The Influence of ESG and Investment on Equity Ratio on Firm Value in the ASEAN Mining Sector

Dina Hastalona
Universitas Sumatera Utara; Sumatera Utara, Indonesia
E-Mail: dinahastalona.mardani@gmail.com

Isfenti Sadalia
Universitas Sumatera Utara; Sumatera Utara, Indonesia

Submitted:
JUNE 2025

Accepted:
OCTOBER 2025

ABSTRACT

This study is to investigate the impact of the Investment to Equity Ratio and the Environmental, Social, and Governance (ESG) Score on firm value, as measured by Tobin's Q, in mining businesses throughout ASEAN between 2019 and 2024. The Common Effect Model (CEM), which is based on 96 observations from 16 companies over a six-year period, is used in the research's panel data regression approach. The findings indicate that Tobin's Q is positively and significantly impacted by ESG Score, with a coefficient of 0.0066 (p = 0.0042). The Investment to Equity Ratio, on the other hand, shows a statistically negligible negative effect (p = 0.2241). The model can account for 8.8% of the variation in company value, according to the R-squared value of 0.088. These results demonstrate how ESG practices can improve firm valuation and market reputation, but they also point to the need for more research on the function of investment finance arrangements. When developing sustainability plans and capital structure optimization techniques for the ASEAN mining industry, managers and investors can benefit from the practical implications of this study.

***Keywords**: ASEAN Mining Sector, ESG Score, Firm Value, Investment to Equity Ratio, Tobin's Q.*

ABSTRAK

Pengaruh Skor Lingkungan, Sosial, dan Tata Kelola (ESG) dan Rasio Investasi terhadap Ekuitas terhadap nilai perusahaan, yang diproksikan oleh Tobin's Q, di perusahaan pertambangan di ASEAN dari tahun 2019 hingga 2024, adalah tujuan penelitian ini. Studi ini menggunakan metode regresi data panel Common Effect Model (CEM), yang didasarkan pada 96 observasi dari 16 perusahaan selama enam tahun. Dengan koefisien 0.0066 (p = 0.0042), hasil menunjukkan bahwa Skor ESG memiliki pengaruh yang signifikan dan positif terhadap Q Tobin. Sebaliknya, Rasio Investasi terhadap Ekuitas memiliki dampak negatif tetapi tidak signifikan secara statistik (p = 0.2241). Nilai R-kuadrat sebesar 0.088 menunjukkan bahwa 8,8% variasi nilai perusahaan dapat dijelaskan oleh model tersebut. Temuan ini menyoroti peran positif praktik ESG dalam meningkatkan persepsi pasar dan valuasi perusahaan, sementara juga menunjukkan perlunya penyelidikan lebih lanjut tentang peran struktur pembiayaan investasi. Studi ini menawarkan implikasi praktis bagi para manajer dan investor dalam merumuskan strategi keberlanjutan dan mengoptimalkan struktur modal di sektor pertambangan ASEAN.

***Kata kunci**: Sektor Pertambangan ASEAN, Nilai ESG, Nilai Perusahaan, Rasio Investasi terhadap Modal, Tobin's Q.*

JIAKES

Jurnal Ilmiah Akuntansi Kesatuan
Vol. 13 No. 5, 2025
pp. 1165-1174
IBI Kesatuan
ISSN 2337 – 7852
E-ISSN 2721 – 3048
DOI: 10.37641/jiakes.v13i5.3692

INTRODUCTION

Amid increasing global pressure toward sustainability, companies, particularly in the mining sector, are expected to adopt Environmental, Social, and Governance (ESG) practices. ESG is no longer perceived merely as a tool for mitigating reputational or environmental risks but has become an integral part of corporate value creation strategies (Poulle et al., 2024). In the ASEAN region, awareness of the importance of Environmental, Social, and Governance (ESG) in the corporate world has increased significantly, in line with global demands for sustainable business practices. Governments, investors, and the public are beginning to place greater emphasis on sustainability as an integral part of corporate strategy. However, empirical findings regarding the relationship between ESG and company value in the region still show mixed results. Several studies report that increasing ESG scores does not always directly correlate with increasing company value. For example, Prabawati and Rahmawati (2022) found a negative relationship between ESG scores and Tobin's Q, indicating that the market has not yet fully appreciated ESG performance as a value-adding factor or that ESG implementation has not yet delivered the expected short-term financial results. Conversely, a study by Makhdalena et al. (2023) showed that ESG has a positive effect on Tobin's Q and Return on Assets (ROA), illustrating that companies that consistently implement sustainability principles are actually able to improve their market and financial performance. These differences may be due to variations in research methodology, industry sectors, levels of ESG disclosure, and regulatory support in each ASEAN country.

