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The Effect of Inflation And Interest Rates on The Exchange Rate of The Rupiah In Indonesia From 1993 To 2023

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Abstract

The resulting globalization resulted in interactions between several countries with other countries in various parts of the world, resulting in international trade. In trade between countries, there are differences between countries, namely currency which is one of the characteristics. The benefit of this study is to see whether there is an influence of independent variables on dependent variables. In this study using an approach, this study uses time series data from 1993 to 2023, time series data obtained from the source of the Central Statistics Agency of West Sumatra Province. This study uses several test models including descriptive statistical tests, normality tests, autocorrelation, heteroscedasticity, multicollinearity, multiple linear regression, R^2 test, t test, and f test. The data obtained were processed using SPSS statistics version 26. The test carried out on the t test has a positive influence on the exchange rate t_calculated (4.577) > t_table (2.048), significant 0.000 <0.05. The test conducted on (X2) found that the interest rate had a negative effect on the exchange rate t_count (4.561) > t_table (2.048), with a significance of 0.000 < 0.05. The results of the f test conducted showed that inflation and interest rates equally affected the interest rate with a t_count value of 11.153 > t_table 3.33, and a significance of 0.00 < 0.005. The test conducted simultaneously using R square 0.443 / 44.3%, the test results together affected the exchange rate by 44.3% which means weak distribution, for 55.7% of 44.3% outside the variables studied.

Keywords: inflation, interest rates, change rates

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INTRODUCTION

Globalization has led to interactions between countries around the world (Muzakky, et al., 2015). Indonesia is now one of the nations participating in global trade. Global trade is based on the interests of the foreign sector in the economy of one country with another country. In foreign trade, there are several countries that include exports and imports in their national income, while there are some countries that have exports and imports that are small compared to their national income. Foreign trade can provide benefits such as obtaining goods that are not produced domestically and gaining access to industrial markets (Sadono Sukirno, 2012).

In foreign trade, there are differences in the currencies used for transactions. Currency differences cause difficulties in trading. Different countries use different currencies, which causes currency differences in each country. A common currency is needed so that money can be converted into other currencies, using a measure of currency exchange rates commonly known as the exchange rate. This exchange rate indicates the price or value of a currency recognized by the whole world (Sukirno, 2012). Currencies differ in each country and their values can change from time to time. The government has the authority to control exchange rates, but exchange rates are also influenced by high supply and demand (Murni, 2013).

Changes that occur can affect the economic situation. If the US dollar strengthens, prices in Indonesia will become cheaper for Americans. Conversely, if the US dollar falls against the rupiah, prices in America will become cheaper for Indonesians (Natsir, 2014). Countries always maintain the value of their currencies to remain stable. If the exchange rate remains stable, the economy of a country will be stable. Conversely, if a country's currency is depressed, the exchange rate may cause chaos in the country's economy.

In Indonesia, the impact of the exchange rate crisis that occurred in 1998 had a negative impact on all sectors of the Indonesian economy. The value of imported commodities increased because the sharp depreciation of the exchange rate caused the value of imported goods to surge, accompanied by high inflation reaching 77.60% in 1998. The crisis caused by the depreciation of the exchange rate had an impact on many industries in Indonesia, such as difficulties in obtaining raw materials from abroad or imported goods. This crisis was exacerbated by the large amount of foreign debt, which reached Rp. 551 trillion (Sari & Fakruddin, 2016).

Table 1. Development of Inflation, Interest Rates, and the Exchange Rate of the Indonesian Rupiah from 1993 to 2023

Tahun	Inflasi	%	Buku Bunga	%	Nilai Tukar	%
1993	9,77	-	9,5	-	2.110	-
1994	9,24	0,53	14,38	4,88	2.200	90
1995	8,60	0,64	14,75	0,37	2.308	108
1996	6,50	2,10	12,88	1,87	2.383	75
1997	11,10	4,60	20,00	7,12	4.650	2.267
1998	77,60	66,50	38,44	18,44	16.800	12.150
1999	2,00	75,60	12,51	25,93	7.100	23.900
2000	9,40	7,40	14,53	2,02	9.595	2.495
2001	12,55	3,15	17,62	3,09	10.400	850
2002	10,03	2,52	12,93	4,69	8.940	1.460
2003	5,16	4,87	8,31	4,62	8.465	475
2004	6,40	1,24	5,92	2,39	9.290	825
2005	17,11	10,71	12,75	6,83	9.830	540
2006	6,60	10,51	9,75	3,0	9.020	810

