

ESG Rating Divergence and Green Bond Premium: Evidence from China's Bond Market

Wenyan Hu*

Department of Accounting, Nanjing University of Science and Technology, Nanjing, China

*Corresponding author: 2845584385@qq.com

Abstract. This paper examines the impact of ESG (Environmental, Social, and Governance) rating disagreement on the green bond premium, using a sample of green bonds issued by Chinese A-share listed companies from 2016 to 2023. Employing a fixed effects regression model, we find that greater ESG rating disagreement significantly reduces the green bond premium. Mechanism analyses suggest that, consistent with limited attention theory, rating disagreement increases perceived information noise and distracts investors, thereby altering their information acquisition behavior. Further heterogeneity analyses reveal that the negative effect is more pronounced among firms in heavily polluting industries and those with high media exposure. These findings underscore the critical role of ESG rating consistency in the pricing of green bonds and offer policy implications for improving ESG rating quality and enhancing regulatory frameworks in the green finance market.

Keywords: ESG rating disagreement; Green bond premium; Information asymmetry; Limited attention theory; Green finance.

1. Introduction

ESG rating is a comprehensive assessment tool for the sustainable development ability of enterprises through the three dimensions of environmental, social and governance. It has been widely regarded as an important international evaluation tool to measure the level of green and sustainable management of enterprises. In the world, the application of ESG rating is increasingly widespread and the popularity is increasing. In China, although nearly 20 institutions have carried out ESG evaluation work for listed companies, the rating results of different institutions for the ESG performance of the same enterprise often show great differences. This phenomenon is called 'rating inconsistency' or 'rating divergence', which may lead to investors' lower trust in these rating information, thus affecting their investment decisions. Further, rating differences may also interfere with the response of the capital market to the green development of enterprises, resulting in deviations in the market's valuation of related enterprises [1]. Therefore, studying the impact of ESG rating divergence on capital market reaction not only has theoretical significance, but also has important practical value for investor behavior, policy makers and market regulators.

Since its official launch in 2016, China's green bond market has developed rapidly, becoming an important part of the global green bond market and providing important financial support for promoting green industry [2]. Compared with traditional bonds, green bonds have attracted much attention not only because of their environmental protection, low carbon and other attributes, but also because of their importance in promoting sustainable development. In terms of the purpose of raising funds, the funds of green bonds are specifically used to support the development and construction of green projects in line with environmental protection, low-carbon and other green projects, which have a direct impetus to the realization of sustainable development goals and often attract investors with long-term investment intentions. Therefore, in the context of the global economy's transition to green, the importance of the green bond market has become increasingly prominent and plays an increasingly critical role. The green bond premium refers to the yield difference between green bonds and traditional bonds with similar yield characteristics, which is manifested in the willingness of investors to accept lower yields in order to support green projects [3].

Although the respective research areas of green bonds and ESG ratings have received some attention, research in the cross-cutting areas of these two topics is still relatively scarce, that is, the

impact of ESG rating divergence on green bond premiums. First of all, the green bond market in China started late, so the relevant market data is relatively insufficient, and many studies have not been able to carry out systematic and comprehensive quantitative analysis. Secondly, the ESG rating divergence in China is still in the early stage of development. Most of the related research relies on limited data and samples, and a representative theoretical framework has not yet been formed[4]. Therefore, this paper will focus on how ESG rating divergence affects the premium of green bonds in the Chinese market and fill the academic gap in this field. Through in-depth analysis of this issue, this paper aims to provide theoretical basis for policy makers and provide valuable reference for the further development of China 's green bond market.

At present, the global climate problem is becoming more and more serious. China is facing the pressure of green transformation of the industrial system and the possible external constraints brought by the international carbon border adjustment mechanism (such as carbon tax). In this context, promoting the reform of carbon emission regulatory system and strengthening the role of market mechanism in carbon governance have become the key issues to achieve sustainable development. This not only reflects the global environmental responsibility, but also concerns the high-quality development of China 's economy and the upgrading of industrial structure.

In the green financial system, green bonds, as an important tool to support green project financing, play an increasingly prominent role in China 's debt financing system with low default risk, large-scale issuance and tradability. It is different from the use of funds and policy orientation of traditional bonds, making the ' green bond premium ' an important indicator to measure the efficiency of green finance and the perfection of market mechanism[5].

In the development of green economy, the environmental information disclosure system is of key significance. As an important mechanism for financial markets to guide resource allocation, information disclosure helps to alleviate information asymmetry in the field of green finance, improve the efficiency of capital flows to environmentally friendly projects, and ensure the effective flow of funds to green projects. In the absence of effective environmental information disclosure, green financial markets may be inefficient or even passive[6]. In recent years, ESG performance, as a new form of multi-dimensional information disclosure, has gradually gained the attention of capital markets and become a new focus for supporters of " stakeholder theory " and value investors[7].

