The Effect of Oil Prices, Gold and Exchanges on JCI During the Covid-19

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A R T I C L E I N F O	ABSTRACT
Keywords: Crude oil price, gold price, exchange rates, JCI/ IHSG, ARIMA, ARCH/ GARCH	This study aims to determine the effect of changes in crude oil prices, gold prices, and exchange rates on the volatility of the Jakarta Composite Stock Price Index (JCI) during the Covid-19 pandemic. Using quantitative methods with descriptive research typeswith composite stock price index (CSPI) data, crude oil price data (WTI), gold price data (London Gold) and data on the Rupiah exchange rate against the Dollar during the Covid-19 pandemic starting from 02 March 2020 to 25 March 2021 taken from Datastream at Eikon Faculty of Economics, Andalas University. Obtained 275 samples. The results of the study using the Arch/Garch method found that there was no significant effect between the price of Crude Oil on the JCI, while for the price of Gold there was a significant positive effect on the JCI and for the exchange rate there was no significant effect on the JCI. The results of the ARIMA forecasting method until March 25, 2022 found that the JCI tends to increase. Crude Oil Prices have decreased until the first quarter of March 2022, Gold prices tend to be stable with not too many significant changes. Meanwhile, the Rupiah Exchange Rate against the US Dollar experienced an appreciation.
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1.   Introduction

Now, The world economy is experiencing a severe shock due to the spread of the virus called corona or better known as Covid-19 which can be described as the "Black Swan event", can cause shock, fear and panic among domestic and international investors and can result in a response. sharp panic selling (He, Liu, Wang, & Yu, 2020). Gold and crude oil are the two most important commodities demanded and traded internationally. Crude oil is the most important energy source in the world, one third of the world's energy comes from crude oil (Singh & Sharma, 2018). Gold is also an important financial asset because it performs three important functions: a monetary function, a non-production function (reserve assets), and a financial function. Many countries still use gold as part of their foreign exchange reserves to maintain exchange rates. Gold is also used for hedging and portfolio diversification because it is seen as a safe haven (Baur & McDermott, 2009). Tandellin (2001) reveals that one of the sources of investment risk is the exchange rate. A stable currency exchange rate will influence foreign investors to invest in a country. The exchange rate itself shows how much domestic money is needed to buy one unit of foreign currency. Changes in exchange rates can be used as a measuring tool to measure the stability and development of the economy in a country. Changes in the exchange rate through changes in costs and income will have a direct impact on the company's profits and thus will have an impact on the company's stock price.

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The research of Shabbir & Kousar (2019) concludes that there is a significant positive relationship between oil prices in the stock market which analyzes the impact of crude oil prices on the Pakistan stock exchange. This finding shows that oil is known as an important energy source for the world where oil prices are considered as a basic need for every country and because this will later affect the performance of a country. Stock markets in developing countries are more vulnerable to news and events caused by uncertain economic conditions. In the study of Sharif et al. (2020) found that the slump in crude oil prices had the strongest impact on the US stock market compared to Covid-19, EPU and GPR. Research conducted by Tian et al.

2.   Literature Review

2.1   Jakarta Composite Stock Price Index (JCI)

Anoraga & Pakarti (2001) stated that the JCI is an index that shows the general movement of stock prices listed on the Stock Exchange, which becomes a reference for the development of activities in the capital market. The Composite Stock Price Index (CSPI) can be said to be a value used to measure stock performance in a stock exchange.

According to Andersen (2005), volatility is the same as the fluctuations observed over a certain period of time and is the variability of the random walk data components. Volality describes the level of risk faced by investors because it reflects fluctuations in stock price movements (Indonesian capital market volatility study team, 2011). Volality is the dynamic variance of an asset (Suharsono, 2012). It can be concluded that volatility is a measurement for fluctuations in an asset during a certain time or period that is time series. Calculation of the composite share price (JCI) is calculated by dividing the market value by the base value which is then multiplied by 100. The JCI is a projection of the movement of all shares (common and preferred shares) listed on the Indonesia Stock Exchange. If the JCI is obtained above 100, it means that the market conditions are in good condition and vice versa if the JCI is obtained below 100, it can be said that the market is in a sluggish state and if it is exactly at 100, it can be said that the stock market is in a stable condition. August 10, 1982 JCI was initially set at 100 points and since then all stock transactions refer to the points that have been set.

