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The Effect of Macroeconomic Variable on Return and Volatility on JII and LQ-45

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Abstract

The study analyze the effect of macroeconomic variables on returns and volatility. Previous research examines the effect of macroeconomic variables on volatility is still limited, and it is interesting to study. Previous research focuses on the effect of macroeconomic variables on JCI; therefore, this study will use JII and LQ-45. The analytical technique used in this study is GARCH. This study states that the Dow Jones and Gold indexes significantly negatively affect JII and LQ-45 returns, while crude oil and exchange rates significantly positively affect JII and LQ-45. The Dow Jones variable has no significant positive effect on JII volatility and negatively affects LQ-45 volatility. The exchange rate has a significant negative effect on the volatility of JII and LQ-45. Crude oil prices have an insignificant negative effect on JII and LQ-45 volatility, and gold has a significant positive effect on JII and LQ-45 volatility.

Keywords: Return, Volatility, Jakarta Islamic Index (JII), LQ-45 Index, Dow Jones Index (DJI).

Abstrak

Penelitian ini menganalisis pengaruh variabel makroekonomi terhadap return dan volatilitas. Penelitian sebelumnya yang mengkaji pengaruh variabel makroekonomi dengan volatilitas masih terbatas, dan menarik untuk diteliti. Penelitian sebelumnya cenderung berfokus pada pengaruh variabel makroekonomi terhadap IHSG, oleh karena itu penelitian ini akan menggunakan populasi JII dan LQ-45. Teknik analisis yang digunakan dalam penelitian ini adalah GARCH. Penelitian ini menyatakan bahwa indeks Dow Jones dan Gold berpengaruh negatif signifikan terhadap return JII dan LQ-45, sedangkan minyak mentah dan nilai tukar berpengaruh positif signifikan terhadap JII dan LQ-45. Variabel Dow Jones berpengaruh positif tidak signifikan terhadap volatilitas JII, dan berpengaruh negatif signifikan terhadap volatilitas LQ-45. Nilai tukar berpengaruh negatif signifikan terhadap volatilitas JII dan LQ-45. Harga minyak mentah berpengaruh negatif tidak signifikan terhadap volatilitas JII dan LQ-45, dan emas berpengaruh positif signifikan terhadap volatilitas JII dan LQ-45.

Kata kunci: Return, Volatilitas, Jakarta Islamic Index (JII), Indeks LQ-45, Indeks Dow Jones (DJI).

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INTRODUCTION

Mamahit et al. (2019) said that in the capital market, especially in stock trades, there will be price fluctuations every day and will establish a price through the process of supply and demand for these stocks. Supply and demand that will establish a stock price can be influenced by several factors, such as how the company's performance and what industry the company is engaged in, as well as macroeconomic factors, and non-economic factors such as social and political conditions (www.idx.co.id). Often investors will use the Jakarta Composite Index (JCI) to see how the overall stock price condition is, whether the shares listed on the Indonesia Stock Exchange are moving up or down (Robiyanto et al., 2019). JCI records information on the performance and movement of the stock market so that the JCI forms a reflection of the performance of the combined stock in the market (Tandelilin, 2017). In addition to seeing how the JCI moves, there is also the LQ-45 index that can be seen or used as an alternative by investors. The LQ-45 index is a stock index of 45 issuers that have high liquidity and specific qualifications. There is a selection by looking for issuers with high liquidity, which is adjusted every six months. The Jakarta Islamic Index (JII) is a collection of 30 shares based on sharia principles. Investors who want to implement investment in sharia rules can look at JII as a reference in viewing sharia stock portfolios.

Seeing how the stock index moves, but investors, when they want to invest, also observe several factors such as the level of risk and return they will get and the level of volatility. Surbakti et al. (2016) said that in investing, investors consider several factors, specifically risk and return. Return is also referred to as the profit to be obtained by investors; investors who dare to take risks will get a higher return. The rate of return is influenced by how the macroeconomic conditions are. In contrast, the level of volatility can reflect existing stock prices because Volatility is a statistical measurement of fluctuations in stock prices in a certain period (Purbawati & Dana, 2016). High volatility indicates relatively high fluctuations, followed by low volatility and high returns (Surbakti et al., 2016).

