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A Comparative Analysis of Asymmetric Transmission across Monetary Policy Regimes on Interest Rate Pass-Through in Indonesia's Banking Sector

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Abstract

This study examines the interest rate pass-through mechanism in Indonesia by analyzing how changes in the central bank policy rate are transmitted to commercial bank lending and deposit rates. The research focuses on two monetary policy regimes implemented by Bank Indonesia, namely the BI 7-Day Reverse Repo Rate and the new BI Rate introduced after December 2023. Using monthly time-series data from August 2016 to January 2025, the study employs the Error Correction Model and Mean Adjusted Lag to evaluate both the short-term and long-term dynamics of interest rate transmission. The Johansen Cointegration Test is also applied to identify the existence of long-run equilibrium relationships between the policy rate and banking interest rates. The results show that the pass-through process is asymmetric, with lending rates responding more quickly to policy rate increases than deposit rates do to policy rate decreases. The analysis also reveals variation in the speed and completeness of pass-through across the different policy regimes. Specifically, the new BI Rate demonstrates a shorter lag in transmission, suggesting improved responsiveness of the interest rate channel under the updated framework. These findings highlight the evolving nature of monetary policy effectiveness in Indonesia's financial system and provide a better understanding of interest rate dynamics in an emerging market context.

Keywords: Interest Rate Pass-Through, Monetary Policy Transmission, BI 7 Days Reverse Repo Rate, BI Rate, Indonesia, Error Correction Model, Mean Adjusted Lag.

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1. Introduction

Indonesia's long-term economic aspiration to achieve 8% growth hinges significantly on stable macroeconomic conditions, especially low and predictable inflation. Within the Inflation Targeting Framework (ITF), Bank Indonesia conducts monetary policy by steering its policy interest rate. A crucial aspect of this process is the transmission of policy rate changes to commercial bank interest rates, a mechanism widely known as interest rate pass-through (Ministry of Finance, 2023).

1.1. Problem Formulation

This study focuses on how effectively Bank Indonesia's policy rate influences lending and deposit rates in the banking sector. The effectiveness of this transmission reflects the central bank's ability to stabilize inflation and influence aggregate demand. Previous studies have observed that the pass-through is often asymmetric—lending rates adjust more quickly when policy rates rise than when they fall, while deposit rates may respond more sluggishly to declining rates (Gigineishvili, 2011; De Bondt, 2005; Hofmann & Mizen, 2004; Chong et al., 2006). These rigidities in interest rate adjustment are particularly important in economies with developing financial sectors like Indonesia.

The motivation for this study arises from structural shifts in Indonesia's monetary policy regimes. Following the BI 7-Day Reverse Repo Rate, a new BI Rate has been implemented since December 2023, yet limited research evaluates its transmission characteristics. Prior research in the Indonesian context, such as that by Wibowo and Randy, and Kacaribu

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and Handayani, has examined the asymmetry of pass-through under previous regimes but not under the new BI Rate. Additionally, Hristov, Hülsewig, and Wollmershäuser (2012) documented that financial market instability during the global financial crisis weakened interest rate pass-through in the Euro area due to increased credit risk.

Other international studies have found that more diversified financial systems and developed capital markets tend to exhibit stronger pass-through effects (Mojon, 2000). Structural variables such as GDP per capita, inflation, and banking competition positively influence the degree of pass-through, while market volatility plays a negative role (Gigineishvili, 2011).

Using monthly time-series data from August 2016 to January 2025, this study employs the Error Correction Model and Mean Adjusted Lag to assess both the short-run and long-run dynamics of pass-through under two different policy regimes. The main finding indicates that interest rate pass-through in Indonesia remains asymmetric. Notably, the new BI Rate regime demonstrates a shorter lag in the transmission process, suggesting enhanced responsiveness. This study contributes to the understanding of monetary policy effectiveness in emerging markets and provides practical insights for monetary authorities and banking institutions.

In this study, the author investigates the extent to which changes in monetary policy affect the banking sector by examining how banks adjust their lending and deposit rates in response to changes in the central bank's policy rate. Accordingly, the following research questions are formulated:

a. How does the effectiveness of monetary policy under the BI 7-Day Reverse Repo Rate, and the new BI Rate (post-December 2023) compare in terms of interest rate pass-through from Bank Indonesia's policy rate to bank lending and deposit rates?
b. What are the differences in the time lag required for adjustments in lending and deposit rates by the banking sector in response to changes in the central bank's policy rate across the three monetary policy regimes examined?

1.2. Research Objectives

The objective of this study is to compare the effectiveness of three monetary policy regimes that are currently or have previously been implemented in Indonesia, specifically in terms of the completeness and speed of interest rate pass-through from the central bank's policy rate to commercial bank interest rates. The monetary policy regimes examined are the BI 7-Day Reverse Repo Rate, and the new BI Rate introduced after December 2023.

1.3. Research Benefits

The expected benefits of this study are as follows:

a. For Bank Indonesia, the findings may serve as a reference in evaluating the effectiveness of the implemented monetary policy changes.
b. For the banking sector, the results can inform interest rate strategy adjustments and support the enhancement of the banking sector's role as a financial intermediary while maintaining profitability.
c. For academics, this research provides a unique source of literature on the impact of monetary policy changes in Indonesia, which can support the development of future research.

2. Literature Review

Monetary policy refers to the actions taken by a central bank to control the money supply and interest rates to achieve specific macroeconomic objectives (Pindyck, 2018). This policy involves regulating monetary variables such as interest rates and money supply to meet aggregate demand and ensure overall economic stability. Recent evidence from Checo, Grigoli, and Sandri (2024) indicates that accurate identification of monetary policy shocks is critical in emerging markets. Meanwhile, Berend and Prüser (2024) find that the transmission of monetary policy in the euro area is strongly influenced by common business cycles, with noticeable cross-country heterogeneity.

