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Analysis of the Effect of Monetary Policy on Exchange Rate Global Currency

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ABSTRACT

The purpose of this study is to analyze the influence of monetary policy proxied by interest rates (X1), money supply/JUB (X2), and inflation (X3) on the Rupiah exchange rate against three currencies with different characteristics: the US Dollar (Y1) as a reserve currency and safe-haven, Yuan (Y2) as a trading partner currency, and Ruble (Y3) as a commodity currency, for the period 2014-2023. This period was chosen because it includes major shocks such as the taper tantrum, the Covid-19 pandemic, the Fed's monetary tightening from 0.25% to 5.50%, the Russia-Ukraine conflict, and the implementation of Bank Indonesia's Inflation Targeting Framework (ITF) of 2-4%. The study uses a quantitative approach with 10-year secondary time series data sourced from the World Bank, Bank Indonesia, and BPS. The multiple linear regression analysis method is used with the help of SPSS 26. Classical assumption tests include One-Sample Kolmogorov-Smirnov normality and VIF multicollinearity. The results of the normality test show Asymp.Sig 0.200 >0.05 so that the data is normally distributed. The VIF value for X1, X2, X3 <10 so that there is no multicollinearity. The results of the study: (1) USD Model: Y1 = 10191.85 + 196.339 X1 + 0.524 X2 - 109.722 X3, R^2 = 81.8%, F Sig 0.008. JUB has a significant positive effect Sig 0.003. Interest rates Sig 0.249 and inflation Sig 0.355 are not significant. (2) Yuan Model: Y2 = 1771.06 + 8.121 X1 + 0.052 X2 - 10.932 X3, R^2 = 60.2%, F Sig 0.022. JUB Sig 0.040 is significantly positive. (3) Ruble Model: Y3=229.56-2.568X1-0.008X2+14.649X3, R^2=90.9%, F Sig 0.001. JUB Sig 0.034 is significantly negative (anomaly), inflation Sig 0.002 is significantly positive. The findings confirm JUB as the main determinant of Rupiah depreciation according to Friedman's quantity theory of money, while the Ruble anomaly is explained by exogenous shocks such as the

Keywords: Monetary Policy, Exchange Rate, Money Supply, Interest Rate, Inflation, Ruble Anomaly

2022 SWIFT sanctions and Brent oil price volatility. Policy implications require careful JUB management and ITF consistency.

INTRODUCTION

The exchange rate is the price of a country's currency against another country's currency and plays a vital role in the economy (Mankiw, 2007). Exchange rate stability impacts foreign exchange reserves, inflation, and economic growth (Nopirin, 2014). Indonesia has adopted a free-floating exchange rate system since 1997, so the value of the Rupiah is largely determined by market mechanisms and influenced by fundamental macroeconomic factors such as inflation, interest rates, and the money supply (Mishkin, 2008). The selection of the three currencies in this study is based on their different characteristics.

The US dollar is the world's leading currency, dominant in global foreign exchange reserves and commodity trade, such as oil. Federal Reserve policy has significant spillovers to emerging markets, and the dollar is often considered a safe haven during times of global uncertainty (Permana, 2022).

China is Indonesia's largest trading partner. The yuan has become increasingly integrated following its inclusion in the IMF's SDR in 2016. It is controlled by the People's Bank of China (PBOC) through a managed float, making it distinct from the USD. Russia is the world's largest energy producer.

The ruble is highly volatile due to international sanctions and geopolitical tensions, thus providing a unique case of currency resilience under extreme external conditions. The 2014-2023 period encompasses the recovery after the 2013 taper tantrum, the 2020-2021 Covid-19 pandemic that caused large capital outflows, the Fed's aggressive monetary tightening from 0% to 5.5%, the 2022 Russia-Ukraine conflict that triggered a surge in energy prices, and the success of BI's ITF in maintaining inflation at 2-4%.

Previous research, such as Puspitaningrum (2013), found an R^2 of 42% for inflation, SBI, and economic growth against quarterly exchange rates from 2003 to 2012. Pramudita (2012) found that the JUB, interest rates, and exchange rates significantly affected inflation. However, comparative research on three different currency characteristics is still limited. Therefore, this study aims to analyze the influence of JUB, interest rates, and inflation on the Rupiah exchange rate against the USD, Yuan, and Ruble.

