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**FACTORS AFFECTING THE RUPIAH EXCHANGE RATE DURING THE COVID 19 PANDEMIC**

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**ABSTRACT**

The world economy throughout 2020 experienced a shock due to the Covid 19 virus pandemic. Indonesia was no exception, it also experienced economic instability. As a country that is rich in raw materials, it still relies heavily on raw materials from abroad. Thus, the volatility of the exchange rate becomes a major influence on the production process in various fields. This study aims to determine the effect of inflation, interest rates and the money supply on the exchange rate before and during the Covid 19 pandemic. The data used are exchange rates, interest rates, inflation and the money supply from January 2018 to April 2021. Where the period is divided into the period before the Covid pandemic occurred, namely January 2018 to February 2020 and during the pandemic from March 2020 to April 2021. The data analysis technique used was multiple regression with the classical assumptions of multicollinearity, autocorrelation, heteroscedasticity and normality. The results showed that the inflation variable, interest rate and the dummy variable had a positive and significant effect on the exchange rate, while the money supply had no significant negative effect on the exchange rate. The adjusted r square value is 0.565 which means that the inflation variable, interest rate, money supply and the dummy variable are able to explain the exchange rate of 56.5% while the rest is explained by other variables not included in this study.

Keywords: exchange rate; inflation; interest rate; money supply

**INTRODUCTION**

The world economy throughout 2020 experienced a shock due to the Covid 19 virus pandemic that was discovered in China. Indonesia is no exception, also experiencing economic instability. In macro conditions in Indonesia, there are many layoffs, which has an impact on the decline in people's income. In addition to the increase in the number of unemployed, there was also an increase in the price of goods and changes in the exchange rate. Indonesia, as a country rich in raw materials, still relies heavily on raw materials from abroad. Thus, the volatility of the exchange rate becomes a major influence on the production process in various fields. Changes in the exchange rate of the rupiah against the US dollar are influenced by many factors, both fundamental and non-fundamental. Fundamental factors such as inflation rate, interest rate, money supply, capital inflows and outflows, international balance of payments position, while non-fundamental factors such as psychological factors, social politics and state security. In addition, it is also influenced by economic openness.

Table 1.  
Development of Rupiah Exchange Rate 2018-2021

Period	Exchange Rate	Change (%)
Quarter I 2018	13756,75	
Quarter II 2018	14441,75	4,98
Quarter III 2018	14817,75	2,60

Period	Exchange Rate	Change (%)
Quarter I 2019	14218,75	-4,04
Quarter II 2019	14268,25	0,35
Quarter III 2019	14116,52	-1,06
Quarter I 2020	14929,28	5,76
Quarter II 2020	14633,31	-1,98
Quarter III 2020	14532,55	-0,69
Quarter I 2021	14409,94	-0,84

From the period 2018 to early 2021 there were fluctuations in the exchange rate. In the second quarter there was an increase of 4.98% and decreased in the next quarter to reach -4.04%. The highest increase of 5.76% occurred in the first quarter of 2020 when the pandemic began. Until first quarter period in 2021, it still decreased by 0.84%. Based on the results of research from Hastuti and Yahya 2020 regarding the phenomenon of the rupiah exchange rate before and during covid 19, there is a conclusion that there is a significant difference in the exchange rate in the period before covid 19 and during covid 19. This means that there is a weakening of the rupiah exchange rate against the dollar along with the increasing number of cases of covid 19 in Indonesia. In addition, the exchange rate is also influenced by inflation and interest rates (Arifin and Mayasya, 2018).

A high inflation rate in a country will cause domestic prices to be more expensive than prices abroad. This causes the demand for goods from abroad or imports to increase, which in turn will increase the demand for foreign currency. The increasing demand for foreign currency causes the domestic currency to depreciate or the exchange rate to weaken. Vice versa, if inflation decreases, the demand for foreign currency will also decrease so that the domestic currency will experience appreciation or the exchange rate will increase again. This is in accordance with the results of research by Arifin and Mayasya in 2018 where there is a positive influence between the inflation rate and the rupiah exchange rate.

