

ESG Rating Divergence and Financing Constraints

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Abstract. The ESG ratings provided by ESG rating agencies become an significant reference for decision-making by investors or creditors. However, the ESG rating divergence not only brings noise to the capital market but also exacerbates corporate financing constraints. The article takes Chinese A-share listed companies from 2015 to 2022 as the sample and uses the fixed effects model to empirically test the impact of ESG rating divergence on corporate financing constraints. The study finds that: ESG rating divergence increases corporate financing constraints. Further research reveals that: ESG rating divergence intensifies market information asymmetry and business operating risks, thereby increasing corporate financing constraints; in non-state-owned enterprises and enterprises with high-quality accounting information disclosure, it exacerbates the impact of ESG rating divergence on financing constraints. This study provides evidence for regulating the construction of the ESG rating system and reducing corporate financing constraints.

Keywords: Financing Constraints, ESG Rating, ESG Rating Divergence, Information Asymmetry, Operating Risks.

1. Introduction

In recent years, with the scale of ESG investments expanding rapidly, the ESG investment concept has gained widespread dissemination globally. According to the 2021 Global Institutional Investor Survey by MSCI, more than half (52%) of the 200 surveyed institutional investors have implemented ESG investment strategies. This indicates that ESG investment is increasingly becoming a mainstream investment practice, reflecting investors' growing concern for sustainable and responsible investment.

Berg found that there is a lack of consensus among different ESG rating agencies when rating the same company, indicating a significant phenomenon of ESG rating divergence [1]. Chatterji noted that the correlation between ratings from six international ESG rating agencies for a specific event is less than 50%, showing low rating consistency. Rating divergence among agencies may affect investor decisions, especially when the differences are substantial [2]. Kotsantonis showed that ESG rating differences are one of the main obstacles to ESG investment and may reduce investors' willingness to invest in companies with rating disparities [3]. Dimson and Billio pointed out that the different weight allocations of ESG rating indicators by rating agencies are the reasons for the rating differences [4-5]. Abhayawansa believe that the non-transparent rating process is another factor of the divergence between rating agencies [6].

Financing constraints have become a significant factor hindering the development of enterprises in China. Firstly, the imbalance of information within the financial sector plays a pivotal role in inducing capital constraints for businesses, and the uncertain factors conveyed by ESG rating divergence also have an impact on the environment of market information [7]. Existing literature on financing constraint alleviation generally believes that reducing market information asymmetry is conducive to decreasing corporate financing constraints. Secondly, disparities in ESG scores can amplify the alpha and beta values within the Capital Asset Pricing Model (CAPM), thereby influencing the balance between risk and reward. Moreover, a more pronounced divergence in ESG scores could potentially result in heightened fluctuations in returns and a reduction in the availability of external funding. This, in turn, could exacerbate the challenges associated with securing financial resources [8].

Based on literature above, this paper proposes the following three hypotheses:

Hypothesis H_1 : An increase in ESG rating divergence will increase corporate financing constraints.

Hypothesis H_2 : ESG rating divergence will increase corporate financing constraints by reducing corporate information transparency and increasing business operating risks.

Hypothesis H_3 : ESG rating divergence will more significantly increase financing constraints in non-state-owned enterprises and enterprises with high-quality accounting information disclosure.

Prior studies concerning the variance in ESG ratings predominantly concentrate on the origins of such discrepancies and their repercussions on the efficiency of capital markets, the investment portfolios of institutional investors, the risk management practices of corporations and auditors, as well as the conduct of investors. However, there is a scarcity of research examining the implications of these rating disparities for the financial constraints faced by businesses. Given this gap, it is essential to investigate the potential influence of ESG rating divergence on corporate financial constraints and to elucidate the underlying mechanisms. This paper addresses this research gap by examining the case of A-share companies listed in China between 2015 and 2022, aiming to empirically assess the effects of ESG rating divergence on corporate financial constraints and uncover the mechanisms of action.