A change in the rate of return and volatility can be affected by how the macroeconomics is in, such as the exchange rate of the rupiah against the dollar, world oil prices, and gold prices. There is also the influence of foreign exchanges that can affect the movement of returns and volatility. According to Dirga et al. (2016), the development of the investment sector, such as stocks, is a pillar of economic growth. Robiyanto et al. (2019) stated that the condition of the Indonesian capital market on stock instruments that affect the JCI is influenced by the fluctuations in exchange rate movements, crude oil prices, and the main stock exchange index in the United States, namely the Dow Jones index. Handiani (2014) says that the world gold price, world oil price, and the USD/IDR exchange rate positively influence the Composite Stock Price Index. In addition, the Dow Jones Index in the research of Deitiana & Stella (2009) has a significant influence on the JCI. Robiyanto (2018) also states that oil prices influence stock price movements because oil is a source of energy from various industries.

Research that has been done by Ghiffari et al. (2018) states that the up and down movement of the New York Stock Exchange has a unidirectional response to investors and market participants on the Indonesia Stock Exchange. The movement of economic growth in developed countries has a correlation or relationship with developing countries. The Dow Jones index is one of the oldest indices in the United States that reflects its economic performance (Robiyanto et al., 2019). Economic growth can be seen from the movement of the index; if the Dow Jones index has an increasing movement, the economy in the United States will also

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increase, and vice versa. One of Indonesia's relations with America is as an export destination; if the United States experiences good economic growth, then economic growth in Indonesia will also increase due to export activities, direct investment, and investment in the capital market in Indonesia (Jayanti, 2014).

Other macroeconomic variables such as the exchange rate between one country's currency and another country's currency. One of them is the American Dollar with Rupiah, which is used to transact in trade and investment. The USD/IDR exchange rate is included in one of the factors that are quite influential on the JCI because if the USD/IDR exchange rate strengthens, investors will choose to invest in USD compared to stocks, and vice versa (Handiani, 2014). These factors can affect the movement of the JCI up or down.

World oil prices are also among the things that affect the movement of the JCI. There is a negative effect of rising oil prices on the capital market in Indonesia because Indonesia is an importer of petroleum; therefore, petroleum can negatively affect macroeconomic balance (Robiyanto, 2018b). An increase in global oil prices will encourage an increase in stock prices in the mining sector, an increase in mining stocks will affect the JCI increase (Kurniawan, 2012). World oil is also one of the macroeconomic variables that affect the economic sector in various countries (Pantas, 2017).

The last is gold; Handiani (2014) said, gold is an item that investors prefer because of its low risk. Low risk, not affected by inflation, has a high value that makes investors interested in investing in gold. More interest in gold will cause the JCI to decline because many investors will sell their shares and prefer to invest in gold, and vice versa.

It can be seen from what has been described previously that previous research has often focused on what happened to the Jakarta Composite Index. Meanwhile, research that focuses on the Jakarta Islamic Index is still rare. Robiyanto (2018b) said that in JII, there are several characteristics such as operational activities and products or services produced following sharia principles and having an Asset Liability Ratio of not more than 90%. The existing Islamic finance industry in Indonesia has experienced strong growth every year. One of the countries with the most significant Muslim majority in the world makes it an essential factor in the development of sharia-based instruments (Pantas, 2017). The volatility variable needs to be added in the study because it reflects the current stock price; if a stock has high volatility, then the fluctuation rate is relatively high; on the contrary, if the volatility is low, it will get a high return. The situation experienced by the macroeconomy also affects the volatility of stocks because the condition of the up or down of the macroeconomy affects the operating activities of a company (Surbakti et al., 2016). Therefore, in this study, we will examine the effect of macroeconomic variables on the return and volatility of the JII and LQ-45. The purpose of this study was to determine the effect of each macroeconomic variable, as well as to add new literature on the return and Volatility of the JII and LQ-45.

