RUPIAH EXCHANGE RATE DYNAMICS: EVIDENCE FROM TOURISM, MONETARY FACTORS, AND OIL PRICE VOLATILITY

Eva Annisa [1*] , Dedy Yuliawan [1]

[1] Development Economics Study Program, Faculty of Economics and Business., Universitas Lampung

Article Info

Article history:
Received May 11, 2026
Revised June 14, 2026
Accepted June 16, 2026

Keywords:
Exchange Rate, ARDL, Foreign Tourist Arrivals, Money Supply, Foreign Exchange Reserves, Oil Volatility Index

ABSTRACT

This study examines the impact of foreign tourist arrivals (WIS), money supply (JUB), foreign exchange reserves (CADEV), and the Oil Volatility Index (OVX) on the Indonesian Rupiah exchange rate (IDR/USD) from January 2015 to December 2024 using the Autoregressive Distributed Lag (ARDL) approach. The results indicate the existence of a long-run cointegrating relationship among the variables. In the short run, an increase in foreign tourist arrivals tends to strengthen the Rupiah, while increases in money supply and OVX lead to Rupiah depreciation. Meanwhile, foreign exchange reserves play a significant role in stabilizing and strengthening the Rupiah. In the long run, only money supply and foreign exchange reserves have a statistically significant effect on the exchange rate, whereas the effects of foreign tourist arrivals and OVX are temporary. The Error Correction Term (ECT) coefficient of −0.314825 indicates that approximately 31.48% of short-run disequilibrium is corrected each month, implying that the adjustment toward long-run equilibrium takes about three months. The model explains 61.23% of the variation in exchange rate movements. These findings provide important policy implications for Bank Indonesia, Ministry of Tourism of the Republic of Indonesia, and financial market participants in maintaining exchange rate stability.

Corresponding Author:
Eva Annisa | Universitas Lampung
Email: eva.annisa@student.unila.ac.id

INTRODUCTION

The exchange rate is a macroeconomic variable with a strategic role in open economies, reflecting the relative price of domestic currency against foreign currencies and serving as the primary transmission mechanism between external and domestic sectors. In the international economics literature, exchange rates not only function as indicators of a country's competitiveness in international trade but also as essential instruments for maintaining macroeconomic stability. Excessive exchange rate fluctuations increase economic uncertainty, deteriorate the balance of payments, and trigger inflationary pressures through the mechanism of imported inflation (Narayan et al., 2019). Empirical evidence from ASEAN economies further demonstrates that sustained currency depreciation adversely affects investment climate and household welfare, underscoring the urgency of sound exchange rate management (Kocoglu et al., 2023; Hakim & Aji, 2025). Therefore, understanding the determinants of exchange rates is a crucial issue, particularly for developing countries such as Indonesia.

From a classical theoretical perspective, long-run exchange rate movements are explained through the Purchasing Power Parity (PPP) theory advanced by Cassel (1918), which posits that exchange rates adjust to differences in price levels between countries. However, this theory has limitations in explaining short-run exchange rate dynamics, which tend to be highly volatile. Subsequent theoretical developments demonstrate that exchange rates are also influenced by monetary and global financial factors. The monetary approach developed by Frenkel (1976) and Dornbusch (1976) emphasizes that differences in money supply between countries constitute the primary determinant of exchange rates. In a related vein, Frankel (2006) highlights that the choice of exchange rate regime—fixed versus flexible—critically shapes how monetary shocks transmit to currency values, a consideration highly relevant for Indonesia's managed float system. Meanwhile, within the Asset Market Approach and Portfolio Balance Theory (Tobin, 1969; Branson, 1983), exchange rates are viewed as prices of financial assets that are highly responsive to changes in investor expectations and international capital flows.

In the context of a developing country with a managed float exchange rate system like Indonesia, exchange rate dynamics are strongly influenced by interactions between domestic fundamentals and external factors. Data from Bank Indonesia's Statistics of Indonesian Economic and Finance (SEKI, 2024) indicate that during 2015–2024, the Rupiah experienced significant fluctuations, particularly during periods of global pressure such as US monetary policy normalization, the COVID-19 pandemic in 2020, and escalating global geopolitical tensions. The Rupiah exhibited a general depreciation trend, from relative stability around Rp13,000–Rp13,500 in the early period, to severe pressure of Rp16,367 in March 2020, and persistently approaching Rp16,000 per US Dollar in 2022–2024. Using a Vector Autoregression (VAR) framework for the period 2006–2018, Sitorus (2020) empirically demonstrated that exchange rate shocks in Indonesia trigger declining foreign exchange reserves and rising interest rates, both of which feed back into inflationary dynamics, underscoring the systemic interdependence of these monetary variables in the Indonesian context.

