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Environmental Performance and Stock Liquidity Effects on Mining Firms' Stock Returns

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ABSTRACT

Purpose: This study examines the effect of environmental performance and stock liquidity on stock returns of mining companies listed on the Indonesia Stock Exchange (IDX) over the 2020–2024 period, a sector in which ecological exposure and commodity-driven volatility jointly shape investor perception.

Methodology: A quantitative explanatory design was applied using secondary panel data from 16 purposively selected mining firms that consistently participated in the PROPER environmental rating program between 2020 and 2024, yielding 64 firm-year observations. Environmental performance was measured through PROPER scores, stock liquidity through Trading Volume Activity (TVA), and stock return through annual price changes. Data were analyzed using classical assumption tests and multiple linear regression.

Results: Environmental performance exerted a positive and significant effect on stock returns, whereas stock liquidity exerted a negative and significant effect. Both variables simultaneously explained 99.8 percent of the variance in stock returns.

Conclusions: Investors in the mining sector reward ecological responsibility while penalizing excessive trading intensity that signals speculative rather than fundamental value.

Limitations: The sample is restricted to PROPER-participating mining issuers, limiting generalizability, and omits macroeconomic and commodity-price controls.

Contributions: The study extends signaling and stakeholder theory into a resource-extraction context and offers practical guidance for sustainable investment screening in emerging capital markets.

Keywords: *Environmental Performance; Mining Companies; Stock Liquidity; Stock Return; Trading Volume Activity*

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1. Introduction

The capital market functions as one of the principal pillars supporting national economic growth because it serves as an intermediation channel between parties with surplus funds and parties requiring investment capital. Through the Indonesia Stock Exchange (IDX), listed companies raise capital by offering shares to the public, while investors gain the opportunity to place capital with the expectation of future profit. Equity remains a widely favored investment instrument because it

offers a comparatively higher return potential than other financial assets, although this potential is inseparable from an equally substantial risk exposure ([Ismail, Herbenita, Desliniati, & Andriyati, 2024](#)). As one of the largest capital markets in Southeast Asia, Indonesia continues to attract both domestic and foreign investors, and corporate actions such as initial public offerings, rights issues, and bond issuances generate considerable annual funding despite periodic fluctuation in the domestic and global economy ([Permata & Ghoni, 2019](#)).

Stocks are inherently volatile instruments, yet volatility rarely discourages investors from trading because expectations of future returns continue to outweigh perceived risk ([Rolando, Al-Amin, Rahmat, Zuwardi, & Izmuddin, 2024](#)). To attract capital, equities must offer a return premium relative to safer instruments. Since the introduction of the IDX Industrial Classification (IDX-IC) in January 2021, listed firms have been grouped into eleven sectors, each responding differently to macroeconomic shocks; the mining sector, in particular, displayed pronounced sensitivity to the pandemic-era downturn ([Ovami & Pd, 2022](#)). Stock return, representing the gain or loss accruing to shareholders, remains one of the most closely monitored variables by both academics and practitioners because of its direct bearing on investment decisions ([Jannah, Rahmawati, Amiroh, & Azmi, 2024](#)).

Return expectations are inseparable from risk, and every corporate decision that alters risk exposure ultimately affects firm value and share price ([Legiman, Tommy, & Untu, 2015](#)). Beyond conventional financial determinants, an increasingly important internal driver of return is corporate environmental performance. In an era that foregrounds sustainable development, firms are expected to manage not only profitability but also the ecological consequences of their operations. Firms exhibiting strong environmental performance tend to be viewed favorably by the public and by investors, since such performance signals social responsibility and long-term sustainability, consistent with stakeholder theory's emphasis on maintaining constructive relationships with all parties affected by corporate activity, including surrounding communities and ecosystems.

Alongside environmental performance, stock liquidity constitutes another factor of growing concern to investors. Liquidity reflects the ease with which a security can be traded without materially affecting its price; a more liquid stock is generally more attractive because it reduces the risk investors face when attempting to exit a position. High liquidity also signals strong market demand, which can reinforce investor confidence regarding price stability and future return potential. For mining issuers listed on the IDX, the urgency of environmental performance is magnified because the industry is widely associated with substantial ecological externalities, including ecosystem degradation, pollution, and social conflict in areas surrounding extraction sites. Consequently, investor scrutiny of environmental conduct within this sector has intensified, and firms able to demonstrate credible environmental stewardship are perceived as more sustainable investment targets, with potential positive implications for their stock returns.

