THE INFLUENCE OF MACROECONOMIC VARIABLES ON THE RUPIAH EXCHANGE RATE FOR THE UNITED STATES DOLLAR

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Abstract

The exchange rate serves as a crucial economic indicator due to its broad impact on various facets of a nation's economy. This study aims to investigate the impact of key macroeconomic variables on the Indonesian rupiah's exchange rate vis-à-vis the US dollar. Specifically, it examines inflation, Bank Indonesia's interest rates, and the Federal Reserve's interest rates using secondary data from official sources spanning from 1990 to 2022. Employing a quantitative approach with associative modeling, the study utilizes the Autoregressive Distributed Lag (ARDL) analysis technique for data analysis. The results indicate that inflation, Bank Indonesia's interest rates, and the Fed's interest rates collectively influence the rupiah's exchange rate against the US dollar. These variables demonstrate short-term impacts on the exchange rate, with persistent effects observed in the long term, emphasizing their role in maintaining exchange rate stability. This research underscores the importance of continuously monitoring and evaluating these macroeconomic factors to ensure stability in the rupiah's exchange rate against the US dollar.

Keywords: Exchange rate, inflation, Bank Indonesia interest rates, Fed interest rates

INTRODUCTION

Indonesia is a nation that practices open economics, which means it engages in global trade (Nuraini and Bagio Mudakir, 2019). This position makes the country more sensitive to global economic challenges and problems such as export-import transactions, investment flows and domestic consumption. The increasingly rapid development of the international economy can cause changes in a country's macroeconomic indicators, including differences in a country's currency. For this reason, a currency that is used to transact between two nations must be able to be changed into another currency using the exchange rate, which is a unit of measurement for the exchange rate (Yuliyanti, 2014).

The price of foreign currency in relation to domestic currency is represented by the exchange rate, also known as the rate at which one currency can be exchanged for another (Prayoga, 2018). Because of its strength and popularity among developing nations, the US dollar (USD) is used as a benchmark in the

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context of Indonesia (Krishnanda et al., 2020). This rate significantly influences trade balances, current transactions, and various macroeconomic factors. It serves as a gauge of a nation's economic health, with a stable exchange rate suggesting economic stability or strength. Conversely, exchange rate volatility affects capital flows and international trade.

Over the course of thirty-three years, Indonesia has gone through three financial crises: the global financial crisis in 2008, the 1998 monetary crisis as well as the 2020 economic disaster. These three financial crises had a big effect on the exchange rate. The 1997 economic collapse in Thailand marked the beginning of the 1998 Indonesian monetary crisis. (Nirmaya et al., 2020). The devaluation of the Baht not only affected Thailand but also triggered a financial crisis throughout the Asian region. This currency instability was one of the main factors in triggering the financial crisis involving Indonesia. One of the main impacts of this crisis is the significant depreciation of the national currency, namely the rupiah. Before the crisis, many Indonesian companies, both private and government owned, had debt in foreign currency. When the rupiah depreciates, the cost of servicing foreign currency debt increases drastically, causing significant financial stress. Unstable exchange rates and high inflation create an unstable economic environment. Many companies experienced financial difficulties, and there was a notable contraction in the economy's real sector.

The 2008 global financial crisis came next. Many consumers with bad credit were given mortgage loans by banking organizations in the United States, which is where this disaster originated. (Burhanuddin and Abdi, 2020). This crisis sparked panic and uncertainty throughout the world. The financial crisis triggered a global economic recession due to declining consumer confidence and investment, declining exports, and weakening overall economic activity. Foreign investors typically take their money out of the Indonesian financial system in order to lower their risk and search for opportunities in more stable markets. The value of the rupiah may decrease if this capital is withheld. During the global financial crisis, Indonesia's banking industry also encountered difficulties.Banks are experiencing liquidity pressure and credit risk due to the economic slowdown and financial market uncertainty.

Lastly, the economic crisis in 2020, which was caused by the COVID-19 virus(Herawati & Gustan, 2020). The rapid spread of the COVID-19 virus has triggered lockdown measures and mobility restrictions around the world. This caused a sharp decline in global economic activity, including international trade, which impacted the currencies of countries that depend heavily on exports. The COVID-19 virus is spreading quickly, which is unsettling the local and global economy. This uncertainty is putting pressure on the rupiah and other emerging nation currencies. Because the US dollar is thought of as a safe haven currency, investors frequently look for more secure investments. This can cause the value of the rupiah exchange rate to drop. Negative sentiment towards the rupiah currency can cause a "run on the rupiah", where investors and holders of assets denominated in the rupiah switch to currencies that are considered more stable. This can accelerate the depreciation of the rupiah.

Dedollarization—the movement to less reliance on the US dollar in financial and commercial transactions—is one topic that has drawn attention recently. Indonesia has instituted a dedollarization campaign aimed at reducing reliance on the US dollar and promoting the use of the rupiah, the country's currency.(Sulfarid, 2022). The steps taken by Indonesia are implementing LCT (Local Currency Transaction). Since 2017, Indonesia has entered into local currency transaction (LCT) agreements with Malaysia, Thailand, Japan and China. Then, Indonesia worked together with other ASEAN countries to reduce the use of the United States dollar in bilateral transactions. Indonesia has used a cross-border and fast QRIS payment system to facilitate LCT transactions between ASEAN countries. However, the dedollarization policy implemented by Indonesia takes quite a long time and requires consistency in economic policy and structural reforms that support exchange rate stability and confidence in the national currency.

Every nation, including Indonesia, aspires to have a stable currency exchange rate with other nations' currencies. This is difficult to do, though, because a number of factors, including non-economic ones like political and security scenarios, the economic conditions of other trading partners, as well as domestic economic conditions and policies, affect how strong or weak the exchange rate is. other nations (Yudiarti et al., 2018). In this case the exchange rate fluctuates or changes so that future exchange rates cannot be predicted because the exchange rate depends entirely on the choice of market mechanism. This exchange rate uncertainty is caused by several factors, including inflation, Bank Indonesia interest rates and the Fed interest rates.