The primary objectives of monetary policy include several critical aspects. First, price stability, which aims to keep inflation under control (inflation targeting) to maintain the purchasing power of households. Second, exchange rate stability, which seeks to minimize fluctuations in currency values to prevent adverse effects on international trade and domestic economic conditions. Third, economic growth promotion, by encouraging investment and consumption within the economy.

The monetary policy transmission mechanism refers to the process through which monetary policy decisions influence macroeconomic variables such as real economic activity and inflation. Taylor (1995) defines this mechanism as "the process by which monetary policy is transmitted into changes in real GDP and inflation" (Bank Indonesia, 2024). Recent contributions, such as Boeckx, Dossche, and Peersman (2020), demonstrate that unconventional monetary policies post-Global Financial Crisis have altered traditional transmission channels. Similarly, Guerrieri and Lorenzoni (2021) emphasize that pandemic-induced liquidity traps have shifted the effectiveness of policy tools, which can be relevant when considering Indonesia's own policy responses.

The effectiveness of monetary policy in influencing real economic activity is also affected by time lag in its transmission. Friedman and Schwartz (1963) emphasized that there is a delay between monetary policy changes and their effects on macroeconomic variables. The length of this delay varies depending on economic conditions, financial market structures, and the expectations of economic agents.

In Indonesia, Bank Indonesia (2024) continues to recognize the multi-channel nature of transmission, especially under digital economy shifts and financial deepening. This reflects the evolving nature of Indonesia's monetary policy framework, which has been adjusted three times in recent years, transitioning from the BI Rate to the BI 7-Day Reverse Repo Rate in 2016, and most recently reverting to the BI Rate in 2024. As Indonesia's monetary authority, Bank Indonesia acknowledges the complexity of the monetary policy transmission process. The central bank outlines five primary channels through which monetary policy affects the economy: credit, interest rates, exchange rates, asset prices, and expectations. Each of these channels operates at different speeds in influencing real economic output and inflation.

Bank Indonesia applies both expansionary and contractionary monetary policies. Expansionary monetary policy is used to stimulate economic recovery during downturns, whereas contractionary monetary policy prevents overheating by tightening credit conditions. The effectiveness of the interest rate transmission mechanism depends on sticky prices, a condition where goods and services prices do not immediately adjust to changes in monetary policy. Price rigidities slow down the response of the real economy to interest rate changes, making the pass-through process more gradual (Bernanke & Gertler, 1995).

This transmission process occurs in two main stages. The first stage explains how monetary policy influences financial market conditions through various channels, leading to adjustments in bank interest rates on loans and deposits. The second stage describes how changes in financial markets affect household and business spending decisions, ultimately impacting production capacity and price levels. Despite its complexity, this process has a clear direction in shaping real economic activity (European Central Bank, 2000). The interest rate channel is one of the most critical mechanisms in monetary policy transmission. Through this channel, changes in the central bank's policy rate influence banking interest rates, which in turn affect aggregate demand. Lower interest rates encourage borrowing and investment, boosting consumption and production. Conversely, higher interest rates lead to increased saving and reduced spending, which slows down inflationary pressures.

One of the main transmission channels of monetary policy is the bank lending channel, whereby changes in the policy interest rate set by the central bank influence the profitability of banks. This, in turn, becomes a fundamental basis for banks in determining the lending rates offered to the public. Bernanke and Blinder (1988) argue that consumers' reliance on bank credit makes this channel particularly influential in the monetary policy transmission mechanism.

Monetary policy also affects the deposit interest rates offered by banks. When the central bank raises the policy rate, banks tend to adjust their deposit rates upward in order to attract funds from the public. This aims to encourage saving behavior over consumption or investment. Conversely, when the policy rate is lowered, deposit rates also decline, thereby incentivizing the public to shift their funds from savings or time deposits toward more productive investment opportunities in the economics.

The transmission of monetary policy requires a certain amount of time or time lag before its effects are fully realized in the real sector. Each transmission channel operates with a different duration, meaning that monetary policy is not always conveyed in a perfect and comprehensive manner. The length of this time lag is influenced by the financial and banking sectors, which ultimately determine the overall effectiveness of the monetary policy transmission mechanism.

Table 1. Average Monetary Policy Time Lag Between Countries

Country	Average Monetary Policy Time Lag
USA	42,2 Months
Europe	48,4 Months
Japan	51,3 Months
Germany	33,4 Months
Great Britain	40,4 Months
France	51,3 Months
Italy	26,6 Months
Poland	18,7 Months
Czech Republic	14,8 Months
Hungary	17,9 Months
Slovakia	10,7 Months
Slovenia	17,8 Months

The study by Havránek and Rusnák (2013) presents an analysis of 67 articles on empirical studies of monetary policy transmission across various countries. The results show that there are significant and varying differences in the time lag between advanced economies and transition economies.

Moreover, high levels of competition within the banking sector, combined with a market structure that tends to be oligopolistic and the presence of individual pricing strategies adopted by each bank, contribute to increased rigidity in lending rates. Buddi W. and Lazuardi (2016) state that the downward trend in bank lending rates is not always followed by an increase in credit demand. This can also be attributed to external factors such as uncertainty, an unfavorable business climate, geopolitical risks, and inadequate infrastructure readiness. In emerging markets like Indonesia, it is critical to accurately identify monetary policy shocks, as they can have asymmetric effects, particularly during times of global economic volatility, Checo, Grigoli, and Sandri (2024).

In the face of global crises and geopolitical risks, emerging economies need to adopt flexible and responsive monetary policies. This includes careful monitoring of external conditions, the use of appropriate monetary policy tools, and policy coordination with advanced economies. Furthermore, it is crucial for emerging economies to strengthen their fiscal and external reserves and improve institutional quality to increase resilience against external shocks. (IMF, 2025)

3. Methods

This study analyzes the transmission of monetary policy in Indonesia by examining two policy rate regimes: BI 7-Day Reverse Repo Rate, and the new BI Rate (post-December 2023). The study uses monthly time-series data from August 2016 to January 2025, sourced from Bank Indonesia's official website. This period is selected to capture various economic conditions, including the COVID-19 crisis (2020–2022), which significantly impacted financial markets. The study considers two main banking interest rates: deposit rates, including time deposit rates for tenors of 1, 3, 6, 12, and 24 months, calculated as a weighted average, and lending rates, categorized into working capital loans, consumption loans, and investment loans, also weighted by total bank credit.