2.2   Crude Oil Price

Price can be equated with money or other goods whose benefits are obtained from goods or services for a person or a group at a certain time and place. There are various types of crude oil traded in the world such as West Texas Intermediate (WTI), Brent Bland, OPEC Basket Price, Russian Export Blend, etc. The price of Crude Oil (crude oil price) can be measured from the price of the center of the world oil market, where the price that is generally used is WTI because the oil traded by WTI is crude oil with high quality which is the benchmark for world oil trade. WTI prices are typically $5 - $6 per barrel higher than OPEC oil prices and $1 - $2 per barrel higher than Brent oil prices.

2.3   Gold price

Gold is one form of investment that has a small risk and has a fairly stable value, gold is also often used as an antidote to inflation. Some of the advantages of gold as an investment medium are that it can have a high level of liquidity which will not be affected by inflation, the value of gold itself is also not determined by the government and is tax free. According to Law Number 42 of 2009 concerning VAT Article 4A paragraph 2, it is stated that there are 4 (four) goods that are stipulated to be tax-free, namely mining goods, goods for public needs, food and beverages as well as securities, as well as money and gold bullion. .

Since 1968 the benchmark world gold price has been standardized on the London gold market, known as the London Gold Fixing system. The five members are Bank of Nova Scottia, Barclays Capital, Deutsche Bank, HSBC and Societe Generale. The process of determining the price is carried out twice a day at 10.30 (gold. AM) and at 15.00 (gold, PM), to measure the price of gold, the United States dollar, British Pound and Euro are used. Meanwhile, the price used as a benchmark for world gold prices is the closing price of Gold, PM The final position of the price offered to each member is the net price of the accumulated demand and supply from clients, and from this bargaining process the gold price is formed every day. If it turns out that demand is more than supply, the price of gold will tend to rise and vice versa if supply is more than demand, the price of gold will tend to fall where this price determination must reach a point of balance. The president will say "there are no flags, and we're fixed" when the price has reached equilibrium and is certain. The price of gold which tends to rise every year makes investors more interested in investing in gold than stocks listed on the Stock Exchange. If this happens, it can be predicted that the Composite Stock Price Index (IHSG) will decline. On the other hand, if the price of gold falls, investors will switch back to stocks and this will cause the JCI to increase.

2.4   Exchange Rates

Each country has a medium of exchange that requires a comparison of a currency value with other currencies or what is called a foreign exchange rate (Salvatore, 2008). The Rupiah exchange rate is the difference in the value of the Rupiah currency price with other currencies. A decrease in the value of a country's currency is called depreciation, while an increase in the value of a country's currency is called appreciation. The importance of this currency exchange rate because it will affect the financial condition of a country after the occurrence of international trade. The effect of the exchange rate on stock prices in Indonesia can be seen from the permissibility of foreign investors to invest in shares on the Indonesia Stock Exchange, and if there is a change in the exchange rate.

The factors that can affect the exchange rate according to Sukirno:
a.   There is a change in people's tastes
b.   There is a change in the price of export and import goods
c.   There is a general increase in prices (inflation)
d.   There are changes in interest rates and investment returns
e.   There is a change in economic growth

According to Tandelilin (2001) one source of investment risk is the risk of currency exchange rates. A stable currency exchange rate will affect foreign investors entering a country, which will be related to export and import oriented companies. This international trade activity will have a direct effect on changes in exchange rates and will also have an impact on a company's profits and will directly impact on the volatility of the JCI.

2.5 Research Hypothesis

Oil prices during July 2020 have increased which is based on the calculation of the formula Indonesian Crude Price(ICP) following the development of the Covid-19 vaccine, the average ICP of Indonesian crude oil in July 2020 reached the level of USD 40.64 per barrel, which increased by USD 3.96 per barrel from the previous month. Research conducted by Sharif et al. (2020) shows that the US market initially reacted to the oil shock, not because of the Covid-19 news coming from Wuhan and other regions, but that the escalating Covid-19 crisis had a direct impact and had an impact on economic policy uncertainty, confirming the initial hypothesis that for In the US economy, oil remains a major source of systematic risk, while the spread of Covid-19 increases uncertainty due to the unpredictable severity of the response to the pandemic.

