The Relationship of Monetary Policy Instruments in the Indonesian Economy

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Abstract. The implementation of monetary policy is closely intertwined with other macroeconomic policies due to the substantial interdependence between monetary policy and broader economic management. Recognizing these connections is critical for policymakers in order to prevent economic imbalances or distortions. This study aims to investigate the interrelationship between monetary policy instruments within the context of the Indonesian economy from 2000 to 2023. Utilizing time series data sourced from Bank Indonesia (BI), the National Statistics Agency (BPS), and other relevant institutions, the research employs the Vector Autoregression (VAR) model, followed by Structural Vector Autoregression (SVAR), to analyze the dynamics between monetary instruments in Indonesia. By introducing shocks to these instruments, the study seeks to predict their effects on the economy and assess their impact across short, medium, and long-term periods. The findings demonstrate a strong correlation between monetary policy tools, highlighting their pivotal role in achieving Indonesia's economic goals.

Keywords: Monetary Policy Instruments, VAR, Indonesian Economy

1 Introduction

Monetary policy refers to the central bank's strategic approach to regulating the money supply in order to influence key economic activities. This includes managing factors such as inflation, employment, and economic growth to achieve broader macroeconomic stability. This includes objectives such as achieving high levels of employment, maintaining stable inflation rates, ensuring the stability of the balance of payments, and fostering consistent economic growth. The execution of monetary policy is inseparable from other macroeconomic policies, as it is intricately linked to various macroeconomic variables. The interdependence between monetary policy and these factors necessitates a comprehensive approach when formulating and implementing policy decisions. It is essential for policymakers to understand this interdependence between monetary instruments and macroeconomic indicators to avoid economic distortions or deviations. The link between monetary instruments and macroeconomic indicators has been extensively studied, and the theories explaining how these interconnections shape economic activity will be explored further.

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According to Keynesian theory, fiscal policy plays a key role in shaping aggregate demand, while monetary policy or adjustments in the money supply have a limited impact on aggregate demand and, in some cases, are considered to have no effect. The money supply alone needs to work through other mechanisms, such as influencing investment indirectly via interest rates. However, the effect of interest rates on investment tends to be weak, and private investment demand is particularly sensitive to interest rates during periods of recession (Ahuja, 2002).

The interdependence between the development of monetary instruments and macro indicators can also be explained by the trend in macro indicators post the 1997 economic crisis, as seen in the following figures:

