THE EFFECT OF INFLATION, INTEREST RATE AND COVID-19 PANDEMIC ON RUPIAH EXCHANGE RATE 2009-2023

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Abstract : *This study aims to determine the effect of inflation, interest rates, and Covid-19 pandemic on rupiah exchange rate during the period from 2009 to 2023. This research utilizes secondary data obtained from Bank Indonesia and employs multiple linear regression analysis method with the assistance of SPSS software version 29.0. The research findings indicate that inflation has a positive and significant effect on the exchange rate of the rupiah, while interest rates have a negative and significant effect on the exchange rate of the rupiah. Additionally, the Covid-19 pandemic (as a dummy variable) has a positive and significant effect on the exchange rate of the rupiah. The Coefficient of Determination (R^2) is 0.566, meaning that 56.6% of the variability in the exchange rate of the rupiah can be explained by inflation, interest rates, and the Covid-19 pandemic. Furthermore, the variable most dominant in influencing the exchange rate of the rupiah is inflation, accounting for 39.9%.*
Keywords: Rupiah Exchange Rate, Inflation, Interest Rate, Covid-19 Pandemic.
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INTRODUCTION

Exchange rate stability plays an important role in stimulating a country's economy. A stable exchange rate is one of the important indicators for a country to be open in managing its economy. An exchange rate is an exchange between two different currencies, where the comparison between the currencies can be measured (Hidayat, Setyadi, & Azis, 2017). The exchange rate index reflects the quality of a country's economy, as the exchange rate is an important factor affecting international capital flows. When the exchange rate is highly volatile, the volatility of the exchange rate becomes relatively large. This situation can cause instability in the economic sector, both macro and micro (Simanjuntak & Mukhlis, 2012).

The rupiah exchange rate in Indonesia fluctuated from 2009 to 2023. In 2013, the rupiah weakened to Rp12,189, an increase of 26.04%. This increase was triggered by several factors, including rising fuel prices and the quantitative easing policy. The quantitative easing policy reduced monetary stimulus which caused investors to withdraw their capital from emerging markets, including Indonesia, and move it to developed countries. This created negative sentiment among foreign investors and weakened the rupiah exchange rate.

In 2015, the rupiah exchange rate weakened again. The rupiah exchange rate fell from Rp12,440 in the previous year to Rp13,795 in 2015. The weakening of the rupiah was caused by the continuing crisis in Greece, the economic recovery of the United States,

the cessation of quantitative easing in the United States, and political dynamics during the government transition. This weakening can have a negative impact on the economy because a weakening exchange rate will reduce the purchasing power of the rupiah and will have a negative impact on the economy.

At the end of 2019 and early 2020, the rupiah exchange rate against the US dollar devalued significantly again along with the coronavirus pandemic which became a global pandemic around the world (Fatmasita, 2020). According to the Central Bureau of Statistics (2020), on March 16, 2020 the rupiah exchange rate against the dollar was IDR 14,743, at which time the rupiah exchange rate against the US dollar was still at a normal level. With the government's appeal to stay at home, many people did panic buying, causing the dollar exchange rate to fall the deepest (Fatmasita, 2020). The rupiah exchange rate against the US dollar even fell back to the level of Rp14,065 on November 9, 2020 before rising from Rp14,080 to Rp14,200 throughout December. The rupiah to US dollar exchange rate in 2021 was at IDR14,250, with the rupiah weakening by only 1.36% against the US dollar. In the first half of 2022, the rupiah again experienced volatility amid the Fed's interest rate hike announcement. The rupiah exchange rate weakened and closed at Rp14,853 in the first semester of 2022.

According to Madura (2020), the evolution of the relative inflation rate can also affect the demand and supply of a currency and will affect the exchange rate. If a country's inflation increases, then the demand for the country's currency will decrease as the country's exports fall (due to higher prices). The effect of inflation on foreign exchange rates can be explained by the theory of purchasing power parity (PPP). According to absolute PPP, or the Law of One Price, the price of the same good or product in two different countries should be the same if valued in the same currency. If there is a price difference in the same currency, there will be a change in demand that causes an adjustment in the price of the good. As a result, this price adjustment will affect the currency exchange rate.