RESEARCH METHODS

Quantitative research type with secondary data (Sugiyono, 2018). Location in Indonesia, 2014 period. - 2023. Data collection techniques of literature studies and documentation studies from the World Bank, BI, BPS, Ministry of Finance, Bappenas. Dependent variables Y1 = Rupiah / USD, Y2 = Rupiah / Yuan, Y3 = Rupiah / Ruble. Independent variables X1 =

Interest Rate (%), X2 = JUB (Billion Rp), X3 = Inflation (%). Operational definition: Exchange rate is the exchange rate of a country's currency measured in another country's currency, inflation is a situation where the value of money declines due to long-term increases in the price of basic goods, interest rate is the ratio of investment returns as a reward to investors, JUB is all types of money in the economy, namely the amount of currency in circulation plus demand deposits. Analysis model: $Y1 = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \mu$, $Y2 = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \mu$, $Y3 = \alpha + \beta1X1 + \beta2X2 + \beta3X3 + \mu$. Multiple linear regression analysis SPSS 26. Kolmogorov-Smirnov normality test criteria Sig>0.05 normal, multicollinearity VIF<10 and tolerance>0.1, R^2 determination, partial t test p<0.05 significant, simultaneous F test p<0.05 significant (Gujarati, 2015).

RESULTS AND DISCUSSION

4.1 Classical Assumption Test

Based on the results of the Kolmogorov-Smirnov normality test, the Asymp.Sig (2-tailed) value for the Rupiah exchange rate against the US Dollar is 0.200, Yuan is 0.200, and Ruble is 0.200. All values are greater than 0.05 so the data is normally distributed. The multicollinearity test shows that the VIF value for interest rates, JUB, and inflation are each less than 10 and tolerance is greater than 0.1 in all three models. The multicollinearity table confirms that there is no multicollinearity so the model is suitable for use.

4.2 Multiple Linear Regression Results

USD Model: Based on SPSS output, the significance value of interest rates is 0.249 >0.05 so H1 is rejected, meaning there is no effect of interest rates on Rupiah/USD. JUB Sig 0.003 <0.05 so H2 is accepted, there is an effect of JUB on USD. Inflation Sig 0.355 >0.05 so H3 is rejected. Equation Y1 = 10191.85 + 196.339X1 + 0.524X2 -109.722X3. The JUB coefficient of 0.524 means that every 1 unit increase in JUB will cause the Rupiah to weaken against USD by 0.524 units assuming other variables are constant. Yuan Model: Interest rate Sig 0.783 >0.05 is rejected, JUB Sig 0.040 <0.05 is accepted, inflation Sig 0.606 >0.05 is rejected. Equation Y2 = 1771.06 + 8.121X1 + 0.052X2 -10.932X3. JUB has a positive effect of 0.052 on Yuan. Ruble Model: Interest rate Sig 0.551 >0.05 is rejected, JUB Sig 0.034 <0.05 is accepted, inflation Sig 0.002 <0.05 is accepted. Equation Y3 = 229.56 -2.568X1 -0.008X2 +14.649X3. JUB coefficient -0.008 is significantly negative and inflation 14.649 is significantly positive.

4.3 Coefficient of Determination and Simultaneous Test

The coefficient of determination R^2 USD is 0.818 or 81.80%, meaning that the interest rate, JUB, and inflation variables together are able to explain variations in the Rupiah/USD exchange rate by 81.80%, the remaining 18.20% is explained by other variables such as the trade balance, foreign exchange reserves, and foreign debt. R^2 Yuan is 0.602 or 60.20%, the

remaining 39.80% is explained by other variables. R^2 Ruble is 0.909 or 90.90%, the remaining 9.10% is explained by other variables. The Ruble model has the strongest explanatory power. The F test shows Sig F for USD 0.008 <0.05, Yuan 0.022 <0.05, Ruble 0.001 <0.05. This means that simultaneously the three independent variables have a significant effect on the exchange rate in the three models.

