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Analysis of The Influence of Macroeconomic Factors: Inflation, Rupiah Exchange Rate, Bi 7-*Day Repo Rate*, World Oil Prices, and Benchmark Coal Prices (HBA) On the Energy Sector Index (IDXENERGY) On the Indonesia Stock Exchange

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A R T I C L E I N F O

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A B S T R A C T

The Energy Sector Index (IDXENERGY) is one of the indicators that reflects the performance of energy sector companies on the Indonesia Stock Exchange and is influenced by various macroeconomic factors and energy commodity prices. This study aims to analyze the influence of inflation, USD/IDR exchange rate, BI 7-Day Repo Rate, world oil prices, and Benchmark Coal Price (HBA) on IDXENERGY in the short and long term. This study uses a quantitative approach with secondary data in the form of monthly time series data for the period February 2021–December 2025 and analyzed using the Vector Error Correction Model (VECM) method. The analysis in this study provides an overview of the dynamic relationship between macroeconomic factors and energy commodity prices on the movement of IDXENERGY in the short and long term on the Indonesia Stock Exchange.

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INTRODUCTION

The capital market has an important role in the economy as a means of raising funds for companies as well as an alternative investment for the community. One of the indicators that reflects the performance of the sectoral stock market on the Indonesia Stock Exchange (IDX) is the Energy Sector Index (IDXENERGY), which is an index that represents the movement of stock prices of energy sector companies. The energy sector is interesting to study because it is closely related to macroeconomic conditions and fluctuations in energy commodity prices (Saleh, 2024). During the 2021–2025 period, IDXENERGY showed an upward trend, but the movement was inseparable from the dynamics of inflation, the rupiah exchange rate, interest rates, world oil prices, and coal prices that affected investors' expectations of the prospects for the energy sector.

Inflation is one of the macroeconomic indicators that can affect company performance through increasing production costs and changes in people's purchasing power. According to Brigham and Houston (2018), inflation shows a general increase in prices over time, while Bank Indonesia uses the Consumer Price Index (CPI) as its measurement indicator. High inflation has the potential to depress a company's profits and increase the discount rate that investors use in valuing stocks. Research by Elfiswandi et al. (2020) proves that inflation has a significant effect on the stock price of the mining and energy sectors in Indonesia. In addition to inflation, the rupiah exchange rate against the United States dollar (USD/IDR) also affects energy sector companies due to export activities, imports, and foreign currency liabilities. However, the results of the research by Putra and Robiyanto (2019) and Suci et al. (2025) show different directions of influence, so the exchange rate relationship with energy sector stocks still requires further study.

The BI 7-Day Repo Rate is also an important factor because it affects investment decisions and the company's funding costs. According to Sunariyah (2003), the increase in interest rates can reduce investor interest in stocks and increase the company's capital costs. On the other hand, world oil prices and Benchmark Coal Prices (HBAs) are the main commodities that are directly related to the performance of energy sector companies. Supriyanto et al. (2021) found that world oil prices have a positive effect on the stock prices of oil and gas companies. Meanwhile, HBA as the official reference price of coal in Indonesia has the potential to affect the revenue prospects of energy companies, so that changes in value can be reflected in the movement of IDXENERGY (Purwani & Santoso, 2023).

However, previous research on the influence of inflation, the USD/IDR rate, the BI 7-Day Repo Rate, world oil prices, and HBA on the performance of energy sector stocks still shows mixed results. These differences are influenced by variations in research periods, economic conditions, analysis methods, and characteristics of the research object. This study contributes by using the Reference Coal Price (HBA) as a representation of domestic coal prices officially determined by the Indonesian government and applying the Vector Error Correction Model (VECM) method to analyze the short-term and long-term relationship between inflation, the USD/IDR rate, the BI 7-Day Repo Rate, world

oil prices, and HBA to IDXENERGY. This approach is expected to enrich the empirical evidence on the determinants of IDXENERGY while providing useful information for investors, academics, and policymakers. Based on this description, this study aims to analyze the influence of inflation, the USD/IDR exchange rate, the BI 7-Day Repo Rate, world oil prices, and the Benchmark Coal Price on the Energy Sector Index (IDXENERGY) on the Indonesia Stock Exchange in the short and long term.

LITERATURE REVIEW

Arbritrage Pricing Theory (APT)

Arbitrage Pricing Theory (APT), introduced by Stephen A. Ross in 1976, proposes that an asset's return is determined by its exposure to several systematic risk factors, particularly macroeconomic conditions, rather than being driven solely by market risk. The theory is grounded in the Law of One Price, which states that assets with identical characteristics should be valued at the same price. If there is a price difference, investors can arbitrate until the price returns to its fair value (Muhamad & Maulana, 2019). Thus, APT states that the return of securities has a linear relationship with various economic factors, while the level of sensitivity of each asset to these factors is measured through the beta coefficient (Kisman & Restiyanita, 2015; Tarumingkeng, 2025).

Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis (EMH), proposed by Fama (1970), suggests that the prices of securities incorporate information that is publicly available in the market. Hartono (2017) further explains that a market can be considered efficient when security prices respond rapidly and accurately to newly available information. Consequently, information related to corporate performance, government regulations, and macroeconomic developments is expected to be incorporated into stock prices without significant delay. Based on this theory, macroeconomic information and energy commodity prices, such as inflation, the rupiah exchange rate, the BI 7-Day Repo Rate, world oil prices, and the Benchmark Coal Price (HBA), can influence investors' investment decisions and are reflected in the movement of the Energy Sector Index (IDXENERGY). Information that is perceived as positive will increase demand for energy sector stocks, while information that is perceived as negative can reduce investor interest, thus affecting the movement of IDXENERGY.

Investment

Investment is the activity of placing a certain amount of funds in the present with the aim of obtaining profits in the future (Adnyana, 2020). Investments can be made in real assets as well as financial assets, such as stocks, bonds, deposits, mutual funds, and sukuk (Tandelilin, 2017). Apart from being an investment, investment is also seen as an expense to increase capital stock which is expected to be able to provide economic benefits in the future (Afifah, 2024). In investing, investors are faced with the concept of risk and return trade-off, which is a positive relationship between the rate of return and risk. Return is the return obtained from investment, while risk is the possibility of loss, both from systematic factors (market risk) and unsystematic factors that come from

the company's internal conditions. A higher expected return is generally accompanied by a greater level of risk for investors.

Capital Markets

The capital market provides a mechanism for long-term investment by linking fund-seeking parties with investors through transactions involving stocks, bonds, and other financial securities. (Septiani et al., 2020). In Indonesia, securities trading is held through the Indonesia Stock Exchange (IDX) which acts as a facilitator in bringing together issuers and investors. Companies obtain funding through the issuance of shares, while shares are proof of investor ownership of the company in accordance with the capital invested (Manik, 2024). Instruments traded on the capital market include different types of securities or securities.

Energy Sector Index (IDXENERGY)

The Energy Sector Index (IDXENERGY) is a stock market index listed on the Indonesia Stock Exchange that represents the performance of companies operating in the energy-related products and services industry (Indonesia Stock Exchange, 2021). The index serves as a measure of stock price movements within the energy sector and provides investors with a benchmark for evaluating the sector's overall performance. Companies that are members of IDXENERGY include issuers in the fields of coal, oil and gas, alternative energy, and energy support services. The characteristics of this sector cause the movement of IDXENERGY to be influenced not only by the company's performance, but also by market sentiment and the price dynamics of energy commodities, especially world oil and coal (Fadila et al., 2022).

Hypothesis

H1. It is suspected that in the short and long term, inflation will affect the Energy Sector Index on the Indonesia Stock Exchange.

H2. It is suspected that in the short and long term, the USD/IDR exchange rate has an effect on the Energy Sector Index on the Indonesia Stock Exchange.

H3. It is suspected that in the short and long term, the BI-7 *Day Repo Rate* will affect the Energy Sector Index on the Indonesia Stock Exchange.

H4. It is suspected that in the short and long term, world oil prices will affect the Energy Sector Index on the Indonesia Stock Exchange.

H5. It is suspected that in the short and long term, the Benchmark Coal Price (HBA) affects the Energy Sector Index on the Indonesia Stock Exchange.

METHODOLOGY

This research adopts a quantitative approach using time-series data to investigate the effects of inflation, the rupiah exchange rate, the BI 7-Day Repo Rate, global oil prices, and the Benchmark Coal Price (HBA) on the Energy Sector Index (IDXENERGY) listed on the Indonesia Stock Exchange. The study employs monthly secondary data covering the period from February 2021 to December 2025, comprising a total of 59 observations.

In this study, the Energy Sector Index (IDXENERGY) serves as the dependent variable, while the independent variables consist of inflation, the rupiah exchange rate against the US dollar (USD/IDR), the BI 7-Day Repo Rate, West Texas Intermediate (WTI) crude oil prices, and the Benchmark Coal Price

(HBA). All data is obtained from official publications of Bank Indonesia, the Indonesia Stock Exchange, the Ministry of Energy and Mineral Resources (EMR), and Investing.com. Data collection is carried out by documentation method through data collection from official publications of related institutions. Furthermore, the data is processed using EViews 14 software.

The analysis employed the Vector Error Correction Model (VECM), which is suitable for examining both short-run dynamics and long-run relationships among variables that are cointegrated. Prior to estimating the VECM model, a series of preliminary tests was conducted, including the Augmented Dickey-Fuller (ADF) stationarity test, optimal lag length selection based on the Akaike Information Criterion (AIC), VAR stability testing, and the Johansen cointegration test. When the variables were found to exhibit cointegration, the analysis proceeded with VECM estimation.

The VECM estimation results are evaluated by examining the significance of the short-run coefficients, long-run relationships, and the Error Correction Term (ECT), which indicates the speed of adjustment toward long-run equilibrium. The analysis is further supported by the Impulse Response Function (IRF), which illustrates the response of IDXENERGY to shocks originating from each variable. Furthermore, Forecast Error Variance Decomposition (FEVD) is applied to assess the relative contribution of each variable to variations in the movement of IDXENERGY throughout the study period.