Apart from inflation, the exchange rate is also influenced by interest rates. This can be explained, when domestic interest rates increase, investors both from within the country or from abroad will invest their capital in the country, which will result in the strengthening of the domestic currency. Conversely, when domestic interest rates decline, investors tend to invest their capital abroad, resulting in a weakening of the domestic currency exchange rate. This is in accordance with the results of Fauji's research in 2016 which concluded that there was a positive influence between interest rates and the rupiah exchange rate.

Another factor that affects the exchange rate is the money supply. What is meant by the money supply is demand deposit and currency held and used by the public as a means of daily payment transactions (Boediono, 2010). If the amount of money circulating in the community increases, it tends to be used for consumption. Consumption of imported goods causes the demand for foreign currency to increase, and in the end can weaken the value of the domestic currency. This is in accordance with the results of Fauji's research in 2016 which concluded that there was a positive influence between the money supply and the rupiah exchange rate. In the current conditions where the COVID-19 pandemic occurs, it also affects the exchange rate of the rupiah against the US dollar. As in the results of Hastuti and Yahya's 2020 research on the phenomenon of the rupiah exchange rate before and during covid 19, there is a conclusion that there is a significant difference in the exchange rate in the period before covid 19 and during covid 19. This study will look at the influence between inflation, interest rates, the money supply against

the rupiah exchange rate with a dummy variable in the form of conditions before the covid 19 pandemic and during the covid 19 pandemic.

### **Exchange rate**

Exchange rate is the amount or price of domestic currency from foreign (foreign) currencies (Salvatore, 2004). The exchange rate or known as the exchange rate is an agreement known as the currency exchange rate against current or future payments, between the two currencies of each country or region. Since the exchange rate includes two currencies, the balance is determined by the supply and demand sides of the two currencies. According to Rita and Eugene (2004) in Hastuti and Yahya (2020) the purchasing power of a currency is the value of a country's currency is determined by the value of goods and services that can be purchased with one unit of currency (as opposed to the price level). Just as the price of goods is formed due to the interaction of buyers and sellers, this exchange rate is formed from the interaction of buyers and sellers of foreign exchange for the sake of international transactions. The form of the exchange rate is divided into 2, namely Fixed exchange rate system and Floating exchange rate. In a fixed exchange rate system, the exchange rate is maintained at a certain level. And if the exchange rate moves too much, the government will intervene to return it to its original state. While in the floating exchange rate system, the exchange rate is allowed to move freely, and is determined by the forces of demand and supply of currency in the money market. However, what is common in countries is to use a mixture of the two forms of exchange rates.

### **Inflation**

Inflation is the process of increasing the general price of goods continuously (Nopirin, 2013). Inflation causes a decrease in people's purchasing power because in real terms the level of income also decreases. In general, inflation results in, among other things, domestic prices being more expensive than foreign prices. Inflation arises due to pressure from the supply side (cost push inflation), from the demand side (demand pull inflation), and from inflation expectations. The causes of cost push inflation are the depreciation of the exchange rate, the impact of foreign inflation, the increase in commodity prices regulated by the government (Administered Price), and negative supply shocks. Meanwhile, demand pull inflation is caused by high demand for goods and services relative to their availability ([www.bi.go.id](http://www.bi.go.id)). When high inflation occurs, people's real income will decrease, while unstable inflation will reduce economic growth where people find it difficult to make decisions to consume, invest or produce. If the domestic inflation rate is higher than the inflation rate in neighboring countries, the real domestic interest rate will become uncompetitive so that it can put pressure on the value of the Rupiah. Bank Indonesia's monetary policy is aimed at managing price pressures originating from the aggregate demand side (demand management) relative to supply side conditions. Monetary policy is not intended to respond to rising inflation caused by surprising and temporary factors that will disappear by themselves over time ([www.bi.go.id](http://www.bi.go.id)).