Several key factors are postulated to drive these exchange rate dynamics. Foreign tourist arrivals represent a direct source of foreign exchange supply; each visiting tourist exchanges foreign currency for Rupiah, thereby increasing the domestic supply of foreign exchange and potentially appreciating the Rupiah (Santana-Gallego et al., 2016; Alfira & Panorama, 2022). The money supply (M2) is a critical monetary variable; excessive money supply growth creates inflationary pressure leading to exchange rate depreciation, consistent with the Monetary Approach (Dornbusch, 1976; Maghfiroh & Jayadi, 2024). Foreign exchange reserves reflect the capacity of monetary authorities to intervene in the foreign exchange market and stabilize the Rupiah (Aizenman & Lee, 2007; Pratiwik & Prajanti, 2023). Finally, the Oil Volatility Index (OVX), published by the Chicago Board Options Exchange (CBOE), captures forward-looking uncertainty in global oil prices and serves as a proxy for global risk sentiment, triggering capital outflows from emerging markets when elevated (Zhang et al., 2023; Korley & Giouvris, 2022; Atems et al., 2022).

Despite extensive literature on exchange rate determinants, a research gap remains. Most studies analyze monetary factors or external factors in isolation, without integrating the real sector (tourism) into a comprehensive analytical framework. Furthermore, the application of OVX as a global uncertainty indicator in the Indonesian context remains limited. From a regional development perspective, the macroeconomic stability of the Rupiah is intrinsically linked to the performance of the real sector, including regional economic structures and labor mobility (Emalia, 2018; Budiarty et al., 2023). Likewise, fiscal and institutional conditions—including fiscal decentralization and governance quality—shape the broader macroeconomic environment within which exchange rate dynamics operate (Marselina, 2015). This study addresses these gaps by employing the ARDL bounds testing approach to analyze the simultaneous short-run and long-run effects of all four variables on the Rupiah exchange rate over the period 2015–2024, providing both theoretical contributions and policy implications for exchange rate stabilization in Indonesia.

LITERATURE REVIEW

Theoretical Framework

The demand and supply framework for foreign exchange constitutes the fundamental mechanism through which exchange rates are determined. Foreign exchange demand arises from domestic payments abroad (imports, debt service, outward investment), while supply originates from export earnings, foreign investment inflows, remittances, and foreign tourist expenditures (Dornbusch & Fischer, 1980). In this context, foreign tourist arrivals directly shift the foreign exchange supply curve to the right, causing Rupiah appreciation, while declining tourism reverses this effect.

The Monetary Approach to Exchange Rate (MAER), developed by Frenkel (1976) and Dornbusch (1976), posits that exchange rates are essentially a monetary phenomenon. When the money supply expands beyond real output growth, excess liquidity drives domestic inflation, reducing the purchasing power of the domestic currency and causing depreciation. Dornbusch's (1976) overshooting model further demonstrates that exchange rates may over-react in the short run before converging to long-run equilibrium due to price stickiness.

The Portfolio Balance Approach (Tobin, 1969; Branson, 1983) extends monetary theory by incorporating portfolio allocation across domestic and foreign assets. Foreign exchange reserves are positioned as strategic instruments for direct market intervention and as signaling mechanisms that enhance investor confidence, thereby attracting capital inflows and appreciating the exchange rate. Pratiwik & Prajanti (2023) empirically confirmed the negative and significant impact of reserves on the Rupiah exchange rate. Furthermore, Aizenman & Lee (2007) argue that the accumulation of reserves serves a dual precautionary and mercantilist purpose, particularly for emerging economies vulnerable to sudden capital flow reversals, reinforcing the strategic importance of adequate reserve levels in buffering external shocks to the exchange rate.

