



The Influence of Global Oil Price Volatility and Exchange Rates on Stock Returns in the Energy Sector in Indonesia

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ABSTRACT

Global economic uncertainty caused by geopolitical tensions and fluctuations in commodity prices has increased risks in emerging capital markets, including Indonesia. This study examines the effect of global oil price volatility and rupiah exchange rate fluctuations on the stock returns of energy sector companies listed on the Indonesia Stock Exchange (IDX). Using a quantitative approach and multiple linear regression analysis, the research analyzes energy sector issuers during the 2021–2025 period. The results show that oil price volatility and the rupiah exchange rate do not significantly affect stock returns, either partially or simultaneously. The model also demonstrates a low explanatory power, indicating that stock return movements are influenced more by internal company fundamentals and domestic energy policies than by external macroeconomic variables. These findings suggest that the Indonesian energy sector is relatively resilient to global economic shocks. Therefore, investors should focus more on firm-level performance and financial conditions when making investment decisions in the energy sector

INTRODUCTION

Current global economic conditions are characterized by a high degree of uncertainty, largely driven by turbulence in energy commodity markets. Global oil price movements are no longer determined solely by traditional supply and demand mechanisms, but are also shaped by extraordinary factors such as global health crises and geopolitical conflicts that disrupt international supply chains (Al-Awadhi et al., 2020). Such instability generates systemic risks that contribute directly to fluctuations in capital markets around the world, considering that oil remains a crucial input in the global production and industrial system (Khan et al., 2025).

Within capital market theory, changes in financial asset prices can be explained through the concept of market efficiency, where information related to global commodity prices is quickly reflected in market valuations by investors and other market participants (Fama, 1970). In the energy industry, variations in global oil prices have a close relationship with expectations of company profitability because these fluctuations directly affect issuers' revenue and profit margins (Purwani & Santoso, 2023). This phenomenon is also consistent with the Capital Asset Pricing Model (CAPM), which states that systematic risks arising from external economic factors should be compensated through expected stock returns (Sharpe, 1964)

Indonesia demonstrates a comparable sensitivity to global economic developments. Data from the Ministry of Energy and Mineral Resources (2024) indicate that the Indonesian Crude Price (ICP) continues to experience fluctuations as a result of rising global demand and international production policies. Although the government has sought to strengthen domestic energy resilience, the Indonesian energy sector remains highly exposed to international market conditions, causing energy-related stocks listed on the Indonesia Stock Exchange (IDX) to be vulnerable to commodity price shocks (Rheynaldi et al., 2023).

In addition to oil prices, the exchange rate represents another important macroeconomic factor influencing the performance of the domestic stock market (Agung & Galuh, 2025). Movements in the rupiah against the US dollar frequently create additional pressure on the operational expenses of energy companies, particularly for firms that rely heavily on foreign currency transactions in their cost structures (Farid et al., 2024). The combined effect of rupiah depreciation and volatile oil prices tends to weaken investor confidence, which subsequently reduces sectoral stock returns in the capital market (Martalena et al., 2023). Moreover, exchange rate volatility not only reflects domestic economic fundamentals but also mirrors market reactions toward tight global monetary policies and external economic uncertainty (Wijaya & Priana, 2023).

From a theoretical perspective, the linkage between macroeconomic indicators and stock market performance can be understood through the transmission channels of inflation and interest rates. Increases in global oil prices generally trigger inflationary pressures, prompting policymakers to adjust exchange rates and interest rates in order to preserve macroeconomic stability

(Nishandini et al., 2026). Previous empirical evidence suggests that these external macroeconomic variables jointly contribute to explaining fluctuations in sectoral stock indices in Indonesia (Laksono & Bustaman, 2024). Nevertheless, prior studies still present inconsistent conclusions regarding whether internal corporate conditions or external macroeconomic variables exert a stronger long-term influence on stock performance (Almadi & Herusetya, 2025).

Despite the growing body of literature on macroeconomic determinants of capital market performance, there remains a significant research gap concerning the energy sector during the period of heightened uncertainty following the pandemic and the escalation of geopolitical tensions in 2024–2025. Earlier studies have largely concentrated on the Jakarta Composite Index (JCI) as a whole, with limited attention devoted specifically to the energy sector, which possesses distinct risk characteristics and sensitivity to commodity market fluctuations (Wahyudi, 2025). Consequently, this study is important because it provides a deeper understanding for investors in managing portfolio risks amid increasing uncertainty in commodity prices and exchange rates.

