

# The Dynamic Relationship of the Rupiah Exchange Rate with the Jii 30 Index Movement through the Vector Autoregressive (Var) Method during the Covid 19 Pandemic

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**Abstract.** This study was conducted to determine the relationship between the rupiah exchange rate and the movement of the JII 30 index. The type of research used is quantitative research with the Vector *Autoregressive (VAR) analysis method using* daily time series data for the period March–December 2019 to March–December 2020 with the help of the *Eviews program*. . 9 . Data was collected using secondary data in the form of published reports from websites related to research. The population of this study is companies listed in the *Jakarta Islamic Index (JII) 30 index*. Technique taking *Sample* used in research This is the saturated *sample* technique. Amount the company that became *the sample* in this study were 30 companies. The results of the granger causality test show that the rupiah exchange rate variable has a unidirectional relationship with the movement of the JII 30 index. Where the JII 30 index affects the rupiah exchange rate and does not apply otherwise. The results of another study using the cointegration test showed that the rupiah exchange rate variable before and after covid 19 affected the JII 30 index.

**Keywords:** Rupiah Exchange Rate, JII Index 30, Vector Autoregressive

## 1 Introduction

Capital market liberalization is one of the impacts of the issue of economic globalization which has encouraged the mobilization of cross-country capital flows. The rapid spread of the COVID-19 outbreak in Indonesia has had a major impact on the Indonesian economy. This certainly has a significant impact on the capital market which has a major role in economic development, because the capital market has fantastic dynamics of economic transactions. For the Indonesian population, the majority of whom are Muslim, not a few are still questioning investment activities in the capital market. Therefore, the Islamic capital market was born which was legalized in 2003 in cooperation with the Indonesia Stock Exchange (IDX) with PT. In July 2000, Danareksa *Manajemen Investasi (DIM) succeeded in establishing the Jakarta Islamic Index (JII)* which aims to guide investors who wish to

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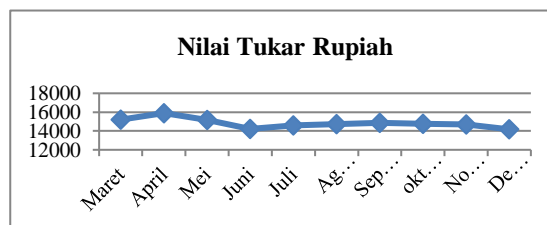
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invest their funds according to sharia, which is ready to be used as investment vehicles according to sharia principles. (Toha, 2020 )

On the other hand, the monetary crisis that hit Indonesia in 1997/1998 was marked by the weakening of the rupiah against foreign currencies, particularly the United States Dollar (IDR/USD). Speculative attacks on the rupiah were triggered by the spillover effect of speculative attacks on the Thai baht, causing volatility and weakening the rupiah. It did not stop there, hundreds of companies, ranging from small to large, many went bankrupt. More than 70% of companies listed on the capital market suddenly *went bankrupt* or went bankrupt. The construction, manufacturing, and banking sectors were the hardest hit. (Detik news, 2018)

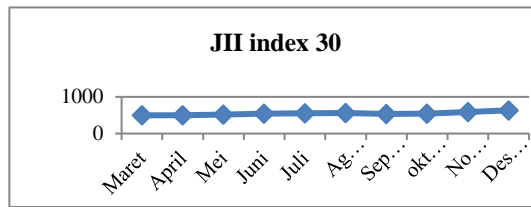
March 2020, when the first case of the coronavirus was found in Indonesia, forced people to reduce their economic activities. As a result, Indonesia's economic growth was depressed by 2.97 percent. (Detik news, 2018) The global consumer and business confidence index also fell sharply. The magnitude of the negative sentiment that emerged from the spread of the Covid-19 outbreak both in the world and in Indonesia affected the condition of the Islamic capital market, both the stock market and the bond market. Uncertainty about the end of the COVID-19 pandemic has prompted investors to adjust their financial portfolios, by shifting liquidity to *haven assets*, including developing countries such as Indonesia. (Martaliah, 2020) This incident shows the anxiety of investors in the stock market which causes investors in the stock market to panic so that they withdraw their funds from the stock market which causes the JCI to fall freely which indirectly affects the *Jakarta Islamic Index* (JII) stock price index. (Baker et al, 2020). These conditions put pressure on the domestic capital market.

