

Investigating the Dynamic Relationship Among JKSE, S&P 500, Cryptocurrencies and Gold Price After Covid-19 Outbreak

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ABSTRACT

This study aims to examine the dynamic relationship between the JKSE, S&P 500, gold prices, and bitcoin prices after WHO declared Covid-19 a global pandemic. The data used is daily data from March to November 2020 which follows trading days in the Indonesian capital market. Furthermore, this research uses VAR modelling to see how the impact of the Covid-19 pandemic on the relationship between the JCI, S&P 500, gold prices and bitcoin prices. The results showed that in the short term the S&P 500 has a positive and significant effect on JKSE, but in the long run it has no significant positive effect, in the long run the gold price has a negative and significant effect on JKSE and vice versa has no effect in the short term, both in the long term and in the short-term bitcoin has a negative and significant effect on JKSE. This research also shows that apart from gold, bitcoin has also become a safe haven for investors.

Keywords: *Key Covid-19, JKSE, S&P 500, Gold, Bitcoin*

1. INTRODUCTION

The spread of Covid 19 shows how fragile the current global economic order is when faced with uncertainty. In 2020 there are four main sources of uncertainty facing the global economy, namely the Covid 19 pandemic, the presidential election in the United States, fluctuations in oil prices and the policies of the Fed [1]. The four sources of uncertainty add to the gloomy projection for global economic growth in 2020.

Among the four sources of uncertainty, the worst impact is the Covid 19 pandemic, which is still not under control. According to WHO, until November 2020, globally, there were 45 million people who were infected by Covid 19 with more than 1,1 million cases of death. In Indonesia alone, in the same month it was recorded that more than 450 thousand people were infected with a total death of more than 15 thousand people. These numbers will continue to increase every day because until now the existing vaccines are still in the testing phase.

The gloomy global economy can be seen from the data released by the IMF in October where global economic growth decreased by -4,4%, while global trade volume decreased by -10,4%. According to

Central Bureau of Statistics (BPS) data, Indonesia officially experienced a recession because the GDP in the third quarter of 2020 was -3,49%, while in the second quarter it was -5,32%.

The high level of global economic uncertainty has caused investors to move their money to countries that are considered to have stronger economic fundamentals. According to Bloomberg, in the United States until October 2020 there was an increase in the inflow of money in the capital market by \$ 165,8 million, the opposite happened in Indonesia where there was a cash outflow of \$ 3,185 million.

These facts reveal a strong relationship between the Covid-19 pandemic and capital market conditions, where investors will move their money to a capital market that is considered to have better fundamentals. There are several studies that reveal a negative relationship between Covid 19 and capital market conditions [2], [3], [4], [5], and [6].

Apart from moving their money to the capital market in countries that are considered to have stronger fundamentals, investors also secure their money in the

form of safe havens, the most commonly used safe haven is gold. Gold has long been considered the safest hedge. According to data quoted from site yahoofinance.com, in the past year there was an increase in gold prices by 23.5%, this data shows that if investors still consider gold as one of the safest instruments during economic shocks, this fact is strengthened by research. [7], [8], [9], and [10].

Another instrument used as a means of hedging is cryptocurrencies, until now there are thousands of cryptocurrencies, but the most commonly used is bitcoin. Quoted from the site yahoofinance.com in the past year there was an increase in bitcoin prices by 44,59%. Although the price of bitcoin fluctuates greatly, it has proven to be a store of value just like money [11], in other research, bitcoin has also proven capable of being a means of hedging just like gold [12], other research proves bitcoin can be a digital asset and has a relationship with conventional assets [13], [14], [15], [16], and [17].

From the description previously explained it indicates that there has been a movement of money from the capital markets of developing countries to the capital market of the United States, besides that investors are also diverting their money to safe havens such as gold and bitcoin. This research will use VAR modelling to see how the impact of the Covid-19 pandemic on the relationship between the JCI, S&P 500, gold prices and bitcoin prices.

2. DATA AND MODEL

2.1. Data

This study uses daily time series data adjusted to stock trading days in Indonesia, starting from the time when WHO announced Covid 19 as a global pandemic on 11 March 2020 to 11 November 2020, so the data used is 168 data. The research data is sourced from data provider sites, namely www.investing.com, www.finance.yahoo.com and www.bloomberg.com.