Recent studies in Asia have shown growing interest in the influence of ESG on firm value. ESG reporting quality is positively correlated with Tobin's Q, suggesting that companies with strong sustainability reporting tend to have higher market valuations. Meanwhile, Qin (2023) highlighted the importance of the external business environment in strengthening the relationship between ESG and firm value, indicating that the economic and regulatory contexts also play a role in determining the significance of ESG's influence. On the other hand, Solikhin et al. (2022) revealed that the influence of ESG can vary depending on industry sector characteristics and management strategies. These conflicting results suggest that the relationship between ESG and company value depends on contextual factors, emphasizing the need to examine whether ESG increases firm value, particularly in the ASEAN mining industry between 2019 and 2024. Given the industry's capital-intensive and ecologically sensitive characteristics, this study plays a crucial role in analyzing how ESG influences market perceptions.

The ambiguity in prior findings presents a research gap concerning the role of ESG in enhancing firm value within the mining sector, an industry characterized by naturally high ESG intensity yet lacking comprehensive analysis in this region. Moreover, there is a noticeable absence of studies incorporating the Investment to Equity Ratio as an explanatory variable for firm value. This ratio reflects the structure of investment financing, an essential factor in capital-intensive industries such as mining. Employing a comprehensive panel data regression approach, this study compares three econometric models: Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM), while also testing model robustness using the Chow and Hausman tests (Baltagi, 2008; Gujarati et al., 2015). According to the relevance criteria for the most recent five-year timeframe, the study targets mining firms throughout ASEAN nations and focuses on the years 2019-2024.

It is anticipated that this study will yield significant empirical data that investors, regulators, and business managers can use to inform capital structure management and ESG strategy formulation. The increasing need for sustainable governance and the requirement to make sure that ESG actions are seen as assets that add to long-term corporate value rather than just liabilities highlight how urgent this study is. This study's main goal is to investigate how ASEAN mining companies' Tobin's Q is affected by ESG ratings and the Investment-to-Equity Ratio between 2019 and 2024.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

ESG Performance and Firm Value

Environmental, Social, and Governance (ESG) is a multidimensional concept used to evaluate a company's social and environmental responsibilities, as well as the quality of its corporate governance (Junius et al., 2020; Shiyu Wu et al., 2022). ESG has emerged as a key metric in recent years for sustainable business plans and investment choices. Poulle et al. (2024) emphasized that ESG is no longer merely a tool for risk mitigation but has evolved into a key driver for long-term corporate value creation. ESG and corporate value are positively correlated, according to several studies. Makhdalena et al. (2023) found that an increase in ESG scores significantly contributed to increases in Tobin's Q and profitability, indicating that good sustainability performance can enhance investor confidence and market perception.

Quality of ESG reporting significantly influences market perception, so that companies with high transparency in sustainability aspects tend to be valued more highly by the market. However, different results were shown by Prabawati and Rahmawati (2022), who found a negative relationship between ESG and Tobin's Q. They indicated a trade-off, where the costs of implementing ESG may not be commensurate with the market benefits obtained in the short term (Khunkaew et al., 2023; Rosalia & Prihandini, 2024). These conflicting findings confirm that the influence of ESG on company value is contextual, depending on industry characteristics, geographic location, and the applicable regulatory framework (Adib et al., 2025; Lau et al., 2025). Therefore, it is important to understand the sector background and business environment when evaluating the role of ESG in creating company value, particularly in sectors such as mining that face higher environmental and social pressures.

H1: ESG performance has a significant impact on firm value.