The existing literature has done relevant research on the mechanism of ESG divergence affecting the stock market. However, due to the difference in the sensitivity of the stock market and the bond market to information, the empirical evidence obtained in the stock market cannot be simply extrapolated to the bond market [8]. Based on this, this paper empirically analyzes the impact of ESG rating divergence on green bond premium based on the green bond data of China 's A-share listed companies from 2016 to 2023. The main contributions are as follows : (1) Expand the research perspective of ESG rating differences in corporate financing decisions ; (2) Enrich the empirical evidence of the influencing factors of green bond premium [9].

2. Literature Review and Research Hypothesis

2.1. Literature Review

2.1.1 Causes and Consequences of ESG Rating Divergence

ESG rating has become an important reference for measuring the environmental, social and governance performance of enterprises. It is not only widely used in the field of practice, but also gradually becomes one of the core issues of academic research. However, more and more studies and reports have pointed out that different rating agencies have obvious differences in the ESG performance of the same enterprise, and this inconsistency has led to in-depth discussions on its causes and effects.

At present, the formation mechanism of ESG rating divergence has been analyzed from multiple perspectives. First of all, due to the lack of a unified evaluation framework and standards, rating

agencies often rely on their own independent evaluation logic and weight setting in the specific evaluation process, resulting in deviations in the results. Berg et al. conducted a comparative study on the rating data of six mainstream international ESG rating agencies, and pointed out that the rating differences are mainly due to three aspects: the measurement methods, coverage and weight distribution of evaluation indicators. In particular, the difference in measurement methods is the main factor leading to differences [10]. Secondly, the quality and extent of enterprise ESG information disclosure is also considered to be a key variable affecting rating consistency. Some scholars believe that the more information provided by enterprises, the greater the space for rating agencies to use different indicator systems to interpret the same information, which may aggravate the inconsistency between ratings. Christensen et al. found that the more fully disclosed the information, the greater the deviation between the rating results [11]. In contrast, Kimbrough et al. have argued that voluntary disclosure of ESG reports can improve information transparency, thereby helping to reduce information errors between rating agencies and reduce the dispersion of ratings [12]. In terms of the economic impact of rating divergence, the existing literature generally points out that it has adverse consequences. Avramov et al.'s research shows that the inconsistency of ESG ratings can easily lead to market concerns about risks, increase risk premiums, inhibit investor participation enthusiasm, and may have adverse effects on risk-return relationships, social value realization, and overall economic welfare [13]. In addition, Liu et al. found through empirical analysis that rating divergence has a 'noise effect' in the capital market, which can significantly enhance the synchronization of stock prices [14]. This situation further aggravates the sensitivity of corporate stock prices to systemic factors and reduces the market's ability to identify the true value of enterprises. At the same time, high rating differences also mean that the cost and difficulty of enterprises to obtain external financing increase, forcing them to rely more on internal funds for operation and investment.

2.1.2 Green bond premiums

As a relatively novel financial instrument, green bonds are still in the early stages of academic research. There remains no consensus on the core issue of whether green bonds exhibit a premium. Some studies suggest that green bonds have significantly lower credit spreads compared to conventional bonds, and the observed green premium varies significantly under different conditions. For example, Wang et al [15]. find empirically that green bonds issued by firms or underwriters with strong performance in social responsibility are more likely to demonstrate a noticeable green premium. Additionally, firms with dispersed ownership structures and long-term institutional investors are more inclined to achieve higher green bond premiums.

However, not all research supports the existence of a significant green premium. Other scholars argue that green bonds do not exhibit consistent pricing advantages—either a premium or a discount—compared to conventional bonds. The relationship between the market performance of green bonds and their “green” label remains ambiguous. For instance, Jiang and Fan [16], using a sample of 387 green bonds issued between 2016 and 2019, find that green bonds do not exhibit lower financing costs in practice. Particularly in the absence of third-party certification, investors tend to demand higher risk compensation, thereby widening the credit spread.

From the current literature landscape, although ESG factors have gradually attracted academic attention in the pricing mechanism of green bonds, most studies focus on the impact of ESG rating levels on pricing outcomes, while insufficient attention has been paid to the consequences of ESG rating disagreement. In fact, given the absence of unified ESG standards and the ongoing development of regulatory systems, it is common for different rating agencies to assign divergent scores to the same firm. This inconsistency in ESG ratings introduces a complex informational environment, increasing uncertainty for investors evaluating green bonds. It may also amplify information asymmetry, which in turn affects investors' ability to identify and respond to the green attributes of a bond, ultimately influencing its credit spread performance.

2.2. Research Hypothesis

Inadequate information disclosure remains one of the key obstacles to improving the pricing efficiency of China's green bond market, particularly as it relates to green bond credit spreads. When an issuing firm exhibits low information transparency, information asymmetry in the market increases, prompting investor concerns about potential risks. Consequently, investors demand higher risk compensation, which is directly reflected in widened bond spreads [17]. Conversely, effective information disclosure by firms can reduce uncertainty, boost market confidence, compress credit spreads, and enhance the pricing advantage of green bonds.