Data on interest rates in Indonesia (IDN) and the Fed's interest rates from 2009 to 2023 reflect the monetary policies adopted by both countries during the period. Prior to the Covid-19 pandemic in 2020, Indonesia implemented a relatively high interest rate policy to control inflation, with interest rates ranging from 6.50% to 7.75%. Meanwhile, the Fed, the central bank of the United States, kept interest rates low at 0.25% to support economic growth. However, when the Covid-19 pandemic hit in 2020, both countries responded with interest rate cuts to stimulate stalled economic activity and mitigate its negative impact. Indonesia lowered interest rates from 5% in 2019 to 3.75% in 2020, while the Fed remained at a low level of 0.25%.

According to research conducted by Pranoto (2019) which examines the effect of inflation, exports, imports and foreign interest rates on the rupiah exchange rate against the US dollar during the 2014-2018 period, it is stated that short-term foreign capital interest rates have a negative and significant effect on the 5th lag. In the short term, foreign interest rates tend to strengthen the rupiah exchange rate against the dollar.

According to research conducted by Miftahul Reski (2020) which examines the effect of Fed interest rates, net exports, domestic political stability and inflation rates on the rupiah exchange rate in Indonesia in 2009-2018, it is stated that partially the Fed has an influence on the rupiah exchange rate in Indonesia in 2009-2018. interest rates that have a positive relationship and have a significant influence on the dollar exchange rate against the rupiah. This is in line with research conducted by Ariana (2018) which shows that the contribution of the Fed's influence on the rupiah exchange rate is positive. Hasyim

(2019) argues that real income and interest rates have a significant negative effect on the exchange rate. In contrast, inflation has a positive but insignificant impact on the exchange rate, and foreign exchange reserves have an insignificantly negative effect on it. Wijaya (2020) found that in the short term, inflation, exports, and imports do not significantly affect the exchange rate, while SBI (Bank Indonesia Certificate) and oil prices do have a significant impact. In the long term, inflation, oil prices, and imports significantly influence the exchange rate, while SBI and exports have an insignificant effect. Yansyah's (2019) research finds that interest rates, inflation, and Indonesia's balance of payments significantly affect the exchange rate. However, interest rates and inflation do not have a significant impact individually. BR Silitonga et al. (2019) found that inflation negatively and insignificantly affects the exchange rate.

Based on phenomena, theories and previous research, the authors are interested in conducting this research with the title "The Effect of Inflation, Interest Rate And Covid-19 Pandemic on Rupiah Exchange Rate 2009-2023"

LITERATURE REVIEW
Purchasing Power Parity

Purchasing power parity theory was first introduced by Swedish economist Gustav Cassel in 1918 and is an important concept in international finance. This theory analyzes the relationship between inflation and exchange rates, and can predict the equilibrium exchange rate when there is a balance of payments imbalance. According to Madura (2020), this theory states that the exchange rate will adjust according to the difference in inflation rates between two countries. If domestic inflation (Ih) is higher than foreign inflation (If), the foreign exchange rate will appreciate against the domestic currency, and vice versa.

International Fisher Efect

The Fisher Effect (IFE) theory posits that currency fluctuations between two countries are driven by differences in interest rates. IFE is closely related to the Purchasing Power Parity (PPP) theory, as interest rates and inflation are interrelated (Pangestuti, 2020).the IFE theory uses interest rates to explain exchange rate fluctuations over time and is closely related to the Purchasing Power Parity (PPP) theory since interest rates often reflect inflation rates. IFE states that if the domestic inflation rate (ih) is higher than the foreign inflation rate (if), the foreign exchange rate will appreciate because the lower foreign interest rate reflects lower inflation expectations. This appreciation increases returns for domestic investors to be equivalent to domestic securities' returns. Conversely, if the domestic inflation rate is lower than the foreign inflation rate, the foreign exchange rate will depreciate, reducing returns for domestic investors.