Investment to Equity Ratio and Firm Value

The investment to equity ratio is a financial metric that indicates the proportion of investments funded by internal equity compared to external funding, such as debt. This ratio is particularly important in capital-intensive sectors such as mining, where long-term financing needs and large-scale investments are crucial (Hao et al., 2011; Sasongko, 2019). This ratio reflects a company's reliance on its own funds for expansion or asset development. The higher this ratio, the greater the company's use of equity as a funding source, which is generally associated with lower financial risk because it does not increase interest expenses. The investment to equity ratio is also closely related to capital structure theories, such as the Pecking Order Theory of Myers and Majluf (1984), which states that companies tend to prioritize internal financing before using debt or issuing new shares. Meanwhile, the Trade-Off Theory emphasizes the importance of balancing the benefits of using debt (such as tax savings) with potential bankruptcy costs (Hasanuddin, 2021; Nukala et al., 2021). Therefore, this ratio plays a role in assessing a company's funding efficiency and strategy, as well as ensuring its risk tolerance and the company's value to investors and other stakeholders. Compared with other financial indicators such as the debt-to-equity ratio or return on assets, the use of the Investment-to-Equity Ratio as a determinant of firm value is still relatively limited (Alvian & Munandar, 2022). However, several studies have shown that a sound capital structure can increase investor confidence and improve firm valuation (Modigliani & Miller, 1958). Therefore, examining this ratio in relation to firm value offers new empirical contributions, particularly in the ASEAN mining sector.

H2: Investment to equity ratio has a significant effect on firm value.

ESG Performance, Investment to Equity Ratio, and Firm Value

Firm value reflects investors' perceptions of a company's performance and long-term Firm value reflects investors' perceptions of a company's performance and long-term prospects. In the financial literature, Tobin's Q is widely used as an indicator of firm value because it combines market and asset replacement values (Kim et al., 2015; Zaleski, 2024). Research shows that non-financial factors such as ESG performance play a significant role in shaping market perceptions of sustainability and corporate governance. ESG is an important benchmark for assessing a company's commitment to social and environmental responsibility (Lindquist et al., 2022; Kushwaha et al., 2025). Companies with high ESG scores tend to gain greater market trust, thereby increasing firm value (Solikhin et al., 2022). Previous studies have shown that implementing ESG strategies not only strengthens a company's reputation but also reduces long-term risks and improves operational efficiency, ultimately contributing to increased firm value (Qin, 2023). In addition to ESG, an efficient capital structure is also a crucial factor. The investment-to-equity ratio, which measures the proportion of investment to equity, reflects the extent to which a company relies on equity capital to finance investments (Bidaya et al., 2023; Burhani & Prajawati, 2023). This ratio impacts firm value because it demonstrates a company's ability to manage financing without excessive reliance on debt, which can reduce financial risk (Akbar & Nusa, 2022). Thus, both ESG performance and investment efficiency, measured through the investment-to-equity ratio, have been theoretically and empirically proven to significantly impact firm value, particularly in the context of long-term sustainability and strategic risk management.

H3: ESG performance and investment to equity ratio have a significant impact on company value.

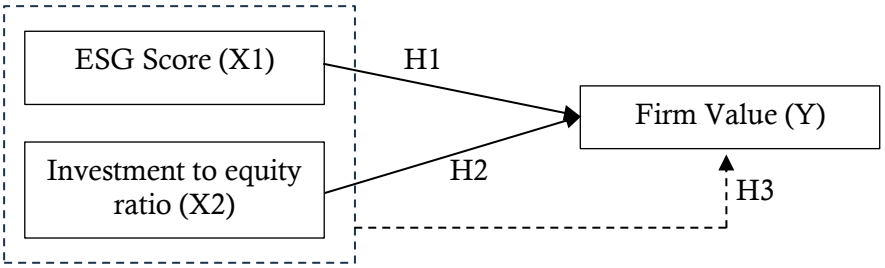

Figure 1. Conceptual Framework

Figure 1 research framework shows how two independent variables and one dependent variable are related. Three primary theories are used to formulate this relationship. According to the first hypothesis (H1), ESG performance significantly affects firm value, meaning that the more a company pays attention to environmental, social, and governance factors, the more valuable the market believes the company to be. Based on the idea that investment choices in relation to equity represent the effectiveness of a business's capital use and financing structure, the second hypothesis (H2) investigates the impact of the investment-to-equity ratio on firm value. To ascertain the degree to which these two factors together affect firm value, the third hypothesis (H3) also looks at the simultaneous impact of ESG performance and investment to equity ratio on firm value. This framework is intended to give a thorough grasp of how financial policies and sustainability issues contribute to the production of corporate value, especially when it comes to mining businesses that operate in the ASEAN economic environment.

