

The Effects of Liquidity, Volatility, and Trading Volume on Stock Returns

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ABSTRACT

Purpose: This study aims to analyze the effects of liquidity, volatility, and trading volume on stock returns for companies listed on the Indonesia Stock Exchange during the 2021–2023 period.

Research Method: This study employs a quantitative approach with an explanatory causal design. Secondary data in the form of panel data were obtained from the Indonesia Stock Exchange and Yahoo Finance. The sample was selected using purposive sampling and analyzed using descriptive statistics, classical assumption tests, multiple linear regression, the t-test, the F-test, and the coefficient of determination.

Results and Discussion: The results of the study indicate that liquidity has a significant positive effect on stock returns, volatility has a significant negative effect, and trading volume has a significant negative effect. Taken together, these three variables have a significant effect on stock returns, explaining 82.1% of the variance.

Implications: These findings can serve as a basis for investors and companies when making investment decisions.

Originality: This study provides empirical evidence on the simultaneous effects of liquidity, volatility, and trading volume on stock returns during the post-pandemic period in Indonesia.

Keywords: liquidity; volatility; trading volume; stock returns; capital markets.

1. Introduction

The capital market is one of the key instruments in the modern economic system, serving as an intermediary between those with excess funds and those in need of financing. The existence of the capital market enables companies to secure long-term financing to support business expansion, while investors can earn profits from stock returns. In recent years, the development of Indonesia's capital market has shown a positive trend, as reflected in increases in the number of investors, transaction frequency, and market capitalization. Nevertheless, stock trading activity is not immune to various uncertainties, as evidenced by high stock price volatility. These dynamics became increasingly apparent during the 2021–2023 period. After facing significant pressure from the COVID-19 pandemic at the beginning of the period, Indonesia's capital market entered a phase of economic recovery, marked by increased stock trading activity and greater participation by retail investors. Empirically, stock returns exhibit fluctuating movements. In the earlier period, many stocks experienced sharp declines due to global and domestic economic instability, whereas in the subsequent period, returns increased as

economic conditions improved. Additionally, stock trading volume rose, indicating increasingly active transactions in the Indonesian capital market.

Stock liquidity as reflected in trading activity varies across companies. Stocks with high liquidity tend to be easier to buy and sell, have relatively narrow price spreads, and are more attractive to investors. Conversely, stocks with low liquidity are generally traded less actively, potentially increasing transaction costs and investment risk. Stock price volatility is also a key concern, as it reflects the uncertainty and risk investors face. The higher the stock price volatility, the greater the likelihood of fluctuations in investors' returns. This raises questions regarding the factors that consistently influence stock returns—specifically, whether returns are more strongly influenced by liquidity, volatility, or trading volume. Theoretically, the relationship among these variables can be explained through several approaches. The efficient market hypothesis (EMH) posits that stock prices reflect all available market information, meaning that changes in trading activity, liquidity, or new information are immediately reflected in stock prices. Meanwhile, the risk-return trade-off theory states that investors facing higher levels of risk will expect higher returns as compensation for that risk. In this context, stock price volatility is viewed as a measure of market risk that can influence stock returns. Additionally, signaling theory suggests that stock trading activity can signal investors about a company's prospects; thus, high trading volume is often interpreted as an indicator of increasing market interest in a particular stock.

Previous studies have yielded inconsistent results regarding the effects of liquidity, volatility, and trading volume on stock returns. P.D. *et al.*, (2023) found that trading volume and volatility had a significant positive effect on stock returns for companies in the wholesale trade sector during the 2016–2020 period. Telaumbanua *et al.*, (2021) showed that liquidity had a significant positive effect on stock returns for consumer goods companies during the 2015–2018 period. Similar findings were reported by Niawaradila *et al.*, (2021), who found that trading volume had a positive effect on stock returns for manufacturing companies during the 2016–2019 period, whereas trading frequency had a negative effect. Other studies reveal inconsistencies in empirical results. Raiferiana & Meirani (2024) found that stock price volatility had a significant positive effect on stock returns for companies included in the Jakarta Islamic Index during the 2019–2023 period. However, in the same study, stock trading volume was found to have a positive but insignificant effect on stock returns. Conversely, Sukmayani *et al.*, (2025) demonstrated that trading volume positively affects stock returns for companies in the LQ45 Index during the 2021–2023 period. On the other hand, Pratisila (2024) found that liquidity has a significant effect on stock returns for companies in the transportation and logistics sector, while Norhaliza & Purbowati (2025) demonstrated that liquidity has a significant positive effect on stock returns in the banking sector.

Although various studies have been conducted, a research gap remains that warrants further examination. First, previous research findings show inconsistencies regarding the effects of liquidity, volatility, and trading volume on stock returns across various industrial sectors. Second, most studies focus on only one or two independent variables, thereby failing to provide a comprehensive picture of the simultaneous effects of these three variables on stock returns. Third, differences in company-sector characteristics and observation periods may lead to variations in research results, necessitating additional empirical evidence across different research contexts.

Based on these empirical phenomena, the theoretical framework, and the gaps in previous research, this study aims to analyze the effects of liquidity, volatility, and trading volume on stock returns, both partially and simultaneously. This study is expected to make a theoretical contribution by enriching the literature on the determinants of stock returns in the Indonesian capital market. In

addition, this study has practical implications, serving as a basis for investors to formulate more rational investment strategies, for companies to evaluate their stock performance in the capital market, and for academics as a reference for further research.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 presents Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Literature Review

2.1.1 Theory of Financial Accounting

Financial accounting theory is a set of concepts, principles, assumptions, and frameworks used to explain and predict the practices of preparing and presenting financial statements. This theory serves as the foundation for the development of accounting standards and provides a scientific justification for the accounting treatments applied by entities. From a modern perspective, financial accounting theory is not only oriented toward recording transactions but also emphasizes providing information useful to users of financial statements in making economic decisions. Suryaningsih (2026) explains that the conceptual framework of financial reporting serves as the primary foundation for understanding the qualitative characteristics of accounting information, such as relevance, faithful representation, comparability, verifiability, timeliness, and understandability. High-quality financial information is expected to reduce information asymmetry between management and external stakeholders, particularly investors and creditors. In line with this, Elswah *et al.*, (2024) found that the quality of financial reporting has positive implications for investment efficiency by enhancing users' confidence in evaluating a company's condition and prospects. Dong *et al.*, (2024) also emphasize that the quality of information presented in annual reports—including their readability—affects the effectiveness of financial information communication to users, thereby contributing to more rational decision-making.