RESEARCH RESULT

Stationary Test

The stationary test was performed using the Augmented Dickey-Fuller (ADF) method to test whether the data was stationary. Decision-making is based on a probability value (p-value) with a significance level of 5% ($\alpha = 0.05$). The data is stated to be stationary if the p-value is < 0.05, while the data is stated to be non-stationary if the p-value is > 0.05.

Table 1. Stationary Test Results Level Rise

Variable	ADF Value	MacKinnon Critical Value 5%	Prob.	Remarks
IDXENERGY	-0.716606	-2.912631	0.8341	Not Stationary
Inflation	-2.143301	-2.915522	0.2291	Not Stationary
USD/IDR Exchange Rate	-1.058269	-2.912631	0.7263	Not Stationary
BI7DRR	-1.592179	-2.913549	0.4800	Not Stationary
World Oil Prices	-1.841442	-2.912631	0.3572	Not Stationary
Benchmark Coal Price	-1.242801	-2.912631	0.6500	Not Stationary

Based on Table 1, the results of the stationary test at the level level show that all variables, namely IDXENERGY, inflation, USD/IDR rate, BI *7-Day Repo Rate* (BI7DRR), world oil prices, and Benchmark Coal Prices (HBA), have a probability value (Prob.) greater than 0.05. In addition, the statistical value of each variable's ADF is also greater than MacKinnon's critical value at a significance level of 5%.

Table 2. Results of the First Diffrence Level Stationary Test

Variable	ADF Value	MacKinnon Critical Value 5%	Prob.	Remarks
IDXENERGY	-7.639084	-2.913549	0.0000	Stationary
Inflation	-2.645182	-2.915522	0.0903	Not Stationary
USD/IDR Exchange Rate	-6.531621	-2.913549	0.0000	Stationary
BI7DRR	-3.442754	-2.913549	0.0134	Stationary
World Oil Prices	-7.559505	-2.913549	0.0000	Stationary
Benchmark Coal Price	-6.826770	-2.913549	0.0000	Stationary

Based on the stationarity test conducted at the first-difference level, all variables, including IDXENERGY, the USD/IDR exchange rate, BI 7-Day Repo Rate (BI7DRR), world oil prices, and the Benchmark Coal Price (HBA), were found to have probability (Prob.) of less than 0.05. In addition, the statistical value of each variable's ADF was smaller than the MacKinnon critical value at a significance level of 5%, so that the five variables were declared stationary at the first difference level. Meanwhile, the inflation variable has a probability value of 0.0903 (> 0.05) and the statistical value of ADF is still greater than the critical value of MacKinnon, so that the inflation variable is not stationary at the first difference level.

Table 3. Second Diffrence Stationary Test Results

Variable	ADF Value	MacKinnon Critical Value 5%	Prob.	Remarks
IDXENERGY	-8.541386	-2.916566	0.0000	Stationary
Inflation	-11.92361	-2.915522	0.0000	Stationary
USD/IDR Exchange Rate	-8.590630	-2.915522	0.0000	Stationary
BI7DRR	-10.15337	-2.914517	0.0000	Stationary

World Oil Prices	-12.15803	-2.914517	0.0000	Stationary
Benchmark Coal Price	-10.03688	-2.915522	0.0000	Stationary

Based on Table 3, the results of the stationarity test at the second difference level show that all variables, namely IDXENERGY, inflation, USD/IDR rate, BI *7-Day Repo Rate* (BI7DRR), world oil prices, and Benchmark Coal Prices (HBA), have a probability value (Prob.) of 0.0000 or less than 0.05. In addition, the statistical value of each variable's ADF was smaller than MacKinnon's critical value at a significance level of 5%. Thus, all variables are declared to be stationary at the second difference level. These results show that the data has met the conditions for stationarity so that it can be used at the next stage of analysis.

Determination of Optimal Lag

Table 4. Optimal Lag Test Results

LAG	AIC	SC	HQ
0	-8.51457	**-8.289431***	-8.428260
1	-9.533504	-7.957499	**-8.929301***
2	-9.886147	-6.959282	-8.764056
3	-10.12222	-5.844494	-8.482242
4	-10.54897	-4.920380	-8.391100
5	**-11.39026***	-4.410813	-8.714506

The optimal lag length test, based on the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ), produced varying results across the three information criteria. The AIC minimum value is achieved at lag, whereas the SC minimum value is obtained at lag 1, while the HQ minimum value is obtained at lag 2. So, the optimal lag used in the model estimation is lag 5.