The historical trajectory of the Indonesian rupiah's exchange rate with the US dollar during the previous three decades is depicted in Figure 1. In 1991, amidst economic turbulence, the exchange rate stood at IDR 1,950.00. During this period, Indonesia operated under a fixed exchange rate regime, aiming to maintain stability by pegging the dollar at that level. However, the rupiah had significant volatility after the switch to a floating exchange rate regime, especially during the 1998 financial crisis (krismon), when it depreciated sharply to IDR 10,013.00. This rapid depreciation was exacerbated by dwindling foreign exchange reserves in Indonesia.
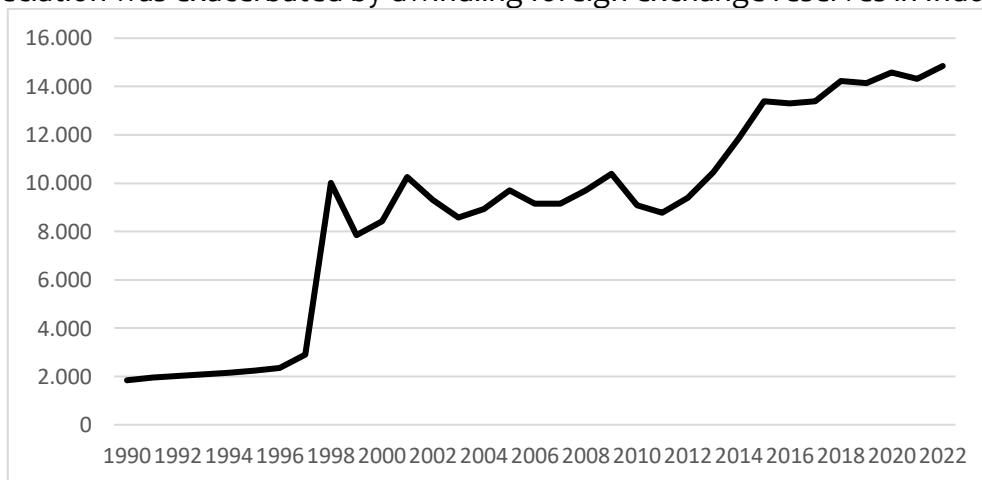
Source: Indonesian Financial Economic Statistics, 2023

Figure 1. Development of the Rupiah Exchange Rate against the Dollar in Indonesia 1990-2022 (USD/IDR)

With IDR 10,260.00, the rupiah saw a significant gain in 2001; this indicates that the rupiah's value decreased in comparison to the US dollar. The world was affected by the global economic crisis in the early 2000s, which began with the monetary crisis and resulted in a number of events including financial crises in several nations. This is the reason. Under these conditions, the currencies of several developing countries, including the rupiah, could weaken due to investors' concerns about global economic uncertainty.

With respect to the US dollar, the Indonesian rupiah's exchange rate hit IDR 14,236.00 in 2018. This was mostly due to the US decision to hike interest rates. Foreign investors seeking higher returns are sometimes drawn to the US by higher interest rates, which increases capital flows into the US and decreases flows into other nations (Fahmi et al., 2019). The global economic volatility during this period was exacerbated not only by the Federal Reserve's interest rate hikes but also by the trade tensions between the US and China. The conflict between Russia and Ukraine is an example of a geopolitical crisis that has affected the value of the rupiah. The rupiah's devaluation was exacerbated by a reduction in US dollars' availability in Indonesia, triggered by capital outflows driven by the higher US interest rates. With the Fed's increase in interest rates, investors believe that saving their money in the United States promises greater returns and lower risk than in developing countries, including Indonesia.

Price fluctuations in each nation can have an impact on comparing the exchange rates of two nations (Faizin, 2020). Because inflation reflects shifts in the market price of goods and influences supply and demand, it also has an impact on the exchange rate. People's purchasing power for goods will decrease, because the same amount of money last year cannot buy the same goods this year. If inflation in a country increases, then demand for that currency will fall because exports will fall due to higher prices. Studies by Suidarma et al. (2018) and Algifari and Rohman (2022) show that there is a generally negative relationship between inflation and the rupiah's exchange rate compared to the US dollar. This is because an increase in inflation or domestic prices that are uncontrolled and higher than this higher price level can cause a tendency to import and this higher price level can cause a tendency to reduce exports so that increasing inflation is considered to be able to depreciate the exchange rate. These findings, however, conflict with those of studies by Kurniasih and Tampubolon (2022) and Nayottama and Andrian (2022), which demonstrate that inflation significantly increases the value of the rupiah relative to the US dollar.

The current worth of future dividend income is primarily determined by the prevailing interest rate. A currency's demand increases with its interest rate, meaning that a higher interest rate tends to strengthen the currency. The central bank controls interest rates, and a consistent increase over time can lead to an upward trend in the nation's currency exchange rate compared to other countries

(Diana & Dewi, 2020). Interest rates and exchange rates are closely intertwined, influencing investor behavior and macroeconomic relationships. Understanding these dynamics is crucial for assessing financial market openness. Research by Diana and Dewi (2020) and Nurhasanah & Soekapdjo (2019) suggests a positive relationship between Bank Indonesia's interest rates and the value of the rupiah against the US dollar. Higher interest rates set by Bank Indonesia may attract international investors to domestic interest-based assets, thereby increasing demand for the local currency relative to foreign currencies and driving up the exchange rate. However, these findings contrast with research by Suidarma et al. (2018), which indicates that Bank Indonesia's interest rate policies significantly reduce the value of the rupiah relative to the US dollar.

One of the factors contributing to the depreciation of the Indonesian rupiah's exchange rate is capital outflow from Indonesia, triggered by increases in the Federal Reserve's interest rates (Zakaria, 2020). Given the US's substantial influence on the stability of the world economy, the Federal Reserve modifies its monetary policy through the US Federal Funds Rate, affecting economies all around the world, including Indonesia. Studies conducted by Adhawiyah et al. (2018) show a significant inverse relationship between interest rates set by the Fed and the value of the rupiah relative to the US dollar. This relationship develops because higher US interest rates drive foreign investors to US assets, which in turn causes them to remove their holdings from other nations, such as Indonesia, and put downward pressure on the value of the rupiah. On the other hand, research by Zakaria (2020) and Sunday (2023) presents divergent conclusions, indicating that the US dollar's value relative to the rupiah is positively impacted by interest rates set by the Fed.

