(-24.2833)	(-13.2868)	(-24.5603)
ROA	0.1328***	0.1166***	0.1329***	0.1169***
	(5.7629)	(5.0410)	(5.7683)	(5.0497)
Cashflow	0.1033***	0.2355***	0.1031***	0.2323***
	(9.1320)	(12.0391)	(9.1316)	(11.8823)
Growth	-0.0001*	0.0000	-0.0001*	0.0000

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	(-1.7547)	(1.0310)	(-1.7365)	(1.1590)
INV	0.0005	-0.0185*	0.0004	-0.0193*
	(0.0866)	(-1.8556)	(0.0754)	(-1.9391)
Board	0.0034	-0.0018	0.0032	-0.0014
	(0.7969)	(-0.3271)	(0.7596)	(-0.2593)
ListAge	-0.0106***	-0.0095***	-0.0106***	-0.0098***
	(-4.8470)	(-3.8283)	(-4.8753)	(-4.0271)
Constant	0.0206	0.1153***	0.0267	0.1521***
	(1.2911)	(5.0764)	(1.6294)	(6.2778)
Industry fe	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes
Observations	7,634	12,260	7,633	12,259
R-squared	0.221	0.212	0.221	0.213

6.2. Heterogeneity Analysis of Pollution Attributes

The positive impact of ESG rating divergence on debt financing costs may be influenced by the industrial pollution. Therefore, this paper examines whether the level of industry pollution of a company influences the relationship between ESG rating disagreement and debt financing costs. The sample is divided into two groups based on whether they belong to heavy-polluting industries (HPIs). Table 8 shows that for non-heavily polluting enterprises (non-HPIs), ESG rating disagreement is positively correlated with debt financing costs at the 1% level, with coefficients of 0.0048 and 0.0058, respectively. For heavy-polluting industries (HPIs), ESG rating disagreement is positively correlated with debt financing costs at the 5% level, with coefficients of 0.0024 and 0.0041, respectively. This result indicates that in non-heavily polluting industries, the impact of ESG rating disagreement on debt financing costs is more significant, suggesting that market participants are more sensitive to ESG performance divergence of those non-heavily polluting companies.

Investors may believe that significant ESG rating disagreement in non-heavily polluting industries could imply potential issues in corporate social responsibility or governance, leading to higher financing costs. In heavy-polluting industries, although ESG rating disagreement still has a positive impact on debt financing costs, the extent of this impact is lower. This suggests that enterprises in heavily polluting industries inherently face higher environmental risks, and investors may have already factored this inherent risk into their risk pricing. Therefore, even with ESG rating disagreement, investors may perceive this as a norm within highly polluting industries, leading to a relatively lower risk premium. Moreover, highly polluting industries often face stricter environmental regulations and policy pressures, which may force enterprises to invest significantly in environmental improvements. Although these improvements may increase rating disagreement in the short term, the market may perceive these measures as beneficial for reducing future compliance risks and environmental liabilities, thus limiting the additional impact on financing costs.

Table 8. Heterogeneity Analysis of Pollution Attributes.

Variables	**(1)** **HPIs** **DebtCost1**	**(2)** **Non-HPIs** **DebtCost1**	**(3)** **HPIs** **DebtCost1**	**(4)** **Non-HPIs** **DebtCost1**
ESGdif6	0.0041**	0.0058***		
	(2.0397)	(4.0902)		
ESGrange6			0.0024**	0.0048***

