

The Impact of ESG Information Disclosure on Stock Pricing Deviation: Heterogeneity Analysis of Coal and Computer Industries in China's A-Share Market

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Abstract. Against the backdrop of China's ESG disclosure regime shifting from semi-mandatory to fully mandatory, ESG information has emerged as a critical determinant of asset pricing in the capital market. This study selects 10 listed companies each from the Shenwan Level-1 Coal and Computer industries in the A-share market, covering the period 2023–2025, to empirically examine the effect of ESG information disclosure on stock pricing deviation and its cross-industry heterogeneity. Using a two-way fixed effects model, the present study this paper find that ESG information disclosure significantly amplifies rather than converges stock pricing deviation. This effect exhibits pronounced industry heterogeneity: it is statistically significant and economically large in the computer industry, while statistically insignificant in the coal industry. The paper further document directional heterogeneity, whereby ESG disclosure exacerbates overpricing but has no material impact on underpricing. Mechanism analysis reveals that investor sentiment plays a partial mediating role: ESG information disclosure indirectly amplifies pricing deviation by fueling irrational investor sentiment. The findings provide empirical support for the design of industry-specific ESG disclosure regulations in China.

Keywords: ESG Information Disclosure, Stock Pricing Deviation, Industry Heterogeneity, Investor Sentiment, Behavioral Finance

1. Introduction

The ESG information has become an important data for capital allocation decisions in global financial markets. However, academic consensus remains elusive regarding if ESG disclosure can improve the efficiency of stock pricing. In China, the ongoing transition from semi-mandatory to mandatory ESG disclosure has intensified the need to understand how this non-financial information is incorporated into stock prices. Stock pricing deviation serves as a direct measure of market efficiency and resource allocation. Compared with mature markets, China's A-share market is symbolized by a high proportion of retail investors and severe information asymmetry, resulting in a persistent pricing deviations and elevated systemic risk. Under this circumstance, this paper responds the core question: If ESG information disclosure mitigate information asymmetry and reduce pricing deviation, or If ESG become a vehicle for speculative trading that amplifies market

inefficiencies. Literature existing now has two competing perspectives on the relationship between ESG and pricing efficiency. The information asymmetry view reckons that ESG disclosure develops the transparency, reduces information frictions, and aligns stock prices more closely with fundamental values [1]. However, the behavioral finance view argues that ESG, as a popular market theme, is prone to speculative trading, triggering investor sentiment swings and exacerbating pricing deviations [2]. While both perspectives have received empirical support, prior research still suffers from three key limitations. First of all, most studies use full A-share samples without systematically comparing the divergent pricing logics of high environmental risk cyclical industries and low risk technology growth industries [3]. Secondly, the literature disproportionately concentrates on rational information transmission channels but neglects behavioral mechanisms [4]. Third, there are few studies distinguishing between overpricing and underpricing, thus failing to capture the full spectrum of ESG's pricing effects [5].

To solve these issues, this paper combines efficient market hypothesis and behavioral finance theories to conduct analysis of the impact of ESG on pricing deviation. Paper employs a two-way fixed effects model to test the baseline effect and uses subsample regressions to test industry and directional heterogeneity. These findings contribute to the literature by documenting the heterogeneous effects of ESG disclosure according to industries and pricing directions, and by highlighting the core role of investor sentiment.

2. Literature review

2.1. Economic consequences of ESG information disclosure

The economic results of ESG disclosure have been studied with focusing on three dimensions: firm value, information asymmetry, and cost of capital. In terms of firm value, there are two competing views emerging. The value enhancement thesis argues that ESG disclosure improves corporate reputation, and attracts long-term institutional investors, thereby enhancing firm value [6]. In contrast, the value destruction thesis figures that ESG investments increases additional costs on firms, crowds out productive investments, and erodes short-term profit [7].

2.2. Determinants of stock pricing deviation

Stock pricing deviation arises from four main sources: information asymmetry, investor sentiment, market institutions, and corporate governance. And information asymmetry is widely recognized as the fundamental cause. When investors lack access to accurate internal information, they cannot precisely assess intrinsic value, resulting in price deviations. In addition, investor sentiment, a core concept in behavioral finance, amplifies these deviations by driving irrational trading behavior, especially in markets dominated by retail investors.

3. Theoretical analysis and hypothesis development

3.1. Theoretical foundations

3.1.1. Information asymmetry theory

Information asymmetry theory reckons that market participants possess unequal information, allowing informed parties to exploit their advantages at the expense of uninformed ones. In capital markets, managers have access to private information about firm performance, while the external

investors rely on public disclosures. This information gap leads to misvaluation and pricing deviations. ESG disclosure, as a paramount way of non-financial information, increases transparency and reduces information asymmetry [8].

3.1.2. Efficient market hypothesis

The EMH figures that stock prices fully reflect all available information, and thus equal intrinsic value in an efficient market. However, real-world markets are imperfect because of information frictions, transaction costs, and investor irrationality. ESG disclosure increases the supply of information into the market, potentially improving information efficiency and making markets closer to the EMH ideal [9].