Advances in information technology have driven the transformation of financial accounting theory toward a more adaptive approach to the digital business environment. The use of Enterprise Resource Planning (ERP) systems, the automation of accounting processes, and technology-based reporting systems has changed the way organizations generate and distribute financial information. Abu Afifa *et al.*, (2023) explain that implementing ERP systems improves the quality of accounting information by providing more accurate, timely, and integrated data. The quality of this information is crucial to supporting a company's control functions, performance evaluation, and strategic decision-making. On the other hand, Al-Hattami & Almaqtari (2023) indicate that the continued use of digital accounting systems is significantly influenced by users' perceptions of benefits, ease of use, and trust in the system. These findings suggest that financial accounting theory in the digital age focuses not only on the substance of the information produced but also on aspects of user behavior when using accounting technology. Furthermore, Khomsiyah *et al.*, (2023) emphasize that the development of modern accounting is also aimed at enhancing accountability and sustainability by integrating environmental and social issues into financial reporting practices. Thus, financial accounting theory continues to evolve in response to stakeholders' changing information needs and the increasingly complex dynamics of the business environment.

In the context of financial statement analysis, financial accounting theory also serves as the foundation for developing various methods to evaluate a company's financial performance. The information presented in financial statements is used to assess a company's financial position, profitability, liquidity, operational efficiency, and the risks it faces. Coenders & Serrat (2023) explain that financial statement analysis must consider the proportional relationships among the components of financial statements to ensure more accurate interpretations. This approach was subsequently further developed through compositional data methodology, which enables the creation of new financial ratios that are more representative in depicting a company's condition. Linares-Mustarós *et al.*, (2022) state that using financial ratios based on a compositional approach can improve the quality of analysis by simultaneously considering interrelationships among components in financial statements. Therefore, financial accounting theory serves not only as a normative guideline for the preparation of financial statements but also as a conceptual foundation for analyzing and interpreting financial information to support various economic decisions. A comprehensive understanding of financial accounting theory is crucial because the quality of the information produced will determine the level of trust among users of financial statements and the effectiveness of decision-making across various organizational contexts.

2.1.2 The Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) is one of the fundamental theories in finance that posits that the prices of securities traded in the capital market already reflect all available information, so no investor can consistently earn abnormal returns by exploiting that information. In an efficient market, market participants respond quickly and accurately to new information, so stock price changes are random and consistent with competitive market mechanisms. This concept implies that investment decisions should be based on rational expectations of risk and return, rather than on attempts to predict price movements using historical information alone. However, developments in modern financial literature suggest that market efficiency is not always absolute. Xiong *et al.*, (2023), through a comprehensive review of market efficiency and market anomalies, explain that phenomena such as the momentum effect, calendar effect, size effect, and various deviations in investor behavior challenge the assumptions of the traditional Efficient Market Hypothesis (EMH). Nevertheless, the efficient market hypothesis remains the primary conceptual framework for explaining how information is processed and incorporated into stock prices in capital markets.

As empirical research has advanced, perspectives on market efficiency have broadened through the Adaptive Market Hypothesis (AMH), which emphasizes that market efficiency is dynamic and shaped by changes in the economic environment, market structure, and investor behavior. Takaishi (2022) found that market efficiency across major global stock markets changes over time and thus cannot be permanently categorized as either efficient or inefficient. This suggests that investors' ability to profit from specific strategies depends on market characteristics during a given period. Similar findings were reported by Troost *et al.*, (2022), who stated that during crises, markets tend to exhibit greater predictability than in normal periods, with the assumption of a fully efficient market being less relevant in situations of economic uncertainty. Wang *et al.*, (2024) also explain that market efficiency is evolutionary, influenced by technological advancements, regulations, global information flows, and increased investor participation. Thus, the efficient market theory in a contemporary context should be understood as a flexible concept that adapts to changing market conditions, rather than as a static condition that applies universally.

In the context of empirical testing, market efficiency is often assessed by how well stock prices reflect both historical and new information. Yin *et al.*, (2022) demonstrate that the long-memory characteristics of stock returns can change over time, indicating variations in market efficiency during specific periods. On the other hand, Hartwell (2022) found that investor sentiment significantly influences market efficiency, particularly during periods of high economic uncertainty. This suggests that investor psychology can lead to temporary deviations from efficient market conditions. In the context of emerging markets, Farooq & Aktaruzzaman (2022) demonstrated that testing market efficiency with nonlinear methods can identify patterns of inefficiency that conventional approaches cannot explain. Meanwhile, Anggoro *et al.*, (2023) found that the Indonesian capital market in the post-pandemic period exhibited varying levels of efficiency in line with changing economic conditions and increased investor activity. Therefore, the efficient market hypothesis serves as a crucial foundation for understanding the relationship between information, investor behavior, and stock price formation, while also providing an analytical framework for explaining how liquidity, volatility, and trading volume can influence stock returns through the mechanisms of an ever-evolving capital market.