This study offers several distinct contributions to the existing body of literature: Primarily, it delves into how discrepancies in ESG ratings influence the financial constraints faced by corporations, thereby broadening the scope of inquiry within the field of ESG rating divergence. Additionally, it adds depth to the discourse on determinants of financial constraints, which have predominantly been examined through conventional lenses. As ESG considerations gain prominence in capital markets, there is a growing imperative to investigate novel factors that may impact financial constraints from an ESG standpoint. Lastly, this research scrutinizes both the effects and the underlying mechanisms of ESG rating divergence on financial constraints, and it performs an analysis of heterogeneity, taking into account the variations in corporate ownership structures and the quality of financial reporting disclosures.

2. Data description and model construction

2.1. Model setting

To explore the impact of ESG rating divergence on corporate financing constraints, this paper establishes the following panel linear regression model:

$$KZ_{it} = \beta_0 + \beta_1 D_{it} + \beta_n Controls_{it} + \sum Year + \sum Industry + \varepsilon_{it} \quad (1)$$

In this study, i denotes the index of the sampled firm, while t signifies the time period. The dependent variable captures the degree of financial constraint experienced by the i company during year t . Conversely, the independent variable measures the degree of divergence in ESG ratings for the i company in the same year t . The set of variables denoted by $Controls_{it}$ constitutes the control variables employed in our analysis. The terms $Industry$ and $Year$ correspond to the industry and year-specific dummy variables, respectively. Lastly, the coefficient β_1 quantifies the influence of ESG rating divergence on the financial constraints faced by corporations.

2.2. Variable Selection

The KZ index, which represents the financial restriction the firm faces, measures the dependent variable, which is financing constraint. According to Kaplan's methodology, a listed company's financial constraints increase with the size of the KZ index [9].

Divergence in ESG ratings is the independent variable. The Huazheng ESG rating, WIND ESG rating, SynTao Green ESG rating, and MengLang ESG rating are the four ESG rating indicators used in this article to gauge the company's ESG rating divergence. Ratings C through AAA are awarded values ranging from 1 to 9, with the Huazheng, WIND, and MengLang ESG ratings all being separated into nine classes. Ten grades make up the SynTao Green ESG grading; ratings D through A+ are assigned values between 0 and 9. To get the data on ESG rating divergence, the standard

deviation of the ESG rating scores of the four types of indicators is computed after the aforementioned four ESG rating techniques have been arranged.

A set of control variables is called a control variable. This work controls the parameters at the corporate level and makes reference to Gibson and others' studies when choosing control variables [10]. Company Size (Size) is one of the chosen control variables to guarantee the stability of the empirical results. the entire assets' natural logarithm; Total assets at the end of the year divided by total liabilities is the asset-liability ratio (Lev); ROA, or net profit margin on total assets, is calculated by dividing net profit by average total assets. Establishment years (FirmAge): Ln (current year - establishment year +1); listed years of the business (ListAge): Ln (year of the current year - listed year +1); Net cash flow from operating activities divided by total assets is known as the cash flow ratio (Opcf); The ratio of management expenses to operational revenue is known as the management expense ratio (Mfee); The natural logarithm of the number of board members is the number of directors (Board); Operating income growth rate (Growth) is calculated by dividing operating income for the current year by operating income for the previous year, and the result is -1. Top 10 shareholders' shareholdings (Top10): the ratio of the top 10 shareholders' shares to the total number of shares; Book value divided by total market value is known as the book-to-market ratio (BM); The average monthly turnover rate of stocks in the current year less the average monthly turnover rate of stocks in the prior year is known as the average monthly excess turnover rate, or Dturn.

Table.1. shows the descriptive statistics of key variables. The observations is large enough to enhance the reliability of the conclusions. The average of KZ index is 1.584 and the average of ESG rating divergence is 1.277.

Table 1. Descriptive statistics

Symbols	Observations	Maximum	Minimum	Average
KZ	11867	11.515	-12.786	1.584
D	12107	4.243	0.5	1.277
Size	12105	28.607	16.412	22.731
Lev	12105	178.345	0.008	0.474
ROA	12105	12.211	-9.117	0.03
ListAge	12104	2.222	-0.997	0.051
FirmAge	12105	168.498	-0.997	0.209
Opcf	12105	2.89	1.386	2.12
Mfee	12105	0.955	0.088	0.557
Board	12105	41.595	0.018	1.387
Growth	12105	3.497	0	2.533
Top10	12105	4.174	1.946	3.094
BM	11986	4.447	-5.921	-0.021
Dturn	11932	3404.611	0.001	0.721

2.3. Data Sources

This study selects A-share listed companies in China that have been rated by at least two of the four rating agencies, Huazheng, WIND, SynTao, and MengLang, from 2015 to 2022. The data was screened in the following steps:

- (1) excluding the ST or*ST companies in special treatment status;
- (2) excluding the data of listed companies in the financial industry;
- (3) excluding the data with incomplete information on key variables;
- (4) excluding companies with ESG score records of less than two years.