This research aims to deepen understanding of how the Federal Reserve, Bank Indonesia, and inflation influence the rupiah's value relative to the US dollar. Inflation, as a persistent increase in prices, directly affects currency purchasing power, making it a critical factor in exchange rate dynamics. Additionally, interest rates play a pivotal role in shaping investor behavior and macroeconomic relationships, influencing exchange rate movements. Through rigorous modeling and analysis, this study aims to provide policy recommendations to the Indonesian government on managing exchange rate fluctuations driven by inflation, Bank Indonesia's interest rates, and the Federal Reserve's policies. By comprehending these mechanisms and their impacts, policymakers can implement appropriate strategies to foster stability and economic growth in Indonesia, ensuring a stable rupiah exchange rate against the US dollar.

"The Influence of Macroeconomic Variables on the Rupiah Exchange Rate against the United States Dollar" refers to the research that was conducted, based on the explanation given above, to identify the factors that affect the Rupiah exchange rate against the US dollar.

RESEARCH METHODS

Because the data employed in this study are actualized as numerical data, a quantitative approach method is adopted. Aside from that, statistical analysis was used to process the data. Thus, this study can be classified as quantitative research.

Numerical data is gathered in order to conduct quantitative research. After that, the numerical data is processed and examined to produce scientific findings.

This method of associative research seeks to determine how the independent and dependent variables are related. Finding out how macroeconomic issues impacted the rupiah's value in relation to the US dollar from 1990 and 2022 was the aim of this study. This was carried out as a result of several occasions that raised the rupiah's value relative to the US dollar during this period.

RESULTS AND DISCUSSION
Research Data Analysis
Time Series Analysis Results

This section will explain in detail the patterns of time series data, using previous observations to predict a value in the future, with the following details:

1) Stationarity Test Results

The variables must be stationary at level I(0), first difference level I(1), or a combination of these two levels in order to pass the stationarity test using ARDL. The hypothesis indicates that H1 is accepted and H0 is rejected based on the Augmented Dickey-Fuller (ADF) test findings, which are smaller than the MacKinnon Critical Value of 1%, 5%, and 10%. It is possible to argue that the data is stationary since it lacks unit roots, and vice versa. The unit root test combined with the ADF test is the stationarity test employed in this work, as indicated in Table 1 as follows.

Table 1. Augmented Dickey-Fuller (ADF) Stationarity Test Results

Test Unit Root at Level Level (I(0))			
Variable	**ADF**		**Decision**
	P-Value	**Significance Level**	
Rupiah Exchange Rate for US Dollar (Y) (Rp)	0.6839	0.05	**Not Stationary**
Inflation (X1) (%)	0.0015	0.05	**Stationary**
Bank Indonesia Interest Rate (X2) (%)	0.0002	0.05	**Stationary**
United States Interest Rate (X3) (%)	0.3043	0.05	**Not Stationary**
Unit Root Test at First Difference Level (I(1))			
Variable	**ADF**		**Decision**
	P-Value	**Significance Level**	
Rupiah Exchange Rate for US Dollar (Y) (Rp)	0.0000	0.05	**Stationary**
Inflation (X1) (%)	0.0000	0.05	**Stationary**
Bank Indonesia Interest Rate (X2)	0.0089	0.05	**Stationary**

(%)			
United States Interest Rate (X3) (%)	0.0086	0.05	Stationary

Based on Table 1, this value shows the results of the Augmented Dickey-Fuller (ADF) stationarity determination. The Bank Indonesia interest rate is the only stationary variable in the level I(0) decision findings; all other variables are not. As a result, testing at the first difference level I is required (1), at this level all variables are stationary with significance below 0.05 or 5%. From the ADF test results, the model is stated to accept H1 and reject H0 and it can be concluded that the values of all research variables do not contain unit roots at level I(1) or first difference so that the next testing stage can be carried out.

2) Bound Testing Cointegration Test Results (Bound Test)

The cointegration test was carried out in this study using the Bound Testing Cointegration method and the ARDL research approach model. This method is applied by comparing the calculated F-statistic value with the critical value. If the F-statistic value is smaller than the lower constraint, cointegration cannot be assumed. Cointegration has been observed when the F-statistic is greater than the upper bound. In this study, the bound test is used to find the significance value that can be applied to the variables under investigation. The bound test results are explained as follows in Table 2.

Table 2. Cointegration Bound Test Results

Cointegration Test Results (Bound Test)		
Statistical Tests	*Value*	**K**
F-Statistics	4.374840	**3**
	Critical Value Bounds	
Significance	**I (0) Bound**	**I (1) Bound**
10%	2.37	**3.2**
5%	2.79	**3.67**
2.5%	3.15	**4.08**
1%	3.65	**4.66**

The value of the F-statistic is 4.374840, as indicated by the cointegration bound test results in Table 2. At the 5% significance level, this figure exceeds both the top and bottom values in the first difference. This demonstrates the applicability of the ARDL model estimate findings up to $\alpha = 5\%$. Additionally, the test's results demonstrate the long-term cointegration relationship between the variables.

3) Optimum Lag Results

Each researcher evaluating the ARDL approach must decide how many lags to utilize as a guide for the subsequent testing phase. The best number of delays to employ in this research can be determined using the optimum lag test, and choosing the right number of delays is essential to getting superior results. The goal

of this lag selection process is to get the optimal model from the study data. The Akaike Information Criteria (AIC) optimum lag length test is the method used to choose the best model.
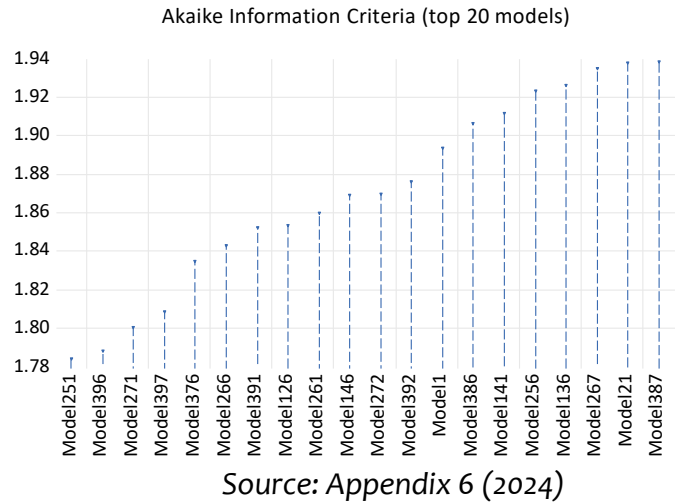

