Monetary Policy Analysis in Indonesia: The Dynamic Relationship Between the BI Rate, Inflation, and the Rupiah Exchange Rate

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Abstract. Monetary policy is crucial for sustaining Indonesia's macroeconomic stability, especially through the benchmark interest rate (BI Rate), which serves as the primary tool of Bank Indonesia. This research revisits the transmission of monetary policy within a contemporary framework marked by post-pandemic recovery, global monetary tightening, and domestic policy shifts under the new administration in 2024. Utilizing monthly time series data from January 2010 to March 2025, this study applies the Vector Autoregression (VAR) and Vector Error Correction Model (VECM) methodologies to examine the dynamic relationships among inflation, the exchange rate (USD/IDR), and the BI Rate. The results affirm the presence of long-term relationships among the three variables, aligning with earlier research, while also revealing significant short-term dynamics that indicate an increased sensitivity of the exchange rate and inflation to interest rate changes during times of global uncertainty. By extending the analysis period to 2025 and considering the context of post-pandemic recovery and policy transitions, this study offers updated empirical insights into the changing effectiveness of Indonesia's monetary policy transmission mechanism. The findings provide important implications for policymakers in developing interest rate strategies aimed at achieving a balance between inflation control, exchange rate stability, and economic recovery.

Keyword: BI rate, Exchange Rate, Inflation, VAR, VECM

1. Introduction

Monetary policy serves as a fundamental component in upholding a nation's macroeconomic stability. In Indonesia, Bank Indonesia (BI) is tasked with maintaining price and exchange rate stability through essential instruments such as the benchmark interest rate (BI Rate). Adjustments to the BI Rate affect consumption, investment, exchange rates, and public expectations regarding inflation. Typically, under normal circumstances, the transmission of monetary policy via interest rates is anticipated to alleviate inflationary pressures and promote stable economic growth [6].

As the monetary authority, Bank Indonesia also fulfills a dual mandate that is executed through both conventional and sharia monetary frameworks [5]. The primary aim is to ensure the stability of the Rupiah, which includes both price stability (inflation) and exchange rate stability. As reported by the Indonesia Business Post, BI employs various policy tools to accomplish this objective, with the BI 7-Day Reverse Repo Rate (BI7DRR) acting as the main benchmark instrument.

Nevertheless, the effectiveness of monetary policy transmission has not consistently been seamless, especially within the context of the Indonesian economy, which has encountered considerable challenges since the political transition in 2024. The new administration led by President Prabowo has introduced a different fiscal and development approach compared to the previous government, resulting

in market uncertainty and prompting capital outflows. As a result, the rupiah experienced a significant decline, reaching its lowest point since the 1998 Asian financial crisis [9]. Additionally, global geopolitical tensions and the interest rate hikes by the U.S. Federal Reserve have further intensified Indonesia's external vulnerabilities.

Domestically, the economy has shown indications of weakening. As reported in [14], Indonesia's economic growth for the first quarter of 2025 was only 4.87%, representing the slowest rate since the recovery following the pandemic. The primary factors contributing to this decline were reductions in household consumption, exports, and investment. In response to these challenges, Bank Indonesia decided to keep its policy rate at 5.75% to ensure stability in the exchange rate, despite the potential risks to growth [3]. Subsequently, in May 2025, BI lowered the rate to 5.50% in an effort to invigorate the economy [13]. This action was also influenced by worries regarding exchange rate pressures in the context of global uncertainty. The fluctuations in exchange rates are indicative of market sentiment towards both domestic and international policy trends, establishing them as a vital mechanism for the transmission of monetary policy that requires further analysis [6].

The Indonesian Rupiah has demonstrated a long-term trend of depreciation against the U.S. Dollar from 2010 to 2025, a trend that intensified post-2020 due to increasing global uncertainty and tightening international financial conditions. These variations underscore the effects of external shocks—such as the normalization of global monetary policy, geopolitical risks, and erratic capital flows—on the stability of the domestic macroeconomy. A depreciated exchange rate leads to imported inflation and greater price instability, prompting a significant inquiry: how effectively can adjustments in the BI Rate alleviate inflationary pressures without hindering economic growth?

Previous research has yielded inconsistent results. [6] indicates that the inflation expectation channel is the most effective mechanism for monetary policy transmission in Indonesia. In contrast, [12] observes that alterations in the BI-7DRR significantly influence consumer prices (CPI) via the consumption and investment credit channels. [16], employing a Structural VAR methodology, deduce that the impact of monetary policy on economic growth is generally more pronounced than its effect on inflation. These results suggest that the transmission of monetary policy is intricate and context-dependent, necessitating an analytical approach capable of capturing the dynamic interplay between variables both simultaneously and over time.

Numerous studies have utilized VAR or VECM methodologies to analyze both short-term and long-term dynamics among inflation, the exchange rate, and the BI Rate. Some have also factored in money supply as a mediating or supplementary variable. The time frames examined in these studies frequently coincide with more recent analyses—such as 2010–2023 or 2016–2024—commonly investigated in local research. Nevertheless, the majority of these studies have not accounted for the post-pandemic period or the recent policy shifts under the new administration.

Consequently, this research utilizes the Vector Autoregression (VAR) or Vector Error Correction Model (VECM) framework to examine the dynamic relationships between inflation, the exchange rate, and the BI Rate concurrently. The selection of the model is contingent upon the outcomes of stationarity and cointegration assessments. By extending the observation period to 2025, this research seeks to capture the changing transmission mechanism of monetary policy in the context of post-pandemic recovery and increased global uncertainty. Utilizing this framework, the research evaluates the reactions of essential macroeconomic variables to interest rate shocks through the Impulse Response Function (IRF) and investigates Granger causality among the variables. This methodology has been extensively employed in monetary policy studies, including [7], to assess the transmission mechanism and its effects on Indonesia's economic growth.

2. Research Method

This research utilizes a quantitative methodology with both descriptive and explanatory aims. The primary objective is to examine the dynamic interactions among essential macroeconomic variables that significantly influence the transmission of monetary policy in Indonesia, specifically the benchmark interest rate (BI Rate), inflation, and the exchange rate of the Rupiah against the U.S. Dollar (USD/IDR).

