Inovbiz: Jurnal Inovasi Bisnis 5 (2025) 43-51
Seri Manajemen Investasi dan Kewirausahaan
INOVBIZ
Website: www.ejournal.polbeng.ac.id/index.php/IBIMK
Email: inovbizmk@polbeng.ac.id

Analysis of the Influence of National Income, Interest Rates, and Inflation on the Nominal Exchange Rate: An Approach Using Cointegration and Error Correction Model (ECM)

Widya Utari[1], Fitrawaty[2], Dede Ruslan[3]
[1] Prodi Ilmu Ekonomi, Fakultas Ekonomi, Universitas Negeri Medan, Indonesia
<widyautari0609@gmail.com>
[2] Prodi Ilmu Ekonomi, Fakultas Ekonomi, Universitas Negeri Medan, Indonesia
3 Prodi Ilmu Ekonomi, Fakultas Ekonomi, Universitas Negeri Medan, Indonesia

ARTICLE INFO

Received: (16 May 2025)
Received in revised: (26 June 2025)
Accepted: (26 June 2025)
Published: (30 June 2025)

Open Access

ABSTRACT

The objective of this research is to evaluate the impact of interest rates, national income, and inflation on the rupiah-to-dollar exchange rate, both in the long term and short term. The analysis is based on secondary data covering the period from 1989 to 2024 (36 years). The method applied in this study is multiple linear regression using the Ordinary Least Squares (OLS) approach. In addition, the research employs cointegration and the Error Correction Model (ECM), preceded by several other statistical tests. The results of the study using Johansen's cointegration test show that there is a long-term equilibrium relationship between all independent variables (inflation, national income, and interest rate) and the dependent variable (exchange rate). This finding is supported by a trace statistic value of 102.1727, which significantly exceeds the critical value at the 5% significance level, namely 47.85613. Moreover, the Maximum Eigenvalue Statistic is 36.7908, which is higher than the 5% critical value of 27.584434. Furthermore, the results from the ECM test indicate that only inflation, the residual term, and the interest rate have a statistically significant impact, while national income does not show significance. These findings suggest that inflation and interest rates have a short-term relationship with the exchange rate, as evidenced by the p-values of the respective variables being below the 5% significance level (0.05). In addition, the residual coefficient in the ECM test result is recorded at -0.732447, indicating that the error correction term (ECT) is significant and that approximately 73.24% of the disequilibrium is corrected in the following period.

Keywords: National Income, Interest Rate, Exchange Rate, Inflation, Cointegration, Error Correction Model (ECM).

1. Introduction

The exchange rate, also known as foreign exchange or currency rate, is a key element in an open economy because it has a substantial impact on the current account balance. In macroeconomic theory, several factors influence exchange rate movements, including the inflation rate, interest rate, and domestic income (GDP). In addition, external factors such as political and economic conditions, as well as other variables, also play a role. The exchange rate of one country's currency against another reflects the level of competitiveness of the domestic economy in the global environment. It also represents a relative comparison between global commodity prices and local commodity prices.

The exchange rate can also be used as an indicator to measure the condition of a country's economic sector. The stability of a currency's exchange rate reflects that the country is in a relatively healthy and consistent economic condition (Salvator, 1997:10 in Santoso, Eko Budi).

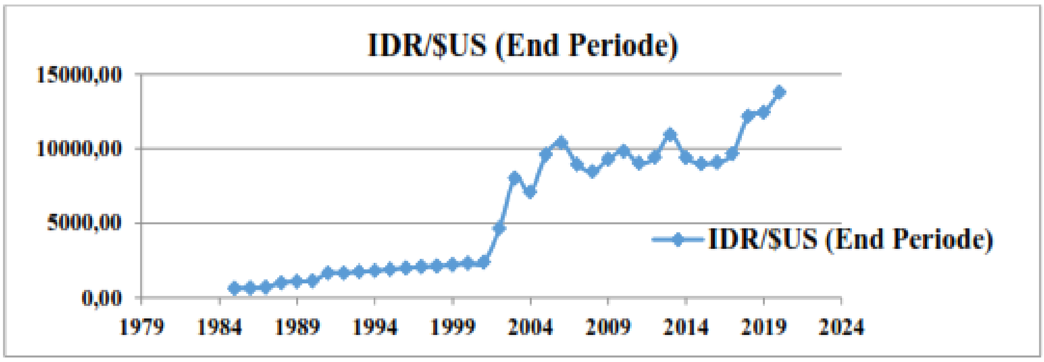
Since August 1997, Indonesia has adopted a flexible or free-floating exchange rate system, which remains in place to this day. Under this system, Bank Indonesia plays a key role in intervening in the global market to ensure the stability of the rupiah exchange rate, which is largely determined by market mechanisms. Exchange rate instability can affect capital or investment flows as well as international trade activities (Ulfia and Aliasaddin in Roshinta et al., 2011). Levi (1996) stated that exchange rate disparities between currencies are generally driven by the levels of supply and demand for those currencies. Fluctuations in exchange rates can lead to two conditions: depreciation and appreciation.