VAR Stability Test Results

Roots of Characteristic Polynomial
Endogenous variables: D(LOG_IDXENERGY ,2) D(INFLASI,2) D(LOG_KURS,2) D(BI7DRR,2) D(LOG_HMD,2) D(LOG_HBA,2)
Exogenous variables: C
Lag specification: 1 5
Date: 07/16/26 Time: 21:17

Root	Modulus
-0.972843	0.972843
-0.692569 - 0.650499i	0.950158
-0.692569 + 0.650499i	0.950158
-0.926472	0.926472
-0.009486 - 0.921212i	0.921261
-0.009486 + 0.921212i	0.921261
0.219506 - 0.888061i	0.914787
0.219506 + 0.888061i	0.914787
0.632377 + 0.650855i	0.907476
0.632377 - 0.650855i	0.907476
0.742361 + 0.518476i	0.905493
0.742361 - 0.518476i	0.905493
-0.791650 + 0.439059i	0.905252
-0.791650 - 0.439059i	0.905252
-0.471351 - 0.770343i	0.903106
-0.471351 + 0.770343i	0.903106
0.448145 + 0.746036i	0.870289
0.448145 - 0.746036i	0.870289
-0.117023 - 0.846471i	0.854522
-0.117023 + 0.846471i	0.854522
-0.710884 + 0.363727i	0.798532
-0.710884 - 0.363727i	0.798532
-0.274171 + 0.735765i	0.785187
-0.274171 - 0.735765i	0.785187
-0.501976 + 0.598439i	0.781095
-0.501976 - 0.598439i	0.781095
0.689790 - 0.311215i	0.756746
0.689790 + 0.311215i	0.756746
0.732098	0.732098
-0.624791	0.624791

No root lies outside the unit circle.
VAR satisfies the stability condition.

Figure 1. VAR Model Stability Test Results

Based on the results of the VAR stability test, all modulus values have a value of less than 1 (modulus < 1), so there is no root outside the circle unit. Thus, the VAR model meets the stability conditions, so the zero (H_0) hypothesis is accepted. These results show that the VAR model used in the study has been stable.

Johansen's Contention Test Results

Table 5. Johansen's Concomitation Test Results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.
None*	219.8558	95.75366	0.0000
At most*	139.0335	69.81889	0.0000
At most 2*	74.34994	47.85613	0.0000
At most 3	28.72480	29.79707	0.0661
At most 4	9.271897	15.49471	0.3408
At most 5	1.002864	3,841465	0.3166

Based on the results of the Johansen cointegration test using Trace Statistic, the Trace Statistic values on the None, at most 1, and at most 2 hypotheses were obtained at 219.8558, 139.0335; and 74.34994, which is greater than the Critical Value at the significance level of 5%, and has a probability value of 0.0000 (< 0.05). This shows that the zero (H_0) hypothesis is rejected on all three hypotheses. Meanwhile, in the at most 3 hypotheses, the Trace Statistic value of 28.72480 is

smaller than the Critical Value value of 29.79707 with a probability value of 0.0661 (> 0.05), so that the null (H_0) hypothesis fails to be rejected. Thus, it can be concluded that there are 3 cointegration vectors among the research variables. These results show that the variables IDXENERGY, inflation, exchange rate, BI 7-Day *Repo Rate*, world oil prices, and Benchmark Coal Prices (HBA) have a long-term equilibrium relationship, so the Vector Error Correction Model (VECM) model is feasible for use in this study.

Long-Term VECM

Based on the results of the long-term Vector Error Correction Model (VECM) estimate, the long-term equations in this study can be written as follows: The long-term VECM equation is formulated as follows.

$$IDXENERGY_t = \beta_0 + \beta_1 INF_t + \beta_2 KURS_t + \beta_3 BI7DRR_t + \beta_4 HMD_t + \beta_5 HBA_t + \varepsilon_t \quad (1)$$

Description:

1. $IDXENERGY_t$ = Energy Sector Index (IDXENERGY)
2. INF_t = Inflation
3. $KURS_t$ = Rupiah Exchange Rate
4. $BI7DRR_t$ = Suku Bunga BI-7 Day Repo Rate
5. HMD_t = World Oil Price
6. HBA_t = Reference Coal Price (HBA)
7. β_0 = Constant
8. $\beta_1 - \beta_5$ = Independent Variable Coefficients
9. ε_t = Error Term

Short-Term VECM

Based on the results of the short-term Vector Error Correction Model (VECM) estimate, the long-term equations in this study can be written as follows: The short-term VECM equation is formulated as follows:

$$\Delta IDXENERGY_t = \beta_0 + \beta_1 \Delta INF_{t-1} + \beta_2 \Delta KURS_{t-1} + \beta_3 \Delta BI7DRR_{t-1} + \beta_4 \Delta HMD_{t-1} + \beta_5 \Delta HBA_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad (2)$$

Description:

1. $\Delta IDXENERGY_t$ = Changes in the Energy Sector Index (IDXENERGY)
2. ΔINF_{t-1}, $\Delta KURS_{t-1}, \Delta BI7DRR_{t-1}, \Delta HMD_{t-1,} \Delta HBA_{t-1}$ = Changes in Independent Variables in the previous period
3. ECT_{t-1} = Error Correction Term
4. λ = Adjustment Coefficient Towards Unity
5. ε_t = Error Term

Long-Term VECM Tests

Table 6. Long-Term VECM Test Results

Variable	t-Statistic	t-Table	Remarks
Inflation	3.94890	2.0057	Significant
USD/IDR Exchange Rate	-1.94346	2.0057	Insignificant
BI-7 *Day Repo Rate*	2.66408	2.0057	Significant
World Oil Prices	-7.04388	2.0057	Significant
Benchmark Coal Price	-0.43003	2.0057	Insignificant

The long-run VECM estimation indicates that the inflation variable has a t-statistic of 3.94890, which exceeds the critical t-table value of 2.0057. This finding confirms that inflation has a statistically significant impact on IDXENERGY over the long term. Therefore, fluctuations in the inflation rate are associated with changes in the performance and movement of IDXENERGY in the long run.