Following the selection process, the study ultimately included 1,127 companies listed on the Chinese A-share market as subjects of analysis. The ESG ratings for these corporations were sourced from databases provided by Huazheng, WIND, SynTao Green, and MengLang. Concurrently, the companies' informational and financial records were obtained from the CSMAR database.

3. Basic Regression

Table 2. displays the foundational regression outcomes linking ESG rating dispersion to the financial constraints of corporations. It is evident that a higher degree of divergence in ESG ratings is positively correlated with increased financial constraints for companies, with the statistical significance at the 1% level. This correlation persists even after the incorporation of control variables and the adjustment for industry and yearly effects, reaffirming the initial hypothesis H_1 . The findings suggest that there is a substantial influence of ESG rating dispersion on the financial constraints experienced by corporations, with those exhibiting greater disparities in ESG ratings encountering more pronounced financial limitations.

Table 2. Basic regression results

	KZ			
D	0.165*** (6.775)	0.262*** (7.78)	0.153*** (6.20)	0.211*** (6.05)
Size	-0.049*** (-3.587)		-0.032** (-2.35)	
Lev	0.183*** (10.378)		0.195*** (10.92)	
ROA	-2.054*** (-21.512)		-2.076*** (-21.47)	
ListAge	0.354*** (11.962)		0.361*** (12.30)	
FirmAge	0.302*** (4.747)		0.324*** (5.05)	
Opcf	-14.226*** (-76.986)		-14.503*** (-78.15)	
Mfee	-0.673*** (-11.89)		-0.708*** (-12.35)	
Board	-0.184*** (-2.585)		-0.184** (-2.55)	
Growth	0.034*** (3.922)		0.037*** (4.21)	
Top10	-1.583*** (-15.415)		-1.518*** (-15.03)	
BM	0.168*** (17.357)		0.199*** (22.41)	
Dturn	0.206*** (6.266)		0.201*** (6.04)	
Industry	YES	YES	NO	NO
Year	YES	YES	NO	NO
N	11749	11867	11749	11867
R ²	0.491	0.003	0.491	0.003

Note:***,** and* represent significance at 1%, 5% and 10%, respectively

4. Mechanism Analysis

4.1. Corporate Transparency

In order to explore the impact of poverty alleviation on enterprise information transparency, this paper establishes a mechanistic regression model as follows:

$$CO_{it} = \beta_0 + \beta_1 D_{it} + \beta_n Controls_{it} + \sum Year + \sum Industry + \varepsilon_{it} \quad (2)$$

As revealed by the regression analysis presented in Table.3., the divergence in ESG ratings exerts a profoundly significant influence on the transparency of corporate disclosures. A heightened level of divergence in a company's ESG ratings is associated with a marked decrease in the transparency of its information, which in turn amplifies information asymmetry and consequently intensifies the financial constraints faced by the company, thus confirming the hypothesis H_2 . ESG ratings have the potential to furnish investors with additional insights, thereby mitigating the effects of information asymmetry. However, differences in ESG ratings across agencies can also reduce corporate information transparency, drawing attention and misunderstandings from market participants. Increased information asymmetry leads investors to demand higher financing costs to compensate for the risks they face, and can also cause investors to doubt the company's governance structure and investor relations, thereby reducing trust in the company and affecting its financing capabilities.

