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Transactions on Economics, Business and Management Research
ISSN: 2960-1789, eISSN: 2960-2254 | Volume 10
MEEA 2024

Research on the Impact of ESG Performance on Stock Price Volatility of Enterprises: Empirical Evidence from A-share Listed Companies

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Abstract. As socially responsible investment and sustainable development gain traction, the ESG performance of companies is increasingly attracting investor and public attention. ESG ratings help identify responsible firms, enabling assessment of their contributions to sustainable growth.This article examines Shanghai and Shenzhen A-share data, focusing on the impact of ESG performance on stock price volatility. Key findings include:A significant negative correlation exists between stock price volatility and ESG performance; higher ESG ratings correspond to lower volatility;he nature of property rights affects this relationship, with non-state-owned enterprises benefiting more from ESG performance in reducing volatility than state-owned enterprises;Policy uncertainty in a company's location significantly moderates the relationship, with greater uncertainty intensifying the negative impact of ESG performance on stock price volatility.This research enhances understanding of the economic consequences of ESG performance and helps investors recognize its value, improving capital allocation efficiency.

Keywords: ESG, stock price volatility, property rights nature, policy uncertainty.

1. Introduction

In recent years, industrialization and urbanization have led to increased greenhouse gas emissions, exacerbating climate change. China has set a "dual carbon" goal to peak carbon emissions by 2030 and achieve carbon neutrality by 2060, highlighting the importance of corporate ESG (Environmental, Social, and Governance) performance.

Investors are increasingly focusing on ESG performance, with significant interest growth since 2009, leading many companies to release ESG reports. Although ESG research in China started later than in other countries, it has become mainstream with the rise of green finance.

Stock price volatility is common in markets, and unusual fluctuations can undermine investor confidence. ESG performance is closely related to stock price volatility; higher ESG ratings typically correlate with better disclosure quality, reducing volatility risk.

This study examines the relationship between ESG performance and stock price volatility in Shanghai and Shenzhen A-shares, analyzing the effects of property rights and policy uncertainty. The findings indicate that better ESG performance leads to lower stock price volatility, with both property rights and policy uncertainty significantly moderating this relationship.

2. References and theoretical basis

2.1. References

ESG stands for Environment, Social Responsibility, and Governance, which are the initials of the three English words. It is an extension and enrichment of the concepts of green investment and responsible investment and is currently an important standard used by the international community to measure a company's level of green and sustainable development[1].

Currently, ESG evaluations in China are typically conducted by third-party institutions, which provide reports to help investors understand a company's ESG performance. The ratings are usually categorized into levels or scores, such as AAA, AA, A+, etc., with higher ratings indicating better performance in ESG[2].

Das Gupta[3] found through cross-country data research that when a company's financial performance is poor, it is more inclined to improve its ESG actions, and the controversies surrounding ESG provide pressure and motivation for companies to enhance their ESG performance.

Martins[4], in his study using the difference-in-differences method, found that compared to developed economies, companies in emerging markets are more likely to negatively adjust their ESG behavior after facing competitive shocks.

Velte (2017)[5] conducted an empirical study using listed companies in Germany as a sample, covering the period from 2012 to 2014. The results showed a positive correlation between a company's ESG performance and return on assets, with the governance indicator having the greatest impact on financial performance.

Chen Wan (2018)[6] found that there is a negative correlation between a company's ESG level and the likelihood of bond default, with companies that perform poorly in ESG facing higher risks of bond default.

Zhang Lin and Zhao Haitao (2019)[7] conducted an empirical study on the relationship between ESG performance and corporate value, finding a positive correlation between them, meaning that better ESG performance is associated with higher corporate value.

Gao Jieying (2021)[8] and others, through research on data from A-share listed companies in China, found a significant positive correlation between a company's ESG performance and investment efficiency, with companies that perform well in ESG demonstrating stronger management capabilities compared to others.

Duan Jin and others (2007)[9] found through empirical research that the impact of money supply on stock price volatility is relatively small, but there is a certain relationship between interest rates and stock price volatility. Wang Jinle and Shi Yongdong (2018)[10] believed that for companies experiencing operating losses, changing senior management would exacerbate stock price volatility..