* Corresponding author
E-mail addresses: widyautari0609@gmail.com (Widya Utari)

Both have significant impacts on the economy, both domestically and internationally. When a foreign currency appreciates against the domestic currency, it can cause the country's export prices to become relatively higher, while import prices tend to fall. Conversely, if the foreign currency depreciates against the domestic currency, the country's export prices tend to decrease relatively, while import prices increase.

Furthermore, free trade and globalization have caused the flow of money and capital in the form of foreign exchange to move rapidly and in large volumes, which can significantly influence exchange rates between countries.

Below is a display of the fluctuations in the rupiah (IDR) exchange rate against the US dollar (USD):



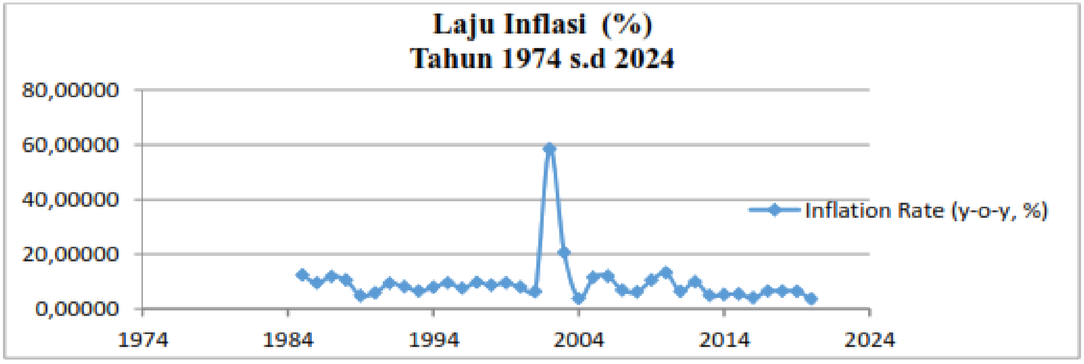
Gambar 1. Fluctuations in the Rupiah Exchange Rate Against the US Dollar
Sumber Gambar: adb.org

Figure 1 shows the fluctuation of the rupiah exchange rate against the US dollar from 1980 to 2016. During this period, it can be observed that the rupiah continuously weakened and depreciated against the US dollar.

As previously mentioned, exchange rates are influenced by several major factors, including inflation, money supply, interest rates, and the relative level of domestic income. Inflation has a significant impact on exchange rates. One of the key factors driving inflation is an excessive money supply, commonly referred to as an "excess supply of money." This leads to rising domestic prices compared to foreign prices, making foreign consumers less inclined to purchase goods from the inflating country. This situation can cause the domestic currency to depreciate against foreign currencies.

For example, in trade relations between Indonesia and the United States, higher prices in Indonesia may encourage Indonesian consumers to substitute imported goods from the U.S. with local products. This increases the demand for U.S. dollars, while American consumers may reduce their purchases of Indonesian goods. Samuelson and Nordhaus (2004) explain that changes in inflation levels can influence international trade activity.

As an illustration, the following presents the changes in Indonesia’s inflation rate from 1974 to 2024:



Gambar 2. Fluctuations in Indonesia’s Inflation Rate from 1974 to 2024
Sumber Gambar: www.adb.org

Figure 2 illustrates the fluctuations in Indonesia’s inflation rate from 1974 to 2024. The rise in Indonesia's inflation rate has often been followed by a weakening or depreciation of the rupiah against the US dollar, as exemplified in 1998. During that time, inflation soared to a very high rate of 58.45%, while the exchange rate of the US dollar surged from IDR 4,650 to IDR 8,025 per dollar. As a result, Indonesia experienced a major economic crisis and recession in 1998. The country’s national income declined by -13.13%, while investment fell dramatically by -164.05%. In 1999, although inflation remained high at 20.47%, it showed a downward trend, accompanied by improvements in other economic indicators, including investment. By the year 2000, Indonesia’s economy began to recover, as evidenced by increases in investment and national income.