Table 3. The regression results of mechanism analysis

	CO			
D	-0.233*** (-16.476)	-0.248*** (-16.873)	-0.229*** (-16.19)	-0.245*** (-16.73)
Controls	YES	NO	YES	NO
Industry	YES	YES	NO	NO
Year	YES	YES	NO	NO
N	11815	12107	11815	12107
R ²	0.055	0.023	0.055	0.023

Note:***, ** and* represent significance at 1%, 5% and 10%, respectively

4.2. Operating Risk

The operational risk is quantified based on the three-year variability of the EBITDA-to-asset ratio for publicly traded firms. Specifically, the three-year variability for firm i in year t is determined by computing the standard deviation over the period from year $t-2$ to year t . In order to investigate how divergence in ESG ratings influences a company's operational risk, the subsequent mechanistic regression model has been formulated:

$$PV_{it} = \beta_0 + \beta_1 D_{it} + \beta_n Controls_{it} + \sum Year + \sum Industry + \varepsilon_{it} \quad (3)$$

According to the regression results in Table.4., ESG rating divergence has a highly significant impact on corporate operating risk. An increase in corporate ESG rating divergence increases corporate operating risk, raises investors' expectations of stock market returns, and thereby increases corporate financing constraints, which validates the hypothesis H_2 . The greater the ESG rating divergence, the higher the degree of uncertainty of the company's ESG performance, and the greater the potential idiosyncratic risk. As the perception of risk increases, investors will demand higher returns to compensate for the additional risks they bear, reducing the liquidity of stocks and increasing corporate financing constraints.

Table 4. The regression results of mechanism analysis

	PV			
D	0.001*** (3.475)	0.001** (2.374)	0.001*** (3.76)	0.001*** (2.92)
Controls	YES	NO	YES	NO
Industry	YES	YES	NO	NO
Year	YES	YES	NO	NO
N	11815	12107	11815	12107
R ²	0.267	0.001	0.267	0.001

Note:***,** and* represent significance at 1%, 5% and 10%, respectively

5. Heterogeneity Analysis

5.1. Enterprise Ownership Attributes

Referring to the research by Ma Wenjie, this paper introduces two dummy variables for state-owned enterprises and non-state-owned enterprises, which denotes 1 and 0 respectively [11]. According to Table.5., compared with state-owned enterprises, the increase in ESG rating divergence has a more significant impact on corporate financing constraints in non-state-owned enterprises, validating the hypothesis H_3 . State-owned enterprises, due to their political background, are more likely to obtain credit inclination in financing, while private enterprises, due to their weaker risk resistance, are at a disadvantage in the capital market and are more susceptible to property rights discrimination when financing, leading to difficulties and high costs of financing, or even an inability to finance at all. Therefore, compared with non-state-owned enterprises, state-owned enterprises mitigate the increase in ESG rating divergence on financing constraints to some extent.

5.2. Accounting Information Disclosure Quality

Based on the evaluation results of the quality of accounting information disclosure by listed companies, companies rated as excellent and good are recorded as AIQ=1; companies rated as satisfactory and poor are recorded as AIQ=0. According to Table.5., compared with enterprises with poor accounting information disclosure quality, the increase in ESG rating divergence has a more significant impact on corporate financing constraints in enterprises with good accounting information disclosure quality, which validates the hypothesis H_3 . For those enterprises with poor accounting information disclosure quality, even if the ESG rating improves, its role in alleviating financing constraints will be limited because the lack of information disclosure restricts market's accurate assessment of the company's ESG performance.

Table 5. The regression results of heterogeneity analysis

	KZ			
	SOE=1	SOE=0	AIQ=1	AIQ=0
D	-0.002 (-0.072)	0.169*** (5.35)	0.058*** (2.853)	-0.016(-0.289)
Controls	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Year	YES	YES	YES	YES
N	4336	7413	9254	2053
R ²	0.778	0.472	0.752	0.395

Note:***,** and* represent significance at 1%, 5% and 10%, respectively

6. Robustness Analysis

6.1. Alternative Dependent Variable

There are various methods to measure financing constraints, and this paper using the SA index as an alternative to the KZ index as the dependent variable. The calculation formula is as follows:

$$SA_{it} = -0.737Size_{it} + 0.043Size_{it}^2 - 0.04Age_{it} \quad (4)$$

In this context, Size refers to the logarithm of a company's total assets as reported in its financial statements, while Age denotes the duration, in years, that the company has been publicly traded. A higher value of the SA index corresponds to a more pronounced financial constraint imposed on the

company. As evidenced in Table.6., upon altering the dependent variable, the escalation of ESG rating dispersion continues to markedly amplify the financial constraints on corporations, thereby confirming the robustness of the findings.

