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# **Factors Affecting Rupiah Exchange Rate on US Dollar**

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#### **ABSTRACT**

This research aims to analyze the influence of interest rates, inflation, and economic growth (GDP) on the rupiah exchange rate on the US dollar. The results of research was analyzed using SPSS Version 25.0. It reveals that the determinant coefficient (R) of 0.6580, which mean the correlation between interest rates, inflation, and economic growth on the rupiah exchange rate for the US dollar is 65,80%. Meanwhile, the R Square value is 0,433, which means that the contribution of the interest rate, inflation, and economic growth variables to the rupiah exchange rate on the US dollar is 43,33% and the rest was influenced by other variables. Considering at each variable, it is known that the interest rate variable has a significant and influential effect on the rupiah exchange rate on the US dollar. The inflation variable has an influence but is not significant on the rupiah exchange rate on the US dollar. Meanwhile, the economic growth variable has an influence and is significant on the rupiah exchange rate on the US dollar. The implication of this research is that the government must concern to interest rates and economic growth in order to increase the rupiah exchange rate on the US dollar.

**Keyword:** Interest Rates, Inflation, Economic Growth and the US Dollar/IDR Exchange Rate

### 1. Introduction

The high and low value of a currency is determined by the size of the supply and demand for its currency (Hadiwinata, 2004). The exchange rate is one of the important prices in an open economy. The implementation of a floating exchange rate and the use of imported raw materials causes the exchange rate to have a significant impact on the country's economy. Since 1970 until now, Indonesia has made three changes to the exchange rate system. Moreover, in 1964 -1978, Indonesia adopted a fixed exchange rate system. Based on Law No. 32 of 1964, Indonesia's official exchange rate is IDR 250/USD. In 1978, Indonesia established a controlled floating exchange rate in Indonesia, the rupiah exchange rate continued to depreciate from year to year on the US Dollar. The rupiah exchange rate varied between IDR 644/USD – IDR 2,383/USD (Afriyanti & Prasetiyo, 2021), (Wijaya et al., 2021).

In 1997, Indonesia adopted a free floating exchange rate system Gilenko, (2017), Lv et al., (2018), Zarei et al., (2019). Since mid-July 1997, the Rupiah has experienced pressure which has resulted in further weakening of the value of the Rupiah on the US Dollar. This pressure was caused by *currency turmoil*, which hit Thailand and spread to ASEAN countries, including Indonesia. This caused Indonesia to experience a monetary crisis in 1998, at which time many companies experienced bankruptcy as they were unable to pay their obligations in foreign currency Atmadja, (2001). Ersyafdi et al., (2022), Haque et al., (2022), Lau & Yip, (2020), Serrano et al., (2021), Sugiyarto & Noegroho, (2022).

The rupiah exchange rate from 2013 to 2022 is in a weakening trend. Based on a Bank Indonesia report, the pressure on the rupiah exchange rate was inseparable from the influence of the slowing global economy and falling international commodity prices, which then led to a widening of Indonesia's current account deficit. Pressure on the rupiah exchange rate has become stronger since the end of 2022 when the outflow of foreign capital was triggered by global uncertainty due to plans to reduce monetary stimulus in the US (*tapering off*). The weakening of the rupiah exchange rate on the US Dollar cannot be separated from the influence of the global economy, but can also be influenced by domestic factors, including the inflation rate, BI rate, and import value Halida, (2022), Lau & Yip, (2020) Qori'ah et al., (2020).

Inflation is a condition of general and continuous increases in prices so that it can reduce the value of a country's currency (<u>Purnomo & Hariyani, 2013</u>). One of the causes of inflation is due to an increase in demand. This increase will cause prices to rise because supply is fixed, where other factors are considered constant (*ceteris paribus*), Carissa & Khoirudin, (<u>2020</u>), Muharam et al., (<u>2021</u>) Vinsensius et al., (<u>2020</u>) Wijaya et al., (<u>2021</u>) . It has changed so that goods in Indonesia are relatively more expensive and goods in America are relatively cheaper. This will result in an increase in demand for American goods, which will also be followed by an increase in demand for US Dollars (<u>Lau & Yilp, 2020</u>). The higher the demand for US Dollars will cause the supply of US Dollars to be less, so the price of obtaining them will be more expensive. This illustrates that a high inflation rate can weaken a country's currency exchange rate. In addition, a high level of inflation can trigger an increase in the value of imports, Carissa & Khoirudin, (<u>2020</u>) Muharam et al., (<u>2021</u>) Vinsensius et al., (<u>2020</u>) Wijaya et al., (<u>2021</u>).