Based on the explanation above, this study aims to examine the impact of several macroeconomic variables—namely interest rates, national income, and inflation—on the nominal exchange rate during the period from 1974 to 2024, spanning 35 years. This research utilizes secondary data. Given the long-term scope of the study and its aim to investigate the existence of long-run equilibrium relationships among money supply, interest rates, national income, inflation, and the exchange rate in time series data, the study employs a cointegration test. In addition to exploring long-run equilibrium, this research also seeks to identify short-run equilibrium relationships by applying the Error Correction Model (ECM) to these variables.

Thus, the research questions addressed in this study are: (1) to analyze the extent to which money supply, national income, interest rates, and inflation affect the exchange rate; (2) to examine whether a long-run equilibrium relationship exists in the time series data—characterized by fluctuations throughout the period—using the cointegration test; and (3) to investigate the short-run equilibrium relationship using the ECM for the specified variables.

2. Research Methods

The analytical strategy applied in this study is multiple linear regression using the Ordinary Least Squares (OLS) approach, based on secondary (time series) data from 1990 to 2024, which is quantitative in nature. The data used are sourced from various institutions, including Bank Indonesia (BI), the Central Statistics Agency (BPS), and the World Bank.

This study explores the effects of money supply, national income, interest rates, and inflation on the exchange rate. Therefore, the regression model used in this research is a multiple linear regression model, expressed as follows:

Yt = Exchange rate
X2t = Money supply
X3t = Interest rate
X4t = National income
X5t = Inflation
ui = Disturbance term

Since this study analyzes long-term data, a cointegration test is necessary to determine whether there is a long-run equilibrium relationship between the independent variables and the dependent variable. Cointegration applies when both independent and dependent time series variables are non-stationary, but if they are cointegrated, it indicates a consistent long-term relationship. This research aims to identify whether there is a long-run equilibrium relationship between economic variables—such as money supply, interest rate, national income, and inflation—and the nominal exchange rate using a cointegration test. The study uses cointegration techniques with time series unit root tests, namely the Engle-Granger (EG) or Augmented Engle-Granger (AEG) methods.

In long-term analysis, time series data that are not stationary cannot exhibit equilibrium relationships unless the variables are cointegrated. In the short term, imbalance may occur, which is why it is important to apply the Error Correction Model (ECM) to adjust short-run behavior toward long-run equilibrium. ECM helps resolve issues of spurious regression and inconsistency, thus allowing the independent and dependent variables to become stationary.

The ECM (Error Correction Model) based on the Engle-Granger approach can be represented as follows (based on the research of Mariani Jaya, Saputra, and others):

α1 = short-run coefficient
β1 = long-run coefficient
α2 = error correction coefficient (adjustment term)

The error correction coefficient indicates how quickly variables adjust back to equilibrium. If the probability value of this coefficient is less than 0.05, it implies a statistically significant short-run relationship.

In long-term time series studies, non-stationary data can lead to spurious regression. According to Wing Wahyu Winarno (2009), signs of spurious regression include: a high R^2 value, a high F-statistic, many statistically insignificant t-values, and a low Durbin-Watson statistic.

Therefore, a cointegration test is necessary to assess whether spurious regression exists in the time series regression model. If cointegration is present, the issue of spurious regression can be resolved, and alignment between variables can be achieved.

One of the most common ways to evaluate the stationarity of time series data is through the Unit Root Test. This test is used to examine whether the coefficient of an estimated variable equals one, which can be described using the following formulation:

$$Y_t = \delta Y_{t-1} + e_t \text{ .... } 8$$

With, et as the residual, which is random (white noise), has a mean of zero, a stable pattern, and no autocorrelation—consistent with the assumptions of OLS (Endri, 2008, as cited in Saputra, Mariani Jaya, et al.).

