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Energy Price and Stock Return: Evidence of Energy Sector Companies in Indonesia

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ABSTRACT

This research aims to analyze the effect of the exchange rates, interest rates, oil prices, coal prices, debt-to-equity ratio, return on asset, and firm size on the dependent variable stock returns in energy sector companies listed on the Indonesia Stock Exchange in 2017-2021. The analysis technique in this study was carried out using a panel data regression test with the Eviews10 program. The results of this study indicate that the variables coal price, debt-to-equity ratio, and firm size have no effect on stock returns, while oil prices and return on assets have a positive impact on stock returns. On the other hand, exchange rates and interest rates have a negative effect on stock returns.

Keywords: Stock Return, Energy Price, Energy Sector Company, Indonesia

JEL Classifications: E22, E44, G11

1. INTRODUCTION

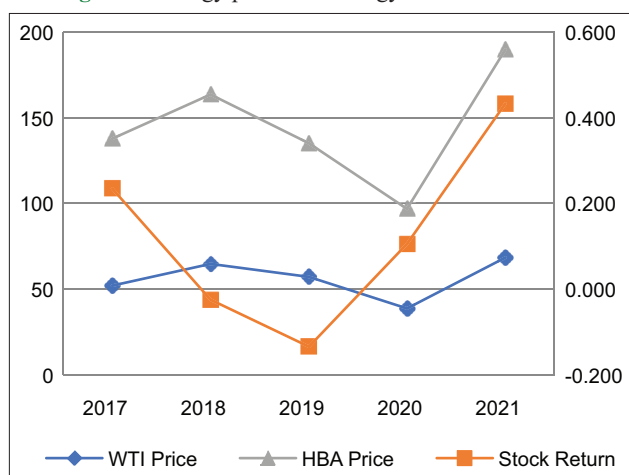
In addition to variable financial and macroeconomic performance factors, companies' share prices in the energy sector are also influenced by world oil and coal prices. World oil and coal prices are considered to represent energy prices because companies included in Indonesia's energy sector are primarily companies that produce oil and coal commodities. As a result, the realization of investment in energy sector companies in Indonesia has fluctuated from 2017 to 2021 (Figure 1). Based on the world oil price reference of price West Texas Intermediate (WTI) in 2020 touched \$38,596/barrel, and in 2021 increased to \$ 68,223/barrel.

Meanwhile, coal price (HBA) also fluctuated like oil price. Macroeconomy factors caused it from 2019 to 2021, which has been volatile. The Covid-19 Pandemic causes some of these to the turmoil of war between Russia and Ukraine. This is expected to affect stock returns in energy sector companies from 2017 to 2021.

Previous studies that focused on analyzing the effect of changes in oil and coal prices on energy sector share prices still need to provide

consistent conclusions. Xia et al. (2019) prove that oil and coal prices contribute the most to changes in returns on energy stocks, which have a robust time-varying pattern with high volatility from time to time. Reboredo (2015) found that oil prices significantly affect the downside risk and increase the return on energy stocks. Endri et al. (2021a) also prove that oil prices positively and significantly affect mining company stock returns. The study by Adenkunle et al. (2020) revealed a negative relationship between oil price volatility and stock prices. Ferrer et al. (2018) found an insignificant effect of crude oil prices on energy sector stock prices. Baruník and Křehlík (2018) also prove that crude oil prices do not significantly disrupt energy stock price fluctuations.

Hassan (2023) found that oil, coal, and natural gas prices are negatively related to the volatility of energy returns, but the effect of natural gas prices is significant. Sun et al. (2019) tested the impact of fluctuations in the prices of three fossil energies (oil, coal, and natural gas) on energy company stock prices. The study results reveal that the cost of fossil energy only accounts for a small part of the fluctuations in the price of shares of energy companies. Ratti and Hasan (2011) found that

Figure 1: Energy prices and energy sector stock return

increases in coal and oil prices led to increases in oil and gas company stock prices.