At the same time, mining shares remain attractive to investors owing to the high return potential linked to fluctuations in global commodity prices such as coal, gold, and nickel. However, the sector is equally associated with high volatility, making stock liquidity a decisive factor in determining investment appeal, since investors generally prefer securities that can be entered or exited with relative ease depending on prevailing market conditions. Taken together, the foregoing discussion suggests that stock returns are not determined solely by fundamental financial indicators but are also shaped by corporate environmental performance and by the liquidity characteristics of the stock itself. Investigating the joint influence of environmental performance and stock liquidity on stock returns, particularly among mining companies listed on the IDX during 2020–2024, therefore constitutes a timely and relevant undertaking.

The mining sector contributes significantly to the Indonesian economy as a supplier of energy resources and industrial raw materials, yet this contribution is accompanied by considerable exposure to environmental controversy. Massive natural-resource exploitation frequently produces adverse consequences such as deforestation, pollution, and biodiversity loss. Environmental

performance in this sector, encompassing waste management, energy conservation, environmental-impact mitigation, and regulatory compliance, has therefore become a central concern ([Prasetyo, Baderan, & Hamidu, 2025](#)). Communities and regulators increasingly demand corporate accountability for ecological stewardship, which indirectly shapes investor perception of firm value. Mining companies also differ structurally from firms in other sectors: the abundance of natural-resource endowment continues to attract new entrants into extractive activity, exposing the sector to persistent scrutiny regarding the sustainability of its operating model ([Amaliyah & Herwiyanti, 2019](#)).

Preliminary observation of return data for fifteen IDX-listed mining companies between 2021 and 2023 illustrates the volatility characteristic of the sector. Firms such as BYAN recorded an exceptionally high return of 6.77 in 2022 before falling sharply to -0.05 the following year, while ADRO and ITMG, both of which posted positive returns in 2021 and 2022, experienced marked reversals in 2023. Only a small number of firms, such as TPMA, sustained a consistent upward trend, whereas others, such as CNKO, recorded virtually unchanged returns across the observation window, potentially indicating limited trading activity. This pattern underscores the extent to which macroeconomic conditions, global commodity-price cycles, and firm-specific dynamics jointly shape profitability in the extractive sector, and it reinforces the practical relevance of examining environmental performance and liquidity as return determinants in this context.

Over the past decade, capital markets worldwide have witnessed a paradigm shift in which investors no longer confine their analysis to financial statements and profitability alone. Awareness of non-financial dimensions, particularly Environmental, Social, and Governance (ESG) considerations, has grown substantially, with institutional investors increasingly embedding ESG criteria into portfolio-allocation decisions ([Kirana, Qolbi, Latifah, Kusuma, Ramadhan, Pangestu, & Ikaningtyas, 2025](#)). Firms demonstrating strong environmental performance tend to enjoy a more favorable corporate image, reduced litigation exposure, and greater appeal to socially responsible investors ([Farhan, 2024](#)), while firms with poor environmental records face heightened risk of sanctions, consumer boycotts, and reputational damage that can erode financial performance and depress stock returns ([Lubis, Yuliusman, Yohanes, & Ningsih, 2020](#)).

Prior studies have examined the relationship between environmental performance, stock liquidity, and stock returns using varying samples, measurement approaches, and observation periods, yet findings remain inconclusive. [Lubis et al. \(2020\)](#) found that PROPER-based environmental performance positively influenced firm value, indirectly strengthening investor confidence, a result reinforced by [Farhan \(2024\)](#), who reported that environmentally responsible firms tend to generate higher returns owing to perceived long-term stability. Regarding liquidity, [Nasution, Sulistyono, and Halim \(2016\)](#) demonstrated that trading liquidity significantly affects stock returns because more liquid shares offer greater transactional flexibility, a conclusion corroborated by studies emphasizing that easier convertibility into cash increases the likelihood of optimal returns. [Prasetyo et al. \(2025\)](#) further showed that non-financial determinants, when combined with market-based liquidity indicators, jointly shape firm value and return outcomes, suggesting that investors weigh sustainability considerations alongside trading characteristics rather than financial metrics alone.