### **Interest rate**

The interest rate is the cost of borrowing or the price paid for borrowed funds (Mishkin, 2011). Interest rate is the amount of interest paid per unit of time which is referred to as a percentage of the amount lent. According to the classical theory, interest is the price of loanable funds (investment funds), thus interest is the price that occurs in the market and investment. While Keynes's theory states that the interest rate is a monetary phenomenon. Interest rates are influenced by the preferences of economic actors in terms of lending and lending, changes in the purchasing power of money, and market interest rates or prevailing interest rates. In the banking world, there are several types of interest rates, namely fixed or fixed interest rates, floating interest rates, flat interest rates, effective interest rates and annuity rates. In this study,

the interest rate used is Bank Indonesia, namely the BI 7-Day Reverse Repo Rate (BI7DRR). The BI 7-Day (Reverse) Repo Rate instrument is used as the new policy interest rate because it can quickly affect the money market, banking and real sector. The BI 7-Day (Reverse) Repo Rate instrument as a new reference has a stronger relationship to money market interest rates, is transactional or traded in the market, and encourages financial market deepening, particularly the use of repo instruments (www.bi.go.id). The expected impacts with the use of the BI 7-Day (Reverse) Repo Rate are:

1. Strengthening monetary policy signals with the BI-7 Day Reverse Repo Rate (BI7DRR) as the main reference in financial markets.
2. Increasing the effectiveness of monetary policy transmission through its influence on movements in money market interest rates and banking interest rates.
3. The establishment of a deeper financial market, particularly transactions and the establishment of an interest rate structure in the Interbank Money Market (PUAB) for a tenor of 3-12 months

### **Money Supply**

Money supply or money supply is the entire money supply in an economy. The money supply can include cash, coins, and balances in checking and savings accounts. Furthermore, there are four types of JUB, namely M0, M1, M2 and M3. The explanation of the four JUBs is as follows (Rosyidi, 2009). M0 is banknotes and coins that exist in the community, not banks and the government. M1 is banknotes and coins held by the public plus savings in the Bank which can be withdrawn at any time (current account/demand deposit). M2 is M1 + savings + time deposits in small amounts at commercial banks. M3 is M2 + long-term deposits in large quantities at non-bank savings institutions, including institutional funds in the money market. Several factors that affect the money supply include (Darsono, 2020): first, Monetary Policy, namely the Central Bank's policy in regulating the money supply. Second, the income of the community where the higher the income of the community, the greater the amount of money circulating in the community, the third is the bank interest rate if the interest rate is too low, the amount of money circulating in the community will increase because people will prefer to rotate their money in other sectors. which is considered productive, fourth is the price of goods when there is an increase in the price of goods, it takes more money held by the public for consumption so that the money supply will also increase.

### **METHOD**

This study uses secondary data. Secondary data is data taken in the form of data taken from other parties. The data used are exchange rates, inflation rates, money supply and interest rates.

#### **Data analysis technique**

This study uses multiple regression analysis, with the aim of seeing the effect of several independent variables on the dependent variable. Equations in research:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$$

Where:

Y = exchange rate

X1 = inflation

X2 = interest rate

X3 = money supply

a = constant

b1, b2, b3 = regression coefficient

e = error

### **Normality test**

The normality test was used to test whether the residual data were normally distributed or not. Normality test using 1 sample Kolmogorov Smirnov.

### **Multicollinearity Test**

Aims to test whether the regression model found a correlation between independent variables. If the independent variables are correlated with each other, then these variables are not orthogonal. Multicollinearity testing uses VIF and Tolerance values.

### **Autocorrelation Test**

Autocorrelation test is used to determine whether in the regression model there is a correlation between confounding variables or not. To test the autocorrelation using the Durbin Watson value.

### **Heteroscedasticity Test**

Heteroscedasticity test is used to see whether in the regression model there is an inequality of residual variance from one observation to another. In the heteroscedasticity test, the Glejser test was carried out.