Exchange Rate

Exchange rates, according to Madura (2020), are defined as the price of a currency in relation to the currency of another country. Exchange rates are divided into two categories, first, the nominal exchange rate is the price of a country's currency compared to the currency of another country. Then the real exchange rate is the nominal value adjusted to the price level or the ratio of international prices to local prices. According to Bank Indonesia circular No.6/41/DPM issued on October 5, 2004, the middle rate can be

calculated with the following formula:

$$\text{Middle Rate} = \frac{\text{Selling Rate} + \text{Buying Rate}}{2}$$

Inflation

Inflation is a condition when there is a price increase in the market, (Halin, 2016). Inflation is an economic problem that can occur in both developed and developing countries, including Indonesia. Economic changes and developments lead to increased demand for goods and services, which triggers inflation. According to Pratama Rahardja (2008:359), inflation is the process of a general and continuous increase in the prices of goods.

Interest Rate

The interest rate is a proportion of the amount lent that the lender charges as interest to the borrower, expressed as an annual percentage, (Hermawan & Purwohandoko, 2020). Sunariyah (2006:80) defines interest rates as the cost of borrowing. Interest rates are expressed as a percentage of the principal loan per unit. Interest is a measure of the price of resources used by debtors that must be paid to creditors. In general, when interest rates are lower, more funds flow, thereby increasing economic growth.

Covid-19 Pandemic

Covid-19, also known as the corona virus by the public, is a virus that attacks the respiratory system. The coronavirus can cause respiratory illness and death from acute pneumonia. This virus is a new type of virus that can spread to humans. This virus can affect anyone, including infants, children, adults, and the elderly.

RESEARCH METHODS

This research is based on secondary data. This means that the data is not obtained directly, but from the official website of Bank Indonesia (www.bi.go.id) for the years 2009-2023. So the research location is also flexible. The time of this research was conducted in 2024. The sample used in this study includes data on the exchange rate (IDR / USD) inflation rate, interest rate, Covid-19 pandemic (Dummy Variable) in the 1st quarter of 2009 to the 4th quarter of 2023 The observation time period is 15 years, from 2009 to 2023. This study uses multiple regression models to see the relationship between the dependent variable and the independent variable to see the factors that affect the exchange rate. In accordance with the concept explained by Ghozali (2018: 95), multiple linear regression analysis is used to see if there is a significant influence between the independent variable and the dependent variable. The equation representing the multiple linear regression model used in this study is as follows:

$$Y = \alpha + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + e$$

Y = Exchange Rate (IDR/US$)
α = Constant
$\beta 1$ - $\beta 3$ = Regression Coefficient
X1 = Inflation (%)
X2 = Interest Rate (%)
X3 = Covid-19 Pandemic (Dummy Variable)

e = Error

RESULTS AND DISCUSSION
1.Classical Assumption Test
Normality Test

The normality test is a classic assumption test which aims to determine whether in the regression model, the residual variables are normally distributed. The normality test is proven using the Kolmogorov-Smirnov Test. If the significance value > 0.05 then the data is normally distributed. Below are presented the results of the normality test on the research variables.

Table 1. Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		60
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1527.66671007
Most Extreme Differences	Absolute	.094
	Positive	.094
	Negative	-.074
Test Statistic		.094
Asymp. Sig. (2-tailed)[c]		.200[d]

Source: data processed SPSS version 29

From table 1 in asymp.sig of 0.200> 0.05, the conclusion from this normality test is that the data is normally distributed.