Another factor that influences changes in exchange rates is the interest rate (BI rate) (Amado & Choon, 2020), (BR Silitonga et al., 2019), (Suhendra et al., 2022). Raising or lowering the interest rate (BI rate) is one of the monetary policies carried out by Bank Indonesia to regulate the money supply and maintain the stability of the rupiah exchange rate. Changes in interest rates (BI rate) will affect investment in foreign securities. Investors who interact globally will look for countries with favorable interest rates Hamdi (2016). If the BI rate increases when foreign interest rates remain relatively unchanged, the Indonesian investors will reduce demand for US dollars because Indonesia offers a more attractive rate of return and investors from abroad that will offer US dollars to invest in rupiah

Besides the inflation rate and BI rate, another factor that influences changes in the exchange rate is the value of imports. Imports are trade in goods from abroad to within the country, resulting in payment transactions going abroad (Sumantri, 2020). The value of Indonesia's imports continues to increase from year to year. The high value of Indonesia's imports is because many raw and auxiliary material components still have to be imported. The greater the need for imports, the greater the demand for foreign exchange (Hamdi, 2016). Based on the literature above, this research aims to find out factors influencing the rupiah exchange rate on the US dollar for period 1977 – 2022.

#### 2. Methods

This type of research data is included in the quantitative data (Riyanto & Hatmawan, 2020) with an observation period from 1977 to 2022. The data used in this research is secondary data taken from the official website of the Central Bureau of Statistics (BPS) www.bps.go.id and the the official website of Bank Indonesia is www.bi.go.id. The time series of data on interest rates, inflation, economic growth, and the rupiah exchange rate taken was started from 1977 to 2022, or as long as (n) 46 years. The data source used is secondary data in the form of data that supports the variables in the research. Data analysis techniques were carried out by analyzing directly by understanding the existing data. Analysis was also carried out using a computer assistance program, namely SPSS Version 25.0 for Windows by using Multiple Linear Regression (Siregar. & Syofian., 2017), (Sugiyono, 2020).

# 3. Results AND Discussions Research Result

The results of the data tabulation on the Rupiah Exchange Rate on the US Dollar, Interest Rates, Inflation, and Economic Growth are interpreted in terms of minimum, maximum, mean, and standard deviation values for each variable. "The exchange rate is the amount of domestic money required, namely the number of rupiah to obtain one unit of foreign currency." The data results have been processed using *the SPSS 25.0* software program for Windows, thus producing a descriptive analysis of return shares shown in Table 1 are as follows:

Table 1. Calculation Results of Descriptive Analysis of the Rupiah Exchange Rate for Dollars (US) Period 1977 to 2016

N	Minimum	Maximum	Mean	Std . Deviation
4 6	362	15.630	6.603	4.385

Source: Primary Data (Processed) 2023.

Table 1 above shows that the Rupiah Exchange Rate on the US Dollar for the period 1977 - 2022 had a maximum value of 15.630. Then, the maximum value of 13.457 means that the rupiah exchange rate is weakening on the US Dollar, so it can be stated that it needs IDR 15.630 to get 1 Dollar. This is because the

demand or need to hold rupiah currency is getting lower, whereas the demand or need to hold US Dollar currency is increasing. Likewise, with a minimum value of IDR 362/US Dollar, this means that it needs IDR 362 to get 1 Dollar. The average value is IDR 6,603,- meaning that in the period from 1977 to 2022, the average rupiah exchange rate was IDR 6,603,-. Meanwhile, the standard deviation is 4.385, meaning that during the research period, the size of the spread of the rupiah exchange rate variable over the US dollar is 4,385 from 46 research time series samples.

