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The Impact of the Divergence of ESG Ratings on Corporate Debt Financing Costs

Wenxin Tian

Antai College of Economics & Management, Shanghai Jiao Tong University, Shanghai, China
1412471019@qq.com

Abstract: ESG ratings serve as a crucial metric for assessing corporate sustainability. However, significant discrepancies exist among different ESG rating agencies when evaluating the same company's ESG performance. This study draws on data from Chinese A-share listed firms spanning from 2018 to 2024 to investigate how ESG rating disagreements affect corporate debt financing costs. The findings reveal that ESG rating disagreements significantly reduce debt financing costs. Green innovation efficiency weakens this cost-reducing effect. The inhibitory effect of ESG rating disagreements on debt financing costs is more pronounced in non-state-owned enterprises and companies located in eastern China. This research provides empirical evidence for understanding the microeconomic consequences of ESG rating disagreements. Based on the research findings, this study provides recommendations for different stakeholders. For ESG rating agencies, there is no need to standardize their criteria immediately. For investors, they can obtain more comprehensive information about corporate sustainability performance by collecting ratings from multiple ESG agencies. For corporations, they should seek an optimal balance between demonstrating tangible green innovation outcomes and maintaining rating adaptability.

Keywords: ESG rating disagreement, debt financing cost, green innovation efficiency, information production theory, creative destruction

1. Introduction

Amid global sustainable development trends, environmental, social, and governance (ESG) factors have garnered increasing attention. As a vital tool for measuring ESG performance, ESG ratings evaluate corporate sustainability and investment value. However, different rating agencies in China often assign divergent ESG scores to the same company, resulting in ESG rating disagreements. Wang Kai et al. [1] found that the average correlation coefficient of ESG ratings for the same company among three major domestic ESG rating agencies (Huazheng, SynTao Green Finance, and Social Value Investment Alliance) was only 0.26, indicating low consistency in rating results and significant discrepancies among domestic ESG evaluation systems.

Despite the rapid development of ESG ratings, research on the impact of ESG rating disagreements on corporations remains limited. ESG rating disagreements influence various aspects, including internal governance and financing. Since debt financing is the primary external funding access for companies [2], what economic consequences do ESG rating disagreements have on it?

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Existing studies on the relationship between ESG ratings and debt financing costs primarily rely on information production theory. From the perspective of creative destruction theory, how does green innovation efficiency moderate this relationship?

The academic contributions of this paper are mainly reflected in the following three aspects: First, it enriches research on ESG ratings. While existing studies predominantly focus on ESG ratings and their economic consequences, this paper delves into ESG rating disagreements, uncovering their relationship with corporate debt financing costs and deepening the understanding of ESG ratings' micro-level impact. Second, it employs creative destruction theory, offering a novel theoretical perspective for analyzing the effects of ESG rating disagreements and enriching the theoretical framework. Third, it examines the moderating role of green innovation efficiency in the relationship between ESG rating disagreements and debt financing costs, thereby enhancing the mechanistic understanding of this relationship.

2. Literature review and hypothesis development

2.1. Literature review

2.1.1. ESG rating disagreements and their sources

ESG rating disagreements are a widespread phenomenon. Existing studies attribute their primary causes to differences in rating agencies' indicator construction methodologies [3] and low-quality corporate ESG disclosures [4].

Rating agencies exhibit significant variations in indicator selection, data sources, and weighting due to differing philosophies, priorities, and data collection capabilities. For instance, Huazheng incorporates product safety indicators in its ratings, whereas SynTao Green Finance does not, leading to divergent evaluations. Thus, differences in rating logic and methodologies are a key structural driver of ESG rating disagreements.

Additionally, low-quality corporate ESG disclosures also lead to rating discrepancies. Currently, there is no unified global standard for ESG information disclosure. By 2016, there were 383 ESG disclosure standards globally [5]. The lack of standardization in the content, format, and frequency of corporate ESG reporting reduces the comparability and verifiability of information. This increases the difficulty for rating agencies in collecting, interpreting, and processing ESG data, ultimately undermining the consistency of rating outcomes. According to Christensen et al. [6], the more ESG information companies disclose, the greater the subjective judgment ESG rating agencies employ in their assessments, thereby amplifying divergence in ESG ratings. Liu et al.'s study [7] on China's A-share listed companies reached similar conclusions, further validating the negative correlation between information disclosure quality and rating consistency.

2.1.2. The impact of ESG rating disagreements on debt financing costs

In academia, research on the economic consequences of ESG rating divergence remains in its nascent stage. Particularly regarding the impact of ESG rating discrepancies on corporate debt financing costs, existing literature has yet to reach a consensus.