The study employs a time series analytical framework utilizing the Vector Autoregression (VAR) or Vector Error Correction Model (VECM), complemented by Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analyses. These models are adept at capturing both short-term and long-term dynamics among interconnected macroeconomic variables, rendering them particularly effective for investigating the transmission mechanism of monetary policy, which functions through lagged and feedback effects among interest rates, prices, and exchange rates.

The VAR method is implemented when all variables are stationary or have been rendered stationary through differencing, with no signs of cointegration among them. In contrast, if the variables possess unit roots and demonstrate a cointegration relationship, the VECM method is employed, as it can effectively model both short-run adjustments and long-run equilibrium relationships among the variables. The choice between VAR and VECM is determined by the outcomes of stationarity and cointegration tests, especially the Johansen cointegration test, performed in the preliminary phase of the analysis [15].

The data utilized in this research comprises monthly secondary time series that depict Indonesia's macroeconomic conditions throughout the observation period from January 2010 to March 2025. The variables considered include the BI Rate (policy interest rate), inflation rate (Consumer Price Index), and the exchange rate (USD/IDR). The data were sourced from official and credible entities, including Bank Indonesia's monetary statistics, the Central Statistics Agency (BPS), and historical market data from Investing.com. All series were standardized into a uniform monthly format for the purpose of analysis.

The choice of these three variables is based on both theoretical and empirical grounds. As per the interest rate transmission channel theory, alterations in the policy rate affect inflation expectations and the exchange rate via financial and expectations channels, which are fundamental mechanisms of monetary policy transmission in small open economies like Indonesia. Consequently, this study emphasizes these three primary variables as they represent the most direct and impactful elements of the monetary policy framework. Although other variables such as money supply, output gap, or international commodity prices may also have supportive roles, they are excluded from this model to ensure focus and simplicity, in line with previous empirical studies on Indonesia's monetary transmission mechanisms (e.g., [6], [12], [16]).

In summary, the robustness of this methodological design is attributed to its systematic analytical approach, the extensive observation period (2010–2025), and its emphasis on capturing the changing dynamics of monetary policy transmission during the post-pandemic and policy transition phase.

3. Result and Discussion

The following is a descriptive account of inflation rates, exchange rates, and interest rates for the period from January 2010 to March 2025

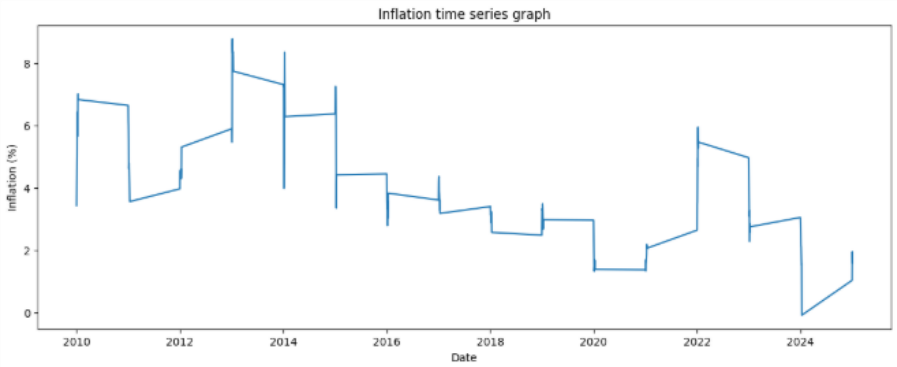

Figure 1. Inflation time series graph.

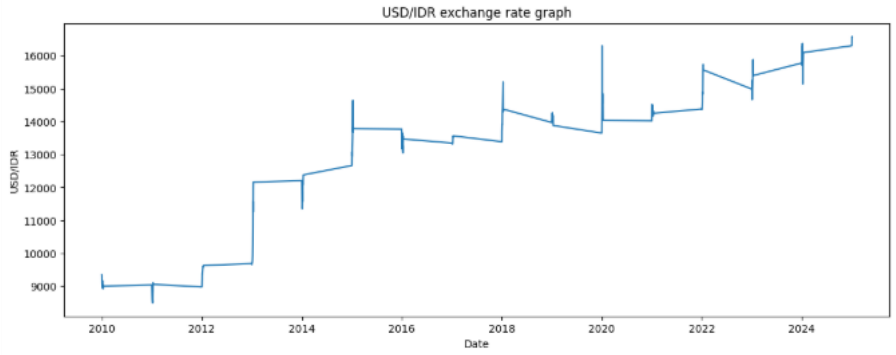

Figure 2. Exchange rates time series graph.

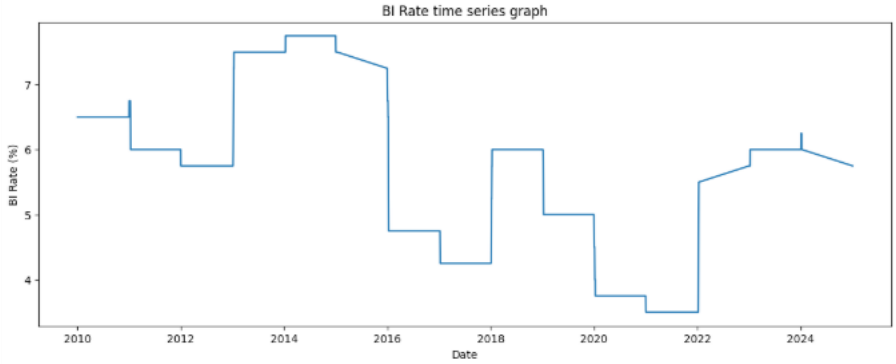

Figure 3. BI Rate time series graph.