2.2. . Theoretical basis

2.2.1. Information Asymmetry Theory

The theory of information asymmetry refers to situations in transactions or decision-making where some participants possess more or more accurate information than others, leading to decreased market efficiency and imbalanced resource allocation. In cases of information asymmetry, buyers and sellers find it difficult to access all the information that the other party possesses during transactions, which can result in one party being deceived or misled, causing the market to lose efficiency.

2.2.2. Sustainable Development Theory

The theory of sustainable development holds that economic, social, and environmental factors are inseparable. Sustainable development can only be achieved when a continuous balance is maintained among these three aspects. Since ESG (Environmental, Social, and Governance) performance considers these three dimensions, the relationship between ESG performance and stock price volatility can be explained through the lens of sustainable development theory.

2.2.3. Stakeholder Theory

Stakeholder theory posits that a company's operations impact its surrounding stakeholders, including shareholders, employees, customers, suppliers, and the government. By shouldering environmental and social responsibilities, companies can convey trustworthy signals to stakeholders, reduce transaction costs between the company and stakeholders, and enhance the efficiency of stakeholder

participation in value creation. ESG (Environmental, Social, and Governance) performance reflects a company's attention to environmental, social, and governance issues, as well as its management capabilities and future planning, which can influence the company's risk management abilities and investor trust. Therefore, there is a close relationship between ESG performance and stakeholder theory.

3. Research Hypothesis

Good ESG performance can suppress stock price volatility through multiple pathways, leading to the following hypothesis: First, the higher the ESG rating of a listed company, the lower its stock price volatility (indicating a negative correlation). State-owned enterprises, backed by government reputation guarantees and preferential credit and resource policies, can convey more significant positive signals and value-driven impacts to the outside world. This helps them gain external recognition and mitigates the impact of negative news on stock price volatility. Therefore, we propose a second hypothesis: compared to state-owned enterprises, non-state-owned enterprises' ESG performance is more effective in suppressing their stock price volatility.

In regions with high policy uncertainty, companies may enhance their ESG performance to convey more positive signals to the outside world, thereby reducing their financing costs and obtaining more government support. This can also lower their stock price volatility and stabilize the investment confidence of minority shareholders. Thus, we propose the final hypothesis: in regions with high policy uncertainty, companies' ESG performance is more effective in suppressing stock price volatility compared to regions with low policy uncertainty.

Factors influencing a company's stock price volatility come from multiple levels, including internal management, external markets, and policy changes. To more accurately and comprehensively study the impact of ESG ratings on stock price volatility, the following control variables were selected to enhance the reliability of this research:

1. Return on Equity (ROE)

Return on Equity (ROE) is the ratio of a company's net profit to its shareholders' equity, used to measure the company's profitability. A high ROE indicates a strong ability to generate high returns for shareholders, which may stimulate investor enthusiasm and lead to stock price volatility. Generally, there is a positive correlation between ROE and stock price volatility.

2. Debt Ratio (LEV)

The debt ratio measures the total debt of a company relative to its total assets. It reflects the level of a company’s debt; a higher debt ratio indicates a greater reliance on borrowed funds, which entails higher financial risk. As the debt ratio increases, the risk of stock price volatility also rises, as investors may worry about the company's ability to manage additional debt, potentially leading to defaults and putting pressure on stock prices.

3. Company Size (SIZE)

The natural logarithm of company size can reflect factors such as financial strength and market competitiveness. Therefore, there is a certain correlation between company size and stock price volatility. Typically, larger companies have distinct advantages, such as economies of scale, allowing them to better withstand market fluctuations, resulting in relatively smaller stock price volatility. Conversely, smaller companies may experience greater stock price volatility in the face of market fluctuations due to insufficient financial strength to mitigate risks.

4. Tobin's Q (TOBINQ)

Tobin's Q is the ratio of a company's total market value to its net asset value. It serves as an indicator of the company's investment level and market value. A higher Tobin's Q indicates that the market

values the company more favorably compared to its actual value, suggesting strong growth expectations. Under such high growth potential, stock price volatility tends to be lower.

5. Institutional Ownership Ratio (INST)

The institutional ownership ratio is the proportion of a company's shares held by institutional investors relative to the total number of shares. Institutional investors are significant market participants, and their trading behaviors often produce important market signals. Their involvement usually implies a thorough analysis of the company's fundamentals and future prospects, allowing for a long-term perspective on investment value. Thus, there is a correlation between institutional ownership and stock price volatility.