2.2. Model

In investigating the dynamic relationship between the JKSE, S&P 500, gold prices and bitcoin prices, Vector Autoregression (VAR) modelling will be used if the data is stationary at the level, but if not then the Vector Error Correction Model (VECM) will be used.[18]. The test steps include: 1). data stationarity test, 2). optimal lag test, 3). VAR stability test, 4). cointegration test, 5). granger causality test, 6). impulse response function, and 7). Forecast error variance decomposition.[18].

3. EMPIRICAL ANALYSIS

3.1. Data Stationary Test

To determine data stationarity, the Augmented Dickey-Fuller (ADF) test is used, if the ADF value is greater than the critical value or if the probability value is less than 0.05 then the data is declared stationary at a predetermined level.

Table 1. Data Stationary Test Results

Variable	Unit Root	Probability	Information
JKSE	Level	0.4214	Not Stationer
	1 st Diff	0.0000	Stationer
S&P500	Level	0.8707	Not Stationer
	1 st Diff	0.0000	Stationer
Gold	Level	0.9715	Not Stationer
	1 st Diff	0.0000	Stationer
Bitcoin	Level	0.3641	Not Stationer
	1 st Diff	0.0000	Stationer

Table 2. Optimal Lag Test Results

Lag	AIC
0	5.450.216
1	4.654.771
2	4.634.123
3	4.640.991
4	4.645.463
5	4.642.934
6	4.632.143
7	46.31128*
8	4.634.556

Table 3. VAR Stability Test Results

Root	Modulus
0.986952 – 0.019090 i	0.987137
0.986952 + 0.019090 i	0.987137
0.896049	0.896049
0.849043	0.849043
-0.360975	0.360975
-0.105621 – 0.221460 i	0.245357
-0.105621 + 0.221460 i	0.245357
0.072750	0.072750

Based on table 1 it can be seen if the data is stationary at the first difference level so that the modelling used is the Vector Error Correction Model (VECM).

3.2. Optimal Lag Test

The optimal lag test uses the Akaike Information Criterion (AIC) value as in the Table 2. Based on table 2 it can be seen if the optimal lag occurs at the 7th lag which is marked with a sign (*).

3.3. VAR Stability Test

A VAR model will be declared stable if it has a modulus value less than 1.

Table 3 shows the modulus value of all roots is less than 1, so it can be concluded that the VAR model used is stable.

Table 4. Cointegration Test Results

Hypothesized		Trace Statistic	0.05 Critical Value
No. of CE(s)	Eigenvalue		
None*	0.143031	4.840.138	4.785.613
At most 1	0.090813	2.370.479	2.979.707
At most 2	0.034073	8.471.984	1.549.471
At most 3	0.018117	2.925.242	3.841.465

3.4. Cointegration Test

The model cointegration test will use the Johansen Cointegration Test as in the following table. Table 4 shows that if there are no co-integrated equations, it can be seen from the absence of a trace statistic value that is greater than the critical value.

3.5. Granger Causality Test

Granger causality test can be seen in the following table.

Table 5 Granger Causality Test Results

Null Hypothesis:	Obs	Prob.
S_P_500 does not Granger Cause JKSE	161	6.E-06
JKSE does not Granger Cause S_P_500		0.0293
GOLD does not Granger Cause JKSE	161	4.E-05
JKSE does not Granger Cause GOLD		0.3264
BTC does not Granger Cause JKSE	161	1.E-06
JKSE does not Granger Cause BTC		0.0438
GOLD does not Granger Cause S_P_500	161	0.0011
S_P_500 does not Granger Cause GOLD		0.1443
BTC does not Granger Cause S_P_500	161	0.0030
S_P_500 does not Granger Cause BTC		0.1084
BTC does not Granger Cause GOLD	161	0.0530
GOLD does not Granger Cause BTC		0.4621

Table 5 shows if the S&P 500 affects the JKSE and vice versa, the price of gold affects the JKSE but not the other way around, the price of bitcoin affects the JKSE and vice versa, the price of gold affects the S&P 500 but not the other way around, the price of bitcoin affects the S&P 500 but not the other way around, the price of gold and bitcoin don't influence each other.

3.6. Impulse Response Function (IRF)

The results of the impulse response function model can be seen in the following figure.

