ESG, foreign ownership, and profitability on stock price volatility in mining and plantation companies

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ABSTRACT

This study examines the effects of Environmental, Social, and Governance (ESG) performance, foreign institutional ownership, and profitability on stock price volatility in mining and plantation companies listed on the Indonesia Stock Exchange during 2022-2024. Using panel data regression on 41 firms (123 observations), stock price volatility is measured by the standard deviation of daily returns, while ESG is proxied by the Katadata Corporate Sustainability Index (KCSI). The results show that profitability and firm size have a positive and significant effect on stock price volatility, whereas ESG performance, foreign institutional ownership, and leverage have no significant effect. These findings indicate that stock price volatility is primarily driven by internal firm fundamentals rather than sustainability factors or ownership structure.

Keywords: ESG; foreign institutional ownership; profitability; stock price volatility; mining and plantation sectors

ESG, Kepemilikan Asing, dan Profitabilitas terhadap Volatilitas Harga Saham Perusahaan Pertambangan dan Perkebunan

ABSTRAK

Penelitian ini menganalisis pengaruh kinerja Environmental, Social, and Governance (ESG), kepemilikan institusi asing, dan profitabilitas terhadap volatilitas harga saham pada perusahaan sektor pertambangan dan perkebunan di Bursa Efek Indonesia periode 2022-2024. Penelitian menggunakan regresi data panel terhadap 41 perusahaan (123 observasi). Volatilitas harga saham diukur dengan standar deviasi return harian, sedangkan ESG diproksikan menggunakan Katadata Corporate Sustainability Index (KCSI). Hasil menunjukkan bahwa profitabilitas dan ukuran perusahaan berpengaruh positif dan signifikan terhadap volatilitas harga saham, sedangkan ESG, kepemilikan institusi asing, dan leverage tidak berpengaruh signifikan. Temuan ini menunjukkan bahwa volatilitas harga saham lebih dipengaruhi oleh faktor fundamental internal perusahaan dibandingkan faktor keberlanjutan dan struktur kepemilikan.

Kata Kunci: *ESG; kepemilikan institusi asing; profitabilitas; volatilitas harga saham; sektor pertambangan dan perkebunan*

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INTRODUCTION

Capital markets play a crucial role in allocating funds and forming stock prices that reflect investors' expectations and risk perceptions. Market risk is commonly assessed using stock price volatility, which captures the magnitude of price fluctuations within a given time frame. High volatility signals greater market uncertainty and elevates investors' perception of risk associated with a particular stock. Empirical studies suggest that stock price volatility is influenced not only by overall market conditions but also by firms' internal and external characteristics, making it an important variable in investment decision-making (Feng *et al*., 2023; Jao *et al*., 2020).

Companies operating in the mining and plantation sectors are characterized by high exposure to environmental, social, and economic risks due to their dependence on natural resources, sensitivity to commodity price fluctuations, and vulnerability to regulatory changes (Liang *et al*., 2024; Olvera & Iizuka, 2024). Although these sectors differ in operational activities—mining focusing on subsurface resource extraction and plantation on agricultural cultivation—both share fundamentally similar risk profiles. These include direct environmental impact, community relations challenges, exposure to global commodity price cycles, and susceptibility to sustainability-related regulations (Fu et al., 2024; Petavratzi et al., 2022).

The integration of these two sectors in this study is therefore justified on both theoretical and empirical grounds. From a theoretical perspective, both industries are classified as resource-based sectors where corporate risk is strongly influenced by external factors particularly commodity market dynamics and environmental policies. Empirically, prior studies have examined mining and plantation companies collectively due to their comparable exposure to ESG-related risks and stock price volatility (Gunawan *et al*., 2022; Pishchalkina *et al*., 2022). Examining these sectors jointly not only increases the sample size for more robust statistical analysis but also enables a more comprehensive understanding of how sustainability performance and firm fundamentals influence market risk in high-risk industries. Furthermore, focusing on these two sectors is particularly relevant in the Indonesian context, where both mining and plantation industries play significant roles in the national economy, contributing substantially to export earnings and employment, while simultaneously facing increasing scrutiny from regulators and stakeholders regarding their environmental and social practices (Rahmaniati & Ekawati, 2024).