The results of the descriptive analysis of interest rates are shown in Table 2 below.

Table 2. Calculation Results of Mean and Standard Deviation of Variables Interest Rates

N	Minimum	Maximum	Mean	Std . Deviation	
40	5.77	41.24	13.01	6,470	

Source: Primary Data (Processed) 2023

Table 2 above shows that the interest rate has a maximum value of 41.24. The maximum value of 41.24 means the highest interest rate set by Bank Indonesia in this research period, this could have an impact on decreasing production of goods and services. The minimum value of 5.77 means that the lowest interest rate set by Bank Indonesia is 6.50%. This can have an impact on increasing the production of goods and services. The interest rate has an average value of 13.01, meaning that out of the 46 years in the research period, the average value of the monetary policy interest rate set by Bank Indonesia is 13.01%. Meanwhile, the standard deviation is 6.470%, meaning that during the research period, the spread size of the Interest rate variable was 6.470% from 46 research time series samples.

The results of the descriptive analysis of inflation are presented in Table 3 below.

Table 3. Calculation Results of the Mean and Standard Deviation of Variables from Inflation

N	Minimum	Maximum	Mean	Std . Deviation
 46	2,00	77,60	8,80	11,586

Source: Primary Data (Processed) 2023.

From Table 3 above, the highest inflation value is 77,60%, which occurred in 1998. In this year, Indonesia experienced the impact of the Monetary Crisis as a result of the large amount of money circulating in the hands of the public, resulting in an increase in overall product prices of 77,60%. Meanwhile, the lowest value is 2,00%. The average value is 8,80%, meaning that during the research period, there was an average inflation of 8,80%. Meanwhile, the standard deviation of 11,586% indicates that the size of the spread of inflation is 11,586% from 46 samples during the research time series.

## a. Indonesian economic growth

Based on data that has been processed using the SPSS 25.0 software program for Windows, the results of the descriptive analysis of Economic Growth are shown in table 4.4 below:

Table 4 Calculation Results of Mean and Standard Deviation of Variables Economic growth.

N	Minimum	Maximum	Mean	Sta . Deviation
46	-13.13	9.88	4.66	3,479

Source: Primary Data (Processed) 2023.

Table 4 above can be explained that the percentage of economic growth during this research period had a minimum value of -13.13, meaning that economic growth experienced a sharp decline until it reached -13.13%. Meanwhile, the maximum value reached 9.88, this is Indonesia's highest economic growth achievement in history. And the average percentage value of Indonesia's economic growth from 1977 to 2022 was 4.66%. And finally, the standard deviation is 3.479%, indicating that the size of the spread of the Rupiah Exchange Rate variable is 3.479% from 4 6 research time series samples.

The results of classical assumption testing in this research include the Normality Test, Multicollinearity Test, Linearity Test and Heteroscedasticity Test. The test results are as follows: The first classical assumption to be tested is normality. The residuals of normally distributed variables will be located around the diagonal line (not scattered far from the diagonal line). Based on the normal PP Plot image, it shows that the distribution of standardized residuals is in the diagonal line range as seen in Figure 4.1 below:

Chart. 1 Normality Test Results

Dependent Variable: Y

Dependent Variable: Y

Observed Cum Prob

Multicollinearity test according to Priyatno (2012) is intended to test whether the regression model used is found to have a relationship (correlation) between the *independent variables*. A good regression model should have no correlation between independent variables. The conditions for the multicollinearity test are as follows if R2 is high but many of the independent variables are not significant, then the regression has multicollinearity. Analyzing the correlation matrix of independent variables, if the correlation between independent variables is high, namely above 0.90, then there is multicollinearity. Seeing a tolerance value smaller than 10% and a VIF value greater than 5 means there is multicollinearity.