Some studies suggest that ESG rating disagreements increase debt financing costs. Zhang Yunqi et al. [8] found that such disagreements heighten market uncertainty about corporate ESG performance, leading to higher capital costs. Wang Yuhan [9] further argued that ESG rating disagreements elevate financing costs by attracting negative media coverage. Conversely, other

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studies posit that ESG rating disagreements reduce financing costs. Chen Pengcheng et al. [10] highlight that ESG rating divergence can actually reduce debt financing costs through three key channels, which are enhancing ESG disclosure quality, stimulating corporate green innovation, and attracting analyst attention.Li Fengyu et al. [11] proposed that divergent ratings provide incremental information, enabling investors to assess ESG performance multidimensionally and thereby lowering financing costs.

2.2. Theoretical analysis and hypothesis development

Information production theory posits that public disclosures and private information production are substitutive. When corporate disclosures are insufficient, ESG rating agencies tend to supplement proprietary information through independent channels. Due to variations in evaluation methodologies, focus areas, and information acquisition channels among different ESG rating agencies, significant rating discrepancies may in fact, reflect more comprehensive informational dimensions. This divergence can help mitigate information asymmetry between investors and firms, thereby reducing corporate debt financing costs [12].

Creative destruction theory suggests that market perceptions of new information and corporate value evolve dynamically. The divergence in ESG ratings reflects heterogeneous market perceptions of a firm's intrinsic value. Certain rating agencies may identify signals of underrecognized ESG potential, triggering investor reassessment of the company's latent value. This cognitive diversity stemming from informational asymmetries facilitates more forward-looking and inclusive external evaluations, potentially enabling firms to secure debt financing at lower costs.

H1: ESG rating disagreements reduce corporate debt financing costs.

The Porter Hypothesis posits that reasonable environmental regulations spur technological innovation. ESG-focused firms prioritize green R&D [13], bolstering sustainability and risk management. This, to some extent, enhances corporate credibility and reduces creditors' reliance on ESG ratings. Investors are more inclined to attribute ESG rating discrepancies to methodological variations across rating agencies—including differences in assessment criteria, data collection practices, and analytical approaches—rather than to fundamental issues in corporate value. Consequently, green innovation efficiency weakens the cost-reducing effect of ESG disagreements.

H2: Green innovation efficiency weakens the negative relationship between ESG rating disagreements and debt financing costs.

3. Research design and empirical analysis

3.1. Sample selection and data sources

The sample comprises Chinese A-share listed companies spanning from 2018 to 2024. ESG disagreements are calculated using ESG ratings from Huazheng, SynTao Green Finance, FTSE Russell, and WIND. The corporate financial data are sourced from the CSMAR database, while the ESG rating data are obtained from the WIND database. This research takes several steps to refine the data: (1)samples in the financial sector are ruled out; (2)ST* and ST status are excluded; (3)samples lacking critical variables are excluded. The final sample includes 9,044 firm-year observations. Continuous variables are winsorized at 1% and 99%.

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3.2. Variable definitions

3.2.1. Dependent variable

Debt financing cost(Cost): Following the methodologies of Li Guangzi [14] and Wei Zhihua et al. [15], this research measures corporate debt financing costs as the ratio of a firm's financial expenses to its year-end total liabilities. The dependent variable is percentage-transformed, meaning a one-unit increase in the independent variable corresponds to a percentage-point change in debt capital costs.

3.2.2. Independent variable

ESG rating divergence (ESG_dif): Considering the differences in rating scales across agencies, this research converts the ratings to numerical values. For Huazheng and WIND, which use a nine-grade rating system, their scores are numerically coded from 1 (lowest) to 9 (highest). SynTao Green Finance uses a ten-grade system. Since no companies in the sample received the lowest grade (D), this research assigns values from 1 (C-) to 9 (A+). For FTSE Russell's 0-3.6 scoring system, the original scores are multiplied by 9/3.6 to convert them to a 0-9 scale. After this standardization, ESG_dif is calculated as the standard deviation of a firm's ESG ratings from different agencies in the same year. For firms with only one ESG rating in a given year, ESG_dif is set to 0.

3.2.3. Control variables

This study incorporates a set of control variables in the model, including: Leverage (Lev), return on assets(ROA), revenue growth (Growth), firm size (Size), inventory-to-sales ratio (ISR), firm age (Est), fixed asset ratio (FAR), intangible asset ratio (IA). The variable definitions are presented in Table 1.

