

# Empowerment or detriment: a study on the impact of ESG rating discrepancies on green investors' decision-making

Xinyu Li<sup>1\*</sup>, Huilin Peng<sup>1</sup>, Keying Long<sup>1</sup>

<sup>1</sup>Business School, Hunan Normal University, Changsha, China

\*Corresponding Author. Email: 583753449@qq.com

**Abstract.** As global attention to sustainable development increases, Environment, Social and Governance (ESG) evaluation system has gradually become a key basis for sustainable investment decisions. However, the current indicator systems across different ESG rating agencies remain unstandardized, resulting in significant discrepancies in evaluation outcomes. Against this backdrop, this paper selects A-share listed companies from 2009 to 2022 as the research sample, utilizing ESG rating data from six agencies—Bloomberg, Wind, Sino-Securities, FTSE Russell, SynTao Green Finance, and SusallWave—to construct multiple indicators of ESG rating discrepancies. Focusing on the perspective of ESG rating discrepancies, the study investigates their impact on green investors' decision-making. The results show that ESG rating discrepancies can attract green investors, and the economic significance of this effect is evident, indicating the existence of an “information effect” within ESG discrepancies. Further analysis reveals that the “information effect” of rating discrepancies is more pronounced when listed companies exhibit lower information transparency and lower ESG rating levels. These findings provide strategies and recommendations for the construction of unified ESG rating standards, corporate sustainable development, and green investment practices.

**Keywords:** ESG rating discrepancies, green investors' decision-making, information effect, information transparency

## 1. Introduction

Sustainable development has gradually become a global consensus. Governments and social organizations worldwide are calling on enterprises to assume greater social responsibility, urging them to seek a balance between maximizing shareholder interests and fulfilling public interests, environmental protection, and other responsibilities during their business operations, thereby creating a favorable environment for sustainable social development. China's “14th Five-Year Plan” and the 2035 long-range objectives have emphasized the concept of green development and, for the first time, incorporated “carbon peaking” and “carbon neutrality” into the government work report, setting the goals of striving to achieve carbon peaking before 2030 and carbon neutrality before 2060 as part of the overall layout for building an ecological civilization. In the 2025 Government Work Report, Premier Li Qiang proposed promoting coordinated efforts to reduce carbon emissions, curb pollution, expand green initiatives, and drive growth, accelerating the economic and social development towards a comprehensive green transition.

As a crucial indicator for assessing corporate sustainable development, Environment, Social and Governance (ESG) has become a focal point of government attention in China. ESG stands for Environmental, Social, and Governance, representing a value concept, investment strategy, and evaluation tool that focuses on environmental, social, and governance performance rather than solely on financial performance [1]. In May 2024, the Ministry of Finance issued the Corporate Sustainability Disclosure Standards—Basic Standards (Draft for Comment), marking the beginning of a unified sustainability disclosure framework in China. Amidst the current tide of green development, ESG construction plays a vital role; it serves as a powerful lever for practicing the green development concept and advancing the overall ecological civilization strategy. On one hand, ESG construction provides strong support for achieving China's “dual carbon” goals; on the other hand, on the international stage, it helps enhance China's influence in the global green and sustainable development agenda, thereby promoting the establishment of a dual circulation development pattern and fostering synergistic and healthy interactions between domestic and international markets.

At the same time, the “dual carbon” goals and ESG initiatives have transformed “green” into a new direction for long-term value investing in China. Since the release of the Guidelines for Establishing the Green Financial System in 2016, the process of refining green financial policies has accelerated continuously. In April 2024, the People's Bank of China, together with the National Development and Reform Commission and five other departments, issued the Guidelines on Further Strengthening

Financial Support for Green and Low-Carbon Development, providing clear guidance for financial institutions to support the green, low-carbon economy. In October of the same year, the issuance of the Opinions on the Role of Green Finance in Building a Beautiful China further detailed the practical pathways for green finance to assist in constructing a beautiful China. These initiatives have fostered the emergence of a distinct group of institutional investors—green investors [2].

As fund investors who shoulder environmental and social responsibilities, green investors must comprehensively weigh economic, social, and environmental performance when making investment decisions. Moreover, during the growth process of enterprises, green investors actively fulfill supervisory and governance roles [3], which are crucial for enhancing firms' long-term value, reducing operational risks, and increasing returns.

To meet stakeholders' information needs regarding corporate ESG performance, various professional agencies at home and abroad have launched ESG rating services. Green investors can rely on the ratings from independent third-party agencies as a basis for allocating investment funds, thereby providing directional support for sustainable development practices. However, discrepancies often exist among different rating agencies when evaluating the same company's ESG performance, leading to ESG rating divergence. On the one hand, based on research in traditional fields such as analyst forecasts and credit rating disagreements, ESG rating divergence may manifest as a “noise effect” [4], failing to provide effective ESG information for investment decisions. On the other hand, ESG rating divergence may reflect an “information effect” [5], representing multidimensional assessments by different agencies and conveying more firm-specific information. For green investors, then, is ESG rating divergence merely noise that disrupts their decision-making, or does it provide incremental information that aids their decisions? This is an empirical question that warrants investigation.