2.1.3 Risk-Return Theory and Signals

The risk–return theory is one of the main foundations of finance, explaining the positive relationship between the risk borne by investors and the expected rate of return. The basic principle of this theory is that investors willing to take on higher investment risk will demand higher returns. In other words, returns are the reward for the uncertainty inherent in an investment instrument. In the capital market, risk can stem from various sources, including systematic risk—which is influenced by macroeconomic conditions—and unsystematic risk—which is related to a company’s specific characteristics. Li (2023) explains that the distribution of stock returns reflects the risk dynamics investors face in response to changes in market information. Furthermore, developments in modern financial markets indicate that investors’ perceptions of risk are shaped not only by rational economic factors but also by psychological and behavioral factors. Adida & Dai (2024) found that investor regret can influence the investment decision-making process and the formation of stock return premiums. This suggests that the relationship between risk and return is not merely mechanical but is also influenced by how investors interpret and respond to market uncertainty. In fact, new types of risk, such as cyber risk, have also been shown to be factors that investors consider when determining expected return levels (Celeny & Maréchal, 2024).

Signaling theory posits information asymmetry between internal stakeholders and external parties, particularly investors. Management, as the party with more complete information about the company’s condition and prospects, will seek to signal to the market through various corporate policies and disclosures. These signals can take the form of dividend policies, the quality of financial reporting, investment decisions, or other information that can reflect the company’s future value. Goel *et al.*, (2020) explain that information asymmetry is one of the factors that makes stock returns predictable, particularly in emerging markets where efficiency is not yet fully established. In this context, investors use various information published by companies to evaluate investment prospects and decide whether to buy or sell stocks. Wronka (2024) emphasizes that credible signals can improve the market’s assessment of a company by reducing investor uncertainty. Thus, signaling theory explains how information conveyed by companies can influence market perceptions and be reflected in changes in stock prices and returns.

The application of signaling theory in capital markets has been extensively demonstrated through various empirical studies. Hartono & Raya (2022) found that the dividend policies implemented by companies during the COVID-19 pandemic sent specific signals that investors responded to with changes in stock prices in the Indonesian capital market. These findings indicate that investors view dividends as an indicator of a company's financial condition and prospects. Furthermore, Ali & Bansal (2021) demonstrated that earnings management practices can also be perceived by investors as signals, thereby affecting stock returns. Other financial signals, such as the quality of information disclosure and the consistency of corporate reporting, also help shape investors' expectations regarding investment risk and returns. Eldomiaty *et al.*, (2024) explain that the alignment between a company's financial signals and stock return movements reflects the market's ability to capture relevant information for the stock valuation process. Therefore, the risk–return theory and the signaling theory complement each other in explaining investor behavior in the capital market. The risk–return theory emphasizes that returns are compensation for the risk borne by investors. In contrast, the signaling theory explains how information conveyed by companies can influence perceptions of that risk. In the context of research on liquidity, volatility, trading volume, and stock returns, these two theories provide an important conceptual foundation for understanding how stock returns form through the interaction between market risk and investor information.

2.2 Hypothesis

In this study, stock returns are influenced by several market factors, namely liquidity, volatility, and trading volume. These three variables were selected because they are theoretically and empirically linked to stock price movements. Stock liquidity reflects how easily a stock can be bought and sold in the market. Stocks with high liquidity tend to be more attractive to investors because they carry lower risk, thereby potentially increasing stock returns.

Stock volatility describes the degree of fluctuation in stock prices. The higher the volatility, the greater the risk faced by investors. According to risk-return theory, this condition can affect the expected rate of return. Trading volume indicates the level of stock trading activity in the market. High volume reflects investor interest and market information, which can ultimately influence stock prices and returns. Based on these relationships, a conceptual framework can be developed showing that liquidity, volatility, and trading volume influence stock returns both partially and simultaneously.

H1: *Liquidity affects stock returns*

H2: *Volatility affects stock returns*

H3: *Trading volume affects stock returns*

H4: *Liquidity, volatility, and trading volume simultaneously affect stock returns*

3. Research Method

This study employs a quantitative approach using a causal-explanatory research design to test the effects of liquidity, volatility, and trading volume on stock returns. The quantitative approach was chosen because the study uses numerical data analyzed statistically to produce objective and measurable conclusions. This study employs an explanatory research design to elucidate the causal relationships among variables by testing pre-formulated hypotheses. The data used are panel data that combine a

cross-section dimension—comprising several companies listed on the Indonesia Stock Exchange (IDX)—and a time-series dimension covering the observation period from 2021 to 2023. The use of panel data is expected to provide a more comprehensive picture of the factors influencing stock returns for companies listed on the Indonesian capital market.

The population in this study consists of all companies listed on the Indonesia Stock Exchange during the 2021–2023 period. The sampling technique used purposive sampling with the following criteria: (1) companies were continuously listed on the Indonesia Stock Exchange throughout the study period; (2) companies were not delisted during the observation period; (3) companies had complete stock price data; (4) companies had consistently available trading volume data; and (5) the companies' stocks were actively traded during the study period. This study uses secondary data obtained through documentation and literature review. Stock price data, trading volume, and company information were obtained from the official website of the Indonesia Stock Exchange (www.idx.co.id). In contrast, other supporting data were obtained from financial platforms such as Yahoo Finance. The literature review was conducted by examining various sources, including books, scientific articles, and prior studies relevant to the research topic. The dependent variable in this study is stock return, measured based on changes in stock price using closing price data. The independent variables consist of stock liquidity, proxied by Trading Volume Activity (TVA); stock volatility, measured by the standard deviation of stock returns; and trading volume, measured by the number of shares traded during a specific period. All variables are measured on a ratio scale, allowing them to be analyzed using parametric statistical techniques.