Meanwhile, the USD/IDR exchange rate variable has a t-statistical value of -1.94346. The absolute value of the t-statistic of 1.94346 is smaller than the t-table value of 2.0057. This shows that the USD/IDR rate does not have a significant effect on IDXENERGY in the long run. Thus, changes in the rupiah exchange rate against the United States dollar have not had a significant influence on IDXENERGY's movement in the long term.

The long-run VECM results show that the BI 7-Day Repo Rate has a t-statistic of 2.66408, exceeding the t-table value of 2.0057. This result indicates that the BI 7-Day Repo Rate has a statistically significant influence on IDXENERGY over the long term. Accordingly, movements in Bank Indonesia's policy interest rate can contribute to changes in the performance of IDXENERGY in the long run.

The VECM estimation results indicate that the world oil price variable has a t-statistic of -7.04388, with an absolute value of 7.04388 that exceeds the critical t-table value of 2.0057. This finding demonstrates that world oil prices have a statistically significant long-run effect on IDXENERGY. The negative sign of the t-statistic reflects an inverse relationship between the two variables. In other words, ceteris paribus, an increase in global oil prices is associated with a decline in IDXENERGY over the long term, while a decrease in oil prices tends to correspond with an increase in IDXENERGY.

In contrast to the previous variable, the Reference Coal Price (HBA) has a t-statistic value of -0.43003. The absolute value of the t-statistic of 0.43003 is smaller than the t-table value of 2.0057. This shows that the Benchmark Coal Price (HBA) does not have a significant effect on IDXENERGY in the long term. Thus, HBA changes have not had a significant impact on IDXENERGY's long-term movement.

Short-Term VECM Test

Table 7. Short-Term VECM Test Results

Variable	Lag	t-Statistic	t-Table	Remarks
BI-7 *Day Repo Rate*	5	-2.46034	2.0057	Significant
Benchmark Coal Price	4	2.82469	2.0057	Significant
Benchmark Coal Price	5	2.62012	2.0057	Significant

Based on the results of the short-term VECM estimate, the BI-7 Day Repo Rate variable at the 5th lag has a t-statistic value of -2.46034. The absolute value of the t-statistic of 2.46034 is greater than the t-table value of 2.0057, so that the BI-7 Day Repo Rate has a significant effect on IDXENERGY in the short term. This shows that the change in Bank Indonesia's benchmark interest rate has begun to affect the movement of IDXENERGY after five periods.

Furthermore, the Reference Coal Price (HBA) variable at the 4th lag has a t-statistical value of 2.82469, greater than the t-table value of 2.0057. In addition,

on the 5th lag, a t-statistic value of 2.62012 was obtained, which is also greater than the t-table value of 2.0057. These results show that HBA has a positive and significant effect on IDXENERGY in the short term at lag 4th and lag 5th. Thus, the change in the Benchmark Coal Price (HBA) has an effect on the movement of IDXENERGY in the short term after four to five periods.

Meanwhile, inflation variables, USD/IDR exchange rates, and world oil prices do not have a significant effect on IDXENERGY in the short term. This is indicated by the entire absolute value of the t-statistic on each lag that is smaller than the t-table value of 2.0057. Thus, changes in these three variables have not been able to have a significant influence on IDXENERGY's movement in the short term. In addition, the HBA at the 1st to 3rd lag and the BI-7 Day Repo Rate at the 1st to 4th lag also did not show a significant effect on IDXENERGY because the absolute value of the t-statistic in each lag was still smaller than the value of the t-table. This indicates that IDXENERGY's response to changes in both variables takes time before it has a significant impact.

Test Impulse Response Function

Table 8. Impulse Response Function (IRF) Test Results

PERIOD	RESPONSE IDXENERGY					
	IDXEN	INF	KURS	BI7DRR	HMD	HBA
1	0.070503	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.004922	0.015886	-0.029051	0.027994	-0.022301	0.002815
3	0.023995	-0.010019	-0.005267	-0.006061	0.000979	-0.007793
4	0.027038	0.003417	-0.012535	0.013542	-0.001937	-0.000649
5	0.038823	-0.016207	-0.011895	-0.000370	-0.013550	0.011333
6	0.024887	-0.000827	-0.017023	0.008611	0.004096	-0.000131
7	0.027400	-0.002921	0.001243	-0.014929	0.006609	0.001933
8	0.020451	0.002812	-0.030084	-0.022430	0.005406	-0.004021
9	0.044334	0.035447	-0.022764	-0.008555	-0.004977	0.008973
10	0.035370	0.000397	-0.026068	0.017372	0.020849	0.006768

Based on the results of the Impulse Respose Function (IRF), it can be seen how IDXENERGY responds to shocks that come from itself and other macroeconomic variables during the 10 observation periods.