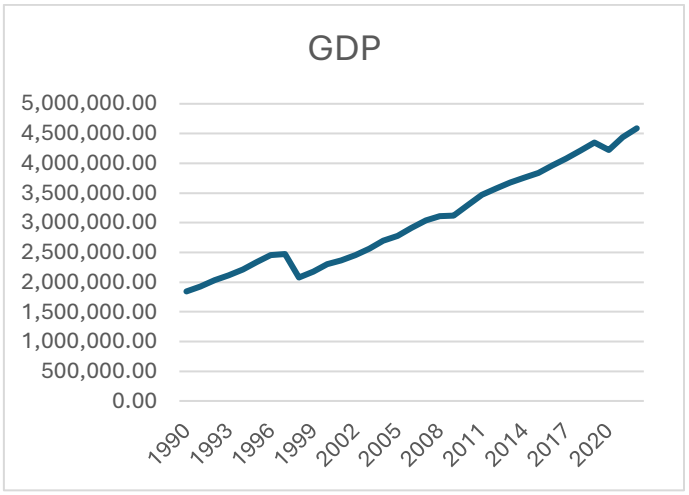

Fig. 1. Gross Domestic Product

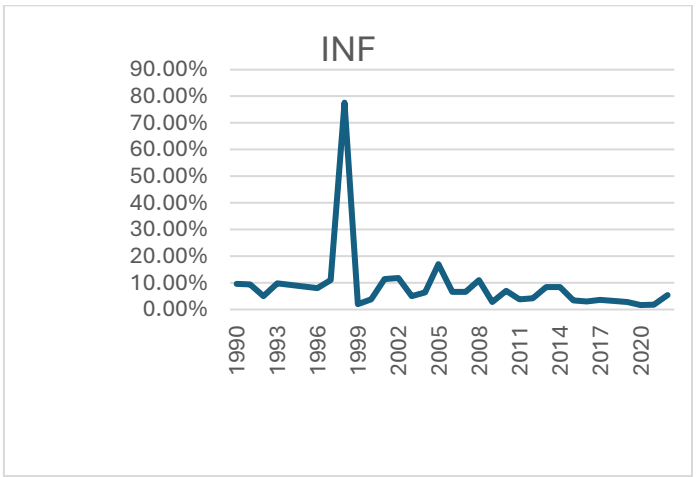

Fig. 2. Inflation

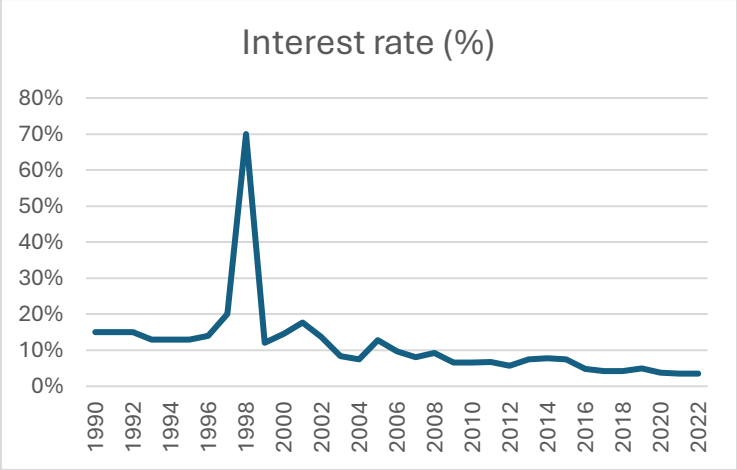

Fig. 3. Interest Rate

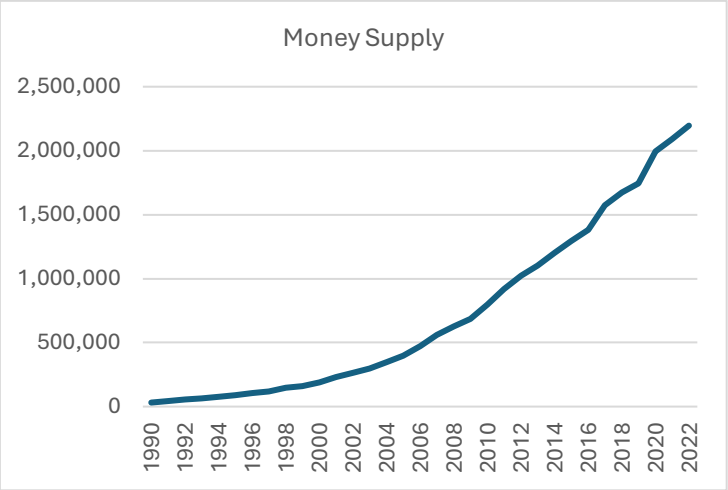

Fig. 4. Money Supply

If we examine the trend of Bank Indonesia Certificates (SBI) over the past two decades, as shown in Figure 3, it reveals a downward trend. This decline coincides with an increase in the money supply (Figure 2). During the same period, Bank Indonesia has focused on stabilizing inflation, particularly in the post-1997 crisis era. Meanwhile, the macroeconomic indicator of Gross Domestic Product (GDP), which represents a country's output, has shown an upward trend. The government's efforts to enhance economic conditions over both the short and long term have generally yielded positive outcomes. However, despite these successes, certain macroeconomic indicators have not consistently reached the anticipated levels of stability. This aligns with the findings of Julaihah (2004), who noted that an increase in the money supply

tends to correlate with a reduction in inflation. Julaihah's research suggests that carefully managed increases in the money supply can help dampen inflationary pressures, contributing to more favorable economic conditions. However, this relationship may not always be straightforward, as other factors such as fiscal policy, global economic conditions, and external shocks can also influence inflation and overall economic stability.

This study aims to explore the intricate relationship between various monetary policy tools and macroeconomic indicators in Indonesia over the period from 2000 to 2023. During this time, Indonesia has undergone significant economic transitions, including the aftermath of the Asian financial crisis, periods of strong economic growth, and recent challenges posed by global uncertainties such as the COVID-19 pandemic. By investigating the interaction between monetary policy instruments—such as interest rates, money supply management, and open market operations—and key macroeconomic variables like inflation, unemployment, economic growth, and the balance of payments, this study seeks to uncover the dynamics that shape Indonesia's economic trajectory.

The period from 2000 to 2023 offers a rich context for analysis, as it captures several phases of Indonesia's economic evolution, including times of growth as well as moments of challenge. The study will utilize advanced econometric models to analyze how changes in monetary policy have affected the broader economy. The findings will provide insights into how the government, particularly Bank Indonesia, has used monetary policy to navigate periods of inflationary pressures, foster economic growth, and maintain stability in the financial system. This investigation will contribute to a deeper understanding of the effectiveness of monetary policy in addressing both cyclical economic issues and long-term structural challenges within the Indonesian economy.

2 Literature Review

2.1 Monetary Instruments and Macroeconomic Indicators in Indonesia

The central bank plays a vital role in shaping the development of a country's financial markets and its overall economy. This importance arises from the fact that its policy decisions directly and significantly influence key economic variables such as interest rates, credit availability, and the money supply. These factors are crucial in driving financial market growth, economic progress, controlling inflation, and enhancing societal welfare. Through carefully crafted and implemented monetary policies, the central bank affects both the immediate economic conditions and long-term economic stability.

Monetary policy refers to a set of strategic actions undertaken by central banks or monetary authorities aimed at regulating monetary aggregates such as money supply, interest rates, and credit conditions to achieve specific macroeconomic goals. These objectives typically include ensuring price stability, promoting employment, fostering economic growth, and maintaining balance of payments stability. The effects of monetary policy are transmitted through various channels, impacting different sectors of the economy, both directly and indirectly. For instance,

by adjusting interest rates, the central bank influences the cost of borrowing for businesses and households, which in turn affects consumption, investment, and the overall direction of economic growth.

The way in which monetary policy influences the economy can vary significantly between countries due to differences in their economic goals and institutional frameworks. The transmission mechanism—how changes in policy affect the real economy—depends on factors such as the structure of the financial system, market openness, and how economic agents respond to policy signals. Therefore, the design and implementation of monetary policy are tailored to suit the specific economic conditions of each country, resulting in unique operational frameworks.