In addition to ESG performance, foreign institutional ownership and profitability are included as key explanatory variables due to their theoretical relevance in explaining stock price volatility. Foreign institutional ownership is associated with improved monitoring and information efficiency, which may reduce uncertainty in stock prices. Meanwhile, profitability reflects firm performance and growth prospects, which can influence investor behavior and trading intensity. To ensure more robust estimation, firm size and leverage are also incorporated as control variables, as they represent fundamental firm characteristics related to information asymmetry, financial risk, and market responsiveness.

Capital markets have increasingly recognized social, environmental and governance (ESG) aspects as non-financial risk factors influencing investor behavior in recent years. ESG reflects the extent to which sustainability principles and corporate social responsibility are integrated into firms' long-term business strategies. ESG-related information is perceived by investors as a signal of managerial quality and the ability of a firm to effectively manage risks over the long term. Firms with superior ESG performance are generally regarded as having greater stability and resilience in the face of economic uncertainty, supported by enhanced reputation, legitimacy, and long-term sustainability (Putri *et al*., 2024).

In natural resource-based industries such as mining and plantation, ESG considerations become particularly relevant due to the sectors' direct interaction with environmental sustainability, community welfare, and governance practices. Companies operating in these industries are often exposed to environmental risks, land use conflicts, and regulatory scrutiny related to sustainability standards. Consequently, investors may view ESG performance as an indicator of how effectively firms manage environmental and social issues and related risks, which may influence corporate risk exposure and financial stability. (Fu *et al*., 2024). Therefore, the integration of ESG practices in these sectors may influence how investors perceive corporate risk and market stability.

In Indonesia, the measurement of ESG performance has continued to evolve alongside growing demands for transparency and sustainability-related regulations. One nationally recognized ESG indicator is the Katadata ESG Index, formerly known as the Katadata Corporate Sustainability Index (KCSI), which evaluates the extent to which publicly listed companies perform on environmental, social, and governance aspects of sustainability. Although ESG has been widely examined using global indices, the application of KCSI in academic research remains relatively limited. This gap provides an opportunity to assess the relevance of KCSI as an ESG proxy in explaining stock market behavior in Indonesia, particularly in relation to stock price volatility (Gunawan *et al*., 2022; Rahmaniati & Ekawati, 2024).

Empirical literature suggests that strong ESG performance functions as a risk-mitigation mechanism by reduce information asymmetry and enhancing investor confidence. Firms with robust ESG practices tend to be more resilient to economic shocks and exhibit lower levels of stock price volatility (Wu *et al*., 2024), particularly during periods of heightened market uncertainty (Albuquerque *et al*., 2019; Broadstock *et al*., 2020; Cerqueti *et al*., 2020). Additionally, empirical research demonstrates that the performance of ESG practice is associated with the reduction of systemic risk and to promote greater stability in stock markets (Zhou & Zhou, 2022). Based on these arguments, the following hypothesis is proposed in this study:

H_1: Higher ESG performance is associated with lower stock price volatility.

Foreign institutional ownership is widely regarded as an effective external monitoring mechanism (Vo & Mazur, 2023), owing to foreign investors' superior ability to acquire and process high-quality information as well as their relatively disciplined investment behavior. From the perspective of agency theory, an increase in foreign ownership can mitigate information asymmetry and improve

the quality of publicly available information, thereby contributing to stock price stability (Yang *et al*., 2024). Empirical evidence from emerging markets indicates that foreign institutional ownership is negatively associated with stock return volatility, reflecting its role in dampening market fluctuations (Isda & Hartono, 2024; Thanatawee, 2021).

Evidence from emerging markets generally demonstrates that foreign institutional ownership is negatively correlated with stock price volatility, primarily due to better monitoring and improved information flow. In the Indonesian context, share price fluctuations decrease with greater foreign institutional ownership, even after accounting for market capitalization, turnover, leverage, and market-to-book ratio (Farhan & Kim, 2023). Comparable findings in Thailand also show that foreign ownership helps reduce volatility, emphasizing the stabilizing influence of foreign investors (Thanatawee, 2021). Therefore, the subsequent hypothesis is proposed:

H_2: Foreign institutional ownership lowers stock price variance significantly.

Firm profitability reflects an entity's ability to generate earnings from its assets and represents one of the most important indicators of internal performance for investors. Return on Assets (ROA) measures how efficiently management utilizes assets to produce profits and is commonly employed in fundamental analysis to assess firm performance quality (Ridho, 2024). Investors and financial analysts typically consider ROA as a key fundamental metric in evaluating growth prospects and risk, as variations in ROA signal changes in operating performance that influence market risk perceptions and investor confidence (Barinov, 2023).