Stock market conditions experienced a significant weakening, as reflected in the Composite Stock Price Index (JCI) which experienced contraction. The Composite Stock Price Index (JCI) closed at 4,538.9 in March 2020 or weakened by 29.8 percent (YoY). Not only that, this epidemic also resulted in a weakening of the rupiah exchange rate which affected international competitiveness and the trade balance which had an impact on *real income and output*. (Alexander, 2017 ) The rupiah exchange rate is one of the factors that influence changes in the stock index in the Indonesian capital market. The stability of changes in the exchange rate is very important, especially for companies engaged in import and export activities. (Darmawan, 2020) Because these activities cannot be separated from the use of foreign exchange, the US dollar is a trading tool or currency that is often used in transactions. Uncontrolled fluctuations in exchange rates can affect the performance of companies listed on the Islamic capital market. When the rupiah *weakens* against the US dollar, the price of imported goods becomes more expensive, especially for companies that mostly use imported goods. An increase in imports of raw materials will automatically increase production costs and ultimately have an impact on the company's profit level. (Anaswati, 2020) The decline in the profit rate makes investors less interested in investing in company shares. So that this will also have an impact on the movement of the company's stock price which then spurs the weakening of the movement of the stock price index. (Iqbal, 2020)



Source: [www.bi.go.id](http://www.bi.go.id) processed by researchers

**Figure 1.** The Development of the Rupiah Exchange Rate in Indonesia (March-December 2020)



Source: www. yahoo.com finance processed by researchers

**Figure 2.** JII 30 Index Movement in Indonesia (March-December 2020)

Figure 1 shows the development of the rupiah exchange rate and its relationship with Figure 2. The movement of the *Jakarta Islamic Index (JII)* stock index. From the graph above, it can be seen that the rupiah exchange rate is thought to affect the stock price index. The stock price of the *Jakarta Islamic Index (JII)* 30 rises when the value of the rupiah strengthens (*appreciation*) and decreases when the value of the rupiah weakens (*depreciation*). . In March 2020 the exchange rate of the rupiah weakened (*depreciated*) drastically until it reached Rp. 15,195 rupiah. (Indonesia, 2020)The weakening of the rupiah exchange rate was followed by a decrease in the stock price of the *Jakarta Islamic Index (JII)* 30 which reached 497 points and in the previous month touched 622 points, indicating a negative relationship between the rupiah exchange rate and stock prices. from the *Jakarta Islamic Index (JII)* 30. (Finance.yahoo.com, 2020)Then in April, the rupiah exchange rate strengthened (*appreciated*) reaching 15,867 rupiahs, although it only strengthened by 0.04% this had an impact on the movement of the *Jakarta Islamic Index (JII)* 30 which increased to 500 points. . From May to November the movement of the rupiah exchange rate hovered above Rp14,000 with share price movements touching the 550 figure, entering the end of December the rupiah exchange rate strengthened to 14,147 followed by an increase in the share price of JII 30 reaching 634 points. (Finance.yahoo.com, 2020)This was driven by increased inflows of foreign capital into domestic financial markets in line with reduced uncertainty in global financial markets and positive investor perceptions of prospects for improvement in the domestic economy, supported by a low current account deficit, low and controlled inflation, the attractiveness of financial assets. domestic. Indonesia's risk premium is high, and Indonesia's risk premium is declining, as well as large global liquidity. (Bank Indonesia, 2020)

The movement of the rupiah exchange rate is very volatile, even Bank Indonesia (BI) said the rupiah exchange rate since March has experienced "*overshooting*" its fundamental value. Quoting the statement of the Senior Deputy Governor of BI, the rupiah exchange rate which reflects Indonesia's economic fundamentals is in the range of Rp. 14,500 per USD. This means that the current surge in the exchange rate is indeed quite far from its long-term equilibrium value. In this case, the sector that has the potential to be affected in the short term is the capital market. If the sale of financial assets (*capital flight*) continues, the price of financial assets will fall, especially share prices. (news.detik.com, 2020)

However, there is a research gap that is the result of previous studies that have been carried out. The results of different studies indicate that there is a research gap on the effect of online customer convenience and reviews on online shopping decisions. The results of the study can be seen in Table 1

Table 1 shows that the results of the study on the Dynamic Relationship of the Rupiah Exchange Rate and the Movement of the JII Index have differences in research, on the one hand, some researchers claim to have an effect, but on the other hand, it is not. affect.