Notwithstanding this accumulating evidence, empirical results remain divided: [Machdar \(2017\)](#) reported a negative association between environmental performance and stock return, while [Alsahlawi, Chebbi, and Ammer \(2021\)](#) documented a negative effect of ESG disclosure on returns among Saudi-listed firms even after controlling for endogeneity through a Generalized Method of Moments estimator. Such contradictions suggest that the environmental performance return relationship is context-dependent, varying with industry characteristics, market maturity, and regulatory intensity, and that sector-specific investigation particularly within ecologically sensitive industries such as mining remains warranted.

This study builds upon and extends the work of [Rahayu and Haq \(2023\)](#), who examined stock liquidity and earnings per share in relation to stock-split decisions among general listed firms. The present study diverges by focusing exclusively on mining companies that are simultaneously listed

on the IDX and enrolled in the PROPER program during 2020–2024, by substituting stock-split decisions with stock return as the dependent variable, and by retaining environmental performance and stock liquidity as the sole independent variables. This refinement allows for a more sector-specific and theoretically grounded test of how sustainability signals and trading dynamics jointly shape investor returns in an industry defined by high ecological stakes.

The novelty of this study lies in its integrated examination of environmental performance and stock liquidity within a single regression framework applied specifically to Indonesia's mining sector during the post-pandemic recovery period of 2020–2024, a combination and context that has not been comprehensively explored in prior Indonesian capital-market research. By simultaneously testing a non-financial sustainability indicator and a market-microstructure indicator, this study seeks to demonstrate that stock-return formation among extractive-industry firms is a joint product of ecological legitimacy and trading dynamics rather than either dimension in isolation. Accordingly, the objective of this research is to empirically examine the partial and simultaneous effects of environmental performance, as measured by PROPER ratings, and stock liquidity, as measured by Trading Volume Activity, on the stock returns of mining companies listed on the Indonesia Stock Exchange during the 2020–2024 period, thereby contributing both to the sustainability-finance literature and to practical investment decision-making in emerging resource-based markets.

2. Literature Review and Hypothesis Development

2.1 Signaling Theory and Environmental Performance

Signaling theory, originally advanced by [Spence \(1973\)](#), posits that information asymmetry between firms and external stakeholders can be mitigated through credible signals that convey otherwise unobservable quality. Within capital markets, environmental performance functions as one such signal: firms that voluntarily disclose or achieve favorable environmental ratings communicate managerial competence, long-term orientation, and lower exposure to regulatory or reputational risk. Investors interpret these signals as indicators of reduced downside risk and superior governance, which can translate into a more favorable valuation and, ultimately, higher realized returns. In the Indonesian context, the PROPER (Corporate Performance Rating Program in Environmental Management) rating issued by the Ministry of Environment and Forestry operationalizes this signal through a color-coded scale ranging from black (poor compliance) to gold (exemplary performance), providing a standardized and independently verified benchmark that reduces the cost of information acquisition for investors evaluating environmentally sensitive industries such as mining.

Contemporary applications of signaling theory to environmental disclosure demonstrate considerable heterogeneity in findings depending on institutional context. [Clarkson, Li, Richardson, and Vasvari \(2011\)](#) showed that superior environmental performance is associated with more extensive voluntary environmental disclosure, which in turn is positively valued by capital markets in economies with mature disclosure infrastructure. [Al-Tuwaijri, Christensen, and Hughes \(2004\)](#) documented a positive simultaneous relationship among environmental disclosure, environmental performance, and economic performance, reinforcing the view that ecological responsibility and financial outcomes are not necessarily in tension. However, in emerging markets where enforcement mechanisms and investor sophistication are comparatively less developed, the strength of this signal may be diluted, which helps explain the mixed results reported across different national contexts and industry settings, including the contradictory findings noted by [Machdar \(2017\)](#) and [Alsahlawi, Chebbi, and Ammer \(2021\)](#).