Figure 1 depicts the significant fluctuations in Indonesia's inflation rate from 2010 to 2024. The inflation rate reached a peak of over 8% during the years 2013–2014, before settling within Bank Indonesia's target range of 2–4% from 2017 to 2019. Subsequently, it dropped to approximately 1% during the COVID-19 pandemic in 2020, a reflection of diminished domestic demand, and then increased again in 2022 due to global inflationary pressures, before moderating in 2023–2024.

Figure 2 illustrates a consistent depreciation of the Rupiah against the U.S. Dollar, moving from around IDR 9,000–10,000 per USD in 2010 to over IDR 16,000 in 2024. This trend has been largely driven by capital flow reversals, increases in global interest rates, and shocks in commodity prices. In contrast, the BI Rate exhibits a responsive policy approach—remaining elevated (6–7.5%) from 2010 to 2015 to combat inflation and stabilize the Rupiah, gradually decreasing during 2016–2019 to foster growth, sharply reduced to 3.5% during the pandemic years of 2020–2021, and then raised to approximately 6% in 2022–2023 in reaction to escalating global inflationary pressures, illustrating Bank Indonesia's adaptive monetary stance amid evolving global conditions.

3.1. Data Stationarity Test

The purpose of the data stationarity test is to verify that all variables exhibit stationarity, at a minimum, after the first level of differencing. This assessment was performed utilizing the Augmented Dickey-Fuller (ADF Test) method for each variable, specifically inflation, exchange rate (USD/IDR), and the BI Rate.

Table 1. Data stationarity test result.

	ADF	P-value
Inflation	-3.0947	0.1185
Exchange Rate (USD/IDR)	-1.7829	0.6670

BI Rate	-2.3620	0.4249

According to the ADF test results presented in Table 1, the p-value for each of the three variables (inflation, exchange rate (USD/IDR), and BI Rate) exceed the 0.05 significance threshold. This suggests that all variables are non-stationary in their level form and possess unit root. Consequently, the first differencing method is utilized to attain stationary.

Table 2. Data stationarity test result after differencing.

	ADF	P-value
Inflation	-4.859	0.01
Exchange Rate (USD/IDR)	-5.8169	0.01
BI Rate	-3.9209	0.0145

Following the initial differencing, the results of the ADF Test indicate that all variables achieve stationary, as evidenced by p-values falling below 0.05. Consequently, the data meet the stationarity criterion and are suitable for subsequent analysis. The next phase entails identifying the optimal lag length for the VAR/VECM model.

3.2. Determining The Optimal Lag Length

The lag length was determined by looking at the values in the Akaike Information Criterion (AIC). The lag length included was 1 to 10. This lag length was considered sufficient to describe the data from January 2010 to March 2025. The optimal lag is shown in Table 3, as follows:

Table 3. Optimal lag length.

	AIC
Lag 1	6.663160
Lag 2	6.566757
Lag 3	6.568154

From Table 3, it is known that the optimal lag length is at lag 2. Lag 2 is selected as the optimal lag because based on the results, the smallest value is at lag 2. Then, because the optimal lag length has been found, further testing can be carried out, namely the cointegration test.

3.3. Johansen Cointegration Test

To investigate the long-term relationship between inflation, the BI Rate, and the exchange rate (USD/IDR), the Johansen cointegration test was utilized, employing the Trace Statistic method. This test also assesses whether the suitable analytical model should be the VAR or the VECM. The test was performed under the assumption of a constant in the model and made use of the optimal lag length derived from the previous lag selection process.

Table 4. Johansen cointegration test result (trace test).

Null Hypothesis (r)	Trace Statistic	10%	5%	1%
r ≤ 2	5.7	7.52	9.24	12.97
r ≤ 1	17.33	17.85	19.96	24.6
r = 0	36.85	32	34.91	41.07

From the above output, it can be seen that for r = 0, the trace statistic value (36.85) exceeds the critical value at a significance level of 5% and 1%, so it can be concluded that there is at least one cointegration relationship between the variables of Inflation, BI Rate, and USD/IDR Exchange Rate. This finding also shows that the VECM (Vector Error Correction Model) is more appropriate than the VAR model because there is at least one cointegration relationship between the variables of inflation, BI Rate, and exchange rate (USD/IDR), so that the model is able to capture the dynamics of short-term relationships while maintaining information on long-term relationships between cointegrated variables.

Economically, this reflects Indonesia's monetary policy framework, which aims to maintain price stability and exchange rate sustainability. In the long term, when inflation or the exchange rate deviates from equilibrium, BI interest rate adjustments are made to restore stability. This supports the theory of monetary transmission through the interest rate channel, whereby policy interest rates affect aggregate demand and ultimately inflation and exchange rates. These results are in line with the findings of Ayuen, et al., who also observed the interaction between policy interest rates, inflation, and exchange rates in the stock market. This shows that despite short-term fluctuations, Bank Indonesia's long-term policy direction remains consistent with its inflation targeting framework [18].

3.4. Granger Causality Test

To understand the direction of causal relationships between the macroeconomic variables analyzed, a Granger causality test was conducted. This test aims to determine whether a variable can be used to predict other variables based on past information. In the context of this study, the Granger causality test was applied to see whether there was a cause-and-effect relationship between inflation, the BI Rate, and the exchange rate (USD/IDR) in the short term.

Table 5. Granger causality test result.

Null Hypothesis (H_0)	F Statistic	Prob.
Inflation does not Granger Cause BI Rate	4.6448	0.00139
BI Rate does not Granger Cause Inflation	0.5949	0.6668

Based on the above test, the results show that Granger-cause Inflation causes BI Rate with a significance value of 0.00139, which means that statistically, H_0 is rejected so that past inflation values have a significant effect in predicting BI Rate. Conversely, the BI Rate is not proven to Granger-cause Inflation, because the p-value is 0.6668, which is far above the 5% significance level, so H_0 is accepted. This indicates that interest rate policy (BI Rate) does not directly cause changes in inflation in the short term, but rather, changes in inflation are a reference for BI Rate policy.

Table 6. Granger causality test result.

Null Hypothesis (H_0)	F Statistic	Prob.