4.4 Discussion

The effect of interest rates was insignificant on the three exchange rates with Sig 0.249; 0.783; 0.551. This result is inconsistent with Nopirin's (2014) interest rate parity theory, which states that an increase in domestic interest rates will attract capital inflows, resulting in appreciation. The insignificance is suspected because Bank Indonesia frequently intervenes triple intervention in the spot, DNDF, and SBN markets to maintain exchange rate stability. Furthermore, global uncertainties such as the Covid-19 pandemic and the increase in the Fed Rate have weakened investor response to domestic interest rates. The results are in line with the Dornbusch overshooting model, which states that in the short term, the transmission of interest rates to exchange rates is not always direct. The effect of the JUB was proven significant on all three exchange rates. Against the USD and Yuan, the JUB had a significant positive effect with Sig 0.003 and 0.040, respectively. This means that an increase in the JUB causes the Rupiah to weaken. These results support Friedman's quantity theory of money, which states that an increase in the JUB will increase inflation and reduce the purchasing power of the domestic currency. The findings are consistent with Sadikin and Putra and Zulki Zulkifli Noor, who found that the Rupiah exchange rate (JUB) had a positive effect on the weakening of the Rupiah. The effect on the Yuan was smaller at 0.052 compared to USD 0.524 because the Yuan implemented a managed float controlled by the PBOC, not fully market-driven. The anomaly against the Ruble, the JUB, had a significant negative effect of -0.008 Sig 0.034. This means that the increase in the JUB actually caused the Rupiah to strengthen against the Ruble. This anomaly is suspected to be influenced by external factors that are very dominant on the Ruble, such as the Russia-Ukraine conflict and fluctuations in world oil prices in 2022-2023, which made the Ruble exchange rate very volatile and not fully influenced by domestic variables in Indonesia. In early 2022, the Ruble fell from 75 to 120 Ruble/USD due to SWIFT sanctions, then strengthened to 50-60 due to Russia's mandatory gas payment policy in Rubles and Brent oil prices rose to 120 USD/barrel. The effect of inflation was only significant on the Ruble Sig 0.002 with a positive coefficient of 14.649, meaning a 1% increase in inflation caused the Rupiah to weaken against the Ruble by 14.649 units. According to the Purchasing Power Parity theory, countries with higher inflation will experience depreciation. Supported by Gujarati. Meanwhile, inflation was not significant against the USD Sig 0.355 and Yuan Sig 0.606. This is suspected because BI has implemented the Inflation Targeting Framework so that Indonesian inflation is relatively maintained in the range of 2-4% with an average of 3.03%. In addition, the USD and Yuan

are the main currencies in foreign exchange reserves so their movements are more influenced by global factors than domestic inflation.

CONCLUSION AND SUGGESTIONS

Conclusion

Based on the research results, it can be concluded: Interest rates partially have no significant effect on the Rupiah exchange rate against USD Sig 0.249, Yuan Sig 0.783, Ruble Sig 0.551 for the 2014-2023 period. The weakening of transmission is suspected to be due to BI intervention and global shocks. The amount of money in circulation has a significant effect on all three exchange rates. Against USD positive 0.524 Sig 0.003 and Yuan positive 0.052 Sig 0.040 causing the weakening of the Rupiah, supporting Friedman's quantity theory of money. Against the Ruble negative -0.008 Sig 0.034 causes the strengthening of the Rupiah due to geopolitical anomalies. Inflation has a significant positive effect on the Ruble 14.649 Sig 0.002, but is not significant against the USD and Yuan due to the success of the ITF. Simultaneously, the three variables have a significant effect with F Sig USD 0.008 R^2 81.80%, Yuan 0.022 R^2 60.20%, Ruble 0.001 R^2 90.90%.

Suggestion

The government is expected to strengthen monetary and fiscal policy coordination to stabilize the Rupiah against the USD and Yuan, maintain inflation control as a top priority for maintaining external stability, and carefully manage the JUB (Jub) due to its greatest impact. Future researchers are advised to add variables such as the trade balance, foreign exchange reserves, foreign debt, the Fed Rate, and oil prices, as well as use dynamic models such as VAR, VECM, or ARDL to capture both the short and long term.

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