Furthermore, monetary policy is dynamic and must adapt to evolving economic conditions. The central bank must continuously assess domestic and international economic environments, as well as external shocks that may pose risks to economic stability. This requires a deep understanding of the interactions between various economic variables and the ability to deploy different policy tools to address emerging challenges. For example, during periods of economic expansion, the central bank may adopt contractionary policies to prevent overheating and curb inflation, while during recessions, it may implement expansionary policies to stimulate growth.

Monetary policy can also be seen as an intervention by the government or central bank to influence macroeconomic conditions through the money market. It includes actions that regulate the process of money creation. Although various factors affect economic activity, monetary policy serves as a tool that the government can directly manage to achieve its economic objectives (Nopirin, 2000).

Bank Indonesia, for instance, employs several strategies and utilizes specific monetary instruments to achieve its operational objectives. The primary tools include open market operations, the discount rate policy, and reserve requirements policy. Open market operations involve the buying and selling of government securities by the central bank, which controls the money supply and liquidity in the economy. By purchasing securities, Bank Indonesia injects liquidity into the financial system, while selling them withdraws excess liquidity, thereby influencing interest rates and overall economic activity.

The discount rate policy focuses on setting the interest rate at which commercial banks can borrow from the central bank. This policy directly impacts borrowing and lending costs in the economy. By adjusting the discount rate, Bank Indonesia can either stimulate or restrain borrowing, which in turn affects credit conditions, economic growth, and inflation.

Finally, the reserve requirements policy involves setting the minimum proportion of deposits that banks must hold as reserves. This policy influences the banking sector's ability to extend credit. By adjusting the reserve ratio, the central bank controls the amount of funds available for lending, impacting the overall credit supply in the economy. Higher reserve requirements reduce

the lending capacity of banks, curbing credit growth, while lower requirements increase lending capacity, thereby boosting economic activity.

Through these instruments, Bank Indonesia regulates liquidity, manages inflation, and maintains financial stability, forming the foundation of its monetary policy framework. Each tool is employed with the aim of achieving broader macroeconomic objectives, such as price stability, sustainable economic growth, and financial system stability.

The following diagram illustrates how these instruments are used to achieve the final macroeconomic objectives.

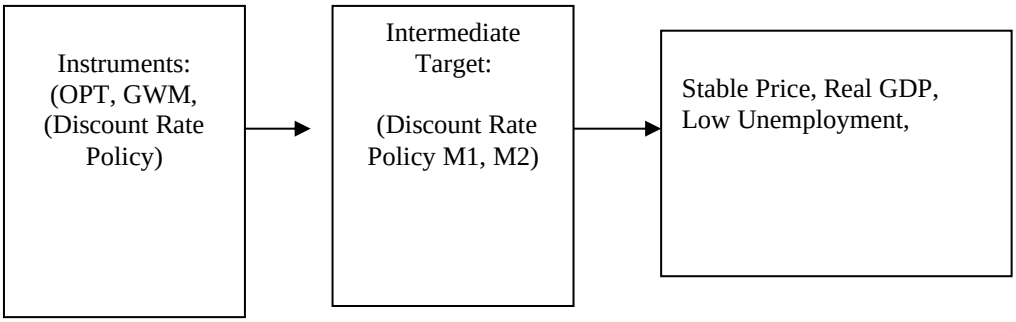

Fig 5. Process of Achieving Final Targets

2.2 Model Mundell-Fleming

The Mundell-Fleming model provides a comprehensive understanding of how equilibrium is achieved within both the goods and money markets in an open economy, with the dynamics influenced by the type of exchange rate regime in place (Mankiw, 2000; Taylor, 1999). In the goods market, equilibrium is represented by the IS curve. In a closed economy, the equilibrium condition is given by Y=EY = EY=E, where YYY stands for real output and EEE for real expenditure. However, in the case of an open economy, the condition changes to Y=DY = DY=D, where DDD signifies domestic demand. Domestic demand is calculated using the formula D=C+I+G+X−MD = C + I + G + X - MD=C+I+G+X−M, where CCC denotes real private consumption, III represents real private investment, GGG is real government expenditure, XXX is real exports, and MMM represents real imports. The trade balance, defined as TTT, is determined by the difference between exports and imports: T=X−MT = X - MT=X−M. Export levels are influenced by the real exchange rate and global income, both of which are assumed to be constant within this model. Similarly, imports are modeled as M=mYM = mYM=mY, where mmm is the marginal propensity to import. As a result, the equilibrium condition in the goods market can be distilled into an equation that defines the IS curve for an open economy.

Equilibrium in the money market is described by the LM curve, which illustrates the relationship between real money demand and both output and interest rates. This relationship is expressed as M/P=L(Y,i)M/P = L(Y, i)M/P=L(Y,i), where M/PM/PM/P is the real money supply and L(Y,i)L(Y, i)L(Y,i) represents the demand for money, which depends on the output YYY and the interest rate iii. This equation can be further transformed to define the LM curve in the context of an open economy.