From a theoretical perspective, managerial disclosures may contain forward-looking information about firm uncertainty, as management forecasts of volatility have been shown to predict future stock return volatility (Ellahie & Peng, 2021). In addition, higher profitability reflects better firm performance and is associated with a greater likelihood of dividend payment, which are preferred by investors under the Bird-in-Hand theory (Estuti et al., 2020). Empirical studies have documented that profitability ratios such as ROA significantly affect stock price volatility, with evidence indicating a positive relationship in which higher profitability is associated with greater stock price fluctuations (Saetban, 2025). Findings from the Indonesian market indicate that higher profitability is significantly associated with increased stock price volatility, implying that more profitable companies generally face greater stock price movements (Saetban, 2025). Referring to the underlying theoretical framework and earlier empirical findings, the following hypothesis is developed:

H_3: Profitability has a positive effect on stock price volatility.

In empirical models of stock price volatility, leverage and firm size are frequently included as control measures because they represent fundamental firm characteristics that influence stock risk. Firm size reflects the scale of operations, earnings stability, and a firm's ability to access external financing. Firms with larger asset bases generally exhibit greater business diversification and lower levels of information asymmetry, which tend to result in more stable stock price movements (Suryani, 2021). This reasoning aligns with empirical

evidence from the Indonesian capital market, which shows that firm size is negatively associated with fluctuations in stock prices, particularly among companies included in the LQ45 index (Rosyida *et al*., 2020).

Leverage, on the other hand, captures a firm's capital structure and its reliance on debt financing. Higher levels of debt increase interest obligations and default risk, thereby amplifying cash flow uncertainty and contributing to greater fluctuations in stock returns (Suryani, 2021). Several empirical studies conclude that firm with higher leverage tend to experience higher stock price volatility, as investors respond negatively to increased financial risk (Rosyida *et al*., 2020).