In light of this, this study selects A-share listed companies from 2009 to 2022 as the research sample and utilizes ESG ratings from six agencies—Bloomberg, Wind, Sino-Securities, FTSE Russell, SynTao Green Finance, and SusallWave—to construct multiple measures of ESG rating divergence. From the perspective of ESG rating divergence, the study focuses on its impact on green investors' decision-making. The findings reveal that ESG rating divergence can attract green investors, indicating the presence of an “information effect” in ESG divergence. The potential marginal contributions of this study are as follows: First, it broadens the research on the economic consequences of ESG rating divergence. Most existing studies have found that ESG rating divergence negatively affects corporate operations, such as increasing the risks of sustainable investment [6], weakening the predictive power of future market information [7], and hindering external financing for firms [8]. This study, however, identifies a positive effect of ESG rating divergence on the entry of green investors, offering a more comprehensive understanding of the economic consequences of ESG rating divergence. Second, it enriches the exploration of factors influencing green investors' decisions. Currently, most scholars examine the influence of national policies [9], air pollution [10], corporate environmental information disclosure [11], and executives' environmental backgrounds [12] on green investors. Although some scholars have noted the role of environmental information disclosure, few have focused on the impact of ESG rating divergence on green investors' economic behavior. By investigating the influence of ESG rating divergence, this study extends the theoretical research on green investor behavior. Third, the study analyzes how corporate characteristics moderate the impact on green investor decision-making, finding that the “information effect” of rating divergence is more pronounced when corporate information transparency is low and ESG performance is poor, thus providing new directions and theoretical support for understanding green investor behavior.

## 2. Literature review

### 2.1. Research on ESG rating divergence

Existing research on the causes of ESG rating divergence mainly focuses on the differences in the rating standards themselves. An early study by Chatterji et al. found that differences in the understanding of dimensions such as environmental and social responsibility between rating agencies directly led to low correlations and significant divergences in the ESG ratings provided by different agencies [13]. As research has progressed, Berg et al. systematically deconstructed the ESG rating system and summarized the sources of divergence into three dimensions: scope, measurement, and weighting. Their study indicated that differences in the definition of the rating scope and the choice of measurement methods are key factors contributing to divergence [4]. Wu et al., through empirical analysis based on three major domestic databases, similarly pointed out that differences in the definition of the rating scope, the lack of uniform measurement standards, and the diversity of weight allocation are the main causes of ESG rating divergence [14]. Zhang and Zhang further expanded the research perspective, indicating that besides these factors, the diversity of information sources and the subjective judgments of raters also influence ESG rating outcomes [15].

Regarding the economic consequences of ESG rating divergence, existing research primarily reveals its multidimensional negative impacts on business operations. From the perspective of financing, Christensen et al. found that ESG rating divergence significantly limits a company's external financing capacity, forcing it to rely more on internal funds [8]. This finding has been further verified in China's capital markets, with a series of studies by Fan et al., Zhang et al., and Yang et al. indicating that ESG rating divergence not only weakens the effect of a company's ESG performance on reducing debt financing costs but also shows a significant positive correlation with the cost of debt capital [16-18]. Wang Ren et al., through empirical analysis of A-share listed companies from 2015 to 2022, further pointed out that ESG rating divergence exacerbates financing constraints through two channels: damaging corporate image and weakening investor confidence [19]. In terms of capital market performance, Li et al. found a significant negative correlation between ESG rating divergence and stock liquidity [20]. Zhao et al., in their study of A-

shares on the Shanghai and Shenzhen stock exchanges from 2011 to 2021, showed a negative correlation between ESG rating divergence and corporate stock returns [21]. Liu et al. further revealed that ESG rating divergence not only increases stock price synchronization but also intensifies market information asymmetry [5]. Sun et al., in a multinational study, showed that information asymmetry caused by ESG rating divergence and the resulting agency costs significantly increase the risk of stock price crashes [22]. From the audit perspective, ESG rating divergence also has significant impacts. Liu and Zhang found that ESG rating divergence increases the probability of a company receiving non-standard audit opinions [23], and the greater the ESG rating divergence, the higher the audit risk premium for the company [24]. For management, Wang et al. pointed out that ESG rating divergence encourages management to adopt short-term business practices to alleviate financing constraints [25]. However, some studies have also found positive effects of ESG rating divergence. He et al. showed that moderate ESG rating divergence might encourage companies to improve voluntary information disclosure to reduce market uncertainty regarding their ESG performance [26]. These findings together provide a multidimensional understanding of the economic consequences of ESG rating divergence.

## 2.2. Research on green investor decision-making

In exploring the factors influencing green investor decision-making, scholars have focused on the effects of national policies, air pollution, corporate environmental information disclosure, and the environmental awareness and background of executives. Yang et al. used a difference-in-differences model and found that long-term institutional investors exhibit symmetric preferences for green investments, while short-term institutional investors are more influenced by green finance policies [9]. Jo et al. found that an increase in air pollution, as measured by the Air Quality Index (AQI), is associated with an increase in the flow of green funds, making air pollution a significant factor in green fund movement [10]. Chen et al., based on the “risk perception-attitude-behavior” theoretical framework, established an SEM model and found that disclosing haze weather conditions, improving the environmental information disclosure level of green financial product assets, and enhancing supervision and management all contribute to increasing public willingness to invest in green projects [11]. Qiu and Zhang further found that the quality of ESG information disclosure is highly positively correlated with the entry of green investors [27]. The better the ESG performance of a company, the greener investors it attracts [28]. Active corporate environmental governance also attracts the entry of green investors, especially for heavily polluting enterprises, with more significant short-term attraction effects [29]. Wang et al. found that green investors tend to enter companies that hire executives with an environmental background [12], and the executives’ environmental awareness enhances the positive impact of green investors’ entry on corporate ESG performance [30].

## 3. Research hypothesis

ESG ratings serve as a critical channel for market participants to gain insights into a company’s ESG performance, providing incremental information on environmental, social, and governance factors. Green investors, as key players in capital markets, pay particular attention to corporate social responsibility, using ESG ratings as a reference when making investment decisions.