2007	6,59	0,01	8,00	1,75	9.419	399
2008	11,06	4,47	9,25	1,25	10.950	1.531
2009	2,78	8,28	6,50	2,75	9.400	1.550
2010	6,96	4,18	6,50	0	8.991	409
2011	3,79	3,17	6,00	0,5	9.068	77
2012	4,30	0,51	5,75	0,25	9.670	602
2013	8,38	4,08	7,50	1,75	12.189	2.519
2014	8,36	0,02	7,75	0,25	12.440	251
2015	3,35	5,01	7,50	0,25	13.795	1.355
2016	3,02	0,33	4,75	2,75	13.436	359
2017	3,61	0,59	4,25	0,5	13.548	112
2018	3,13	0,48	6,00	1,75	14.481	933
2019	2,72	0,41	5,00	1,0	13.901	580
2020	1,68	1,04	3,75	1,25	14.105	204
2021	1,87	0,19	3,50	0,25	14.269	164
2022	5,51	3,64	5,50	2,0	15.731	1.462
2023	2,61	2,90	6,00	0,5	15.416	315

Source: Indonesian Economic and Financial Statistics (BI) and Economic Indicators (BPS) 1993-2023

The table above shows the development of exchange rates, inflation, and interest rates from 1993 to 2023. The development of inflation can be seen in 2011, when inflation fell from 6.96% to 3.79% and the rupiah exchange rate weakened from Rp. 8,991 to Rp. 9,068. It can be seen that this inflation trend was not in line with the exchange rate trend. This trend in 2011 did not show a theoretical relationship, whereby if inflation falls, the rupiah exchange rate will strengthen.

The development of interest rates can be seen in 2019, where there was a decrease from 6.00% to 5.00%, and in 2019, the exchange rate appreciated from Rp. 14,481 to Rp. 13,901, where this development does not show a theoretical relationship, which is that if interest rates decrease, the exchange rate will weaken.

LITERATURE REVIEW

A. Exchange rate

The exchange rate is also known as the price of a currency. The exchange rate is very important in an open economy because it has a significant impact on the balance of transactions. The exchange rate can provide a general picture of how currencies can be compared (Krugman, 2005). According to M Natsir, the cost of currency in a country is the exchange rate. Miskhin states that "exchange rate is the price of one currency in terms of another" (Natsir, 2014). Factors that influence the exchange rate

1. Shifts in public taste; these changes can alter the consumption of domestically produced goods or imported goods.
2. Changes in export and import prices can affect the balance of demand; an increase in the price of domestic goods will lead to an increase in exports,

while a decrease will lead to a decrease in exports. The opposite applies to imported goods.

3. A general increase in prices, known as inflation, can cause domestic prices to be higher than foreign prices, which can lead to an increase in imports. Inflation makes exports more expensive, which causes exports to decline.
4. Changes in interest rates and rates of return on investment can affect capital flows. If domestic interest rates and investment returns are low, capital tends to flow out of the country in search of high returns. Conversely, if interest rates and investment returns are high, this can bring foreign capital into the country.
5. Economic growth, with an increase in currency value relative to the economy, depends on the current state of the economy (Sukirno, 2003).

B. Inflation

A continuous increase in the price of goods is known as inflation. In this case, inflation is defined as a simultaneous and sustained increase in the overall price level. Meanwhile, Malton in Mankiw states that inflation is a monetary phenomenon caused by an excessive amount of money in circulation (SS and Fadli 2024).