This research aims to compare the effectiveness of different monetary policy regimes in Indonesia by measuring the degree of pass-through (short-run and long-run) and the time lag in interest rate adjustments. Previous studies suggest that monetary policy effectiveness is determined by how quickly and fully changes in policy rates are transmitted to banking interest rates (Bondt, 2005; Liu et al., 2008; Zulkhibri, 2012). Based on the literature review and empirical findings, the study proposes the following hypotheses: there is a cointegration relationship between the policy rate and banking interest rates across all monetary policy regimes, and the transmission mechanism of the new BI Rate exhibits a shorter time lag compared to previous regimes.

Referring to previous research methodologies, this study also employs the error correction model (ECM), as applied by Liu et al. (2008, 2011), Zulkhibri (2012), Wibowo and Lazuardi (2016), and Kacaribu and Handayani (2021). The basis for using this model lies in the presence of cointegration between the independent and dependent variables, as proposed by Engle and Granger (1987).

First, a unit root test (stationarity test) is conducted on the independent and dependent variables. This step involves applying the Phillips-Perron (PP) test (Phillips & Perron, 1988). The objective of these tests is to confirm or validate the research hypothesis to ensure more reliable and valid results (Confirmatory Analysis) (Brooks, 2008). The unit root test helps prevent spurious regression, as regression results between independent and dependent variables may merely reflect co-movement trends rather than a meaningful correlation.

3.1. Cointegration Test

Two time series variables can be considered cointegrated if the test results indicate the existence of a linear combination that remains stationary, even though each individual variable is non-stationary at its level. This linear combination is referred to as the long-run equilibrium equation (Engle & Granger, 1987). As discussed in literature review, this study conducts the Johansen cointegration test based on the Vector Auto Regression framework (Johansen, 1991, 1995), using the trace statistic and maximum eigenvalue as the test statistics.

The next step is the cointegration test, which evaluates the existence of a long-term equilibrium relationship between the independent and dependent variables that have undergone stationarity testing. The Johansen Cointegration Test (Johansen, 1991) is used for this purpose.

3.2. Vector Error Correction Model (VECM)

The model specification for the VECM estimation is based on the marginal cost pricing model of the bank (Rousseas, 1985).

$$\text{Bank Rate} = \gamma + \alpha_1 \cdot \text{Market Rate} + e$$

A specification for the bivariate error-correction process is derived using the ARDL equation, following the approach of Liu et al. (2011).

$$\Delta y_t = \beta_0 \Delta x_t + \delta(y_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + \sum_{i=1}^{q} \beta_i \Delta x_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + v_t$$

Here, y_t represents the time series data for the dependent variables, which include the working capital loan interest rate, investment loan interest rate, consumer loan interest rate, and rupiah time deposit interest rates across various tenors. Meanwhile, x_t denotes the time series data for the independent variable—the Bank Indonesia policy interest rate. All variables used in this study are based on monthly intervals.

3.3. Interest Rate Pass-Through Estimation

Finally, an estimation of the error correction process is performed using the independent and dependent variables that have been previously tested. If cointegration is confirmed, the ECM model is implemented to analyze the relationship dynamics. This methodology ensures a robust assessment of monetary policy transmission and the effectiveness of interest rate pass-through in Indonesia.

To assess the comparative effectiveness of different monetary policy regimes, as stated in the research question, this study evaluates three key indicators: the degree of short-run interest rate pass-through, the degree of long-run interest rate pass-through, and the response time (time lag) of banking interest rates to changes in the policy interest rate across the three monetary policy regimes.

The long-run interest rate pass-through is measured by the magnitude of the coefficient α_1 from the error-correction model. A coefficient of $\alpha_1 = x$ implies that a one-unit change in the independent variable x leads to an x-unit change in the dependent variable y in the long-run equilibrium. If the α_1 coefficient approaches or equals 1, it indicates a complete long-run interest rate pass-through, and vice versa.

To measure the degree of short-run interest rate pass-through, the coefficient β_0 from the error-correction model is used. This coefficient can be interpreted such that a one-unit change in x results in an x-unit change in y in the short-run equilibrium. The interpretation of β_0 is similar to that of α_1, representing the short-run interest rate pass-through.

3.4. Mean Adjusted Lag

Finally, to measure the time lag of banking interest rates in response to changes in the policy interest rate, this study employs the Mean Adjusted Lag (MAL), under the assumption that the pass-through is not perfectly completed.

$$\mathrm{MAL} = \frac{\beta_0 - \alpha_1}{\alpha_1 \cdot \delta}$$

In this context, the coefficients α_1 and β_0 represent the long-run and short-run interest rate pass-through levels at equilibrium, while δ denotes the error-correction term coefficient in the error correction model.

4. Result and Discussions

This study observes data spanning the period from January 2011 to January 2025, comprising a total of 169 observations. The entire dataset is divided into three monetary policy regimes: BIRATE, BI7DRR, and BIRATE2. The distribution and descriptive statistics of the data across these regimes is presented in the table below.