The Financial Channel Theory (Rey, 2015; Miranda-Agrippino & Rey, 2020) explains that under high global financial integration, emerging market exchange rates are predominantly driven by global financial factors rather than traditional fundamentals. The OVX, as a forward-looking indicator of oil price uncertainty, triggers risk aversion and flight-to-safety behavior among global investors when elevated, leading to capital outflows from emerging markets and Rupiah depreciation. Korley & Giouvris (2022) and Atems et al. (2022) confirmed that OVX increases consistently cause local currency depreciation across their sample countries. For Indonesia, as a net oil importer with significant foreign portfolio investment exposure, elevated OVX simultaneously worsens the current account through higher energy import costs and weakens the capital account through risk-driven outflows, amplifying the depreciating pressure on the Rupiah (Zhang et al., 2023; Narayan et al., 2019).

Prior Empirical Studies

Table 1. Summary of Relevant Empirical Studies

No	Author/Title	Method/Variables	Key Findings
1	Zhang et al. (2023) – Volatility Predictability in Crude Oil Futures	OVX vs. GARCH vs. Stochastic Volatility; WTI data 2010–2022	OVX outperforms GARCH and SV in short-run oil volatility prediction due to its forward-looking nature
2	Usman Bashir (2025) – Oil Price Volatility and Pakistan's Economic Growth	ARDL; OVX, Exchange Rate, Interest Rate, GDP Growth	Oil price volatility negatively affects economic performance and causes exchange rate depreciation in the long run
3	Korley & Giouvris (2022) – OVX and Exchange Rate in Sub-Saharan Africa	Quantile Regression; Markov Switching; OVX, exchange rates of 5 countries	OVX increases consistently depreciate local currencies; effects stronger in bearish market conditions
4	Alfira & Panorama (2022) – Tourist Arrivals and JUB on Exchange Rate	Multiple Linear Regression; Tourist Arrivals, M2, Rupiah/USD	Both variables jointly significant; tourist arrivals positively strengthen Rupiah; M2 increases depreciate Rupiah
5	Astuty (2023) – Determinants of Rupiah Exchange Rate	OLS; Exports, Inflation, M2, Foreign Exchange Reserves	Reserves significantly strengthen Rupiah; M2 and inflation increase depreciation
6	Pratiwik & Prajanti (2023) – Rupiah Exchange Rate Determinants	ARDL and VAR; Inflation, M2, Open Market Operations, Reserves	Reserves negatively significant (appreciation); exchange rate shock affects bank credit for 15 months
7	Syamad & Handoyo (2023) – Money Supply and Dornbusch Overshooting	ARDL; M2, Inflation, Interest Rate, GDP	Short-run M2 coefficient (2.46%) > long-run (2.38%), confirming Dornbusch overshooting in Indonesia
8	Fadilah (2021) – Impact of Declining Tourist Arrivals	SVAR, IRF; Tourist Arrivals, Reserves, Exchange Rate	Tourist arrival shocks affect reserves and exchange rate temporarily; effects dissipate within 15–20 months

Source: Compiled by author (2025)

RESEARCH METHODOLOGY

Data and Sources

This study uses secondary data with monthly frequency covering the period January 2015 to December 2024, yielding 120 observations. This period encompasses major events including US monetary policy normalization (2018), the COVID-19 pandemic (2020), and the Russia-Ukraine geopolitical conflict (2022).

Table 2. Variables, Indicators, and Data Sources

No	Variable	Symbol	Measurement	Unit	Source
1	Exchange Rate	KURS	Rupiah against US Dollar (Rp/USD), middle rate	Rupiah/USD	Bank Indonesia
2	Foreign Tourist Arrivals	LNWIS	Monthly international tourist arrivals (log-transformed)	Persons (Ln)	BPS
3	Money Supply	LNJUB	M2 – broad money (log-transformed)	Billion Rupiah (Ln)	Bank Indonesia
4	Foreign Exchange Reserves	CADEV	Total foreign exchange reserves of Indonesia	Million USD	Bank Indonesia
5	Oil Volatility Index	OVX	CBOE Crude Oil Volatility Index (30-day forward-looking)	Index	CBOE / Investing.com

Source: Compiled by author (2025)

ARDL Model Specification

This study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran, Shin, & Smith (2001). ARDL is chosen for several key advantages: (1) it accommodates mixed orders of integration I(0) and I(1) without requiring all variables to be integrated of the same order; (2) it simultaneously estimates short-run dynamics and long-run multipliers; (3) it performs well with relatively small samples (T = 120 monthly observations); and (4) it provides the bounds test for cointegration without requiring strict pre-testing of unit roots. The long-run equilibrium relationship is specified as:

$$KURS_t = \theta_0 + \theta_1 LNWIS_t + \theta_2 LNJUB_t + \theta_3 CADEV_t + \theta_4 OVX_t + \varepsilon_t \quad ...(1)$$