Given the lack of a unified evaluation standard, different rating agencies often have varying understandings and assessments of a company’s ESG performance, resulting in significant discrepancies in ESG ratings. As a consequence, the investment willingness of green investors may be affected. Berg et al. argue that when there are disagreements among rating agencies, the rating results fail to objectively and accurately reflect a company’s ESG performance, offering ineffective guidance for investors’ decisions [4]. Additionally, such discrepancies complicate the process of verifying a company’s true ESG information, contributing to information asymmetry.

From another perspective, the differences in rating systems and focal points across agencies contain unique value. Some agencies focus on environmental innovations, such as investments in renewable energy technology, while others emphasize social aspects like employee rights protection and community relations. This diversity allows for a more nuanced evaluation of a company’s ESG performance from multiple angles, transmitting more distinctive information. It helps investors break free from a single perspective and better understand a company, providing a more comprehensive examination of its strengths and weaknesses across various ESG domains, which can offer a more holistic basis for green investment decisions [31], thereby reducing information asymmetry and enhancing the “information effect” of ESG ratings [5]. Incorporating multiple sources of information during the decision-making process effectively reduces the interpretive and judgment errors associated with a single viewpoint [32], preventing investment misjudgments due to partial understanding.

Moreover, facing diverse ratings and results from different agencies, green investors actively engage their subjective initiative, dedicating more effort to collecting and analyzing relevant information in order to make more comprehensive and accurate investment decisions. Shao et al. show that ESG rating discrepancies significantly stimulate investors’ initiative, prompting them to actively search for information [33]. Compared to individual investors, institutional investors possess stronger information processing and searching abilities, making the “information effect” of ESG rating discrepancies more pronounced [34]. As a specific group within institutional investors, green investors, when confronted with ESG rating discrepancies, can leverage their information channels and processing capabilities to dig deeper into unique company-level information, effectively alleviating information asymmetry and reducing the interference of ESG rating discrepancies on investment decisions [5], thereby formulating more professional and comprehensive investment strategies [35].

Based on this, the following hypothesis is proposed:

H1: Discrepancies in ESG ratings positively affect the entry of green investors.

## 4. Research design

### 4.1. Sample selection and data sources

With reference to the study by Zhou et al. [24], this paper selects A-share listed companies in China's capital market from 2009 to 2022 as the sample. The starting year of 2009 is chosen because at least two rating agencies' data are required to calculate ESG rating divergence, and data from two or more agencies can be accessed starting from this year. Based on the actual needs of the research, the data undergo the following processing: (1) Excluding ST, PT, and \*ST companies due to their special characteristics; (2) Excluding companies in the financial and insurance sectors due to significant differences in accounting treatment compared to other industries; (3) Excluding companies with missing data or only a single ESG rating result; (4) Eliminating the influence of extreme values on the conclusions by truncating all continuous variables at the 1st and 99th percentiles.

After filtering, a total of 25,295 observations are obtained. As for the data sources, the ESG data are selected from the ratings/score results published by six rating agencies (Bloomberg, Wind, Sino-Securities, FTSE Russell, SynTao Green Finance, and MSCI), while other data are sourced from the CSMAR database.

### 4.2. Econometric model specification

The econometric model is specified as:

$$\ln GI_{it} = \beta_0 + \beta_1 ESGU_{it} + \beta_2 X_{it} + \gamma_p + \delta_t + \epsilon_{it} \quad (1)$$

where  $i$  represents the company, and  $t$  represents the year. In this model,  $\ln GI_{it}$  is the dependent variable, representing the number of green investors;  $ESGU_{it}$  is the core explanatory variable, indicating the divergence in ESG ratings of the company;  $X_{it}$  represents a series of control variables;  $\gamma_p$  denotes industry fixed effects;  $\delta_t$  represents year fixed effects, and  $\epsilon_{it}$  is the random error term.

### 4.3. Variable design

#### 4.3.1. Dependent variable: number of green investors ( $\ln GI$ )

Based on the research of Jiang et al. [2], to obtain detailed investment information about listed companies' funds, this paper matches the "Fund Subject Information Table" and the "Stock Investment Detail Table" from the CSMAR database. On this basis, each fund's "investment goals" and "investment scope" are manually examined to determine if they include environment-related keywords such as "environmental protection", "ecology", "green", "new energy development", "clean energy", "low carbon", "sustainability", and "energy conservation". If such terms appear, it is determined that the company has green investors; otherwise, it is considered not to have them. Finally, the number of green investors for each listed company per year is counted, with 1 added to the total and then logged to measure the degree of green investor entry ( $\ln GI$ ).

#### 4.3.2. Core explanatory variable: ESG rating divergence ( $ESGU$ )

Following the approach of Avramov et al. [6], the standard deviation of the ratings from the six rating agencies is used to measure the ESG rating divergence. The specific steps include: (1) Initial data processing, where the ESG ratings or scores of listed companies from the six rating agencies are standardized into a unified scoring format; (2) Ranking, where ESG scores for each rated company are ranked annually by each agency, with higher-scoring companies ranked higher and companies with the same score given the same rank; (3) Standardization, where the ranks are standardized using the range standardization method; (4) Pairwise Rating Divergence, where the standard deviation of each company's two rating agencies' standardized rankings is calculated to obtain the pairwise rating divergence. The average of these 15 pairwise rating divergences is taken as the company's ESG rating divergence for that year ( $ESGU1$ ). Additionally, this study also directly uses the standard deviation of the six rating agencies' standardized rankings as an alternative measure of the company's ESG rating divergence for that year ( $ESGU2$ ).