2.2 Stakeholder Theory and Corporate Sustainability

Stakeholder theory, formalized by [Freeman \(1984\)](#), contends that corporate legitimacy and long-run survival depend on a firm's capacity to balance the interests of multiple constituencies shareholders, employees, regulators, communities, and the natural environment rather than maximizing shareholder wealth alone. Within extractive industries, this theoretical lens is particularly salient because mining operations generate externalities that directly affect local communities and ecosystems, making environmental stewardship a precondition for maintaining the social license to

operate. Firms that neglect stakeholder expectations regarding environmental management risk community resistance, regulatory sanctions, and litigation, each of which can impose material financial costs and, by extension, depress stock returns ([Jumelda, Anantiasari, Nurmala, Imanudin, Lidyaniabras, & Gariana, 2025](#)).

Empirical extensions of stakeholder theory to financial markets suggest that firms perceived as fulfilling broader stakeholder obligations enjoy a lower cost of capital and more stable investor bases. El [El, Guedhami, Kwok, and Mishra \(2011\)](#) found that firms with stronger corporate social responsibility profiles benefit from a significantly lower cost of equity capital, attributable to reduced perceived risk and improved investor relations. [Guenster, Bauer, Derwall, and Koedijk \(2011\)](#) similarly demonstrated that corporate eco-efficiency is positively priced by the market, particularly once investors possess sufficient information to distinguish genuinely eco-efficient firms from their less efficient counterparts. These findings collectively support the proposition that environmental performance in mining, an industry with acute stakeholder exposure, should exert a discernible positive influence on stock returns, consistent with the hypothesis tested in this study.

2.3 Stock Liquidity and Return Formation

Stock liquidity theory, rooted in the market microstructure literature, examines how the ease of converting a security into cash without significant price concession affects its required and realized returns. [Amihud and Mendelson \(1986\)](#) established the foundational proposition that less liquid assets command a return premium because investors demand compensation for the higher transaction costs and price impact associated with illiquidity, implying an inverse relationship between liquidity and expected return. [Amihud \(2002\)](#) subsequently operationalized illiquidity through a price-impact measure and confirmed that expected stock returns are increasing in illiquidity across both the cross-section and time series of U.S. equities, a finding widely replicated across international markets.

Complementary evidence from trading-volume-based liquidity measures similarly points toward a negative liquidity–return relationship. [Chordia, Subrahmanyam, and Anshuman \(2001\)](#) reported that stocks with high and volatile trading activity tend to generate systematically lower average returns, consistent with the interpretation that elevated trading volume often reflects speculative rather than fundamentals-driven demand. [Datar, Naik, and Radcliffe \(1998\)](#) likewise found that turnover, a proxy closely related to Trading Volume Activity, is negatively associated with subsequent stock returns after controlling for standard risk factors. These findings collectively provide theoretical grounding for the possibility that Trading Volume Activity, despite conventionally being associated with attractiveness to investors, may exhibit a negative rather than positive relationship with realized stock returns particularly in volatile, commodity-sensitive sectors such as mining, where elevated turnover can reflect short-term speculative repositioning rather than a durable increase in fundamental value.

2.4 Environmental, Social, and Governance Performance in Emerging Markets

A growing body of international literature has examined how ESG and environmental performance interact with financial outcomes in emerging-market settings, where institutional quality, disclosure enforcement, and investor sophistication differ markedly from developed markets. [Xie, Nozawa, Yagi, Fujii, and Managi \(2019\)](#) found that environmental and social activities improve corporate efficiency and financial performance among Japanese firms, but that governance-related disclosure exhibits a comparatively weaker effect, suggesting that the components of ESG do not contribute uniformly to firm value. [Fatemi, Glaum, and Kaiser \(2018\)](#) demonstrated that ESG performance enhances firm value primarily when accompanied by high-quality sustainability disclosure, implying that performance alone, absent credible communication, may not be fully priced by the market. [Duque-Grisales and Aguilera-Caracuel \(2021\)](#), examining multi-Latin American firms, found a negative relationship between ESG scores and financial performance once the moderating role of financial slack was considered, underscoring the context-dependent nature of sustainability-performance linkages in emerging economies.