The short-run Error Correction Model (ECM) representation is:

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ISSN: 2716-0696, DOI: 10.61992/jiem.v8i2. 378

$$\Delta KURS_t = \alpha_0 + \Sigma\gamma_i \cdot \Delta KURS_{t-i} + \Sigma\delta_{1j} \cdot \Delta LNWIS_{t-j} + \Sigma\delta_{2k} \cdot \Delta LNJUB_{t-k} + \Sigma\delta_{3l} \cdot \Delta CADEV_{t-l} + \Sigma\delta_{4m} \cdot \Delta OVX_{t-m} + \lambda \cdot ECT_{t-1} + \varepsilon_t \quad ...(2)$$

where λ is the coefficient of the Error Correction Term (ECT), which must be negative and statistically significant to confirm cointegration and the existence of a valid error-correction mechanism.

Estimation Procedure

The analytical steps are: (a) Unit root testing using the Augmented Dickey-Fuller (ADF) test to confirm no variable is I(2); (b) Optimal lag length selection based on Akaike Information Criterion (AIC); (c) ARDL Bounds Test (Pesaran et al., 2001) to test for cointegration — H_0 is rejected if F-statistic exceeds the upper bound I(1) critical value; (d) Estimation of long-run and short-run coefficients from the ARDL-ECM; (e) Hypothesis testing via F-test (simultaneous significance) and t-tests (individual significance); and (f) Model stability diagnostics including CUSUM, CUSUM of Squares, normality test, autocorrelation (Breusch-Godfrey), and heteroscedasticity tests.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 3. Descriptive Statistics of Research Variables

	KURS	WISMAN	JUB	CADEV	OVX
Mean	14.3595	868.8809	6470005	128208.4	40.59608
Median	14.3045	966.115	6125337	129799	38.085
Maximum	16.421	1547.231	9210816	155719	170.55
Minimum	12.625	105.79	4174826	100240	21.32
Std. Dev.	0.895674	434.373	1546960	12981.21	17.14107
Skewness	0.40443	-0.61427	0.246995	-0.28113	4.222705
Kurtosis	2.449759	2.139606	1.713082	2.302372	30.16772
Jarque-Bera	4.785093	11.24782	9.500914	4.014053	4047.049
Probability	0.091397	0.003611	0.008648	0.134388	0

Source: Authors' calculation using EViews 13

Rp12,625 and a maximum of Rp16,421, indicating a persistent depreciation trend over the decade. The Jarque-Bera test (prob. 0.091 > 0.05) confirms normal distribution for KURS, satisfying parametric analysis assumptions. The WISMAN variable averaged 868.88, equivalent to approximately 869,000 arrivals per month. The minimum value of 105.79 (~106,000 arrivals) occurred during the COVID-19 travel restrictions of 2020, reflecting the severe impact on the tourism sector. The maximum value was 1,547.23 (~1.55 million arrivals). Non-normality (prob. 0.0036) is evident, which is expected given the extreme structural break caused by the pandemic.

The JUB (M2 money supply) showed consistent expansion from approximately Rp4.17 quadrillion at the start of the period to Rp9.25 quadrillion by December 2024, with particularly aggressive expansion during the COVID-19 period (2020–2021) due to Bank Indonesia's accommodative monetary policy. The CADEV variable averaged 128,208.4, with a minimum

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ISSN: 2716-0696, DOI: 10.61992/jiem.v8i2. 378

of 100,240 and a maximum of 155,719. The Jarque-Bera test (prob. 0.134 > 0.05) confirms normality, allowing parametric analysis. The relatively stable range indicates that despite external shocks, Indonesia's current account balance remained structurally consistent. The OVX exhibited extreme right skewness (4.22) and excess kurtosis (30.17), driven by the unprecedented spike to 170.55 in March 2020 during the simultaneous COVID-19 pandemic and Saudi Arabia-Russia oil price war.

Unit Root Test Results

Table 4. ADF Unit Root Test Results

Variable	**ADF – Level (Prob.)**	**ADF – 1st Difference (Prob.)**	**Integration Order**
KURS	0.1854	0.0000	I(1)
LNWIS	0.8732	0.0000	I(1)
JUB	0.2582	0.0000	I(1)
CADEV	0.1942	0.0000	I(1)
OVX	0.0000	–	I(0)

Note: *** denotes significance at 1%. Source: EViews 13 output, processed by author

The ADF test confirms that KURS, LNWIS, JUB, and CADEV are non-stationary at level but stationary after first differencing, hence I(1). The OVX is stationary at level (I(0)), providing the necessary mix of I(0) and I(1) integration orders that validates the ARDL approach. No variable is integrated at order I(2), satisfying the fundamental ARDL assumption.