2. LITERATURE REVIEW

2.1. Effect of Exchange Rate on Stock Return

According to Mankiw (2007), the currency exchange rate between two countries is the price of the currency that residents of that country use to trade with each other. Endri et al. (2021a) stated that fundamental exchange rate changes reflect competitiveness differences between Indonesia and its trading partners. The weakening of the rupiah exchange rate can positively impact energy sector companies' stock returns because most of the product from energy sector companies, especially coal, is exported, and sales transactions use foreign currency as a payment. However, a study by Endri et al. (2021a) showed that the exchange rate significantly negatively affects stock return. Meanwhile, Amalia et al. (2021) stated that the exchange rate does not affect stock return.

H_1 : Exchange rate affects the stock return

2.2. Effect of Interest Rate on Stock Return

The interest rate is the price that must be paid if there is an exchange between one rupiah now and one rupiah in the future (Nurhayati et al., 2022). Therefore, an increase in interest rates will cut the Company's profits. This is because the increase in interest rate is proportional to the increase in loan interest, so companies will be more conservative in conducting funding policies. In addition, when interest rates rise, people tend to save their money in the bank, thereby selling shares which impacts decreasing prices and stock returns. Amalia et al. (2021) showed that interest rate significantly negatively affects stock return. Meanwhile, Suharyanto and Zaki (2021) stated that interest rate does not affect the stock return.

H_2 : Interest rate affect the stock return

2.3. Effect of Oil Price on Stock Return

World oil is the primary energy source for all industries worldwide and is needed by many parties (Aminda et al., 2023). For countries that are oil producers (exporters), an increase in oil prices will increase the welfare of the country and increase the income

of local people (Walujadi et al., 2022). Increasing oil prices will undoubtedly increase the opportunities for oil-producing companies to earn higher revenues. Meanwhile, the increase in oil prices caused the market to look for alternative energy to replace petroleum; for example, alternative energy such as coal also has the opportunity to generate higher profits. A study by Endri et al. (2021a) showed that oil price significantly positively affects stock return. Meanwhile, Marwanti and Robiyanto (2021) stated that oil price does not affect the stock return.

H_3 : Oil price affects the stock return

2.4. Effect of Coal Price on Stock Return

Coal is one of the energy sources needed in the industrial world, both domestic and foreign industries. An increase in coal demand every year triggers an increase in coal prices (Endri et al., 2021b). In addition, the increase in coal prices was followed by coal commodities, which are non-renewable resources whose numbers are dwindling. Increasing coal prices will make investors interested in investing in coal go-public companies because investors can gain greater profits by distributing dividends and capital gains. A study by Hasan and Ratti (2015) and Oberndorfer (2009) found that coal energy prices affect stock returns.

H_4 : Coal price affect the stock return

2.5. Effect of Debt to Equity Ratio on Stock Return

Debt to equity ratio (DER) is the ratio of total debt to total equity, which impacts the Company's burden on external parties (creditors) in fulfilling its debt obligations. A high DER value illustrates a relatively high company risk. As a result, investors tend to avoid stocks with a high DER, affecting the Company's stock price and ultimately impacting investor stock returns. Endri et al. (2019) stated that DER significantly negatively affects stock return. Meanwhile, Razak et al. (2020) stated that DER does not affect stock return.

H_5 : DER affects the stock return

2.6. Effect of Return on Asset on Stock Return

Return on assets (ROA) can be used to assess the strength of a company in funding all investments in assets that support production activities to obtain optimal profits. The higher ROA, the greater the potential for production activities to run efficiently and obtain maximum profits. High ROA performance indicates a high level of productivity in using assets to obtain net profit so that a company's shares will be more profitable for investors and provide greater returns for investors (Endri et al., 2019). Asikin et al. (2021) showed that ROA significantly positively affects stock return. Meanwhile, Razak et al. (2020) stated that ROA does not affect stock return.

H_6 : ROA affects the stock return

2.7. Effect of Firm Size on Stock Return

Based on the signal theory, companies provide signals to investors through financial reports with total assets so that investors are

interested in investing in the Company. Firm size signals investors positively (Connelly et al., 2011).

Handayani et al. (2019) showed that firm size significantly positively affects stock return. Meanwhile, Fachrudin and Ihsan (2021) stated that firm size does not affect stock return.