Exchange Rate (USD/IDR) does not Granger Cause BI Rate	2.0605	0.08815
BI Rate does not Granger Cause Exchange Rate (USD/IDR)	1.1286	0.3448

Furthermore, the relationship between the BI Rate and the exchange rate shows the same result. The exchange rate (USD/IDR) does not significantly Granger-cause the BI Rate with a p-value of 0.08815, so H_0 is accepted, indicating a weak indication that exchange rate movements may be a consideration in interest rate policy. Meanwhile, the BI Rate also does not Granger-cause the exchange rate, as seen from the insignificant p-value of 0.3448, so H_0 is accepted. Thus, there is no causal relationship between the BI Rate and USD/IDR.

Table 7. Granger causality test result.

Null Hypothesis (H_0)	F Statistic	Prob.
Exchange Rate (USD/IDR) does not Granger Cause Inflation	2.5014	0.04432
Inflation does not Granger Cause Exchange Rate (USD/IDR)	1.2299	0.3000

Regarding the relationship between inflation and exchange rates, it was found that exchange rates Granger-cause inflation with a significance level of 0.04432, indicating that exchange rate fluctuations can affect inflation rates. However, the opposite direction is not significantly proven, where inflation does not Granger-cause the exchange rate with a p-value of 0.3. This reflects those external pressures from exchange rate movements first affect domestic price levels, while changes in inflation do not have a direct impact on the exchange rate.

The above results show that Bank Indonesia responds to inflationary pressures by adjusting interest rates, rather than directly suppressing inflation instantly. This pattern reflects a forward-looking policy approach with an inflation targeting framework, in which monetary authorities adjust policy based on future inflation expectations rather than reacting directly to short-term fluctuations.

These results also indicate that the transmission of interest rate policy to inflation is slow, which is consistent with the literature that monetary policy usually experiences a lag before it has an impact on real economic variables. Meanwhile, the relationship with the exchange rate shows that exchange rate movements tend to cause inflation variations (through imports and external price pressures), but the reverse effect is less strong. This is relevant to the exchange rate pass-through theory, which states that currency depreciation can raise the prices of imported goods and ultimately drive domestic inflation [19].

3.5. VECM Model Estimation

After conducting a series of estimation steps, namely data stationarity testing, lag length determination, cointegration testing, and Granger causality testing, the next step is VECM model estimation. This model estimation analyzes the interaction between inflation, exchange rate (USD/IDR), and BI so as to provide an understanding of the behavior of these three variables and how each respond to changes in the economic system. The estimation is carried out by determining one cointegration (r = 1) for each

dependent variable, namely changes in inflation, changes in exchange rates, and changes in the BI Rate. The results of the VECM estimation are shown in the following table:

Table 8. Short-Term VECM Estimation Results.

	Variable	Coefficient	t-stat	p-value
Inflation.d	Inflation.dl1	0.2158	2.996	0.00313
	USD_IDR.dl1	-4.969e-05	-0.416	0.67777
	BI_Rate.dl1	0.1342	0.565	0.57273
USD_IDR.d	Inflation.dl1	291.694	0.645	0.520
	USD_IDR.dl1	-0.0666	-0.888	0.376
	BI_Rate.dl1	87.1489	0.584	0.560
BI_Rate.d	Inflation.dl1	506	2.371	0.0188
	USD_IDR.dl1	3.55e-05	1.004	0.3166
	BI_Rate.dl1	0.3.\019	4.293	2.90e-05

In the short-term analysis, inflation is significantly influenced by the previous period's inflation value with a coefficient of 0.2158 and a p-value of 0.00313, indicating a persistence effect, while the influence of USD/IDR and BI Rate on inflation is insignificant. For the USD/IDR equation, all variables in differential form are insignificant, so that exchange rate movements in the short term are freer and are not statistically influenced by inflation or the BI Rate. Meanwhile, in the BI Rate equation, both the previous period's inflation coefficient of 0.0506 and p-value of 0.0188 and the BI Rate itself with a coefficient of 0.3019 and p-value of 2.90e-05 have a significant effect, indicating that the BI Rate tends to adjust to changes in inflation and maintain the movement pattern from the previous period.

Table 9. Long-Term VECM Estimation Results.

	Variable	Coefficient	t-stat	p-value
Inflation.d	ECT	-0.08503	-2.736	0.00685
USD_IDR.d	ECT	21.1854	1.085	0.279
BI_Rate.d	ECT	0.04292	4.663	6.11e-06

In the long-term analysis, the Error Correction Term (ECT) component in the Inflation equation has a value of -0.08503 and is statistically significant with a p-value of 0.00685. This indicates that inflation corrects long-term imbalances by 8.5% of the previous period's deviation, so that when there is a deviation from the relationship between inflation and other variables, inflation will adjust towards equilibrium. Conversely, the ECT in the USD/IDR equation is not significant (p-value = 0.279), which indicates that there is no long-term correction mechanism of the exchange rate to imbalances. In the BI Rate equation, ECT is significant (p-value = 6.11e-06) but positive, which contradicts economic theory because it should be negative, so that the correction to long-term equilibrium does not proceed as expected.

The results above show long-term and short-term correction mechanisms. The VECM model with a significant ECT (Error Correction Term) shows that when there is a deviation from equilibrium, the system will slowly adjust towards a new equilibrium. In the case of inflation, the ECT is significantly negative, indicating that inflation corrects deviations of around 8.5% per period from long-term

equilibrium. However, the short-term coefficient for the BI Rate on inflation is not significant, confirming that interest rates do not have a direct and strong effect in the short term. This is in line with economic reality, which points to price rigidity and obstacles in the transmission of interest rate policy, where the effect of interest rates on inflation only emerges after several quarters.

3.6. IRF (Impulse Response Function)

The Impulse Response Function (IRF) is used to see how a variable responds dynamically to shocks from other variables in the system over several periods. In this study, the IRF is generated from a VAR representation model derived from a VECM model conversion. The IRF function provides an overview of the direction and magnitude of the impact of one variable on another.

