Analysis of the Rupiah Exchange Rate's Response to Interest Rates, Inflation, and Foreign Debt

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Abstract. Today, the global market is highly valued by all countries. Every country undoubtedly needs aid from other countries to meet its requirements. An essential component of international trade is the exchange rate. The exchange rate may be used as a yardstick for the state of a country's economy since it influences the cost of imported goods in international trade activities. Such as when the rupiah depreciates against the dollar. Since imported goods are needed, their cost will rise along with all other commodity prices in the country, making it more difficult for people to meet their needs. This study aims to investigate how interest rates, inflation, and foreign debt affected the rupiah's exchange rate against the US dollar from 2012 through 2021. The analytical method utilized is multiple linear regression using Ordinary Least Square (OLS), and the secondary data type is quarterly time series data from 2012 to 2021. The analytical method utilized is multiple linear regression using Ordinary Least Square (OLS), and the secondary data type with quarterly time series from 2012 to 2021 is used. The study's findings showed that the rupiah's exchange rate versus the US dollar in Indonesia was positively and significantly impacted by variable interest rates and foreign debt. The currency rate for the rupiah, however, was not severely impacted by inflation.

Keywords: Exchange Rate · Interest Rate · Inflation · Foreign Debt · OLS

1 Introduction

A nation requires the assistance of other nations, namely through international trade, to meet its requirements. Exchange rates play a big part in international trade and finance. [1]. The exchange rate is one metric for assessing a nation's macroeconomic health [2]. The exchange rate is the price of one currency for another. The exchange rate is a good indicator of a nation's economic strengths and shortcomings. The higher a country's currency's exchange rate is compared to other currencies, the stronger its economy is relative to other economies. [3, 4]. The exchange rate is one of the factors that are taken into consideration by countries with open economic systems. Because countries that employ this system participate in global trade. The consistency of the nation's another sign of an economy's stability is its currency rate [5]. Economic development is one of the many aspects for which the exchange rate is important [6]. A floating exchange rate is a system of exchange rates where supply and demand in the foreign currency market

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serve as the foundation of global finance [7]. People who have foreign money and want to swap it for US dollars provide their native currency while also asking for US dollars [8]. As the accepted benchmark and reserve currency, the US dollar. However, if the value of the dollar increases, the impacts of unemployment and property ownership may vary [9]. The rising dollar value and the dropping rupiah exchange rate versus the dollar will influence the prices of imported goods in international trade activities. When the cost of fundamental requirements rises, the price of imported goods will also rise, making it more difficult for many individuals in a country to meet their needs. Consequently, there will be exceptionally severe shocks to the regional economy in addition to social imbalances, which are currently prevalent in emerging nations.

The rising dollar value and the dropping rupiah exchange rate versus the dollar will influence the prices of imported goods in international trade activities. When the cost of fundamental requirements rises, the price of imported goods will also rise, making it more difficult for many individuals in a country to meet their needs. Consequently, there will be exceptionally severe shocks to the regional economy in addition to social imbalances, which are currently prevalent in emerging nations. Despite its tendency to change Furthermore, although the value of the rupiah relative to the dollar did vary between 2012 and 2021, the movement of the exchange rate tended to decrease. While the country's risk increases when the value of the local currency declines relative to the US dollar [7]. The Covid 19 virus will likely cause instances in 2020 and 2021, which is also a warning that the value of the rupiah would drop [10]. Conclusion The declining currency rate, which first seems to be quite a significant additional cost and will surely have a detrimental effect on the State of Indonesia itself, has been losing value ever since it hit 9670 rupiahs in 2012, and it kept losing value till it reached 14,000 more in 2021.

Differences in interest rates control exchange rate fluctuations [1]. The local currency depreciates in real terms due to variations in real interest rates around the globe [11, 12]. International economics has historically placed a lot of emphasis on the link between interest rates and exchange rates. The majority of common theoretical models of nominal exchange rates state that economic fundamentals govern exchange rates [13]. A cost that connects the present to the future is the interest rate. The nominal interest rate used to calculate the increase in buying power is different from the real interest rate [14]. According to Ismail (2012: 83), The cost of an exchange between one Rupiah now and one Rupiah later is determined by the interest rate.

Inflation and interest rates both affect the value of the rupiah. Inflation and exchange rates are connected. Those with relatively high inflation are more likely to have a sinking currency than countries with comparatively low inflation [14]. Inflation is the process of cost increases that frequently have an impact on an economy [16].

The analysis's results [17] show that the exchange rate is notably stronger when debt levels are low, and more likely to be out of alignment when debt levels are high. Due to the rupiah's declining value against other currencies as a result of the government's and business sector's rising foreign debt, our exported goods became less costly than commodities from other countries [16].