H_7 : Firm size affects the stock return

3. METHODOLOGY AND DATA

This research is quantitative. The population in this research are energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2017-2021 period. The sampling method was purposive sampling. The sample criteria were: (1) Energy sector companies listed on the IDX in 2021. (2) Energy sector companies were delisted from IDX in 2016 to 2021. (3) Energy sector companies should have consistently published complete financial reports from 2017 to 2021. Based on these criteria, the number of samples that meet the criteria of this research is 49 companies from 71 energy sector companies listed on the Indonesian Stock Exchange.

This research analyzed the effect of Exchange Rate, Interest Rate, Oil Price, Coal Price, ROA, DER, and Firm Size on the energy stock returns. The method of processing secondary data that has been collected from various sources is carried out using some software, such as Microsoft Excel 2019 and EViews 10.0. Data processing activities use Microsoft Excel 2019 software for table creation and analysis. Meanwhile, the author uses the EViews 10.0 software in panel data regression processing.

The research model used is as follows:

$$RS_{i,t}Q_{it} = \alpha + \beta_1 FOREX_{it} + \beta_2 IR_{it} + \beta_3 OP_{it} + \beta_4 CP_{it} + \beta_5 DER_{it} + \beta_6 ROA_{it} + \beta_7 SIZE_{it} + \varepsilon_{it}$$

Which are:

$RS_{i,t}Q_{it}$ = Stock return, α = Intercept, β = Slope, i = Company, t = Year, ε = Component error, $FOREX$ = Exchange rate, IR = Interest rate, OP = Oil price, CP = Coal price, DER = Debt to equity ratio, ROA = Return on asset, $SIZE$ = Firm size.

4. RESULTS AND DISCUSSION

4.1. Data Analysis

Table 1 describes the statistical data of the research variables, including mean, median, maximum, minimum, and standard deviation. The exchange rate variable (FOREX) had a maximum value of IDR 14.553/US\$ in 2018 and a minimum of IDR 13.616/US\$ in 2017. Meanwhile, the interest rate variable (IR) has a maximum value of 0,05625 in 2019 and a minimum value of 0,03521 in 2021. The oil price variable (OP) has a maximum value of US\$ 68,2230/barrel in 2021 and a minimum value of US\$ 38,5960/barrel in 2020. While the coal price variable (CP) has a maximum value of US\$ 121,4710/ton in 2021 and a

minimum value of US\$ 58.,1700/ton in 2020. The debt to equity ratio (DER) variable has a maximum value of 34,0556 for ARII in 2018, with debts of US\$ 340.079.000 and a minimum value of -13.2913 for APEX in 2017, which had negative equity for that year. Meanwhile, the return on asset (ROA) variable has a maximum value of 0.52018 for BYAN in 2021, with a profit for the year of US\$ 1.265.957.342 and a minimum value of -1.01265 for MITI in 2019, which suffered a loss of Rp. 87.934.380.048 in that year. The firm size (SIZE) variable has the most significant standard deviation compared to the variables in this study. The standard deviation of SIZE is IDR 24,456 Trillion, with an average value for the SIZE variable of IDR 14,448 Trillion, indicating a relatively large distribution of data variables. While the stock return variable (RS) has a maximum value of 3.34043 at the INDY in 2017 and a minimum value of -0.92308 at the SMRU in 2019.

4.2. Panel Data Regression

The panel data regression model for estimating and analyzing the determinants of stock returns in energy sector companies listed on the Indonesia Stock Exchange during the 2017-2021 period is based on three models: Common Effect, Fixed Effect, and Random Effects. The panel data regression model was applied in the study for further analysis using paired tests for each model.

Based on the paired test results using Chow Test, Lagrange Multiplier (LM) Test, and Hausman Test shown in Table 2, the panel data regression method was chosen to estimate and analyze the determinants of the stock returns of energy sector companies listed on the Indonesia Stock Exchange during 2017- 2021 is a random effects model.

Table 3 shows the results of panel data regression testing with the random effect model. The estimation results of the random effects model can be written in the following panel data regression equation:

$$RS = 39,71095 - 4,627712 * FOREX - 24,18668 * IR + 0,717248 * OP - 0,014515 * CP + 0,0011410 * DER + 1,396812 ROA + 0,042204 SIZE + [CX=F]$$

The coefficient of determination (R^2) is a measure that shows how much the contribution of the independent variable to the dependent variable. Below are the results of the coefficient of determination in this research. Based on Table 4 and the model equation, it can be seen that the effect of Exchange Rate, Interest Rate, Oil Price, Coal Price, DER, ROA, and Firm Size on stock return is 0,120460. This means that the effect of the independent variable on the dependent variable is 12.05%, and the rest is influenced by other variables not included in this research.