3.1.3. Behavioral finance theory

Behavioral finance challenges the assumption of perfect rationality, arguing that investor decisions are systematically biased by many psychological factors such as the sentiment, the overconfidence, and the herding. In China's A-share market, where retail investors account for a big share of trading volume, irrational behavior is pervasive. And ESG, as a trendy investment data, is easily exploited by speculators to trigger herding and momentum trading, thus amplifying pricing deviations [10].

3.2. Hypothesis development

3.2.1. ESG disclosure and absolute pricing deviation

In China's A-share market, many retail investors generally lack the expertise to conduct deep analysis of ESG information, often equating high ESG ratings with superior investment value. At the same time, some institutional investors engage in short term speculative trading around ESG themes, making prices away from fundamentals. Furthermore, ESG in China disclosure regime remains underdeveloped, with concerns about information reliability. Collectively, these factors mean that ESG disclosure may not effectively reduce information asymmetry but instead become a catalyst for speculative trading, amplifying absolute pricing deviation. Thus, The paper provides the first propose:

H1: ESG information disclosure significantly amplifies the absolute pricing deviation of stocks.

3.2.2. Industry heterogeneity

The impact of ESG disclosure on pricing deviation is more likely to vary across industries due to differences in ESG materiality and investor attention. The computer industry, a high growth technology sector, is a focal point of ESG themed investment, with investors highly sensitive to ESG. However, the coal industry, a traditional cyclical sector, is valued primarily based on profit and dividend yields, with investors paying less attention to ESG. In Addition, computer industry stocks exhibit higher inherent volatility, making them more susceptible to ESG driven sentiment swings. Therefore, the paper gives the second propose:

H2: The impact of ESG disclosure on absolute pricing deviation exhibits industry heterogeneity, with a stronger amplification effect in the computer industry than in the coal industry.

3.2.3. Directional heterogeneity

ESG may have asymmetric effects on overpriced and underpriced stocks. When a stock is overpriced, market sentiment is excessively optimistic, and positive ESG news can further fuel speculative buying, exacerbating overpricing. But when a stock is underpriced, market sentiment is pessimistic, and investors are easily to underreact to positive information, including ESG disclosures. Thus the following is the third propose:

H3: The impact of ESG disclosure exhibits directional heterogeneity, with a more pronounced amplification effect on overpricing than on underpricing.

4. Research design

4.1. Sample selection and data sources

The sample in paper consists of 10 listed companies from the Shenwan Level-1 Coal and Computer industries, covering the period from 2023 to 2025, including a total of 60 firm-year observations. At the same time, the paper excludes ST and *ST companies and firms with missing data.

ESG ratings are obtained from the Huazheng ESG Database. Financial and market data are got from the CSMAR Database. To mitigate the influence of extreme values, The paper winsorize the absolute pricing deviation (Mis) at the 2.5% level on both tails.

4.2. Variable definitions

4.2.1. Dependent variable: absolute pricing deviation

This paper use the residual income model (RIM) to estimate the intrinsic value of stocks. The absolute pricing deviation is calculated as the absolute value of the difference between market price and intrinsic value, divided by intrinsic value.

4.2.2. Independent variable: ESG composite score

The paper use the Huazheng ESG composite score as the measure of ESG performance. This score ranges from 0 to 10, with higher values indicating better ESG performance.

4.2.3. Control variables

Paper include the following control variables: firm size (Size, natural logarithm of total assets), leverage (Lev, total debt/total assets), return on assets (ROA, net income/average total assets), revenue growth (Growth), top shareholder ownership (Top1), institutional ownership (Inst), firm age (Age), and turnover ratio (Turnover, annual trading volume/outstanding shares).

4.3. Model specification

To test Hypothesis H1, Paper estimates the following two-way fixed effects model:

$$Mis = \alpha_0 + \alpha_1 ESG + \sum Controls + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where μ_i denotes firm fixed effects, λ_t denotes year fixed effects, and ε_{it} is the error term.

5. Empirical results and analysis

5.1. Descriptive statistics

Table 1. Descriptive statistics

Variable	Full Sample(N=60)		Coal Industry (N=30)		Computer Industry(N=30)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Mis 0	0.412	0.287	0.238	0.195	0.586	0.321
ESG	7.318	0.825	6.837	0.642	7.8	0.678
Size	23.872	0.914	24.053	0.827	23.691	0.956
Lev	0.34	0.125	0.402	0.098	0.278	0.117
ROA	0.107	0.062	0.143	0.037	0.071	0.058
Growth	-0.021	0.245	-0.142	0.087	0.1	0.216
Top1	0.483	0.147	0.574	0.089	0.392	0.115
Inst	0.421	0.118	0.345	0.047	0.497	0.112
Age	21.25	7.632	22.1	5.876	20.4	9.124
Turnover	2.765	1.214	1.782	0.523	3.748	0.897

As the table 1 shows, descriptive statistics reveal significant differences between the two industries. The average absolute pricing deviation in the computer industry (0.586) is 2.46 times that in the coal industry (0.238), indicating that technology stocks generally have higher valuation premiums and greater pricing deviations. The average ESG score in the computer industry (7.8) is also significantly higher than in the coal industry (6.84), consistent with the observation that emerging industries are more proactive in ESG disclosure.