Table 2. Number of Observations by Monetary Policy Regime

Kebijakan	Observasi
BI 7 Days Reverse Repo Rate	86
BI Rate (Post December 2023)	14
Total	100

4.1. Descriptive Statistics

Table 3. Descriptive Statistics by Monetary Policy Regime

	BI7DRR	SBPMK	SBPI	SBPK	DEP1M	DEP3M	DEP6M	DEP12M	DEP24M
Mean	4,68	9,80	9,57	11,45	5,04	5,25	5,61	5,77	6,20
Median	4,75	9,67	9,39	11,26	5,64	5,81	6,15	6,27	6,74
Maximum	6,00	11,60	11,34	13,69	6,92	6,91	7,37	7,40	7,38
Minimum	3,50	8,40	8,13	10,17	2,83	2,97	3,20	3,27	3,47
Std. Dev	0,8898	0,9641	0,9968	1,0667	1,3623	1,3536	1,4028	1,2635	1,1540

	BIRATE2	SBPMK	SBPI	SBPK	DEP1M	DEP3M	DEP6M	DEP12M	DEP24M
Mean	6,07	8,79	8,79	10,18	4,71	5,42	5,64	5,75	4,17
Median	6,00	8,83	8,82	10,13	4,72	5,40	5,65	5,85	4,24
Maximum	6,25	8,87	8,86	10,36	4,87	5,55	5,97	5,93	4,39
Minimum	5,75	8,62	8,69	10,10	4,58	5,26	5,44	5,17	3,81
Std. Dev	0,15281	0,09048	0,06525	0,10101	0,09035	0,10026	0,16589	0,25331	0,18728

During the BI7DRR period, the average lending rates were ranging from 9.57% to 11.45%, indicating that the policy stance during this regime may have aimed at reducing lending rates. Deposit rates also higher than BIRATE2, with averages ranging from 5.04% to 6.20%. The standard deviations during this period were higher compared to the BIRATE2 regime, especially for short-term deposits (DEP1M and DEP3M) and medium-term deposits (DEP6M), reflecting greater fluctuations in interest rate adjustments during this time.

In the BIRATE2 period, the mean lending rates were the lowest among the three regimes, ranging from 8.79% to 10.18%, indicating a stronger policy focus on suppressing lending rates. Deposit rates also reached their lowest levels, ranging from 4.17% to 5.75%, suggesting that this regime also aimed to reduce deposit interest rates. The standard deviations in this period were the lowest among the three, particularly for short-term lending and deposit rates, suggesting a more stable transmission mechanism of monetary policy with lower volatility.

The graph below illustrates the trends of the policy interest rate and lending rates across two distinct monetary policy regimes: BI7DRR, and BIRATE2. It also presents the responses of working capital loan rates (SBPMK), investment loan rates (SBPI), and consumer loan rates (SBPK) to changes in the policy rate.

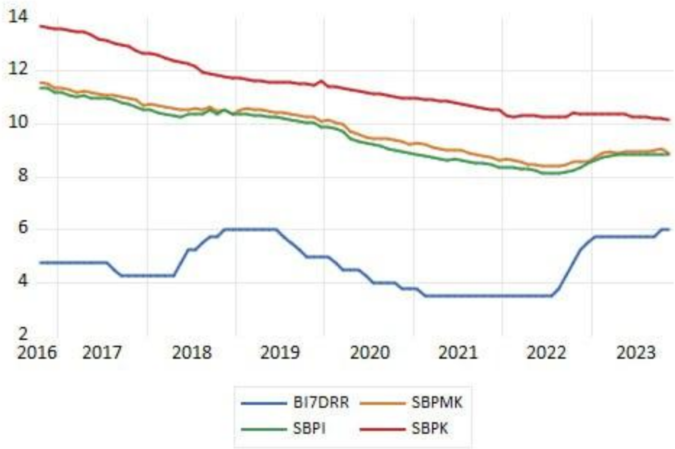

Figure 1. BI 7DRR Observations Against Working Capital, Investment, and Consumer Lending Rates

In the BI7DRR period (2016–2023), the transmission of monetary policy appeared to be more responsive compared to the previous regime. The BI7DRR showed a steady downward trend from 2016 to 2021, which was followed by a more noticeable decline in lending rates. However, when the BI7DRR began to rise again during 2022–2023, lending rates did not immediately adjust upward, indicating that banks remained cautious in aligning their lending rates with policy rate increases. Nevertheless, compared to the previous regime, BI7DRR proved more effective in lowering lending rates, with a faster transmission during periods of rate cuts.

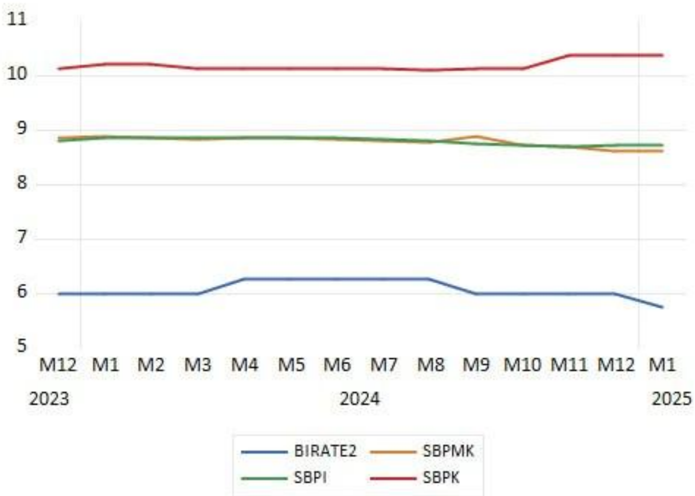

Figure 2. BIRATE(2) Observations Against Working Capital, Investment, and Consumer Lending Rates

In the BIRATE2 period (2023–2025), interest rate trends appear more stable. The BIRATE2 remained within a relatively narrow range, with only minor increases and decreases. Lending rates during this period also showed minimal fluctuations, indicating that this policy regime is more stable than the previous ones. The differences among consumer, working capital, and investment loan rates became smaller compared to earlier periods, suggesting a more uniform lending rate structure. This implies that the interest rate transmission under BIRATE2 is more stable, as changes in the policy rate are more quickly and smoothly reflected in lending rates, with less volatility.