#### 4.3.3. Control variables

Referring to previous studies [12, 28], this paper selects a series of control variables: debt-to-asset ratio ( $Lev$ ), the ratio of total debt to total assets; Return On Equity ( $ROE$ ), the ratio of after-tax profits to net assets, with a weighted average  $ROE$  after deducting non-recurring gains and losses post-2012; fixed asset ratio ( $FIXED$ ), the ratio of net fixed assets to total assets; board size ( $Board$ ), the logarithm of the number of directors; independent director ratio ( $Indep$ ), the ratio of independent directors to total board members; chairman and CEO duality ( $Dual$ ), where the value is 1 if the chairman and CEO are the same person, otherwise 0; largest shareholder's shareholding ratio ( $Top1$ ), the ratio of shares held by the largest shareholder to total shares; investment opportunities, measured by Tobin's  $Q$ ; number of employees ( $Employee$ ), the logarithm of the number of employees in the listed company.

## 5. Empirical results analysis

### 5.1. Descriptive statistics

Table 1 presents the descriptive statistics of the key variables. The indicator reflecting the number of green investors, *lnGI*, has a mean of 0.632, a median of 0.000, a standard deviation of 0.824, a minimum value of 0, and a maximum value of 3.091. Its mean is significantly higher than the median, and the standard deviation is large, suggesting that some companies in the sample have attracted a large number of green investors. However, more than 50% of the sample companies have zero green investors, indicating a highly uneven distribution of green investors. The minimum value of ESG rating divergence is 0, and the average value is 0.183 (0.195). The divergence levels for the two measurement methods are similar, indicating that ESG rating divergence is common among listed companies in China, with varying degrees of divergence among companies. However, the maximum value of the ESG rating divergence reaches 0.552, suggesting that some companies face significant rating discrepancies.

Regarding financial indicators, the mean debt-to-asset ratio (*Lev*) is 0.436, indicating that the average debt-to-asset ratio of the sample companies is 43.6%. The standard deviation is 0.200, and the range is 0.882, suggesting significant differentiation in the leverage of the sample companies, warranting attention to the ESG risk transmission effects of highly leveraged firms. The mean return on equity (*ROE*) is 0.067, indicating that the overall profitability of the sample companies is low. The minimum value is -0.617, showing that some companies are suffering significant losses, possibly related to negative ESG events. The mean fixed asset ratio (*FIXED*) is 0.209, with a maximum value of 0.697, indicating that a few companies in the sample are capital-intensive, while most have low fixed asset ratios.

Regarding governance structure, the mean board size (*Board*) is 2.128, corresponding to approximately 8-9 members, with a standard deviation of 0.203, indicating relatively stable board sizes in listed companies. The mean proportion of independent directors (*Indep*) is 0.378, with a minimum value of 0.333, meeting the requirement that independent directors account for at least one-third of the board in listed companies. The mean duality (*Dual*) is 0.277, indicating that 27.7% of the companies have the chairman and CEO positions held by the same person, potentially affecting the efficiency of ESG decision-making. The mean proportion of shares held by the largest shareholder (*Top1*) is 0.346, suggesting high ownership concentration in Chinese listed companies, with a significant presence of the “dominant shareholder” phenomenon.

The mean Tobin’s Q value (*TobinQ*) is 1.962, with a maximum value of 8.215, reflecting the market’s valuation premium for green and environmentally friendly companies, potentially positively correlated with ESG performance. The mean number of employees (*Employee*) is 7.864, corresponding to about 2,600 people, with a standard deviation of 1.296, indicating significant differences in company size, which may affect the costs of ESG practices through economies of scale. The statistical results for the control variables are consistent with previous research and fall within a reasonable range.

**Table 1.** Descriptive statistics of key variables

Variable	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
<i>lnGI</i>	25295	0.632	0.000	0.824	0.000	3.091
<i>ESGU1</i>	25295	0.183	0.165	0.127	0.000	0.552
<i>ESGU2</i>	25295	0.195	0.184	0.132	0.000	0.552
<i>Lev</i>	25295	0.436	0.433	0.200	0.063	0.882
<i>ROE</i>	25295	0.067	0.077	0.136	-0.617	0.390
<i>FIXED</i>	25295	0.209	0.174	0.161	0.002	0.697
<i>Board</i>	25295	2.128	2.197	0.203	1.609	2.708
<i>Indep</i>	25295	0.378	0.364	0.054	0.333	0.571
<i>Dual</i>	25295	0.277	0.000	0.448	0.000	1.000
<i>Top1</i>	25295	0.346	0.322	0.153	0.084	0.755
<i>TobinQ</i>	25295	1.962	1.548	1.265	0.828	8.215
<i>Employee</i>	25295	7.864	7.782	1.296	4.920	11.378

### 5.2. Pearson correlation analysis

Table 2 reports the Pearson correlation analysis results for the key variables. The Pearson correlation coefficients between *lnGI* and *ESGU1*, *ESGU2* are both significantly positive at the 1% level, suggesting a positive correlation between ESG rating divergence and the entry of green investors, which preliminarily supports the research hypothesis. The specific relationship between the two requires further examination through regression analysis in the following section.