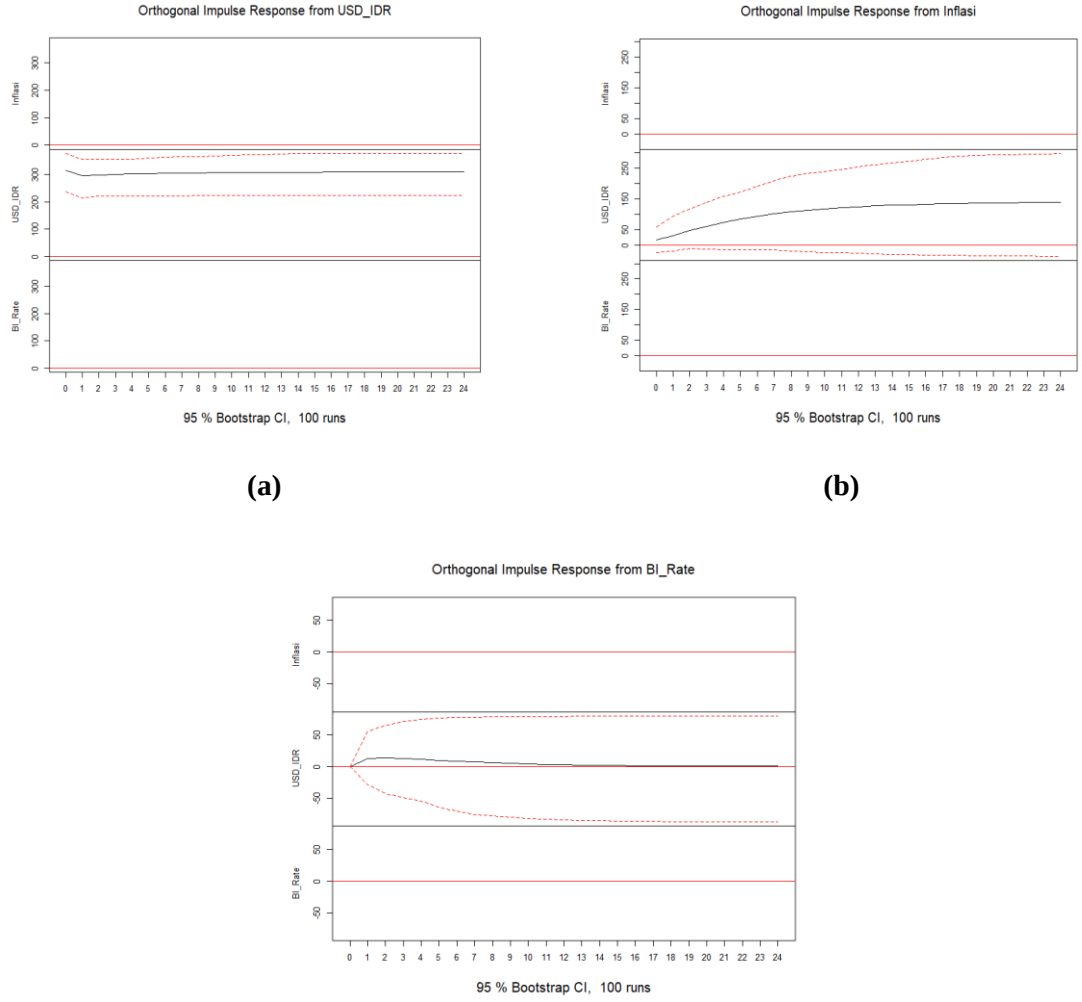

Figure 4. (a) IRF from exchange rate, (b) IRF from inflation, (c) IRF from BI rate.

Based on the IRF Inflation Plot graph above, inflation does not have a shock on itself, nor does the BI Rate respond to shocks from inflation. This means that both variables are not triggered by inflation shocks in the short to medium term. Meanwhile, the exchange rate (USD/IDR) has a positive response, meaning that shocks to inflation cause the rupiah to depreciate. However, this effect is not significant and tends to stabilize after several periods.

Then, for the exchange rate (USD/IDR) IRF plot, inflation and the BI Rate do not respond to shocks from the exchange rate (USD/IDR). This means that exchange rate (USD/IDR) shocks do not trigger significant changes in inflation or the BI Rate in the short to medium term. Meanwhile, the exchange rate (USD/IDR) has a negative response to itself. However, this effect is not significant and only lasts for one period, after which it tends to stabilize.

As for the BI Rate IRF plot above, it can be seen that inflation and the BI Rate are not affected by shocks from the BI Rate. However, inflation shocks trigger positive changes in the exchange rate (USD/IDR), where there is a tendency for the rupiah to strengthen shortly after an increase in the BI Rate. However, this effect is not significant because it is still within the interval limit.

These IRF results show that so far, interest rate shocks have responded slowly to other variables, confirming the slow or gradual nature of policy transmission. This effect supports the idea that monetary policy takes time to take effect and that a combination of policy instruments (monetary + exchange rate policy or policy communication) is important for the effect to be strong and effective. In addition, the IRF highlights that inflation itself is a major source of variability in the system, which means that price stability is an important "pillar" in maintaining market confidence and medium-term expectations.

3.7. FEVD (Forecast Error Variance Decomposition)

FEVD analysis is conducted to quantify how much of the forecast error variance of a variable can be explained by shocks from the variable itself and from other variables in the model (Bertolomeus Laksana Jayadri et al., 2024). The FEVD output presented here shows the decomposition of the forecasting error variance for the Inflation variable in period 24.

Table 10. Results of variance decomposition analysis (Inflation).