Across the two graphs presented, the interaction between the policy rates (BI7DRR, and BIRATE2) and deposit rates across various tenors (1 month, 3 months, 6 months, 12 months, and 24 months) is also evident over the different monetary policy periods.

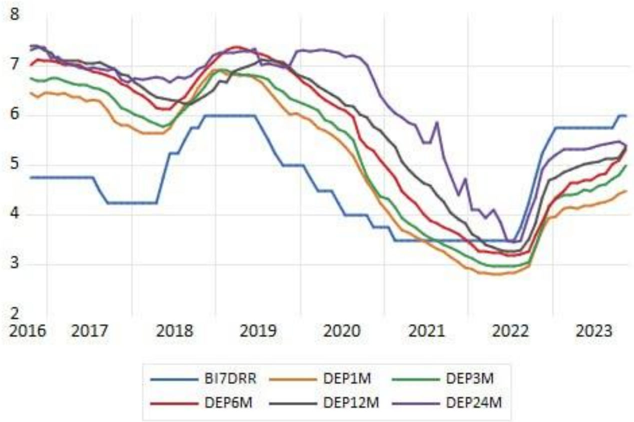

Figure 3. BI7DRR Observations Against Deposit Rates

In the BI7DRR period (2016M10–2023M12), the BI7DRR exhibited a gradual downward trend from 2016 to 2020, which was accompanied by declining deposit rates across all tenors. However, from 2021 to 2023, the BI7DRR began to rise again, prompting increases in deposit rates, particularly for DEP12M and DEP24M. The response of deposit rates to BI7DRR appeared more coordinated compared to the previous period, suggesting that the BI7DRR regime was more effective in guiding the movement of deposit rates. Short-term deposit rates (DEP1M and DEP3M) tended to be more stable, whereas long-term deposits showed greater fluctuations in response to changes in the BI7DRR.

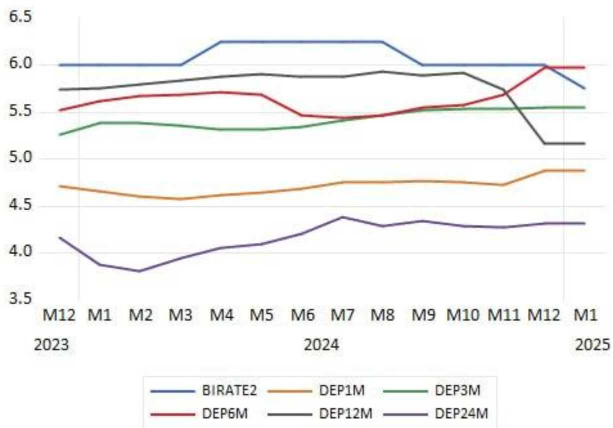

Figure 4. BIRATE(2) Observations Against Deposit Rates

During the BIRATE2 period (2023M12–2025M01), the policy rate remained relatively constant, with only minor increases and decreases. Deposit rates also exhibited lower volatility compared to previous periods, indicating a more effective interest rate transmission mechanism. Although long-term deposit rates remained slightly more volatile than short-term rates, overall, deposit rates across all tenors moved more steadily in line with the policy rate. This suggests that the BIRATE2 policy regime has been more successful in maintaining the stability of deposit rates compared to the previous monetary policy regimes.

The results of the stationarity test (Table 4) indicate that, across all monetary policy periods, none of the measured variables are stationary at the level form. However, in all policy regimes, all variables become stationary at the first difference. Therefore, all variables are deemed suitable to proceed to the next stage of analysis.

Table 4. Stationerity Test

			Phillips-Perron				
Variable	Test At	Prob Value	Interpretation	Variable	Test At	Prob Value	Interpretation
BI7DRR	"Level"	0,64280	Non-Stationer	BIRATE(2)	"Level"	0,79320	Non-Stationer
	"1st Diff"	0,00060	Stationer		"1st Diff"	0,00740	Stationer
SBPMK	"Level"	0,98920	Non-Stationer	SBPMK	"Level"	0,89210	Non-Stationer
	"1st Diff"	0,00000	Stationer		"1st Diff"	0,00450	Stationer
SBPI	"Level"	0,38520	Non-Stationer	SBPI	"Level"	0,33050	Non-Stationer
	"1st Diff"	0,00000	Stationer		"1st Diff"	0,02600	Stationer
SBPK	"Level"	0,01200	Non-Stationer	SBPK	"Level"	0,77200	Non-Stationer
	"1st Diff"	0,00000	Stationer		"1st Diff"	0,02090	Stationer
DEP1M	"Level"	0,68870	Non-Stationer	DEP1M	"Level"	0,91110	Non-Stationer
	"1st Diff"	0,02060	Stationer		"1st Diff"	0,03280	Stationer
DEP3M	"Level"	0,28850	Non-Stationer	DEP3M	"Level"	0,97600	Non-Stationer
	"1st Diff"	0,00980	Stationer		"1st Diff"	0,00520	Stationer
DEP6M	"Level"	0,31080	Non-Stationer	DEP6M	"Level"	0,90150	Non-Stationer
	"1st Diff"	0,00880	Stationer		"1st Diff"	0,01850	Stationer
DEP12M	"Level"	0,59760	Non-Stationer	DEP12M	"Level"	0,29610	Non-Stationer
	"1st Diff"	0,04630	Stationer		"1st Diff"	0,01590	Stationer
DEP24M	"Level"	0,69150	Non-Stationer	DEP24M	"Level"	0,73270	Non-Stationer
	"1st Diff"	0,00000	Stationer		"1st Diff"	0,00840	Stationer

4.2. Optimal Time Lag

The optimal time lag testing was conducted using the VAR module in EViews 12 (bivariate VAR). The results of the optimal lag selection are presented in the table below, based on several sequential modified criteria available in EViews 12. The optimal lag is determined by selecting the lowest value across all evaluated criteria. The lag specification used in this study follows the approach of Wibowo and Lazuardi (2016), which employed a lag length of 6 (Figure 5).