LITERATURE REVIEW

Return. Stock return is the profit obtained from the difference between the selling price and the purchase price of the stock. In investing, investors tend to look at the level of return that can be obtained. The greater the level of return owned by a company, the more interested investors will be in investing their capital. Investors will get returns in the form of capital gains or losses and dividends (Tandelilin, 2017). The following formula can calculate return:

$$R = \frac{t-(t-1)}{(t-1)} \dots\dots\dots(1)$$

Where: R = Stock return.

t = stock price in period t.

t-1 = Share price in the previous period.

According to Surbakti et al. (2016), return and risk on stocks have a positive relationship because the greater the risk is obtained, the higher the profit is obtained, and vice versa.

Volatility. Volatility usually occurs because the capital market is closely related to macroeconomic conditions. Volatility will cause significant risk and uncertainty; companies will find it challenging to raise their capital market capital during volatile market conditions (Kartika, 2003). In the research of Mamahit et al. (2019), the overall capital market in Indonesia showed positive performance and growth because the JCI had an upward trend and had relatively well-maintained Volatility. Volatility is the primary concern of investors.

Jakarta Islamic Index. Jakarta Islamic Index is an index consisting of 30 Islamic stocks in Indonesia. The Jakarta Islamic Index (JII) was first launched on the Indonesia Stock Exchange on July 3, 2000. This stock index was launched and created based on Islamic Sharia. In addition, this stock index is used as a benchmark for sharia-based stock performance and aims to develop the Islamic capital market in Indonesia. Companies registered with JII are not companies that distribute, produce, and provide goods or services that will cause harm. Various conditions must be met to enter JII, including the issuer not running a gambling business and prohibited games according to Islamic law.

LQ-45. Index LQ-45 is a stock index consisting of 45 stocks with high liquidity and a large market capitalization and is also supported by good company fundamentals. The LQ-45 index aims to complement the JCI and provide a reliable means for investors to monitor the price movements of actively traded stocks. There are several criteria for issuers to be included in the LQ-45 index, including market capitalization considerations. In addition, the company's financial condition and development will also be seen. The 45 issuers will be adjusted every six months. Therefore, the stocks contained in the LQ-45 index will continually change.

Dow Jones Index. According to Kurniawan (2012), the Dow Jones index is the oldest in America and was issued on May 26, 1896 by the Wall Street Journal and Dow Jones & Company editors. The Dow Jones index is included in the average stock index of 30 industrial companies in America (Sumantyo & Sutanto, 2019). The United States had the most robust economy in 2007 with a contribution of 20-30% of world turnover and had a world Gross Domestic Product (GDP) of 20% (Robiyanto et al., 2019). Therefore, the United States has a significant influence on the economy in other countries and the influence of economic activities between interconnected countries. In a study conducted by Kurniawan (2012), the Dow Jones index significantly affected the JCI. Robiyanto et al. (2019) examine that the Dow Jones index positively affects the JCI because if the Dow Jones index strengthens, the JCI will also strengthen, and vice versa. According to Surbakti et al. (2016), the Dow Jones variable on JCI volatility has a significant positive effect because globalization and economic relations between related countries allow for a volatility relationship. While in the research of Ghiffari et al. (2018), there was no significant effect between the Dow Jones index on the JCI.

H1a: The Dow Jones index has a positive effect on JII returns.

H1b: The Dow Jones index has a positive effect on LQ-45 returns.

H2a: The Dow Jones index has a positive effect on JII volatility.

H2b: The Dow Jones index has a positive effect on LQ-45 Volatility.

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Exchange Rate. The exchange rate is the value of a specific country's currency that can be exchanged for another country's currency. This study will use the exchange rate of the rupiah against the US dollar. The level of demand and supply can affect the exchange rate; if the demand for rupiah is lower than the supply of rupiah, there will be depreciation against the US dollar (Robiyanto et al., 2019). Many companies in Indonesia still depend on imported raw materials from abroad; the currency value also affects the price of raw materials; if the value of the currency depreciates, the price of raw materials will increase in price. The increase in the price of raw materials will reduce company profits due to an increase in production costs (Kurniawan, 2012). Under these conditions, investors tend to sell their shares to companies whose profits are declining to affect the movement of the JCI, which decreases.