Multicollinearity Test

Multicollinearity test in classical assumptions is a test used to determine whether there is a perfect linear relationship between variables or to explain the regression model. The regression model is said not to occur multicollinearity if the tolerance value> 0.1 and the VIF value < 10 (Imam Ghazali, 2005). The multicollinearity test results in this study can be seen in the table below:

Table 2. Multicollinearity Test

Coefficients[a]

Model	Collinearity Statistics	
	Tolerance	VIF
1 INFLATION	.334	2.993
IDN IR	.434	2.302
COVID-19	.596	1.677

Source: data processed SPSS version 29

Based on the results of the multicollinearity test table above, it shows that the Tolerance value on the inflation variable is 0.334, the Indonesian interest rate is 0.434

and Covid-19 is 0.596, which is greater than 0.1. And the VIF value of inflation is 2,993, the Indonesian interest rate is 2,302 and Covid-19 is 1,677 where the value is smaller than 10. It can be concluded that in this study there are no symptoms of multicollinearity between the independent variables.

Autocorrelation Test

The autocorrelation test aims to determine whether in a regression model there is a correlation between confounding errors in period t and period t-1 errors. In the autocorrelation test, the value of Durbin Watson (DW) can be seen in the Model Summary table. If the DW value lies between Du < d < 4-dU, it can be said that there are no symptoms of autocorrelation, either positive or negative.

Table 3. Autocorrelation Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.403[a]	.163	.117	646.25255	1.790

Source: data processed SPSS version 29

The results of the autocorrelation test calculation with the Cochrane-Orcutt method show a Durbin-Watson value of 1.790, with a total data (n) of 60 and independent variables (k) of 3. The dl value is 1.4797, Du is 1.6889, and 4-Du is 2.3111. Since the calculated Durbin-Watson value (1.790) is greater than Du (1.6889) and smaller than 4-Du (2.3111), it can be concluded that there are no autocorrelation symptoms.

Heterocedacity Test

The heterocedacity test is one of the classic assumption tests where this test is carried out to see whether the data variance is constant or not heterocedacity.

Table 4. Heterocedacity Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.554[a]	.307	.198	2324348.7134

Source: data processed SPSS version 29

The results of the heteroscedasticity test using the White test show an R Square value of 0.307. With n = 60, the calculated Chi-Square result is 18.42 (60 x 0.307). The Chi-Square table is calculated with df = n - 1, which is 77.931. Since the calculated Chi-Square value (18.42) is smaller than the Chi-Square table (77.931), it can be concluded that there are no symptoms of heteroscedasticity.

2. Regression Equation

Table 6. Regression Equation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15765.023	647.301		24.355	<,001
	INFLATION	291.722	111.452	.399	2.617	.011
	IDN IR	-900.952	149.616	-.805	-6.022	<,001
	COVID-19	2121.334	636.348	.380	3.334	.002

Source: data processed SPSS version 29

The quantitative analysis technique used is multiple linear regression, so the regression equation is obtained as follows:

$$Y= 15765{,}023 + 291{,}722X_1 - 900{,}952X_2 + 2121{,}334X_3 + e$$

The regression equation can be explained as follows:
1. A constant of 15,765.023 indicates that if inflation, interest rates, and the impact of the Covid-19 pandemic are zero, the rupiah exchange rate will be 15,765.023.
2. The inflation coefficient (X1) of 291.722 means that every 1% increase in inflation will increase the rupiah exchange rate against the US dollar by 291.722.
3. The interest rate coefficient of -900.952 means that every 1% increase in interest rates will reduce the rupiah exchange rate against the US dollar by 900.952.
4. The coefficient of the Covid-19 pandemic (X3) of 2,121.334 means that every 1% increase in the impact of the Covid-19 pandemic will increase the rupiah exchange rate against the US dollar by 2,121.334.