Based on these considerations, this research aims to examine the impact of global oil price volatility and fluctuations in the rupiah exchange rate on the stock returns of energy sector companies listed on the Indonesia Stock Exchange. More specifically, the study investigates how shocks originating from these two external variables are transmitted into the stock price movements of energy firms. The proposed hypotheses state that global oil price volatility has a significant positive effect on energy sector stock returns, whereas depreciation in the rupiah exchange rate has a significant negative influence on the performance of energy sector shares in the Indonesian capital market.

LITERATURE REVIEW

Market Efficiency Theory and CAPM

The theoretical foundation underlying the relationship between macroeconomic variables and stock prices is closely associated with the Efficient Market Hypothesis (EMH). According to Fama (1970), in an efficient capital market, stock prices fully and rapidly incorporate all available information, including information related to global commodity price movements and monetary policy changes. Consequently, fluctuations in global oil prices and exchange rates are interpreted by market participants as new information that may alter firms' intrinsic values, thereby triggering adjustments in stock prices (Yaqub, 2024).

Furthermore, the Capital Asset Pricing Model (CAPM) introduced by Sharpe (1964) posits that the expected return of an asset is determined by systematic risk, namely risk that cannot be eliminated through portfolio diversification. Within the energy sector, volatility in oil prices and exchange rate movements constitutes a major source of systematic risk that shapes investor expectations regarding future returns. In this framework, investors tend to require higher expected returns as compensation for the increasing level of macroeconomic uncertainty and market risk arising from these external factors (Chauhan et al., 2025).

The Effect of Global Oil Price Volatility on Stock Returns

The relationship between global oil prices and capital market performance is characterized by a complex and multidimensional interaction. According to Purwani & Santoso (2023), increases in energy commodity prices are generally interpreted as positive signals for the energy sector because they contribute to higher corporate revenues and profitability, which subsequently encourage stock price appreciation. Nevertheless, excessive fluctuations in oil prices may also generate operational and financial uncertainty for firms operating within the sector. Khan et al. (2025) further argue that commodity price volatility constitutes an important factor in sustainable economic development, as it significantly affects investor confidence and investment decisions related to energy-based assets.

Empirical evidence in Indonesia indicates that shocks in international crude oil prices directly influence the returns of energy sector indices (Rheynaldi et al., 2023). The magnitude of this impact becomes more pronounced during periods of economic and global crises, such as the COVID-19 pandemic, when heightened uncertainty contributes to unpredictable movements in stock prices and increased market volatility (Zhang et al., 2022). Consequently, fluctuations in global oil prices are widely regarded as one of the primary determinants of the performance of energy sector stocks listed on the Indonesia Stock Exchange (Wahyudi, 2025).

The Effect of Exchange Rates on Stock Returns

The rupiah exchange rate against the US dollar represents a significant macroeconomic indicator that affects both the competitiveness and financial burden of companies in the energy sector. Depreciation of the rupiah generally increases the costs associated with imported raw materials, machinery, and operational equipment, while simultaneously raising the burden of foreign currency-denominated debt held by energy firms (Martalena et al., 2023). As a result, exchange rate depreciation is often associated with lower stock returns, since investors tend to reduce their holdings in sectors that are highly dependent on imported inputs when the domestic currency weakens (Wijaya & Priana, 2023).

In addition, the relationship between exchange rates and stock market performance is closely linked to market liquidity conditions and expectations regarding domestic economic growth. (Farid et al., 2024) demonstrate that the exchange rate functions as an intermediary variable connecting oil price dynamics with movements in the Jakarta Composite Index (JCI). Persistent instability in the exchange rate may increase perceived risk among foreign investors, thereby encouraging capital outflows and exerting downward pressure on the returns of energy sector stocks (Laksono & Bustaman, 2024).

Synthesis of Previous Research and Hypothesis Development

Based on the theoretical framework and the findings of prior empirical studies, it can be inferred that macroeconomic variables exhibit a distinct relationship with capital market performance, although the magnitude and direction of their influence may differ depending on market conditions and the specific observation period. Existing literature suggests that fluctuations in global oil prices and exchange rates play an important role in shaping investor

behavior and determining stock return movements, particularly within the energy sector, which is highly sensitive to external economic shocks. However, previous studies also reveal inconsistent findings regarding the significance and intensity of these effects, thereby indicating the need for further empirical investigation.