As for the balance of payments, equilibrium is represented by B=T+KB = T + KB=T+K, where BBB is the balance of payments surplus, TTT represents the trade or current account surplus, and KKK signifies the capital account surplus. The capital account is influenced by the differential between domestic and global interest rates, expressed as K=f(r−r∗)K = f(r - r^*)K=f(r−r∗), where rrr is the domestic interest rate and r∗r^*r∗ is the global interest rate. By integrating these relationships, the overall balance of payments equilibrium can be described as a function of exports, imports, domestic and global interest rates, and domestic income, which ultimately defines the BB curve that captures the equilibrium in the balance of payments.

2.3 Inflation, Growth, and Unemployment

In the long run, factors on the supply side of the economy, such as productivity, technological innovations, and labor market dynamics, primarily determine real income and employment levels. These factors define the economy's potential output by influencing how efficiently goods and services are produced. Additionally, the flexibility of markets—how quickly the economy can adjust to changes—is significantly shaped by welfare policies and regulatory frameworks. Welfare policies can impact labor participation and mobility, while regulatory environments either promote or impede business operations and the hiring process. According to the European Central Bank (2004), these structural elements are critical in shaping long-term trends in income and employment.

Olivier Blanchard, a distinguished economist and former Chief Economist at the International Monetary Fund, emphasizes that monetary policy not only affects the actual unemployment rate but also has an impact on the natural rate of unemployment over time. The natural rate of unemployment refers to the baseline level of unemployment that exists even when the economy is operating at full capacity, often due to labor market inefficiencies or mismatches in worker skills. Blanchard highlights that central banks, through their influence on interest rates and inflation expectations, play a significant role in shaping both short-term and long-term unemployment dynamics.

Historical trends show that while unemployment generally rises slowly over time, it can experience sharp increases during economic recessions. In such periods, businesses often scale back production and reduce their workforce, leading to higher unemployment. However, once the recession ends and economic conditions improve, unemployment rates tend to decline, often returning to pre-recession levels. This cyclical nature of unemployment reflects the interplay between short-term demand-side factors, such as consumer spending and investment, and long-term supply-side factors that together shape the broader economic environment.

Monetary policy plays a key role in influencing economic activity through several channels, including changes in interest rates, credit availability, asset prices, exchange rates, and public expectations (Mishkin, 1996; ECB, 2004). These channels enable central banks to steer the economy towards goals like stable inflation and sustainable growth. For instance, adjustments in interest rates affect the cost of borrowing for businesses and households, while changes in exchange rates can impact a country's trade balance by influencing the competitiveness of its exports.

The importance of monetary policy is especially evident during economic downturns. emphasize that monetary policy is a vital tool for managing recessions, as it becomes particularly effective in stimulating demand and promoting recovery. provide compelling evidence that monetary policy interventions are most impactful during recessions, when traditional growth drivers such as private investment and consumption are weakened.

Further research supports this view. found that interest rate changes have nearly double the effect on economic output during recessions compared to periods of stability, illustrating the heightened sensitivity of the economy to monetary policy in fragile conditions. Stockhammer and Simon (2008) argue that a comprehensive understanding of the relationship between monetary policy and unemployment requires a focus on how these policies function during recessions. The timing and intensity of monetary policy during downturns can significantly influence long-term employment trends and contribute to overall economic stability.

3 Research Method

The data utilized in this research comprises annual data covering the period from January 2000 to 2023, with the study focusing on Indonesia. The data was collected through a documentation method, relying on secondary sources. These secondary data were sourced from reputable institutions, including Susenas and the National Statistics Agency (BPS), providing comprehensive and reliable information for the analysis.

3.1. Data Analysis Method and Research Model

This research applies the Vector Autoregression (VAR) method. Univariate autoregression, a linear model, explains the current value of a variable based on its previous values.), along with later influential studies, highlighted the reliability and robustness of VAR as a framework for data analysis, forecasting, structural interpretation, and policy evaluation (Stock et al., 2001). One of the key features of VAR is that it treats all variables symmetrically, without distinguishing between dependent and independent variables (Sims, as cited in Gujarati, 2003: 848). With the selected variables in mind, the research model can be formulated as follows:

$$\mathrm{OPT_t} = a_{11}OPT_{t-1} + a_{12}GWM_{t-1} + a_{13}RDiskonto_{t-1} + a_{14}rJUB_{t-1} + a_{15}rDOM_{t-1}$$
$$+ a_{16}EXC_{t-1} + a_{17}EXPOR_{t-1} + a_{18}IMPOR_{t-1} + a_{19}INV_{t-1} + a_{1.10}UNEMP_{t-1}$$
$$+ a_{1.11}BOP_{t-1} + a_{1.12}INF_{t-1} + a_{1.13}GROW$$
$$+ a_{11}OPT_{t-2} + a_{12}GWM_{t-2} + a_{13}RDiskonto_{t-2} + a_{14}rJUB_{t-2} + a_{15}rDOM_{t-2}$$
$$+ a_{16}EXC_{t-2} + a_{17}EXPOR_{t-2} + a_{18}IMPOR_{t-2} + a_{19}INV_{t-2} + a_{1.10}UNEMP_{t-2}$$
$$+ a_{1.11}BOP_{t-2} + a_{1.12}INF_{t-2} + a_{1.13}GROW_{t-2}$$

Where;