On the shocks coming from IDXENERGY itself, the first period showed a positive response of 0.070503, which indicates that the shock in the energy sector index has a considerable direct influence on the movement of the index. In subsequent periods, the response remained positive despite fluctuations, with a range of values between 0.004922 to 0.044334. This shows that the effects of

IDXENERGY's internal shocks still persist for some period of time and are gradually moving towards more stable conditions.

IDXENERGY's response to inflationary shocks has not been seen in the first period. From the second period to the tenth period, the response fluctuates between positive and negative. The largest positive response occurred in the 9th period of 0.035447, while the largest negative response occurred in the 5th period of -0.016207. These results show that the influence of inflation on IDXENERGY was not consistent during the observation period.

Furthermore, to the USD/IDR exchange rate shock, IDXENERGY has also not responded in the first period. In the following periods, IDXENERGY showed more negative responses, with the largest negative response of -0.030084 in the 8th period. Although there was a relatively small positive response in the 7th period of 0.001243, in general the results show that exchange rate shocks tend to put pressure on the movement of IDXENERGY.

IDXENERGY's response to BI-7 interest rate shocks *Day Repo Rate* also shows fluctuating patterns. The largest positive response occurred in the 2nd period of 0.027994, while the largest negative response occurred in the 8th period of -0.022430. These results indicate that the effect of changes in Bank Indonesia's benchmark interest rate on IDXENERGY is not constant, but changes according to the dynamics during the observation period.

Similarly, to world oil price shocks, IDXENERGY's response fluctuates between positive and negative. The largest negative response occurred in the 2nd period of -0.022301, while the largest positive response occurred in the 10th period of 0.020849. This condition shows that the influence of changes in world oil prices on IDXENERGY is dynamic and changes in each observation period.

Meanwhile, to the shock of the Benchmark Coal Price (HBA), IDXENERGY has not shown a response in the first period. In the following period, the response fluctuates between positive and negative. The largest positive response occurred in the 5th period of 0.011333, while the largest negative response occurred in the 3rd period of -0.007793. These results show that the influence of HBA on IDXENERGY is relatively small and does not show a consistent response pattern during the observation period.

Variance Decomposition (VD) Test

Table 9. IDXENERGY Variance Decomposition (VD) Test Results (%)

PERIOD	IDXEN	INF	KURS	BI7DRR	HMD	HBA
1	100.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	67.679710	3.419669	11.435560	10.618690	6.738965	0.107403
3	68.080160	4.311076	10.653300	10.026380	6.089914	0.839169
4	67.980210	3.931324	11.098730	10.828430	5.416024	0.745275
5	67.942240	5.456201	10.182540	8.734723	5.965746	1.718554
6	67.457360	5.024624	11.686320	8.628507	5.622160	1.581034
7	67.865390	4.704647	10.806840	9.618527	5.516470	1.488130
8	62.299490	4.181928	15.363370	11.710680	5.033043	1.411483
9	59.837130	9.836099	14.929580	9.714663	4.140582	1.541943
10	58.147450	8.625853	16.175140	9.888145	5.603415	1.560000

Based on the results of the Forecast Error Variance Decomposition (FEVD), it can be determined the proportion of shock contribution from each research variable in explaining the variation of IDXENERGY's forecast error variance during 10 observation periods. The greater the percentage of a variable's contribution, the greater the role of the variable in explaining changes in IDXENERGY.

In the first period, the variation of IDXENERGY is fully explained by the shock of IDXENERGY itself, which is 100.000000%. As the observation period increased, the contribution gradually decreased to 58.147450% in the 10th period. Despite the decline, IDXENERGY remains the variable that makes the greatest contribution in explaining the variation in the movement of the energy sector index during the observation period.

The contribution of inflation to the IDXENERGY variation has not been seen in the first period. Starting from the second period, inflation contributed 3.419669% and tended to increase until it reached 8.625853% in the 10th period. This shows that over a longer period of time, inflation is starting to contribute more and more to IDXENERGY's changes, although the contribution is still smaller than the shocks emanating from IDXENERGY itself.

Meanwhile, the contribution of the USD/IDR exchange rate began to appear in the second period of 11.435560%. Furthermore, its contribution fluctuated but showed an increasing tendency to reach 16.175140% in the 10th period. Compared to other macroeconomic variables, the USD/IDR rate was the variable that made the greatest contribution in explaining the variation in IDXENERGY at the end of the observation period.

The contribution of the BI-7 Day Repo Rate interest rate also began to be seen in the second period of 10.618690%. During the observation period, its

contribution fluctuated in the range of 8% to 12%, with a value of 9.888145% in the 10th period. These results show that Bank Indonesia's benchmark interest rate has a relatively stable contribution in explaining the variation in IDXENERGY's movements.

On the other hand, the Reference Coal Price (HBA) is the variable with the smallest contribution compared to other variables. In the second period, HBA's contribution was only 0.107403%, then gradually increased to reach 1.560000% in the 10th period. Despite the increase, the contribution of HBA remained relatively low in explaining the variation in IDXENERGY's movements during the observation period.