Table 6. The result of robustness testing

	SA			
D	0.022*** (8.671)	0.03*** (7.001)	0.022*** (8.76)	0.029*** (6.61)
Controls	YES	NO	YES	NO
Industry	YES	YES	NO	NO
Year	YES	YES	NO	NO
N	11815	12107	11815	12107
R ²	0.65	0.004	0.65	0.004

Note:***,** and* represent significance at 1%, 5% and 10%, respectively

6.2. Alternative Independent Variable

This paper adds ESG scores from Bloomberg and FTSE Russell in addition to the ESG rating divergence. The Bloomberg ESG rating specific scores are rounded to the nearest tenth, and the FTSE Russell ESG ratings are scaled to 200% of the specific scores to be included as sample data. The data of ESG rating divergence is obtained by calculating the standard deviation of the ESG rating scores of the six types of indicators. According to Table.7., after changing the independent variable, the increase in ESG rating divergence continues to significantly increase corporate financing constraints, and the therefore robustness is validated.

Table 7. The result of robustness testing

	KZ			
Ds	0.152*** (6.311)	0.187*** (5.579)	0.167*** (6.30)	0.195*** (5.22)
Controls	YES	NO	YES	NO
Industry	YES	YES	NO	NO
Year	YES	YES	NO	NO
N	11749	11867	11749	11867
R ²	0.494	0.001	0.494	0.001

Note:***,** and* represent significance at 1%, 5% and 10%, respectively

7. Conclusion

The research focused on Chinese A-share firms that received ESG ratings from a minimum of two out of the four agencies—Huazheng, WIND, SynTao Green, and MengLang—spanning the period from 2015 to 2022. The paper conducts an empirical analysis to assess how the divergence in corporate ESG ratings affects financing constraints and uncovers the underlying mechanisms behind this effect, leading to the conclusions outlined below:

- (1) Corporate ESG rating divergence significantly increases its financing constraints.
- (2) The impact of ESG rating divergence on increasing corporate financing constraints is more pronounced in state-owned enterprises with property rights attributes and in enterprises with high-quality accounting information disclosure.
- (3) Corporate ESG rating divergence increases its financing constraints by reducing corporate transparency and increasing corporate operational risks.

References

- [1] Berg F, Kölbel J F, Rigobon R. Aggregate confusion: The divergence of ESG ratings [J]. *Review of Finance*, 2022, 26 (6): 1315-1344.
- [2] Chatterji A K, Durand R, Levine D I, et al. Do ratings of firms converge? Implications for managers, investors and strategy researchers [J]. *Strategic Management Journal*, 2016, 37 (8): 1597-1614.
- [3] Kotsantonis S, Serafeim G. Four things no one will tell you about ESG data [J]. *Journal of Applied Corporate Finance*, 2019, 31 (2): 50-58.
- [4] Dimson E, Marsh P, Staunton M. Divergent ESG ratings [J]. *The Journal of Portfolio Management*, 2020, 47 (1): 75-87.
- [5] Billio M, Costola M, Hristova I, et al. Inside the ESG ratings: (Dis) agreement and performance [J]. *Corporate Social Responsibility and Environmental Management*, 2021, 28 (5): 1426-1445.
- [6] Abhayawansa S, Tyagi S. Sustainable investing: The black box of environmental, Social, and Governance (ESG) ratings [J]. *The Journal of Wealth Management*, 2021, 24 (1): 49-54.
- [7] Mi Rui. Analyst coverage, accounting information comparability, and financial constraints [J]. *Finance and Accounting Monthly*, 2023, 44 (09) : 82-89
- [8] Avramov D, Cheng S, Lioui A, et al. Sustainable investing with ESG rating uncertainty [J]. *Journal of Financial Economics*, 2022, 145 (2): 642-664.
- [9] KAPLAN S N, ZINGALES L. Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints? [J]. *Quarterly Journal of Economics*, 1997, 112 (1) : 169-215
- [10] Gibson B.R., Krueger P., Schmidt P.S. ESG Rating Disagreement and Stock Returns [J]. *Financial Analysts Journal*, 2021, 77 (4): 104-27.
- [11] Ma Wenjie, Yu Bojian. Corporate ownership attributes and differences between Chinese and foreign ESG ratings [J]. *Finance and Economics Research Institute*, 2023 (06): 124-136.