C. Interest rates

Interest rates are the price that creditors will return on loans that have been received and given by banks (Frederic, 2008). Interest rates can also be described as the value, rate, price, or profit given to investors from the use of funds invested based on economic value calculations for a certain period of time. Interest rates can be used to regulate the economy of a country. According to Baediono, interest rates are an indicator in determining whether someone will invest or save (Masno, 2020).

RESEARCH METHOD

The type of research, the study adopted a quantitative research model, which is numerical or numerical research (Lukman, 2007). The type of data used in the research used secondary data (time series), which is a series of data that has a certain time span with the same interval (M. F. A, 2020). The data was not obtained from the variables in the study; the secondary data was obtained from the internet, from a reference that was the same as what the author was researching (Nurhasanah 2016). The Central Statistics Agency (BPS) of West Sumatra Province and BI provided secondary data for this study.

Data analysis techniques descriptive statistical tests, which aim to obtain information about the variables being studied, can be used to identify research variables. Normality tests can be used to determine whether variables are normally distributed or not (Insukindro, 2003). These tests can be processed by comparing data using the Kolmogorov-Smirnov test. Significance values can be calculated by measuring the normality of the data. Autocorrelation test, the existence of a relationship between one observation and another. Autocorrelation can occur in time series. Testing for autocorrelation can be done using the Durbin-Watson test, which involves comparing d values, or it can be done using other methods such as the Breusch-Godfrey test, known as the LM test (Wahyu, 2007).

Multicollinearity test, the multicollinearity test aims to identify value reductions, tested to determine whether there is a relationship between variables that could cause interference in the regression results. The test that can be used to test for multicollinearity value reductions uses the variance inflation factor (VIF) (Yanti & Hamzah, 2024). The heteroscedasticity test aims to determine whether there are differences in variance between different observers. We assume that the distribution of the variance is the same, because the purpose of the regression test is prediction (Yanti & Hamzah, 2024). Multiple linear regression test, which is a regression analysis involving several independent variables with their relationship to the dependent variable in general. This method allows researchers to see the relationship between variables (Wardhana, 2024). The R^2 test, the coefficient of determination, is the ability to explain the relationship between several variables. The value of the coefficient of determination is between zero and one; the closer it is to one, the better (Wardhana, 2024). The t-test is used to see the significance of the relationship between independent variables and dependent variables if other variables are considered constant. To test the relationship between variables, the calculated t-value and the table t-value are needed, which must then be compared (Elva Susanti, et al. 2021). The F-test assesses the combined relationship between all variables (Agus 2007).

RESULTS AND DISCUSSION

A. Descriptive Statistical Test

Table 2. Descriptive Statistical Analysis Results

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Exchange Rate	31	2110	16800	10125,81	4139,421
Inflation	31	1,68	77,60	8,7671	13,29486
Interest Rate	31	3,50	38,44	9,9281	6,78095
Valid N (listwise)	31				

The results of descriptive statistics show the lowest exchange rate of 2110, the highest value of 16800, and an average value of 10125.81. Inflation had a lowest value of 1.68, a highest value of 77.60, and an average of 8.7671. Meanwhile, the interest rate had a lowest value of 3.50, a highest value of 38.44, and an average of 9.9281

B. Classical Assumption Test

1. Normality Test

Table 3. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		31
Normal	Mean	,0000000

Parameters[a,b]	Std. Deviation	3088,23833819
Most Extreme Differences	Absolute	,106
	Positive	,057
	Negative	-,106
Test Statistic		,106
Asymp. Sig. (2-tailed)		,200[c,d]
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

The results of the One Sample Kolmogorov-Smirnov test show a significance value of 0.200, which is greater than 0.05. Therefore, based on the results of the One Sample Kolmogorov-Smirnov test, it can be confirmed that the distribution is normal.

2. Autocorrelation Test

Table 4. Autocorrelation Test Results

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,915[a]	,836	,817	1678,706	1,908
a. Predictors: (Constant), Inflasi, Suku Bunga					
b. Dependent Variable: Nilai Tukar					

Our autocorrelation test concludes that the dw value is 1.908, the du value is 1.570, and the 4-du value is 2.43. As a result, the dw value is greater than the du value, and the dw value is smaller than the 4-du value, or 1.570 < 1.908 < 2.43. This explanation leads to the conclusion that there is no autocorrelation.