In research conducted by Kurniawan (2012), the USD/IDR exchange rate has no significant effect on the JCI. Every increase of one rupiah against the US Dollar will result in a negative decline in stocks. Meanwhile, in the research of Robiyanto et al. (2019), there is a negative effect on the JCI because if the rupiah exchange rate against the dollar weakens, it will cause the JCI to weaken, and vice versa if there is an appreciation of the rupiah against the US Dollar, the JCI will strengthen. That condition makes investors interested in investing in stocks. Robiyanto's (2018b) research shows that the USD/IDR exchange rate significantly negatively affects JCI returns.

In contrast to the research conducted by Surbakti et al. (2016), the exchange rate variable has a positive effect on the Volatility of JCI returns.

H3a: The exchange rate (USD/IDR) has a negative effect on JII returns.

H3a: The exchange rate (USD/IDR) has a negative effect on LQ-45 returns.

H4a: The exchange rate (USD/IDR) has a negative effect on JII volatility.

H4a: The exchange rate (USD/IDR) has a negative effect on LQ-45 Volatility.

Crude Oil. Kurniawan (2012) defines world oil price as the price of world crude oil measured by the spot price of the world oil market, using the West Texas Intermediate or Brent standard. Lightweight crude oil is a crude oil found in West Texas Intermediate which has high quality because it has low sulfur content. Sumantyo & Sutanto (2019) argue that the world oil price is the price of oil sold abroad which can affect the condition of the Indonesian economy; this condition affects Indonesia due to oil imports for household and industrial consumption. In a study conducted by Kurniawan (2012), world oil prices do not affect the JCI. Research conducted by Robiyanto et al. (2019) the price of crude oil positively influences the JCI.

H5a: World oil prices have a positive effect on JII returns.

H5b: World oil prices have a positive effect on LQ-45 returns.

H6a: World oil prices have a positive effect on JII volatility.

H6b: World oil prices have a positive effect on LQ-45 Volatility.

Gold Price. Gold is one of the tangible assets that can be invested and is a precious metal included in commodities and assets that affect the economy. Apart from being an investment asset, gold can also be used as a store of wealth because its value is universally accepted and as a financial standard for many people (Robiyanto, 2018b). Gold is also an asset with low risk and tends to be stable (Kurniawan, 2012); therefore, if gold experiences an increase, investors tend to invest in gold rather than the capital market. This condition caused the Jakarta Composite Index to decline. In a study conducted by Kurniawan (2012), world gold prices significantly affect the JCI. Research conducted by Robiyanto (2018b) explains that there is a positive influence on the price of gold in the Rupiah currency.

- H7a: The gold price has a positive effect on JII returns.
- H7b: The gold price has a positive effect on LQ-45 returns.
- H8a: The gold price has a positive effect on JII volatility.
- H8b: The gold price has a positive effect on LQ-45 Volatility.

RESEARCH METHOD

The data used in this study are secondary data from daily closings of the capital market, USD/IDR exchange rates, world oil commodity prices (WTI), and gold prices in 2015-2019. This study uses capital market data at the daily closing index of the Dow Jones index, Jakarta Islamic Index, and LQ-45 Index. Daily capital market closing data and gold prices will be taken from Investing. The closing USD/IDR exchange rate used is the middle rate and is obtained from www.bi.go.id. The daily closing data on World Texas Intermediate crude oil is obtained from the U.S Energy Information Administration. The population in this study is all daily closing time series data which includes the Jakarta Islamic Index and LQ-45 Index for the period January 2015 – December 2019, which is 1169 days.

This study will use the analysis technique Generalized Autoregressive Conditional Heteroscedasticity (GARCH). The GARCH method was chosen because this study using time series data which sometimes found abnormal data, and the data could not be normalized. The GARCH method was introduced by Bollerslev (1986), which is a derivative or development of the ARCH model.