Optimal Lag Length and Bounds Test

Based on the Akaike Information Criterion (AIC), the optimal ARDL model specification selected is ARDL(1,5,1,4,1). The bounds test results are reported in Table 5.

Table 5. ARDL Bounds Test for Cointegration

Test Statistic	**Value**	**Significance Level**	**Lower Bound I(0)**	**Upper Bound I(1)**	**Decision**
F-statistic	3.9512	5%	2.56	3.49	Reject H_0 – Cointegration Confirmed
k (regressors)	4	10%	2.20	3.09	

Source: EViews 13 output, processed by author

The F-statistic of 3.9512 exceeds the upper bound critical value of 3.49 at the 5% significance level, leading to rejection of the null hypothesis of no cointegration. This confirms that a statistically significant long-run equilibrium relationship exists among KURS, LNWIS, JUB, CADEV, and OVX during the 2015–2024 period. The existence of cointegration validates the subsequent estimation of the ARDL-ECM for both short-run dynamics and long-run multipliers.

Short-Run ARDL-ECM Estimation Results

Table 6. Short-Run ARDL-ECM Coefficient Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Significance
D(LNWIS)	−0.390615	0.153285	−2.5483	0.0124	** (5%)
D(LNWIS(−1))	−0.218331	0.156314	−1.3968	0.1656	Not significant
D(LNWIS(−2))	0.120298	0.149306	0.8057	0.4224	Not significant
D(LNWIS(−3))	−0.153772	0.143583	−1.0710	0.2868	Not significant
D(LNWIS(−4))	−0.328893	0.140870	−2.3347	0.0216	** (5%)
D(JUB)	1.35E−06	2.42E−07	5.5859	0.0000	*** (1%)
D(CADEV)	−3.89E−05	7.97E−06	−4.8808	0.0000	*** (1%)
D(CADEV(−1))	−1.20E−05	7.84E−06	−1.5264	0.1301	Not significant
D(CADEV(−2))	−6.42E−06	7.95E−06	−0.8073	0.4215	Not significant
D(CADEV(−3))	−2.40E−05	7.83E−06	−3.0709	0.0028	*** (1%)
D(OVX)	0.007834	0.001574	4.9775	0.0000	*** (1%)
CointEq(−1) / ECT	−0.394545	0.067525	−5.8430	0.0000	*** (1%)

Note: *** $p<0.01$; ** $p<0.05$; * $p<0.10$. Dependent variable: D(KURS). $R^2 = 0.6697$.
Source: EViews 13

The short-run results reveal significant dynamic effects for all four independent variables. Foreign tourist arrivals (D(LNWIS)) exhibit a negative and significant contemporaneous effect (coeff. −0.391, p = 0.012), consistent with the Balance of Payments mechanism: increased tourist arrivals augment foreign exchange supply, appreciating the Rupiah. A lagged effect persists at four months prior (D(LNWIS(−4)) coeff. −0.329, p = 0.022), suggesting that the foreign exchange market absorbs tourism-generated supply with some delay. This finding aligns with Santana-Gallego et al. (2016), who demonstrated that greater international tourist flows generate net positive foreign exchange earnings that strengthen host country currencies, a mechanism particularly relevant for tourism-dependent developing economies such as Indonesia.

Money supply expansion (D(JUB)) significantly depreciates the Rupiah in the current period (coeff. 1.35×10^{-6}, $p < 0.001$), consistent with the Monetary Approach. Notably, the short-run coefficient exceeds the long-run coefficient (7.64×10^{-7}), providing empirical evidence of the Dornbusch (1976) overshooting phenomenon in Indonesia, corroborating Syamad & Handoyo (2023). These results are further consistent with Maghfiroh & Jayadi (2024), whose ARDL panel study across ASEAN economies found that broad money expansion is a robust and persistent driver of exchange rate depreciation, with the magnitude of the effect particularly pronounced in economies with underdeveloped financial markets.