Source: Appendix 6 (2024)

Figure 2. Optimum Lag Length Graph

Figure 2 illustrates the outcomes of determining the optimal lag length for the research data using the AIC method. All AIC values in the figure are positive, with the smallest value recorded at 1.78 corresponding to lag (2,4,4,4). Therefore, based on this criterion, the optimal model for the research data is the ARDL model (4,2,2,2). The ARDL model estimation results show distinct lag lengths for each variable. The exchange rate of the Indonesian rupiah (Y) against the US dollar has a lag of 4, which means that the values from the four periods prior to this one can have an impact on the exchange rate of the present period. The lag of two associated with inflation (X1) implies that the current levels of inflation may be influenced by the rupiah's exchange rate to the US dollar over the last two periods. Similarly, the interest rates from the Federal Reserve (X3) and Bank Indonesia (X2) exhibit a lag of two, indicating that the exchange rate of the rupiah relative to the US dollar during the previous two periods might have influenced their current values.

4) Stability Test Results

The stability test is the second test carried out using the ARDL model. In the stability test, the CUSUM (cumulative sum of recursive residuals) and CUSUMQ (cumulative sum of squares of recursive residuals) models are used to evaluate the data's short- and long-term stability. According to this test criterion, the estimate is deemed stable if the CUSUM plot remains inside the upper and lower limit lines or reaches a threshold value of 5%. This also holds true for CUSUMQ. Determining the stability of data is the goal of the CUSUM and CUSUMQ tests. The following is how the stability test results are displayed in Figures 3 and 4.
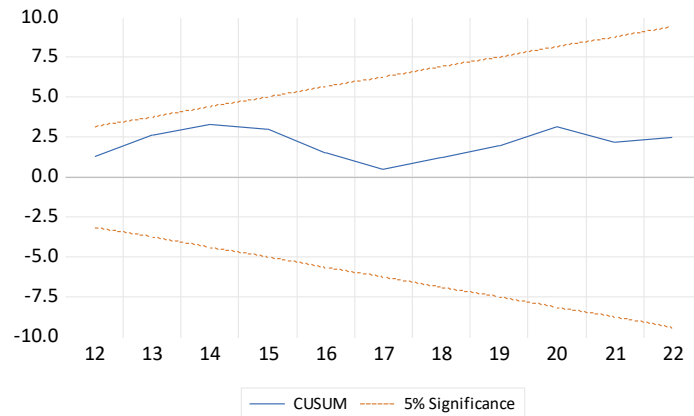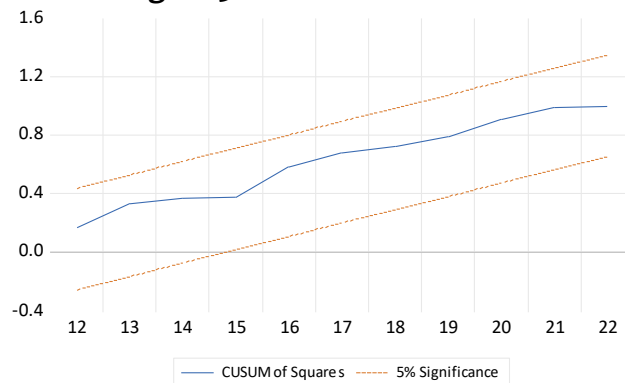
Figure 3. CUSUM Test Results

Figure 4. CUSUMQ Test Results

Figures 3 and 4 display the stability test results using the CUSUM and CUSUMQ graphs, it is known that from the cumulative recursive residual amount line is between the 5% critical line so that the model indicates the stability of the estimated parameters. Based on testing the suitability of this model, it is shown that the model formed has demonstrated parameter stability.

Classic assumption test

1) Normality Test Results

Finding out if the dependent and independent variables in the regression model have a normal distribution is the goal of the normality test. Ascertain the probability that Jarque Bera (JB) will try this.

a) The data is regularly distributed if the probability is greater than 0.05.

b) The data is not regularly distributed if the probability is less than five percent.

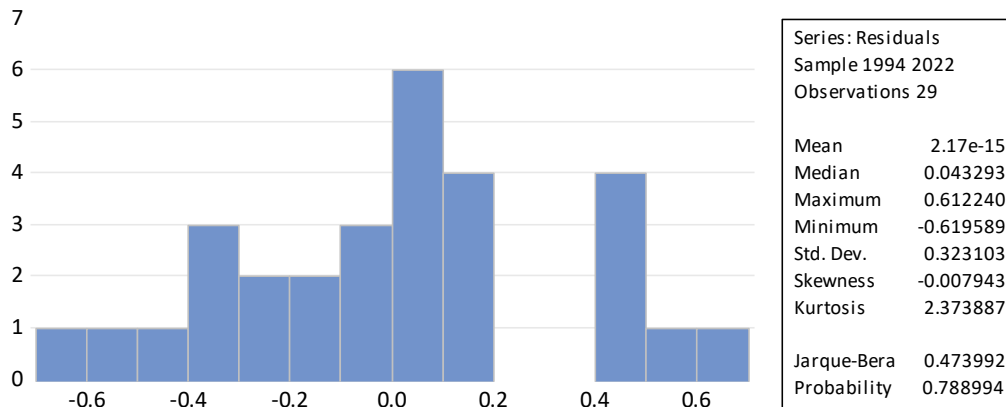The explanation of the normalcy test in this study can be found in Figure 4.8.

		Series: Residuals
		Sample 1994 2022
		Observations 29
		Mean 2.17e-15
		Median 0.043293
		Maximum 0.612240
		Minimum -0.619589
		Std. Dev. 0.323103
		Skewness -0.007943
		Kurtosis 2.373887
		Jarque-Bera 0.473992
		Probability 0.788994

Figure 5. Normality Test Results

As Figure 5 shows, the probability value is 0.788994 and the Jarque Bera value is 0.473993. This study's model might be considered normally distributed because its probability value, or 0.788994>0.05, is higher than 0.05.

2) **Autocorrelation Test Results**

The purpose of the autocorrelation test is to determine whether the research data set has an autocorrelation issue. In this study, an autocorrelation test called the Breusch-Godfrey Serial Correlation LM Test was employed. It can be determined that there are no autocorrelation issues with the data if the Chi Square probability value is greater than 5%. Table 3 provides a description of the autocorrelation test that was used in this investigation.