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \sigma^2_t + \varepsilon_t \dots \dots \dots (2)$$

$$\sigma^2_t = \alpha_0 + \alpha_1 \varepsilon^2_{t-1} + \dots + \alpha_p \varepsilon^2_{t-p} + \lambda_1 \sigma^2_{t-1} + \dots + \lambda_q \sigma^2_{t-q} \dots \dots \dots (3)$$

Where:

- Y_t = JII / LQ-45
- β_0 = Constant
- $\beta_1 - \beta_3$ = Regression coefficient
- X_1 = Dow Jones Index
- X_2 = USD/ IDR exchange rate
- X_3 = World crude oil price
- X_4 = Gold price
- σ^2_t = Variant at t-time
- ε_t = Residual at t-time

The four parts of the conditional variance:

- σ^2_t = Variant at t-time
- α_0 = Constant variance
- $\alpha_1 \varepsilon^2_{t-1}$ = Volatility in the previous period (ARCH Component)
- $\lambda_1 \sigma^2_{t-1}$ = Variant in the previous period (GARCH Component)

Before the analysis test with GARCH, the stationarity test was carried out using the Augmented Dickey-Fuller test or the ADF test. In this test, the data to be used must be stationary. The hypothesis in the Augmented Dickey-Fuller test is $H_0 \geq \alpha$, then there is a unit root, the time series data is not stationary.

RESULTS AND ANALYSIS

Of the variables used for the research process to produce descriptive statistics of each variable. As for what is included in the descriptive statistics, namely the minimum, maximum, and standard deviation of each variable.

Table 1. Descriptive Statistical Results

	Mean	Median	Maximum	Minimum	Standard Deviation
JII	0.000090	0.000507	0.058001	-0.076505	0.011761
LQ-45	0.000180	0.000546	0.061944	-0.076980	0.011518
Dow Jones	0.000461	0.000717	0.050278	-0.046049	0.008768
Exchange Rate	0.000091	0.000225	0.018513	-0.022041	0.004037
WTI	0.000520	0.001228	0.146764	-0.095500	0.024714
GOLD	0.000149	0.000131	0.044851	-0.047099	0.007930

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021)

In Table 1, descriptive statistics represent a description of each variable's movement from 2015 to 2019, taken from the daily closing of 1169 days. JII and LQ-45 are dependent variables with data diversity of 0.011761 and 0.011518, which are stated in the standard deviation value. At the same time, the independent variable is the Dow Jones index which has a standard deviation of 0.008768. Independent variables such as the USD/IDR exchange rate have a variance of 0.004037, while oil has an average of 0.024714. Finally, this study also uses gold as an independent variable which has a diversity of value 0.007930.

After knowing the descriptive statistical data from each data, the data will then be processed with a stationary test. The stationary test used is the Augmented Dickey-Fuller Test which is carried out to determine whether the data from each variable used is stationary or not. Stationary data is a fluctuation in data whose value does not depend on time and the variance of the fluctuation.

Table 2. Augmented Dickey Fuller Test

T-statistic	JII	LQ-45	Dow Jones	Exchange Rate	WTI	GOLD
ADF-Test Statistic	-35.188640	-33.649210	-35.435660	-32.974530	-37.001930	-35.576870
Level 1%	-3.435729	-3.435729	-3.435729	-3.435729	-3.435729	-3.435729
Level 5%	-2.863803	-2.863803	-2.863803	-2.863803	-2.863803	-2.863803
Level 10%	-2.568025	-2.568025	-2.568025	-2.568025	-2.568025	-2.568025
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Result	Stationer	Stationer	Stationer	Stationer	Stationer	Stationer

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021).

It can be seen in Table 2 of the Augmented Dicker Fuller test that the probability results of the entire variable (1 percent), then the data is declared stationary. So that all variables that will be used can be analyzed using GARCH.

Table 3. GARCH Test Results (JII Return)

Variable	Coefficient	Z-statistic	Prob.
Dow Jones	-0.709563	-57.047030	0.0000*
Exchange Rate	0.088796	1.977111	0.0480**
WTI	0.029777	4.735608	0.0000*
Gold	-0.190154	-15.778860	0.0000*
RESID(-1)^2	2.048519	27.090990	0.0000
GARCH	0.095998	14.134560	0.0000
Adjusted R-Squared	-0.199956		

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021).