RESEARCH METHODS

The research design of this study adopts a quantitative explanatory approach using panel data regression analysis. This study examines the impact of the ESG Score and the Investment to Equity Ratio on firm value as measured by Tobin's Q using a quantitative

methodology and panel data regression method. This method was chosen because it is able to combine the characteristics of cross-company data (cross-section) and time-series data simultaneously, thus providing a more accurate picture of the dynamics between time and between entities (Baltagi, 2008; Gujarati et al., 2015). All mining businesses operating in the ASEAN region make up the study's population, and it has full data for the years 2019–2024. The company must regularly produce annual financial reports, submit a desired report or have an available ESG score, and provide equity investors with comprehensive information on the investment structure in order for the sample strategy to adopt a purposive sampling method. Based on these criteria, 16 companies were obtained with data for 6 years, so the total observations in this study are 96 panel data (16 x 6).

Tobin's Q, a proxy for firm value that is determined by dividing market value by asset replacement cost, is the dependent variable in this study. The investment-to-equity ratio, which indicates the effectiveness of equity use in investment financing, and the ESG Score, which evaluates a company's welfare performance from environmental, social, and governance dimensions, make up the independent variables. The study's secondary data came from official publications of ASEAN stock exchanges, sustainability reports, corporate annual reports, and reliable financial databases, including Bloomberg and Refinitiv. For regression analysis, the Pooled Least Squares (PLS) model was employed. The Common Effect Model was determined to be the most suitable after the Chow test revealed a probability value of 0.9305 ($p > 0.05$). The significance of each independent variable was then assessed using a t-test, and the overall significance of the model was ascertained using an F-test. The model's ability to explain changes in firm value was gauged by the R2 score.

RESULTS

The mean, standard deviation, minimum, and maximum values for every research variable are all included in descriptive statistics. The standard deviation shows how widely the data deviates from the mean, whereas the mean shows the data's central tendency. For example, suppose the investment-to-equity ratio variable has a high mean and a low standard deviation. In that case, this indicates that the majority of companies have a high and stable investment-to-equity ratio. Conversely, a large standard deviation indicates significant variation between companies. This test is important for detecting outliers and as a basis for selecting further analysis methods. Thus, descriptive statistics results help researchers understand general data patterns and identify potential problems before proceeding to the hypothesis testing stage.

Table 1. Descriptive Statistics Test Results

Model	Y_TOBINS	X1ESG_SCORE	X2_IER
Mean	-0.349773	34.71250	-2.444515
Median	-0.425496	35.00000	-2.654776
Maximum	0.554460	64.00000	0.273159
Minimum	-0.886247	7.200000	-4.627051
Std. Dev.	0.296268	13.26681	1.060062
Skewness	0.592544	-0.184903	0.574297
Kurtosis	2.869900	3.439624	2.951739
Jarque-Bera	5.685446	1.320102	5.286390
Probability	0.058267	0.516825	0.071134
Sum	-33.57820	3332.400	-234.6735
Sum Sq. Dev.	8.338614	16720.78	106.7544
Observations	96	96	96

The findings of the descriptive statistical analysis for the three primary variables are shown in Table 1. With a standard deviation of 0.30 and an average value of -0.35 for Tobin's Q (Y_Tobins) based on 96 observations, the firm value is often below one and shows considerable variability. The distribution appears to be roughly normal but

significantly skewed to the right, as shown by the positive skewness (0.59) and kurtosis value near 3 (2.87). With a mean of 34.71 and a comparatively broad dispersion (standard deviation of 13.27), the X1 variable (ESG Score) has a maximum value of 64 and a minimum of 7.2. The distribution is marginally more peaked than a normal distribution (kurtosis = 3.44) and comparatively symmetrical (skewness = -0.18).

The data are normally distributed, according to the Jarque-Bera probability of 0.516. A general trend toward low levels of investment compared to equity among the enterprises is indicated by the X2 variable (Investment-to-Equity Ratio), which has a negative mean of -2.44. The comparatively significant variability is reflected in the 1.06 standard deviation. The kurtosis around normal (2.95) and positive skewness (0.57) point to a distribution that is about normal with a few right-tail outliers. The presumption of normalcy is supported by the three variables' overall data dispersion within allowable ranges.

