DYNAMIC BEHAVIOR OF RUPIAH EXCHANGE RATE PERIOD 1999Q1-2020Q2 (STICKY PRICE MODEL KEYNESIAN APPROACH)

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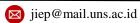
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ABSTRACT

This study investigates the dynamic behavior of the Indonesian Rupiah (IDR) exchange rate against the US Dollar (USD) from the first quarter of 1999 to the second quarter of 2020. The primary objective is to assess the factors influencing exchange rate fluctuations using time-series data analyzed through multiple linear regression. The study focuses on key macroeconomic variables, including the M2 money supply ratio, inflation ratio, GDP ratio, and interest rate ratio, to determine their impact on the IDR/USD exchange rate. The findings reveal that the M2 ratio, inflation ratio, and GDP ratio significantly and positively influence the IDR/USD exchange rate, indicating that increases in these variables lead to a depreciation of the Rupiah. However, the interest rate ratio does not exhibit a significant effect on the exchange rate. The model demonstrates a high degree of fit with an adjusted R^2 value of 94.42%, and the overall model is statistically significant, as indicated by the F-statistic probability of 0.000. These results provide valuable insights into the determinants of exchange rate movements in Indonesia during the specified period.

1. INTRODUCTION

The exchange rate is a fundamental macroeconomic indicator that plays a critical role in determining the economic health and political stability of a nation (Nopirin, 2010). Fluctuations in exchange rates can have profound impacts, influencing not only economic variables like inflation and interest rates but also political conditions. A sharp decline in a currency's exchange rate is often seen as detrimental to the economy, potentially leading to increased inflation, higher costs for imported goods, and a loss of investor confidence. Such economic challenges can, in turn, lead to political instability. On the other hand, a weaker currency can boost a country's export competitiveness by making its goods more affordable on the international market. This increase in competitiveness can drive export growth and reduce imports, potentially leading to a surplus in the current account. Therefore, understanding the dynamics of exchange rates is crucial for policymakers and economists alike.

The global economic crisis of 1997 had a significant impact on Indonesia's economy, particularly on the exchange rate of the rupiah. During the crisis, the rupiah depreciated by nearly 600%, plunging from Rp. 2,380/USD in June 1997 to a peak of Rp. 14,150/USD in July 1998 (Pratiwi & Santosa, 2012). This sharp depreciation highlighted the vulnerability of Indonesia's currency to external shocks and underscored the importance of exchange rate management in maintaining economic stability. Despite some recovery in the following years, the rupiah has continued to experience volatility, with fluctuations driven by both domestic and international factors.

This study seeks to analyze the behavior of the rupiah exchange rate over the period from the first quarter of 1999 to the second quarter of 2020, using the Sticky Price Model Keynesian Approach (Parianom, 2009). This model, based on the Dornbusch Model, posits that in the short term, prices are sticky and do not adjust immediately to changes in monetary conditions. As a result, exchange rates can experience short-term volatility that deviates from long-term equilibrium levels. The model is particularly relevant for analyzing countries like Indonesia, where exchange rate movements are influenced by a range of factors, including monetary policy, inflation, and external economic conditions.

The variables considered in this study include the exchange rate of IDR/USD as the dependent variable, while the independent variables are the M2 money supply ratio, inflation ratio, GDP ratio, and interest rate ratio. The analysis covers a period of over two decades, providing a comprehensive overview of the factors influencing the rupiah's exchange rate. Time-series data is employed, and the analysis is conducted using multiple linear regression methods to determine the significance and impact of each variable on the exchange rate.

The results of this study are expected to provide valuable insights into the behavior of the rupiah exchange rate and the validity of the Keynesian Sticky Price Model in explaining these dynamics. Preliminary findings suggest that the M2 ratio, inflation ratio, and GDP ratio have a significant positive effect on the IDR/USD exchange rate, while the interest rate ratio does not have a significant impact. These findings indicate that during the study period, the Keynesian Sticky Price Model may not fully capture the complexities of Indonesia's exchange rate behavior.

Given the importance of exchange rates in economic policy, the insights gained from this study could inform future monetary policy decisions and contribute to more effective exchange rate management. Understanding the determinants of exchange rate movements is crucial for developing strategies to mitigate the negative impacts of currency volatility and enhance economic resilience in the face of global financial fluctuations.