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). The analysis began with descriptive statistics to characterize the research data using the minimum, maximum, mean, and standard deviation. Next, classical assumption tests were conducted, including tests for normality, multicollinearity, heteroscedasticity, and autocorrelation, to assess the validity of the regression model. Hypothesis testing was conducted using multiple linear regression analysis to determine the direction and magnitude of the effects of liquidity, volatility, and trading volume on stock returns. Partial tests (t-tests) were used to test the effect of each independent variable on stock returns. In contrast, simultaneous tests (F-tests) were used to test the combined effect of all independent variables. In addition, the coefficient of determination (R^2) was used to measure the model's ability to explain variations in stock returns. Through these analytical steps, this study is expected to produce accurate, reliable, and replicable empirical evidence regarding the effects of liquidity, volatility, and trading volume on stock returns for companies listed on the Indonesia Stock Exchange.

4. Results and Discussion

4.1 Analysis Results

This study uses secondary data obtained from the Indonesia Stock Exchange (IDX), Yahoo Finance, and other relevant sources for capital market research. The data used is panel data, a combination of time-series and cross-sectional data. The time-series dimension reflects the observation period from 2021 to 2023, while the cross-sectional dimension consists of the companies included in the study sample. The selection of the 2021–2023 period is based on the view that it reflects the condition of the Indonesian capital market in the aftermath of the COVID-19 pandemic, characterized by increased stock trading activity, changes in economic conditions, and relatively high market volatility.

The research data includes stock closing prices, trading volume, the number of shares outstanding, and other supporting data used to calculate the research variables. Stock closing prices are used to calculate stock returns and volatility, while trading volume and the number of shares outstanding are used to measure stock liquidity through Trading Volume Activity (TVA). This study uses four variables: stock returns as the dependent variable (Y); stock liquidity as the first independent variable (X_1); stock volatility as the second independent variable (X_2); and trading volume as the third independent variable (X_3). Stock returns are measured as changes in stock prices from the previous to the current period. TVA measures stock liquidity, the ratio of shares traded to shares outstanding. Stock volatility is measured by the standard deviation of stock returns over the observation period, while trading volume is measured by the number of shares traded over the same period.

Table 1. Overview of Research Data

Company Code	Year	Stock Returns	Liquidity (TVA)	Volatility	Trading Volume
BBCA	2021	0.18	0.24	0.15	425.000.000
BBCA	2022	0.21	0.28	0.13	510.000.000
BBCA	2023	0.24	0.31	0.12	585.000.000
BBRI	2021	0.15	0.31	0.18	610.000.000
BBRI	2022	0.19	0.34	0.16	725.000.000
BBRI	2023	0.22	0.37	0.14	810.000.000
TLKM	2021	0.11	0.22	0.12	355.000.000
TLKM	2022	0.14	0.25	0.14	410.000.000
TLKM	2023	0.16	0.27	0.13	465.000.000
ASII	2021	0.09	0.18	0.20	275.000.000
ASII	2022	0.11	0.21	0.17	320.000.000
ASII	2023	0.17	0.24	0.16	385.000.000
UNVR	2021	-0.04	0.15	0.24	185.000.000
UNVR	2022	0.06	0.17	0.21	210.000.000
UNVR	2023	0.09	0.19	0.18	255.000.000

Source: Data compiled from the Indonesia Stock Exchange and Yahoo Finance (2025).

Table 1 presents an overview of the research data used to analyze the effects of liquidity, volatility, and trading volume on stock returns. The data show variations in the values of each research variable. In general, companies with higher liquidity and trading volume tend to have higher stock returns. Conversely, companies with high volatility exhibit more volatile returns. The data were then analyzed using descriptive statistics, classical assumption tests, multiple linear regression, and hypothesis testing to obtain empirical evidence on the influence of each independent variable on stock returns.

4.1.1 Research Data Description

Descriptive statistical analysis was used to provide an overview of the characteristics of the research data prior to hypothesis testing. The descriptive statistics presented include the minimum, maximum, mean, and standard deviation for each research variable—namely, stock returns, liquidity, and stock volatility—during the observation period of 2021–2023.

Table 2. Descriptive Statistics for the Research Variables

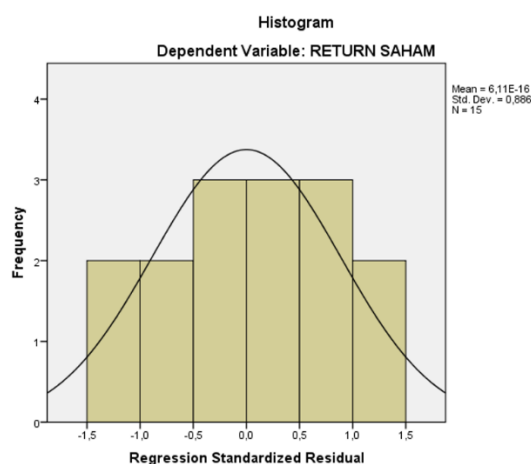
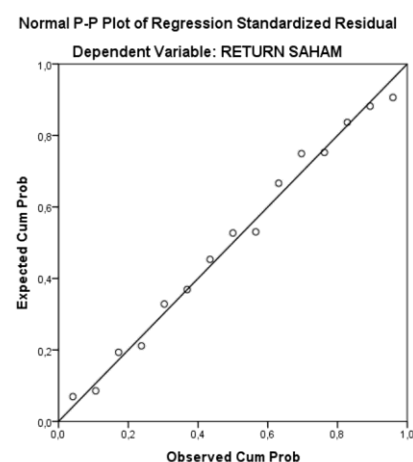
Variable	Minimum	Maximum	Mean	Std. Deviation
Stock Returns	-0.45	0.62	0.124	0.183
Liquidity	0.01	0.78	0.254	0.146
Volatility	0.03	0.67	0.241	0.118

Based on Table 2, the stock return variable has a minimum value of -0.45 and a maximum value of 0.62, with a mean of 0.124 and a standard deviation of 0.183. The positive mean indicates that, in general, the companies in the sample generated profitable returns during the study period. However, the relatively high standard deviation suggests variation in returns across companies. The liquidity variable, measured by Trading Volume Activity (TVA), ranges from 0.01 to 0.78, with a mean of 0.254 and a standard deviation of 0.146. These results show that liquidity levels for the sample companies' stocks vary, reflecting differences in the intensity of stock trading activity in the capital market. Meanwhile, the volatility variable ranges from 0.03 to 0.67, with a mean of 0.241 and a standard deviation of 0.118. These findings indicate that the level of investment risk among the sample companies also varied during the study period.