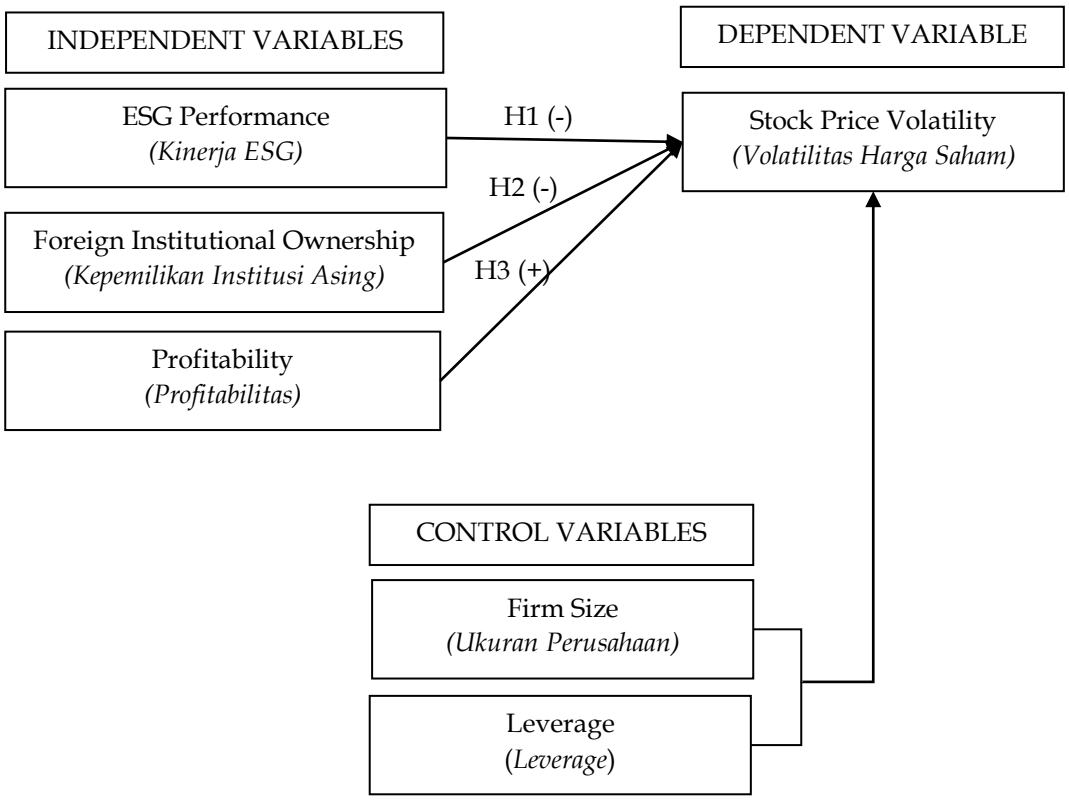

Figure 1. Research Framework

Source: Research Data, 2026

Despite the growing literature, this study identifies three key research gaps. First, prior studies have largely relied on global ESG indices, while limited research utilizes country-specific measures such as the Katadata Corporate Sustainability Index (KCSI). Second, empirical evidence on ESG and stock price volatility remains inconclusive, particularly in emerging markets and high-risk sectors. Third, limited studies simultaneously examine mining and plantation sectors within a unified framework, despite their similar exposure to sustainability-related risks. Therefore, this study aim to address these gaps by examining the combined effects of ESG performance, foreign institutional ownership, and profitability on stock price volatility in Indonesia's resource-based industries.

This study aims to examine the effects of ESG performance measured by the Katadata Corporate Sustainability Index (KCSI), foreign institutional

ownership, and profitability on stock price volatility among publicly IDX-listed mining and agricultural corporations. This research extends the application of KCSI as an ESG indicator within the Indonesian capital market literature. From a practical perspective, the findings are expected to assist investors and corporate managers in assessing stock risk and formulating investment strategies that incorporate sustainability considerations.

This study contributes to the literature by providing empirical evidence using a country-specific ESG proxy (KCSI) and by focusing on resource-based sectors in an emerging market context, which remain underexplored in prior research.

RESEARCH METHODOLOGY

This study employ a quantitative research approach aimed at examining causal relationships among variables based on theoretical frameworks and hypothesis testing using numerical data. The primary analytical approach adopted in this study facilitates the simultaneous assessment of firm-specific differences and temporal dynamics. This method allows for the control of unobserved heterogeneity inherent in repeated observations across entities (panel data) (Basuki & Prawoto, 2021).

The use of panel data in this study allows for a more comprehensive analysis by combining cross-sectional and time-series dimensions (Evers, 2025). This approach is particularly relevant for mining and plantation companies, which exhibit heterogeneous characteristics across firms while simultaneously being exposed to common macroeconomic and sectoral shocks over time. By employing panel data regression, this study is able to control for unobserved firm-specific effects that may influence stock price volatility but are not directly observable, such as managerial practices, operational efficiency, and risk management strategies. Furthermore, the panel data framework enhances estimation efficiency by increasing the number of observations and reducing potential biases arising from omitted variables. Panel data methods allow researchers to control for unobserved entity-specific effects and improve estimation precision by exploiting both cross-sectional and temporal variations in the data (Verbeek, 2022). Working with panel data also enables control for unobserved fixed effects, which can reduce omitted variable bias and improve the accuracy of estimates.

The study utilizes secondary data obtained from annual financial statements, share ownership records, stock price data, and firm-level ESG scores. ESG performance data are sourced from the Katadata Corporate Sustainability Index (KCSI), available at green.katadata.co.id. Data on foreign institutional ownership are obtained from share ownership composition records published by the Indonesian Central Securities Depository (KSEI) through web.ksei.co.id. Financial statement and stock price data are sourced from the Indonesia Stock Exchange's official website (idx.co.id).

The population of this study comprises mining and plantation companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 observation period. However, the sector classification in this study does not strictly follow the

IDX sectoral codes but instead aligns with the coverage of the Katadata Corporate Sustainability Index (KCSI), which categorizes firms under plantation and mining sectors. Based on KCSI data, the total number of firms in these categories was 49 in 2022 (18 plantation and 31 mining), 69 in 2023 (27 plantation and 42 mining), and 76 in 2024 (26 plantation and 50 mining). From the original dataset, the final sample was selected via judgmental sampling, guided by the subsequent parameters: (1) continuous listing on the IDX throughout the 2022–2024 period; (2) had KCSI scores consistently across 2022-2024 period; (3) had complete annual financial reports; (4) accessibility of daily stock price data to compute volatility; and (5) disclosure of foreign institutional ownership in the shareholding structure. After applying these criteria, a final sample of 41 firms was obtained, resulting in 123 firm-year observations and forming a balanced panel dataset.