Table 3. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test			
F-Statistics	0.212356	Prob. F(2.9)	**0.8126**
Obs*R-squared	1.306846	Prob. Chi-Square (2)	**0.5203**

Prob. is based on Table 3, and the autocorrelation test yielded a chi square value of 0.5203. According to this test, the probability of a chi square is 0.9655 > 5%. Therefore, it can be said that there are no autocorrelation issues with the study's data.

3) **Heteroscedasticity Test Results**

Finding out if the study data has unequal residuals or variances between observations is the goal of the heteroscedasticity test. The Breusch-Pagan-Godfrey test is one of the heteroscedasticity tests used in this investigation. In conclusion, if the Chi-Square Probability value is more than five percent, the heteroscedasticity assumption is met. The following is an explanation of the heteroscedasticity test in Table 4.

Table 4. Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-Statistics	1.090369	Prob. F(17.11)	**0.4541**
Obs*R-squared	18.19972	Prob. Chi-Square (17)	**0.3763**
Scaled explained SS	1.798768	Prob. Chi-Square (17)	**1,0000**

Prob. Table 4 indicates that the chi-square derived from the heteroscedasticity test is 0.3763. Probability Chi-Square has a value of 0.3763 > 0.05, per this test. Thus, it can be concluded that the study's data do not have any problems with heteroscedasticity.

4) **Multicollinearity Test Results**

The multicollinearity test's objective is to determine whether the research's data shows a relationship between the independent and dependent variables. This study used the Variance Inflation Factor (VIF) as a multicollinearity test. It can be concluded that there are no multicollinearity issues with the data if the VIF score is less than 10. Table 5 provides an explanation of the multicollinearity test that was used in this investigation.

Table 5. Multicollinearity Test Results

Variance Inflation Factors	
Variable	**VIF**
Y (-1)	8.267075
Y (-2)	7.374492
X1	6.951474
X1 (-1)	9.399687
X1 (-2)	8.425933
X1 (-3)	7.774022
X1 (-4)	5.377259
X2	7.394638
X2 (-1)	7.766254
X2 (-2)	7.892863
X2 (-3)	4.307708
X2 (-4)	3.896520
X3	8.040681
X3 (-1)	5.201866
X3 (-2)	9.346942
X3 (-3)	7.946937
X3 (-4)	6.071464
C	NA

Table 5 demonstrates that the VIF value for each variable is less than 10. Testing indicates that the VIF value of this data is less than 10. Thus, it can be concluded that the study's data do not have any problems with multicollinearity.

Short Term and Long Term ARDL Estimation Results

This section provides a detailed explanation of the analytical methods used to process study data. This study uses the Autoregressive Distributed Lag (ARDL) approach for data analysis.

a) **Short Term ARDL Estimation Results**

In the short-term analysis of this research, a one-month period was examined. The short-term estimation results indicate the effects within the subsequent month. Specifically, the current period's effects are observed in the previous month, and so forth. This ARDL model research focuses on identifying variables that exhibit cointegration, forming a set conducive to the Error Correction Model (ECM) for

dynamic equilibrium analysis. To discern between short-term and long-term effects in the ARDL model, the CointEq(-1) value is utilized as the estimation outcome. A significant CointEq(-1) value (<0.05) with a negative coefficient indicates a short-term relationship within the research model. Thus, the ARDL model is deemed valid and applicable for this study. The detailed results of the short-term relationship analysis are presented in Table 6.

Table 6. Error Correction Coefficient Results

Variable	Coefficient	Std. Error	T-Statistics	Prob.
CointEq(-1)	-0.117589	0.021530	2.974883	0.0126

How much error will be corrected in each time period is indicated by the value of the error correction coefficient (CointEq(-1)) in the short-term model of the ARDL model used in this study. The value of CointEq(-1) must be negative and significant (coefficient value) in order to satisfy the requirements. According to Table 6, the model's CointEq(-1) value is -0.117589, with a probability of 0.0126. CointEq(-1)'s value satisfies the conditions. There is a large probability and a negative coefficient value. According to the coefficient value of -0.117589, 11.75% of the data error will be fixed during each time period.

The Error Correction Model (ECM) displays the short-term outcomes of the ARDL model. Using the general to specific procedure, which starts with the maximum lag and removes ARDL variables that are not especially significant in order to provide the simplest findings, the Error Correction Model (ECM) model is created.

The variables D(X1), D(X1(-3)), D(X2), D(X3(-2)), and D(X3(-3))) have a positive and substantial influence, while the variables D(X2(-1)) has a negative and significant influence, according to the short-term ARDL model estimation findings shown in Table 7. Furthermore, the variables D(X1(-1)), D(X1(-2)), D(X2(-2)), D(X2(-3)), D(X3), and D(X3(-1)) have no effect, whereas only the variable D(X3(-1)) has a positive and negligible influence. Table 7 provides an explanation of the short-term ARDL estimation results.

Estimation Equation:

Y = 0.648642039191 + 0.233768525802*Y(-1) + 0.0800376499128*X1 - 0.0172301408848*X1(-1) - 0.000871520213884*X1(-2) + 0.0602974978 499*X1(-3) - 0.0499816688643*X1(-4) + 0.108919952357* X2 + 0.0400500925439*X2 (-1) + 0.0391273902267* 76639059076*X3(-1) + 0.270832160835*X3(-2) + 0.00121723848493*X3(-3) - 0.488115081158*X3(-4) + 1.55502755374

Table 7. Short Term ARDL Estimation Results

Variable	Coefficient	Std. Error	T-Statistics	Prob.
D(Y(-1))	-0.233769	0.158982	-1.470411	0.1695
D(X1)	0.080038	0.019667	4.069702	0.0019
D(X1(-1))	-0.009444	0.022285	-0.423793	0.6799
D(X1(-2))	-0.010316	0.025324	-0.407348	0.6916
D(X1(-3))	0.049982	0.016675	2.997359	0.0121
D(X2)	0.108920	0.031109	3.501264	0.0050
D(X2(-1))	-0.092302	0.037425	-2.466349	0.0313

D(X2(-2))	-0.053175	0.029375	-1.810197	0.0976
D(X2(-3))	-0.045278	0.020626	-2.195162	0.0505
D(X3)	-0.040127	0.101391	-0.395760	0.6998
D(X3(-1))	0.216066	0.172794	1.250422	0.2371
D(X3(-2))	0.486898	0.118649	4.103676	0.0017
D(X3(-3))	0.488115	0.164079	2.974883	0.0126
CointEq(-1)*	**-0.117589**	**0.021530**	**-5.461544**	**0.0002**