**Table 2.** Pearson correlation analysis of key variables

Variable	lnGI	ESGU1	ESGU2
lnGI	1		
ESGU1	0.063***	1	
ESGU2	0.090***	0.991***	1

Note: The values in the table represent Pearson correlation coefficients. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

### 5.3. Main regression analysis

Table 3 presents the estimated results on the impact of ESG rating discrepancies on the number of green investors. Columns (1) and (3) report univariate regressions, while columns (2) and (4) report the results after controlling for additional variables. First, ESG rating discrepancy is measured using ESGU1. In the absence of control variables, the coefficient is 0.300 ( $t=6.10$ ), indicating that a one-unit increase in ESG rating discrepancy leads to a 30% increase in the number of green investors. After including control variables, the coefficient decreases to 0.165 ( $t=4.11$ ), but the significance remains unchanged, suggesting that the control variables partially explain the impact of ESGU1, yet ESG rating discrepancies still have a significant positive effect on the entry of green investors. Next, ESGU2 is used to measure ESG rating discrepancy. Without control variables, the coefficient is 0.486 ( $t=10.00$ ), indicating a larger impact. After including control variables, the coefficient decreases to 0.235 ( $t=5.99$ ). These results collectively suggest that regardless of the method used to measure ESG rating discrepancy, there is a significant positive correlation between ESG rating discrepancy and the number of green investors, supporting the research hypothesis H1.

In columns (2) and (4), the control variables—Return On Equity (ROE), Independent Director Ratio (Indep), Investment Opportunity (TobinQ), and number of employees (Employee)—all show a significant positive correlation with the number of green investors at the 1% level, indicating that firms with strong profitability, high growth potential, and large scales are more likely to attract green investors, and that the supervision role of independent directors may enhance corporate ESG performance. The Board (Board size) is positively correlated with the number of green investors at the 5% significance level, suggesting that firms with larger boards may place more emphasis on ESG management.

Meanwhile debt-to-asset ratio (Lev), fixed asset ratio (FIXED), and the largest shareholder's shareholding ratio (Top1) all show a significant negative correlation with the number of green investors at the 1% level, indicating that companies with higher debt ratios, heavy assets, and concentrated ownership are less attractive to green investors, and that concentrated ownership may weaken the motivation for ESG information disclosure or implementation.

**Table 3.** ESG rating discrepancy and green investor entry

Variable	lnGI			
	(1)	(2)	(3)	(4)
ESGU1	0.300*** (6.10)	0.165*** (4.11)		
ESGU2			0.486*** (10.00)	0.235*** (5.99)
Lev		-0.147*** (-3.24)		-0.145*** (-3.19)
ROE		1.310*** (26.79)		1.306*** (26.75)
FIXED		-0.393*** (-6.11)		-0.392*** (-6.12)
Board		0.119** (2.47)		0.118** (2.45)
Indep		0.469*** (2.97)		0.463*** (2.93)
Dual		0.089*** (5.66)		0.089*** (5.66)
Top1		-0.226*** (-4.14)		-0.229*** (-4.20)

**Table 3.** Continued

TobinQ		0.190***		0.190***
		(28.41)		(28.47)
Employee		0.280***		0.278***
		(33.08)		(32.86)
Constant	0.577***	-2.287***	0.537***	-2.287***
	(41.53)	(-15.75)	(40.14)	(-15.77)
Year/Industry	YES	YES	YES	YES
N	25295	25295	25295	25295
Adj. R <sup>2</sup>	0.084	0.342	0.087	0.343

Note: \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively. The t-values in parentheses are adjusted for clustering at the company level. The same applies below.

## 5.4. Addressing endogeneity issues

### 5.4.1. Instrumental variables method

The relationship between ESG rating divergence and the number of green investors might be subject to endogeneity due to reverse causality, meaning that the entry of green investors could potentially influence ESG rating divergence. To address this, this study uses the lagged ESG rating divergence as an instrumental variable to test for possible endogeneity. The Kleibergen-Paap rk Wald F statistic is significantly higher than the critical value of Stock-Yogo, indicating a strong correlation between the instrumental variable and the endogenous variable, and no issue of weak instruments. The Kleibergen-Paap rk LM statistic yields a p-value of 0.000, which, at the 1% level, rejects the null hypothesis that “the instrument is not identified,” verifying the exogeneity condition of the instrument. The regression results in columns (1) and (2) of Table 4 show that the coefficients of both ESGU1 and ESGU2 are significantly positive at the 1% level. This suggests that even after considering potential reverse causality, the positive effect of ESG rating divergence on the entry of green investors remains stable, further supporting the reliability of the research hypothesis.

### 5.4.2. Propensity score matching method

To address the potential endogeneity issue caused by omitted variables—namely, that ESG rating divergence might stem from differences in other company characteristics, which could also affect green investors’ decisions—the Propensity Score Matching (PSM) method is used. Following the approach of Zhang Yongshen et al. [36], ESG rating divergence is categorized into “high divergence” and “low divergence” groups based on the median, assigned values of 1 and 0, respectively, and all control variables are used as covariates for 1:1 nearest neighbor matching. Columns (3) and (4) of Table 4 report the regression results after matching with PSM, where the coefficients of ESGU1 and ESGU2 are 0.159 and 0.194, respectively, and both are significant at the 1% level. This result indicates that after controlling for differences in other company characteristics, ESG rating divergence still attracts green investors, which is consistent with the previous findings.

**Table 4.** Instrumental variables method and propensity score matching method

Variable	Instrumental Variables Method		Propensity Score Matching Method	
	lnGI			
	(1)	(2)	(3)	(4)
ESGU1	0.377*** (3.18)		0.159*** (3.28)	
ESGU2		0.539*** (4.71)		0.194*** (3.99)
Lev	-0.023 (-0.46)	-0.019 (-0.38)	-0.137*** (-2.63)	-0.201*** (-3.78)
ROE	1.300*** (24.47)	1.288*** (24.32)	1.326*** (22.27)	1.371*** (21.80)
FIXED	-0.311*** (-4.43)	-0.312*** (-4.44)	-0.395*** (-5.42)	-0.415*** (-5.65)