Research conducted by Tian et al. (2020) show that uncertainty in the oil market has a strong positive effect. Research conducted by Shabbir et al. (2019) regarding the impact of gold and oil prices on the Pakistani stock market found that there is a positive and significant relationship between oil prices and the stock market. Singh & Sharma (2018) find that returns on gold and crude oil show a consistently positive correlation. Arfaoui & Rejeb (2017) also find that the stock market is positively and significantly influenced by oil prices, gold prices, and US interest rates. The pandemic has severe implications on the volatility of oil prices through the demand side due to travel restrictions and the low cost of expected output growth in China and European countries. So based on the result of the reseach above, the first hypothesis can be proposed in this study: **Changes in Crude Oil Prices have a Positive effect on the volatility of the Jakarta Composite Index (JCI) during the Covid-19 pandemic.**

Gold is one form of investment that has a small risk and has a fairly stable value, gold is also often used as an antidote to inflation. Some of the advantages of gold as an investment medium are that it can have a high level of liquidity which will not be affected by inflation, the value of gold itself is also not determined by the government and is tax free. Research conducted by Shabbir et al. (2019) found that there is a positive and significant relationship between gold prices and the stock market. Singh & Sharma. (2018) explained that the return of gold and crude oil showed a positive and consistent correlation in the three research periods. Research conducted by Singhal et al. (2018) found that international gold prices positively affect Mexican stock prices. Arfaoui et al. (2017) also found that gold prices in the international market were positive and significantly influenced by oil prices and US$. The second hyphotesis can be drawn in this research**: Changes in Gold Prices have a positive effect on the volatility of the Jakarta Composite Index (JCI) during the Covid-19 pandemic.**

The importance of currency exchange rates because it will affect the financial condition of a country after the occurrence of international trade. This is in line with research conducted by Tian et al. (2020)found that the stock would benefit if the RMB appreciated. Chkir et al. (2020) find that the exchange rate and oil prices influence each other in all sub-periods except for the British pound in the first period and the Japanese yen in the fifth period. Research conducted byBai & Koong (2018) also find that the dollar index responds positively to US stock shocks for the first 4 months and then declines slightly to return to normal. Research conducted by Tang & Yao (2017) found that in ten of the eleven emerging markets studied, financial structure had a significant impact. real exchange rates are positively related to domestic stock markets, except for Brazil and China. Based on this description, the third hypothesis can be proposed for this research: **Changes in the Exchange Rate have a positive effect on the volatility of the Jakarta Composite Index (JCI) during the Covid-19 pandemic.**
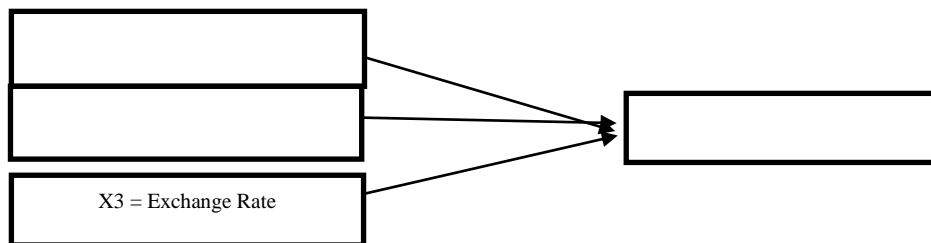

X3 = Exchange Rate

Fig 1. Conseptual Framework

3. Methods

The method used in this study is a quantitative method, based on its objectives, this research is a type of descriptive research. In this study, the population used as the object of research is the entire stock index on the Indonesia Stock Exchange. While the sample is part of the total owned by the population (Taylor, 2005). In this study, the sample used was selected using purposive sampling method. Purposive sampling is a sampling technique that provides equal opportunities for each element (member) of the population to be selected as a sample member (Sugiyono, 2017). The sample criteria in this study are the index which represents all shares listed on the Indonesia Stock Exchange, the number of shares that were actively traded during the study period and excluded if there was a holiday (red date) in the study period. Based on the above criteria, the samples taken are composite stock price index (CSPI) data, crude oil price data (WTI), gold price data (London Gold) and data on the Rupiah exchange rate against the Dollar during the Covid-19 pandemic starting from March 02. 2020 to March 25, 2021. This study uses a data collection technique in the form of a documentation method. This method is done by collecting secondary data from Datastream at Eikon Faculty of Economics, Andalas University, Padang. The data collected is in the form of statistical numerical values related to research variables that function to determine the effect between variables. The data analysis method used in this study is time series data or time series. This time series data is a collection of observations in a certain time span. The data is collected in continuous time intervals.