VAR Lag Order Selection Criteria BI7DRR						
Variables	LR	FPE	AIC	SC	HQ	**Selected Lag**
SBPMK	2	2	2	1	1	**2**
SBPI	3	3	3	2	3	**3**
SBPK	1	1	1	1	1	**1**
DEP1M	6	1	1	1	1	**6**
DEP3M	6	1	1	1	1	**6**
DEP6M	1	2	2	1	1	**2**
DEP12M	1	3	3	1	1	**3**
DEP24M	1	1	1	1	1	**1**

Figure 5. Optimal Time Lag BI7DRR Monetary Policy Regime

VAR Lag Order Selection Criteria BIRATE(2)						
Variables	LR	FPE	AIC	SC	HQ	**Selected Lag**
SBPMK	0	3	4	4	4	**4**
SBPI	0	3	4	4	4	**4**
SBPK	0	0	3	3	3	**3**
DEP1M	0	0	4	4	4	**4**
DEP3M	0	1	4	4	4	**4**
DEP6M	0	3	4	4	4	**4**
DEP12M	0	0	4	4	4	**4**
DEP24M	0	0	4	4	4	**4**

Figure 6. Optimal Time Lag BIRATE(2) Monetary Policy Regime

4.3. Johansen Cointegration Test

The Johansen cointegration test was conducted to identify the existence of long-run relationships among the variables under study. This test was performed using EViews 12 software, applying the five available assumptions. The objective of the test is to determine whether a cointegrating relationship exists among the analyzed variables, indicating that these variables move toward a long-term equilibrium.

To ensure robustness, the results of the Johansen cointegration test—based on both the trace statistic and the maximum eigenvalue—are compared with critical values at the 5% significance level. If the test statistic exceeds the critical value, the null hypothesis is rejected, indicating the presence of cointegration among the variables in this study.

Table 8 presents the results of the cointegration tests between each dependent variable and its corresponding independent variable based on the specified time frames. The yellow-highlighted cells indicate results that align with the alternative hypothesis, suggesting the presence of cointegration between the examined variables.

The subsequent testing, namely the Error-Correction Model (ECM), can only be applied to dependent variables that exhibit cointegration with the independent variable. As shown in the table below, the variable pairs that demonstrate cointegration are: [BI7DRR, SBPMK], [BI7DRR, SBPI], [BI7DRR, SBPK], [BI7DRR, DEP1M], [BI7DRR, DEP6M], [BIRATE2, SBPI], [BIRATE2, SBPK], [BIRATE2, DEP1M], [BIRATE2, DEP3M], [BIRATE2, DEP6M], and [BIRATE2, DEP12M].

The BIRATE2 period shows the highest number of cointegrating relationships between the policy rate and both lending and deposit interest rates, indicating that during this policy regime, banks had increasingly adopted the BI Rate as a reference in setting lending and deposit interest rates.

Table 6. Johansen Cointegration Test Hypothesis

	Maximum Eigenvalue	Trace Statistic
H0	CE = r	CE =< r
H1	CE = r+1	CE > r

Table 7. Johansen Cointegration Test Result

		BI7DRR				BIRATE2			
Variable	Assumption	Trace (None)	Trace (at most 1)	Max-Eig (None)	Max-Eig (at most 1)	Trace (None)	Trace (at most 1)	Max-Eig (None)	Max-Eig (at most 1)
SBPMK	1	"Reject"	"Accept"	"Reject"	"Accept"	"Accept"		"Accept"	
	2	"Reject"	"Accept"	"Reject"	"Accept"	"Accept"		"Accept"	
	3	"Accept"		"Accept"		"Accept"		"Accept"	
	4	"Accept"		"Accept"		"Accept"		"Accept"	
	5	"Accept"		"Accept"		"Accept"		"Accept"	
SBPI	1	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"
	2	"Reject"	"Don't Reject"	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"
	3	"Accept"		"Accept"		"Reject"	"Reject"	"Reject"	"Reject"
	4	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	5	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"

Variable	Assumption	BI7DRR				BIRATE2			
		Trace (None)	Trace (at most 1)	Max-Eig (None)	Max-Eig (at most 1)	Trace (None)	Trace (at most 1)	Max-Eig (None)	Max-Eig (at most 1)
SBPK	1	"Reject"	"Accept"	"Reject"	"Accept"	"Accept"		"Accept"	
	2	"Reject"	"Accept"	"Reject"	"Accept"	"Accept"		"Accept"	
	3	"Accept"		"Accept"	"Accept"	"Accept"		"Accept"	
	4	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	5	"Accept"		"Accept"		"Reject"	"Reject"	"Accept"	
DEP1M	1	"Accept"		"Accept"		"Reject"	"Accept"	"Accept"	
	2	"Accept"		"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"
	3	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	4	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Reject"	"Reject"	"Reject"
	5	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"
DEP3M	1	"Accept"		"Accept"		"Accept"		"Accept"	
	2	"Accept"		"Accept"		"Accept"		"Accept"	
	3	"Accept"		"Accept"		"Accept"		"Accept"	
	4	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	5	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Accept"	"Reject"	"Accept"
DEP6M	1	"Accept"		"Accept"		"Accept"		"Accept"	
	2	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"
	3	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"	"Reject"	"Accept"
	4	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	5	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"	"Reject"
DEP12M	1	"Accept"		"Accept"		"Accept"		"Accept"	
	2	"Accept"		"Accept"		"Accept"		"Accept"	
	3	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	4	"Accept"		"Accept"		"Reject"	"Reject"	"Accept"	
	5	"Reject"	"Reject"	"Accept"		"Reject"	"Accept"	"Accept"	
DEP24M	1	"Accept"		"Accept"		"Reject"	"Reject"	"Accept"	
	2	"Accept"		"Accept"		"Reject"	"Reject"	"Accept"	
	3	"Reject"	"Reject"	"Accept"		"Accept"		"Accept"	
	4	"Accept"		"Accept"		"Reject"	"Accept"	"Reject"	"Accept"
	5	"Reject"	"Reject"	"Accept"		"Reject"	"Reject"	"Reject"	"Reject"

4.4. VECM Estimation Result

The Vector Error Correction Model (VECM) estimation was conducted on the variables presented in the table 8, using the selected lag lengths. The estimation equations include the indicators α_0 and β_0, which represent the long-run and short-run pass-through values, respectively, for each variable measured under different monetary policy regimes.