If it turns out that in the regression model there is multicollinearity, then independent variables that have high correlation must be removed. A good regression model does not have correlation between independent variables. For more details, multicollinearity testing uses *tolerance values* and see the VIF as shown in table 5 below:

Table 5 Multicollinearity Test Results

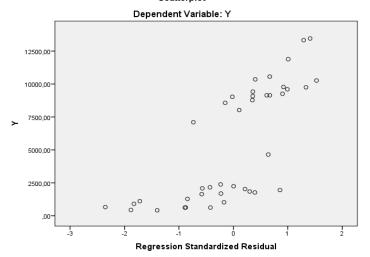
Vari	able	Collinearity	Information		
Dependent	Independent	Tolerance	VIF	Information	
Rupiah	Interest Rates	0.463	2,158	Multicollinearity free	
Exchange Rate against the US	Inflation	0.304	3,291	Multicollinearity free	
Dollar	Economic growth	0.415	2,408	Multicollinearity free	

Source: Primary Data (Processed) 2023.

To find out whether it is there or not Multicollinearity can be seen in *tolerance value* and *variance inflation factors* (VIF) The table above shows that the tolerance values for the three independent variables are above 0.1 with a variance value inflation factor is below 10. Thus it can be concluded that the multiple regression equation does not have multicollinearity. Heteroscedasticity testing is intended to test whether there is inequality in the regression code from the residual of one observation to another observation. Priyatno (2012) If the variance of the residuals from one observation to another remains then it is said to be homoscedasticity . Meanwhile, if it is different, it is called heteroscedasticity . A good regression is one that has homoscedasticity

To determine whether there is heteroscedasticity, you can do it by looking at whether there is a certain pattern on the *scatterplot graph*. If there is a certain pattern such as the points forming a regular pattern (wavy, widening then narrowing), then heteroscedasticity has occurred. If there is no clear pattern, and the points spread above and below the number 0 on the Y axis, then heteroscedasticity does not occur. The results of data processing show a scatterplot graph as can be seen in the following image:

Figure 1 Heteroscedasticity Test Results
Scatterplot



Based on Figure 1 above, which is the result of heteroscedasticity testing, it can be explained that the regression in this study did not occur heteroscedasticity. This is because it does not form a certain regular pattern (wavy, widening then narrowing) and the points spread above and below the number 0, so heteroscedasticity does not occur. By paying attention to the multiple linear regression model, we can estimate the equation that influences the Rupiah Exchange Rate against the US Dollar from the factors of interest rates, inflation and economic growth as follows:

Table 6 Multiple Linear Regression Estimation Results.

				Emear Regres	_					
				Model Sumi	nary <sup>b</sup>					
Model	R	R Square	Adjusted R	Std. Error of		Change S	Statisti	cs		Durbin-
			Square	the Estimate	R Square	F Change	df1	df2	Sig. F	Watson
					Change				Change	
1	,658 a	,433	,386	3436.65604	,433	9,172	3	36	,000	,604
a. Predict	ors: (Cons	tant), X3, X1	, X2							
b. Depend	dent Varial	ble: Y								

				Coc	efficients	a					
	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	C	Correlation	S		nearity istics
		В	Std. Error	Beta			Zero- order	Partials	Part	Γoleran ce	VIF
	(Constant)	16753.15	2371,547		7,064	,000					
1	X1	-513,352	124,938	-,757	-4,109	,000	-,323	-,565	-,516	,463	2,158
1	X2	3,731	86,162	,010	,043	,966	,000	,007	,005	,304	3,291
	X3	-897,499	245,409	-,712	-3,657	,001	-,265	-,520	-,459	,415	2,408
				a. Depend	lent Var	iable:	Y				

From the estimation results using SPSS Version 25.0 software above, to simplify the results to make it easier to analyze them. With the help of SPSS Version 25.0 it can be seen that the determinant coefficient (R) is 0.6580. This shows that the relationship between interest rates, inflation and economic growth on the rupiah exchange rate against the US dollar is 65.80%. The R <sub>Square</sub> value is 0.433, which means that the contribution of the interest rate, inflation and economic growth variables to the rupiah exchange rate against the US dollar is 43.33% and the rest is influenced by other variables.