**Table 1.** The results of research on the Dynamic Relationship of the Rupiah Exchange Rate and the Movement of the JII Index

Variable Relationship	Have Influence	Has No Influence
The Relationship between the Rupiah Exchange Rate and the Jakarta Composite Index (JCI)	Jeni Mardika Anaswati Pasaribu (2020)	Neny Mulyani (2012)
	Rizki Adi Saputr and Agus Harjito (2015)	
The relationship between the JII 30 index variable and the rupiah exchange rate	M. Ali Ridho (2020)	Wawan Supriyanto (2006)

## 2 Literature Review

### 2.1 Exchange Rate

The exchange rate of a currency is the rate of exchange rates from one currency to another that can be used in various transactions, including international trade, tourism, and international investment transactions, or it can also be a short-term flow of money between countries, which is cross-border. geography or legal boundaries. Price describes how much of one currency must be exchanged for one unit of another currency. Another term for exchange rate is the Exchange Rate. (Sadono, 2015)

### 2.2 JII index 30

On July 3, 2000, the Indonesia Stock Exchange in collaboration with PT Danareksa Investment Management (DIM) launched a stock index based on Islamic sharia, namely the *Jakarta Islamic Index* (JII). This index is expected to be a benchmark for sharia-based stock performance and to further develop the Islamic capital market. (Hermuningsih, 2019)

The establishment of the *Jakarta Islamic Index* (JII) is intended to support sharia investment activities and as a benchmark for stock investment performance based on sharia principles. With this index, the Indonesia Stock Exchange (IDX) has provided stocks that can be used as a means of investing for investors by sharia principles to increase investor confidence in developing sharia investments. So that in the end it will increase trading transactions in the capital market. (Pratiwi, 2012).

## 3 Research Method

This study uses a quantitative research type because the data on the rupiah exchange rate and the movement of the JII 30 index will be processed and explained by collecting numerical data which is analyzed using statistical-based methods. This study also uses associative research to determine the relationship between the rupiah exchange rate variable (X1) and the movement of the JII 30 index (X2).

This research was conducted in Indonesia by collecting secondary data on the official website of yahoo finance, Bank Indonesia (BI), the Indonesia Stock Exchange (IDX), and the Financial Services Authority (OJK) by looking at the development of the Rupiah Exchange Rate and the Movement of the JII 30 Index during the Covid 19 Pandemic. The rupiah exchange rate was taken from Bank Indonesia and the JII 30 Index Movement was taken from Yahoo Finance and the Indonesia Stock Exchange.

## 4 Results and Discussion

### 4.1 Unit Root Test

The unit root test in this study aims to see whether the processed data is stationary or not on the research variables, namely the Rupiah Exchange Rate and the Movement of the JII 30 Index as seen from the average value. If the variable  $Y_t$  at the data level has one unit root, then the variable is not stationary. Further testing is carried out on the *first difference* and so on until stationary data is obtained. This study uses the *Augmented Dickey-Fuller (ADF)* and *Philip Peron (PP)* methods. To determine whether a series has a unit root or not, it is necessary to compare the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP) test statistics with the Augmented Dickey-Fuller (ADF)* table values. If the t-value of the ADF statistic is less than the critical value of the *Augmented Dickey-Fuller (ADF)* table with a certain level of significance, then *the series* is not stationary. (Febrianti et al., 2021)

Based on the results of the unit root test as shown in table 2 below, it is known that the three original variables have unit roots, which means that the original research data is not stationary.