In the context of ESG-related information, although ESG ratings can help mitigate information asymmetry to some extent, significant discrepancies among rating results may render such information ineffective or even misleading. Unlike a single consistent rating, divergent ESG assessments often convey ambiguous, inconsistent, or even contradictory signals. This makes it more difficult for investors to interpret ESG information accurately, thereby undermining the green bond premium.

From the perspective of signaling theory, ESG ratings serve as a means for firms to communicate their sustainability performance to external investors in capital markets. However, when different rating agencies assign widely varying scores to the same firm, such "multiple signals" diminish the perceived credibility and interpretability of the information. As a result, ESG ratings lose their intended signaling function, preventing investors from forming a comprehensive and accurate understanding of the firm's ESG performance. This heightened uncertainty raises risk perception, which in turn leads investors to demand higher risk premiums, ultimately eroding the pricing advantage of green bonds.

According to the theory of limited attention, investors do not possess unlimited cognitive resources and must selectively allocate their attention within limited time and capacity. When ESG ratings exhibit substantial disagreement, the associated complexity and uncertainty increase markedly. Investors face high cognitive costs when attempting to interpret this heterogeneous information. On one hand, such "noisy information" distracts investors during ESG evaluation, reducing their ability to simultaneously process other critical information—such as financial performance, governance structure, or project use of proceeds—thereby leading to valuation bias and lower green bond premiums. On the other hand, faced with complex information environments and pronounced rating conflicts, investors may shift their limited attention toward alternative investment targets with more consistent and transparent ESG signals, thereby reducing demand for green bonds with high rating disagreement and indirectly exerting downward pressure on their pricing.

In summary, we reasonably expect that ESG rating disagreement increases the issuance spread of green bonds, thereby diminishing the green bond premium. Based on this, we propose the following hypothesis:

H1: *Ceteris paribus*, ESG rating disagreement reduces the green bond premium.

3. Research Design

3.1. Research Sample

To investigate the impact of ESG rating disagreement on green bond premiums, this study constructs a panel dataset of green bonds issued by Chinese A-share listed firms between 2016 and 2023. Based on this dataset, we conduct a systematic empirical analysis.

The key explanatory variable—ESG rating disagreement—is constructed using ESG scores from six representative rating agencies: Bloomberg, Wind, Huazheng, FTSE Russell, SynTao Green Finance, and Menglang. ESG data are sourced from the Wind Financial Terminal, the CSMAR database, Bloomberg, and the official websites of the respective agencies to ensure data completeness and reliability. We quantify rating disagreement by calculating the cross-agency dispersion in ESG

scores assigned to the same firm at the same point in time, thereby capturing the inconsistency in ESG assessments.

The dependent variable, green bond premium, is measured using the direct matching method, which is widely adopted in asset pricing research. Following Zerbib (2019) and Qi & Liu (2021) [18,19], each green bond is matched with a comparable non-green (conventional) bond issued by the same firm. Matching criteria include: (1) the same issuer, (2) identical credit ratings, and (3) differences in both remaining maturity and time to maturity of no more than one year. These strict criteria enhance the comparability between bonds. Applying this approach yields a final sample of 222 matched green–non-green bond pairs.

All raw data on green bond yields and control variables are obtained from the Wind and CSMAR databases. To improve the quality and representativeness of the sample, we exclude observations related to financial firms, ST-designated firms, and cases with missing values for key variables. During the data preprocessing stage, all continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Specifically, we first collect the raw data, then apply the selection criteria, and finally implement winsorization. This process ensures data robustness and improves the reliability of the subsequent empirical analyses.

3.2. Variable Definitions

3.2.1 Green Bond Premium

As a financial instrument, the defining feature of green bonds lies in their environmentally friendly use of proceeds, which distinguishes their pricing mechanism from that of traditional bonds. Since green bonds typically fund projects with clean, sustainable, and low-carbon characteristics, some investors are willing to accept lower returns to support environmental initiatives. This results in lower interest rates for green bonds relative to comparable conventional bonds—a phenomenon referred to as the “green premium.” This premium reflects the yield differential between green and conventional bonds under otherwise similar conditions, capturing a “green preference” premium beyond the risk-free rate and credit risk premium.

Following the methodology proposed by Xie Jinjing et al [20], this study measures the green bond premium as the difference between the coupon rate of a green bond and that of its matched conventional bond. A negative value indicates that the green bond bears a lower financing cost, implying the existence of a green premium relative to a similar conventional bond. Furthermore, the greater the absolute value of this difference, the stronger the market's recognition or preference for green bonds—i.e., the more pronounced the green premium. This metric offers a direct measure of the impact of environmental attributes on bond pricing and serves as a valuable indicator for assessing the efficiency of the green finance market.