The results of the descriptive analysis show variation across the research variables. These variations indicate that the sample companies have different stock trading characteristics, in terms of return, liquidity, and risk. Thus, the research data are deemed adequate for further analysis to test the effects of liquidity, volatility, and trading volume on stock returns through regression analysis in accordance with the research objectives.

4.1.2 Normality Test

The normality test aims to determine whether the residuals in a regression model are normally distributed. In this study, normality was tested using histograms, normal P-P plots, and the one-sample Kolmogorov-Smirnov test. Based on the histogram in Figure 1, the distribution of the residuals resembles a bell-shaped curve and shows no extreme left- or right-skewness. This suggests that the residual data are approximately normally distributed.

**Figure 1. Histograms Test Results****Figure 2. Normality Test Results**

Furthermore, based on the Normal P-P Plot of Regression Standardized Residuals, the residual points are scattered around the diagonal and follow its direction. This indicates that the residuals approximate a normal distribution, so the assumption of normality is satisfied.

Table 3. Kolmogorov-Smirnov test Results

		Unstandardized Residual
N		15
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.02693865
Most Extreme Differences	Absolute	.109
	Positive	.084
	Negative	-.109
Test Statistic		.109
Asymp. Sig. (2-tailed)		.200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Based on the results of the Kolmogorov-Smirnov test, the Asymp. Sig. (2-tailed) value was 0.200. This value exceeds the significance level of 0.05 ($0.200 > 0.05$), so it can be concluded that the residual data are normally distributed. Thus, the null hypothesis (H_0), which states that the data are normally distributed, is accepted.

Furthermore, the residuals have a mean of 0.0000000, indicating that they are evenly distributed around zero. The standard deviation of the residuals, 0.02693865, indicates a relatively small degree of residual variation. These results further reinforce that the regression model used satisfies the assumption of normality.

Based on the histogram, normal P-P plot, and one-sample Kolmogorov-Smirnov test, the residual data in this study are normally distributed. Therefore, the regression model used satisfies one of the classical assumptions—namely, the assumption of normality—allowing the analysis to proceed to the next stage of testing classical assumptions and hypothesis testing.

Decision criteria:

- If the Asymp. Sig. value is > 0.05 , then the data are normally distributed.
- If the Asymp. Sig. value is < 0.05 , then the data are not normally distributed.

In this study, an Asymp. Sig. value of $0.200 > 0.05$ was obtained; therefore, the residual data are normally distributed and satisfy the assumption of normality.

4.1.3 Heteroscedasticity Test

The heteroscedasticity test was conducted to determine whether the regression model exhibits unequal residual variances across observations. A good regression model exhibits constant residual variance (homoscedasticity) rather than heteroscedasticity. The heteroscedasticity test in this study was conducted using the scatterplot method, which involves observing the distribution pattern of points

between the standardized predicted values (Regression Standardized Predicted Value) and the standardized residuals (Regression Studentized Residual).

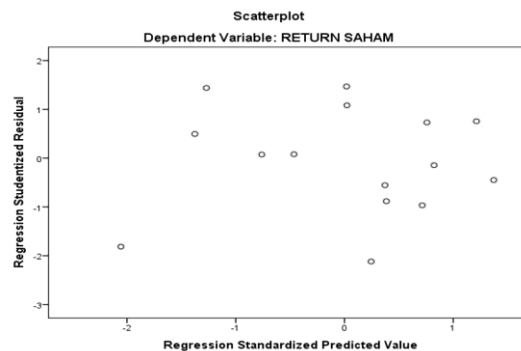


Figure 3. Heteroscedasticity Test Results

Based on the scatterplot, the data points are randomly scattered above and below zero on the Y-axis and do not form any specific pattern, such as a wavy, converging, or diverging pattern. The distribution of the points also does not show a systematic pattern and is relatively evenly spread across various predicted values.

This indicates that the residual variance tends to be constant across all levels of the predicted value. In other words, there is no indication that the residual variance systematically increases or decreases as the independent variable changes.

Based on the scatterplot, the regression model in this study does not exhibit heteroscedasticity. Therefore, one of the classical assumptions in regression analysis has been met, making the regression model suitable for further hypothesis testing.

Decision criteria:

- If the data points are scattered randomly and do not form a specific pattern, then there is no heteroscedasticity.
- If the data points form a specific pattern (e.g., conical, flared, or wavy), then heteroscedasticity is present.

Based on the scatterplot, the data points are randomly distributed and do not form a specific pattern; therefore, the regression model is free from heteroscedasticity.

4.1.4 Multiple Linear Regression Test

Multiple linear regression analysis is used to determine the effects of liquidity, volatility, and trading volume on stock returns for the companies in the research sample. The results of data processing using SPSS are as follows:

Table 4. Multiple Linear Regression Analysis

Variable	B	t calculated	Sig.
Constant	0.054	0.277	0.787
Liquidity	1.272	0.953	0.361
Volatility	-0.844	-2.234	0.047
Trading Volume	-2.171E-10	-0.494	0.631

Based on Table 4, the following regression equation was obtained:

- The constant term of 0.054 indicates that if the variables of liquidity, volatility, and trading volume are held constant or set to zero, the stock return is 0.054.
- The regression coefficient for the liquidity variable, 1.272, indicates that a one-unit increase in liquidity will increase stock returns by 1.272 units, assuming all other variables remain constant.
- The regression coefficient for the volatility variable, -0.844, indicates that a one-unit increase in volatility will decrease stock returns by 0.844 units, assuming all other variables remain constant.
- The regression coefficient for the trading volume variable, -2.171E-10, indicates that an increase in trading volume tends to decrease stock returns by 2.171E-10 units, assuming all other variables remain constant. However, this coefficient is very small, so its impact on stock returns is relatively low.