The unit root test is conducted using the Augmented Dickey-Fuller (ADF) method, with the following hypotheses:

H0 = presence of a unit root
H1 = absence of a unit root

3. Results and Discussion

3.1 Estimasi Prototipe penelitian

The estimation results of the research model using E-Views, conducted prior to the cointegration test and the Error Correction Model (ECM), are as follows:

Dependent Variable: LOG(NILAI_TUKAR2)
Method: Least Squares
Date: 06/06/17 Time: 09:44
Sample: 1980 2015
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.193.836	0.201221	1.090.263	0.0000
LOG(INFLASI)	0.159898	0.011120	1.437.953	0.0000
LOG(PERT_EK)	-0.104934	0.031198	-3.363.550	0.0020
LOG(SUKU_BUNGA)	0.067099	0.008325	8.060.380	0.0000
R-squared	0.977155	Mean dependent var		2.099.745
Adjusted R-squared	0.975013	S.D. dependent var		0.127448
S.E. of regression	0.020146	Akaike info criterion		-4.867.174
Sum squared resid	0.012988	Schwarz criterion		-4.691.228
Log likelihood	9.160.913	Hannan-Quinn criter.		-4.805.764
F-statistic	4.562.438	Durbin-Watson stat		1.449.941
Prob(F-statistic)	0.000000			

Based on the data processing results using E-Views, the output shown above was obtained, which is then used to construct the multiple regression equation as follows:

LOG(BESARAN_TUKAR2) = 2.1938 + 0.1599 * LOG(INFLASI) - 0.1049 * LOG(PERTB_EK) + 0.067 * LOG(SUKU_BUNGA) ……………………. 9

Based on Equation 9, inflation and interest rates have a positive relationship with the exchange rate, meaning that an increase in interest rates and inflation causes the exchange rate to weaken (depreciation), while a decrease in interest rates and inflation strengthens the exchange rate (appreciation). Conversely, national income has a negative relationship with the exchange rate, meaning that an increase in national income leads to an appreciation of the exchange rate against foreign currencies.

The estimation results show that, in certain parts, the variables of inflation, national income, and interest rates have a significant impact on the exchange rate in the long run, as their probability values (Prob.) are all less than 0.05 (alpha 5%).

From a simultaneous perspective, the three independent variables (inflation, national income, and interest rates) significantly influence the dependent variable (exchange rate), as the F-statistic probability is 0, which is less than the alpha value of 0.05 (5%).

The goodness of fit of the model in this study is very strong, with an adjusted R-squared coefficient of 0.975, indicating that the independent variables can explain 97.5% of the variation in the dependent variable. The model's goodness of fit is also supported by a low Akaike Information Criterion (AIC) value of -4.867174. The smaller the AIC value, the better the research model applied.

Classical Assumption Testing of the Research Model

To ensure that the research model analysis meets the BLUE (Best Linear Unbiased Estimator) criteria, it is crucial to perform classical assumption tests to determine whether the model violates any classical assumptions.

.

3.2 Autocorrelation Test

The output of the autocorrelation test using E-Views is as follows:

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.685.745	Prob. F(3,29)	0.1919
Obs*R-squared	5.345.722	Prob. Chi-Square(3)	0.1482

The results of the Breusch-Godfrey autocorrelation test show an Obs*R-squared value of 5.345722 and a Prob. F(3,29) of 0.1919, which is greater than 0.05. This means that H_0 is accepted, indicating that the research model does not suffer from autocorrelation. Autocorrelation testing can also be conducted using the Durbin-Watson method, which yields a DW value of 1.449941. This result indicates that the conclusion regarding the presence or absence of autocorrelation cannot be determined with certainty.

3.3 Heteroskedasticity Test

The results of the heteroskedasticity test using the Glejser method are as follows:

Heteroskedasticity Test: Glejser			
F-statistic	1.329.903	Prob. F(3,32)	0.2819
Obs*R-squared	3.990.849	Prob. Chi-Square(3)	0.2625
Scaled explained SS	5.067.516	Prob. Chi-Square(3)	0.1669

The results of the heteroskedasticity test using the Glejser method show a Prob. Obs*R-squared value of 0.2625 and a Prob. F(3,32) value of 0.2819, both of which exceed 0.05. This means that H_0 is accepted, indicating that the research model does not experience heteroskedasticity (i.e., it is homoskedastic).

3.4 Unit Root Test (Stationarity Test)

After the classical assumption tests, the next step is to conduct a stationarity test using the unit root test on each variable used in the research model. The Augmented Dickey-Fuller (ADF) test is then applied to evaluate the stationarity of the variables at the second difference level. If a variable is not stationary at the level, the subsequent procedure is to perform the unit root test at the first difference level until the variable becomes stationary.