**Table 2.** Root Test Results with *Augmented Dickey-Fuller (ADF)* and *Philip Peron (PP)* Methods

Variable	ADF test	PP test	Integration Order	Results
Not	-1.861621	-2.252914	5%	Not stationary
D(NTR)	-22.41151	-23,12265		Not moving
JII	-1.714411	-2.252914	5%	Not stationary
D(JII)	-24,18629	-24.18104		Not moving

Source: *Eviews 9 the Year 2022 Data Processed*

Table 2 shows that the results of the *unit root test* on the rupiah exchange rate and the JII 30 index are not stationary at that level. Then do the unit root test on the *first difference data*. The test results using the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP)* test as shown in table 4.1 indicate that the data is stationary with a significance level of 5%. This means that all of the above variables are stationary at the *first difference* so that these variables can be said to be integrated at a 5% degree. (Beik & Fatmawati, 2014) The results of the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP)* test on the first level of differentiation for the rupiah exchange rate variable obtained information that the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP) test* value is greater than the *Augmented Dickey-Fuller (PP) test*. *Fuller (ADF) McTable Kinnon* at the 5% confidence level is  $-22,41151 > -2.866060$  and the *Philip Peron (PP)* test results show  $-23,12265 > -2.866060$ . The results of the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP)* test at the first differentiation level for the JII 30 index variable obtained information that the *Augmented Dickey-Fuller (ADF)* or *Philip Peron (PP) test* value is greater than the *Augmented Dickey-Fuller (ADF) McKinnon's Table* at the 5% confidence level, namely  $-24,18629 > -2.866060$  and the *Philip Peron (PP)* test results show  $-24.18104 > -2.866060$ .

#### 4.2 Granger Causality Test

Granger causality test is used to see the causal or reciprocal relationship between each variable and other variables one by one so that it can be seen whether these variables statistically influence each other (two-way relationship), have a unidirectional relationship, or have no equal relationship. once (no relationship). influence each other). (Febrianti et al., 2021)

The conditions that must be met to state the existence of a causal relationship, both one-way and two-way, are if the F-statistical Probability value  $< F$ -critical at = 5%. The following table presents the results of the Granger causality test.

**Table 3.** *Granger Test* Causality Test Results

No	null hypothesis	Problem.	Information
1	JII is not Granger's Cause	0.0005	
	VALUE_TUKAR is not Granger Cause JII	0.8453	One Way Relationship

The relationship between JII 30 and the rupiah exchange rate has a one-way relationship. Where JII 30 affects the rupiah exchange rate. Judging from the probability value of the F-statistics JII 30 of 0.0005, it is smaller than 5%. Meanwhile, the rupiah exchange rate does not affect JII 30 because the probability value of the F-statistics of the rupiah exchange rate is greater than 5%, namely  $0.8453 > 0.05$ . Thus, it is concluded that there is a unidirectional relationship between the JII 30 variable and the rupiah exchange rate and does not apply otherwise.

This can be seen from the movement of the JII 30 index which decreased in 2020 by -20.08%, this was followed by a decline in the rupiah exchange rate which reached 14,829 or -4.55%. This happened because, since the pandemic, the Composite Stock Price Index (JCI) has not been able to return to its original position, which was at the level of 5,942 in March 2020. The Indonesia Stock Exchange (IDX) has implemented several policies to curb the level of index weakening further due to market conditions. at the moment. very volatile. The stock price is a reflection of the value of a company for investors.

### 4.3 Optimal Lag Test

Before performing a cointegration test, and forming a VAR or VEC model, it is necessary to determine the lag length. Because the cointegration test and the *Vector Autoregressive* (VAR) and *Vector Error Correction Model* (VECM) models are very sensitive to lag length. So that the determination of the optimal lag length is one of the important procedures that must be carried out in the formation of the model.

Table 3 below presents a recapitulation table comparing the *Log-Likelihood values* and the criteria used in determining the lag length, for the VAR model starting from lag lengths 1-8 following the research conducted by Wawan Supriyanto.