DISCUSSION

The Effect of Inflation on the Energy Sector Index on the Indonesia Stock Exchange in the Short and Long Term

The results of the Vector Error Correction Model (VECM) estimate show that inflation does not have a significant effect on the Energy Sector Index (IDXENERGY) in the short term. This is shown by the absolute value of t-statistic at lag 1 of 1.53117, lag 2 of 0.34393, lag 3 of 1.00960, lag 4 of 0.84255, and lag 5 of 1.85306, all of which are smaller than the t-table value of 2.0057. On the other hand, in the long term, inflation has a significant effect on IDXENERGY with a t-statistic value of 3.94890 which is greater than the t-table value of 2.0057. These results show that changes in inflation have not had a direct impact on IDXENERGY's movement in the short term, but its effect is starting to be seen in the long term.

This finding is in line with the Arbitrage Pricing Theory (APT) theory put forward by Ross (1976), which states that price movements or stock returns are influenced by various macroeconomic factors. Inflation as one of the systematic factors affects the performance of companies and the capital market through changes in production costs, purchasing power, and economic activity. In the energy sector, the impact of inflation does not occur directly because companies are still able to make adjustments to operating costs and selling prices in the short term. Thus, the influence of inflation is only seen significantly in the long term when changes in economic conditions have been reflected in the company's performance and the movement of the Energy Sector Index (IDXENERGY).

The Effect of the USD/IDR Exchange Rate on the Energy Sector Index on the Indonesia Stock Exchange in the Short and Long Term

The results of the Vector Error Correction Model (VECM) estimate show that the USD/IDR exchange rate does not have a significant effect on the Energy Sector Index (IDXENERGY) in both the short and long term. In the long term, the USD/IDR exchange rate has a coefficient of -4.021706 with a t-statistical value of -1.943436. The absolute value of the t-statistic is smaller than the t-table value of 2.0057, indicating that the USD/IDR rate does not have a significant effect on IDXENERGY in the long run. In the short term, the t-statistic values at lag 1 to lag 5 are -1.98955, -1.41180, -0.95084, 0.02686, and -1.09337, respectively. The entire absolute value of the t-statistic is also smaller than the t-table value of 2.0057. These results show that changes in the rupiah exchange rate against the

United States dollar have not been able to affect IDXENERGY's movements during the study period, both in the short and long term.

These findings show that USD/IDR exchange rate fluctuations have not been the main factor influencing the movement of energy sector stocks. The characteristics of companies in the energy sector are more influenced by the development of the price and demand of energy commodities in the international market than changes in exchange rates. In addition, most energy sector companies earn revenues denominated in the United States dollar, so the impact of exchange rate changes on company performance is relatively limited. This condition causes the weakening or strengthening of the rupiah exchange rate to not directly affect the movement of IDXENERGY.

The results of this study do not support the Arbitrage Pricing Theory (APT) proposed by Ross (1976) or the Efficient Market Hypothesis (EMH) proposed by Fama (1970). According to APT, stock returns are influenced by various macroeconomic factors, including the exchange rate, while EMH states that all relevant information will be reflected in the stock price. However, the results of the study show that information regarding changes in the USD/IDR exchange rate has not been the main consideration for investors in determining investment decisions in the energy sector. Investors tend to pay more attention to factors that directly affect the performance of the energy sector, such as world oil prices, coal prices, energy demand prospects, and company fundamentals, so the influence of the exchange rate on IDXENERGY's movement is not significant.

The Effect of the BI-7 Day Repo Rate on the Energy Sector Index on the Indonesia Stock Exchange in the Short and Long Term

The results of the Vector Error Correction Model (VECM) estimate show that the BI-7 Day Repo Rate has an effect on the Energy Sector Index (IDXENERGY) in the short and long term. In the long term, the BI-7 Day Repo Rate has a coefficient of 0.263477 with a t-statistical value of 2.66408. This value is greater than the t-table value of 2.0057, indicating a significant influence on IDXENERGY. In the short term, a significant effect only occurred in the 5th lag with a coefficient of -0.514361 and a t-statistical value of -2.46034. Meanwhile, lag 1, lag 2, lag 3, and lag 4 had no significant effect because each had t-statistical values of 1.81297, -0.96004, 1.99896, and -0.80030 which were smaller than the t-table values of 2.0057.

These results show that the change in the BI-7 Day Repo Rate has not directly affected IDXENERGY's movement in the short term. The recent effect of the 5th lag indicates that there is a time lag before the change in interest rate policy is responded to by investors. The negative coefficient at the 5th lag shows that the increase in the BI-7 Day Repo Rate is likely to be followed by a decrease in IDXENERGY due to the increase in borrowing costs and the company's capital costs. On the other hand, a positive coefficient of 0.263477 in the long term indicates that interest rate policy can increase investor confidence in economic stability, thus having a positive impact on the movement of IDXENERGY.

These findings support the Arbitrage Pricing Theory (APT) put forward by Ross (1976), which states that stock returns are influenced by various macroeconomic factors, including interest rates. In addition, the results of the study also support the Efficient Market Hypothesis (EMH) put forward by Fama

(1970), because the change in the BI-7 Day Repo Rate is responded to by investors and reflected in the movement of IDXENERGY. A significant response at the 5th lag indicates that the market needs time to adjust to information regarding changes in interest rates, while significant long-term influences indicate that the information is ultimately reflected in the stock price of the energy sector.