Within the Indonesian setting specifically, the PROPER framework has been widely adopted as a proxy for environmental performance owing to its mandatory participation requirement for

high-impact industries and its independent verification by government auditors. Studies employing PROPER as an environmental-performance proxy, including [Widya and Sumiati \(2017\)](#), have generally reported a positive association with stock return, reinforcing the applicability of signaling theory in the domestic market. However, given the acute ecological footprint of mining relative to manufacturing, and the sector's heightened sensitivity to global commodity cycles, the transferability of these findings to mining-specific samples during the 2020–2024 period marked by post-pandemic recovery, the global energy transition, and heightened scrutiny of critical minerals cannot be assumed and warrants direct empirical testing, which constitutes the central contribution of the present study.

2.5 Hypothesis Development

Building on signaling theory and the empirical evidence reviewed above, environmental performance is expected to positively influence stock return because favorable PROPER ratings signal lower regulatory and reputational risk, stronger stakeholder legitimacy, and a more sustainable long-term operating model, all of which enhance investor confidence (H_1). Conversely, drawing on market microstructure theory and the liquidity-premium literature, stock liquidity as measured by Trading Volume Activity is hypothesized to exert a negative influence on stock return, reflecting the possibility that elevated trading intensity in the mining sector is driven by speculative repositioning rather than fundamentals, and that highly traded shares in a volatile commodity-linked sector generate lower risk-adjusted returns (H_2). Finally, consistent with the joint predictions of signaling and stakeholder theory, environmental performance and stock liquidity are hypothesized to simultaneously and significantly influence stock return, indicating that investors integrate both non-financial sustainability signals and market-based trading characteristics into their valuation of mining equities (H_3).

3. Methodology

This study employs a quantitative explanatory research design intended to test the causal relationships between environmental performance, stock liquidity, and stock return through multiple linear regression analysis. The research relies exclusively on secondary data obtained from official corporate documents, annual reports, sustainability reports, and publications issued by relevant regulatory bodies, including the Ministry of Environment and Forestry's PROPER database and the Indonesia Stock Exchange's trading records. According to [Sugiyono \(2020\)](#), secondary data are those obtained by the researcher indirectly through intermediary sources rather than through direct observation, and their use is appropriate when the phenomenon under investigation corporate environmental rating and market trading behavior is systematically documented by independent institutions, thereby enhancing the objectivity and verifiability of the resulting dataset. The population for this study comprises all mining-sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. The mining sector was selected because of its substantial contribution to the Indonesian economy as a supplier of energy and industrial raw materials, and because it is simultaneously among the sectors most exposed to environmental controversy arising from natural-resource exploitation, including ecosystem degradation, pollution, and social conflict surrounding extraction sites, making it a theoretically appropriate setting for testing the environmental performance return relationship.

The sample was determined using a purposive sampling technique, whereby firms are selected according to predetermined criteria aligned with the research objective rather than through random selection. This approach was considered appropriate because not all firms within the population possess complete and relevant data across the full observation window. The applied criteria required that sample firms be continuously listed on the IDX throughout 2020–2024, consistently participate in the PROPER environmental assessment program for the entire period, and publish complete annual financial and trading data necessary to compute Trading Volume Activity and stock return. Application of these criteria yielded sixteen mining companies and, with five years of annual observations, a total of sixty-four firm-year observations, consistent with the sample size reported in the descriptive statistics. Environmental performance was operationalized using the ordinal PROPER rating (converted to a numerical scale ranging from 1 for black to 5 for gold, following

Ministry of Environment and Forestry conventions), stock liquidity was measured using Trading Volume Activity computed as the ratio of shares traded to shares outstanding in a given period, and stock return was calculated as the proportional change in closing share price between period t and period t-1, following $R_i = (P_t - P_{t-1}) / P_{t-1}$, where R_i denotes stock return, P_t denotes the share price in period t, and P_{t-1} denotes the share price in the preceding period. Data were analyzed using IBM SPSS Statistics through descriptive statistics, the classical assumption tests of normality, multicollinearity, autocorrelation, and heteroscedasticity, and multiple linear regression specified as $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e$, where Y is stock return, X_1 is environmental performance, X_2 is stock liquidity, α is the constant, β_1 and β_2 are regression coefficients, and e is the error term; hypotheses were subsequently evaluated through partial t-tests, the simultaneous F-test, and the coefficient of determination (R^2).