In this study, stock price volatility functions as the dependent variable and is calculated based on the standard deviation of daily returns, which is transformed into its natural logarithm to stabilize variance and mitigate potential heteroskedasticity. Volatility measures derived from daily stock returns often exhibit extreme values, particularly in natural resource–based industries that are highly sensitive to commodity price fluctuations. The natural logarithm transformation helps improve distributional properties and enhance the robustness of regression estimates. (Basuki & Prawoto, 2021). The main independent variables comprise performance of ESG as measured by KCSI, foreign institutional ownership defined as the proportion of foreign-held shares to total outstanding shares, and firm profitability proxied by Return on Assets (ROA). As control variables, firm size and leverage are incorporated into the analysis, with firm size measured by the natural logarithm of total assets and leverage proxied by the Debt-to-Asset Ratio (DAR).

Firm size and leverage are included as control variables to isolate the effects of the main explanatory variables on stock price volatility. In the mining and plantation sectors, firm size reflects not only operational scale but also exposure to global commodity markets and information intensity, which may influence investor behavior. Larger firms with higher visibility and analyst coverage tend to attract greater investor attention, resulting in quicker stock price reactions and stronger market responses to new information (Ballinari *et al*., 2022; Bozok & Özyıldırım, 2022). Leverage, on the other hand, captures financial risk arising from debt financing. Although leverage may not always exert a direct influence on volatility, its inclusion ensures that the estimated effects of ESG performance, foreign ownership, and profitability are not confounded by differences in capital structure across firms.

The empirical relationships among variables are estimated through panel regression techniques implemented in EViews version 13, allowing the model to simultaneously incorporate both temporal and cross-sectional dimensions. This approach enables the model to address potential biases arising from unobserved heterogeneity through the application of fixed effects or random effects specifications. The analytical procedure begins with classical assumption tests and multicollinearity diagnostics, followed by a series of panel model selection tests, including the Chow test, Hausman test, and Lagrange Multiplier test, a

series of tests is performed to determine the most suitable estimation model. To address potential heteroskedasticity, the regression analysis is performed using robust standard errors.

The selection of the random effects model indicates that firm-specific characteristics not explicitly included in the model are not systematically correlated with the explanatory variables. This suggests that unobserved heterogeneity across mining and plantation companies, such as differences in managerial style or corporate governance practices, can be treated as random rather than fixed effects. The random effects specification is therefore considered appropriate, as it allows for more efficient parameter estimation while maintaining the generalizability of the results across firms within the observed sectors.

The relationship among variables is represented by the following regression equation:

$$\ln(VOL_{it}) = \alpha + \beta_1 ESG_{it} + \beta_2 FOR_{it} + \beta_3 ROA_{it} + \beta_4 SIZE_{it} + \beta_5 DAR_{it} + \varepsilon_{it} \quad \text{.....(1)}$$

where $\ln(VOL_{it})$ represents the natural logarithm of stock price volatility where i represents the firm and t represents the time period; ESG_{it} denotes the ESG score based on the Katadata Corporate Sustainability Index (KCSI); FOR_{it} refers to foreign institutional ownership; ROA_{it} represents profitability; $SIZE_{it}$ denotes firm size; DAR_{it} represents leverage; and ε_{it} is the error term.

RESULTS AND DISCUSSION

This study employ a balanced panel dataset consisting of 41 publicly listed mining and plantation companies conducted on the Indonesian bourse during 2022–2024. With a three-year observation window, the total number of observations analyzed amounts to 123. The dataset includes stock price volatility, ESG performance measured by KCSI, foreign institutional ownership, firm profitability, and the control variables firm size and leverage. The analysis begins with descriptive statistics, followed by multicollinearity diagnostics and panel model selection tests, and proceeds with regression estimation and discussion of the empirical implications of each variable.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Volatility	123	0	11.184	5.061	1.767
ESG	123	30.730	81.580	58.261	10.588
FOR	123	0.003	0.957	0.244	0.255
ROA	123	-6.427	61.634	12.323	14.341
SIZE	123	27.638	32.741	30.208	1.293
DAR	123	4.061	87.809	41.708	20.189

Source: Research Data, 2026

The descriptive statistics reveal several sector-specific patterns. The mean ESG score of 58.26 indicates moderate sustainability adoption among Indonesian mining and plantation firms, yet the wide range (30.73 to 81.58) suggests substantial heterogeneity in ESG implementation. This variation may reflect differences in regulatory pressure across subsectors, where large-scale mining operations face stricter environmental scrutiny compared to plantation firms.