2. RESEARCH METHODS

This section outlines the research design, data sources, and analytical methods applied in this study, which examines the dynamic behavior of the Rupiah exchange rate from 1999Q1 to 2020Q2. The exchange rate (Rp/$) serves as the dependent variable, while the independent variables include inflation rate, money supply (M2), and GDP, using quarterly data. The study employs a hypothesis-testing research design to assess the relationships between these variables. The methodology involves collecting and analyzing secondary data from various sources, such as Indonesian Financial Economic Statistics (SEKI), Bank of Indonesia's Annual Reports, and international financial data. The data is analyzed using multiple linear regression to provide a systematic, factual, and accurate representation of the relationships among the variables. This detailed methodological approach ensures that the study is replicable."The data type is secondary data. Secondary data used in the study include Indonesian Financial Economic Statistics (SEKI), the Bank of Indonesia's Annual Report, International Financial Statistics, the Pacific Exchange Rate, the Bureau of Economic Analysis, and the Federal Reserve (Gujarati & Porter, 2009).

The initial model of this research is as follows:

$$EXCHANGE\ BEHAVIOR = f\{(MS - MS*), (INF - INF*), (GDP - GDP*), (INT - INT*)\} \dots\dots\dots (1)$$

The regression model uses a multiple linear regression approach.

$$KURS_t = \beta_0 + \beta_1 MS_t + \beta_2 INF_t + \beta_3 GDP_t + \beta_4 INT_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Where as :
Kurs   : Exchange rate Rp/$
MS   : Indonesia's M2 money ratio to America
INF   : Indonesia's Inflation Ratio to America
GDP   : Indonesia's GDP Ratio to America
INT   : Interest rate ratio to America
β_0 : Constanta
$\beta1\dots \beta4$: Intercept of each independent variable
ε : Error or residual

3. RESULTS AND DISCUSSION
3.1. RESULTS

The result of the short-term regression equation can be seen in the following table.

Table 1. Linear Regression Results

Variable	Coefficient	P-value
C	3.61	0.0000
MS	0.604	0.0335
INF	0.0007	0.0036
GDP	1.8435	0.0244
INTEREST	-0.000016	0.7256
AR (1)	0.924	
Adj. R^2	0.944	
F-Statistic	0.000	

Source: Processed data (2020)

From table 1 above, it can be concluded that the MS, INF, and GDP variables have a significant and positive effect on the exchange rate variable. Only the INTEREST variable has no significant, but positive effect. Then from Adj. R^2, it can be seen that the independent variables can represent the dependent variable by 94.4%. Then from the F-statistic, it can be seen that the independent variables simultaneously significantly affects the dependent variable.

3.2. DISCUSSION

Using the Keynesian Sticky Price Model approach, this study wants to know the Dynamic Behavior of the Rupiah Exchange Value Period 1999-2020Q2. In this approach, one condition associated with a country's economy is the reference in the exchange rate comparison. The researchers chose the country of contrast based on the high level of currency transactions between those countries. The researchers used the neural comparator in the United States with the currency Dollar.

As for the variables used to look at the behavior of exchange rates, the amount of money in circulation (the ratio between M2 in Indonesia and M2 in the United States), inflation (the relationship between Indonesia's inflation and the US inflation), GDP (GDP price ratio in Indonesia with GDP prices in the US), and the interest rate variable (BI's benchmark interest rate ratio with the Federal Fund Rate in the United States) (Puspitaningrum et al., 2014). The survey showed that of the four variables that influenced the Rp/$ exchange rate, there were three significant variables: the amount of money in circulation, inflation, and GDP. While interest variables have no significant influence on the rate of Rp/$.

The amount of money in circulation projected as money in the broad sense (M2) consisting of M1, quota money (including savings, futures deposits in rupee and currency, as well as currency turnover), and securities issued by the monetary system owned by the domestic private sector with a remaining term of up to one year. The research results show that the M2 ratio of Indonesia to the US significantly positively influences the rate of Rp/$. This suggests that the higher the amount of money circulating in the society caused the rupiah exchange rate to be depressed, so instead the lower the amount circulating caused rupee exchange rates to be appreciated. The high amount of money circulating in society indicates high economic activity, including transactions and investments. The level of economic activity also affects transactions abroad. The bulk of purchases from abroad will cause demand for foreign currencies to rise, leading to pressure on the currency exchange rate that will be depressed. The results of this study are in line with the research carried out by Hassan and Gharleghi (2015), Iskandarsyah (2013), Muchlas and Alamsyah (2015), Eris et al. (2015), and Santosa (2015).