OPT	: Operation market operation
GWM	: Reserve requirement
RDiskonto	: The Interest Rate of Bank Indonesia Certificates (SBI)
JUB	: Money Suply
RDOM	: The Domestic Interest Rate
EXC	: *Exchange Rate*
EXPOR	: *Export*
IMP	: *Import*
INV	: Investment
INF	: Inflation rate
GROW	: Growth
UNEMP	: Unemployment
BOP	: Balance of Payment

3.2 Data Analysis Techniques

The use of the VAR (Vector Autoregression) model in research involves several essential tests, including the stationarity test, optimal lag determination, model stability test, and cointegration test. The stationarity test ensures that the data's mean and variance remain constant over the observation period, as per Gujarati (2003). The optimal lag determination is used to identify the time period over which a variable is influenced by its own past values or by other endogenous variables. In Eviews, the optimal lag is indicated by a star symbol, and the lag with the most stars is considered optimal. The stability test for the VAR model evaluates whether the system is stable by ensuring that all unit roots have a modulus of less than one and lie within the unit circle. Stability in the VAR system is crucial for valid results.

To determine whether the variables in the system exhibit a long-term equilibrium relationship, a cointegration test is applied, consistent with economic theory. This can be conducted using several methods, such as the Engle-Granger Cointegration Test, the Cointegration Regression Durbin-Watson Test, or the Johansen Cointegration Test. Additionally, the Impulse Response Function (IRF), derived from the Vector Moving Average, analyzes the duration and magnitude of the effect of shocks from one variable on another over time. Finally, the Variance Decomposition (VD) test measures the importance of each variable within the VAR system by assessing how shocks to one variable affect the behavior of others, providing insight into the dynamic interactions between variables.

4 Research Result

4.1. Analysis of Research Results

Unit Root Test (Stationarity Test)

Table 1. Results of Unit Root Test at Level

No	Variable	ADF Value	Critical Value	Probability	Summary
1	OPT	-1.712077	-3.577723	0.4188	Not Stationary
2	GWM	-1.885709	-3.577723	0.3360	Not Stationary
3	R DISKONTO	-0.599742	-3.577723	0.8608	Not Stationary
4	JUB	2.070368	-3.577723	0.9999	Not Stationary
5	R DOM	-0.497233	-3.577723	0.8825	Not Stationary
6	EXC	-3.731251	-3.577723	0.006	Stationary
7	EXPORT	-0.476388	-3.577723	0.9841	Not Stationary
8	IMPORT	-0.50109	-3.577723	0.8817	Not Stationary
9	INV	-0.915957	-3.577723	0.7745	Not Stationary
10	UN EMP	-4.801618	-3.577723	0.0003	Stationary
11	BOP	-3.758513	-3.577723	0.0062	Stationary
12	INF	-2.474209	-3.577723	0.1281	Not Stationary
13	GROW	-2.26451	-3.577723	0.1874	Not Stationary

Table 2. Results of Unit Root Test at First Difference Level

No	Variable	ADF Value	Critical Value	Probability	Summary
1	OPT	5.006221	-3.58112	0.0002	Stationary
2	GWM	8.402720	-3.58112	0.0000	Stationary
3	R DISKONTO	2.771953	-3.58112	0.072	Not Stationary
4	JUB	0.59174	-3.58112	0.9863	Not Stationary
5	R DOM	3.5773325	-3.58112	0,0101	Stationary
6	EXPORT	6.123948	-3.58112	0.0000	Stationary
7	IMPORT	7.104607	-3.58112	0.0000	Stationary
8	INV	3.937790	-3.58112	0.0038	Stationary
9	GROW	7.727681	-3.58112	0.0000	Stationary

Table 3. Results of Unit Root Test at *second difference* ***level***

No	Variable	ADF Value	Crical Value	Prob	Conclusion
1	R diskonto	-7.03183	-3.584743	0.0000	Stationary
2	R dom	6.638805	-3.584743	0.0000	Stationary
3	JUB	0.46634	-3.584743	0.8822	Not Stationary

*Source: Data processed using Eviews 6; *) McKinnon Critical Value at 1% Significance Level*

The data presented in Table 4.3 reveals that the variables \(rDISKONTO\) and \(rDOM\) have achieved stationarity at the second difference level. This indicates that these variables no longer exhibit trends or seasonality, making them suitable for inclusion in further analysis. However, the JUB variable remains non-stationary even after taking the second difference. This non-stationarity suggests that including JUB in the model could lead to spurious regression, where the results may be misleading due to the presence of non-stationary data. As a result, it is necessary to remove the JUB variable from the model. This conclusion is corroborated by the results of the Augmented Dickey-Fuller (ADF) test, where the ADF test statistic is smaller than the McKinnon critical value, and the associated probability value is less than 0.01, indicating that stationarity has not been achieved for JUB.

Cointegration Test.

The Cointegration Test is performed to determine whether there exists a long-term equilibrium relationship between variables, particularly in cases where the data is non-stationary. This test is essential for identifying whether the variables move in tandem over time, even though they may individually exhibit non-stationarity. Common methods for conducting this test include the Engle-Granger test and the Johansen cointegration test. When cointegration is detected, it signifies that the non-stationary variables share a common stochastic trend, allowing for meaningful long-term relationships to be analyzed despite their individual non-stationarity. This is vital for ensuring that regression results remain valid and do not lead to spurious conclusions.