3. Multicolony Assay

Table 5. Multicolony Assay Results

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	14.488	1.265		11.451	000		
	x1	410	.090	1.318	4.577	000	.240	4.170
	x2	.802	.176	-1.313	-4.561	000	.240	4.170
a. Dependent Variable: y								

The multicollinearity test can be seen in the tolerance values for (X1) 0.240 and (X2) 0.240, where the tolerance values of both variables are greater than 0.01. From the test, the inflation factor (VIF) values for both

variables were 4.170, which is less than 10. The results of the multicollinearity test did not indicate multicollinearity, as shown in the explanation.

4. Heteroscedasticity Test

Table 6. Heteroscedasticity Test Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	1.906	.715		2.665	013
	x1	-.063	.051	-.466	-1.241	.225
	x2	.113	.099	.426	1.135	.266
a. Dependent Variable: abs_resid						

The heteroscedasticity test shows a sig value of 0.225 for variable (X1) and 0.266 for variable (X2). Since the values of variables (X1) and (X2) are above 0.05, it can be assumed that there is no heteroscedasticity.

C. Multiple Linear Regression Equation Test

Table 7. Multiple Linear Regression Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	14.488	1.265		11.451	.000
	x1	.410	.090	1.318	4.577	.000
	x2	-.802	.176	-1.313	-4.561	.000
a. Dependent Variable: y						

From the results of the equation model in this study, it can be concluded that:

1. A constant value of 14.488 means that if (X1) and (X2) are assumed to be 0, then the intervention value is 14.488.
2. The regression coefficient value of (X1) 0.410 means that if inflation increases by 1 percent, the exchange rate will weaken by 41.0%.
3. The regression coefficient value of (X2) 0.802 means that if there is a 1 percent increase, the interest rate will rise by 80.2%.

D. Determination Coefficient Test (R^2)

Table 8. Determination Coefficient (R^2) Results

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.666[a]	.443	.404	3.196630
a. Predictors: (Constant), x2, x1				
b. Dependent Variable: y				

The coefficient of determination test obtained a determination value or R Square of 0.443 / 44.3%. This value means that both variables together affect the exchange rate variable (Y) by 44.3%. The remaining 55.7% is obtained from other variables that were not studied.

E. T-test

Table 9. T-test Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.488	1.265		11.451	.000
	x1	.410	.090	1.318	4.577	.000
	x2	-.802	.176	-1.313	-4.561	.000
a. Dependent Variable: y						

From the results of the tests conducted, the following conclusions can be drawn:

1. Inflation variable (X1)
   It can be seen that the t-test obtained a t-count value for the inflation variable of 4.577, and a t-table value of 2.048 from the calculations performed. It can be seen that the t-count value (4.577) > t-table (2.048). Similarly, the sig value is 0.00 < 0.05. In conclusion, Ha can be accepted, indicating that there is a relationship between variable (X1) and variable (Y).
2. Interest rate variable (X2)
   From the t-test conducted, the t-count value for the interest rate variable was 4.561 and the t-table value was 2.048. From the test conducted, it can be seen that t-count (4.561) > t-table (2.048). This can be considered as acceptance of Ha, which indicates a correlation between variable (X2) and variable (Y).

F. F-test

Table 10. F Test Results

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	227.928	2	113.964	11.153	.000[b]
	Residual	286.116	28	10.218		
	Total	514.044	30			
a. Dependent Variable: y						
b. Predictors: (Constant), x2, x1						

The f test that has been carried out to see the simultaneous effect of (X1) and (X2) on (Y) shows a sig value of 0.00 < 0.005 and a t_count value of 11.153 > t_table 3.33, indicating that (X1) and (X2) both have an impact on the exchange rate (Y).