**Table 4.** Continued

Board	0.115** (2.20)	0.114** (2.17)	0.143*** (2.62)	0.121** (2.21)
Indep	0.542*** (3.20)	0.529*** (3.12)	0.487*** (2.69)	0.456** (2.55)
Dual	0.077*** (4.52)	0.076*** (4.50)	0.100*** (5.50)	0.075*** (4.11)
Top1	-0.371*** (-6.32)	-0.377*** (-6.42)	-0.224*** (-3.66)	-0.178*** (-2.89)
TobinQ	0.220*** (30.41)	0.220*** (30.48)	0.194*** (25.15)	0.195*** (24.17)
Employee	0.303*** (33.67)	0.300*** (33.00)	0.284*** (30.35)	0.280*** (28.76)
Kleibergen-Paap rk Wald F	7865.37	7907.15		
KleibergenPaap rk LM (p-value)	522.19 (0.00)	405.61 (0.00)		
Constant	-2.820*** (-16.43)	-2.827*** (-16.52)	-2.395*** (-14.47)	-2.295*** (-13.93)
Year/Industry	YES	YES	YES	YES
N	20366	20366	13987	13936
Adj. R <sup>2</sup>	0.416	0.415	0.344	0.338

## 5.5. Robustness check

### 5.5.1. Changing the regression sample

This study further investigates the potential impact of sample distribution on the robustness of the conclusions. According to the distribution of the sample, the highest proportion of observations comes from those rated by only two rating agencies. This limited number of rating agencies may result in insufficient accuracy in the ESG rating divergence measurement. To eliminate such sample selection bias, this paper removes the companies rated by only two agencies and conducts the regression analysis again. The results, shown in columns (1) and (2) of Table 5, indicate that after excluding this subset of samples, the regression coefficients of the core explanatory variables ESGU1 and ESGU2 remain significantly positive at the 1% level. This suggests that the positive effect of ESG rating divergence on the entry of green investors remains robust. This test effectively alleviates the measurement error problem caused by the uneven coverage of rating agencies, further reinforcing the reliability of the study's conclusions.

### 5.5.2. The measurement of the dependent variable

This study substitutes the original dependent variable, the number of green investors, with an alternative variable—whether green investors enter (GI2). If the company has green investors entering that year, the value is 1; otherwise, it is 0. This substitution aims to examine the attracting effect of ESG rating divergence on the entry of green investors. The results, as shown in columns (3) and (4) of Table 5, demonstrate that the regression results for whether green investors enter are significantly positive at the 1% level, confirming the robustness of the conclusions.



**Table 5.** Changing the regression sample and replacing the dependent variable

Variable	Change in Regression Sample		Replacement of Dependent Variable	
	InGI		GI2	
	(1)	(2)	(3)	(4)
ESGU1	0.292*** (3.04)		0.126*** (4.95)	
ESGU2		0.311*** (3.73)		0.155*** (6.32)
Lev	-0.240*** (-3.33)	-0.239*** (-3.32)	-0.139*** (-5.41)	-0.138*** (-5.38)
ROE	1.428*** (19.44)	1.425*** (19.42)	0.700*** (25.07)	0.698*** (25.01)
FIXED	-0.219** (-2.18)	-0.218** (-2.18)	-0.208*** (-5.90)	-0.207*** (-5.89)
Board	0.104 (1.38)	0.104 (1.38)	0.067*** (2.61)	0.066*** (2.59)
Indep	0.511** (2.15)	0.511** (2.15)	0.098 (1.12)	0.095 (1.08)
Dual	0.137*** (5.71)	0.137*** (5.70)	0.057*** (6.37)	0.057*** (6.38)
Top1	-0.223*** (-2.75)	-0.225*** (-2.77)	-0.069** (-2.30)	-0.070** (-2.34)
TobinQ	0.218*** (23.73)	0.218*** (23.75)	0.070*** (21.78)	0.070*** (21.79)
Employee	0.275*** (23.65)	0.274*** (23.55)	0.143*** (35.29)	0.142*** (35.04)
Constant	-2.227*** (-10.08)	-2.231*** (-10.11)	-0.946*** (-12.29)	-0.944*** (-12.28)
Year/Industry	YES	YES	YES	YES
N	10271	10271	25295	25295
Adj. R <sup>2</sup>	0.400	0.399	0.252	0.253

### 5.5.3. Replacing the regression model

First, using the Logit Model for Regression. In the baseline regression analysis, this paper uses the OLS model to examine the effect of ESG rating divergence on the entry of green investors. To further strengthen the robustness of the conclusions, this paper substitutes the original dependent variable “the number of green investors (InGI)” with the binary variable “whether green investors enter (GI2).” If the company has green investors entering that year, the value is 1; otherwise, it is 0. Since GI2 is a discrete variable, the study uses the Logit model instead of the OLS model for regression, controlling for year and industry fixed effects, and adjusting the standard errors at the company level. The regression results, shown in columns (1) and (2) of Table 6, indicate that the coefficients of ESGU1 and ESGU2 are significantly positive at the 1% level. This result further validates the robustness of the main regression conclusion.

Second, using the Tobit Model. The dependent variable, the number of green investors, mainly falls in the positive range but shows a large number of zero values and exhibits a skewed distribution of non-negative integers. To address this type of censored data, the Tobit model is commonly used in similar studies to correct for estimation bias. Therefore, this paper also conducts a robustness check on the relationship between ESG rating divergence and the entry of green investors using the Tobit model. The results, shown in columns (3) and (4) of Table 6, indicate that after switching the estimation method, the core explanatory variables ESG rating divergence remain significantly positive at the 1% level. This result is highly consistent with the conclusions of the baseline regression using the OLS model, further verifying the robustness of the research conclusions under different econometric methods, indicating the statistical reliability of ESG rating divergence’s attraction to green investors.