### **Coefficient of Determination**

The coefficient of determination measures how far the model's ability to explain variations in the dependent variable is. The value of the coefficient of determination is between zero and one.

### **Simultaneous Test (F Test)**

The F statistic test shows whether all independent or independent variables included in the model have a joint effect on the dependent variable.

### **Partial Test (t Test)**

The t test is used to see the effect of the independent variable on the dependent variable partially.

## **RESULTS**

### **Descriptive statistics**

Descriptive statistics are used to describe a data statistically. To interpret the results of descriptive statistics of exchange rates, inflation, interest rates and the money supply can be seen from the following table:

Table 1.  
Descriptive Data

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Inflation	40	1.32	3.49	2.6217	0.74563
Exchange Rate	40	13480	16448.84	14412.4843	514.74980
Interest Rate	40	3.50	6.00	4.8500	0.85635
Money Supply	40	5351650.33	6957298.17	6067697.8648	514484.90912

From the table it can be seen that the total number of data processed is 40. This number was taken from January 2018 to April 2021. Where the period is divided into the period before the Covid pandemic occurred, namely January 2018 to February 2020 and during the pandemic from March 2020 to April 2021. The lowest inflation rate of 1.32 occurred in August 2020 and the highest value of 3.49 in August 2019. The lowest exchange rate of the rupiah against the

dollar of 13480 occurred in January 2018 and the highest of 16448 in March 2020, at the beginning of the Pandemic. The lowest interest rate was 3.5 in February-April 2021 and the highest was 6 in November 2018 to June 2019. Meanwhile, the lowest money supply was 5351650.33 in February 2018 and the highest was 6957298.17 in April 2021.

Table 2.  
Normality Test

	Unstandardized Residual
Kolmogorov-Smirnov Z	0.103
Asymp. Sig. (2-tailed)	0.200

From the output, it can be seen that the value of Kolmogorov Smirnov is 0.103 with a significance level of 0.200 above 0.05 so it can be concluded that the residual data has been normally distributed.

### Classic Assumption Multicollinearity

Table 3.  
Multicollinearity Test

	Tolerance	VIF	Description
Inflation	0,194	5,162	Free
Interest Rate	0,403	2,481	Free
Money Supply	0,177	5,645	Free
Dummy	0,144	6,955	Free

From the output, it can be seen that all independent variables have a tolerance value above 0.1 and a VIF value below 10 so it can be concluded that the equation model is free from multicollinearity.

### Autocorrelation

The autocorrelation test used a run test with the results as in table 4. From the output results, it can be seen that the Z value is -1.442 with a significance level of 0.149. because the significance is greater than 0.05, it can be concluded that there is no positive autocorrelation in the model.

Table 4.  
Autocorrelation Test

	Unstandardized Residual
Z	-1.442
Asymp. Sig. (2-tailed)	0.149

### Heteroskedasticity

Table 5.  
Heteroskedasticity

Variable	t	Sign
Inflation	0,793	0,433
Interest Rate	0,570	0,572
Money Supply	1,339	0,189

Heteroscedasticity test using Glejser test. From table 5 it can be seen that the significance value of all independent variables is above 0.05. Because the significance value is above 0.05, it can be concluded that the model is free from heteroscedasticity.

## ANOVA

Table 6.  
ANOVA

	F	Sign
Regression	11,377	0,000

The results of the F test from table 6 show that the model has a calculated F value of 11.377 and a significance of 0.000. Because the significance value is less than 0.05, it can be concluded that simultaneously the interest rate variable, inflation in the money supply and the dummy variable have a significant effect on the exchange rate variable.

## Coefficient of Determination

Table 7.  
Coefficient of Determination

	R	R Square	Adjusted R Square
Regression	0,752	0,565	0,512

Based on table 7, the coefficient of determination shown by adjusted r square has a value of 0.512 which means that variations in the exchange rate variable can be explained by variations in interest rates, inflation, money supply and dummy variables of 51.2% but the remaining 48.8% explained by other variables outside the research model.