3.2.2 ESG Rating Divergence

The core explanatory variable of this study is ESG rating disagreement (ESG Rating Disagreement, hereafter referred to as ESGU). Drawing on the quantitative approach proposed by Avramov et al. [13], this study selects ESG ratings from six representative agencies—Bloomberg, Wind, Huazheng, FTSE Russell, SynTao Green Finance, and MioTech—to compare the ESG scores assigned to the same firm at the same point in time. We construct the ESGU indicator based on the standard deviation of these ratings to quantify the degree of disagreement.

The construction process includes the following steps:

Score normalization: Since the rating systems of different agencies vary significantly—with some using letter grades (e.g., A, BBB) instead of continuous numerical values and differing upper and lower bounds—direct comparison is not feasible. To improve comparability, we first convert all raw ratings into percentile ranks and then standardize them to unify the scoring scale.

Calculation of rating disagreement: For each pair of rating agencies, we calculate the standard deviation between their ESG scores for firm i using Equation (1):

$$S_{m,w,i} = \sqrt{\frac{(g_{m,i} - \frac{g_{m,i} + g_{w,i}}{2})^2 + (g_{w,i} - \frac{g_{m,i} + g_{w,i}}{2})^2}{2-1}} \quad (1)$$

Equation (1) calculates the standard deviation between two ESG ratings and can be used to measure the degree of ESG rating divergence. Specifically, $g_{m,i}$ denotes the ESG score assigned to firm i by rating agency m , and $g_{w,i}$ denotes the ESG score assigned to the same firm by agency w . The term $\bar{g}_i = \frac{g_{m,i} + g_{w,i}}{2}$ represents the average of the two agencies' ratings. The denominator (2-1=1) indicates the degrees of freedom when calculating the sample standard deviation between two values.

Construction of the ESGU indicator: We calculate the standard deviation for each possible pairwise combination of the six rating agencies and then take the average of all these pairwise standard deviations. This average value serves as the final ESG rating disagreement indicator (ESGU) for each firm at each time point.

3.2.3 Control Variables

To improve the accuracy of the regression analysis and minimize the influence of other potential confounding factors, this study incorporates a comprehensive set of control variables into the empirical model. These variables are drawn from three main dimensions: ESG rating level, bond characteristics, and firm fundamentals.

First, regarding the ESG dimension, considering that a firm's overall ESG performance in the capital market may directly affect investor behavior, we include the composite ESG score (*ESG*) as a baseline control variable. This allows us to isolate the effect of ESG rating disagreement from that of the firm's overall ESG quality.

Second, with respect to bond characteristics, we introduce the following variables: (1) bond issuance size (*BondSize*), reflecting the scale of the financing project; (2) bond maturity (*BondMaturity*), capturing repayment horizon and interest rate sensitivity; and (3) bond rating (*BondRating*), which measures the degree of default risk.

At the firm level, we select the following variables to control for the potential impact of corporate performance and governance on bond pricing: (1) firm size (*Size*); (2) firm age (*Age*); (3) financial leverage (*Lev*), reflecting the debt burden; (4) return on assets (*ROA*), capturing profitability; (5) current ratio (*Current*), indicating liquidity; (6) Tobin's Q (*TobinQ*), reflecting the market valuation relative to book value; (7) duality of chairman and CEO (*Dual*); (8) the ownership percentage of the largest shareholder (*Top1*), indicating ownership concentration; and (9) ownership type (*SOE*), distinguishing between state-owned and non-state-owned enterprises.

Additionally, to account for time- and industry-specific heterogeneity, year and industry fixed effects are included in all regressions. Detailed definitions and data sources for all variables are provided in Table 1.

Table 1. Variable definition

Variable Type	Variable Name	Symbol	Definition
Dependent Variable	Green bond premium	Gspread	Yield spread between green bonds and comparable conventional bonds
Explanatory Variable	ESG rating disagreement	ESGU	Average standard deviation of ESG scores across rating agencies
	Composite ESG score	ESG	Average ESG rating score
Bond Characteristics	Bond issuance size	BondSize	Natural logarithm of (issuance size + 1)
	Bond maturity	BondMaturity	Number of years to maturity
	Bond rating	BondRating	Assigned as: AAA=9, AA+=8, AA=7; higher values indicate better ratings
Firm Characteristics	Firm size	Size	Natural logarithm of total assets
	Firm age	Age	Natural logarithm of the number of years since listing
	Financial leverage	Lev	Total liabilities / total assets
	Profitability	ROA	Net income / average total assets
	Ownership type	SOE	Dummy variable: 1 for state-owned, 0 otherwise
	Current ratio	Current	Current assets / current liabilities
	Tobin's Q	TobinQ	Market value / book value of total assets
	CEO-chairman duality	Dual	Dummy variable: 1 if CEO and chairman are the same person, 0 otherwise
Fixed Effects	Top shareholder ownership ratio	Top1	Shares held by largest shareholder / total shares
	Year fixed effects	Year	Year dummy variables
	Industry fixed effects	Industry	Industry dummy variables