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			(2.1775)	(4.3739)
Size	0.0039***	0.0042***	0.0034***	0.0028***
	(3.3069)	(5.1773)	(2.7839)	(2.9792)
Lev	-0.1923***	-0.2116***	-0.1916***	-0.2092***
	(-12.6217)	(-24.8576)	(-12.5894)	(-25.0827)
ROA	0.0929**	0.1467***	0.0921**	0.1468***
	(2.1277)	(7.4829)	(2.1135)	(7.4872)
Cashflow	0.1993***	0.1851***	0.1991***	0.1834***
	(6.4051)	(13.1211)	(6.3965)	(13.0536)
Growth	-0.0001	0.0000	-0.0001	0.0000
	(-0.1893)	(0.4438)	(-0.1580)	(0.5570)
INV	-0.0565***	-0.0042	-0.0564***	-0.0047
	(-3.2003)	(-0.6570)	(-3.2092)	(-0.7296)
Board	0.0084	-0.0015	0.0083	-0.0014
	(1.1265)	(-0.3455)	(1.1173)	(-0.3219)
ListAge	-0.0118***	-0.0104***	-0.0118***	-0.0107***
	(-4.0791)	(-5.8008)	(-4.0750)	(-6.0619)
Constant	0.0656**	0.0777***	0.0763***	0.1054***
	(2.5323)	(4.9985)	(2.8951)	(6.0715)
Industry fe	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes
Observations	4,502	15,392	4,502	15,392
R-squared	0.203	0.204	0.203	0.205

6.3. Mechanism Analysis

From the perspective of information asymmetry, ESG rating disagreement increases the inconsistency in market perceptions of corporate sustainability and credit risk, exacerbating information asymmetry problems. Investors and creditors may become more cautious due to this uncertainty, demanding higher risk premiums or stricter financing conditions, thereby increasing corporate financing constraints. From the perspective of market signaling, ESG rating disagreement may be interpreted by the market as a signal of potential issues in a company's environmental, social, or governance practices. Investors may perceive these disagreements as reflecting inconsistencies in the company's management and operations, leading them to question the company's sustainability and long-term profitability. As a result, the greater the rating disagreement, the higher the financing constraints a company may face. Considering the credit risk premium, ESG rating disagreement complicates the assessment of a company's credit risk, leading creditors to increase financing constraints (e.g., raising interest rates or reducing loan amounts) to compensate for the additional risk brought by this uncertainty. The tightened corporate financing constraints typically leads to an increase in debt financing costs.

Based on this, the study examines whether ESG rating disagreement increases corporate debt financing costs by raising corporate financing constraints, using several indicators such as the SA index, KZ index, and WW index to measure financing constraints. The regression results in Table 9 show that ESG rating disagreement is positively correlated with the SA, KZ, and WW indices at the 1% significance level. This result shows that the greater the ESG rating disagreement, the higher the level of corporate financing constraints. Moreover, the impact of financing constraints on corporate debt financing costs is significantly positive. Therefore, it can be concluded that financing constraints

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mediate the relationship between ESG rating disagreement and debt financing costs, indicating that ESG rating disagreement increases corporate debt financing costs by increasing corporate financing constraints.

Table 9. Mechanism Analysis.

Variables	(1) SA	(2) SA	(3) KZ	(4) KZ	(5) WW	(6) WW
ESGdif6	0.0187***		0.0529***		0.0017***	
	(7.3341)		(3.7586)		(5.3025)	
ESGrange6		0.0137***		0.0699***		0.0009***
		(9.2185)		(8.7623)		(4.9750)
Size	0.0884***	0.0848***	-0.3137***	-0.3364***	-0.0500***	-0.0502***
	(33.9936)	(31.5095)	(-29.0532)	(-29.6383)	(-247.2315)	(-234.9601)
Lev	-0.0849***	-0.0787***	6.2461***	6.2820***	0.0310***	0.0314***
	(-7.2893)	(-6.7305)	(79.9071)	(79.9370)	(21.0873)	(21.2391)
ROA	-0.2957***	-0.2966***	-4.9638***	-4.9536***	-0.1225***	-0.1227***
	(-11.0812)	(-11.1346)	(-20.1725)	(-20.1416)	(-25.0375)	(-25.0597)
Cashflow	0.0333	0.0295	-13.5335***	-13.5731***	-0.0990***	-0.0990***
	(1.1509)	(1.0241)	(-53.0434)	(-53.0791)	(-27.7857)	(-27.7668)
Growth	0.0003***	0.0003***	-0.0014	-0.0013	-0.0350***	-0.0350***
	(6.0816)	(6.4389)	(-0.7883)	(-0.7581)	(-2,637.9272)	(-2,625.4287)
INV	0.0275*	0.0264	1.1161***	1.1054***	-0.0162***	-0.0162***
	(1.6688)	(1.6062)	(11.6287)	(11.5382)	(-7.2388)	(-7.2371)
Board	-0.0831***	-0.0833***	-0.0531	-0.0531	-0.0035***	-0.0035***
	(-9.2828)	(-9.3062)	(-1.1038)	(-1.1062)	(-3.3361)	(-3.3509)
ListAge	-0.1872***	-0.1877***	0.4110***	0.4068***	0.0063***	0.0063***
	(-68.0937)	(-68.4088)	(26.8592)	(26.6639)	(21.3534)	(21.2857)
Constant	-5.2616***	-5.1874***	5.1357***	5.5700***	0.0948***	0.0989***
	(-103.6554)	(-99.0015)	(22.9155)	(23.7797)	(22.3064)	(22.1963)
Industry fe	Yes	Yes	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,894	19,894	19,894	19,894	19,894	19,894
R-squared	0.355	0.356	0.720	0.721	0.997	0.997