3.5 Exchange Rate Unit Root Test

The following is the output of the unit root test for the exchange rate variable:

Null Hypothesis: NILAI_TUKAR2 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.269.833	0.6324
Test critical values:	1% level	-3.632.900	
	5% level	-2.948.404	
	10% level	-2.612.874	

*MacKinnon (1996) one-sided p-values.

The result of the unit root test at the level, as shown in the table, indicates that H_0 is accepted: the ADF test statistic is 0.1269833, which is greater than the 5% critical ADF value of 2.948404, and the probability value is 0.6324, which exceeds 0.05. Thus, based on these results, we can conclude that the exchange rate variable is not stationary. Therefore, the next step is to conduct the unit root test at the first difference level.

3.6 Inflation Unit Root Test

For the inflation data, the unit root test output is as follows:

Null Hypothesis: INFLASI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.687626	0.8370
Test critical values:	1% level	-3632900	
	5% level	-2.948.404	
	10% level	-2.612.874	

*MacKinnon (1996) one-sided p-values.

The unit root test output at the level, as shown in the table, indicates that H_0 is accepted; the ADF test statistic is -0.687626, which is greater than the 5% critical value of -2.948404, and the probability value is 0.8370, which is greater than 0.05. Therefore, the result shows that the inflation data is non-stationary. Subsequently, the unit root test at the first difference level will be conducted.

3.7 Unit Root Test for National Income

For the national income data, the output of the unit root test is as shown in the following table:

Null Hypothesis: PERTUB_EK has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.660.684	0.9994
Test critical values:	1% level	-3.632.900	
	5% level	-2.948.404	
	10% level	-2.612.874	
*MacKinnon (1996) one-sided p-values.			

The unit root test output at the level above shows that H0 is accepted: the ADF test statistic is 1.660684, which is greater than the 5% critical ADF value of -2.948404, and the probability value is 0.9994, which exceeds 0.05. Therefore, it can be concluded from the output that the national income data is non-stationary. Subsequently, the next phase of the unit root test at the first difference level will be conducted.

3.8 Unit Root Test for Interest Rate

For the interest rate data, the unit root test output is as shown in the following table:

Null Hypothesis: SUKU_BUNGA has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.861.900	0.3457
Test critical values:	1% level	-3.632.900	
	5% level	-2.948.404	
	10% level	-2.612.874	
*MacKinnon (1996) one-sided p-values.			

The unit root test output at the above level shows that H_0 is accepted; the ADF test statistic is -1.861900, which is higher than the 5% critical value of -2.948404, and the probability value is 0.3457, which is greater than 0.05. Therefore, the results indicate that the interest rate data is not stationary. Subsequently, the next stage of the unit root test at the first difference will be conducted.

Since all the variables used in this research are non-stationary at the level, the unit root test at the first difference is required to ensure that all variables become stationary. Furthermore, to perform a cointegration test, the variables used must be stationary.

3.9 Cointegration Test

As explained in the previous chapter, the next step in this research is to conduct a cointegration test. The purpose of this test is to examine whether there is a short-term equilibrium relationship between national income, interest rates, and inflation on the nominal exchange rate, using non-stationary data.

The cointegration test first checks whether the residuals from the applied model in this study are stationary at a certain level. The results of the ADF test, conducted using this method, are shown in the following table:

Null Hypothesis: RESID03 has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.420.200	0.0013
Test critical values:	1% level	-3.632.900	
	5% level	-2.948.404	
	10% level	-2.612.874	
*MacKinnon (1996) one-sided p-values.			

From the unit root test output of the residuals of the research model at the level shown above, it can be concluded that H_0 is rejected; the ADF test statistic is -4.420200, which is lower than the ADF critical value at the 5% level, which is -2.948404, and the probability value is 0.0013, which is less than 0.05. This indicates that the residuals are stationary, and therefore, there is evidence of cointegration among the variables in the model. Subsequently, all variables (the group) used in the research model were tested for cointegration using the Johansen Cointegration Test in EViews. The results indicate that a long-run equilibrium relationship exists when the time series components are cointegrated. The results are as follows:berikut:

Time: 16:21

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.661124	3.679.208	2.758.434	0.0025
At most 1 *	0.494240	2.317.760	2.113.162	0.0254
At most 2	0.230245	8.897.236	1.426.460	0.2948
At most 3 *	0.138654	5.074.812	3.841.466	0.0243