Referring to the conceptual framework developed in this study, the research hypotheses are formulated as follows:

- H1: Global oil price volatility has a positive effect on the stock returns of energy sector companies listed on the Indonesia Stock Exchange.
- H2: Fluctuations in the rupiah exchange rate, particularly depreciation against the US dollar, have a negative effect on the stock returns of energy sector companies listed on the Indonesia Stock Exchange.
- H3: Global oil price volatility and fluctuations in the rupiah exchange rate simultaneously affect the stock returns of energy sector companies listed on the Indonesia Stock Exchange.

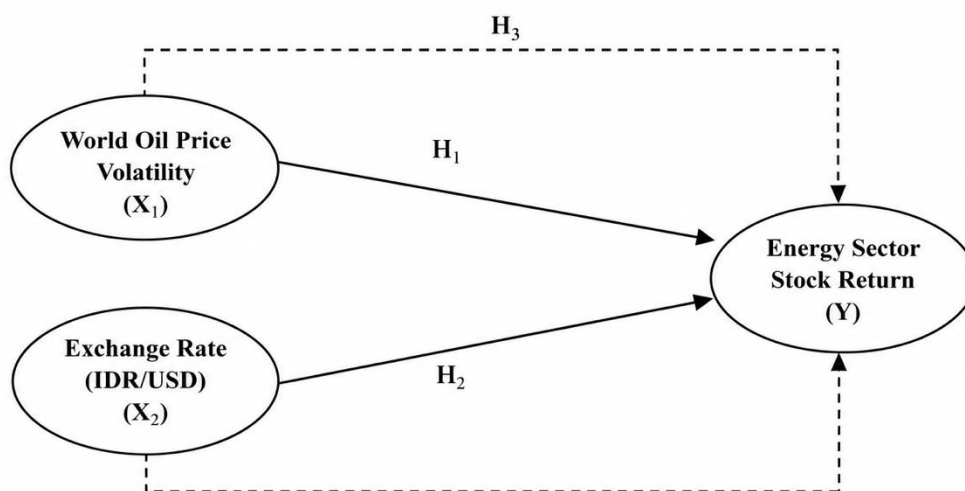


Figure 1. Conceptual Framework

Notes:

H₁ : World oil price volatility has an effect on energy sector stock return.

H₂ : Exchange rate (IDR/USD) has an effect on energy sector stock return.

H₃ : World oil price volatility and exchange rate (IDR/USD) simultaneously affect energy sector stock return.

Figure 1. Conceptual Framework

METHODOLOGY

Research Design

This study employed a quantitative research approach with an explanatory research design. The explanatory approach was selected because the study aims to examine the causal relationship between global oil price volatility, rupiah exchange rate fluctuations, and stock returns in the Indonesian energy sector. The analysis was conducted using multiple linear regression to measure the effect of independent variables on the dependent variable.

Population and Sample

The population of this study consisted of all energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2025 period. The sample was determined using a purposive sampling technique based on several criteria:

1. Energy sector companies consistently listed on the IDX during the observation period.
2. Companies with complete financial and stock price data during the research period.
3. Companies actively traded throughout the observation period.

Based on these criteria, the final sample included energy sector issuers that met the data availability requirements for analysis.

Table 1. List of Energy Sector Companies Selected as Research Samples

No	Stock Code	Company Name
1	ADRO	Adaro Energy Indonesia Tbk
2	AKRA	AKR Corporindo Tbk
3	ANTM	Aneka Tambang Tbk
4	ELSA	Elnusa Tbk
5	ENRG	Energi Mega Persada Tbk
6	ESSA	ESSA Industries Indonesia Tbk
7	HRUM	Harum Energy Tbk
8	INDY	Indika Energy Tbk
9	ITMG	Indo Tambangraya Megah Tbk
10	MEDC	Medco Energi Internasional Tbk
11	PGAS	Perusahaan Gas Negara Tbk
12	PTBA	Bukit Asam Tbk
13	TINS	Timah Tbk
14	TOBA	TBS Energi Utama Tbk

Data Sources and Data Collection

This study utilized secondary data obtained from official and publicly accessible sources. Stock price data of energy sector companies were collected from the Indonesia Stock Exchange (IDX) and financial market databases. Data on global oil prices were obtained from international energy market reports, while rupiah exchange rate data against the US dollar were sourced from Bank Indonesia and related financial publications.