Table 4. Johansen Cointegration Test

Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.953491	606.4975	334.9837	0.0000
At most 1 *	0.917215	465.3646	285.1425	0.0000
At most 2 *	0.817798	350.7553	239.2354	0.0000
At most 3 *	0.768457	272.4339	197.3709	0.0000
At most 4 *	0.701350	205.1364	159.5297	0.0000
At most 5 *	0.593439	149.5462	125.6154	0.0008
At most 6 *	0.552097	108.1452	95.75366	0.0053
At most 7 *	0.441036	71.19907	69.81889	0.0387
At most 8	0.392828	44.44227	47.85613	0.1010
At most 9	0.257384	21.49089	29.79707	0.3277
At most 10	0.154493	7.802401	15.49471	0.4868
At most 11	0.001797	0.082729	3.841466	0.7736

Trace test indicates 8 cointegrating eqn(s) at the 0.05 level

As shown in Table 4.4, eight equations demonstrate cointegration at a significance level of 5 percent.

Table 5. Optimal Lag Length Determination

Lag	Log L	LR	FPE	AIC	SC	HQ
0	43.56159	NA	4.12e-16	-1.372243	-0.895206	-8.818594
1	549.0601	725.2804	7.43e-23	-17.08957	-10.88809*	-14.76646
2	777.1239	208.2322*	7.67e-24*	-20.74452*	-8.818594	-16.27699*

Table 4.5 shows that the optimal lag length varies based on the criterion applied: the Akaike Information Criterion (AIC) identifies lag 2 as the optimal choice, the Schwarz Criterion (SC) indicates lag 1, and the Hannan-Quinn Criterion (HQ) also recommends lag 2.

In cases where different criteria recommend different lag lengths, researchers generally prioritize one criterion based on the context of the analysis or combine the results for a more balanced approach. The AIC typically favors longer lag lengths, whereas the SC tends to select more parsimonious models with shorter lags. The final choice of lag length ultimately depends on the objectives of the study, balancing between model complexity and accuracy.

Uji Stabilitas VAR

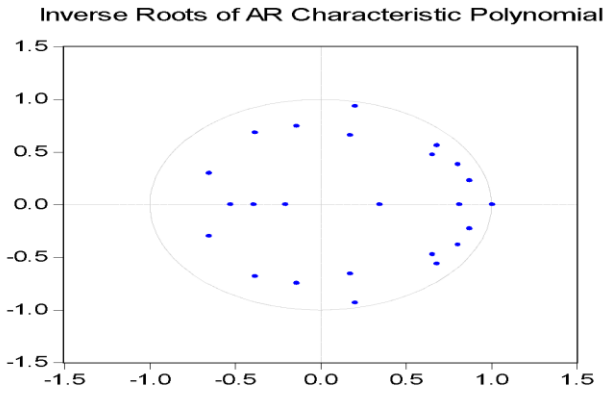

Fig. 1. Results of VAR Stability Test

Analysis Models

Struktural Vector Auto Regression (SVAR)

Table 6. Results of SVAR Estimation and the Impact of a 5% OPT Shock

	Before the OPT Shock		After Shock OPT		Coef Change
	Coefficient	Prob	Coefficient	Prob	
C1 (OPT)	-0.057995	0.6941	-0.089422	0.5442	-0.031427
C2 (GWM)	0.013816	0.9253	0.019671	0.8939	0.005855
C3 (rDisk)	-0.001160	0.9937	-0.002912	0.9842	-0.001752
C4 (rDom)	-0.011007	0.9405	-0.005678	0.9693	0.005329
C5 (EXC)	0.108715	0.4609	0.092634	0.5298	-0.016081
C6 (EXPORT)	0.079221	0.5911	0.065234	0.6582	-0.013987
C7 (IMP)	-0.062665	0.6708	0.030633	0.8354	0.093298
C8 (INV)	-0.209790	0.1548	0.007538	0.9592	0.217328
C9 (OPT)	2.045633	0.0000	0.993883	0.0000	-1.05175
C10 (GWM)	-0.454719	0.0020	-0.862430	0.0000	-0.407711
C11 (rDisk)	-1.102335	0.0000	0.193802	0.1887	1,296137
C12(rDOM)	0.078387	0.5950	-0.976476	0.0000	-0.898089
C13 (EXC)	-1.444291	0.0000	0.133189	0.3684	1,311102
C14 (EXPORT)	-0.641494	0.0000	-0.746557	0.0000	-0.105063
C15 (IMP)	4.849115	0.0000	0.355881	0.0158	-4.493234
C16 (INV)	2.329909	0.0000	-0.245848	0.0954	-2.084061
C17 (UNEMP)	-3.304541	0.0000	0.786504	0.0000	4.091045
C18 (OPT)	-2.287384	0.0000	-7.180923	0.0000	-4.893542
C19 (GWM)	-0.135935	0.4014	4.622960	0.0000	4.478025
C20 (rDisk)	1.229894	0.0000	1.699247	0.0000	0.469353