Obs.	Inflation	USD_IDR	BI_Rate	Obs.	Inflation	USD_IDR	BI_Rate
1	1	0	0	13	0.9543	0.0131	0.0326
2	0.9990	0.0004	0.0006	14	0.9490	0.0147	0.0363
3	0.9972	0.0009	0.0019	15	0.9437	0.0162	0.0401
4	0.9946	0.0017	0.0037	16	0.9383	0.0178	0.0439
5	0.9915	0.0025	0.0060	17	0.9330	0.0193	0.0477
6	0.9879	0.0035	0.0086	18	0.9278	0.0208	0.0514
7	0.9839	0.0047	0.0114	19	0.9227	0.0223	0.0550
8	0.9795	0.0059	0.0146	20	0.9177	0.0237	0.0586
9	0.9748	0.0073	0.0179	21	0.9127	0.0251	0.0622
10	0.9699	0.0087	0.0214	22	0.9078	0.0266	0.0656
11	0.9648	0.0101	0.0251	23	0.9031	0.0279	0.0690
12	0.9596	0.0116	0.0288	24	0.8984	0.0293	0.0723

Analysis of the inflation variable in the initial period found that the variation in inflation forecasting errors was entirely explained by inflation shocks themselves, i.e., 100%. This is reasonable because in the first period, shocks to this variable did not have time to affect other variables. This consistency is also seen in other studies, where shocks to inflation itself are the largest source of inflation variance, with a proportion of 55.57% to 63.04%. However, over time, the contribution of inflation shocks to inflation variation gradually declined. In the 24-period, this contribution becomes around 89.84%. Despite this decline, inflation itself remains the most dominant factor in explaining inflation fluctuations over the 24-period forecasting horizon.

The contribution of the BI Rate increased consistently from 0% to 7.23% in period 24, indicating the increasingly significant role of monetary policy in explaining inflation variations over time. Meanwhile,

the contribution of the USD_IDR exchange rate was relatively small, reaching only 2.92% in period 24. These results differ from several previous studies, such as Indrajaya [20], which found that the contribution of the BI Rate to inflation reached 79.64%, or Teapon & Mustafa [16], which found that the contribution of interest rates was 25.92-27.60%, indicating the complexity of inflation dynamics and monetary policy transmission in Indonesia, which is highly dependent on the model specifications and data period used.

Table 11. Results of variance decomposition analysis (Exchange Rate).

Obs.	Inflation	USD_IDR	BI_Rate	Obs.	Inflation	USD_IDR	BI_Rate
1	0.0029	0.9971	0.0000	13	0.0810	0.9182	0.0008
2	0.0066	0.9925	0.0009	14	0.0860	0.9133	0.0007
3	0.0121	0.9866	0.0013	15	0.0906	0.9087	0.0007
4	0.0189	0.9797	0.0014	16	0.0948	0.9046	0.0006
5	0.0264	0.9722	0.0014	17	0.0987	0.900724	0.000576
6	0.0342	0.9644	0.0014	18	0.102268	0.89719	0.000542
7	0.0420	0.9567	0.0013	19	0.105553	0.893935	0.000512
8	0.0495	0.9493	0.0012	20	0.108582	0.890933	0.000485
9	0.0567	0.9422	0.0011	21	0.111378	0.888162	0.00046
10	0.0635	0.9355	0.0010	22	0.113963	0.8856	0.000438
11	0.0698	0.9293	0.0009	23	0.116355	0.883228	0.000417
12	0.0757	0.9235	0.0008	24	0.118572	0.881029	0.000399

Variance decomposition analysis for the USD/IDR variable shows that in period 1, the variation in USD/IDR was almost entirely influenced by internal factors, with a proportion of 99.71%. This indicates that the movement of the Rupiah exchange rate against the US Dollar was greatly influenced by internal factors or shocks from the variable itself at the beginning of the period. In period 24, USD/IDR still explains 88.1% of its variance.

These results show that the exchange rate of the Rupiah against the US Dollar is still heavily influenced by internal factors in the long term. However, inflationary pressures began to contribute significantly to exchange rate movements, rising to 11.85% in the 24th period. This is in line with the Purchasing Power Parity Theory, which states that inflation shocks (both domestic and foreign) can have an impact on the weakening of the domestic currency exchange rate [16]. This is further reinforced by Yuliati et al. [10], who found that inflationary shocks can trigger a decline (depreciation) in the exchange rate, as also identified in the study by Teapon and Mustafa [16].

Table 12. Results of variance decomposition analysis (BI Rate).

Obs.	Inflation	USD_IDR	BI_Rate	9	0.3672	0.0143	0.6185
1	0.0007	0.0001	0.9992	10	0.4062	0.0149	0.5789
2	0.0162	0.0029	0.9809	11	0.4401	0.0155	0.5444
3	0.0509	0.0054	0.9437	12	0.4695	0.0159	0.5146
4	0.1007	0.0077	0.8916	Obs.	Inflation	USD_IDR	BI_Rate
5	0.1582	0.0096	0.8322	13	0.4950	0.0163	0.4887
6	0.2168	0.0112	0.7720	14	0.5172	0.0166	0.4662
7	0.2723	0.0124	0.7153	15	0.5367	0.0168	0.4465
8	0.3227	0.0134	0.6639	16	0.5537	0.0170	0.4293

17	0.5687	0.0172	0.4141	21	0.6136	0.0177	0.3687
18	0.5819	0.0173	0.4008	22	0.6220	0.0178	0.3602
19	0.5937	0.0175	0.3888	23	0.6296	0.0179	0.3525
20	0.6042	0.0176	0.3782	24	0.6365	0.0179	0.3456

Meanwhile, the BI Rate variable shows a decreasing pattern of dependence on itself. In the first period, the BI Rate accounted for 99.92% of the error variance, but in the 24th period, its contribution decreased to only 35.25%. This means that over time, external factors have increasingly influenced the movement of the BI Rate, with the inflation variable having an impact of up to 63.65% in the 24th period. Meanwhile, the USD/IDR exchange rate variable only contributed a small influence of 1.79%. Below is the graph of the FEVD for inflation, exchange rate, and BI rate.