Foreign exchange reserves (D(CADEV)) exhibit a strong contemporaneous negative effect (coeff. -3.89×10^{-5}, $p < 0.001$) and a significant lagged effect at three months (D(CADEV(−3))

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ISSN: 2716-0696, DOI: 10.61992/jiem.v8i2. 378

coeff. -2.40×10^{-5}, $p = 0.003$), confirming the effective stabilizing role of reserves through both direct intervention and portfolio signaling channels.
The OVX (D(OVX)) positively and significantly depreciates the Rupiah (coeff. 0.00783, $p < 0.001$): each one-point increase in OVX raises the exchange rate by approximately Rp0.0078, reflecting the risk-off financial channel as global oil market uncertainty triggers capital outflows from Indonesia. This result is consistent with Usman Bashir (2025), who found that oil price volatility generates significant exchange rate pressure in oil-importing developing economies by simultaneously deteriorating the trade balance and inducing portfolio rebalancing toward safe-haven assets.

The Error Correction Term (ECT = −0.395, $p < 0.001$) is negative and highly significant, confirming the cointegration relationship and a robust error-correction mechanism. The adjustment speed of 39.45% per month implies that approximately 2–3 months are required for the exchange rate to return to long-run equilibrium following an external shock. This moderate-speed adjustment is consistent with the broader ARDL literature applied to Indonesian macroeconomic variables, where short-run disequilibria in key indicators such as poverty, unemployment, and output tend to correct gradually over similar horizons, reflecting the structural inertia of the Indonesian economy (Pratama & Yuliawan, 2026; Umara et al., 2024).

Long-Run Coefficient Estimates

Table 7. Long-Run ARDL Level Coefficient Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Significance
LNWIS	0.173492	0.102026	1.7005	0.0921	Not significant (5%)
JUB (LNJUB)	7.64E−07	9.43E−08	8.0979	0.0000	*** (1%)
CADEV	−3.14E−05	1.45E−05	−2.1713	0.0322	** (5%)
OVX	−0.002611	0.006247	−0.4179	0.6769	Not significant
Constant (C)	12.35115	1.955984	6.3145	0.0000	*** (1%)

Note: *** p<0.01; ** p<0.05. Source: EViews 13 output, processed by author

The estimated long-run equilibrium equation is:

$$EC = KURS - (0.1735\cdot LNWIS + 7.64\times10^{-7}\cdot JUB - 3.14\times10^{-5}\cdot CADEV - 0.0026\cdot OVX + 12.3512)$$

In the long run, money supply (JUB) remains the dominant determinant of the Rupiah exchange rate (coeff. 7.64×10^{-7}, $p < 0.001$). This finding is consistent with the Monetary Approach to Exchange Rate (Frenkel, 1976; Dornbusch, 1976) and corroborated by Maghfiroh & Jayadi (2024). Foreign exchange reserves (CADEV) maintain their negative and significant long-run effect (coeff. -3.14×10^{-5}, $p = 0.032$), confirming the persistent stabilizing role of reserves in line with the Portfolio Balance Approach (Branson, 1983). The long-run effectiveness of reserves as an exchange rate anchor is further supported by Aizenman & Lee (2007), who demonstrate that accumulated reserves reduce exchange rate volatility and enhance monetary

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policy credibility in emerging markets. However, foreign tourist arrivals (LNWIS) and OVX lose statistical significance in the long run (prob. 0.092 and 0.677, respectively), indicating that their effects on exchange rate are transitory in nature. The insignificance of LNWIS in the long run may be attributed to import leakages in the tourism supply chain, which erode the net foreign exchange effect of tourism over extended periods (Fadilah, 2021; Kuncoro, 2016). Similarly, the transitory nature of OVX effects suggests that domestic policy buffers and market adjustment processes effectively neutralize short-term energy price uncertainty shocks over the medium to long run, a pattern consistent with the findings of Atems et al. (2022) for oil-importing economies in Sub-Saharan Africa.

Model Diagnostics

Table 8. Summary of Model Diagnostic Tests

Diagnostic Test	Statistic	Prob.	Decision
Normality (Jarque-Bera)	1.8430	0.3979	Residuals normally distributed
Serial Correlation (Breusch-Godfrey LM)	0.2105	0.8107	No autocorrelation
Heteroscedasticity (Breusch-Pagan-Godfrey)	0.9876	0.4813	No heteroscedasticity
Structural Stability (CUSUM)	–	–	Within 5% critical bands
Structural Stability (CUSUM of Squares)	–	–	Within 5% critical bands

Source: EViews 13 output, processed by author

All diagnostic tests confirm the reliability of the estimated model. Residuals are normally distributed, free from serial correlation and heteroscedasticity, and the CUSUM and CUSUM of Squares tests confirm parameter stability throughout the 2015–2024 study period, indicating the model is well-specified and structurally stable.