C21(rDOM)	2.442088	0.0000	-1.442268	0.0000	-3,884356
C22(EXC)	-12.77391	0.0000	-3.406965	0.0000	9,366945
C23 (EXPOR)	6.158902	0.0000	0.212981	0.2477	-5,945921
C24 (IMP)	-3.915003	0.0000	0.077228	0.6218	3,992231
C25 (INV)	-2.482068	0.0000	0.464861	0.0022	2,946929
C26 (UNEMP)	2.273196	0.0000	1.247163	0.0000	-1,026033
C27 (BOP)	0.309491	0.0358	0.127123	0.3886	-0,182368
C28 (OPT)	-1.367774	0.0041	1.834591	0.0891	3,202365
C29 (GWM)	-1.698417	0.0000	-2.009942	0.0046	-0,311525
C30 (rDisk)	-0.845875	0.0030	-1.329271	0.0000	-0,483396
C31 (rDOM)	1.636008	0.0000	2.080652	0.0000	0,444644
C32 (EXC)	-5.090151	0.0074	-1.767656	0.0007	3,322493
C33 (EXPOR)	5.636611	0.0000	4.858220	0.0000	-0,77789
C34 (IMP)	-7.356434	0.0000	-1.797756	0.0000	5,558678
C35 (INV)	-0.063818	0.9031	-0.279942	0.0929	-0,216124
C36 (UNEMP)	2.091569	0.0006	-0.473848	0.0712	-2,565417
C37 (BOP)	0.126896	0.4110	0.280409	0.0592	-0,153513
C38 (INF)	-0.148985	0.3123	0.172498	0.2420	0,321483

Table 6 presents a thorough and in-depth analysis of the estimated effects that various monetary instruments have on a wide range of macroeconomic indicators, showcasing a total of 38 coefficients alongside their corresponding probability values. These coefficients provide quantifiable measures of how changes in monetary policy directly affect key economic variables. More specifically, coefficients C1 to C8 assess the influence of monetary instruments on unemployment, offering valuable insights into how shifts in monetary policy, such as interest rate adjustments or liquidity management, impact unemployment rates. This analysis helps clarify the extent to which central bank actions can stimulate or dampen labor market conditions.

Coefficients C9 to C17 are focused on the balance of payments, which is a crucial measure of a nation's economic transactions with the rest of the world. These coefficients demonstrate how modifications in monetary policy influence the balance of payments, thereby affecting the country’s international financial position. For example, changes in interest rates could lead to fluctuations in foreign investment and capital flows, which directly impact the balance of payments and the country's economic standing on a global scale.

In addition, coefficients C18 to C27 explore the effect of monetary policy on inflation. This set of coefficients highlights the degree to which central bank decisions contribute to either maintaining price stability or triggering inflationary pressures. Inflation management is a key aspect of monetary policy, and the findings from this section shed light on how well monetary instruments, such as interest rates or reserve requirements, control inflation. For instance, tighter monetary policy may reduce inflation but could also hinder growth, while looser policy may stimulate demand but risk fueling inflation.

Finally, coefficients C28 to C38 delve into the relationship between monetary instruments and economic growth. This segment of the analysis illustrates how different policy interventions, such as changes in discount rates or open market operations, can either drive economic expansion or act as constraints on growth. Understanding the precise impact of these instruments on growth provides essential insights for policymakers, who must balance the goals of fostering economic development while maintaining financial stability.

The probability values associated with each coefficient further provide a measure of the statistical significance of these relationships, with lower values (generally below 0.05) indicating a higher likelihood that the observed effects are not merely the result of random variation. This statistical insight strengthens the reliability of the findings, ensuring that the relationships identified between monetary policy actions and macroeconomic variables are meaningful and not coincidental.

Moreover, these coefficients reveal the degree of sensitivity that various macroeconomic variables—such as unemployment, the balance of payments, inflation, and economic growth—display in response to monetary policy shocks. These shocks may take the form of interest rate changes, adjustments to reserve requirements, or open market operations. By analyzing the response of these indicators to such interventions, the model provides a nuanced understanding of how monetary policy influences the broader economy.

The detailed assessment of Table 6 offers critical insights into the complex and dynamic interactions between monetary instruments and key macroeconomic indicators. The findings not only help policymakers better comprehend the effects of their monetary decisions but also equip them with the knowledge to forecast potential outcomes of future interventions. For instance, understanding how a change in the discount rate might affect unemployment or inflation can guide central banks in fine-tuning their policies to achieve specific economic goals.

Furthermore, this analysis contributes to broader economic discourse by illustrating the interconnectedness of monetary policy decisions with domestic and international economic variables. It emphasizes the importance of timing, scale, and precision in the application of monetary tools, highlighting that miscalculated or untimely interventions could have unintended consequences, such as increased inflation or unsustainable growth patterns.

In summary, the findings derived from Table 6 offer valuable guidance for policymakers aiming to achieve optimal economic outcomes. By understanding the distinct and interconnected impacts of monetary policy on unemployment, inflation, the balance of payments, and growth, decision-makers are better equipped to implement strategies that support macroeconomic stability and long-term prosperity. This comprehensive analysis serves as a key resource for navigating the complexities of monetary policy in an ever-evolving economic landscape.