6. Book-to-Market Ratio (BM)

The book-to-market ratio indicates the relationship between a company's book value and its market value. It is commonly used to assess a company's earnings and asset situation. A low BM ratio suggests that the company may be undervalued. Given that stock price volatility varies among different types of companies, this ratio is used as a control variable.

3.1. . Analysis

Table 1 presents the descriptive statistical analysis of the main variables in this study. The stock price volatility (VOL) has a maximum value of 7.715 and a minimum value of only 1.268, indicating a substantial difference in stock price volatility among the sample companies. The average ESG rating (ESG) is 6.590, suggesting that the overall ESG ratings of the sample companies are in the upper-middle range. However, the maximum value of 9 and minimum value of 4 indicate significant variability in ESG ratings among different sample companies across various years.

Regarding the control variables, the Debt Ratio (LEV), which is the ratio of total liabilities to total assets, is influenced by the industry and type of enterprise. It measures the strength of a company’s financial leverage. Generally, for stable industries (such as public utilities and healthcare), this ratio does not exceed 50%, while for high-risk industries (such as real estate and financial services), it typically does not exceed 80%. In this sample, LEV has a maximum value of 91% and a minimum value of only 5.9%, showing a large disparity, but the average does not exceed 50%, indicating that the overall financial risk of the sample is relatively low.

The Return on Equity (ROE) has a maximum value of 36.5% and a minimum value of -66.2%, demonstrating a clear polar difference. The Book-to-Market Ratio (BM), which reflects the value type of a company, has a maximum value of 7.342 and a minimum value of 0.090, indicating significant diversity in the value of the sample companies. Tobin's Q (TOBINQ) reflects a company's value and growth prospects, with an average TOBINQ of 1.112, falling within the range of 1 to 2. This suggests that the management of most sample companies can effectively operate their assets and liabilities, achieving an appropriate balance between market value and net assets.

Table 1. Descriptive Statistics

standard deviation	variable	sample size	Maximum value	average value	minimum value
VOL	19331	7.715	2.891	1.268	1.013
ESG	19331	9.000	6.590	4.000	1.094
SIZE	19331	26.350	22.340	19.670	1.247
LEV	19331	0.910	0.445	0.059	0.201
ROE	19331	0.365	0.070	-0.662	0.105
BM	19331	7.342	1.112	0.090	1.089
TOBINQ	19331	9.544	1.912	0.848	1.173
INST	19331	0.891	0.410	0.001	0.230

3.1.1. ESG Ratings of Listed Companies and Stock Price Volatility

The regression results based on the OLS model show the impact of corporate ESG ratings on stock price volatility. The regression coefficient for ESG is -0.073 and is significant at the 1% level. This indicates that a higher ESG rating can effectively reduce stock price volatility, supporting Hypothesis 1. This suggests that good ESG performance enhances a company's reputation, reduces information asymmetry between the company and investors, and thereby increases the trust of investors and other stakeholders, leading to decreased stock price volatility. Additionally, ESG performance can compel companies to improve their operational management capabilities, reduce production costs, and lower financial risks, further contributing to reduced stock price volatility.

3.1.2. The Moderating Effect of Ownership Structure

The moderating effect of ownership structure on the relationship between corporate ESG ratings and stock price volatility is examined in the regression results. Attention should be focused on the interaction term between ESG ratings and ownership structure (ESGSOE). The ESG rating (ESG) remains significantly negatively correlated with stock price volatility (VOL) at the 1% level. Additionally, the interaction term ESGSOE is significantly positively correlated at the 1% level.

Since SOE is set as a dummy variable, with state-owned enterprises valued at 1 and non-state-owned enterprises at 0, it can be concluded that this interaction term weakens the negative correlation between ESG ratings and stock price volatility, supporting Hypothesis 2. State-owned enterprises diminish the negative correlation between ESG performance and stock price volatility. This is primarily because state-owned enterprises, as important economic components of a socialist country, have stronger financing capabilities and higher levels of investor trust. Therefore, when faced with negative news, the state's "safety net" image can reduce the extent of investor reaction. In contrast, for non-state-owned enterprises, poor ESG performance is more likely to lead investors to sell their stocks, resulting in greater stock price volatility.