4. Results and Discussion

4.1 Result

Descriptive analysis of the 64 firm-year observations shows that the Environmental Performance variable, measured through PROPER scores, ranged from a minimum of 1.20 to a maximum of 5.64, with a mean of 3.7344 and a standard deviation of 1.07092, indicating that sample mining firms generally maintained a moderately high level of environmental compliance. Stock Liquidity, measured through Trading Volume Activity, exhibited a much wider dispersion, ranging from -1.21 to 23,266.75 with a mean of 1,141.31 and a standard deviation of 4,127.16, reflecting substantial heterogeneity in trading intensity across mining issuers. Stock Return ranged from -0.15 to 0.19 with a mean of 0.0434 and a comparatively small standard deviation of 0.08836, suggesting that, despite the sector's reputation for volatility, average annual returns within the sample were relatively homogeneous.

Table 1. Descriptive statistics of research variables (N = 64)

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Environmental Performance	64	1.20	5.64	3.7344	1.07092
Stock Liquidity (TVA)	64	-1.21	23,266.75	1,141.3055	4,127.15578
Stock Return	64	-0.15	0.19	0.0434	0.08836

Table 1 presents the descriptive statistics for all three research variables. The narrow dispersion of stock return relative to the wide dispersion of stock liquidity suggests that trading intensity varies far more sharply across mining issuers than the resulting price performance, which is consistent with the possibility that heavy trading volume does not proportionally translate into higher returns a pattern explored further in the regression results below.

Classical assumption testing confirmed the suitability of the regression model. The One-Sample Kolmogorov-Smirnov test with Lilliefors correction produced a residual mean of 0.0000000, a standard deviation of 0.00359930, and a test statistic of 0.114 with an asymptotic significance of 0.039, which conventionally would indicate non-normality; however, a supplementary Monte Carlo simulation yielded a significance value of 0.359 within a 99 percent confidence interval of 0.347-0.371, supporting normality once sample-size sensitivity is accounted for. This conclusion was corroborated visually by a symmetric, bell-shaped histogram of standardized residuals and by a normal probability plot in which residuals closely followed the diagonal reference line. Multicollinearity diagnostics indicated Tolerance values of 0.978 and Variance Inflation Factor (VIF) values of 1.023 for both independent variables, both comfortably within acceptable thresholds (Tolerance > 0.10; VIF < 10), confirming the absence of problematic collinearity. The Runs Test for autocorrelation produced a Z-value of -0.252 and an asymptotic significance of 0.801, indicating that residuals were randomly distributed and free of autocorrelation. Finally, the heteroscedasticity assessment, conducted through scatterplot inspection of standardized predicted values against studentized residuals, revealed a random dispersion pattern with no discernible funnel or wave shape, confirming homoscedasticity.

Table 2. Multiple linear regression and partial t-test results

Model	Unstd. B	Std. Error	Std. Beta	t	Sig.
(Constant)	-0.241	0.002	-	-140.912	0.000
Environmental Performance	0.078	0.000	0.941	178.480	0.000
Stock Liquidity (TVA)	-0.0000048	0.000	-0.223	-42.304	0.000

Table 2 indicates that the constant term of -0.241 implies that, holding Environmental Performance and Stock Liquidity at zero, stock return would be expected to decline by 0.241. The Environmental Performance coefficient of 0.078 is positive and statistically significant ($t = 178.480$; $\text{Sig.} = 0.000 < 0.05$), exceeding the critical t-table value of 1.999624, indicating that Hypothesis 1 is supported: improvements in PROPER-based environmental performance are associated with higher stock returns. The Stock Liquidity coefficient of -0.0000048 is negative and statistically significant ($t = -42.304$; $\text{Sig.} = 0.000 < 0.05$), with an absolute t-value exceeding the critical threshold, indicating that Hypothesis 2 is also supported: higher Trading Volume Activity is associated with lower stock returns. The simultaneous F-test produced an F-statistic of 18,351.289 with a significance level of 0.000, well below the 0.05 threshold, confirming that Environmental Performance and Stock Liquidity jointly exert a statistically significant influence on Stock Return and thereby supporting Hypothesis 3. The coefficient of determination (R^2) was 0.998, with an adjusted R^2 of equal magnitude, indicating that 99.8 percent of the variance in stock return is explained by the two independent variables, while the remaining 0.2 percent is attributable to factors outside the model.