Data collection was conducted using documentation techniques by recording monthly historical data for the 2021–2025 period.

Operational Definition of Variables

Table 2. Operational Definition and Measurement of Research Variables

Variable	Definition	Measurement
Stock Returns (Y)	The level of return generated from energy sector stocks during a certain period	$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$

Global Price Volatility (X1)	Oil Fluctuations in global crude oil prices during the observation period	Percentage changes in the global oil prices
Rupiah Exchange Rate (X2)	The exchange rate of the Indonesian rupiah against the US dollar	Average exchange rate during the observation period

Data Analysis Technique

The data analysis process consisted of several stages:

1. Descriptive Statistical Analysis to describe the characteristics of the research variables.
2. Classical Assumption Tests, including:
 - Normality test using the Shapiro–Wilk test,
 - Multicollinearity test using Variance Inflation Factor (VIF),
 - Heteroscedasticity test using the Breusch–Pagan test.
3. Multiple Linear Regression Analysis to examine the effect of global oil price volatility and exchange rate fluctuations on stock returns.
4. Hypothesis Testing, including:
 - t-test to evaluate the partial effect of each independent variable,
 - F-test to evaluate the simultaneous effect of all independent variables,
 - Coefficient of determination (R^2) to measure the explanatory power of the regression model.

The statistical analysis was conducted using EViews 12 software with a significance level of 5% ($\alpha = 0.05$).

Regression Model

The regression model used in this study is formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where:

- (Y) = Energy sector stock returns
- (α) = Constant
- (β_1, β_2) = Regression coefficients
- (X_1) = Global oil price volatility
- (X_2) = Rupiah exchange rate against the US dollar
- (ε) = Error term

RESEARCH RESULT

Descriptive Statistics

Descriptive statistics show that the energy sector's stock returns averaged 0.0188 with a standard deviation of 0.0762. Global oil price volatility averaged 0.0583 with a standard deviation of 0.0371. The rupiah exchange rate averaged 15,420.07 with a standard deviation of 813.17. These data exhibit reasonable variation for regression testing.

Table 3. Descriptive Statistics

Variables	Mean	Std. Dev	Min	Max
Energy sector stock returns	0.0188	0.0762	-0.1635	0.2242
Volatility of world oil prices	0.0583	0.0371	0.0064	0.1792
Rupiah exchange rate	15420,07	813,17	14199	16787

Classical Assumption Test

The Shapiro-Wilk normality test yielded a significance level of 0.644, indicating a normally distributed residual distribution. The multicollinearity test showed a VIF of 3.36 for each independent variable, indicating no serious multicollinearity. The Breusch-Pagan heteroscedasticity test yielded a significance level of 0.943, indicating the model was free from heteroscedasticity.

Table 4. Results of the Classical Assumption Test

Test	Results	Decision
Normality (Shapiro-Wilk)	p = 0.644	Normally distributed
Multicollinearity (VIF)	3.36 and 3.36	There is no multicollinearity
Heteroscedasticity (Breusch-Pagan)	p = 0.943	There is no heteroscedasticity

Regression Results

The results of the multiple linear regression analysis show that the model equation is $Y = 0.0421 + 0.1902X_1 - 0.000002X_2$. The coefficient of world oil price volatility is positive, while the coefficient of exchange rate is very small negative. Statistically, both independent variables are not significant.

Table 5. Multiple Linear Regression Results

Variables	Coefficient	t count	Sig.
Constant	0.0421	0.207	0.837
Volatility of world oil prices	0.1902	0.672	0.504
Rupiah exchange rate	-0.000002	-0.173	0.863

Hypothesis Test Results

The t-test shows that global oil price volatility has a significance level of 0.504 and the rupiah exchange rate has a significance level of 0.863. Both values are greater than 0.05, indicating that each variable has no significant effect on energy sector stock returns. The F-test yields a value of 0.282 with a significance level of 0.755, indicating that the model is simultaneously insignificant. The R^2 value of 0.0102 indicates that the model can only explain 1.02 percent of the variation in stock returns.