3.1.3. The Moderating Effect of External Policy Uncertainty

The interaction term ESG*UNCER is significantly negatively correlated at the 1% level. Since this study sets the policy uncertainty of the company's location as a dummy variable, with regions experiencing policy uncertainty valued at 1 and those without valued at 0, it can be concluded that this interaction term enhances the negative correlation between ESG ratings and stock price volatility, supporting Hypothesis 3. Policy uncertainty strengthens the negative correlation between a company's ESG performance and its stock price volatility.

This is primarily because companies in regions with policy uncertainty are more focused on enhancing sustainability in the face of various policy risks. They do this by improving environmental

practices, addressing social responsibilities, and managing governance issues, which leads to better ESG performance. Furthermore, under the pressure of policy uncertainty, companies tend to adopt more cautious and stable operational strategies. In this context, higher ESG ratings reflect the progress made in sustainability, and investors, recognizing these advancements, may perceive the company as a more reliable and long-term investment, thereby reducing their reaction to negative news and stabilizing stock price volatility.

4. Robustness Check

4.1. PSM Test

Considering the issue of endogeneity and the potential influence of other characteristics between companies that have received ESG ratings and those that have not, this study employs the Propensity Score Matching (PSM) method for robustness testing of the regression sample.

The approach is as follows: the companies that have received ESG ratings are divided into two groups: those with ESG scores greater than 6 (high_pscore=1), designated as the treatment group, and those with ESG scores less than or equal to 6 (high_pscore=0), designated as the control group. The previously identified control variables reflecting company characteristics are used as covariates. Nearest neighbor matching is then applied to select samples from the treatment and control groups in a 1:1 ratio.

After matching the samples using the PSM method, regression analysis is conducted. All results remained substantively unchanged, except for the moderating effect of external policy uncertainty, which did not pass the robustness check. Therefore, this study will further examine the moderating effect of external policy uncertainty.

5. Summary

This study analyzes empirical data from listed companies on the Shanghai and Shenzhen A-shares market in China. Unlike previous literature, it explores the impact of corporate non-financial performance (ESG performance) on stock price volatility. Based on theories of information asymmetry, stakeholder theory, and sustainable development, the study identifies the pathways through which corporate ESG ratings affect stock price volatility and proposes three related research hypotheses. The empirical analysis and robustness checks further validate these hypotheses, confirming the correctness of the research conclusions. The findings of this study are as follows:

Higher ESG Ratings Lead to Lower Stock Price Volatility: There is a negative correlation between a company's ESG rating and its stock price volatility. This may be because companies with high ESG ratings excel in environmental, social, and governance aspects, demonstrating better stability and long-term growth potential, which instills confidence in investors. Moreover, companies with high ESG ratings prioritize social and environmental responsibilities, helping to maintain their reputation and reduce negative public perceptions, thus minimizing potential losses from regulatory scrutiny or environmental incidents. These factors contribute to enhanced investor confidence and reduced reactions to uncertainty, leading to lower stock price volatility. Additionally, companies with good ESG performance send more positive signals to the market, effectively reducing information asymmetry between investors and the company, thereby stabilizing stock prices.

State-Owned Enterprises Mitigate the Negative Correlation: State-owned enterprises (SOEs) can weaken the negative correlation between ESG performance and stock price volatility. This is primarily because SOEs play a significant role in the economy of a socialist country. As government-supported entities, they have greater political influence, which leads to more extensive attention and evaluation of their ESG performance. Furthermore, as part of the national framework, SOEs enjoy advantages in financing channels and resource utilization that differ from non-state-owned enterprises. Additionally, stock prices in China are often closely tied to national policies. Many investors perceive

SOE stocks as relatively safe investments and tend to hold them long-term. Therefore, in the face of negative news, the "safety net" effect from the government reduces the likelihood of mass selling, thereby lowering stock price volatility.

Policy Uncertainty Enhances the Negative Correlation: Policy uncertainty can strengthen the negative correlation between ESG performance and stock price volatility. In regions with policy uncertainty, companies face higher risks, leading investors to focus more on the long-term stability and risk management capabilities of these companies. Consequently, they pay closer attention to ESG performance. If these companies demonstrate strong ESG performance, investors are more inclined to hold onto their stocks during political and economic uncertainty, resulting in relatively lower stock price volatility. Additionally, companies in uncertain policy environments may need to make greater efforts in ESG to enhance their competitive advantage in a fiercely competitive market, positively impacting their stability and long-term value, thereby further stabilizing stock price volatility.

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