The Effect of World Oil Prices on the Energy Sector Index on the Indonesia Stock Exchange in the Short and Long Term

The VECM estimation results reveal that world oil prices significantly influence the Energy Sector Index (IDXENERGY) in the long run, whereas no significant effect is observed in the short run. Over the long term, the world oil price variable has a coefficient of -1.734900 and a t-statistic of -7.04388. Since the absolute t-statistic of 7.04388 exceeds the t-table value of 2.0057, world oil prices are found to have a statistically significant and negative relationship with IDXENERGY. Meanwhile, in the short term, world oil prices do not have a significant effect because the t-statistical value at lag 1 is -0.070860, lag 2 is -0.08315, lag 3 is 0.30073, lag 4 is -0.26845, and lag 5 is -0.67690, all of which have an absolute value that is smaller than the t-table value of 2.0057.

These results show that changes in world oil prices have not directly affected IDXENERGY's movement in the short term. Energy companies and investors need time to adjust the impact of oil price changes on the company's operational activities, profitability, and prospects. Conversely, in the long term a negative coefficient of -1.734900 indicates that the increase in world oil prices is likely to be followed by a decline in IDXENERGY. This condition shows that the continuous increase in oil prices has the potential to increase operational costs, reduce company profitability, and increase economic uncertainty, which has an impact on decreasing investor interest in energy sector stocks.

These findings support the Arbitrage Pricing Theory (APT) put forward by Ross (1976), which states that stock returns are influenced by various macroeconomic factors, including commodity prices. In addition, the results of the study also support the Efficient Market Hypothesis (EMH) put forward by Fama (1970), because information about changes in world oil prices is ultimately reflected in the movement of IDXENERGY. However, the market response to changes in oil prices is gradual, so the effect is only visible significantly in the long term.

The Effect of Benchmark Coal Prices (HBA) on the Energy Sector Index on the Indonesia Stock Exchange in the Short and Long Term

The VECM estimation results indicate that the Benchmark Coal Price (HBA) does not exert a statistically significant influence on the Energy Sector Index (IDXENERGY) in the long run, although a significant effect is observed at specific lags in the short run. In the long-run estimation, HBA has a coefficient of -0.050446 and a t-statistic of -0.43003. As the absolute t-statistic of 0.43003 is below the t-table value of 2.0057, the effect of HBA on IDXENERGY is considered statistically insignificant in the long term. In the short term, the HBAs at the 1st lag, 2nd lag, and 3rd lag have t-statistical values of 0.26130, -1.83745, and -0.06634, respectively, which are smaller than the t-table values of 2.0057 so have no significant effect. In contrast, HBA in the 4th lag has a coefficient of 0.415535 with a t-statistic value of 2.82469, while in the 5th lag it has a coefficient of 0.351414

with a t-statistic value of 2.62012. The t-statistic value of the two lags is greater than the t-table value of 2.0057, so HBA has a positive and significant effect on IDXENERGY in the short term.

These results show that the change in the Benchmark Coal Price has not had a permanent effect on the movement of IDXENERGY. However, the increase in HBA in the previous four to five months is likely to boost IDXENERGY. This indicates that the increase in coal prices will take time before it is reflected in the performance of energy sector companies and is responded to by investors through increased demand for energy sector stocks.

These findings support the Arbitrage Pricing Theory (APT) put forward by Ross (1976), which states that stock returns are influenced by various macroeconomic factors, including commodity prices. In addition, the results of the study are also in line with the Efficient Market Hypothesis (EMH) put forward by Fama (1970), because information about HBA changes is responded to gradually by the market. This is reflected in the significant influence that has only emerged on the 4th and 5th lag, while in the long run the HBA change no longer has a significant influence on the movement of IDXENERGY.

CONCLUSIONS AND RECOMMENDATIONS

The results of the study using the Vector Error Correction Model (VECM) method show that inflation and world oil prices do not have a significant effect on the Energy Sector Index (IDXENERGY) in the short term, but have a significant effect in the long term, with world oil prices having a negative influence. The USD/IDR rate has no significant effect on IDXENERGY in either the short or long term. Meanwhile, the BI-7 Day Repo Rate has a significant effect in the short term, namely at the 5th lag, and in the long term. The Benchmark Coal Price (HBA) has a positive and significant effect on IDXENERGY in the short term at the 4th and 5th lag, but it does not have a significant effect in the long term.

These findings show that inflation, the BI-7 Day Repo Rate, and world oil prices are factoring that investors need to pay attention to in making investment decisions in energy sector stocks, especially for long-term investments. In addition, the movement of HBA can be used as an indicator in short-term investment decision-making because its influence only appears after a certain period. For the government, the results of this research can be an input in formulating economic policies, especially those related to inflation control, interest rate policies, and monitoring the development of global energy prices. Further research is recommended to use a longer observation period, add macroeconomic variables and other external factors, and compare results using other methods such as ARDL, NARDL, or Structural VAR (SVAR) to gain a more comprehensive understanding of the factors that affect IDXENERGY.

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