3. Hypothesis Test
T Test (Partial)

The t test is used to test the effect of the independent variables partially. Based on SPSS version 29.0 processing, the following results are obtained:

Table 7. T Test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15765.023	647.301		24.355	<,001
	INFLATION	291.722	111.452	.399	2.617	.011
	IDN IR	-900.952	149.616	-.805	-6.022	<,001
	COVID-19	2121.334	636.348	.380	3.334	.002

Source: data processed SPSS version 29

The Effect of Inflation on Rupiah Exchange Rate

Table 7 shows that the inflation variable has a significanc level of 0.011, which is less than 0.05. Therefore, Hypothesis 1, which states that inflation significantly affects the rupiah exchange rate against the US dollar, is accepted.

The Effect of Interest Rate on Rupiah Exchange Rate

Table 7 shows that the Indonesian interest rate variable has a significance level of <0.001, which is less than 0.05. Thus, Hypothesis 2, which states that the Indonesian interest rate significantly affects the rupiah exchange rate against the US dollar, is accepted.

The Effect of Covid-19 Pandemic on Rupiah Exchange Rate

Table 7 shows that the Covid-19 variable has a significance level of 0.002, which is less than 0.05. Therefore, Hypothesis 3, which states that the Covid-19 pandemic significantly affects the rupiah exchange rate against the US dollar, is accepted.

F Test

The F test is one of the tests in the hypothesis which aims to determine the effect of independent variables together or simultaneously on the dependent variable. In this F test, it can be done by comparing Fcount and Ftable from the ANOVA table in the SPSS output.

Table 8. F Test

ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	179264579.136	3	59754859.712	24.303	<,001b
	Residual	137692169.047	56	2458788.733		
	Total	316956748.183	59			

Source: data processed SPSS version 29

In this study, using a significance level of 0.05, the F-table value with df1 = 3 (4-1) and df2 = 56 (60-3-1) is 2.77. With an F-count of 24.303, which is greater than the F-table value of 2.77, we accept Ha. This means that inflation, interest rates, and the Covid-19 pandemic simultaneously have a significant effect on the rupiah exchange rate.

4. Test Coefficient of Determination

The coefficient of determination (R2) test is a test that aims to measure how far the regression model's ability to explain variations in the dependent variable.

Table 8. Coefficient Determination

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752a	.566	.542	1568.053

Source: data processed SPSS version 29

The coefficient of determination (R²) is 0.566, or 56.6%. This indicates that the independent variables (inflation, interest rates, and the Covid-19 pandemic) explain

56.6% of the variation in the dependent variable (rupiah exchange rate). The remaining 43.4% is attributed to other factors not included in this regression model.

Beta Test

Table 8. Beta Test

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	15765.023	647.301		24.355	<,001
INFLATION	291.722	111.452	.399	2.617	.011
IDN IR	-900.952	149.616	-.805	-6.022	<,001
COVID-19	2121.334	636.348	.380	3.334	.002

Source: data processed SPSS version 29

In testing and analyzing the coefficient of partial determination of the inflation variable with a beta coefficient value of 0.399 or 39.9% compared to other variables. This means that inflation is the most dominant variable affecting the rupiah exchange rate 2009-2023.

CONCLUSIONS

Based on hypothesis testing and discussion, the findings are as follows: Inflation (X1) significantly and positively affects the rupiah exchange rate, in line with purchasing power parity theory. Interest rates (X2) have a significant negative impact, as higher interest rates attract foreign investment and rupiah appreciation, while lower interest rates cause depreciation. The Covid-19 pandemic also significantly affected the rupiah, causing an initial depreciation due to investor flight to safer assets and economic disruption. The coefficient of determination (R^2) is 0.566, indicating that the variables explain 56.6% of the variation in the rupiah exchange rate, with the remaining 43.4% caused by other factors. From this conclusion, Bank Indonesia must remain active in controlling economic conditions through monetary policy, including controlling bank interest rates through the SBI policy and controlling inflation rates through the Inflation Targeting policy. This action is expected to help maintain the stability of the rupiah exchange rate against the US dollar.