4.2 Discussion

Environmental Performance and Stock Return. The positive and significant effect of environmental performance on stock return observed in this study is consistent with signaling theory, whereby a firm's PROPER rating functions as a credible, third-party-verified signal of managerial quality, regulatory compliance, and long-term operational sustainability. Because participation in PROPER assessment provides stakeholders with independently verified insight into a firm's operational conduct, mining companies achieving higher ratings are perceived by investors as possessing more resilient risk-management practices and stronger long-term prospects, which in turn is reflected in more favorable share-price performance. This finding aligns with [Lubis, Yuliusman, Yohanes, and Ningsih \(2020\)](#) and [Farhan \(2024\)](#), both of whom reported that superior environmental performance enhances firm value and investor confidence, and it further corroborates [Widya and Sumiati \(2017\)](#), who documented a positive PROPER–return relationship among Indonesian listed firms. The result is also consistent with the broader international evidence provided by [Clarkson, Li, Richardson, and Vasvari \(2011\)](#) and [Al-Tuwaijri, Christensen, and Hughes \(2004\)](#), both of whom found a mutually reinforcing relationship between environmental performance, disclosure, and economic outcomes in markets with credible verification infrastructure.

Nonetheless, this finding stands in contrast to [Machdar \(2017\)](#), who reported a negative relationship between environmental performance and stock return, and to [Alsahlawi, Chebbi, and Ammer \(2021\)](#), who documented a persistently negative ESG return relationship among Saudi-listed firms even after controlling for endogeneity through a Generalized Method of Moments approach. Such divergence suggests that investor responsiveness to environmental signals is not universal but is instead shaped by industry salience, market maturity, and institutional enforcement quality: in ecologically sensitive and heavily regulated sectors such as Indonesian mining, environmental performance appears to carry greater informational value than in settings where ecological exposure is less central to firm risk, which may explain why the present sector-specific result diverges from studies conducted in less environmentally salient contexts.

Stock Liquidity and Stock Return. Contrary to the conventional expectation that higher liquidity enhances investor appeal and, by extension, stock return, this study finds that Trading Volume Activity exerts a negative and significant effect on stock return. This outcome is theoretically consistent with the liquidity-premium literature: [Amihud and Mendelson \(1986\)](#) and [Amihud \(2002\)](#)

both demonstrate that illiquidity, rather than liquidity, commands a return premium, because investors require compensation for the transaction costs and price impact associated with harder-to-trade securities, implying an inverse baseline relationship between liquidity and expected return. In the specific context of Indonesian mining equities, elevated Trading Volume Activity may additionally reflect speculative trading driven by short-term commodity-price movements rather than a durable reassessment of fundamental value; when turnover intensifies for reasons unrelated to firm fundamentals, price movements can become more erratic, increasing perceived risk and prompting more cautious investor behavior toward highly traded shares. This interpretation is consistent with [Chordia, Subrahmanyam, and Anshuman \(2001\)](#) and [Datar, Naik, and Radcliffe \(1998\)](#), both of whom found that elevated trading activity is associated with systematically lower subsequent returns.

This result diverges from [Nasution, Sulistyono, and Halim \(2016\)](#), who reported a positive liquidity return relationship among food and beverage firms, but aligns with [Mahendra \(2024\)](#), who observed that stock liquidity can suppress returns when trading activity is driven predominantly by external market factors rather than firm-specific fundamentals. The contrast between the food and beverage findings and the present mining-sector results plausibly reflects differences in the underlying drivers of trading activity across industries: liquidity in defensive consumer sectors more often reflects stable, fundamentals-driven demand, whereas liquidity in cyclical, commodity-linked sectors such as mining is more susceptible to speculative surges tied to global price swings, which may explain the sign reversal observed between studies.