**Table 4.** Recapitulation of LR, FPE, AIC and HQ .  
log value In the VAR model between NTR and JII 30

left behind	LogL	LR	FPE	AIC	SC	headquarter
0	-25686.46	Not	2.03000000	85.20549	85.22739	85.21401
1	-25639.40	93.49423	1.790000	85.07926	85.16686*	85.11335
2	-25633.75	11.16694	1.800000	85.09037	85.24367	85.15004
3	-25623.33	20.49547	1.800000	85.08566	85.30466	85.17089
4	-25601,50	42.70551	1.720000	85.04313	85.32783	85.15393
5	-25598.01	6.807979	1.760000	85.06138	85.41178	85.19776
6	-25594.74	6.334919	1.790000	85.08038	85.49649	85.24233
7	-25519.13	145,6888	1.430000	84,85948	85.34128	85.04699
8	-25495.04	46.19269*	1.360000*	84,80941*	85.35691	85.02250*

Source: *Exodus Eviews 9, 2022*

Based on table 4 above, it can be seen that the five criteria have different results, namely LR, FPE, AIC, and HQ with a lag length of 8, while SC with a lag length of 1. Therefore, in this study after considering previous studies and the characteristics of daily data, then the lag length that has the most goodness will be used according to the LR, FPE, and HQ criteria, namely, lag 8.

#### 4.4 Cointegration Test

After knowing that the rupiah exchange rate data and JII 30 are stationary, then it will be tested whether there is a long-term equilibrium relationship between the rupiah exchange rate variable and the JII 30 variable. The cointegration test method used in this study is *the Johansen Cointegration Test*. If the *Trace Statistic value* is less than the *Critical Value* at = 5% then the observed variable is not cointegrated, otherwise, if the *Trace Statistic value* is greater than the *Critical Value* at = 5%, the observed variable is cointegrated. In this study, the *Johansen* cointegration test will be used, with the criteria that if the *trace statistic* is greater than the *critical value*, then the equation is cointegrated, with  $H_0$  equal to non-cointegration and  $H_1$  equal to cointegration. This means that when the *trace statistic* is greater than the *critical value*, reject  $H_0$  and accept  $H_1$  and the equation is cointegrated.

Table 5 below presents the results of the cointegration test using the *Johansen Cointegration Test method*. (Febrianti et al., 2021)

**Table 5.** *Johansen Cointegration Test Results*

Hypothesized CE Quantity	Eigenvalue	Trace Stats	0.05 Critical value	Problem.
There isn't any*	0.233969	294.1253	29.79707	0.0001
at most 1*	0.120197	133.4063	15,49471	0.0001
at most 2*	0.088971	56.18779	3.841466	0.0000

Source: *Exodus Eviews 9, 2022*

From table 4, it can be seen that the cointegration test results using the Johansen cointegration test method *show the trace statistic value* is greater than the *critical value* with a significance level of 5%, namely  $294.1253 > 29.79707$ . Based on the results of cointegration testing using *the Johansen cointegration test method* at 5%, it is known that the *trace statistic value* is greater than the *critical value* with a significance level of 5%. This means that the rupiah exchange rate variable and JII 30 have a long-term equilibrium relationship.

- 1) Based on this research, there is a long-term equilibrium relationship between the rupiah exchange rate and the JII 30 index. This is evidenced by the *trace statistic value* greater than the *critical value* with a significance level of 5%.
- 2) the short-term relationship, the value of t-statistics  $[1.79401] < t$ -table value of 1.963919017 means that the JII 30 index before covid 19 did not affect the rupiah exchange rate after covid 19
- 3) The rupiah exchange rate variable with JII 30 shows the t-statistic value  $[1.79401] > t$ -table 1.963919017, meaning that the rupiah exchange rate before covid 19 affects the JII 30 index after covid 19.

#### 4.5 Empirical Model Of VAR

*Vector Autoregressive (VAR)* is usually used for forecasting a system that is interdependent in time series to analyze the dynamic impact of *random error* variables in system variables and to conduct causality tests. The things to note:

1. Variables (endogenous and exogenous) believed to interact
2. The highest number of lags is needed to capture the effects of each variable on other variables.

According to Enders, if there is a cointegration relationship between research variables, then the estimation is carried out with VEC, whereas if there is no cointegration, then the estimate is made using VAR *Difference (VARD)*. by using the *Vector Error Correction Model (VECM)*. The following is a table of estimation results with (VECM).