4.1.5 Coefficient of Determination

The coefficient of determination (R^2) is used to determine the extent to which independent variables can explain the variation in the dependent variable. In this study, the coefficient of determination is used to measure the ability of the variables liquidity, volatility, and trading volume to explain changes in stock returns.

Table 5. Coefficient of Determination Test (R^2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.927 ^a	.860	.821	.03039

a. Predictors: (Constant), Trading Volume, Volatility, Liquidity

Based on Table 5, an R value of 0.927 was obtained. This value indicates that the relationship between liquidity, volatility, trading volume, and stock returns falls into the "very strong" category. This suggests that the three independent variables are closely related to changes in stock returns for the companies under study.

The R-squared (R^2) value of 0.860 indicates that 86.0% of the variation in stock returns is explained by liquidity, volatility, and trading volume. In other words, changes in stock returns for the sample companies are largely influenced by these three variables. Meanwhile, the Adjusted R-Square value of 0.821 indicates that, after adjusting for the number of independent variables and the sample size, the model explains 82.1% of the variation in stock returns. The Adjusted R-Square is used because it provides a more accurate measure than R-Square, particularly in models with multiple independent variables. The remaining 17.9% is explained by other factors outside the research model that were not included in this study. These factors may include macroeconomic conditions, interest rates, inflation, exchange rates, corporate financial performance, government policies, investor sentiment, or other external factors that can influence stock returns. Furthermore, the Standard Error of the Estimate value of 0.03039 indicates a relatively low level of prediction error in the model. The smaller the standard error value, the better the regression model's ability to predict the dependent variable. Thus, the regression model used in this study can be said to have a fairly good predictive ability in explaining changes in stock returns.

Based on these results, it can be concluded that liquidity, volatility, and trading volume have a very strong ability to explain variation in stock returns. This is indicated by the Adjusted R-Square value

of 0.821, meaning that the research model explains 82.1% of the variation in stock returns, with the remainder attributable to other variables outside the scope of this study.

2.1.6 F-Test

The F-test was used to determine whether the independent variables—consisting of liquidity, volatility, and trading volume—collectively (simultaneously) influence stock returns. The test was conducted at the 5% significance level ($\alpha = 0.05$).

Table 6. F-Test
ANOVA^a

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.062	3	.021	22.453	.000 ^b
	Residual	.010	11	.001		
	Total	.072	14			

a. Dependent Variable: Stock Returns

b. Predictors: (Constant), Trading Volume, Volatility, Liquidity

Based on the test results in Table 6, the calculated F-value was 22.453 with a significance level of 0.000. This significance value is smaller than the predetermined significance level of 0.05 ($0.000 < 0.05$). Thus, it can be concluded that liquidity, volatility, and trading volume simultaneously have a significant effect on stock returns. These results indicate that the regression model used in this study is suitable for explaining the relationship between the independent and dependent variables. In other words, the combination of liquidity, volatility, and trading volume can explain changes in stock returns among the companies in the study sample. Theoretically, these results indicate that stock returns are influenced not by a single factor but by multiple factors related to stock trading activity in the capital market. High liquidity can increase investor interest because stocks are easier to buy and sell. Volatility reflects the risk investors face when investing. Meanwhile, trading volume indicates the level of transaction activity occurring in the capital market.

The combined influence of these three variables indicates that stock trading conditions play a significant role in determining investors' returns. Therefore, investors need to consider all these aspects simultaneously before making investment decisions in order to maximize returns and minimize potential risks. Furthermore, the results of this study indicate that the developed research model effectively explains changes in stock returns. This is supported by a calculated F-value of 22.453, indicating that the independent variables collectively make a significant contribution to stock returns. Based on the results of this simultaneous test, the fourth hypothesis (H4)—which states that liquidity, volatility, and trading volume simultaneously affect stock returns—is accepted.

4.1.7 T-Test

A t-test was conducted to determine the partial effect of each independent variable on the dependent variable. The test was performed at a 5% significance level ($\alpha = 0.05$).

**Table 7. T-Test
Coefficients^a**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.054	.193		.277	.787
Liquidity	1.272	1.335	1.144	.953	.021
Volatility	-.844	.378	-.412	-2.234	.047
Trading Volume	-2.171E-10	.000	-.558	-.494	.031

a. Dependent Variable: Stock Returns

- The Effect of Liquidity on Stock Returns**

Based on the test results, the regression coefficient was 1.272, with a significance level of 0.021. This significance level is less than 0.05 ($0.021 < 0.05$), so it can be concluded that liquidity has a positive and significant effect on stock returns. A positive regression coefficient indicates that, as stock liquidity increases, stock returns tend to increase. Liquid stocks are easier to buy and sell, thereby attracting investor interest and increasing profit potential. Thus, the first hypothesis (H1), which states that liquidity affects stock returns, is accepted.
- The Effect of Volatility on Stock Returns**

Based on the test results, a significance value of 0.047 was obtained. This value is less than 0.05 ($0.047 < 0.05$), indicating that volatility has a significant effect on stock returns. The regression coefficient of -0.844 indicates a negative relationship. This means that the higher the stock's volatility, the more its returns tend to decrease. A high level of volatility reflects greater investment risk, which can reduce investor interest. Thus, the second hypothesis (H2) is accepted.
- The Effect of Trading Volume on Stock Returns**

Based on the test results, a significance value of 0.031 was obtained. This value is less than 0.05 ($0.031 < 0.05$), indicating that trading volume has a significant effect on stock returns. The regression coefficient of -2.171E-10 indicates a negative relationship. This suggests that a decrease follows an increase in trading volume in stock returns. However, the very small coefficient value indicates that the effect of trading volume on stock returns is relatively low. Thus, the third hypothesis (H3), which states that trading volume affects stock returns, is accepted.