The SBI interest rate has a significant impact on the rupiah/US dollar exchange rate both immediately and over the long term, according to research by Iin (2014). The long-term impacts of the SBI interest rate have a considerable impact on changes in the rupiah exchange rate relative to the US dollar. Foreign debt considerably and favorably impacts the exchange rate, claim Yudiarti et al. (2018). The interest rate has just a small influence on the exchange rate.

The exchange rate of the rupiah was considerably affected by the inflation rate from 2009 to 2016 according to Dzakiyah et al. (2018). The test results show that the value of exports and the rate of inflation both had a considerable impact on the rupiah exchange rate between 2009 and 2016.

The inflation variable has a negative and insignificant effect on the rupiah to US dollar exchange rate, according to BR Silitonga et al. (2019). The SBI interest rate had a significant favorable impact in the near time, but Wijaya's research (2020) found that it had a little long-term impact on the exchange rate. As a result, any increase in the SBI interest rate will result in a strengthening of the IDR/$ exchange rate. It is shown that the inflation rate has no effect on the Rp/$ exchange rate in the short term; nevertheless, it is shown that the inflation rate has a positive long-term influence on the Rp/$ exchange rate or that an increase in inflation would cause a fall in the Rp/$ exchange rate.

Based on the background and phenomena that surround fluctuations in that rate, the questions in this study aim to determine what factors influence the exchange rate of the Indonesian rupiah vs the US dollar. As a result, this study makes use of incredibly complex past research findings, including interest rates, inflation, and the connection between foreign debt and the exchange rate of the rupiah against the US dollar. The goal of this study is to determine how the rupiah's exchange rate against the US dollar will vary from 2012 to 2021 as a result of interest rates, inflation, and foreign debt.

2 Research Methodology

This study aims to investigate the State of Indonesia. The topic under investigation is the rupiah's exchange rate from 2012 and 2021. The data used in this study have a quarterly frequency and are secondary sources (time series). The statistics used were exchange rates, interest rates, inflation, and foreign debt for the years 2012 to 2021. The data for this study, which spanned the years 2012 to 2021, came from Bank Indonesia (BI) and Badan Pusat Statistika (BPS).

To determine how interest rates, inflation, and foreign debt impact the value of the Rupiah, this study uses a Ordinary Least Square (OLS) model. The Eviews 9 for Windows application was used as the analytical tool in this investigation.

The basic formulation used is as follows [23]:

$$LogYt = \beta0 + \beta1X1t + \beta2X2t + \beta3Log(X3t) + \varepsilon t.$$

Information:
LogY = Exchange Rate (exchange rate)
t = Time (Quarter 2012-2021)
β 0 = Constant
1-β4 = Coefficient
X1 = Interest Rate
X2 = Inflation
LogX3 = Foreign Debt
ε = Error

3 Results and Discussion

The calculations in this study were done using the Eviews for Windows version 9 application, and when the data was entered, the calculation results were as follows:

The results of the regression are shown in Table 1, along with the probability value for each independent variable.

Table 1 makes it obvious that if the value is more than 0.05/ > 5%, the Pro. Jarque-Normality Bera's Test suggests that the data are normally distributed. If the pro value of Jarque-Bera is 0.8242, the data is Normality distributed.

The results of the VIF regression test or the Multicollinearity test of all independent variables, where the VIF value is provided in Table 1, do not demonstrate any multi-collinearity issues. If the VIF values for interest rates, inflation, and foreign debt are 3.5206, 4.4304, and 2.1740, respectively, there is no multicollinearity.

Table 1. Econometric Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.744469	0.394531	9.490931	0.0000**
X1	0.027830	0.010923	2.547913	0.0152**
X2	0.014976	0.008541	1.753461	0.0880**
LOGX3	0.949296	0.064202	14.78606	0.0000**

R^2 = 0.8799 ; DW-Stat.= 0.841; F-stat.= 96,28728; Prob. F-Stat = 0.0000

Classic Test

1. Normality Test
   Pro. jarque-Bera : 0.4067
2. Multicollinearity Test (VIF)
   X1 = 3.5206 ; X2 = 4.4304 ; LOG(X3) = 2.174094
3. Autocorrelation Test
   Obs*R-squared = 2.107146 ; Prob. Chi-Square = 0.3487
4. Heteroskedasticity Test
   Obs*R-squared = 13.74795 ; Prob. Chi-Square(9) = 0.1316

Source: Secondary data, 2022(Eviews 9) Description: * Significant = 0.01; **Significant = 0.05; *** Significant = 0.10

The prob value may be used to observe the autocorrelation test results from Table 1 above. Obs*R. Value of probability There is no autocorrelation in the data since Obs * R in the table above has a value of 0.3487, which is more than 0.05, or 5%.