**Table 6.** Vector Error Correction Model (VECM)

Equation cointegration:	CointEq1	CointEq2
D( FLOW_MODAL_Foreign (-1))	1.000000	0.000000
D(EXCHANGE_VALUE_RUPIAH(-1))	0.000000	1.000000
D(JII_30(-1))	-7730000	17.37180
	5.10000	(1.06538)
	[-1.51833]	[16.3058]
C	-945000	2.197448
	D(_RUPIAH EXCHANGE	
	RATE,2)	D(JII 30.2)
CointEq1	-0.000016	-0.000257
	(0.00086)	(0.00012)
	[-0.18613]	[-0.21842]
CointEq2	-0.254981	-0.063182
	(0.0407)	(0.00575)
	[-6.06056]	[-10.9957]
D(EXCHANGE_VALUE_RUPIAH(-1),2)	-0.602601	0.051464
	(0.04728)	(0.00646)
	[-12.7445]	[ 7.96931]
D(EXCHANGE_VALUE_RUPIAH(-2),2)	-0.435051	0.035084
	(0.04715)	(0.00644)
	[-9,22620]	[ 5.44780]
D(EXCHANGE_VALUE_RUPIAH(-3),2)	-0.228494	0.021509
	(0.03676)	(0.00502)
	[-6.21502]	[ 4.28366]
D(JII_30(-1),2)	1.142439	0.165419
	(0.63681)	(0.08697)
	[ 1.79401]	[1.90197]
D(JII_30(-2),2)	1.158391	0.102456
	(0.50270)	(0.06866)
	[ 2.30436]	[ 1.49230]
D(JII_30(-3),2)	0.307582	0.064303
	(0.35136)	(0.04799)
	[ 0.87541]	[ 1.34002]
C	-0.114788	0.021999
	(2.87114)	(0.39213)
	[-0.03998]	[ 0.05610]
R-squared	0.490940	0.469128
adj. R-squared	0.481529	0.459314
Number of inhabitants square	2977079.	55531,42
SE equation	70.73539	9.660751
F-statistics	52.16556	47.79985
Possibility log	-3440.416	-2231,955
Akaike AIC	11.37534	7.393591
Schwarz SC	11,46249	7.480745
Means depends	0.004942	0.006244
depending on SD	98.23686	13.13827
Determinant resident covariance ( dof adj . )		1.830000
Determinant resident covariance		1.720000
Possibility log		-25809.97
Akaike's information criteria		85.17946
Schwarz Criteria		85.48450

Source: *Exodus Eviews 9, 2022*



In the rupiah exchange rate variable lag 1 shows the t-statistic value of the rupiah exchange rate variable  $[-12.7445] < t\text{-table value } 1.963919017$  meaning that the rupiah exchange rate before covid 19 does not affect the rupiah exchange rate after covid 19. The index variable JII 30 shows significance with the value t-statistics  $[7.96931] > t\text{-table value of } 1.963919017$  means that the rupiah exchange rate before covid 19 affects the JII 30 index after covid 19. Meanwhile, the rupiah exchange rate variable shows the t-statistic value  $[1.79401] < 1.963919017$  meaning the index JII before covid 19 did not affect the rupiah exchange rate after covid 19. The JII 30 index variable showed a t-statistic value  $[1.90197] < 1.963919017$  meaning that the JII 30 index before covid 19 did not affect the JII 30 index after covid 19.

## 4 Conclusion

Based on the results of tests and analyzes that have been carried out regarding the analysis of the dynamic relationship between the rupiah exchange rate and the movement of the JII 30 index using the *Vector Autoregressive* (VAR) approach during the Covid 19 Pandemic, the following conclusions can be drawn: 1) The reciprocal relationship between the rupiah exchange rate and the JII 30 index produces a one-way relationship, namely only the JII 30 index affects the rupiah exchange rate and does not apply vice versa where the probability value of the JII 30 index against the rupiah exchange rate  $< 0.05$  and the rupiah exchange rate against the JII index  $30 > 0.05$ . 2) The relationship between the rupiah exchange rate before covid 19 affected the JII 30 index after covid 19 seen from its significance value  $> 1.963919017$  while the JII 30 index before covid 19 did not affect the rupiah exchange rate after covid 19 seen from its significance value  $< 1.963919017$ .

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