3.3. Regression Model Construction

In order to verify the hypothesis and examine the impact of ESG rating divergence on the green bond premium, this paper constructs the following regression model (2) for testing :

$$Gspread_{i,t} = \alpha_0 + \alpha_1 ESGU_{i,t} + \alpha_i Controls_{i,t} + \sum Year + \sum Ind + \varepsilon_i \quad (2)$$

4. Analysis of Empirical Results

4.1. Descriptive Statistic

Table 2 presents the descriptive statistics of the main variables. As shown in the table, the average value of the green bond premium is -0.3233, indicating that, compared to conventional bonds, green bonds generally have lower default risk, and investors are willing to pay a premium for their green attributes. In addition, the average credit rating of green bonds is 8.9477, with a minimum value of 8, suggesting that most green bonds are rated AAA.

The average bond maturity is 3.4373 years, with a median of 3 years and a standard deviation of 0.9345, indicating that the majority of green bonds have a 3-year term. Regarding issuer characteristics, the average firm size is 26.0404 (log-transformed total assets), the average financial leverage is 67.81%, and the average return on assets (ROA) is 3.62%.

Table 2. Descriptive Statistic

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) p50	(6) max
<i>Gspread</i>	222	-0.3233	0.4891	-1.5308	-0.2409	0.9006
<i>Size</i>	222	26.0404	0.7075	23.7269	26.4936	26.4956
<i>Age</i>	222	2.8096	0.5358	0.0000	2.8908	3.3678
<i>Lev</i>	222	0.6781	0.0976	0.4028	0.711	0.8882
<i>ROA</i>	222	0.0362	0.0312	-0.0434	0.0288	0.1373
<i>TobinQ</i>	222	0.9825	0.2216	0.8253	0.931	2.0597
<i>Dual</i>	222	0.2529	0.4359	0.0000	0.0000	1.0000
<i>Top1</i>	222	43.9508	12.7907	8.258	46.3712	74.8945
<i>SOE</i>	222	0.9775	0.1508	0.000	1.0000	1.0006
<i>Current</i>	222	0.9154	0.4199	0.314	0.8805	1.8510
<i>BondRating</i>	222	8.9477	0.2257	8.0000	9.0009	9.0008
<i>ESGU</i>	222	0.1829	0.0732	0.0542	0.1887	0.3446
<i>ESG</i>	222	0.6692	0.1802	0.1805	0.7000	0.9528
<i>BondMaturity</i>	222	3.4373	0.9345	2.0000	3.0000	5.0000

4.2. Benchmark Regression Analysis

Table 3 reports the empirical results regarding the impact of ESG rating disagreement on the green bond premium. Columns (1) to (3) present the regression results under three model specifications: without control variables, with controls for bond and ESG characteristics, and with full controls, respectively.

As shown in Column (3), the coefficient of ESG rating disagreement is 1.170 and is statistically significant at the 5% level. This indicates that higher ESG rating disagreement significantly reduces the green bond premium, thereby providing empirical support for Hypothesis 1.

Table 3. Baseline Regression Results

	(1) Gspread	(2) Gspread	(3) Gspread
ESGU	1.632*** (0.546)	1.201** (0.563)	1.170** (0.586)
ESG		-1.092*** (0.193)	-0.703*** (0.247)
BondRating		0.306* (0.181)	0.210 (0.206)
BondMaturity		-0.075** (0.033)	-0.132*** (0.038)
BondSize		0.223*** (0.046)	0.118** (0.047)
Size			-0.096 (0.101)
Age			0.125* (0.068)
Lev			1.663** (0.689)

ROA			7.797*** (2.240)
Current			-0.047 (0.185)
TobinQ			0.059 (0.242)
Dual			-0.138 (0.138)
Top1			0.008** (0.003)
SOE			0.114 (0.262)
N	222.000	222.000	222.000
r2	0.241	0.419	0.544

4.3. Robustness Tests

4.3.1 Change the Measurement of ESG Rating Divergence

In the baseline regression, ESG rating disagreement is measured as the standard deviation of ESG scores provided by six rating agencies, which effectively captures the degree of divergence in their assessments of a firm's ESG performance. However, considering that SynTao Green Finance and MioTech may have relatively limited data coverage, we conduct a robustness check using only the ratings from four major agencies: Bloomberg, Wind, Huazheng, and FTSE Russell.

Based on the ESG scores from these four agencies, we recalculate the standard deviation and construct a new ESG rating disagreement indicator, denoted as ESG1. We then re-estimate the regression model using ESG1 as the key independent variable.