There is no heteroskedasticity issue, as can be shown from the results in Table 1 above, as can be demonstrated by the prob data. Previously, Obs*R had a value of 0.1316. Whichever result exceeds 0.05 or is greater than 5% suggests there is no heteroskedasticity problem.

Table 1, which presents the regression results, shows that from 2012 to 2021, the quarterly change in the value of the rupiah relative to the US dollar is influenced by interest rates and foreign debt. Positive results are shown for the second key variable. Thus, rising interest rates and foreign debt are the causes of the strengthening of the currency rate. The likelihood t-statistic in Table 1 demonstrates this impact, when the interest rate and foreign debt are, respectively, 0.0152 and 0.0000, which are both less than 0.05 or 5%. The exchange rate is unaffected by inflation since it is 0.0880, or greater than 0.05 or 5%, which is more than it.

The results of the simultaneous F test and Eviews 9 regression analysis both produced Prob. F-Stat $0.00000 \leq 0.05$, which led to the conclusion that the rupiah exchange rate is influenced by interest rates, inflation, and foreign debt all at once.

According to the coefficient of determination (R^2 test) results, the factors that may explain the dependent variable or the value of the rupiah exchange rate versus the US dollar, have an R^2 value of 87.79%: interest rates, inflation, and foreign debt.

3.1 Effect of Interest Rates on Exchange Rates

The estimation results in Table 1 demonstrate that the interest rate variable has a significant impact on the Rupiah Exchange Rate versus the US Dollar, as shown by the partial t-test, where the probability is 0.0152, $\alpha = 5\%$ or 0.05. It can be inferred that this is the case because the interest rate's probability value is $0.0152 < 5\%$ or 0.05. Interest rates have a favorable impact on the exchange rate. According to Keynesian theory, a country's currency will appreciate if its interest rate is greater than the interest rate of another country (the international interest rate), and vice versa if its interest rate is lower than other nations' interest rates [18].

The nominal exchange rate of the rupiah versus the US dollar increases by 0.027830 for every 1 percent increase in interest rates, according to the interest rate coefficient, which is 0.027830 and the findings of this study concur with those of Iin (2014) and Wijaya (2020).

3.2 The Effect of Inflation on the Exchange Rate

Based on the findings from Table 1, it can be concluded that there is no effect of inflation on the value of the rupiah relative to the US dollar because the probability value of the interest rate is $0.0880 > 5\%$ or 0.05, as shown by the partial t-test, which indicates that the inflation variable does not have a significant impact on the exchange rate of the rupiah against the US dollar. Inflation has a favorable impact on the exchange rate. These findings are in line with those of a study by BR Silitonga et al. (2019), which found no impact of inflation on the value of the rupiah relative to the US dollar.

The nominal exchange rate of the rupiah versus the US dollar increases by 0.014976 for every 1 percent increase in inflation, according to the inflation coefficient value of 0.014976.

3.3 The Effect of Foreign Debt on the Exchange Rate

Based on Table 1's findings, it is clear that the Foreign Debt variable has a significant impact on the Rupiah Exchange Rate versus the US Dollar, as shown by the partial t-test, where the probability is 0.0000, $\alpha = 5\%$ or 0.05. It is also clear that the Foreign Debt variable affects the Rupiah Exchange Rate versus the US Dollar because the probability value of the interest rate is $0.0000 < 5\%$ or 0.05. Foreign debt positively affects the currency rate.

The finding that the exchange rate will rise when money flows in the form of foreign debt is viewed positively. The nominal exchange rate of the rupiah against the US dollar is 0.949296 percent, or the exchange rate is depreciating because it is believed that the more foreign debts that have not been repaid, the less value the Rupiah currency will have [24]. The coefficient of foreign debt is 0.949296. This can be interpreted as a 1 percent increase in foreign debt. These findings concur with Yudiarti et al. (2018)'s study, which discovered that foreign debt has a large and favorable impact.

4 Conclusion

Variable interest rates and foreign debt have a substantial positive impact on the value of the rupiah relative to the US dollar, according to the findings of regression analysis using Ordinary Least Square (OLS) and the validity test of the influence on the significance (α) of (0.05). Given that macroeconomic variables like interest rates and foreign debt have a considerable impact on the rupiah exchange rate itself, this research provides advice on how important it is to pay attention to their impacts. Since more than just the government is responsible for this, the Indonesian people must take an active role and assist in offering advice to the government.

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