Foreign institutional ownership (FOR) exhibits a mean of 24.40% with a standard deviation of 25.51%, indicating that foreign investor presence is highly concentrated in a subset of firms, particularly those with larger market capitalization and international exposure. Profitability (ROA) shows extreme values ranging from -6.43% to 61.63%, reflecting the cyclical nature of commodity-based industries where firms experience volatile earnings due to fluctuations in global prices of coal, palm oil, and other resources. These sectoral characteristics are essential for interpreting the subsequent regression results.

Foreign institutional ownership also displays a relatively high degree of dispersion, indicating that the presence of foreign investors is uneven across firms. Meanwhile, profitability as measured by Return on Assets (ROA) shows a large standard deviation, reflecting significant differences in financial performance among companies, which may contribute to variations in stock price volatility. In contrast, firm size appears to be relatively homogeneous across the sample, whereas leverage exhibits substantial variation, indicating differences in financing strategies and financial risk exposure among firms.

Table 2. Multicollinearity Test

	Correlations				
	ESG	FOR	ROA	SIZE	DAR
ESG	1	-0.069	0.147	0.252	-0.067
FOR	-0.069	1	-0.153	0.187	0.116
ROA	0.147	-0.153	1	0.010	-0.319
SIZE	0.252	0.187	0.010	1	0.010
DAR	-0.067	0.111	-0.319	0.010	1

Sumber: Research Data, 2026

The multicollinearity test presented in Table 2 shows that all correlation coefficients among the independent variables and control variables are below the threshold value of 0.85. According to the criterion proposed by Basuki and Prawoto (2021), this condition indicates the absence of strong linear relationships among the variables included in the model. Therefore, the results indicate that multicollinearity does not pose a concern in the regression model, allowing each independent variable to represent a distinct construct and ensuring that the estimated regression coefficients can be interpreted reliably.

In this study, the appropriate regression model was determined using panel data analysis through the Chow test, Hausman test, and Lagrange Multiplier test. The Chow test results show a Cross-section F statistic of 5.4980 with a p-value of 0.0000 (< 0.05) and a Cross-section Chi-square value of 166.0086 with a p-value of 0.0000, suggesting that the fixed effects model is more suitable than the common effects model. The Hausman test subsequently produces a Chi-square statistic of 6.4869 with a probability of 0.2617 (> 0.05), indicating that the difference between fixed and random effects estimators is not systematic. Therefore, the random effects model is chosen as the preferred specification.

The analysis is further supported by the Lagrange Multiplier (Breusch–Pagan) test, which produces a test statistic of 39.6117 with a probability value of 0.0000 (< 0.05), confirming that the random effects model is more suitable than the common effects model. Based on the results of these three diagnostic tests, which supports the selection of the random effects model as the most appropriate

estimation technique and is therefore employed as the final model in the panel data regression analysis.

The panel data regression results based on the random effects model yield the following equation:

$$\ln(VOL_{it}) = -5.6244 + 0.0117\ ESG_{it} - 0.6040\ FOR_{it} + 0.0566\ ROA_{it} + 0.3345\ SIZE_{it} - 0.0157\ DAR_{it} \quad (2)$$

ESG performance exhibits a positive coefficient in the regression estimates, while the coefficients of foreign institutional ownership and leverage are negative. Profitability and firm size are also associated with positive coefficients. However, The results of the statistical significance tests indicate that only profitability and firm size significantly influence stock price volatility, while ESG performance, foreign institutional ownership, and leverage do not demonstrate a statistically meaningful effect. These findings suggest that variations in stock price volatility within the sample are primarily driven by firms' internal fundamental characteristics rather than by sustainability-related factors or ownership structure.