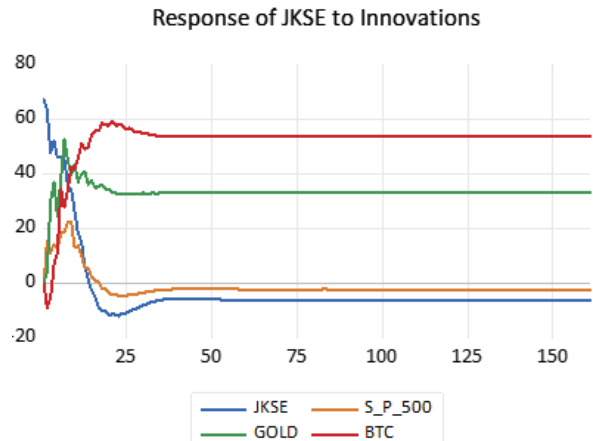


Figure 1. Impulse Response Function

Figure 1 shows if the shock to the S&P 500 will be responded positively by the JKSE but in the 18th period it will turn negative and so on, then the shock to the gold price will be responded positively by JKSE until its peak in the 7th period and subsequently decreased but remains positive JKSE initially responded negatively to the shock to the bitcoin price but from the 4th period it turned positive onwards.

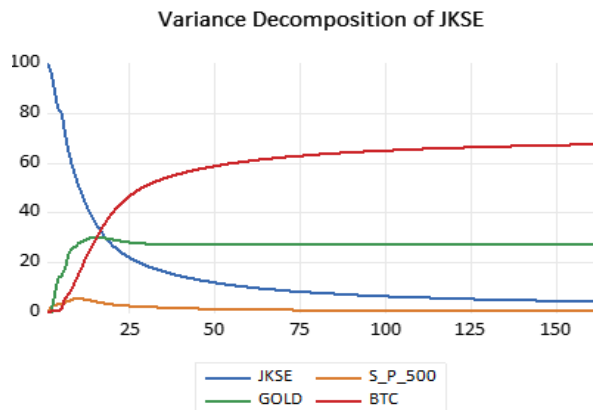


Figure 2. Forecast Error Variance Decomposition

3.7. Forecast Error Variance Decomposition

The results of the Forecast Error Variance Decomposition on the model can be seen in the following Figure 2. The figure 2 shows that the diversity in JKSE is influenced by JKSE itself in the 1st period by 100% and then continues to decline, the highest contribution of the S&P 500 to the JKSE diversity occurred in the 9th period of 5.9% and subsequently decreased constantly, The highest contribution of gold prices to the JKSE diversity occurred in the 15th period of 30.3% and subsequently experienced a constant decline, the highest contribution of bitcoin prices to the JKSE diversity occurred at the end of the period amounting to 67.55% and subsequently experiencing a constant increase.

4. CONCLUSION

This paper examines the dynamic relationship between the Indonesian stock index proxied with the JKSE, the US stock index proxied by the S&P 500, gold prices and bitcoin prices after the Covid 19 pandemic was announced as a global pandemic by WHO in March 2020.

The test results using VECM modeling show that in the short term the S&P 500 has a positive and significant effect on JKSE, but in the long run it has no significant positive effect. This shows that the capital market between countries is still strongly integrated, especially for the short term where negative sentiment after WHO announced Covid-19 as a global pandemic will be responded to by investors by moving their money to countries that are considered to have stronger fundamentals. Evidence of the existence of capital market integration between countries is consistent with the research results [19], [20], and [21]. However, it is only temporary, if the government provides the right economic stimulus, in the long-term investors will return to the country, this fact is in accordance with the research results. [3]. Furthermore, this is evidence that the government policy in overcoming economic shocks due to the Covid 19 pandemic by budgeting Rp. 695.2 trillion as an economic recovery program is correct.

Other results show that in the long run the gold price has a negative and significant effect on JKSE, and vice versa has no effect in the short term. Some investors responded to the shock due to the Covid 19 pandemic by moving their assets to safe havens such as gold, especially in the long term, this proves that gold is still one of the main choices for investors in case of economic shocks, as well as confirming the results of research [9].

Furthermore, both in the long and short term, the price of bitcoin has a negative and significant effect on JKSE, these results indicate that bitcoin has been transformed into a digital financial asset for investors, and in accordance with the research results. [10].

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