## Regression Analysis

After being freed from the classical assumption test, the regression results are as follows:

Table 8.  
Regression Results Equation

Variabel	B	Std Error	T	Sign
(Constant)	10828.064	1854.306	5.839	0.000
Inflation	476.930	174.799	2.728	0.010
Interest rate	443.553	105.517	4.204	0.000
Money supply	-7.227E-5	0.000	-0.273	0.787
Dummy	1775.107	313.212	5.667	0.000

Equality:

$$\text{Exchange Rate} = 10828064 + 476.930 \text{ Inflation} + 443.553 \text{ Interest Rate} - 0.00007227 \text{ JUB} + 1775.107 \text{ Dummy}$$

1. The constant 10828064 can be interpreted that if all the independent variables, namely inflation, interest rates, the money supply remain or do not change, the exchange rate will be positive 10828064.
2. The inflation coefficient of 476,930 can be interpreted if the inflation rate increases by 1 unit while other variables remain constant, the exchange rate will increase by 476,930.
3. The coefficient of interest rate 443.553 can be interpreted if the interest rate increases by 1 unit while other variables remain constant, the exchange rate will increase by 443.553.
4. The coefficient of the money supply of -0.00007227 can be interpreted if the money supply increases by 1 unit while the other variables remain constant, the exchange rate decreases by 0.00007227.
5. The coefficient of the dummy variable of 1775,107 means that during the COVID-19 pandemic, the rupiah exchange rate is predicted to increase by 1775,107.

## DISCUSSION

### Inflation rate affects the exchange rate

From table 8 it can be seen that the inflation rate has a regression coefficient of 476,930 with a t value of 2,728 and a significance of 0.010. Because the significance value is below 0.05, it can be concluded that the inflation rate has a significant effect on the exchange rate. So that hypothesis 1 is accepted. The positive direction of the regression coefficient can be interpreted that when inflation increases it will result in the exchange rate also increasing, and vice versa when inflation decreases it will result in the exchange rate also decreasing. This result is in accordance with the Purchasing power parity theory which states that if inflation tends to increase, domestic goods prices are more expensive than foreign goods prices. So that the demand for foreign goods will increase and make the demand for foreign currency also increase. This resulted in the value of the rupiah depreciating, which means the exchange rate also increased. This result is in accordance with research from Arifin and Mayasya (2018) that there is a positive influence between inflation and the exchange rate in the period 2007 to 2014, but is not in accordance with Fauji's (2016) research.

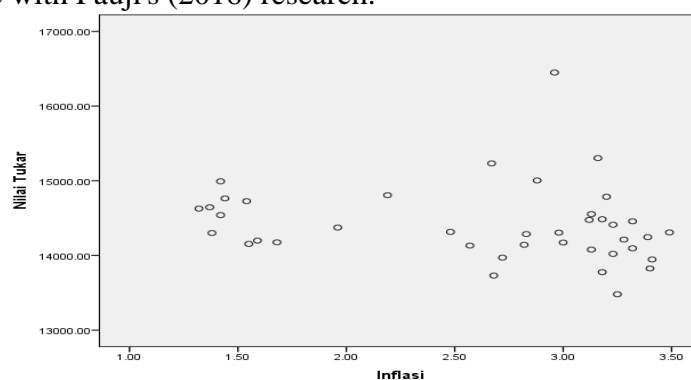


Figure 1 Correlation of Inflation and Exchange Rate

### Interest rates affect the exchange rate

From table 8 it can be seen that the interest rate has a regression coefficient of 443.553 with a t-value of 4.204 and a significance of 0.000. Because the significance value is below 0.05, it can be concluded that interest rates have a significant effect on the exchange rate so that hypothesis 2 is accepted. The positive direction in the regression coefficient can be interpreted that when interest rates increase it will result in the exchange rate also increasing, and vice versa when interest rates decrease it will result in the exchange rate also decreasing. When interest rates increase, it will result in a decrease in investment in the real sector. And, investors will be more interested in investing abroad. This causes a decrease in production, so this situation causes the supply of foreign currency to decrease and the rupiah exchange rate to depreciate. This is in line with the results of research by Fauji (2016) and Arifin and Mayasya (2018).