The results, which control for all covariates and include year fixed effects, show that ESG1 remains positively associated with the dependent variable at the 5% significance level. This finding is consistent with the baseline regression and further confirms that increased ESG rating disagreement significantly reduces the green bond premium, thereby reinforcing the negative effect of ESG disagreement.

4.3.2 Excluding samples during the epidemic

To further test the robustness of the findings, this study excludes the sample from the year 2020, during which the COVID-19 pandemic had a profound and widespread impact on the global economy. The business environment, market performance, and ESG practices of firms were all significantly affected. During this exceptional period, ESG ratings may have been influenced by pandemic-related factors, resulting in discrepancies compared to ratings from normal years. Therefore, removing the 2020 sample allows us to examine whether the conclusions of this study remain valid under non-crisis conditions.

The regression results after excluding the pandemic period remain statistically significant, indicating that the findings are robust even after controlling for the extreme external shock of COVID-19. Specifically, the effect of ESG rating disagreement on the green bond premium continues to be significant, and the sign of the coefficient remains consistent with the baseline regression. This further confirms that the observed negative relationship is not driven solely by anomalies during the pandemic, and the findings hold broad applicability.

Table 4.Robustness Tests

	(1) Gspread	(2) Gspread
ESGU	1.170** (0.591)	

ESG	-0.703*** (0.249)	
Size	-0.096 (0.102)	-0.117 (0.095)
Age	0.125* (0.069)	0.118* (0.068)
Lev	1.663** (0.695)	1.706** (0.670)
ROA	7.797*** (2.260)	5.869** (2.315)
Current	-0.047 (0.186)	-0.082 (0.179)
TobinQ	0.059 (0.244)	0.187 (0.238)
Dual	-0.138 (0.139)	-0.108 (0.140)
Top1	0.008** (0.003)	0.007** (0.003)
SOE	0.114 (0.265)	0.203 (0.259)
BondRating	0.210 (0.208)	0.281 (0.198)
BondMaturity	-0.132*** (0.038)	-0.121*** (0.037)
BondSize	0.118** (0.048)	0.126*** (0.047)
ESGU1		0.658** (0.297)
ESG1		-0.685*** (0.217)
N	222.000	195.000
r2	0.542	0.556

5. Further Analysis

5.1. Mechanism Test

Based on the preceding theoretical analysis, when ESG ratings exhibit significant disagreement, the complexity and uncertainty of the associated information increase substantially, thereby reducing the effectiveness and interpretability of the rating signals. As a result, investors are required to allocate more cognitive resources to process and interpret this ambiguous information, which diverts their limited attention away from other critical signals. In such a context, information asymmetry intensifies, and investors perceive higher investment risk. To compensate for this risk, they demand higher risk premiums, thereby driving up bond credit spreads [21]. Accordingly, it can be inferred that heightened investor inattention may serve as a key channel through which ESG rating disagreement diminishes green bond premiums.

To empirically test this mechanism, the Baidu Search Index is used as a proxy for investor attention. It is widely recognized as a measure of market interest in specific stocks or the overall market and has been employed in prior studies to examine the impact of investor attention on market volatility [22]. Following this approach, we construct an investor attention variable (ATT) by aggregating and

log-transforming the search volumes for each firm's stock code, abbreviated name, and full name [23].

As shown in Columns (1) and (2) of Table 5, the regression coefficient of ESGU on ATT is significantly negative, indicating that greater ESG rating disagreement leads investors to divert their attention toward broader macro-level information. This finding supports the presence of a limited attention mechanism and confirms that ESG rating disagreement constrains investors' ability to process firm-specific ESG information.

Table 5. ESG Rating Divergence and Green Bond Premium : Mechanism Test

	(1) ATT	(2) Gspread
ESGU	-3.061*** (0.456)	0.678 (0.648)
ATT		-0.161* (0.093)
ESG	-0.680*** (0.192)	-0.812*** (0.253)
Size	0.472*** (0.079)	-0.020 (0.110)
Age	0.033 (0.053)	0.130* (0.068)
Lev	1.041* (0.536)	1.830*** (0.692)
ROA	5.425*** (1.744)	8.669*** (2.284)
Current	0.514*** (0.144)	0.036 (0.190)
TobinQ	0.338* (0.188)	0.114 (0.242)
Dual	-0.073 (0.108)	-0.149 (0.138)
Top1	-0.012*** (0.003)	0.006* (0.003)
SOE	-0.342* (0.204)	0.059 (0.263)
BondRating	0.142 (0.161)	0.233 (0.206)
BondMaturity	0.006 (0.029)	-0.131*** (0.037)
BondSize	0.163*** (0.037)	0.144*** (0.050)
N	222.000	222.000
r2	0.850	0.551

5.2. Heterogeneity Analysis

To further examine whether the impact of ESG rating disagreement on green bond premiums exhibits heterogeneity, this study conducts interaction effect analyses from two perspectives: corporate pollution intensity and media attention. The detailed results are reported in Table 6.