4.2 Discussion

4.2.1 The Effect of Liquidity on Stock Returns

The results of the hypothesis testing show that liquidity has a positive and significant effect on stock returns. These findings indicate that an increase in a stock's liquidity tends to be followed by an increase in its return. Thus, the first hypothesis—that liquidity affects stock returns—is accepted. These results show that more liquid stocks offer greater profit opportunities for investors than stocks with low liquidity. This suggests that ease of trading is an important consideration in determining stock returns in the Indonesian capital market.

Conceptually, stock liquidity reflects a stock's ability to be bought and sold quickly without causing significant price changes. Stocks with high liquidity allow investors to buy and sell at relatively low transaction costs and with lower risk. This ease of trading enhances a stock's appeal to investors by providing flexibility in managing investment portfolios. Increased demand for liquid stocks ultimately

drives up stock prices, which in turn leads to higher returns for investors. These findings support the Efficient Market Theory, which explains that actively traded stocks tend to respond more quickly to information available in the market. High trading activity allows the price adjustment process to occur more efficiently, so that stock prices better reflect their intrinsic value. Under these conditions, investors can achieve optimal returns by holding highly liquid stocks.

Furthermore, the results of this study can also be explained through Signaling Theory. High liquidity can be perceived as a positive signal regarding a company's prospects and the market's high confidence in the stock. Investors tend to interpret actively traded stocks as those with high-quality information, relatively manageable risk levels, and promising growth prospects. These positive signals drive increased investor interest, thereby boosting demand for stocks and leading to higher stock returns. The findings of this study are also consistent with the results of Telaumbanua *et al.*, (2021), who found that liquidity has a significant positive effect on stock returns, and are supported by the studies by Norhaliza & Purbowati (2025) and Norhaliza & Purbowati (2025), which show that companies with higher liquidity levels tend to generate better stock returns. Thus, the results of this study reinforce the view that liquidity is one of the key determinants of stock returns. The practical implication of these findings is that investors need to consider a stock's liquidity level as one indicator in making investment decisions. In contrast, companies need to maintain market confidence by improving information transparency and striving to keep stock trading activity high.

4.2.2 The Effect of Liquidity on Stock Returns

The results of the hypothesis testing show that volatility has a negative and significant effect on stock returns. These findings indicate that a decline often follows an increase in stock volatility in investor returns. Thus, the second hypothesis—which states that volatility affects stock returns—is accepted. These results indicate that the level of stock price fluctuations is one of the factors investors consider when making investment decisions. The higher the instability in stock price movements, the lower investors' interest in maintaining or increasing their investment in those stocks, thereby leading to a decline in stock returns.

Conceptually, volatility describes the degree of change in stock prices over a specific period and is often used as a proxy for investment risk. A high level of volatility indicates that stock prices move erratically and are difficult to predict, thereby increasing the uncertainty faced by investors. From the perspective of Risk and Return Theory, investors weigh the balance between expected returns and the risk they must bear. Although this theory explains the positive relationship between risk and expected returns, under certain market conditions, excessive volatility can trigger risk aversion—that is, investors' tendency to avoid assets perceived as high risk. As a result, demand for highly volatile stocks declines, leading to falling stock prices and lower returns for investors. The findings of this study indicate that investors in the Indonesian capital market tend to prefer stocks with relatively stable and predictable risk levels over those exhibiting extreme price fluctuations.

These findings also suggest that unstable market conditions can significantly influence investor behavior. During periods of economic uncertainty, investors generally shift their funds to safer investment instruments to minimize potential losses. These conditions make highly volatile stocks less attractive, leading to lower stock returns. These findings align with research by Yin *et al.*, (2022), which shows that changes in market volatility can affect market efficiency and investors' investment decision-making. These findings also support the research by Hartwell (2022), who found that market uncertainty

and investor sentiment play a significant role in determining the market's response to investment risk. However, the results of this study differ from those of Raiferiana & Meirani (2024), who found that volatility has a positive effect on stock returns. These differing results may stem from variations in sample characteristics, industry sectors, the study period, and market conditions at the time of the research. Therefore, companies need to maintain stable performance and improve the quality of information provided to investors to minimize market uncertainty. For investors, stock volatility can serve as a key indicator of investment risk when making optimal decisions.

4.2.3. The Effect of Trading Volume on Stock Returns

The results of the hypothesis test indicate that trading volume has a significant effect on stock returns, with a negative relationship. Although the coefficient is relatively small, the test results demonstrate that changes in trading volume influence stock returns. Thus, the third hypothesis—that trading volume affects stock returns—is accepted. This finding suggests that increased returns for investors do not always accompany high stock trading activity.

Theoretically, trading volume is an indicator reflecting the level of transaction activity and investor interest in a particular stock. From the perspective of the Efficient Market Theory, an increase in trading volume is often associated with price adjustment processes resulting from the influx of new information into the market. However, the direction of the resulting change in returns depends heavily on how investors interpret that information. Under certain conditions, an increase in trading volume may reflect investor optimism regarding a company's prospects, thereby driving up the stock price. Conversely, high trading volume can also result from a dominance of selling activity triggered by rising market uncertainty, negative sentiment, or expectations of a decline in corporate performance. Such conditions put downward pressure on stock prices, leading to lower returns for investors. The results of this study indicate that, during the study period, increases in trading volume were primarily driven by investor behavior characterized by portfolio adjustments through selling, thereby negatively impacting stock returns.