GDP (Gross Domestic Product) is one of the important macroeconomic indicators (Budiono, 2013). The high or low level of GDP can be used as a basis for the high level of economic activity of a country and can also determine the per capita income of a nation (Sidqiy & Amara, 2020). In short, the higher GDP results in the higher economic activity of a country. In this study, the measurement of GDP using a price approach applies where GDP is based on the price and quantity of output of each year. Research results show that GDP positively influences the debt value of Rp/$. This means that the higher GDP leads to increased economic activity among domestic populations and countries. High domestic economic activity leads to increased imports, which means high demand for foreign currencies, especially the dollar, which will cause the rupee currency to suffer a depression against the US dollar. The results of this study are in line with the research carried out by Hassan and Gharleghi (2015), Iskandarsyah (2013), and Santosa (2015).

The last variable that affects the Rp/$ rate is inflation. Inflation is one of the macroeconomic indicators used to determine the low levels of people's purchasing power through changes in the prices of goods and services (Mankiw, 2018). Based on the research results, there is a significant positive influence of inflation on the rate of Rp/$. This is because the increasing price of domestic goods relative to the price of foreign goods caused the demand for goods from home to abroad to be reduced so that, the contrary, the higher price of internal goods compared to foreign prices caused imports to rise. As a result, the demand for the dollar will increase, so the dollar's exchange rate will be depressed. Another explanation can be seen from the purchasing power side. Increasing domestic price levels will lead to a decline in people's purchasing power and consumer consumption, so economic activity will decline, which will cause the exchange rate to be depressed. The results of this study are in line with studies conducted by Hassan and Gharleghi (2015), Puspitaningrum et al. (2014), and Were et al. (2013)

In addition to the three significant variables that influence the Rp/$ exchange rate, the most sensitive variable of GDP affects the Rp/$ rate. As for the value of the determination coefficient in the form of Adjusted R^2 of 0,9442, which means that 94,42% of the rate variability of the Rp/$ can be explained by the amount of money in circulation (MS), GDP, inflation (INF), and interest rate (INTEREST), the remaining 5,48% is influenced by other factors outside this regression equation model.

Based on the Keynesian Sticky Price Model approach and looking at the regression equation results from 1999 quarter 1 to 2020 quarter 2, it can be concluded that the Sticky Price approach Keynessian Model did not apply in Indonesia in that period. This is because one variable, the interest rate, does not significantly influence the exchange rate of Rp/$ (Beaudry & Portier, 2018).

4. CONCLUSION

Based on the results of the discussion in the previous chapter, this study's conclusion is as follows: 1) The amount of money in circulation (MS) significantly influences the rate of Rp/$. This suggests that if the amount of money in circulation increases, the rate of Rp/$ will rise (depression), just the opposite; 2) Inflation (INF) has a significant positive influence on the rate of Rp/$. This suggests that if the inflation rate rises, then the rate of Rp/$ will rise (depression), and so on; 3) GDP has a significant positive influence on the rate of Rs. This suggests that if the GDP rate rises, then the rate of the Rp/$ will rise (depression), and so on; 4) This study's determination coefficient is 0.9442, which means that 94,42% of the variability of the exchange rate Rp/$ can be explained by the amount of money in circulation (MS), GDP, inflation (INF), and interest rate (INTEREST); the remaining 5.48% is influenced by other factors outside this model of regression equations; 5) Based on the results of linear regression studies, the Sticky Price Model Keynesian approach was not valid in Indonesia during the period. This is because there is one variable, the interest rate, which does not significantly influence the exchange rate of Rp/$.

Based on the conclusions obtained from the data processing results, the suggestion can be formulated as follows: 1) The Bank of Indonesia must maintain the stability of the debt value because it has a high impact on the economy. Besides, it can control M2, which can influence exchange rates and economic activity. It should also assign inflation stability as it can affect the rupiah/dollar exchange rate; 2) To the government to continue promoting policies that can increase GDP and ultimately boost economic activity; 3) Further research can continue using this model with a longer period or try other models for exchange rate behavior

5. REFERENCES

Beaudry, P., & Portier, F. (2018). *REAL KEYNESIAN MODELS AND STICKY PRICES*.

Budiono. (2013). *Ekonomi Makro*. Yogyakarta: BPFE UGM.