From the perspective of firm pollution characteristics, Column (1) in Table 6 shows that the interaction term between ESG rating disagreement and the indicator for heavily polluting firms is

statistically significant. This suggests that pollution intensity moderates the relationship between ESG rating disagreement and the green bond premium. The observed heterogeneity likely stems from two main mechanisms. First, firms in heavily polluting industries face greater environmental risks and more pressure to undergo green transitions, making them more dependent on ESG information and subject to heightened scrutiny from both the market and regulators. ESG rating disagreement amplifies the uncertainty surrounding these firms' environmental risks, leading investors to demand a higher premium as compensation. Second, green bonds serve as critical signals of transformation for such firms; however, ESG rating disagreement weakens the credibility of these signals, reducing market trust in the firm's green transition. The resulting information asymmetry and heightened uncertainty prompt investors to demand higher compensation, thereby increasing the volatility of green bond premiums.

From the perspective of media attention, high levels of media coverage can significantly improve information transparency and increase scrutiny of a firm's ESG performance. Under such circumstances, ESG rating disagreement is further magnified, and investors become more sensitive to discrepancies in ESG signals. Media monitoring not only amplifies the dissemination of ESG-related information but may also trigger investor skepticism regarding the authenticity of green bonds. Consequently, when ESG ratings diverge, investors become more cautious and require a higher premium to offset the perceived information asymmetry.

Furthermore, high media attention intensifies investors' emotional reactions to ESG performance. In the presence of significant rating disagreement, media coverage may fuel doubts about the credibility of a firm's green transition, thereby influencing investment decisions. These sentiment-driven responses can exacerbate negative market expectations surrounding the firm's green bonds, pushing premiums even higher. In addition, media reports may contribute to herding behavior, prompting more investors to adopt a conservative stance toward green bonds issued by firms with inconsistent ESG ratings.

Table 6. ESG rating divergence and green bond premium : heterogeneity analysis

	(1) Gspread	(2) Gspread
ESGU	-0.298 (0.483)	4.438* (2.649)
Pollute	-0.605*** (0.219)	
Pollute_ESGU	2.595** (1.050)	
ESG	-0.472** (0.231)	-0.119 (0.228)
Size	-0.158* (0.093)	-0.068 (0.087)
Age	0.188*** (0.065)	0.128** (0.064)
Lev	1.364** (0.620)	1.578*** (0.561)
ROA	4.016*** (1.504)	4.147*** (1.413)
current	0.144 (0.133)	0.037 (0.133)
TobinQ	0.329 (0.200)	0.217 (0.199)
Dual	-0.225* (0.133)	-0.196 (0.122)
Top1	0.004	0.006*

	(0.003)	(0.003)
SOE	0.563***	0.460**
	(0.197)	(0.190)
BondRating	0.492**	0.540***
	(0.202)	(0.194)
BondMaturity	-0.108***	-0.079**
	(0.033)	(0.034)
BondSize	0.068	0.077*
	(0.043)	(0.043)
Media		-0.056
		(0.085)
Media_ESGU		-0.806*
		(0.457)
N	222.000	222.000
r2	0.488	0.522

6. Conclusion and Policy Recommendations

Against the backdrop of accelerating global climate change and the pursuit of sustainable development, ESG ratings have become a critical tool for resource allocation in green financial markets. However, the significant inconsistencies among rating agencies are weakening the effectiveness of ESG ratings, particularly in the pricing of green bonds. ESG rating disagreement undermines investor confidence, potentially raises the coupon rates of green bonds, increases the cost of green financing, and ultimately hinders the development of the green finance market and the realization of carbon neutrality goals.

Empirical findings in this study demonstrate a significant negative relationship between ESG rating disagreement and the green bond premium. This reveals that rating disagreement, as a form of information uncertainty, disrupts the efficient allocation of resources in the green finance market. Divergent evaluation criteria among rating agencies lead to fragmented information in the market, increasing the cognitive burden on investors. Based on the theories of limited attention and risk aversion, investors tend to demand higher risk premiums in response to rising uncertainty—even when the bonds themselves possess legitimate green attributes—thereby eroding the financing advantage that green bonds are expected to offer.

Moreover, the heterogeneity analysis further reveals that the adverse impact of ESG rating disagreement on green bond premiums is particularly pronounced among heavily polluting firms and firms with high media exposure. In the former case, rating disagreement amplifies market skepticism about the credibility of a firm's green transition. In the latter, media scrutiny exacerbates the dissemination of conflicting signals, intensifying negative investor expectations and reputational concerns. These findings collectively suggest that ESG rating disagreement is systematically weakening the pricing mechanism and market confidence in green bonds.