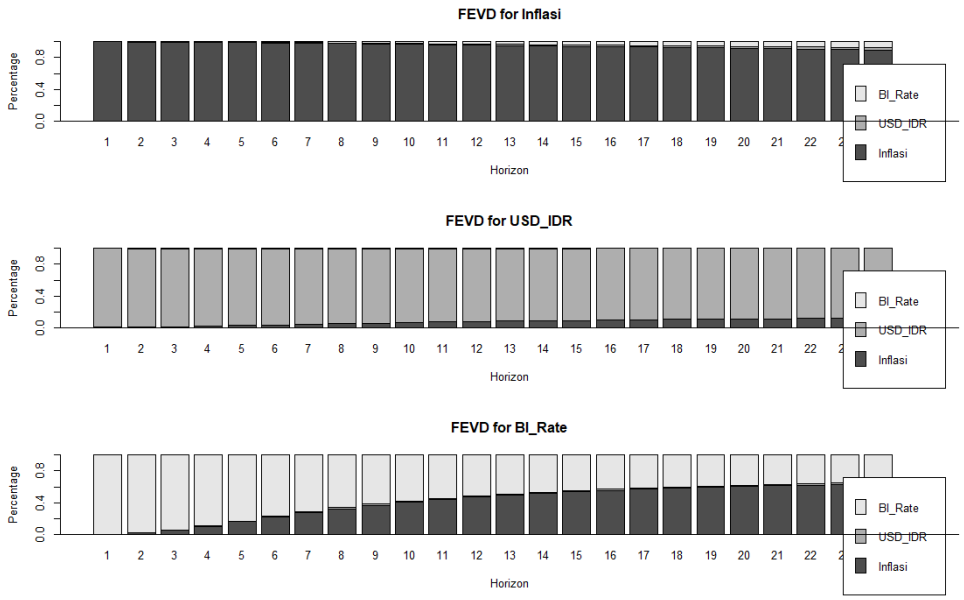

Figure 5. Forecast Error Variance Decomposition (FEVD) graph.

These results show that inflation has the greatest contribution in explaining variations in BI interest rates and exchange rates during the forecast horizon. This means that inflation remains the most influential variable in Indonesia's macroeconomic environment. The dominance of inflation's contribution also highlights the central role of price stability in shaping monetary dynamics and exchange rates. This finding is in line with Indrajaya's research [20], which found that inflation contributed 79.64% to BI interest rate variations. Although the magnitude is smaller in this study, the direction remains consistent, indicating that inflation expectations continue to influence monetary policy decisions. The smaller contribution is due to stronger BI policy credibility and macroprudential coordination after the pandemic, which helped stabilize the financial system.

3.8. Forecasting

In this analysis, the forecast results provide estimates of future values for each variable, accompanied by confidence intervals that indicate the range within which the actual values are expected to decrease.

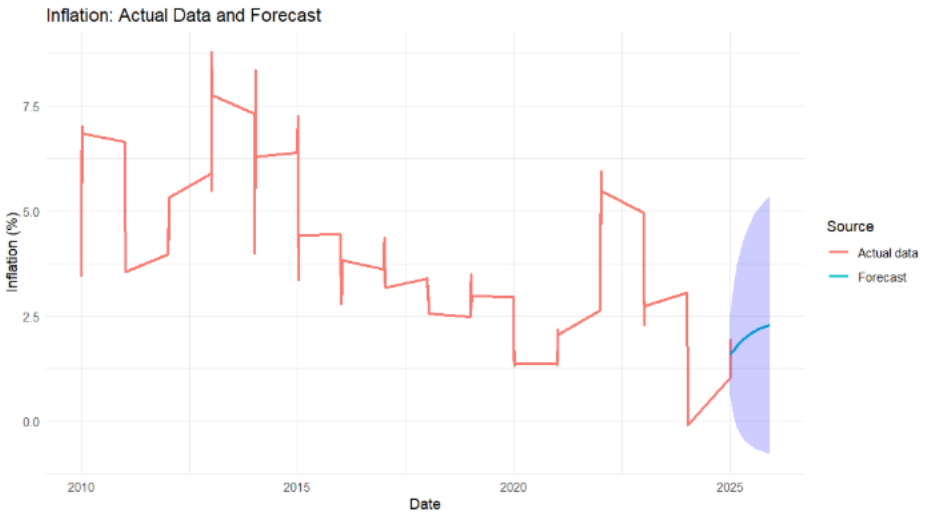

Figure 6. Inflation projections plot.

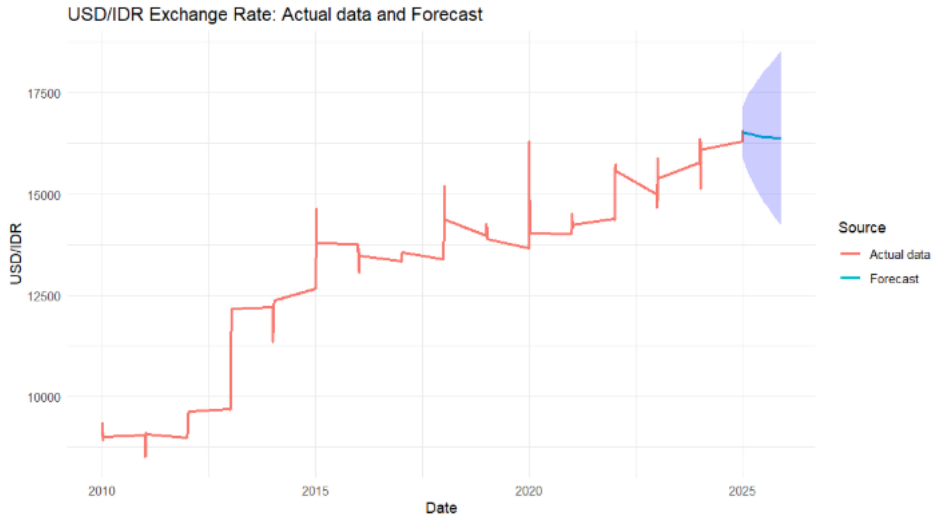

Figure 7. Exchange rate projections plot.