Information: *significant at a significance level of 1%

**significant at a significance level of 5%

It can be seen from the results of the GARCH test above that the probability value of the Dow Jones index, the price of oil or WTI, and gold has a probability value of less than $\alpha=1\%$, which is 0.0000. There is a probability value less than $\alpha=5\%$ in the exchange rate variable, which is 0.0480. This condition indicates that all independent variables have a significant effect on JII return. Table 3 also shows the Adjusted R-squared value of -0.199956, meaning that the JII return of 19.99 percent during the study period can be explained by the Dow Jones index variable, the USD/IDR exchange rate, crude oil, and gold. The remaining 80.01 percent is explained by other variables that are not used in this study.

Table 4. GARCH Test Results (LQ-45 Return)

Variable	Coefficient	Z-statistic	Prob.
Dow Jones	-0.464542	-54.696980	0.0000*
Exchange Rate	0.068483	2.187836	0.02878**
WTI	0.018408	4.187882	0.0000*
Gold	-0.136968	-16.588910	0.0000*
RESID(-1)^2	1.934431	26.459300	0.0000
GARCH	0.111439	15.567570	0.0000
Adjusted R-Squared	-0.203520		

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021).

Information: *significant at a significance level of 1%

**significant at a significance level of 5%

From the GARCH return test results above on LQ-45 return, the probability value of the Dow Jones index, the price of oil or WTI, and gold has a probability value of less than $\alpha=1\%$, which is 0.0000. In the exchange rate variable, there is a probability value less than $\alpha=5\%$, which is 0.02878. This condition indicates that all independent variables have a significant effect on LQ-45 return. In addition, Table 4 also shows the Adjusted R-squared value of -0.203520, meaning that the LQ-45 return of 20.35 percent during the study period can be explained by the Dow Jones index variable, the USD/IDR exchange rate, crude oil, and gold. The remaining 79.65 percent is explained by other variables that are not used in this study.

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Table 5. GARCH Test Results (JII Volatility)

Variable	Coefficient	Z-statistic	Prob.
Dow Jones	0.014414	0.724808	0.4686
Exchange Rate	-0.410873	-8.967256	0.0000*
WTI	-0.003248	-0.506647	0.6124
Gold	0.352746	15.500850	0.0000*
RESID(-1)^2	1.487734	14.368340	0.0000
GARCH	-0.042302	-3.798567	0.0001
Adjusted R-Squared	-0.051319		

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021).

Information: *significant at a significance level of 1%

In Table 5, it can be seen that the probability value of the exchange rate variable and gold has a probability value smaller than $\alpha=1\%$, which is 0.0000. At the same time, the Dow Jones index and WTI variables have a probability value greater than $\alpha=1\%$, namely 0.4686 and 0.6124. This condition indicates that the independent variables such as the exchange rate and gold used in this study individually have a significant effect on the volatility of JII. The Dow Jones and WTI variables do not have a significant influence individually on JII volatility.

Table 6. GARCH Test Results (LQ-45 Volatility)

Variable	Coefficient	Z-statistic	Prob.
Dow Jones	-0.084001	-6.468514	0.0000*
Exchange Rate	-0.341812	-12.489890	0.0000*
WTI	-0.004839	-0.766995	0.4431
Gold	0.288309	18.119030	0.0000*
RESID(-1)^2	1.356897	18.285230	0.0000
GARCH	-0.069798	-4.219107	0.0000
Adjusted R-Squared	-0.085858		

Source: Investing, www.bi.go.id, USEIA, Processed Data (2021).

Information: *significant at a significance level of 1%

In Table 6, it can be seen that the probability value of the Dow Jones index, exchange rate variable, and gold has a probability value smaller than $\alpha=1\%$, which is 0.0000. At the same time, the WTI variable has a probability value greater than $\alpha=1\%$, namely 0.4431. This condition indicates that the independent variables such as the exchange rate and gold used in this study individually have a significant effect on the volatility of JII. The Dow Jones and WTI variables do not have a significant influence individually on JII volatility.