Table 6. Hypothesis Test Results

Test	Mark	Decision
Oil volatility t-test	$p = 0.504$	Not significant
Rupiah exchange rate t-test	$p = 0.863$	Not significant
F test	$F = 0.282; p = 0.755$	The model is not significant
Coefficient of determination (R^2)	0.0102	Low apparent power
Adjusted R^2	-0.0258	The model is not strong yet

DISCUSSION

The interpretation of the statistical findings concerning the effects of global oil price volatility and the rupiah exchange rate on stock returns in Indonesia's energy sector reveals a complex interaction between macroeconomic indicators and capital market performance. The results of the multiple linear regression analysis show that global oil price volatility has a positive regression coefficient (0.1902), whereas the rupiah exchange rate exhibits a negative coefficient (-0.000002). Although the directions of these relationships are consistent with theoretical expectations, the results of the partial t-test indicate that neither variable has a statistically significant influence on energy sector stock returns listed on the Indonesia Stock Exchange (IDX).

The insignificant impact of global oil price volatility on energy sector stock returns ($p = 0.504$) suggests that investors in the Indonesian capital market do not regard fluctuations in oil prices as the primary factor influencing investment decisions. From the perspective of Signaling Theory, information related to changes in global oil prices may not constitute a sufficiently strong signal to substantially alter investor behavior in the short run (Joo & Park, 2021). This finding is consistent with the argument proposed by Al-Awadhi et al. (2020), who emphasized that during periods of crisis or external economic shocks, market responses tend to be inconsistent and highly dependent on the intensity and relevance of the information received by market participants.

These findings also provide important implications for Arbitrage Pricing Theory (APT) and the Efficient Market Hypothesis proposed by Fama (1970). In theory, macroeconomic variables such as oil prices and exchange rates are categorized as systematic risk factors that should influence asset prices across the market. However, the insignificant results indicate that the Indonesian capital market may not fully reflect external information efficiently, particularly within the energy sector. This condition can be explained through the concept of market segmentation, where domestic institutional characteristics, government intervention, and investor composition reduce the direct transmission of global shocks into stock prices. As explained by Almadi & Herusetya (2025), investors in Indonesia tend to place greater emphasis on firm-specific fundamentals, including operational efficiency, profitability, and corporate governance, rather than relying solely on external macroeconomic indicators.

The weak explanatory power of the regression model may also be associated with omitted variable bias in financial modeling theory. According to multifactor asset pricing theory, stock returns are influenced by numerous interconnected variables rather than only one or two macroeconomic indicators. Factors such as inflation, interest rates, market sentiment, trading volume, firm size, leverage, and global geopolitical uncertainty may simultaneously influence stock returns. Therefore, the low coefficient of determination ($R^2 = 0.0102$) indicates that global oil prices and exchange rates alone are insufficient to capture the complexity of stock return movements in Indonesia's energy sector. This interpretation is supported by (Laksono & Bustaman, 2024), who argue that sectoral stock performance in Indonesia is often more strongly affected by domestic business cycles and sector-specific conditions than by direct global commodity price shocks.

From the perspective of Behavioral Finance Theory, the weak relationship between macroeconomic variables and stock returns may arise because investors do not always behave rationally when processing information, as investment decisions are frequently influenced by psychological biases, emotions, investor sentiment, and heuristic behavior (Sharma & Negi, 2025). During periods of high uncertainty, investors frequently exhibit herding behavior by following overall market trends rather than evaluating macroeconomic fundamentals comprehensively (Khan et al., 2025). This phenomenon weakens the statistical relationship between external economic indicators and stock price movements because investor decisions are increasingly driven by psychological factors and market sentiment. Consequently, stock returns become more difficult to predict using conventional macroeconomic regression models.

Meanwhile, the insignificant effect of the rupiah exchange rate against the US dollar ($p = 0.863$) reflects the relative resilience of the Indonesian energy sector to foreign exchange risk exposure. From a theoretical standpoint, depreciation of the rupiah should adversely affect firms with liabilities denominated in foreign currencies, in accordance with exchange rate and capital market theory (Wijaya & Priana, 2023). However, many Indonesian energy companies derive substantial revenues in US dollars through export-oriented activities, thereby creating a natural hedging mechanism that reduces the negative consequences of currency depreciation (Martalena et al., 2023). This condition explains why exchange rate fluctuations do not exert a statistically significant impact on stock returns, which is in line with the findings of Farid et al. (2024), who identified the exchange rate as a mediating rather than a primary determinant of stock market performance.