Based on the table 9, it can be concluded that none of the variables exhibit a complete short-run pass-through. The value of β_0 represents the short-run pass-through coefficient and is considered complete or perfect if it equals 1. It is also evident that the highest short-run pass-through value is observed in the DEP1M variable during the BIRATE2 policy period, at 43% and 44%. In contrast, the lowest short-run pass-through is found in the DEP6M variable during the same policy period, ranging from -2% to -5%, indicating that deposit rates did not immediately respond to changes in the policy interest rate.

Table 11 presents the α_0 coefficients from the VECM estimation, indicating that in the long run, lending rates (SBPMK, SBPK, and SBPI) across all three policy periods exhibit an incomplete pass-through to the policy interest rate. Negative α_0 coefficients suggest that increases in the policy rate are not followed by corresponding increases in lending rates. Meanwhile, deposit rates (DEP1M, DEP3M, DEP6M, DEP12M, and DEP24M) display varying patterns. Short- and long-term deposits (DEP1M, DEP3M, DEP12M, and DEP24M) during the BI7DRR and BIRATE2 policy periods tend to be less responsive to the policy rate. In contrast, medium-term deposits (DEP6M) during the BIRATE2 period demonstrate a complete pass-through, indicating that changes in the policy interest rate have a significant impact on this type of deposit.

The ECT (Error Correction Term) coefficient in Table 11 is represented by the value δ. This coefficient indicates the speed at which the dependent variable adjusts to restore equilibrium following a change in the independent variable. As referenced in the literature review section, the ECT coefficient is expected to be negative, reflecting adjustment toward a long-run equilibrium between the variables. A positive value, on the other hand, suggests that the adjustment between variables is moving further away from equilibrium.

Most variables exhibit ECT (δ) coefficients that align with the hypothesis (negative), indicating the presence of a correction mechanism toward long-run equilibrium. An exception is found in the DEP1M variable during the BIRATE2 period, which has a positive coefficient, suggesting that the 1-month deposit rate during this period did not immediately adjust to changes in the policy rate or even moved in the opposite direction. These findings also indicate that the transmission mechanism of monetary policy operates with varying speeds of adjustment depending on the type and maturity of banking products.

Table 9. VECM Test specification

Variables		Selected Lag	Assumption
BI 7DRR	SBPMK	2	2
	SBPI	3	2
	SBPK	1	2
	DEP1M	6	4
	DEP6M	2	2 3
BI RATE 2	SBPI	3	2 4
	SBPK	3	4
	DEP1M	2	2 3
	DEP3M	2	4
	DEP6M	2	2 3 4
	DEP12M	2	3
	DEP24M	2	4

Table 10. Estimation Results of Short-Run Interest Rate Pass-Through

Variables		Selected Lag	Assumption Selected	b0	Pass-Through
BI 7DRR	SBPMK	2	2	0,06429	incomplete
	SBPI	3	2	0,06372	incomplete
	SBPK	1	2	0,01038	incomplete
	DEP1M	6	4	0,14708	incomplete
	DEP6M	2	2	0,05807	incomplete
			3	0,05826	incomplete
BI RATE 2	SBPI	3	2	0,09233	incomplete
			4	0,09943	incomplete
	SBPK	3	4	0,20451	incomplete
	DEP1M	2	2	0,44197	incomplete
			3	0,43859	incomplete
	DEP3M	2	4	0,08235	incomplete
	DEP6M	2	2	-0,59117	incomplete
			3	-0,59491	incomplete
			4	-0,29612	incomplete
	DEP12M	2	3	0,12219	incomplete
	DEP24M	2	4	0,21426	incomplete

The values of α_0, β_0, and δ can then be used to calculate the Mean Adjusted Lag (MAL). The results of the MAL calculation in Table 13 indicate that the effectiveness of monetary policy transmission through the policy rate varies across different policy regimes and banking products. The MAL values during the BI7DRR periods tend to be higher than those in the BI RATE2 period, suggesting an improvement in the effectiveness of monetary policy implemented by the central bank.

Table 11. Estimation Results of Long-Run Interest Rate Pass-Through

Variables		Selected Lag	Assumption Selected	a0	Pass-Through
BI 7DRR	SBPMK	2	2	-1,18850	incomplete
	SBPI	3	2	-0,88450	incomplete
	SBPK	1	2	-0,27589	incomplete
	DEP1M	6	4	-1,21307	incomplete
	DEP6M	2	2	-2,92256	incomplete
			3	-2,93527	incomplete
BI RATE 2	SBPI	3	2	0,03987	incomplete
			4	-0,13629	incomplete
	SBPK	3	4	0,26484	incomplete
	DEP1M	2	2	0,39069	incomplete
			3	0,38996	incomplete
	DEP3M	2	4	-0,07170	incomplete
	DEP6M	2	2	2,25636	complete
			3	2,28595	complete
			4	1,63393	complete
	DEP12M	2	3	-0,53962	incomplete
	DEP24M	2	4	-0,78769	incomplete

Table 12. Error Correction Term

Variables		Selected Lag	Assumption Selected	d
BI 7DRR	SBPMK	2	2	-0,02011
	SBPI	3	2	-0,01731
	SBPK	1	2	-0,02072
	DEP1M	6	4	-0,10952
	DEP6M	2	2	-0,01540
			3	-0,01538
BI RATE 2	SBPI	3	2	-0,43390
			4	-1,09117
	SBPK	3	4	-2,37336
	DEP1M	2	2	1,97590
			3	1,95609
	DEP3M	2	4	-0,95371
	DEP6M	2	2	-0,85348
			3	-0,84515
			4	-1,22682
	DEP12M	2	3	-3,57387
	DEP24M	2	4	-2,25303