REFERENCE

Fatmasita, A. P. (2020). Pengaruh Pandemi Covid-19 dan Nilai Tukar Rupiah terhadap Pergerakan Indeks Harga Saham Gabungan (IHSG) di Bursa Efek Indonesia (BEI) (Doctoral dissertation, Universitas Brawijaya).

Ghozali, I. (2018). Aplikasi Analisis Multivariate dengan Program IBM SPSS. Yogyakarta: Universitas Diponegoro. *Edisi 9). Semarang: Badan Penerbit Universitas Diponegoro*, *490*.Ghzalai, Imam, (2005). *"Aplikasi Analisis Multivariate dengan Program SPSS",* Universitas Diponegoro, Semarang.

Ginting, R. P. (2020). Pengaruh Tingkat Suku Bunga Fed, Ekspor Neto, Stabilitas Politik Dalam Negeri dan Tingkat Inflasi Terhadap Nilai Tukar Rupiah di Indonesia Tahun 2009-2018 (Doctoral dissertation, Universitas Siliwangi).

Halin, H. (2016). Analisis Pengaruh Inlasi, Kurs Mata Uang Dan Suku Bunga Terhadap Perubahan Harga Saham Perusahaan Di Bursa Efek Indonesia. *Jurnal Ilmiah Ekonomi Global Masa Kini*, *7*(1), 8-12.

Hasyim, H. (2019). Analisis faktor-faktor yang mempengaruhi perubahan nilai tukar di Indonesia tahun 2006-2018. *Jurnal Al-Iqtishad*, *14*(2), 63-88.

Hermawan, T. W., & Purwohandoko, P. (2020). Analisis pengaruh inflasi, nilai tukar Rupiah, BI rate, jumlah uang beredar, dan indeks Shanghai Stock Exchange terhadap indeks Sri Kehati di Bursa Efek Indonesia Periode 2014-2019. *Jurnal ilmu manajemen*, *8*(4), 1-15.

Hidayat, L. R., Setyadi, D., & Azis, M. (2017, July). Pengaruh inflasi dan suku bunga dan nilai tukar rupiah serta jumlah uang beredar terhadap return saham. In *FORUM EKONOMI: Jurnal Ekonomi, Manajemen dan Akuntansi* (Vol. 19, No. 2, pp. 148-154).

Madura, J. (2020). International financial management. Cengage Learning

Msi, D. T. H. S. S., & DR Imam Mukhlis SE, M. (2012). *Dimensi Ekonomi Perpajakan Dalam Pembangunan Ekonomi*. Penebar Plus+.

Pangestuti, D. C. (2020). *Manajemen Keuangan Internasional*. Deepublish.

Pranoto, H., & Nuryadin, R. (2019). Pengaruh Inflasi, Ekspor, Impor dan Suku Bunga Luar Negeri Terhadap Nilai Tukar Rupiah Atas Dolar Amerika Periode Januari 2014 sd Desember 2018. *JIEP: Jurnal Ilmu Ekonomi dan Pembangunan*, *2*(3), 727-741.

Silitonga, R. B., Ishak, Z., & Mukhlis, M. (2017). Pengaruh ekspor, impor, dan inflasi terhadap nilai tukar rupiah di Indonesia. *Jurnal Ekonomi Pembangunan*, *15*(1), 53-59.

Sunariyah. (2006). *Pengantar Pengetahuan Pasar Modal.* Edisi Kelima. Yogyakarta: UPP STIM YKPN.

Wijaya, E. (2020). Analisis faktor-faktor yang mempengaruhi nilai tukar rupiah periode 1999Q1-2019Q2. *Jurnal Samudra Ekonomi Dan Bisnis*, *11*(2), 197-209.

Yansyah, M. F., & Masbar, R. (2019). Pengaruh Variabel Moneter Dalam Negeri Dan Luar Negeri Terhadap Nilai Tukar Rupiah. *Jurnal Ilmiah Mahasiswa Ekonomi Pembangunan*, *4*(1), 1-10.