Table 1. The variable definitions

	Variable	Sign	Definition
Dependent Variable	debt financing cost	cost	Financial expenses / year-end total liabilities*100
Independent Variable	ESG rating divergence	ESG_dif	The standard deviation of the company's ESG ratings across all rating agencies in the year.
Control Variables	leverage	Lev	Total liabilities / total assets
	return on assets	ROA	Net profit / total assets
	revenue growth	Growth	(Current year operating revenue - Prior year operating revenue) / Prior year operating revenue
	firm size	Size	ln（total assets）
	inventory-to-sales ratio	ISR	Net inventory / operating revenue
	firm age	Est	log(firm age+1)
	fixed asset ratio	FAR	Net fixed assets /total assets
	intangible asset ratio	IA	Net intangible assets / total assets

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3.3. Econometric model specification

This study employs a two-way fixed effects model to examine the impact of ESG rating divergence on corporate debt financing costs.

$$Cost_{it} = \beta_0 + \beta_1 ESG_dif_{it} + \beta_2 Controls_{it} + year_t + id_i + \varepsilon_{it} \quad (1)$$

$Cost_{it}$ represents corporate i's debt financing cost in year t. ESG_dif_{it} represents corporate i's ESG rating divergence in year t, $Controls_{it}$ represents corporate i's control variables in year t, ε_{it} and represents error terms. id_i stands for Individual fixed effects, $year_t$ stands for time fixed effects.

4. Empirical results

4.1. Descriptive statistics

Table 2 shows the key variables' descriptive statistics. Cost (mean = 0.526, SD = 2.608) varies widely. ESG_dif (mean = 0.714, SD = 0.519) confirms rating disagreements, and the degree of rating divergence varies significantly across firms. Other variables align with prior literature [16].

Table 2. Descriptive statistics of key variables

VARIABLES	N	mean	sd	min	max
cost	9,044	0.526	2.608	-16.44	5.674
ESG_dif	9,044	0.714	0.519	0	2.135
Lev	9,044	0.450	0.186	0.0550	0.890
ROA	9,044	0.0383	0.0653	-0.269	0.248
Growth	9,044	0.293	0.685	-0.704	4.884
Size	9,044	22.71	1.372	19.32	26.39
ISR	9,044	0.250	0.297	0	3.210
Est	9,044	1.321	0.125	0.954	1.568
FAR	9,044	0.200	0.148	0.00182	0.655
IA	9,044	0.0470	0.0533	3.10e-05	0.335

4.2. Baseline regression

Obtained from estimating Equation (1), the baseline regression results examining the impact of ESG rating divergence on debt financing costs are presented in Table 3. Without control variables, the coefficient of ESG_dif on Cost is -0.1050, statistically significant at the 5% level. After incorporating control variables, the coefficient becomes -0.1291 with 1% significance. A one-standard-deviation increase in ESG_dif leads to an average 0.65 standard-deviation decrease in Cost (=2.608 × -0.1291 / 0.519). According to information production theory and creative destruction theory, ESG rating divergence reduces debt financing costs by mitigating information asymmetry and triggering market re-evaluation of firms' latent value.

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Table 3. Baseline regression results

	(1)	(2)
VARIABLES	cost	cost
ESG_dif	-0.1050**	-0.1291***
	(0.049)	(0.047)
Constant	0.6013***	-2.9891
	(0.035)	(3.631)
Controls	NO	YES
Fixed effects	Company and Year	
Observations	9,044	9,044
R-squared	0.760	0.774

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.3. Robustness checks

This study employs robustness checks by alternating the dependent variable, adding macroeconomic control variables, and adding industry fixed effects. Firstly, following the approach of Avramov et al. [17], this study adopts an alternative measurement for ESG rating divergence. This research converts all agency ratings into a comparable nine-grade scale, then conducts rankings of ESG scores for all rated firms within each rating agency, and standardizes these rankings to create ESG_rank. The regression results are presented in Column (1) of Table 4, which remain consistent with our baseline findings. Second, after incorporating GDP growth rate as an additional control variable, both the coefficient magnitude and statistical significance of ESG_dif remain consistent with our baseline results. Third, the re-estimation of Equation (1) with industry fixed effects (Column 3, Table 4) yields coefficient estimates that are qualitatively and statistically consistent with our main regression results.

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Table 4. Robustness checks

	(1)	(2)	(3)
VARIABLES	cost	cost	cost
ESG_rank	-0.404**		
	(-2.65)		
ESG_dif		-0.129**	-0.136**
		(-2.73)	(-2.80)
Constant	-3.223	-2.429	-4.100
	(-0.88)	(-0.67)	(-1.11)
GDP_Growth		-16.45*	
		(-2.53)	
Controls		YES	
Fixed effects	Company and Year		Company, Year and Industry
Observations	8,857	9,044	8,928
R-squared	0.769	0.774	0.775

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.4. Mechanism test

Following Liu Chang et al. 's methodology [18], this study measures green innovation efficiency (Efi) as the ratio of green innovation output to input. Output is measured by the annual count of green patents, while input is measured by R&D expenditures in the corresponding year.