Furthermore, the weakness of the model can also be interpreted through the Adaptive Market Hypothesis (AMH), which argues that market efficiency evolves over time depending on changing economic conditions, investor learning behavior, market competition, and institutional adaptation (Rönkkö et al., 2024). In emerging markets such as Indonesia, the transmission of macroeconomic information into stock prices is often imperfect because of information asymmetry and uneven investor access to financial information. As a result, macroeconomic variables may fail to generate statistically strong effects even

when theoretical relationships exist. This explanation supports the argument of Wahyudi (2025), who states that the Indonesian capital market still demonstrates characteristics of partial inefficiency in responding to global oil price shocks.

In addition, Indonesia's domestic energy policies may weaken the direct impact of global commodity fluctuations on listed energy firms. The existence of fuel subsidies, export regulations, and government intervention in energy pricing mechanisms creates a buffering effect that reduces the transmission of international oil price volatility into corporate earnings. Consequently, the relationship between global oil prices and stock returns becomes less direct and statistically weaker (Rheynaldi et al., 2023). This condition differs from energy markets in developed countries, where commodity price movements are more fully integrated into capital market valuations.

Simultaneously, the results of the F-test ($p = 0.755$) and the extremely low coefficient of determination indicate that the regression model lacks sufficient explanatory capacity to predict stock returns comprehensively. From an econometric perspective, this may indicate that stock returns in the energy sector are nonlinear and dynamic in nature, while the ordinary least squares (OLS) model employed in this study assumes a linear relationship between variables. Financial market variables are often characterized by volatility clustering, structural breaks, and asymmetric responses to economic shocks. Therefore, more advanced econometric models such as GARCH, VAR, or VECM may provide better explanatory power in future research.

From an economic perspective, these findings suggest that the Indonesian energy sector possesses a unique risk structure and demonstrates relative resilience to short-term global macroeconomic shocks. For investors, the results imply that investment decisions in the energy sector should not rely exclusively on macroeconomic indicators such as oil prices and exchange rates. Instead, investors should prioritize firm-specific analysis, including financial performance, operational efficiency, corporate strategy, and government energy policies, as these factors appear to exert a more substantial influence on stock return performance in Indonesia's energy sector.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the data analysis and discussion, this study concludes that global oil price volatility and fluctuations in the rupiah exchange rate did not exert a statistically significant influence on the stock returns of energy sector companies listed on the Indonesia Stock Exchange, either partially or simultaneously, during the observation period. Although global oil price volatility demonstrated a positive relationship and the rupiah exchange rate exhibited a negative relationship with stock returns, both relationships were consistent only directionally with theoretical expectations and showed relatively weak explanatory power.

These findings suggest that the Indonesian energy sector possesses a relatively strong resilience to external macroeconomic shocks. The performance of energy sector stocks appears to be influenced more substantially by internal corporate factors, domestic energy policies, and long-term contractual

arrangements that reduce the direct transmission of daily fluctuations in global commodity prices. Furthermore, the very low coefficient of determination indicates that variations in stock returns within the energy sector are predominantly explained by factors outside the macroeconomic variables included in the regression model.

ADVANCED RESEARCH

This study is subject to several limitations that may provide valuable directions for future research. First, the relatively limited observation period may not adequately capture the long-term effects of structural transformations in the global economy. Therefore, future studies are encouraged to extend the research timeframe or employ higher-frequency data, such as daily or weekly observations, in order to identify market dynamics and anomalies more accurately.

Second, the research model in this study focuses exclusively on two external macroeconomic variables. Future research is therefore recommended to incorporate additional control variables, including inflation rates, interest rates (BI Rate), and firm-specific fundamental indicators such as the Debt-to-Equity Ratio (DER) and Return on Assets (ROA), to enhance the explanatory power of the regression model (R^2).

Finally, future studies may also consider applying more advanced econometric approaches, such as the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model or the Vector Error Correction Model (VECM), in order to examine more comprehensively the dynamic interactions and volatility transmission mechanisms among macroeconomic variables and stock returns.

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