Discussion

The findings from various studies highlight the critical role that monetary policy instruments play in influencing Indonesia's economic outcomes. Open market operations, reserve requirements, and the discount rate are the primary tools employed by Bank Indonesia to

manage economic stability and growth. These instruments are intricately connected to key macroeconomic variables such as inflation, economic growth, and exchange rate stability (Fitra Waty, 2014). The interdependencies between these tools emphasize the need for careful coordination and calibration by policymakers to achieve the desired economic objectives.

One significant finding from the research is the impact of the money supply (M2) and interest rates on price and exchange rate stability. found that these monetary indicators play an important role in both the short and long term, directly affecting inflation and currency value. The stability of the exchange rate, in particular, is vital for maintaining Indonesia's competitiveness in international trade, as fluctuations can influence the balance of payments and broader economic stability. This reinforces the importance of Bank Indonesia's active role in adjusting interest rates and managing liquidity to ensure that inflation remains within target levels and that the currency remains stable.

In addition to these domestic effects, the research emphasizes the relationship between monetary policy and Indonesia's balance of payments. The findings suggest that Bank Indonesia's monetary tools not only affect internal economic factors but also play a role in managing the country's external financial position. As Indonesia is an open economy with significant international trade and capital flows, the balance of payments is crucial for maintaining overall economic health. By carefully adjusting open market operations and reserve requirements, Bank Indonesia can influence capital inflows and outflows, thus stabilizing the external sector.

Moreover, the dynamic relationship between monetary policy instruments and economic outcomes in Indonesia is further emphasized in a regional context. Rasyidin et al. (2022) identified that Indonesia, unlike some other ASEAN countries, demonstrates a unique responsiveness to its monetary policy tools, reflecting a more complex and adaptive economic environment. This suggests that Indonesia's economy may be more sensitive to changes in monetary policy, requiring greater flexibility and precision in the application of policy instruments to navigate both domestic and global economic challenges effectively.

Overall, these findings illustrate the critical role of monetary policy in ensuring macroeconomic stability in Indonesia. The interplay between instruments such as open market operations, reserve requirements, and interest rates is complex, and their proper management is essential to promoting sustainable growth, maintaining price stability, and ensuring balance in international trade. The ability of Bank Indonesia to fine-tune these instruments in response to shifting economic conditions is paramount in securing Indonesia's long-term economic health.

These findings have important implications for policymakers. Understanding the positive and negative correlations between different monetary policy instruments and macroeconomic outcomes can guide Bank Indonesia in optimizing its monetary policy. For example, policymakers must be cautious when utilizing tools like open market operations and reserve requirements, as these show negative correlations with growth. Similarly, the positive relationship between domestic interest rates, exports, and unemployment suggests that adjustments to interest rates should be made with careful consideration of their broader economic effects, particularly in balancing growth and inflation control.

The analysis indicates that the effects of monetary policy instruments differ in the short and long term. While instruments like open market operations and interest rates can have immediate impacts, tools such as reserve requirements may influence economic outcomes over a longer period. Policymakers need to consider both the short-term shocks and the long-term structural adjustments when making decisions to promote sustainable economic growth.

Given Indonesia's open economy, the role of external factors, such as global economic conditions, commodity price fluctuations, and foreign capital flows, cannot be ignored. These external shocks can amplify or dampen the effects of domestic monetary policy. For instance, global interest rates and exchange rate volatility can significantly affect Indonesia's trade balance and inflation rates. Therefore, Bank Indonesia's monetary policy must be flexible and responsive to these global dynamics, ensuring that domestic instruments are calibrated to withstand international pressures.

Based on these findings, several recommendations can be made for monetary authorities. First, when addressing inflation or managing liquidity, Bank Indonesia should carefully adjust open market operations and interest rates while considering their potential dampening effect on growth. Second, the reserve requirement ratio could be used as a longer-term tool to manage systemic liquidity without creating excessive short-term volatility. Finally, maintaining a balance between domestic interest rates and exchange rate stability is crucial for safeguarding Indonesia's external financial position, especially in managing exports and imports.

This study has provided important insights, but it also faces limitations, particularly in terms of the complexity of global economic interactions that might not be fully captured in the data. Future research could explore how emerging technologies, changes in global financial architecture, or economic shocks (such as pandemics or financial crises) might further influence the effectiveness of monetary policy instruments in Indonesia. Additionally, further investigation into the distributional impacts of monetary policy on different economic sectors could provide a more nuanced understanding of how these tools affect various parts of the economy.

In conclusion, the study highlights the dynamic and evolving relationship between monetary policy instruments and macroeconomic indicators in Indonesia. The ability of Bank Indonesia to finely tune these instruments, especially in response to both domestic and international economic challenges, will be critical in ensuring the country's long-term economic health and stability.

5 Conclusion

This study has explored the relationship between monetary policy instruments and macroeconomic indicators in Indonesia from 2000 to 2023. The findings reveal that certain variables, such as investment, balance of payments, and inflation, do not significantly influence

economic growth. However, variables like domestic interest rates, exports, unemployment, and balance of payments exhibit positive correlations with growth, while factors such as open market operations, reserve requirements, the discount rate, exchange rates, and exports display negative correlations with growth.

The results also show that a 5% shock to open market operations in 2010 had significant impacts on economic growth, particularly through changes in the discount rate, domestic interest rates, exchange rates, and exports. Imports demonstrated the largest reaction to the shock, while exports had the most substantial coefficient in terms of their contribution to growth.

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