Table 13. Estimation Result of Mean Adjusted Lag

Variables		Selected Lag	Assumption Selected	b0	Pass-Through	a0	Pass-Through	d	MAL
BI 7DRR	SBPMK	2	2	0,06429	incomplete	-1,18850	incomplete	-0,02011	52,42
	SBPI	3	2	0,06372	incomplete	-0,88450	incomplete	-0,01731	61,92
	SBPK	1	2	0,01038	incomplete	-0,27589	incomplete	-0,02072	50,07
	DEP1M	6	4	0,14708	incomplete	-1,21307	incomplete	-0,10952	10,24
	DEP6M	2	2	0,05807	incomplete	-2,92256	incomplete	-0,01540	66,21
			3	0,05826	incomplete	-2,93527	incomplete	-0,01538	66,33
BI RATE 2	SBPI	3	2	0,09233	incomplete	-0,03987	incomplete	-0,43390	7,64
			4	0,09943	incomplete	-0,13629	incomplete	-1,09117	1,59
	SBPK	3	4	0,20451	incomplete	0,26484	incomplete	-2,37336	0,10
	DEP1M	2	2	0,44197	incomplete	0,39069	incomplete	1,97590	0,07
			3	0,43859	incomplete	0,38996	incomplete	1,95609	0,06
	DEP3M	2	4	0,08235	incomplete	-0,07170	incomplete	-0,95371	2,25
	DEP6M	2	2	-0,59117	incomplete	2,25636	complete	-0,85348	1,48
			3	-0,59491	incomplete	2,28595	complete	-0,84515	1,49
			4	-0,29612	incomplete	1,63393	complete	-1,22682	0,96
	DEP12M	2	3	0,12219	incomplete	-0,53962	incomplete	-3,57387	0,34
	DEP24M	2	4	0,21426	incomplete	-0,78769	incomplete	-2,25303	0,56

The MAL value reflects the speed at which bank interest rates adjust to the policy rate, expressed in months. For example, the 6-month deposit rate during the BI7DRR period shows the slowest adjustment speed, taking up to 66.33 months to fully respond to changes in the BI7DRR. This condition may be influenced by external factors beyond the scope of the tested variables during that period, such as the COVID-19 pandemic and rising geopolitical tensions abroad.

5. Conclusions

5.1. Empirical Findings

This study examines the transmission of monetary policy in Indonesia, focusing on two different monetary policy regimes: BI 7-Day Reverse Repo Rate (BI7DRR), and BI Rate 2 (BIRATE2) over the period from August 2016 to January 2025. The empirical analysis highlights several key findings related to the impact of policy rates on lending and deposit rates. The BI7DRR period shown a more responsive transmission mechanism, with a more fluctuative movement in both lending and deposit rates. The most stable and effective transmission occurred during the BIRATE2 period, where lending and deposit rates showed lower volatility and more consistent alignment with the policy rate.

The analysis also explored the time lags in the transmission of monetary policy. Time lags were observed in all two regimes, with lending rates adjusting slower than deposit rates. The results of the Johansen cointegration test indicated long-run relationships between the policy rate and lending rates across all three policy regimes. However, BIRATE2 showed the highest number of cointegrating relationships, suggesting that banks increasingly adopted the policy rate as a reference for determining lending and deposit rates during this period. The Error Correction Model (ECM) results revealed that the short-run pass-through of policy changes to interest rates was incomplete, with the highest pass-through observed in short-term deposit rates during the BIRATE2 period. The 1-month deposit rate during BIRATE2, however, showed less responsiveness, suggesting an exception in the expected transmission. Finally, the Mean Adjusted Lag (MAL) analysis indicated that the transmission of monetary policy improved during the BIRATE2 period, with a faster adjustment of interest rates compared to the BI7DRR periods, indicating a more efficient transmission mechanism in the more recent policy regime.

5.2. Policy Implications

The findings of this study carry several significant implications for monetary policy in Indonesia and other emerging economies. First, the study suggests that a stable and consistent policy framework, such as the one seen in the BIRATE2 period, leads to better alignment between policy rates and lending rates. This highlights the importance of maintaining predictability and consistency in policy actions, as smoother transmission enhances the overall effectiveness of monetary policy. A more predictable policy environment also helps in reducing interest rate volatility, which was more evident in the B7DRR periods.

Additionally, the study points to the need for a more balanced approach to policy rate adjustments. While aggressive policy changes are sometimes necessary, they can lead to significant fluctuations in interest rates, particularly in deposit products. The findings suggest that a more gradual and well-communicated policy approach may help mitigate such volatility, especially in times of global uncertainty.

The evidence of incomplete pass-through, especially in long-term deposits, suggests that there is limited immediate impact of the policy rate changes on long-term financial products. This indicates the need for complementary policies that focus on long-term financial stability, including measures to enhance the resilience of the banking sector and improve the sensitivity of long-term financial instruments to policy changes. Furthermore, given the observed time lags, it is critical for Bank Indonesia to consider not only domestic economic conditions but also global economic trends and external risks when formulating policy. This could include better coordination between monetary and fiscal policies to enhance overall policy effectiveness.

In conclusion, the study emphasizes the importance of a stable and consistent monetary policy framework in facilitating effective transmission to the real economy. While the central bank of Indonesia has made notable progress in enhancing the effectiveness of its monetary policy over time, continued improvements and adjustments are necessary, particularly in the face of external economic shocks and geopolitical uncertainties. Ongoing refinement of policy tools, along with stronger institutional coordination, will be essential for maintaining economic stability and ensuring that monetary policy remains responsive to both domestic and international challenges.

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