3.1 GARCH . Model Volatility Analysis

a. Data Stationary Test

Stationary data test can be done by making a plot between the observation value (Y) and time (t), and based on the plot, the data pattern can be seen. If the data has a mean value and constant variance, it can be concluded that the data is stationary. According to Gujarati (2012) empirical analysis based on time series data assumes that time series data is stationary. The data

analyzed for the GARCH model must be stationary so that each variable used needs to be tested first. Furthermore, according to Sadeq (2008) a time series data is said to be stationary if the autocorrelation coefficient for all lags is statistically not significantly different from zero or different from zero for the next few lags. Stationary test can be done by unit root test using Augmented Dickey-Fuller (ADF) test. Time series data is stationary if it has an ADF value greater than the critical value.

3.2   GARCH Model Parameter Estimation
The stages in estimating the GARCH model are as follows:

a.   ARIMA Model Estimation

The ARIMA model estimation can be done by correlogram test from a bar chart with the data rules in the PACF (Partial Correlation) column used to determine the maximum order of AR(p) and ACF (Autocorrelation) used to determine MA(q). It should be noted whether the value is getting further from the zero value or in the next lag it is closer to the zero value. Then after that, several AR, MA or ARIMA models will be obtained (Hartati, 2017).

b.   Model Estimation

According to Juanda and Junaidi (2012) after the equation is formed, it is necessary to choose the best model by taking into account the significance of the estimation parameters such as the largest log likelihood and the smallest AIC value.

c.   Model Evaluation

Furthermore, the model can be evaluated using the ARCH-LM test on Eviews software to test whether there is an ARCH effect in the residuals.

After doing ARIMA modeling to find the best lag from ARIMA. After that find and model the GARCH lag by calculating the smallest AIC. Then calculate the GARCH volatility after getting the best GARCH model. The calculation process will use the Eviews software

3.3   Garch/Arch models
To see the effect between variables, a significance test (probability) was carried out. The criteria in this significance test include: If the probability value (Prob) is greater than the 5% significance level (> 0.05), then there is no influence between the independent variables on the dependent or H0 is accepted and Ha is rejected and If the probability value (Prob) is smaller than the 5% significance level (<0.05), then there is an influence between the independent variables on the dependent or H0 is rejected and Ha is accepted.

4.   Result and Analysis

4.1   Data Stationary Test
Stationarity test is one of the assumptions that must be met in time series data analysis. This stationary test was carried out using the Augmented Dickey Fuller (ADF) test.

Table 1
ADF Test

ADF Test	T-Statistic	Prob	Stationary
Y (JCI)	-11.64260	0.000	Level
X1 (WTI)	-15.38363	0.000	Level
X2 (GOLD)	-17.02947	0.000	Level
X3 (EXCHANGE)	-4.442145	0.003	Level

The results of the statistical test show that each variable is stationary at "Level" with a probability value (Prob) of 0.000 <0.05. So that the next step can be estimated ARIMA by finding the most appropriate order d = 0.

4.2   Garch Model
a.   ARIMA estimation

ARIMA model estimation by looking at ACF (Autocorrelation Function) and PACF (Partial Autocorrelation Function). From the results of the ACF and PACF, several predictions of the ARIMA model will be selected.

Fig 2. Correlogram Test of Variable Y (JCI)

From the image of the Variable Y Correlogram Test (JCI) above, it is known that the ACF in lag 1 and lag 2 is not significant, then in PACF there is no significant occurrence in lag 1 and lag 2 and only significant in lag 3. Then the ARIMA models that can be used are ARIMA Model 1 (3,3,1), ARIMA Model 2 (0,3,3) and ARIMA Model 3 (3,3,2).