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-value

At most 3 *	0.138654	5.074.812	3.841.466	0.0243

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The output of the cointegration test, as shown above, allows us to compare the trace statistic with the critical value at the 5% level. The results show that the trace statistic, which is 102.1727, exceeds the 5% critical value, which is 47.85613. Additionally, the Maximum Eigenvalue Statistic, recorded at 36.7908, also exceeds the 5% critical value of 27.584434, which further strengthens the evidence of cointegration. As a result, we can conclude that the four variables—exchange rate, inflation, national income, and interest rate—are cointegrated. This indicates that in the long run, there exists a stable equilibrium relationship among these economic variables. Therefore, the issue of spurious regression is no longer present in the equation.

3.10 Estimation of the Error Correction Model (ECM)

Since all the data used in this research are not stationary at the level but become stationary at the first difference, and because there is cointegration among the variables, it implies that a long-run equilibrium relationship exists, as previously explained. However, in the short run, such equilibrium may not exist, leading to a condition of disequilibrium. Therefore, this study applies the ECM (Error Correction Model) prototype to examine market adjustment.

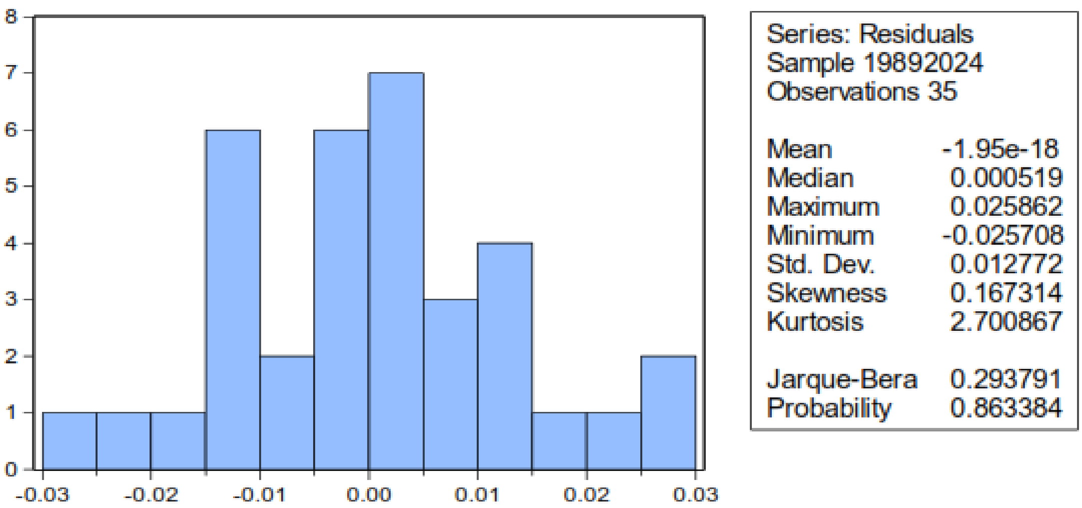
To assess the ECM using the Engle-Granger test, it is necessary to include an error correction term in order to eliminate short-run disequilibrium issues (Engle & Granger, 1989). This error correction variable is derived from the residuals obtained from the long-run estimation. The first step in predicting the ECM model is conducted by combining the differences in inflation, national income, and interest rate with the exchange rate, along with the lagged residuals of the model:

Dependent Variable: LOG(NILAI_TUKAR2)
Method: Least Squares
Date: 19/04/26 Time: 09:44
Sample: 1989 2025
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.010527	0.010132	-1.038.932	0.3071
LOG(INFLASI)	0.293954	0.067479	4.356.238	0.0001
LOG(PERT_EK)	-0.145475	0.116921	-1.244.210	0.2231
LOG(SUKU_BUNGA)	0.027837	0.010251	2.715.611	0.0109
R-squared	0.771225	Mean dependent var		0.011109
Adjusted R-squared	0.740721	S.D. dependent var		0.026703
S.E. of regression	0.013597	Akaike info criterion		-5.626.355
Sum squared resid	0.005546	Schwarz criterion		-5.404.163
Log likelihood	1034612	Hannan-Quinn criter.		-5.549.655
F-statistic	2528323	Durbin-Watson stat		2.025.620
Prob(F-statistic)	0.000000			

The results of the Error Correction Model (ECM) test show that the lagged residual value is negative (-0.732447), which is the preferred condition (it should not be positive). Furthermore, since only inflation, the residual, and interest rate are significant variables, there exists a short-run relationship between these factors and the exchange rate, as indicated by the probability (Prob.) values for each variable being less than 0.05 (5%). In the results above, the residual coefficient of -0.732447 indicates that the error correction term is significant at 73.24%. Because the national income variable is not significant, it can be concluded that the exchange rate and national income share only a long-term relationship, not a short-term equilibrium. This aligns with the view that when discussing national income, we are inherently referring to the future.