Table 2. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Period F	0.266115	5.88	0.9305
Period Chi-square	1.440673	5	0.9198

Table 2 displays the results of the Chow Test, which include a Chi-square statistic of 1.440673 with a p-value of 0.9198 and a F statistic of 0.266115 with a p-value of 0.9305. There is not enough evidence to reject the null hypothesis because the p-values of both tests are much higher than the traditional significance level of 0.05. This suggests that the regression parameter structure does not significantly alter between the investigated time periods. As a result, the model that estimates individual regressions by time is less suitable than the pooled regression model. Stated otherwise, this panel's time series data shows a consistent parameter structure throughout the examined eras.

These findings are consistent with the literature on the use of the Chow Test in detecting structural differences in panel regressions across entities. As explained by Nielsen and Whitby (2015) and Aronu et al. (2019), the Chow Test is an effective tool for assessing the structural stability of a model and identifying coefficient variations across groups or over time. In this context, the Chow Test suggests the presence of fixed effects across the observed companies, implying that the Fixed Effects Model (FEM) is more appropriate than the Pooled Least Squares (PLS) model, which assumes parameter homogeneity. Compared to other approaches, a key advantage of the Chow Test in this study lies in its ability to detect inter-firm differences in how financial ratios affect stock prices. This is particularly relevant given the characteristics of the data, which exhibit non-normal distribution and high variability. Therefore, selecting the FEM enables the model to better capture heterogeneity across entities, enhancing the validity of subsequent analysis and the reliability of regression estimates.

Table 3. Common Effect Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.664204	0.118154	-5.621516	0.0000
X1ESG_SCORE	0.006623	0.002258	2.933280	0.0042
X2_InvestmentEquityRatio	-0.034581	0.028257	-1.223803	0.2241

The Common Effect Model (CEM) is used in Table 3's regression estimation findings. Using 96 observations (16 companies over 6 years) and the Panel Least Squares estimate method, this model attempts to explain how the ESG Score (X1) and the Investment to Equity Ratio (X2) affect Tobin's Q (Y), a proxy for firm value. With an intercept (C) of -0.6642 and statistical significance at the 1% level ($p = 0.0000$), Tobin's Q should be negative when both X1 and X2 are zero. With a p-value of 0.0042 (< 0.01) and a coefficient of 0.0066, the ESG Score (X1) significantly and favorably affects Tobin's Q. The market's view of firm value in the mining industry can be improved by paying attention to environmental, social, and governance concerns, as evidenced by the fact that

a one-point increase in ESG Score results in a 0.0066-point increase in Tobin's Q. In contrast, the Investment to Equity Ratio (X2) is statistically insignificant (p = 0.2241) despite having a negative coefficient of -0.0346. This shows that, in the context of this dataset, investment relative to equity has not significantly affected firm value, either as a result of inefficient investments or less-than-ideal financing arrangements. With a coefficient of 0.0066 (p = 0.0042), the Common Effect Model (CEM) estimation results show that the ESG Score positively and statistically significantly affects Tobin's Q.

Table 4. R Square and F-Test Result

Test	Value
R-squared	0.088387
Adjusted R-squared	0.068783
F-statistic	4.508496
Prob(F-statistic)	0.013526

Only around 8.8% of the variation in Tobin's Q can be explained by the two independent variables in the model, according to Table 4's R-squared value of 0.088. Despite being relatively low, this is frequent in socio-financial studies, especially when using non-financial variables as ESG and short-panel data (Gregory, 2022). The model's overall statistical significance (F = 4.51; p = 0.0135), despite the low R-squared, indicates that at least one of the independent variables, the ESG Score, has a genuine effect on company value. The model is significant at the 5% level, meaning that at least one of the two independent variables has a statistically significant impact on the dependent variable, as indicated by the F-statistic of 4.51 and the p-value of 0.0135. According to the Common Effect Model, the Investment to Equity Ratio has no discernible impact on Tobin's Q; only the ESG Score does.

DISCUSSION

According to the study's findings, business value, as measured by Tobin's Q, is positively and significantly impacted by the ESG Score. This study supports empirical evidence that corporate governance, social responsibility, and environmental performance add value for shareholders in addition to being a question of compliance. This relationship aligns with the results of a meta-analysis conducted by Gregory (2022), which concluded that there is a consistent positive and significant influence of ESG on Tobin's Q across various industrial sectors. Furthermore, research by Zhi (2023) confirms that improved ESG performance is closely correlated with growth in operating cash flow and improved market perception of the company's long-term prospects. At the regional level, research by Chairani and Siregar (2021) confirms a positive correlation between ESG and firm value in the ASEAN region, indicating that sustainability principles are increasingly relevant in the regional business context. This research is also supported by Gaol et al. (2024), who stated that strategic ESG implementation not only reduces exposure to reputational and operational risks but also contributes to the formation of a more credible corporate image in the eyes of investors and the public.