Autocorrelation	Partial Correlation	lag	AC	PAC	Q-Stat	Prob
		1	-0.257	-0.257	18.405	0.000
		2	-0.088	-0.165	20.547	0.000
		3	-0.056	-0.137	21.415	0.000
		4	-0.004	-0.085	21.420	0.000
		5	0.060	0.011	22.426	0.000
		6	0.037	0.048	22.818	0.001
		7	0.004	0.044	22.822	0.002
		8	-0.082	-0.051	24.725	0.002
		9	0.027	0.002	24.927	0.003
		10	0.031	0.024	25.201	0.005
		11	-0.099	-0.108	28.047	0.003
		12	-0.052	-0.129	28.816	0.004
		13	0.038	-0.044	29.227	0.006
		14	-0.005	-0.047	29.234	0.010
		15	0.037	0.006	29.628	0.013
		16	-0.011	0.004	29.666	0.020
		17	0.023	0.059	29.823	0.028
		18	-0.034	0.011	30.169	0.036
		19	-0.012	-0.026	30.215	0.049
		20	-0.020	-0.057	30.334	0.065
		21	0.036	0.001	30.732	0.078
		22	-0.072	-0.113	32.273	0.073
		23	0.085	0.012	34.435	0.059
		24	-0.003	0.011	34.438	0.077
		25	0.015	0.046	34.505	0.098
		26	-0.024	0.015	34.684	0.119
		27	0.019	0.047	34.791	0.144
		28	0.005	0.035	34.799	0.176
		29	-0.040	-0.034	35.302	0.195
		30	0.082	0.036	37.414	0.165
		31	-0.010	0.012	37.448	0.197
		32	-0.016	-0.009	37.525	0.231
		33	0.003	-0.007	37.527	0.269
		34	-0.029	-0.027	37.788	0.300
		35	0.009	0.015	37.813	0.342
		36	-0.002	0.001	37.814	0.386

Fig 3. Correlogram Test of Variable X1 (Crude Oil Prices)

From the Correlogram of the X1 variable (WTI Crude Oil Price) above, it is known that the ACF at lag 1 is significant, then a cutoff occurs, namely at lag 2 and lag 3. Then the PACF occurs significantly at lag 1 to lag 3. Then the ARIMA model that can be used namely ARIMA Model 1 (3,1,0), ARIMA Model 2 (0,1,1) and ARIMA Model 3 (3,1,1).

Autocorrelation	Partial Correlation	lag	AC	PAC	Q-Stat	Prob
		1	-0.032	-0.032	0.2902	0.590
		2	0.130	0.129	5.0175	0.081
		3	-0.053	-0.046	5.7954	0.122
		4	-0.146	-0.168	11.751	0.019
		5	-0.037	-0.034	12.133	0.033
		6	-0.172	-0.140	20.534	0.002
		7	0.076	0.063	22.158	0.002
		8	-0.027	-0.009	22.370	0.004
		9	0.028	-0.019	22.591	0.007
		10	-0.001	-0.039	22.591	0.012
		11	-0.045	-0.045	23.173	0.017
		12	0.108	0.095	26.577	0.009
		13	-0.032	0.005	26.879	0.013
		14	0.064	0.021	28.078	0.014
		15	-0.014	-0.011	28.134	0.021
		16	-0.044	-0.045	28.702	0.026
		17	0.026	0.029	28.898	0.035
		18	-0.109	-0.057	32.423	0.020
		19	0.015	-0.016	32.492	0.027
		20	0.014	0.044	32.555	0.038
		21	-0.083	-0.109	34.618	0.031
		22	0.149	0.123	41.275	0.008
		23	-0.073	-0.037	42.904	0.007
		24	0.028	-0.047	43.134	0.010
		25	0.031	0.062	43.429	0.013
		26	0.014	0.031	43.492	0.017
		27	0.034	0.000	43.855	0.021
		28	-0.047	-0.005	44.531	0.025
		29	0.019	-0.023	44.637	0.032
		30	-0.043	0.008	45.206	0.037
		31	-0.010	-0.008	45.235	0.048
		32	0.005	0.014	45.244	0.060
		33	0.048	0.080	45.970	0.066
		34	0.079	0.023	47.940	0.057
		35	-0.007	0.009	47.958	0.071
		36	-0.041	-0.077	48.497	0.080

Fig 4. Correlogram X2 Test (Gold Price)

From the Correlogram of the X2 variable (Gold Price) above, it is known that the ACF at lag 1 is not significant, then it is significant at lag 2 and lag 3 is not significant. Then in PACF there is no significant occurrence in lag 1, it is significant in lag 2 and in lag 3 it is not significant. Then the ARIMA model that can be used is ARIMA (2,2,1) ARIMA(0,1,2) and ARIMA (2,1,1).
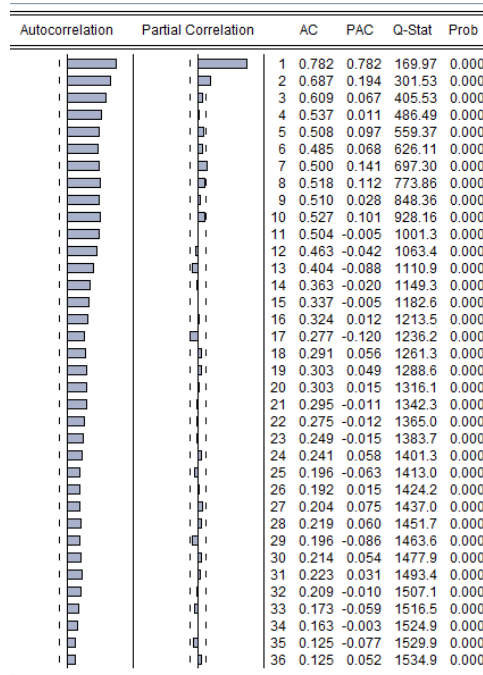
Fig 5. X3 Correlogram Test (Exchange Rate)