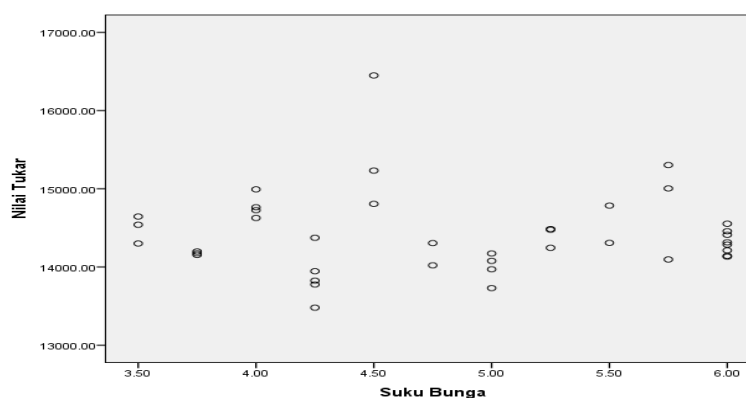


Figure 2 Correlation of Interest Rates and Exchange Rates

### The Money Supply has an effect on the exchange rate

From table 8 it can be seen that the money supply has a regression coefficient value of -0.00007227 with a t value of -0.273 and a significance of 0.787. Because the significance value is above 0.05, it can be concluded that the money supply has no significant effect on the exchange rate, so hypothesis 3 is rejected. In accordance with the money supply theory, the money supply has a negative effect on the exchange rate, meaning that an increase in the money supply will cause the domestic currency to depreciate. However, in this study the results were not significant. The money supply has no significant effect on the exchange rate because the increase in the money supply in the community does not reach consumers directly for consumption, but enters the banking system and then into the business sector as a form of investment. After that, they go to the household sector for consumption. So it can be concluded that the increase in the money supply takes a relatively long time to reach consumers. And then used to consume imported goods. This result is not in accordance with the research conducted by Fauji (2016).

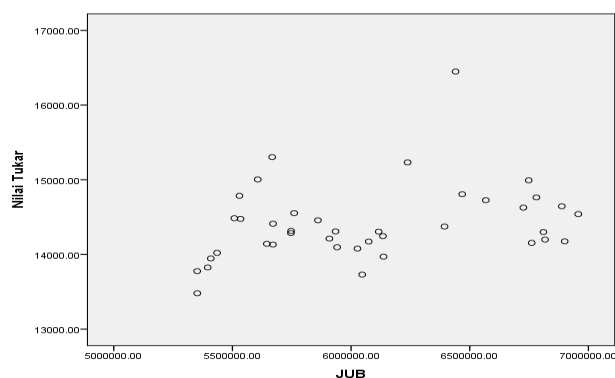


Figure 3. Correlation of the Money Supply and Exchange Rate

### The effect of the Dummy variable on the exchange rate

From the table it can be seen that the dummy variable has a coefficient value of 1775,107 and a significance of 0.000 which means that the dummy variable has a significant effect on the exchange rate. It can be concluded that when conditions change from a pre-pandemic state (0) to a pandemic state (1), the exchange rate will be positive (increase). The situation during the pandemic had a major impact on economic conditions in almost all countries, including Indonesia.

## CONCLUSION

Based on the analysis in this study it can be concluded that: Partially, inflation and interest rate variables have a positive and significant effect on the exchange rate in the period January 2018 to April 2021. Partially, the money supply variable has no significant effect on the exchange rate. The dummy variable has a significant positive effect on the rupiah exchange rate against the dollar, which means that the situation during the pandemic caused the exchange rate to increase compared to before the pandemic. All independent variables contribute 56.5% to the independent variables, which means 43.5% of the exchange rate is explained by other variables outside the model.

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