In the test results listed in Table 3, it can be seen that the coefficient value of Dow Jones is -0.709563, which indicates that Dow Jones has a significant negative effect on JII's return. This is not in line with what has been described in H1a above, that the Dow Jones has a positive effect on JCI returns. While in Table 4, the Dow Jones index has a coefficient value of -0.464542, indicating that the Dow Jones index has a significant negative effect on LQ-45 returns. This is also not in line with H1b. Then H1a and H1b are rejected because they are not in accordance. This condition indicates that if the Dow Jones index strengthens, the return of JII and LQ-45 will also be higher. Table 5 and 6 show the coefficient values of Dow Jones of 0.014414 and -0.084001. This shows that the Dow Jones index has no significant positive effect on JII volatility

and the Dow Jones index has a significant negative effect on LQ-45 volatility. These results indicate the following H2a described above, which says that the Dow Jones index positively influences JII volatility; therefore, H1b is accepted, while H2b is rejected.

The other macroeconomic variables, such as the exchange rate, the GARCH test results in Table 3 yield a value of 0.088796, which means that the exchange rate has a significant positive effect on JII returns. Meanwhile, the return LQ-45 in Table 4 can be seen from the coefficient of 0.068483, which means that the exchange rate also has a positive and significant effect on LQ-45 returns. This condition is not following H3a and H3b, which state that the USD/IDR exchange rate has a negative effect on JII's return. This can be interpreted that if the dollar exchange rate against Rupiah depreciates, then JII and LQ-45 will weaken; on the contrary, if the Dollar exchange rate against Rupiah appreciates, it will increase JII and LQ-45 returns. Then in Table 5 and 6, it can be seen that the coefficient results are -0.410873 and -0.341812, which means that the USD/IDR exchange rate has a significant negative effect on JII and LQ-45 Volatility. This condition states that the USD/IDR exchange rate has a negative effect, according to the results of the coefficients in Table 5 and 6 of the GARCH test results. Therefore H4a and H4b are accepted.

Furthermore, there is a variable price of crude oil, in Table 3 shows that the price of crude oil has a coefficient value of 0.029777; this indicates that crude oil has a significant positive effect on JII returns. While Table 4 shows the coefficient value of crude oil prices of 0.018408, this indicates that world oil prices have a significant positive effect on LQ-45 returns. This condition is in line with H5a and H5b; therefore, the hypothesis is accepted. The increase in crude oil prices will push the JCI rate of return. While in Table 5 and 6, crude oil has a coefficient value of -0.003248 and -0.004839, which means that crude oil has an insignificant negative effect on JCI volatility. This is not in line with what is stated in H6a and H6b; namely, crude oil has a positive effect on the Volatility of JII and LQ-45. Therefore, this condition aligns with previous research conducted by Kurniawan (2012), which stated that world crude oil did not affect. Crude oil is one of the factors that have an essential role in a company because crude oil is the primary source of energy.

The last independent variable is gold; in Table 3 and 4, it can be seen that the coefficient value of gold is -0.190154 and -0.136968, which means that gold has a significant negative effect on JII and LQ-45 returns. This is not in line with H7a, and H7b, namely gold, positively influences JII and LQ-45 returns. Therefore H7a and H7b are rejected. While in Table 5 and 6, the coefficient values of gold are 0.352746 and -0.069798. This indicates that gold has a significant positive effect on JII volatility, and gold has a significant negative effect on LQ-45 volatility. This is in line with H8a, which states that gold has a positive effect on JII volatility, while for H8b, it is not in line. Therefore H8a is accepted, while H8b is not accepted.

CONCLUSION

This study shows that the conditions of variables such as the Dow Jones, the USD/IDR exchange rate, and gold do not affect the return rates of JII and LQ-45. Only the oil variable affects JII and LQ-45. Meanwhile, on JII volatility, the variables that influence Dow Jones, exchange rate, and gold. Only the crude oil variable does not affect JII's volatility. The limitation obtained in this study is that it uses common variables, and in this study, it has not concluded how the influence of indirect variables is, therefore further research is recommended to add

variables such as market risk, gross national product, and be able to test how the influence is not directly by including intermediary variables such as company profits.

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