Simultaneous Significance Test (F-Test)

With $R^2 = 0.6697$ and $k = 11$ independent variables in the ECM, the calculated F-statistic is 17.94, which substantially exceeds the critical F-value of approximately 1.90 ($df_1 = 11$, $df_2 = 103$, $\alpha = 5\%$). This confirms that all independent variables jointly and significantly explain variations in the Rupiah exchange rate, validating the overall model specification and confirming hypothesis H_5.

CONCLUSIONS

This study employed the ARDL bounds testing approach to analyze the short-run and long-run determinants of the Indonesian Rupiah exchange rate (IDR/USD) over the period January 2015 – December 2024. Five principal conclusions are drawn. First, foreign tourist arrivals (LNWIS) negatively and significantly appreciate the Rupiah in the short run (at the current period and four months prior), consistent with the Balance of Payments mechanism. However, LNWIS is not statistically significant in the long run at the 5% level, likely due to import leakages in the tourism supply chain that erode the net foreign exchange benefit over time. Second, money supply (JUB) is the most robust and persistent determinant, significantly depreciating the Rupiah in both the short run and long run. The larger short-run coefficient relative to the long-run coefficient provides direct empirical evidence of the Dornbusch (1976) overshooting phenomenon in Indonesia, where exchange rates over-react to monetary shocks before gradually converging to equilibrium.

Third, foreign exchange reserves (CADEV) effectively stabilize the Rupiah exchange rate across all horizons—at the current period, three months prior, and in the long run—confirming the dual stabilization channels of direct market intervention and investor confidence signaling, as predicted by the Portfolio Balance Approach. This finding further corroborates the impulse response analysis of Sitorus (2020), who showed that exchange rate shocks in Indonesia lead to a measurable decline in foreign exchange reserves, highlighting the critical role of reserve adequacy as both a first-line shock absorber and a credibility anchor for monetary policy.

Fourth, the Oil Volatility Index (OVX) significantly depreciates the Rupiah in the short run through the risk-off financial channel, where heightened global oil market uncertainty triggers capital outflows from Indonesia. However, OVX effects are purely transitory and dissipate in the long run, suggesting that Bank Indonesia's policy responses and market self-correction mechanisms are effective in absorbing external energy market shocks. Fifth, all four independent variables jointly and significantly explain 66.97% of the variation in Rupiah exchange rate changes. The ECT coefficient of −0.395 indicates a monthly adjustment speed of 39.45%, implying that approximately 2–3 monts are required for the Rupiah to return to long-run equilibrium following an external shock.

These findings carry important policy implications. Bank Indonesia should monitor OVX as an early warning indicator for short-run exchange rate pressure and exercise caution in money supply expansion given its large and persistent depreciating effects. This is consistent with the view of Miranda-Agrippino & Rey (2020), who emphasize that central banks in emerging economies must account for global financial cycle drivers — including commodity market volatility — when calibrating domestic monetary and exchange rate policies. Maintaining adequate foreign exchange reserves remains critical as an exchange rate buffer. The Ministry of Tourism should intensify foreign tourist promotion while simultaneously implementing policies to reduce import leakages in the tourism value chain. Importantly, Rupiah stability has broad implications beyond monetary policy: currency depreciation increases the cost of imported inputs and erodes real wages, which in turn exacerbates poverty and widens income disparities — effects that are particularly pronounced in regions dependent on agricultural commodities and underdeveloped labor markets (Arivina & Emalia, 2018; Anwar et al., 2025). Future research is encouraged to employ the Nonlinear ARDL (NARDL) framework to capture potential asymmetric effects, incorporate additional external variables such as the US Federal Funds Rate or the Global Economic Policy Uncertainty (EPU) index, and extend the analysis to a comparative ASEAN panel setting.

Acknowledgements

The author expresses sincere gratitude to the supervisor, Dr. Dedy Yuliawan, S.E., M.Si., for guidance and mentorship throughout this research. The author also acknowledges Bank Indonesia, Badan Pusat Statistik, and the Chicago Board Options Exchange (CBOE) for providing the data used in this study.

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