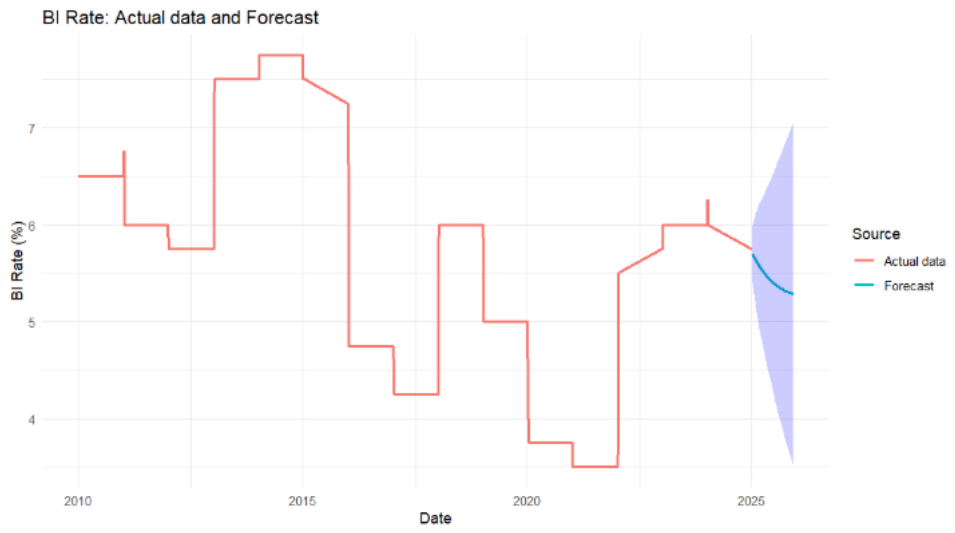

Figure 8. BI rate projections plot.

Based on Figure 6, it shows that inflation estimation has increase from 1.59% at 1st month to 2.29 at 12th month. However, minimum confidence interval shows that there is possible inflation can be under 0% or even higher than 5% at several months later. Based on Figure 7 exchange rate possible decrease from 16535.86 at 1st and end to 16375.42 at 12th month. However, confidence interval shows that Rupiah exchange rate can be vary, with lower margin higher than upper margin. Based on Figure 8 shows that BI rate decrease from 5.07% to 5.28%. Forecasting from three variable can be showed from Table 13.

Table 13. Forecasted values (12 periods ahead).

Period	Inflation	USD/IDR	BI Rate	Period	Inflation	USD/IDR	BI Rate
1	1.5907	16534.86	5.6986	7	2.104	16414.64	5.3877
2	1.6787	16507.96	5.6335	8	2.1554	16403.75	5.3585
3	1.7844	16483.2	5.5698	9	2.1984	16394.66	5.3341
4	1.8834	16461.58	5.5129	10	2.2343	16387.06	5.3138
5	1.9695	16443.17	5.464	11	2.2642	16380.72	5.2968
6	2.0426	16427.65	5.4225	12	2.2892	16375.42	5.2826

Based on the forecasting results, the three main variables, inflation, the exchange rate of the Rupiah against the US Dollar (USD/IDR), and the BI Rate, show interrelated dynamics. The inflation projection (Figure 6) shows a moderate upward trend after 2025 with a fairly wide confidence interval, indicating the potential for price pressures that need to be anticipated by the monetary authorities. Meanwhile, the Rupiah exchange rate projection (Figure 7) shows a stable trend despite lingering uncertainty, meaning that the risks of depreciation and appreciation remain open and could affect import inflation. The BI Rate projections (Figure 8) show a downward trend, indicating that Bank Indonesia has room to implement accommodative monetary policy to support economic growth, as long as inflation remains under control and the stability of the Rupiah is maintained.

Overall, we can see that these three variables show an interrelated and dynamic relationship, in line with the theoretical framework discussed earlier. Rising inflation trends in line with the theory of lower interest rates can stimulate economic activity and cause moderate inflationary pressure. Conversely, projected stability in the exchange rate supports the Monetary Transmission Mechanism theory, whereby BI interest rate adjustments affect capital flows and currency valuation [21].

These estimated results are consistent with the theoretical discussion presented earlier, confirming that monetary policy variables in Indonesia are dynamically interconnected. These results also address the research objective—to understand Monetary Policy Analysis in Indonesia: The Dynamic Relationship Between BI Interest Rates, Inflation, and the Rupiah Exchange Rate. Despite short-term volatility, the findings indicate that changes in BI interest rates can influence inflation expectations and exchange rate movements, reflecting an active transmission mechanism in Indonesia's monetary system.

4. Conclusion

This study concludes that the monetary policy transmission mechanism in Indonesia works through interest rates and exchange rates, which affect inflation and the rupiah exchange rate over time. Empirical results show a long-term relationship between inflation, the BI Rate, and the exchange rate during the 2010–2025 period, as indicated by the results of cointegration tests and VAR/VECM model estimates. However, in the short term, changes in the benchmark interest rate have not been directly effective in controlling inflation or stabilizing the exchange rate, indicating that monetary policy effects require a time lag to fully impact the economy.

Forecasting analysis also supports this finding by showing that inflation tends to increase moderately when the BI Rate declines slightly, while the Rupiah exchange rate remains relatively stable during the projection period. These results are consistent with theory, which explains that monetary policy affects prices and exchange rates indirectly through aggregate demand, investment behavior, and capital movements. In addition, external shocks, such as global uncertainty, also play an important role in determining the effectiveness of Indonesia's monetary policy transmission. These findings indicate that Bank Indonesia cannot rely solely on interest rate policy to maintain macroeconomic stability. A combination of policies involving fiscal coordination, foreign exchange market intervention, and strengthening of the real sector is needed to improve the effectiveness of policy transmission.

The novelty of this study lies in the integration of inflation, exchange rate, and interest rate analysis over a long period (2010–2025) to assess how monetary policy transmission works in the context of Indonesia's dynamic economy. However, this study has limitations, such as the use of a linear VAR/VECM model that does not capture non-linear relationships and does not include important variables such as inflation expectations or capital flows. Therefore, further research is recommended to use non-linear models (e.g., Threshold VAR or Markov Switching VAR) and add other macroeconomic variables to gain a deeper understanding of the monetary policy transmission mechanism in Indonesia.

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