From the Correlogram of the X3 variable (Exchange Rate) above, it is known that the ACF in lag 1 and lags onwards is significant. Then in PACF there is a significant occurrence in lag 1 and lag 2 and in lag 3 it is not significant. Then the ARIMA models that can be used are ARIMA Model 1 (2,2,3), ARIMA Model 2 (0,2,3) and ARIMA Model 3 (2,1,2).

b.   Best Model

The search for the best model is done by entering the equations that have been obtained previously, and looking for the smallest Akaike Into Criterion (AIC) and Schwarz Criterion (SIC) values.

Table 2
AIC and SIC . values

Variable	1st model	2nd model	3rd model
Y (JCI)	AIC = 13.00 SIC = 13.03	AIC = 13.61 SIC = 13.62	AIC = 13.61 SIC = 13.63
X1 (WTI)	AIC = 19.06 SIC = 19.09	AIC = 18.13 SIC = 18.11	AIC = 19.04 SIC = 19.06
X2 (GOLD)	AIC = 13.22 SIC = 13.24	AIC = 13.20 SIC = 13.22	AIC = 12.50 SIC = 12.54
X3 (EXCHANGE)	AIC = 8.84 SIC = 8.88	AIC = 8.82 SIC = 8.85	AIC = 8.83 SIC = 8.86

From the table, the variable Y (JCI) used ARIMA 3,3,1 (the 1st model) with an AIC value of 13.00 and an SIC value of 13.03. Variable X1 (WTI) used ARIMA 0.1,1 (2nd model) as forecasting with AIC value of 18.13 and SIC value of 18.11. Variable X2 (GOLD) used ARIMA 2,1.1 model (3rd model) as forecasting with AIC value of 12.50 and SIC value of 12.54 and for variable X3 (EXCHANGE) used ARIMA model 0.2,3 (model 2) as a forecast with an AIC value of 8.82 and an SIC value of 8.85.

c.   Volality Forecast

In this study, variable Y (JCI), variable X1 (WTI), variable X2 (Gold) and variable X3 (Exchange rate) are forecasted for the next 1 (one) year until March 25, 2022.
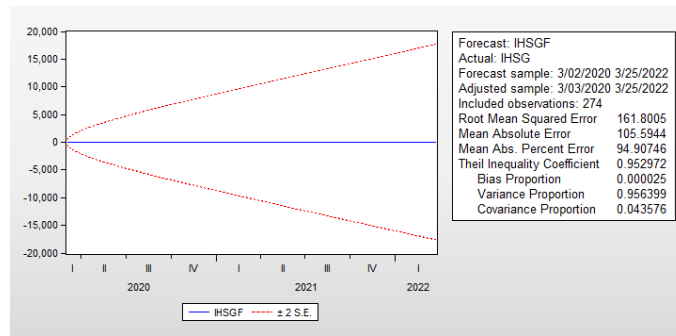
Fig 6. Forecasting Variable Y (JCI)

The JCI forecasting results in Figure 5 show that the JCI tends to increase. Seen from the second quarter of 2021 (beginning of forecasting) to the first quarter of 2022 the JCI continues to move up. This may be due to the perception that next year's economy will be better because the facilities and medicines for handling Covid-19 have been realized so as to allow people to run the economy normally again.
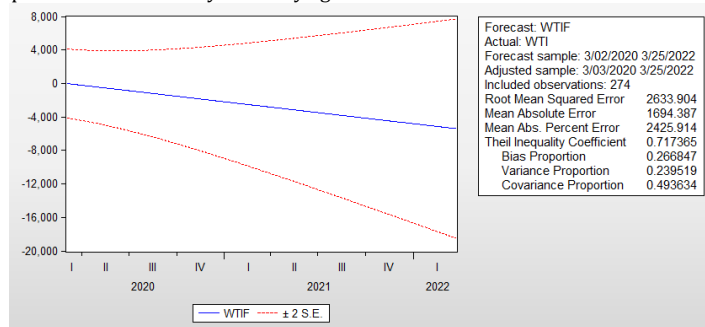