5.2. Correlation analysis

Table 2. Correlation matrix

Variable	1	2	3	4	5	6	7	8	9
1. Mis	1								
2. ESG	0.342	1							
3. Size	-0.187	*0.482	1						
4. Lev	*-0.476	*-0.523	*0.367	1					
5. ROA	*-0.412	*0.415	0.182	*-0.476	1				
6. Growth	*0.534	*0.374	0.156	*-0.321	0.098	1			
7. Top1	*-0.451	*0.298	*0.315	*0.387	0.224	*-0.356	1		
8. Inst	*0.397	*0.572	0.193	*-0.489	0.241	*0.427	0.085	1	
9. Turnover	*0.652	0.217	-0.105	*-0.392	-0.168	*0.483	*-0.314	*0.357	1

The table 2 shows that the ESG composite score is positively and significantly correlated with the raw pricing deviation at the 5% level, providing preliminary support for baseline hypothesis.

5.3. Baseline regression results

Table 3. Baseline regression results

Variable	Coef.	Conventional Std. Err.	t-value	p-value	Robust Std. Err.	t-value	p-value	Clustered Std. Err.	t-value	p-value
ESG	5.885 ₂	2.8742	2.048	0.0492*	2.2872	2.573	0.0151*	2.4403	2.412	0.0262*

The table 3 indicates that the coefficient on ESG composite score is 5.885 and statistically significant at the 5% level ($p=0.026$ under cluster-robust standard errors). This implies that a one-point increase in ESG score is associated with an average 5.885-unit increase in raw pricing deviation. In other words, firms with better ESG performance experience more severe stock overpricing, supporting Hypothesis H1.

5.4. Heterogeneity analysis

5.4.1. Industry heterogeneity

Table 4. Industry heterogeneity analysis

Variable	Coal Industry	Computer Industry
ESG	0.872(1.24)	6.213(2.67)
Control Variables	Included	Included
Firm/Year Fixed Effects	Controlled	Controlled
N	30	30
Adj-R ²	0.725	0.897

The table 4 shows that the coefficient on ESG score is 6.213 and statistically significant at the 5% level in the computer industry, with a larger magnitude than the full sample. This is because the computer industry is a core area of ESG-themed speculation, with both institutional and retail investors chasing ESG leaders, driving prices far above fundamentals.

In contrast, the coefficient on ESG score is positive but statistically insignificant in the coal industry. This suggests that ESG performance has limited impact on pricing in traditional cyclical industries, where investors focus primarily on earnings stability and dividend payouts. These results support Hypothesis H2.

5.4.2. Directional heterogeneity (overpricing vs. underpricing)

Table 5. Directional heterogeneity (overpricing vs. underpricing)

Variable	N=32	N=28
ESG	7.342(2.89)	-1.256(-0.97)
Control Variables	Included	Included
Firm/Year Fixed Effects	Controlled	Controlled
Adj-R ²	0.912	0.684

When splitting the sample into overpriced (N=32) and underpriced (N=28) subsamples, this paper find that the ESG coefficient is 7.342 and statistically significant in the overpriced subsample, but negative and insignificant in the underpriced subsample, as the table 5 shows. This indicates that ESG disclosure only amplifies pricing deviation for already overpriced stocks, as positive ESG news further fuels investor optimism and creates valuation bubbles. These findings support Hypothesis H3.

6. Conclusion

This study documents a paramount ESG pricing deviation effect in China's A-share market: Better ESG performance is associated with more severe stock overpricing. This effect exhibits pronounced heterogeneity: it is only important in the computer industry and for overpriced stocks, but not in the coal industry. This paper also find that trading activity is the most vital determinant of pricing deviation, with high turnover stocks being more prone to overvaluation.

According to these findings, Paper proposes the following policy recommendations:

First of all, for regulators, it is important to develop industry-specific ESG disclosure standards. Regulators should impose stricter disclosure requirements on high environmental risk industries and strengthen supervision over ESG information fraud.

Secondly, firms should prioritize substantive ESG management rather than symbolic disclosure for listed companies. Technology growth firms, in particular, should recognize the potential risks of ESG driven overvaluation and strive to align stock prices with fundamental values. Traditional cyclical firms are also supposed to improve ESG management to meet evolving investor demands.

However, this study has several limitations. Firstly, the sample size is relatively small, just covering only 20 firms over 3 years, so future research should expand the sample size and time horizon to make the result closer to the reality. Secondly, this paper does not distinguish between different dimensions of ESG disclosure quality. The studies in future could test how the quality and materiality of ESG information affect pricing deviation. Thirdly, the paper only tests the mediating role of investor sentiment. Research in future need to explore other potential mechanisms, such as analyst coverage and media attention.

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