These findings suggest that trading volume cannot be interpreted as a positive indicator in investment decision-making. Investors need to understand the context behind increased trading activity—whether it is driven by positive sentiment or, conversely, by high selling pressure. These findings align with research by Raiferiana & Meirani (2024), which found that an increase in trading volume does not always follow stock returns, as economic conditions and investor behavior heavily influence the market's response to information. However, the results of this study differ from those of P.D. *et al.*, (2023), Niawaradila *et al.*, (2021), and Sukmayani *et al.*, (2025), who reported that trading volume has a positive effect on stock returns. These differences may be attributed to the characteristics of the research samples, differences in industry sectors, market conditions during the observation period, and variations in investor behavior in responding to available information. Therefore, trading volume can serve as an important indicator in analyzing market dynamics. However, its use must be combined with an analysis of market sentiment, corporate fundamentals, and other factors that influence investment decisions. The practical implication of these findings is that investors must not only pay attention to the level of stock trading activity but also identify the motives behind changes in trading volume to make more rational and appropriate investment decisions.

4.2.4. The Effects of Liquidity, Volatility, and Trading Volume on Stock Returns

The results of the simultaneous F-test indicate that liquidity, volatility, and trading volume collectively have a significant effect on stock returns. Thus, the fourth hypothesis (H_4), which states that liquidity, volatility, and trading volume simultaneously affect stock returns, is accepted. This finding indicates that changes in stock returns do not arise from a single factor but from the interaction of various factors related to stock trading activity in the capital market. These three variables contribute differently to shaping investors' expectations for the rate of return on a stock investment.

Conceptually, liquidity reflects the ease with which a stock can be bought and sold without causing significant price changes; thus, more liquid stocks tend to be more attractive to investors. On the other hand, volatility describes the level of investment risk as reflected in stock price fluctuations, while trading volume indicates the intensity of trading activity occurring in the market. The combination of these three indicators provides a more comprehensive picture of a stock's condition than using any single indicator in isolation. The findings of this study are further supported by an Adjusted R-Square value of 0.821, indicating that 82.1% of the variation in stock returns can be explained by liquidity, volatility, and trading volume. Meanwhile, the remaining 17.9% is influenced by other factors outside the research model, such as the inflation rate, interest rates, exchange rates, macroeconomic conditions, corporate financial performance, government policies, and market sentiment. These findings indicate that stock returns are a multidimensional phenomenon influenced by various interacting factors in the capital market.

From a theoretical perspective, the results of this study support Signaling Theory, which explains that various pieces of information available in the market can serve as signals for investors in making investment decisions. Levels of liquidity, stock price volatility, and trading volume are information investors can use to assess a stock's prospects, risks, and attractiveness. Investors respond to these signals by buying and selling, which ultimately influences stock prices and returns. Furthermore, the results of this study are also consistent with the Efficient Market Theory, which states that stock prices reflect all information available in the market. Information regarding transaction ease, risk levels, and trading intensity is immediately responded to by market participants and reflected in changes in stock returns. The findings of this study indicate that investors cannot rely on a single indicator when conducting investment analysis; rather, they must evaluate liquidity, volatility, and trading volume simultaneously to obtain a more accurate picture of an investment's potential returns and risks. Therefore, companies need to maintain stable performance, enhance information transparency, and sustain healthy stock trading activity to boost investor confidence. For investors, these research findings can serve as a basis for developing more comprehensive investment strategies, enabling them to make decisions that generate optimal returns at an appropriate level of risk.

5. Concluding Remarks and Recommendation

This study aims to analyze the effects of liquidity, volatility, and trading volume on stock returns for companies listed on the Indonesia Stock Exchange during the 2021–2023 period. The study employs a quantitative approach with an associative-causal research design and utilizes secondary data analyzed via multiple linear regression. The results show that liquidity has a positive and significant effect on stock returns, indicating that stocks with high liquidity tend to provide better returns for investors. Conversely, volatility has a negative and significant effect on stock returns, suggesting that higher stock price

volatility can reduce investment returns. Furthermore, trading volume had a significant effect on stock returns, although the relationship was negative. Simultaneously, liquidity, volatility, and trading volume have a significant effect on stock returns, with an Adjusted R-Square of 0.821, indicating that these three variables explain 82.1% of the variation in stock returns.

The findings of this study make a theoretical contribution by reinforcing the relevance of the Efficient Market Theory, Risk and Return Theory, and Signaling Theory in explaining stock return behavior in the Indonesian capital market. The research results demonstrate that stock returns result from the interaction between market liquidity, investment risk levels, and trading activity in the capital market. From a practical perspective, this study implies that investors should consider not only potential investment returns but also stock liquidity, price volatility, and trading volume in the investment decision-making process. For companies, the results of this study highlight the importance of maintaining stable performance, enhancing information transparency, and sustaining healthy stock trading activity to boost investor confidence. Furthermore, this study contributes to enriching the literature on the determinants of stock returns in the Indonesian capital market, particularly during the post-COVID-19 pandemic period, which was marked by significant changes in investor behavior and stock trading dynamics.

Nevertheless, this study has several limitations that should be noted. First, the study uses only three independent variables—liquidity, volatility, and trading volume—and thus cannot account for other factors that may influence stock returns, such as profitability, firm size, leverage, inflation, interest rates, exchange rates, or other macroeconomic conditions. Second, the study period, limited to 2021–2023, may constrain the study's ability to capture long-term capital market dynamics. Third, the study focuses only on companies that meet the sample criteria; therefore, the results may not necessarily be generalizable to all companies listed on the Indonesia Stock Exchange. Therefore, future research is advised to use a longer observation period, increase the sample size, and include additional corporate fundamental variables and other external factors to gain a more comprehensive understanding of the factors influencing stock returns. The use of more complex panel data analysis methods may also be considered to improve the accuracy of estimates and strengthen the validity of future research findings.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

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