Details of the results are explained as follows.

a) "In the current period, inflation (X1) positively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of 0.080038 and a probability value of 0.0019 (< 0.05)."

b) "In the previous period, inflation (X1(-1)) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of -0.009444 and a probability value of 0.6799 (> 0.05)."

c) "In the previous two periods, inflation (X1(-2)) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of -0.010316 and a probability value of 0.6916 (> 0.05)."

d) "In the previous three periods, inflation (X1(-3)) positively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of 0.049982 and a probability value of 0.0121 (< 0.05)."

e) "The Bank Indonesia interest rate in the current period (X2) positively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of 0.108920 and a probability value of 0.0050 (< 0.05)."

f) "The Bank Indonesia interest rate in the previous period (X2(-1)) negatively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of -0.092302 and a probability value of 0.0313 (< 0.05)."

g) "The Bank Indonesia interest rate in the previous two periods (X2(-2)) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of -0.053175 and a probability value of 0.0976 (> 0.05)."

h) "The Bank Indonesia interest rate in the previous three periods (X2(-3)) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of -0.045278 and a probability value of 0.0505 (> 0.05)."

i) "The Fed's interest rate in the current period (X3) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of -0.040127 and a probability value of 0.6998 (> 0.05)."

j) "The Fed's interest rate in the previous period (X3(-1)) does not significantly affect the rupiah exchange rate against the US dollar, with a coefficient of 0.216066 and a probability value of 0.2371 (> 0.05)."

k) "The Fed's interest rate in the previous two periods (X3(-2)) positively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of 0.486898 and a probability value of 0.0017 (< 0.05)."

l) "The Fed's interest rate in the previous three periods (X3(-3)) positively and significantly affects the rupiah exchange rate against the US dollar, with a coefficient of 0.488115 and a probability value of 0.0126 (< 0.05)."

2) Long Term ARDL Estimation Results

After completing the short-term ARDL estimation test and understanding the results of the short-term ARDL model, the following step is to estimate the ARDL over the long term. Long-term research is conducted over a period of one year. A year later, the impact is evident in long-term outcomes. The findings of the long-term ARDL estimation are displayed as follows in Table 8.

Table 8. Long Term ARDL Estimation Results

Variable	Coefficient	Std. Error	T-Statistics	Prob.
Inflation (X1) (Rp)	1.714441	1.609768	2.087663	0.0253
Bank Indonesia Interest Rate (X2) (%)	2.051821	0.861793	2.380873	0.0364
The Fed Interest Rate (X3) (%)	-6.232118	2.122061	-2.936824	0.0135
C	**13.22421**	**3.061086**	**4.320105**	**0.0012**

The long-term ARDL model results in Table 8 indicate significant influences of the variables as follows:

a) "Inflation (X1) positively affects the rupiah exchange rate against the US dollar, with a coefficient value of 1.714441 and a significance level of 0.0253 (< 0.05).\The Bank Indonesia interest rate (X2) positively affects the rupiah exchange rate against the US dollar, with a coefficient value of 2.051821 and a significance level of 0.0364 (< 0.05)."

b) "The Fed's interest rate (X3) negatively affects the rupiah exchange rate against the US dollar, with a coefficient value of -6.232118 and a significance level of 0.0135 (< 0.05)."

Simultaneous Test (F Test)

The Simultaneous Test (F Test) is used to determine whether there is a significant influence between the independent and dependent variables. Table 9 provides an explanation of the F test used in this investigation. The Simultaneous Test (F Test) is used to determine whether there is a significant influence between the independent and dependent variables. Table 9 provides an explanation of the F test used in this investigation.

Table 9 Simultaneous Test Results (F Test)

F-Count	F-Table	Prob.	Decision
83.422213	2.93403	0.000000	Significant to the Rupiah Exchange Rate against the United States Dollar

Given that the F-Calculated value is 83.422213 and the F-Table is 2.93403 (83.422213>2.93403) with a probability value of 0.000000 (0.000000< 0.05), Table 9 suggests that the independent variable (X) influences the dependent variable (Y) . In particular, interest rates at Bank Indonesia, the Federal Reserve, and inflation all have an impact on the value of the rupiah relative to the US dollar.

Discussion of Research Results

The following are the findings of the research discussion, which were derived from the test results that were conducted in order to address the issues raised in the problem formulation and give research findings based on numerous earlier journals.

The Effect of Inflation (X1) on the Rupiah Exchange Rate against the United States Dollar (Y)

The recent short-term ARDL model findings indicate that inflation positively and significantly affects the rupiah exchange rate against the US dollar. In the current period, inflation leads to an increase in the rupiah exchange rate by IDR 0.080038, with a significance level of 0.0019 (<0.05). Similarly, over the three preceding periods, inflation raises the exchange rate by IDR 0.049982, significant at 0.0121 (<0.05). These results are consistent with Kurniasih and Tampubolon's (2022) study, which also identifies a positive correlation between domestic inflation and the rupiah exchange rate. However, they diverge from the expectations of purchasing power parity theory, which typically predicts a negative impact of inflation on the exchange rate. Fadillah and Sukmana (2017) argue for a negative influence, contrasting with Nayottama and Andrian's (2022) findings that support a positive effect of inflation on the exchange rate. The observed positive influence may arise from short-term market dynamics such as speculation or temporary trading activities, where demand and supply dynamics in the foreign exchange market can outweigh underlying economic fundamentals.

The recent estimation results on inflation's impact on the rupiah exchange rate against the US dollar indicated no significant effect in the previous period, with a coefficient of -0.009444 and a significance level of 0.6799, and in the two preceding periods, with a coefficient of -0.010316 and a significance level of 0.6916. These findings are consistent with Utami and Islam's (2021) research, which suggests that inflation does not significantly influence the rupiah exchange rate against the US dollar. However, they contrast with findings by Khan (2019) and Kurniasih and Tampubolon (2022), which indicate a negative and significant impact of inflation on the rupiah exchange rate.The lack of significance in these results may be attributed to the stronger influence of external factors such as global economic conditions, Federal Reserve monetary policy, and international market sentiment on exchange rates. For instance, Sigit et al. (2023) observed that during the 2008 financial crisis, interventions by the Fed, including interest rate cuts and Quantitative Easing (QE), stabilized global markets and facilitated the US economy's recovery, which had broader implications for the global economy compared to domestic inflation. Similarly, from 2018 to 2019, trade tensions between the US and China disrupted international supply chains and global market stability, significantly impacting exchange rates more than domestic inflation.