Eris, I., Putro, T. S., & Kosnita, S. E. (2015). PENGARUH TINGKAT SUKU BUNGA BI RATE, JUMLAH UANG BEREDAR DAN NERACA PEMBAYARAN TERHADAP NILAI TUKAR RUPIAH TAHUN 2006-2015. *JOM Fekon*, *4*(1), 393–404. https://jom.unri.ac.id/index.php/JOMFEKON/article/view/12365

Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics*. McGraw-Hill.

Hassan, M. H., & Gharleghi, B. (2015). Exchange Rate Determination in Maldives: A Study Based on the Sticky Price Monetary Model. *International Journal of Business and Management*, *10*(7), 85–92. https://doi.org/10.5539/ijbm.v10n7p85

Iskandarsyah, N. (2013). Faktor-Faktor yang Memengaruhi Pergerakan Rupiah: Analisis Model Moneter dengan Menggunakan Johansen Cointegration dan Error Correction Model. *Widyariset*, *16*(1), 39–48. https://download.garuda.kemdikbud.go.id/article.php?article=1754364&val=18681&title= DETERMINANT FACTORS OF RUPIAHS FLUCTUATION the Flexible-Price Monetary APPROACH THROUGH JOHANSEN COINTEGRATION AND ERROR CORECTION MODEL

Mankiw, N. G. (2018). *Principles of Economics* (8th ed.). Independence: Cengage Learning.

Muchlas, Z., & Alamsyah, A. R. (2015). FAKTOR-FAKTOR YANG MEMPENGARUHI KURS RUPIAH TERHADAP DOLAR AMERIKA PASCA KRISIS (2000-2010). *Jurnal JIBEKA*, *9*(1), 76–86. https://www.academia.edu/44427639/FAKTOR_FAKTOR_YANG_MEMPENGARUHI_ KURS_RUPIAH_TERHADAP_DOLAR_AMERIKA_PASCA_KRISIS_2000_2010

Nopirin. (2010). *Ekonomi Moneter*. Yogyakarta : BPFE-Yogyakarta.

Parianom, R. (2009). *Analisis Variabel-variabel yang Mempengaruhi Perilaku Nilai Tukar Rupiah: Dengan Pendekatan Behavior Equilibrium Exchange rate (BEER)* [Universitas Indonesia]. https://lib.ui.ac.id/detail?id=130856&lokasi=lokal

Pratiwi, T. E., & Santosa, H. P. (2012). Analisis Perilaku Kurs Rupiah (IDR) terhadap Dollar Amerika (USD) pada Sistem Kurs Mengambang Bebas di Indonesia Periode 1997.3 – 2011.4 (Aplikasi Pendekatan Keynesian Sticky Price Model. *Diponegoro Journal of Economics*, *1*(1), 298–310. https://ejournal3.undip.ac.id/index.php/jme/article/view/646

Puspitaningrum, R., Suhadak, & Zahror, Z. A. (2014). Pengaruh Tingkat Inflasi, Tingkat Suku Bunga SBI, Dan Pertumbuhan Ekonomi Terhadap Nilai Tukar Rupiah Studi Pada Bank Indonesia Periode Tahun 2003-2012. *Jurnal Administrasi Bisnis S1 Universitas Brawijaya*, *8*(1), 1–9. https://media.neliti.com/media/publications/79644-ID-pengaruh-tingkat-inflasi-tingkat-suku-bu.pdf

Santosa, A. B. (2015). Pengujian Model Portofolio Balance Models dalam Menjelaskan Nilai Tukar Rupiah. *Seminar Nasional Multi Disiplin Dan Call For Papers*. https://www.neliti.com/publications/171712/pengujian-model-portofolio-balance-models-dalam-menjelaskan-nilai-tukar-rupiah#cite

Sidqiy, A., & Amara, S. (2020). *Faktor – Faktor Yang Mempengaruhi Pemerataan Pendapatan di Indonesia. 9*(1), 48–67. https://doi.org/https://doi.org/10.24036/ecosains.11549957.00

Were, M., Kamau, A. W., & Kisunguh, K. N. (2013). An Empirical Investigation of Exchange Rate Determination in Kenya: Does Current Account Imbalance Play a Role? *Advances in Management & Applied Economics*, *3*(2), 165–178. https://ideas.repec.org/a/spt/admaec/v3y2013i2f3_2_8.html