#### **Discussion**

Based on estimates, it shows that the regression coefficient value of the interest rate variable (X1) is negative, namely 513.35, indicating that if the interest rate variable decreases by 1 percent, it will increase the rupiah exchange rate against the American dollar by 513.35 rupiah over the US dollar assuming other variables remain constant ( *ceteris varibus* ). The results of testing the interest rate variable show that this variable has a

calculated T test value of 4.109 with a significant probability of 0.000. The T table value in this equation is 1.681 [ df = 42; 46-3-1(0.05)]. Where the calculated T value is greater than T table (4.109 > 1.681) and the significance value is smaller than the real level (0.05), then this means that the interest rate variable has a significant influence on the rupiah exchange rate for US dollars. with a confidence level of 95 percent.

Based on estimates, it shows that the regression coefficient value of the inflation variable (X2) is positive, namely 3.73, indicating that if the inflation variable rises by 1 percent it will increase the rupiah exchange rate against the US dollar by 3.73 rupiah against the US dollar assuming the other variables remain constant ( *ceteris varibus* ). The results of testing the inflation variable show that this variable has a  $_{calculated}$  T test value of 0.043 with a significant probability of 0.966. The T  $_{table}$  value in this equation is 1.689 [ df = 42; 46-3-1(0.05)]. Where the  $_{calculated}$  T value is smaller than T  $_{table}$  (0.043 < 1.681) and the significance value of t is greater than the real level (0.05), then this means that the inflation variable has an influence but is not significant on the rupiah exchange rate against the US dollar with 95 percent confidence level.

Based on estimates, it shows that the regression coefficient value for the economic growth variable (X3) is negative, namely -897.499, indicating that if the economic growth variable decreases by 1 percent, the exchange rate for the US dollar will increase by 897.49 rupiah over the US dollar assuming the other variables remain constant ( *ceteris varibus* ). The results of testing the economic growth variable show that this variable has a calculated T test value of 3.657 with a probability of 0.001. The T table value in this equation is 1.681 [ df = 42; 46-3-1(0.05)]. Where the calculated T value is greater than T table (3.657 > 1.681) and the significance value of t is smaller than the real level (0.05), then this means that the economic growth variable has a significant influence on the rupiah exchange rate against the US dollar with 95 percent confidence level. You can also find out the calculated F value is 9.172 while the F table at the 5% significance level is 2.873 with df1 = 3 and df2 = 42, or a significance value of 0.000 and a significance level of 0.05. Thus the calculated F value (9.172) is greater than the F table price (2.873) or by looking at the significance value (0.000) it is smaller than the significance level (0.05). From the results of simultaneous testing, it can be concluded that the hypothesis in this research is that the influence of inflation, interest rates and economic growth on the rupiah exchange rate against the US dollar is acceptable.

#### 4. Conclusion

There is a relationship between interest rates, inflation and economic growth on the rupiah exchange rate against the US dollar which is 65.80%. The R <sub>Square</sub> value is 0.433, which means that the contribution of the interest rate, inflation and economic growth variables to the rupiah exchange rate against the US dollar is 43.33% and the rest is influenced by other variables. The results of testing the interest rate variable show that the calculated T value is greater than the T table (4.109 > 1.681) and the significance value is smaller than the real rate (0.05), so this means that the interest rate variable has a significant influence on Rupiah exchange rate for US dollars for coffee with a confidence level of 95 percent. The results of testing the inflation variable show that the calculated T value is smaller than the T table (0.043 < 1.681) and the significance value of t is greater than the real level (0.05), so this means that the inflation variable has an influence but is not significant on the exchange rate rupiah against the US dollar with a confidence level of 95 percent. The results of testing the economic growth variable show that the calculated T value is greater than the T table (3.657 > 1.681) and the significance value of t is smaller than the real level (0.05), so this means that the economic growth variable has a significant influence on the value exchange rupiah for US dollars with a confidence level of 95 percent. Simultaneous test results showed that the calculated F value (9.172) was greater than the F table (2.831) with a significance value smaller than 0.05. Thus, the hypothesis in this study that there is an influence of inflation, interest rates and economic growth on the rupiah exchange rate against the US dollar can be accepted.

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