Table 3. Random Effects Panel Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.624	3.762	-1.494	0.137
ESG	0.017	0.009	1.225	0.222
FOR	-0.6	0.602	-1.002	0.317
ROA	0.056	0.008	6.872	0.000
SIZE	0.334	0.125	2.664	0.008
DAR	-0.015	0.007	-1.968	0.051

Source: Research Data, 2026

Based on the panel data regression results reported in Table 3, it can be concluded that the effects of the examined variables on stock price volatility vary across factors. Stock price volatility is significantly influenced by firm size and profitability, whereas ESG performance, foreign institutional ownership, and leverage are not found to exhibit statistically significant effects. These differences in statistical significance suggest that the dynamics of stock price volatility among mining and plantation companies in Indonesia during the observation period are more strongly driven by firms' internal fundamental characteristics than by non-financial factors or ownership structure.

Table 4. Model Goodness-of-Fit Test

R-squared	0.378
Adjusted R-squared	0.351
S.E. of regression	0.780
F-statistic	14.231
Prob(F-statistic)	0.000

Source: Research Data, 2026

The subsequent discussion focuses on the empirical implications of the study variables, based on the results of the model's goodness-of-fit tests. An F-test value of 14.2311, with a p-value of 0.0000 (< 0.05), confirms that all independent variables jointly have a statistically significant impact on stock price volatility. Meanwhile, the adjusted R^2 of 0.3516 indicates that about 35.16% of the

volatility in stock prices is captured by the model, while the remainder is attributable to unobserved factors.

The empirical results reveal that ESG performance, as measured by the Katadata Corporate Sustainability Index (KCSI), does not exhibit a statistically significant effect on stock price volatility among mining and plantation companies in Indonesia. Although the coefficient is positive, this finding suggests that sustainability-related information has not yet been fully internalized by investors as a primary determinant of stock price risk in resource-based sectors. This result is inconsistent with earlier studies that document a volatility-reducing role of ESG during period of market uncertainty (Albuquerque *et al*., 2019; Broadstock *et al*., 2020; Zhou & Zhou, 2022). However, it aligns with more recent evidence from Indonesia's mining sector suggests that ESG risk ratings have an insignificant effect on stock returns, indicating that external factors may dominate market performance in high-risk industries (Leo & Hidayati, 2026). One possible explanation is that investors in the Indonesian market still prioritize financial fundamentals and commodity price movements over non-financial indicators when assessing short-term risk. Additionally, the relatively low level of ESG disclosure quality and the absence of mandatory sustainability reporting standards may limit the signaling value of ESG scores. In this context, ESG practices are often perceived as compliance-driven rather than strategic, thereby failing to influence investor perceptions of risk.

In contrast, profitability (ROA) demonstrates a positive and statistically significant effect on stock price volatility, supporting Hypothesis H3. This finding indicates that higher profitability is associated with greater price fluctuations, which contradicts the traditional view that strong financial performance reduces firm risk. Instead, this result aligns with the behavioral finance perspective, where profitable firms attract greater investor attention, trading volume, and market speculation, thereby amplifying price sensitivity to new information (Saetban, 2025). In the context of mining and plantation sectors, high profitability often coincides with favorable global commodity price cycles, which heightens investor expectations and reactions to external shocks. This finding is consistent with empirical evidence from the Indonesian LQ45 index, where ROA positively impacted stock price volatility performance (Ridho, 2024; Saetban, 2025).

Foreign institutional ownership (FOR) is found to have no significant effect on stock price volatility, contrary to Hypothesis H2. This result diverges from prior studies that emphasize the stabilizing role of foreign investors through enhanced monitoring and information efficiency (Farhan & Kim, 2023; Thanatawee, 2021). However, it is consistent with more recent findings suggesting that the stabilizing effect of foreign ownership may be conditional on market conditions, firm transparency, and the nature of investor behavior (Vo & Mazur, 2023; Yang et al., 2024). In the Indonesian mining and plantation sectors, foreign ownership is often concentrated in a few large firms and may not necessarily translate into improved information flow or reduced speculation. Furthermore, foreign investors in commodity-based industries may themselves

engage in short-term trading strategies in response to global price volatility, thereby offsetting any potential stabilizing effect. The lack of significance may also reflect the relatively short observation window (2022–2024), which captured a period of post-pandemic recovery and global commodity price fluctuations, where foreign investor behavior may have been more opportunistic than stabilizing.