Based on the statistical test conducted

The t-value is 4.577, the t-value and t-table value is 2.048, significant 0.000 < 0.05, meaning that H0 is not accepted. This shows that inflation has a significant impact on the exchange rate, which means that if inflation increases, the US dollar will weaken or depreciate.

The effect of inflation is not in line with the purchasing power parity theory, which states that if inflation increases, the rupiah exchange rate will weaken or depreciate. In 2020, contrary to the theory, inflation decreased to 1.68%, but the exchange rate increased or depreciated to Rp.14,105. The decline of the rupiah in 2020 was triggered by massive selling of government securities in the Indonesian financial market, where foreign investors withdrew their funds from the stock and bond markets, causing large capital outflows and additional pressure on the rupiah. Global uncertainty, the shutdown of economic activity around the world, and lockdown policies in a number of countries.

The impact of inflation is similar to the purchasing power parity theory, whereby this increase can trigger inflation, and inflation causes the value of money to decrease the purchasing power of the currency, which means that if goods and services purchased experience a decline, then the amount of currency received will decrease. As a result, it can cause the value of the Rupiah to weaken due to inflation.

Controlling inflation through appropriate monetary policy is important, and in this case the government, through the monetary authorities, needs to make inflation stability a key focus in order to maintain exchange rate stability.

The findings obtained from this test are supported by previous research conducted by Istiqomah entitled “The Effect of Inflation and Investment on the Indonesian Rupiah Exchange Rate”. The results of the study show that inflation has a significant effect, in line with the findings of the study.

The effect of interest rates on the rupiah exchange rate

The statistical test on t_count obtained -4.561, which is greater than the t_table value of 2.048, significant at 0.000 < 0.05, thus Ho is rejected. It can be seen that X2 has a negative and significant correlation with the rupiah exchange rate. If interest rates fall, the value of the rupiah will rise, so its value will fall, whereas if X2 increases, the value of the rupiah will fall, which can cause the rupiah to appreciate or strengthen.

This study is not in line with the theory that if the interest rate decreases, the rupiah will weaken, resulting in a depreciation of the rupiah exchange rate. Conversely, if the interest rate is high/increases, the rupiah exchange rate will rise, which can result in an appreciation or strengthening of the rupiah exchange rate.

As in 202022, when interest rates fell to 5.5% and the rupiah exchange rate strengthened to Rp.15,731, which was not in line with the interest rate parity theory, the weakening of the rupiah exchange rate was caused by the Federal

Reserve (The Fed) aggressively raising interest rates to control inflation, making the US dollar more attractive to investors and weakening the rupiah.

The effect observed in the test was consistent with the interest rate parity theory. An increase in interest rates will cause the exchange rate to strengthen or appreciate. If there is an increase, it can attract foreign investors, which will lead to an increase in demand for the currency.

The findings from this test are supported by previous research conducted by Masri Ramadhan entitled "The Effect of Interest Rates, Inflation, and Economic Growth on the Exchange Rate of the Rupiah against the US Dollar." The results of the study show that interest rates have a significant impact on the exchange rate of the rupiah against the dollar.

CONCLUSION

Based on the data obtained, it can be seen that the t-test results for the inflation variable (X1) show a t-value of 4.577 > t-table 2.048 and a significance of 0.000 < 0.05. It can be said that Ho is rejected and H1 is accepted, which means that inflation has a significant effect on the exchange rate. For the interest rate (X2), the t-value is 4.561 < t-table 2.048. Similarly, sig 0.000 < 0.05, it can be said that Ho is rejected and H2 is accepted, which means that the interest rate has a significant effect on the exchange rate.

It can be said that (X1) and (X2) both affect the rupiah exchange rate. The f test sig value is 0.00 < 0.05 and the t_count value is 11.153 > t_table 3.33. It can be said that Ha is accepted, which means that inflation and interest rates together have a significant effect on the exchange rate. The R Square test value is 0.443, which means that 44.3% of the change in variable (Y) is jointly caused by variables (X1) and (X2). The remaining 55.7% may be influenced by other variables not included in this study, such as changes in public perception, changes in the prices of export and import goods, and economic growth.

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