The coefficient of -0.0346 and the p-value of 0.2241 show that the investment-to-equity ratio has a negative but negligible impact on firm value. This result suggests that, at least for the 2019–2024 timeframe, this ratio cannot yet be regarded as a significant factor in determining firm value generation, especially in the mining industry in the ASEAN area. While theoretically, this ratio can reflect a company's efficiency in utilizing equity for investment activities, in practice, its effect on firm value tends to be weak and inconsistent (Lumapow & Tumiwa, 2017; Fajaria & Isnalita, 2018; Husna & Satria, 2019; Mujino & Wijaya, 2021). This result aligns with a study by Del Brio et al. (2003), who examined manufacturing sector companies and found that financial ratios such as the current ratio and debt-to-equity ratio also showed no significant effect on firm value. In the context of the mining industry, which is known to be capital-intensive and has a long-term investment cycle, the investment-to-equity ratio may not fully reflect the quality or effectiveness of capital allocation (Setyabudi, 2021; Rahmawati et al., 2021). Other factors

that may contribute to this insignificance are commodity price volatility, energy sector regulation, and high environmental risks, which have a greater impact on firm value than indicators of financing structure alone (Atiningsih & Izzaty, 2021; Bon & Hartoko, 2022).

Within the framework of capital structure theories such as the Trade-Off Theory and Pecking Order Theory by Modigliani and Miller (1958), Myers and Majluf (1984) stated that the investment-to-equity ratio should impact firm value through its influence on the cost of capital and financial risk. Theoretically, a company's capital structure will be more optimal and its value will rise the more effectively it manages equity funding. The study's findings, however, suggest that this ratio does not accurately reflect the efficiency of capital allocation in the context of the ASEAN mining industry because its impact on firm value is not statistically significant. Numerous intricate external factors, including significant commodity price volatility, reliance on long-term project cycles, regulatory uncertainty, and environmental concerns, could be the reason for its insignificance. Furthermore, throughout the research period, the market valuation of the company may not yet reflect the value of investments made in this area, which typically take a long time to realize. On the other hand, the model created for this study effectively illustrates how the ESG Score affects how the market values a company. These findings imply that ESG performance has become a critical determinant of market valuation in the ASEAN mining sector, reflecting investors' growing attention to sustainability. Meanwhile, financial structure indicators such as the investment-to-equity ratio may not yet serve as reliable predictors of firm value in capital-intensive industries.

CONCLUSION

This analysis comes to the conclusion that, for mining businesses in the ASEAN region between 2019 and 2024, the ESG Score significantly and favorably affects company value as determined by Tobin's Q. This research demonstrates that market views of firm value can be improved by sustainability strategies, which include environmental, social, and governance elements. This proves that ESG is a strategic tool that can improve a company's long-term standing in addition to being a tool for risk mitigation. On the other hand, there was no discernible effect of the investment-to-equity ratio on business value. This is probably because mining is a capital-intensive industry, and this ratio does not always reflect how well investments are allocated. To put it another way, this ratio might not accurately represent the effectiveness or financial impact that could have a short-term effect on business value. Even though the model only explains a small portion of the variation in firm value, as indicated by the R-squared value of 8.8%, this result is significant because it shows that non-financial variables like ESG are still relevant in corporate valuation analysis, especially when short-term panel data is used.

However, this study has certain limitations. The relatively low explanatory power and the use of a short six-year observation period may restrict the ability to capture long-term effects. Moreover, the focus on ASEAN mining firms limits the generalizability of the findings to other sectors or regions. In order to improve the model's explanatory power, it is advised that additional control variables be added for future studies, such as leverage, company size, and revenue growth. Furthermore, to investigate more complex dynamics across time and between enterprises, a longitudinal method utilizing fixed effects or random effects models can be employed. In order to validate the results more generally, the next study might examine the mediating or moderating effect of ESG and company value, as well as compare various industry sectors.

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