Firm size (SIZE) exhibits a positive and significantly effects stock price volatility, indicating that larger firms experience higher price fluctuations. This finding challenges the conventional assumption that size reduces risk through diversification and market power. Instead, it supports the argument that larger firms, particularly in resource-based sectors, attract greater analyst coverage, higher trading volume, and stronger market reactions to macroeconomic news and commodity price changes (Ballinari *et al*., 2022; Bozok & Özyıldırım, 2022). In the context of mining and plantation companies, large-scale operations are often more exposed to international markets, regulatory shifts, and global demand cycles, all of which contribute to higher volatility.

Meanwhile, leverage (DAR) shows no significantly effected stock price volatility. This result suggests that capital structure considerations may be overshadowed by operational and market-based factors in determining stock risk within these sectors. Investors may place greater emphasis on earnings performance, commodity price trends, and regulatory developments rather than debt levels when forming expectations about price fluctuations. The observations made here are congruent with existing literature reporting weak or insignificant effects of leverage on volatility in commodity-based industries (Rosyida *et al*., 2020; Suryani, 2021).

In the context of mining and plantation companies, higher profitability is frequently associated with favorable commodity price conditions. While such conditions improve earnings performance, they also increase investor sensitivity to changes in global commodity markets. As a result, stock prices of more profitable firms may react more strongly to new information related to commodity prices, demand forecasts, or macroeconomic developments, leading to higher volatility despite improved firm fundamentals.

The regression results further show that larger firm size is associated with higher and significant stock price volatility among mining and plantation companies in Indonesia. This finding suggests that, in the context of mining and plantation industries during the 2022–2024 period, larger firms tend to experience more pronounced price fluctuations. One possible explanation is the higher liquidity and trading intensity typically associated with large firms, which make their stock prices more responsive to new information and changing market expectations. Within the mining and plantation sectors, large firms often attract greater attention from investors and analysts due to their dominant market positions and substantial exposure to global commodity price movements, which ultimately contributes to higher volatility. This evidence

suggests that firm size does not necessarily serve as a stabilizing factor in terms of stock price risk, particularly in natural resource–based industries.

Evidence indicating a positive relationship between firm size and stock price volatility suggest that larger firms are not necessarily less risky in terms of price fluctuations. Larger companies generally attract higher trading volumes, greater analyst coverage, and broader investor participation. While these characteristics enhance market visibility and information availability, they also increase the speed and intensity of market reactions to new information.

Within the mining and plantation sectors, large firms are typically more exposed to global commodity markets and international demand conditions. Their stock prices tend to respond more rapidly to changes in global economic outlooks, commodity price movements, and policy developments. Consequently, higher firm size may amplify stock price volatility as market participants continuously update expectations based on new information affecting large-scale operations and global exposure.

Leverage, measured using the debt-to-asset ratio (DAR), is also found to have no significant effect on stock price volatility. Even though the leverage coefficient appears negative, the finding implies that investors do not view a firm's debt level as a key determinant when assessing stock risk in mining and plantation companies throughout the study period. Instead, investment decisions in these sectors seem to be driven more by operational results and expectations of future expansion than by considerations of capital structure.

CONCLUSION

This study concludes that internal firm fundamentals (particularly profitability and firm size) are the primary drivers of stock price volatility in mining and plantation companies, while ESG performance (KCSI) and foreign ownership do not exhibit significant effects during the 2022–2024 period. Based on these findings, several operational recommendations can be proposed. For corporate issuers, especially those in the mining and plantation sectors, the non-significant effect of ESG on volatility should not be interpreted as a reason to neglect sustainability practices. Instead, companies should focus on Elevating the standard and clarity within ESG reporting to move beyond mere regulatory compliance. By providing more comparable, audited, and decision-useful sustainability data (such as quantifiable environmental impact metrics and community development outcomes) issuers can gradually strengthen the relevance of ESG information for market participants. For investors and financial analysts, the significant positive effect of profitability (ROA) on volatility suggests that high profitability should be treated as a key risk indicator rather than solely a sign of stability. Investors are advised to incorporate profitability metrics into their risk assessment frameworks by monitoring the sustainability of high ROA levels, particularly in commodity-sensitive sectors. Given that elevated profitability often coincides with favorable commodity price cycles, investors should adopt a more dynamic approach by analyzing cash flow volatility and historical earnings persistence to anticipate potential price fluctuations. These strategies enable market participants to make more informed decisions that account for the specific risk characteristics of resource-based industries. This

study is limited by its relatively short observation period (2022–2024), which may not fully capture the long-term effect of ESG performance on stock price volatility.

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