As shown in Table 5, the interaction term ESG_Dif×Efi exhibits a statistically significant coefficient of -0.0019, indicating that green innovation efficiency attenuates the cost-reducing effect of ESG rating divergence. This finding supports Hypothesis 2.

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Table 5. Moderating effect of technological innovation

	(1)
VARIABLES	cost
ESG_dif	-0.1388***
	(0.049)
ESG_difxEfi	0.0019**
	(0.001)
Efi	-0.0016**
	(0.001)
Constant	-2.9958
	(3.631)
Controls	YES
Fixed effects	Company and Year
Observations	9,044
R-squared	0.774

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5. Heterogeneity analysis

4.5.1. Ownership

Given the significant influence of ownership structure on firm performance [19], samples are stratified into state-owned enterprises (SOEs) and non-SOEs to examine heterogeneous effects. As Table 6 demonstrates, the coefficient of ESG rating divergence is statistically insignificant for SOEs, whereas it remains significantly negative ($p < 0.05$) for non-SOEs. The close information linkages between banks and SOEs enable more comprehensive assessments of SOEs' ESG performance [20], allowing lenders to evaluate their intrinsic value and risks more independently. This consequently diminishes banks' reliance on ESG rating divergence. Moreover, SOEs' inherent political attributes and mandated social responsibilities result in lower public sensitivity to their ESG disclosures. It reduces their market competitiveness value of ESG performances relative to non-SOEs [21]. Therefore, compared to SOEs, non-SOEs' ESG rating divergence can reduce a corporation's debt financing cost more significantly.

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Table 6. Heterogeneity analysis: ownership

	(1)	(2)
	SOEs	non-SOEs
VARIABLES	cost	cost
ESG_dif	-0.0420	-0.1648**
	(0.051)	(0.066)
Constant	-0.1281	-7.1166
	(3.745)	(5.120)
Controls	YES	
Fixed effects	Company and Year	
Observations	2,914	6,104
R-squared	0.866	0.758

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.5.2. Region

China exhibits significant regional disparities in economic development and institutional environments. Following Shen Xiaobo et al. 's methodology [22], firms are stratified into three geographic groups (eastern, central, and western regions) based on their provincial locations. As shown in Table 7, the regression coefficients of ESG_dif are statistically insignificant for firms in central and western regions, while significantly negative at the 1% level for eastern region firms. This occurs because eastern regions have more well-developed incentive policies supporting ESG compliance [23], enabling firms to obtain higher returns by improving their ESG performance. Consequently, institutional investors have stronger incentives to identify firms' underrecognized ESG potential, making ESG rating divergence's cost-reducing function more pronounced. In contrast, central and western regions place relatively lower emphasis on long-term sustainable development and ESG performance, resulting in diminished informational value of corporate ESG levels.

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Table 7. Heterogeneity analysis: regions

	(1)	(2)	(3)
	Eastern Regions	Central Regions	Western Regions
VARIABLES	cost	cost	cost
ESG_dif	-0.1915***	0.0543	0.0313
	(0.059)	(0.096)	(0.103)
Constant	0.1107	-15.5125	-9.9738
	(3.708)	(13.445)	(9.183)
Controls		YES	
Fixed effects		Company and Year	
Observations	6,697	1,417	930
R-squared	0.765	0.786	0.856

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusions and implications

This study examines the impact of ESG rating divergence on corporate debt financing costs using a two-way fixed effects model with panel data from A-share listed firms (2018-2024). The results demonstrate that ESG rating divergence significantly reduces debt financing costs, while green innovation efficiency attenuates this cost-reduction effect. Heterogeneity analyses reveal more pronounced effects for non-state-owned enterprises and firms in eastern regions.

Based on these findings, this study proposes three key implications. First, ESG rating divergence does not solely generate negative impacts on corporate operations. There is no need to standardize rating methodologies immediately. Such divergence may reflect multidimensional assessments of firms' sustainability capabilities. With this diversity, investors can gain more comprehensive insights from multiple perspectives.

Second, investors can obtain richer information about corporate sustainability by collecting ratings from multiple ESG agencies. Synthesizing these diverse signals allows for more holistic and accurate investment decisions, thereby enhancing resilience to market uncertainties.

Third, when green innovation achievements reach sufficient prominence, markets may reduce their reliance on ESG rating information. Consequently, firms should strike a strategic balance between demonstrating tangible green innovation outcomes and maintaining rating flexibility.

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