**Table 6.** Replacing regression models

Variable	Logit Model		Tobit Model	
	GI2		lnGI	
	(1)	(2)	(3)	(4)
ESGU1	0.726*** (5.32)		0.395*** (4.82)	
ESGU2		0.878*** (6.65)		0.517*** (6.53)
Lev	-0.891*** (-6.27)	-0.887*** (-6.24)	-0.464*** (-5.01)	-0.461*** (-4.98)
ROE	4.826*** (19.22)	4.820*** (19.20)	3.183*** (23.18)	3.175*** (23.15)
FIXED	-1.081*** (-5.49)	-1.080*** (-5.49)	-0.737*** (-5.69)	-0.736*** (-5.69)
Board	0.368*** (2.64)	0.364*** (2.61)	0.245*** (2.78)	0.243*** (2.76)
Indep	0.667 (1.41)	0.649 (1.37)	0.548* (1.87)	0.539* (1.85)
Dual	0.307*** (6.42)	0.308*** (6.43)	0.192*** (6.42)	0.192*** (6.42)
Top1	-0.411** (-2.57)	-0.417*** (-2.61)	-0.386*** (-3.80)	-0.391*** (-3.86)
TobinQ	0.383*** (17.64)	0.383*** (17.64)	0.272*** (25.96)	0.271*** (25.97)
Employee	0.769*** (29.57)	0.765*** (29.42)	0.515*** (35.49)	0.512*** (35.25)
Constant	-7.999*** (-15.85)	-7.978*** (-15.83)	-5.371*** (-17.56)	-5.361*** (-17.57)
Year/Industry	YES	YES	YES	YES
N	25273	25273	25295	25295
Adj. R <sup>2</sup>	0.218	0.218		

## 5.6. Heterogeneity analysis

### 5.6.1. transparency of listed companies' information quality

The quality of corporate financial information disclosure is a key indicator for measuring information transparency. Higher disclosure levels can significantly enhance investors' understanding of a company [37]; conversely, when a company fails to disclose adequate financial information, investors are forced to rely on non-financial information to make decisions [38]. It is worth noting that, apart from voluntary disclosure by companies, third-party accounting firms also play an important role in determining financial information quality. Research indicates that the Big Four international accounting firms deliver significantly higher information transparency for their audited listed clients compared to non-Big-Four-audited enterprises, attributable to their rigorous audit procedures, extensive industry expertise, and superior independence [39]. Based on this, for companies with lower information transparency, investors may be more inclined to refer to third-party ESG ratings to fill the information gap. In this context, the divergence in ESG ratings reveals the differing assessments of companies' sustainable performance by different rating agencies, offering green investors a multi-dimensional analysis perspective, thus effectively alleviating the information asymmetry caused by insufficient transparency. Therefore, this paper hypothesizes that ESG rating divergence has a more significant impact on green investors' decisions in companies with lower information transparency.

In this study, companies are categorized into two groups based on whether their accounting firms belong to the Big Four. When a company hires a Big Four firm, its information transparency is considered high, with a value of 1; otherwise, it is assigned a value of 0. Other variables remain consistent with model (1). The regression results are presented in Table 7. The coefficients of ESGU1 and ESGU2 are significantly positive in the low transparency group but not significant in the high transparency group,

and the difference in coefficients between the groups is significant at the 1% level. In summary, when the information transparency of listed companies is low, the “information effect” of ESG rating divergence becomes more pronounced, further enhancing its impact on green investors’ decisions.

**Table 7.** Heterogeneity analysis: transparency of listed companies’ information

Variable	ESGU1		ESGU2	
	(1) High	(2) Low	(3) High	(4) Low
	Transparency	Transparency	Transparency	Transparency
ESGU	-0.239 (-1.58)	0.203*** (4.98)	-0.180 (-1.25)	0.274*** (6.84)
Lev	-0.130 (-0.60)	-0.140*** (-3.12)	-0.131 (-0.61)	-0.138*** (-3.07)
ROE	2.012*** (8.97)	1.261*** (25.84)	2.014*** (8.96)	1.256*** (25.80)
FIXED	-0.230 (-0.98)	-0.403*** (-6.12)	-0.232 (-0.99)	-0.403*** (-6.13)
Board	0.294** (1.98)	0.096** (1.96)	0.296** (2.00)	0.095* (1.94)
Indep	1.217*** (2.62)	0.313* (1.92)	1.222*** (2.63)	0.306* (1.88)
Dual	0.064 (0.99)	0.090*** (5.61)	0.063 (0.98)	0.090*** (5.61)
Top1	-0.790*** (-3.45)	-0.193*** (-3.48)	-0.791*** (-3.45)	-0.195*** (-3.53)
TobinQ	0.238*** (9.90)	0.185*** (26.26)	0.239*** (9.92)	0.184*** (26.32)
Employee	0.315*** (11.64)	0.261*** (29.80)	0.316*** (11.64)	0.260*** (29.62)
Constant	-3.000*** (-6.18)	-2.058*** (-13.77)	-3.022*** (-6.24)	-2.056*** (-13.77)
Year/Industry	YES	YES	YES	YES
N	2058	23237	2058	23237
Adj. R <sup>2</sup>	0.482	0.316	0.482	0.317
Between-Group Coefficient Difference Test	P=0.0028		P=0.0013	

### 5.6.2. ESG rating levels

Enterprises that have long focused on sustainable operations, by integrating Environmental, Social, and Governance (ESG) objectives into their core strategies, not only accumulate verifiable ESG performance in practice but also tend to establish institutionalized, transparent disclosure systems, demonstrating higher levels of non-financial information measurement and disclosure [40]. ESG ratings are an important indicator for assessing corporate sustainability. Companies with high ESG ratings not only perform better in sustainable practices but also have higher information transparency. For such companies, ESG rating divergence may merely reflect slight disagreements among rating agencies on their “excellence” (e.g., whether they meet industry benchmarks), rather than fundamental differences. In contrast, companies with low ESG ratings often have low information transparency (e.g., incomplete disclosures, unclear historical ESG events), and in this case, divergence may provide key incremental information, helping green investors to assess the company’s ESG performance from multiple perspectives, identify undervalued companies, and make investment decisions. Therefore, this paper hypothesizes that for companies with low ESG ratings, the impact of ESG rating divergence on green investors’ decisions will be more significant.