The long-term estimation findings on the impact of inflation on the rupiah exchange rate against the US dollar indicate positive and significant effects. With a coefficient of 1.714441 and a significance level of 0.0253 (<0.05), these results suggest that a one-unit increase in inflation over the long term raises the rupiah exchange rate against the US dollar by IDR 1,714.44. This aligns with purchasing

power parity theory and is supported by research from Kurniasih and Tampubolon (2022) as well as Fernanda Nayottama and Andrian (2022), which assert that inflation has a positive and significant impact on the rupiah exchange rate against the US dollar. However, these findings contrast with research by Utami and Islami (2021), which suggests that inflation does not significantly affect the rupiah exchange rate against the US dollar. The observed positive influence can be attributed to higher prices of goods and services, particularly noticeable before major holidays. According to the Indonesian Ministry of Finance (2018), the 2018 APBN report highlighted a rise in basic goods prices before major holidays like Eid al-Fitr, accompanied by increased tax revenues, particularly from the trade and consumption sectors during festive seasons. The report indicated that state revenues surpassed the APBN target, reaching IDR 1,942.3 trillion compared to IDR 1,894.7 trillion. Increased inflation can strengthen the rupiah exchange rate against the US dollar by boosting the prices of goods and services, thereby enhancing state income. This increase in income stimulates demand for the rupiah, ultimately reinforcing its exchange rate against the US dollar.

The influence of the Bank Indonesia interest rate (X2) on the Rupiah Exchange Rate against the United States Dollar

The short-term ARDL model analysis of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar indicates significant and positive outcomes in the current period, with a coefficient of 0.108920 and a significance level of 0.0050 (<0.05). This implies that a 1 percent increase in Bank Indonesia's interest rate leads to an increase in the rupiah exchange rate against the US dollar by IDR 0.108.92. These findings are consistent with purchasing power parity theory and are supported by Nurhasanah and Soekapdjo's (2019) research, which also demonstrates a positive and significant impact of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar. Similarly, studies conducted by Diana and Dewi (2020), Fadillah (2022), and Sunday (2023) corroborate that Bank Indonesia's interest rates positively influence the rupiah exchange rate against the US dollar. However, these results contrast with Suidarma et al.'s (2018) findings, which indicate a negative and significant effect of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar. Higher interest rates implemented by Bank Indonesia increase the expected returns on investments in Indonesia, attracting foreign capital inflows and thereby strengthening the rupiah against the US dollar. Nurhasanah and Soekapdjo (2019) emphasize that Bank Indonesia's series of interest rate hikes in 2018 aimed to stabilize the rupiah, contributing to indications of stabilization and appreciation in the rupiah exchange rate against the US dollar.

The recent short-term findings regarding Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar showed a significant negative impact in the previous period, with a coefficient of -0.092302 and a significance level of 0.0313 (<0.05). This indicates that a 1 percent increase in Bank Indonesia's interest rate results in a decrease in the rupiah exchange rate against the US dollar by IDR 0.092.30. These results diverge from the expectations of purchasing power parity theory, which predicts a positive and significant effect of Bank Indonesia's interest

rates on the rupiah exchange rate against the US dollar. However, they align with Suidarma et al.'s (2018) research, which similarly found a negative and significant impact of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar. In contrast, Mahayanti and Sudirman (2014) concluded that Bank Indonesia's interest rates do not significantly influence the rupiah exchange rate against the US dollar. The lack of significance in these results can be attributed to Bank Indonesia's strategic use of interest rates as a tool for monetary policy aimed at managing inflation and stabilizing exchange rates. Increases in Bank Indonesia's interest rates can raise borrowing costs for financial institutions, reducing market liquidity. This reduction in liquidity may dampen economic growth and decrease demand for the domestic currency, thereby weakening the rupiah against the US dollar. According to the Fiscal Policy Agency (2019), a 50 basis point increase in the BI-7DDR (Bank Indonesia 7-Day Reverse Repo Rate) in 2018 led to an increase in the average working capital credit interest rate from 10.57 percent to 10.83 percent, contributing to the depreciation of the rupiah exchange rate to IDR 14,236.00.

The recent short-term findings regarding Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar were inconclusive in the two preceding periods, with coefficients of -0.053175 and -0.045278, and significance levels of 0.0976 (>0.05) and 0.0505 (>0.05), respectively. These results are consistent with Mahayanti and Sudirman's (2014) research, which suggested that Bank Indonesia's interest rates had no significant impact on the rupiah exchange rate against the US dollar. However, they contrast with studies by Irma (2019), Wijaya and Purwanti (2021), and Nurjanah (2022), which found a positive and significant effect of Bank Indonesia interest rates on the rupiah exchange rate against the US dollar. The lack of significance in these recent findings may be attributed to Indonesia's monetary policy approach of adjusting interest rates to manage the rupiah's exchange rate against the US dollar, without achieving significant impact on its fluctuations. This economic scenario is influenced partly by the Federal Reserve's use of similar tools to stabilize the US dollar exchange rate against other currencies. Despite elevated Bank Indonesia interest rates, domestic money market rates have not effectively attracted substantial inflows of foreign funds. According to Irawati's (2023) study, both the Federal Reserve and Bank Indonesia raised their interest rates in 1998 and 2022 to maintain their respective exchange rates.

The long-term analysis findings on the impact of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar show significant and positive effects, with a coefficient of 2.051821 and a significance level of 0.0364 (<0.05). This suggests that a 1 percent increase in Bank Indonesia's interest rate leads to an increase in the rupiah exchange rate against the US dollar by IDR 2,051.82. These results align with purchasing power parity theory, indicating that Bank Indonesia's interest rates have a positive and significant influence on the rupiah exchange rate against the US dollar. This finding is supported by research conducted by Diana & Dewi (2020), Sunday (2023), Suhendra et al. (2022), and Fadhilah (2022), all of which also found a positive and significant impact of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar.