7. Conclusions and Implications

Based on panel data from A-share listed companies in China from 2015 to 2022, this study analyzes the relationship between ESG rating disagreement and debt financing costs. The findings reveal a significant positive correlation between ESG rating disagreement across different rating agencies and corporate debt financing costs. Specifically, the greater the ESG rating disagreement, the higher the debt financing costs for companies. Additionally, non-state-owned enterprises (non-SOEs) are more susceptible to the impact of ESG rating disagreement, resulting in higher financing costs compared to state-owned enterprises (SOEs). Furthermore, the influence of ESG rating disagreement on debt financing costs is more pronounced in non-heavily polluting industries than in heavily polluting ones. Regarding to research mechanism, this paper shows that corporate

financing constraints mediate the relationship between ESG rating disagreement and debt financing costs. ESG rating disagreement may exacerbate corporate financing constraints, thereby leading to an increase in debt financing costs. This finding underscores that ESG rating disagreement is not only a focal point for investors but also a critical factor influencing the corporate financing environment.

The above findings have several important policy implications. First, our findings suggest for enhancing the uniformity of ESG rating standards. The findings of this study indicate that greater ESG rating disagreement leads to higher debt financing costs, which may hinder corporate development. Therefore, it is imperative to standardize ESG rating criteria. Regulatory agencies should promote the unification and transparency of ESG rating standards to reduce discrepancies among different rating agencies and lower the financing costs associated with rating disagreement. Second, we need to pay attention to proactive management of ESG performance by companies. The significant positive correlation between ESG rating disagreement and debt financing costs, particularly affecting non-SOEs, suggests that companies, especially non-SOEs, should strengthen their management and disclosure of ESG performance to reduce rating disagreement and thereby lower financing costs. Proactively improving ESG performance not only enhances a company's market competitiveness but also helps to build a positive social image. In addition, differentiated policy support should be considered by relevant government agencies. Tailored policies should be provided to help companies alleviate financing constraints arising from ESG rating disagreement, particularly for non-SOEs and non-heavily polluting industries. More favorable policy support and financial assistance should be directed toward these groups.

Our study also offers several extensions of future research opportunities. First, to ensure the generalizability of our findings, it is expected to evaluate the relationship between ESG divergence and the cost of debt financing in developed countries with more financial development and stricter disclosure requirement. Second, future research should delve into how industry-specific characteristics and different ownership structures influence the impact of ESG rating divergence on debt financing costs. This approach can provide tailored insights for firms across various sectors and ownership models, helping to identify industry and ownership-specific strategies for managing ESG-related risks. Third, the finding that financial constraints mediate the relationship between ESG rating disagreement and debt financing costs suggests that other intermediary mechanisms might also play a role. Future research could explore additional factors such as corporate governance, risk management practices, or stakeholder engagement, to provide a more comprehensive understanding. Overall, these directions will help refine the understanding of ESG rating disagreement's role in corporate finance, offering a broader perspective for both academia and industry practitioners.

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