Fig 7. Forecasting Variable X1 (Crude Oil Price)

The X1 (WTI) forecasting results show that WTI oil prices have decreased until the first quarter of March 2022, this may be due to the fact that the targeted oil consumption has not been fully absorbed.
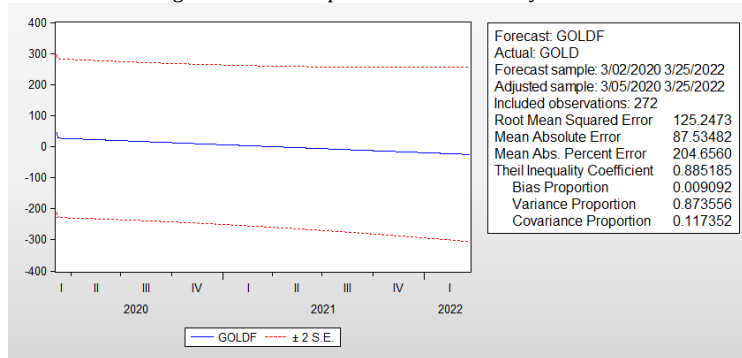

Fig 8. Forecasting Variable X2 (Gold Price)

X2 forecasting results (Gold Price) tend to be stable with not too many significant changes. Maybe some of these reasons that make gold prices remain stable.
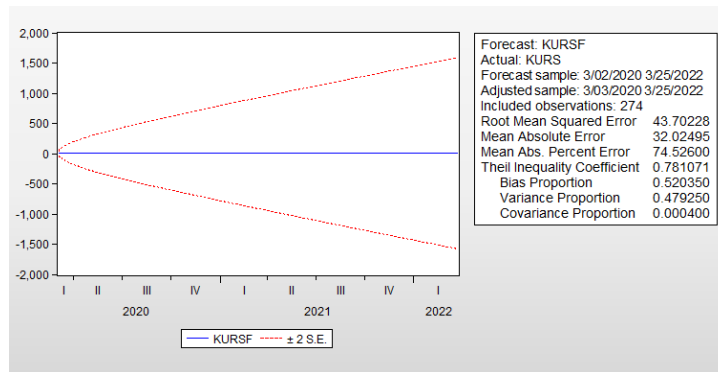
Fig 9. Forecasting Variable X3 (Exchange Rate)

Forecasting results show that forecasting the exchange rate of the Rupiah against the US Dollar has appreciated. The curve tends to move up until the end of the forecast in the first quarter of 2022.

4.3   Arch/ Garch

Table 3.

Variance Equation

Variable	Prob.
C	0.0015
RESID(-1)^2	0.0000
GARCH(-1)	0.0000

From the table, it is known that the value of Prob RESID(-1)^2 or ARCH is 0.000 and the value of Prob GARCH(-1) is 0.0000. Due to the prob value < 0.05, it is possible to use the ARCH or GARCH approach.

Table 4.

Arch/ Garch Method

Variable	Coefficient	Prob.
C	0.246168	0.0175
X1 (Crude Oil Price)	0.003880	0.7024
X2 (Gold Price)	0.122319	0.0214
X3 (Exchange Rate)	-0.192130	0.3617

Table 4 shows that there is no significant effect of variable X1 (WTI Crude Oil Price) on Variable Y (JCI), because the Prob value is 0.7024 > 0.05, or in other words H0 is accepted and H1 is rejected. The results of this study are not the same as the previous study by Sharif et al. (2020) which shows that the US market initially reacts to oil shocks, and research conducted by Tian et al. (2020) show that uncertainty in the oil market has a strong positive effect. This study is also different from the results of research conducted by Shabbir et al. (2019) found that there is a positive and significant relationship between oil prices and the stock market. Singh & Sharma (2018) finds that returns on gold and crude oil show a consistently positive correlation. Arfaoui & Rejeb (2017) also find that the stock market is positively and significantly influenced by oil prices, gold prices, and US interest rates. This may be due to unstable conditions that trigger oil prices to sometimes experience high spikes and sometimes drastic declines, besides that investors also switch to other sectors that are considered more risk-free. As is the case now, many vehicles are powered by electricity, so the use of oil itself is not too significant, not to mention that flights are still limited in several countries so that the consumption of oil by the aviation world is also reduced and the composition of oil companies on the Indonesia Stock Exchange itself is also not much.