However, these results diverge from Suidarma et al.'s (2018) research, which suggested a negative and significant effect of Bank Indonesia's interest rates on the rupiah exchange rate against the US dollar. They also differ from the findings of Mahayanti and Sudirman (2014), who indicated that Bank Indonesia's interest rates do not significantly influence the rupiah exchange rate against the US dollar. The observed positive impact is attributed to higher interest rates attracting foreign investment in bonds and deposits, thereby increasing demand for the rupiah and stabilizing its exchange rate. According to Fadhilah (2022), in response to global uncertainty in 2018, Bank Indonesia raised its benchmark interest rate to 6.47 percent. This policy measure helped stabilize the rupiah, which had weakened to IDR 14,236.00 per US dollar, and later strengthened to IDR 14,147.00 in 2019. Increased interest rates can stimulate capital inflows into Indonesia, ultimately strengthening the rupiah exchange rate against the US dollar.

The influence of the Fed's interest rate (X3) on the Rupiah Exchange Rate against the United States Dollar (Y)

In the short-term ARDL model analysis, significant positive effects of the Fed's interest rate on the rupiah exchange rate against the US dollar were found for the two previous periods, with a coefficient of 0.486898 and a significance level of 0.0017 (<0.05), as well as for the three previous periods, with a coefficient of 0.488115 and a significance level of 0.0126 (<0.05). This indicates that a 1 percent increase in the Fed's interest rate in these periods led to an increase in the rupiah exchange rate against the US dollar by IDR 486,898 and IDR 488,115, respectively. These results deviate from purchasing power parity theory, which predicts a negative and significant impact of the Fed's interest rate on the rupiah exchange rate against the US dollar. However, they are consistent with findings by Zakaria (2020), who documented a positive and significant effect of the Fed's interest rate on the rupiah exchange rate. In contrast, they contradict Adhawiyah et al.'s (2018) findings, which suggested a negative and significant impact of the Fed's interest rate on the rupiah exchange rate. The increase in the Fed's interest rates makes US financial assets more attractive to global investors and signals robust economic growth in the US. This enhances confidence in the global economy, including Indonesia, making emerging markets like Indonesia appealing investment destinations. Consequently, capital inflows into Indonesia increase, bolstering the rupiah exchange rate against the US dollar. During the Fed's interest rate hike in 2018, Indonesia experienced heightened capital inflows, with foreign portfolio investments in Indonesian bonds and stocks surging as global investors sought higher returns amid low interest rates in many developed countries (Zakaria, 2020).

With a coefficient of -0.040127 and a significance level of 0.6998 (>0.05) for the current period and a coefficient of 0.216066 and a significance level of 0.2371 (>0.05) for the previous period, the short-term analysis of the Fed's interest rate impact on the rupiah against the US dollar reveals non-significant results. These results contradict purchasing power parity theory, which holds that the Fed's interest rate will have a large negative effect on the value of the rupiah relative to the US dollar. They support research by Irawati (2023) and Suidarma et al. (2018) that shows the rupiah exchange rate is not significantly impacted by the Fed's

interest rate. However, they contradict Adhawiyah's (2018) argument for a negative impact and Zakaria's (2020) findings of a positive effect of the Fed's interest rate on the rupiah exchange rate. The lack of significance in these results may stem from Indonesia's stable macroeconomic fundamentals, which enable the country to anticipate and manage changes in Fed interest rate policies. Despite external pressures such as Fed rate hikes, Indonesia maintained consistent GDP growth rates, as evidenced by Central Statistics Agency (2020) data showing growth rates of 5.17 percent in 2018 and 5.02 percent in 2019. This stability likely mitigated the immediate impact of external interest rate changes on the rupiah exchange rate.

With a coefficient of 6.232118 and significance at 0.0135 (<0.05), the long-term examination of the Fed's interest rate impact on the rupiah versus the US dollar demonstrates considerable negative effects in the current time. This suggests that the value of the rupiah relative to the US dollar decreases by IDR 6,232.11 for every 1% increase in the Fed's interest rate. These results are consistent with purchasing power parity theory, which holds that the Fed's interest rate will have a negative impact on the value of the rupiah. Adhawiyah et al. (2018), who also discovered a fairly negative influence of the Fed's interest rate on the rupiah, corroborate their findings. However, they contradict Zakaria (2020), who argues for a positive effect, and Suidarma et al. (2018), who suggest no significant impact. The negative effect is attributed to capital outflows from emerging markets like Indonesia to the US during periods of Fed rate hikes, notably from 2015 to 2018. This resulted in a sharp depreciation of the rupiah, reaching IDR 14,236.00 per US dollar in 2018, compared to around IDR 11,865.00 in 2014, eroding investor confidence and contributing to its depreciation.

CONCLUSION

The discussion of the data analysis results given in the previous chapter and the reference to the research objectives in the introductory chapter can be used to draw conclusions about how to formulate the research topic. As a result, the subsequent conclusions are made:

1) Inflation, Bank Indonesia interest rates and the Fed interest rates simultaneously have a significant effect on the rupiah exchange rate against the United States dollar. The results of this research show that the rise and fall of inflation, Bank Indonesia interest rates, and the Fed rates will have a simultaneous impact on the rupiah exchange rate against the United States dollar.

2) In the short term, inflation in the current period and the three preceding periods positively and significantly affects the rupiah exchange rate against the US dollar. However, in the previous period and the two periods before that, inflation shows no significant impact on the rupiah exchange rate against the US dollar. Similarly, the current period's Bank Indonesia interest rate has a positive and significant effect on the rupiah exchange rate against the US dollar, while in the preceding period it negatively and significantly affects it. In the two periods before that and three periods earlier, it does not significantly influence the rupiah exchange rate against the US dollar. Moreover, the Fed's interest

rate in the two previous periods and the three periods before that has a positive and significant effect on the rupiah exchange rate against the US dollar, whereas in the current period and the previous period, it does not significantly impact the rupiah exchange rate against the US dollar.

3) In the long term, inflation positively affects the rupiah exchange rate against the United States dollar, meaning that higher inflation leads to a stronger rupiah. Similarly, an increase in the Bank Indonesia interest rate positively impacts the rupiah exchange rate, indicating that higher interest rates strengthen the rupiah. Conversely, an increase in the Fed's interest rate negatively impacts the rupiah exchange rate, causing it to weaken against the United States dollar.

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