4.3. Hypothesis Testing

Based on Table 5, they are testing each random effect model regression coefficient for the determinants of stock returns for energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2017-2021 period using the t-test. The t-test was conducted to determine whether each of the independent variables

Table 1: Statical data description

Measurement	FOREX	IR	OP	CP	DER	ROA	SIZE	RS
Mean	14.131,08	0,04613	56,0654	88,4832	1,30154	0,01942	14,448 T	0,12488
Median	14.175,53	0,04563	57,0990	85,9180	0,82742	0,02951	4,235 T	0,00000
Maximum	14.553,00	0,05625	68,2230	121,4710	34,0556	0,52018	115,540 T	3,34043
Minimum	13.616,00	0,03521	38,5960	58,1700	-13,2913	-1,01265	64,597 M	-0,92308
SD	321,5545	0,00726	10,4481	21,1888	4,11774	0,16406	2,44×10 ¹³	0,55767

Table 2: Panel data regression model testing

Method	Testing	Result
Chow-test	Common effect versus fixed effect	Fixed effect
LM-test	Common effect versus random effect	Random effect
Hausman-test	Fixed effect versus random effect	Random effect

Table 3: Random effect testing results

Variable	Coefficient
C	39.71095
FOREX	-4.627712
IR	-24.18668
OP	0.717248
CP	-0.014515
DER	0.011410
ROA	1.396812
SIZE	0.042204

Table 4: The coefficient of determination weighted statistic

Weighted statistic			
R-squared	0,12046	Mean Dependent Var	-0,96691
Adjusted R- Squared	0,09448	S.D. Dependent Var	0,903411
S.E. of regression	0,85968	Sum Squared Resid	175,1526
F-statistic	4,63699	Durbin-Watson Stat	1,894296
Prob (F-statistic)	0,00007		

Table 5: Hypothesis test results (t-test)

Variable	Std. Error	t-statistic	Prob	Conclusion
FOREX	2,713407	-1,705,498	0,0894*	Significant
IR	8,368494	-2,890,207	0,0042***	Significant
OP	0,319491	2,244,968	0,0257**	Significant
CP	0,072572	-200,008	8,416	Not Significant
DER	0,016646	685,442	4,937	Not Significant
ROA	0,438569	3,184,930	0,0016***	Significant
SIZE	0,052800	799,326	4,249	Not Significant

*Significant level at α (alpha) <0.1 (<10%), **Significant level at α (alpha) <0.05 (<5%), ***Significant level at α (alpha) <0.01 (<1%)

used in this research can partially influence the stock returns of energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2017-2021 period significantly or not with three levels of confidence, namely 90 percent or alpha equals ten percent ($\alpha = 0,1$), 95 percent or alpha equals five percent ($\alpha = 0,05$) and a confidence level of 99 percent or alpha equals one percent ($\alpha = 0,01$).

The results of the hypothesis testing above show that the exchange rate is a variable with a lower α value than the significant level of 0,1. In contrast, the oil price variable has a lower α value than the significant level of 0,05. The interest rate and ROA are variables that have α value lower than the significant level 0,01. The empirical findings of this research as in line with the research hypothesis, which states that the variable exchange rate,

oil prices, interest rate, and ROA affect the stock return of energy sector companies listed on the Indonesia Stock Exchange for the period 2017-2021. Meanwhile, the coal price, DER, and firm size variables have a higher α value than the significant level of 0,1. Therefore, the empirical finding of this research is not in line with the research hypothesis, which states that the coal price, DER, and firm size affect the stock return of energy sector companies listed on the Indonesia Stock Exchange for the period 2017-2021.

4.4. Discussion

Based on empirical evidence shows that the exchange rate variable (FOREX) has a negative and significant effect on stock returns for energy sector companies listed on the Indonesia Stock Exchange during 2017-2021. The results of this study are by the arbitrage pricing theory (APT) theory that states stock returns are not only influenced by market portfolios but also by macroeconomic variables, in this case, the exchange rate. The results of this study support the research conducted by Putra and Robiyanto (2019), Endri et al. (20212), and Supriyanto et al. (2021).