Next, we examine the normality of the ECM model, and the results are as follows: The output from the Jarque-Bera normality test is shown in Figure 5. The Jarque-Bera statistic is 0.293, which is below 2, and the JB probability is 0.863384, which exceeds the 0.05 (5%) threshold. This indicates that the residuals of the ECM model are normally distributed.



Gambar 5. Hasil Uji Normalisasi Pada Prototipe ECM

4. Conclusion

The data processing results carried out on the statistical prototype used in this study—which began with model estimation, classical assumption tests, stationarity tests on all research data (both independent and dependent variables), cointegration tests, and the ECM—show that all variables used in this study are valid.

This study found that all independent variables influence the dependent variable, and the relationship among national income, inflation, and interest rates with the exchange rate has remained in equilibrium over the past 36 years, from 1989 to 2024. By applying the ECM to examine short-term equilibrium relationships, it was found that inflation and interest rate variables exhibit an equilibrium relationship with the exchange rate. However, the national income variable does not show a short-term equilibrium relationship. This finding aligns with the theory that economic growth primarily reflects long-term future conditions.

5. Concerning References

Blanchard, Olivier.(2003). Macroeconomics. Third Edition. Prentice Hall

Gujarati, Damodar N.(2009). Econometrics.McGraw-Hill International Edition.

Hismendi, Abubakar Hamzah, Basic Said Musnadi.(2013). Analisis Pengaruh Besaran Tukar, SBI, Inflasi Dan Pertumbuhan GDP Terhadap Pergerakan Indeks Harga Saham Gabungan Di Bursa Efek Indonesia, Jurnal Ilmu Ekonomi Pascasarjana Universitas Syiah Kuala Volume 1, No. 2, Mei 2013 ISSN 2302 0172

Jaya Saputra, Mariani, Setiawan, Adi dan Mahatma, Tundjung, Analisis Kointegrasi Data Runtun Waktu Indeks Harga Konsumen Beberapa Komoditas Barang Kota Di Jawa Tengah, Skipsi Program Studi Matematika, Fakultas Sains dan Matematika, Universitas Kristen Satya Wacana, Jl. Diponegoro 52-62 Salatiga 50711

Krugman, Paul R..(2003). International Economics, Sixth Edition

Muhammad, Malim.(2014). Kointegrasi dan Estimasi ECM Pada Data Time Seres, Jurnal Konvegensi, Vol. 4 No.1.

Noor, Zulki Zulkifli.(2011). Pengaruh Inflasi, Suku Bunga, dan Jumlah Uang Beredar Terhadap Besaran Tukar, Trikonomika, Volume 10, No. 2, Desember 2011, Hal. 139–147 ISSN 1411-514X

Pratiwi, Tara Eka, Santosa, H. Purbayu Budi.(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), Volume I, Nomor1http://ejournals1.undip.ac.id/inde x.php/jme

Roshinta Puspitaningrum, Suhadak, Zahroh Z.A.(2014). Pengaruh Tingkat Inflasi, Tingkat Suku Bunga Sbi, Dan Pendapatan nasional Terhadap Besaran Tukar Rupiah Studi Pada Bank Indonesia Periode Tahun 2003-2012, Jurnal Administrasi Bisnis (JAB)| Vol. 8 No. 1 Februari 2014|

Wibowo, Tri dan Amir, Hidayat.(2005). Faktor-Faktor Yang Mempengaruhi Besaran Tukar Rupiah, Jurnal Kajian Ekonomi dan Keuangan, Departemen Keuangan Vol. 9 No. 4, Desember 2005.

Theo, William dan Juwita, Ratna, Pengaruh Suku Bunga, Inflasi, Dan Pendapatan Nasional Terhadap Besaran Tukar Rupiah Tahun 2008-2012, Manajemen STIE MDP