Based on these insights, this study offers the following policy recommendations:

Promote the standardization and regulatory coordination of ESG ratings. Regulatory authorities should encourage greater transparency and alignment in rating methodologies across agencies. Establishing unified data frameworks and disclosure standards would help minimize subjective bias.

Enhance ESG rating disclosure and interpretation mechanisms. Rating agencies should be required to disclose the quantitative basis and explanatory notes alongside their rating results. This would assist market participants in understanding the sources of rating disagreement and alleviate information asymmetry.

Address green premium volatility in high-risk entities. For green bonds issued by heavily polluting or reputation-sensitive firms, regulators could implement differentiated disclosure requirements and

credit enhancement mechanisms to stabilize green premiums and ensure the effectiveness of green financing.

References

- [1] Amel-Zadeh A, Serafeim G. Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal*, 2018, 74(3): 87–103.
- [2] Bonds, G. Mobilising the Debt Capital Markets for a Low-Carbon Transition.(2015). OECD and Bloomberg Philanthropies. Available at: [https://www.oecd.org/environment/cc/Green% 20bonds% 20PP](https://www.oecd.org/environment/cc/Green%20bonds%20PP), 20, 20.
- [3] Agliardi E, Agliardi R. Financing environmentally-sustainable projects with green bonds. *Environment and Development Economics*, 2019, 24(6): 608–623.
- [4] Liu Bai, Lu Jiarui, Ju Tao. Formalism or Substantialism: Green Innovation under Soft ESG Regulation. *Nankai Business Review*, 2023, 26(5).
- [5] Tang D Y, Zhang Y. Do shareholders benefit from green bonds?. *Journal of Corporate Finance*, 2020, 61: 101427.
- [6] Huang Rong, He Yuting. The Dynamic Relationship between Environmental Information Disclosure and Financing Constraints: Evidence from Heavily Polluting Industries. *Journal of Financial Economics Research*, 2020, 35(2): 63–74.
- [7] Eccles R G, Ioannou I, Serafeim G. The impact of corporate sustainability on organizational processes and performance. *Management Science*, 2014, 60(11): 2835–2857.
- [8] Zhao Li, Lu Yifan. ESG Rating Divergence and Corporate Operating Risk. *Journal of Technology Economics*, 2024, 43(7).
- [9] Chen Pengcheng, Li Zhi, He Qilong. Does ESG Rating Divergence Always Imply Negative Effects?—Evidence from the Perspective of Debt Financing Costs. *Journal of Technology Economics*, 2024, 43(5).
- [10] Berg F, Kölbel J F, Rigobon R. Aggregate confusion: The divergence of ESG ratings. *Review of Finance*, 2022, 26(6): 1315–1344.
- [11] Christensen D M, Serafeim G, Sikochi A. Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review*, 2022, 97(1): 147–175.
- [12] Kimbrough M D, Wang X, Wei S, et al. Does voluntary ESG reporting resolve disagreement among ESG rating agencies?. *European Accounting Review*, 2024, 33(1): 15–47.
- [13] Avramov D, Cheng S, Lioui A, et al. Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics*, 2022, 145(2): 642–664.
- [14] Liu Xiangqiang, Yang Qingqing, Hu Jun. ESG Rating Disagreement and Stock Price Synchronicity. *China Soft Science*, 2023(08): 108–120.
- [15] Wang J, Chen X, Li X, et al. The market reaction to green bond issuance: Evidence from China. *Pacific-Basin Finance Journal*, 2020, 60: 101294.
- [16] Jiang Feifan, Fan Longzhen. Green Premium or Discount?—Evidence from Credit Spread in China’s Green Bond Market. *Modernization of Management*, 2020(4).
- [17] Friewald N, Nagler F. Over-the-counter market frictions and yield spread changes. *The Journal of Finance*, 2019, 74(6): 3217–3257.
- [18] Zerbib O D. The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, 2019, 98: 39–60.
- [19] Qi Huaijin, Liu Siqin. Is There a Green Premium in China’s Bond Market?. *Accounting Research*, 2021(11): 131–148.
- [20] Xie Jinjing, Hou Zhenzhen. ESG Rating Divergence and Green Premium: An Empirical Study. *Credit Research*, 2024, 42(12): 77–85.
- [21] Zhou Hong, Jian Lei, Li Guoping. Corporate Social Responsibility, Credit Spread and Its Transmission Mechanism: Evidence from Listed Companies in China. *Accounting Research*, 2016(5): 18–25.

- [22] Zhang Tonghui, Yuan Ying, Zeng Wen. Can Investor Attention Improve Volatility Forecasting Accuracy? Evidence from High-Frequency Data in China's Stock Market. *Chinese Journal of Management Science*, 2020, 28(11): 192–205.
- [23] Luo Qi, Zhang Zhida, Wu Ximei, et al. Dividend Sentiment, Catering, and Crash Risk: Evidence from Baidu Search Index. *Journal of Management Sciences in China*, 2023, 26(2): 87–103.