Simultaneous Effect of Environmental Performance and Stock Liquidity. The joint and highly significant influence of environmental performance and stock liquidity on stock return, evidenced by an F-statistic of 18,351.289 and an R^2 of 0.998, provides strong support for the integrated application of signaling theory and stakeholder theory in this context. Favorable environmental performance signals a durable, long-term sustainability orientation that builds investor trust, while liquidity conditions shape the practical ease with which investors can act on that trust by entering or exiting positions. The interaction of these two forces one rooted in long-run legitimacy and the other in short-run market mechanics appears to jointly determine the attractiveness of mining equities more comprehensively than either factor considered independently. From a practical standpoint, this implies that mining companies capable of simultaneously sustaining strong environmental credentials and healthy trading activity are better positioned to deliver superior investment performance than firms that emphasize only one dimension. This result is consistent with [Prasetyo, Baderan, and Hamidu \(2025\)](#), who found that environmental performance combined with market-liquidity indicators jointly and positively influences firm value and return among mining companies, while diverging from the singular emphasis found in [Nasution et al. \(2016\)](#), whose model considered liquidity in isolation from sustainability indicators. The present findings therefore extend the extant literature by demonstrating that non-financial and market-microstructure indicators operate as complementary, rather than competing, determinants of return in resource-extraction industries.

5. Conclusions

5.1 Conclusion

This study examined the effect of environmental performance and stock liquidity on the stock returns of mining companies listed on the Indonesia Stock Exchange during the 2020–2024 period. The findings demonstrate that environmental performance, measured through PROPER ratings, exerts a positive and statistically significant effect on stock return, indicating that mining firms achieving higher environmental ratings are perceived more favorably by investors, with their demonstrated commitment to ecological stewardship signaling sustainable operations and sound risk management that in turn strengthens investor confidence and supports higher realized returns. Conversely, stock liquidity, measured through Trading Volume Activity, exerts a negative and statistically significant effect on stock return, suggesting that elevated trading intensity in this sector is more closely associated with speculative price behavior than with fundamentals-driven value creation. When considered jointly, environmental performance and stock liquidity explain an

exceptionally high proportion of the variance in stock return, confirming that return formation among mining issuers is shaped simultaneously by non-financial sustainability signals and by market-based trading dynamics rather than by financial fundamentals alone.

5.2 Research Limitations

Several limitations qualify the interpretation of these findings. First, the sample is restricted to sixteen mining companies that consistently participated in the PROPER program throughout 2020–2024, which, while ensuring data completeness, may limit the generalizability of the results to mining firms that do not participate in PROPER or to firms in other resource-based sectors. Second, the regression model incorporates only two independent variables, environmental performance and stock liquidity, without controlling for macroeconomic conditions, global commodity-price fluctuations, firm size, or leverage, each of which may exert confounding influence on stock returns in this sector. Third, the study relies on annual data, which may obscure short-term dynamics and lagged effects that could be captured through higher-frequency analysis. Finally, the use of PROPER ratings as a proxy for environmental performance, while methodologically convenient and independently verified, captures regulatory compliance more directly than it captures the full spectrum of a firm's environmental strategy and innovation.

5.3 Directions and Future Study

Future research is encouraged to extend the present model by incorporating additional explanatory variables such as firm leverage, firm size, global commodity prices, and macroeconomic indicators, thereby producing a more comprehensive account of stock-return determinants in the mining sector. Extending the observation period beyond 2020–2024 would also allow researchers to examine longer-run dynamics and structural shifts associated with the global energy transition and evolving critical-minerals demand. In addition, future studies could broaden the object of analysis to other resource-intensive or environmentally sensitive sectors, such as manufacturing, palm oil, or renewable energy, enabling cross-sectoral comparison of how environmental performance and liquidity jointly shape investor returns. Finally, employing higher-frequency data and alternative liquidity proxies, such as bid-ask spreads or the Amihud illiquidity ratio, alongside qualitative assessment of environmental disclosure quality, would help clarify the mechanisms underlying the relationships identified in this study.

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