As for the X2 variable (Gold Price) there is a significant positive effect on the Y variable (JCI) because the Prob value is 0.0214 <0.05, or in other words H0 is rejected and H2 is accepted. which is in line with previous research conducted by Shabbir et al. (2019) which found that there was a positive and significant relationship between gold prices and the stock market. Singh & Sharma. (2018) also explained that the return of gold shows a positive correlation. Singhal et al. (2018) found that international gold prices positively affect Mexican stock prices. The price of gold which tends to rise every year makes investors more interested in investing in gold than stocks listed on the Stock Exchange. If the gold price increases by 1%, the Jakarta Composite Index (JCI) will also increase by 0.122319. Where a situation like Covid-19 will have a direct impact on the choice of investors to invest in gold and with this change in investor investment will have an effect on changes in the JCI. This increase is because the price of gold always adjusts to inflation, so it is often used by investors as an investment option that is less risky as a step to protect their investment. The number of defaults for some financing and lending also tends to experience losses during this Covid-19 pandemic, for some gold investors it is also another alternative to divert most of their investments. Where a situation like Covid-19 will have a direct impact on the choice of investors to invest in gold and with this change in investor investment will have an effect on changes in the JCI. This increase is because the price of gold always adjusts to inflation, so it is often used by investors as an investment option that is less risky as a step to protect their investment. The number of defaults for some financing and lending also tends to experience losses during this Covid-19 pandemic, for some gold investors it is also another alternative to divert most of their investments. Where a situation like Covid-19 will have a direct impact on the choice of investors to invest in gold and with this change in investor investment will have an effect on changes in the JCI. This increase is because the price of gold always adjusts to inflation, so it is often used by investors as an investment option that is less risky as a step to protect their investment. The number of defaults for some financing and lending also tends to experience losses during this Covid-19 pandemic, for some gold investors it is also another alternative to

divert most of their investments.

Variable X3 (Exchange Rate) has no significant effect on variable Y (JCI), because the Prob value is 0.3617 > 0.05, or in other words H0 is accepted and H3 is rejected. This study is different from previous research conducted by Tian et al. (2020) found that stocks will benefit if the RMB appreciates and in the research of Singhal et al. (2019) found that the exchange rate is highly correlated with stock prices. This means that the appreciation or depreciation of the Rupiah exchange rate against the US Dollar does not affect the volatility of the JCI. The results are different because the value of the currency used is also different from the research conducted by Singhal et al. (2019) which uses the Chinese Renminbi currency.

5. Conclusion

The Covid-19 pandemic and several previous crises have shaped new prices in the stock market. The Composite Stock Price Index (JCI) experienced several temporary trading suspensions. This study uses quantitative methods with the aim of testing the established hypotheses. The sample used was selected using purposive sampling method. The Arch/Garch method is used to see the effect of each variable and to predict the condition of one year to come, the ARIMA forecasting method is used. The data used are the composite stock price index (JCI), crude oil price data (WTI), gold price data (London Gold) and data on the Rupiah exchange rate against the Dollar during the Covid-19 pandemic. The results showed that X1 (crude oil price) had no significant effect on Y (JCI). The price of gold (X2) has a significant positive effect on Y (JCI). The exchange rate (X3) has no effect on the JCI (Y). Variable Y (JCI) uses the ARIMA model of 3,3,1 with an AIC value of 13.00 and an SIC value of 13.03. Variable X1 (WTI) used ARIMA 0,1,1 model as forecasting with AIC value of 18.13 and SIC value of 18.11. Variable X2 (GOLD) used ARIMA 2,1,1 model for forecasting with AIC value of 12.50 and SIC value of 12.54 and for variable X3 (exchange rates) ARIMA model 0,2,3 was used as forecasting with AIC value of 8.82 and the SIC value of 8.85. JCI forecasting results show that the JCI tends to increase. Seen from the second quarter of 2021 (beginning of forecasting) to the first quarter of 2022 the JCI continues to move up. The X1 (WTI) forecasting results show that WTI oil prices have decreased until the first quarter of March 2022. The X2 (Gold Price) forecasting results tend to be stable with not too many significant changes. Forecasting results show that forecasting the exchange rate of the Rupiah against the US Dollar has appreciated. The curve tends to move up until the end of the forecast in the first quarter of 2022.

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