This study divides companies into two sub-samples based on whether their average ESG rating (the arithmetic means of the standardized rankings from six rating agencies for that company in a given year) is greater than the sample median, and separately

analyzes the impact of ESG rating divergence on green investors for these two sub-samples. The regression results are shown in Table 8. The coefficients of ESGU1 and ESGU2 are significantly positive in the low ESG rating group but not significant in the high ESG rating group, and the difference in coefficients between the groups is significant at the 1% level. In summary, when a company has a low ESG rating, the “information effect” of ESG rating divergence becomes effective, enhancing its impact on green investors’ decisions.

**Table 8.** Heterogeneity analysis: ESG rating levels

Variable	ESGU1		ESGU2	
	(1) Low ESG	(2) High ESG	(3) Low ESG	(4) High ESG
	Rating	Rating	Rating	Rating
ESGU	0.357*** (5.97)	-0.045 (-0.84)	0.423*** (7.31)	0.026 (0.50)
Lev	-0.209*** (-4.24)	0.011 (0.16)	-0.205*** (-4.15)	0.008 (0.11)
ROE	0.906*** (18.23)	1.842*** (21.69)	0.902*** (18.20)	1.844*** (21.70)
FIXED	-0.316*** (-4.59)	-0.395*** (-4.43)	-0.315*** (-4.58)	-0.397*** (-4.45)
Board	0.060 (1.10)	0.123** (1.98)	0.058 (1.07)	0.124** (2.00)
Indep	-0.002 (-0.01)	0.553*** (2.75)	-0.013 (-0.07)	0.555*** (2.77)
Dual	0.097*** (5.22)	0.096*** (4.44)	0.097*** (5.22)	0.095*** (4.41)
Top1	-0.102* (-1.66)	-0.390*** (-5.28)	-0.105* (-1.71)	-0.391*** (-5.29)
TobinQ	0.142*** (16.63)	0.227*** (24.52)	0.142*** (16.67)	0.227*** (24.50)
Employee	0.212*** (21.48)	0.303*** (27.90)	0.210*** (21.29)	0.303*** (27.96)
Constant	-1.478***	-2.548***	-1.467***	-2.570***
Year/Industry	YES (-8.63)	YES (-13.72)	YES (-8.58)	YES (-13.85)
N	12416	12741	12416	12741
Adj. R <sup>2</sup>	0.251	0.403	0.252	0.403
Between-Group Coefficient Difference Test	P=0.0000		P=0.0000	

## 6. Conclusion and recommendation

This paper uses A-share listed companies in China from 2009 to 2022 as a sample to examine the impact of ESG rating discrepancies on green investors’ decision-making. The study finds that ESG rating discrepancies attract green investors, and the economic significance of this effect is evident, indicating the existence of an “information effect” in ESG rating discrepancies. This conclusion holds after addressing issues of endogeneity and conducting robustness tests. Further research shows that when a company’s information transparency is low and its ESG rating level is low, the “information effect” of rating discrepancies becomes more significant.

Based on the above conclusions, the following recommendations are made: Enterprises, as the primary entities responsible for disclosing ESG information, should integrate ESG concepts into strategic planning and major decision-making. They should establish dedicated management teams to disclose ESG reports and improve internal ESG management systems. In response to the objective existence of ESG rating discrepancies, companies can enhance their sustainable development capabilities through green innovation and technological development, reduce distrust from various stakeholders caused by rating discrepancies, and

thus mitigate operational risks. Furthermore, enterprises can increase communication with rating agencies, proactively analyze the reasons for discrepancies, and provide relevant data to reduce rating discrepancies caused by information asymmetry. For green investors, on one hand, they should deeply understand the rating methods, data sources, and weight settings of different ESG rating agencies. They should prioritize rating agencies with transparent methodologies, reliable data sources, and third-party verification. By combining multiple rating results, they can avoid the risks of information asymmetry that arise from relying on a single rating agency. On the other hand, although ESG rating discrepancies introduce uncertainty, they also present opportunities for green investors to achieve excess returns. Green investors can choose companies that are undervalued in ESG ratings, invest in projects and enterprises that perform well and have potential value, and diversify their investment portfolios to reduce investment risks [41]. The government, as an important force in promoting ESG development, should actively push for the unification of ESG rating standards. For instance, it can refer to International Financial Reporting Standards for Sustainability Disclosure issued by the International Sustainability Standards Board (ISSB) to establish an ESG rating system suited to China's national conditions. This would reduce discrepancies caused by standard differences between different rating agencies and provide enterprises with accurate ratings. At the same time, the government should strengthen the regulation of ESG rating agencies, ensure transparency and scientific rigor in the rating process, and facilitate data sharing among enterprises, rating agencies, and stakeholders.

## Notes

1) The number of observations rated by two agencies is 15,022, by three agencies is 5,655, by four agencies is 1,081, by five agencies is 1,509, and by six agencies is 2,028.

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