Based on empirical findings showing that the interest rate variable has a negative and significant effect on stock returns of energy sector industrial companies listed on the Indonesia Stock Exchange (IDX) during the period 2017-2021. A negative coefficient indicates that the greater the interest rate, the Company's ability to generate stock returns will decrease. When interest rates rise, people tend to save their money in the bank, thereby selling shares that decrease prices and stock returns. The result of this research is by the initial hypothesis and is in line with the research of Amalia et al. (2021) and Endri et al. (2020).

The research result shows that the oil price variable has a positive and significant effect on stock returns for energy sector companies listed on the Indonesia Stock Exchange (IDX). The findings of this study support the signal theory, which states that the better signal that has a positive impact on a company, the more attractive investors are to invest in that Company. The result of this study is the initial hypothesis and in line with the research of Putra and Robiyanto (2019), Endri et al. (2021a), and Supriyanto et al. (2021).

Empirical evidence shows that the variable coal price has a negative and insignificant effect on stock returns for energy sector companies listed on the Indonesia Stock Exchange (IDX). This shows that the size of the fluctuation in the variable price of coal is not a consideration for investors in their decision to purchase company shares in the energy sector in 2017-2021. Based on the research gap, which states that coal prices do not affect stock returns, is in line with research by Hassan (2023).

By the empirical findings, it shows that the Debt to Equity Ratio (DER) variable has a positive and not significant effect on the stock returns of energy sector industrial companies listed on the Indonesia Stock Exchange (IDX) during the period 2017-2021 which shows that the size of the DER is not a consideration for investors in the decision to purchase company shares in the energy sector in 2017-2021. Based on the research gap which states that the DER has no effect on stock returns in line with research by Hapsoro and Syahriar (2021), Sivilianto and Endri (2019), Razak et al. (2020), Endri et al. (2021) and Supriyanto et al. (2021).

The research result shows that the variable Return on Assets (ROA) has a positive and significant effect on the stock returns of energy sector industrial companies listed on the Indonesia Stock Exchange (IDX) during the period 2017-2021. When viewed from a positive coefficient, it indicates that the greater the ROA, the Company's ability to generate stock returns will increase. The findings of this study are consistent with the signal theory, which states that the higher the Company's profit, the more investors will be interested in investing in that Company. The result of this study is the initial hypothesis and in line with research from Endri et al. (2019), Anthony et al. (2020), Asikin et al. (2021), Hafidzi and Qomariah (2022), and Harahap et al. (2020).

Empirical findings show that the Firm Size variable has a positive and insignificant effect on stock returns for energy sector companies listed on the Indonesia Stock Exchange (IDX), which shows that the size of the firm size variable is not a consideration for investors in purchasing decisions. Company shares in the energy sector in 2017-2021. This is supported by the firm size of companies in the energy sector which already has quite a large discrepancy between companies with total trillions and companies with total assets in billions. Based on the research gap states that firm size does not affect stock returns, in line with research by Suciati (2018), Yularti and Diyani (2018), Cahyani and Sembiring (2019), and Fachrudin and Ihsan (2021).

5. CONCLUSION

The results showed that the coal price, debt to equity ratio (DER), and firm size variables do not affect the return stock of energy sector companies listed on the Indonesia stock exchange for 2017-2021. On the other hand, the exchange rate and interest rate variables have a negative and significant effect on the stock returns of energy sector companies listed on the Indonesia stock exchange for 2017-2021. Meanwhile, the oil price and return on asset (ROA) variables positively and significantly affect the stock returns of energy sector companies listed on the Indonesia Stock Exchange for 2017-2021. Therefore, for investors in purchasing shares in energy sector companies, it is necessary to consider macroeconomic factors such as exchange rates, interest rates, and fluctuations in oil prices (OP). As for the Company's internal factors, investors can pay attention to the variable Return on Assets (ROA).

This study proves that the four research variables significantly influence stock returns in energy sector companies. Recommendations for this research can be developed by extending

the research period and involving other internal factors such as total asset turnover, profit margin, price earning ratio, dan market to book ratio.

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