Monetary Policy Analysis in Strengthening Economic Fundamentals in Indonesia

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Abstract

This study aims to determine the monetary policy in strengthening the economic fundamentals. The variables in this study are the Money Supply, Exchange Rate, Inflation and Economic Growth (GDP). The analysis method used in this study is using the Vector Auto Regression model or abbreviated as the VAR method with the Impulse Response Function (IRF) test, Forecast Error Variance Decomposition (FEVD), stationarity test, cointegration test, lag structure stability test, and optimal lag length test. The results of the Vector Autoregression study using the lag 2 basis show that there is a contribution from each variable to the variable itself and other variables. The results of the Vector Autoregression analysis also show that past variables (t-1) contribute to the current variables both to the variables themselves and other variables. From the results of the analysis, there is a reciprocal relationship between one variable and another. Response Function analysis shows the response of other variables to changes in one variable in the short, medium and long term, and it is known that the stability of the response of all variables is formed in the short, medium and long term. Variance AnalysisDecomposition shows the existence of variables JUB and Inflation.

Keywords: JUB, Inflation, Exchange Rate and GDP

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Introduction

Monetary policy is implemented by the Governor of the Central Bank (Bank Indonesia) to determine the amount of money in circulation. The government tightens the national money supply, credit and banking system. By changing the amount of money in circulation, the Central Bank can influence several financial variables and economic variables such as: interest rates, stock prices and exchange rates. By reducing the amount of money in circulation, it will increase interest rates and reduce investment which means lowering GNP and inflation. The essential nature of monetary policy is how the Central Bank controls the amount of money in circulation and the relationship between money, output and inflation, is one thing that is very fascinating in macroeconomics although often controversial. Tight money policy in the United States by reducing the growth rate of the amount of money has raised interest rates, slowed economic growth, and increased unemployment during 1979-1982.

Monetary policy is a policy that is intended to increase national income by changing the amount of money in circulation or changing the demand for money. In fact, in general, monetary policy is divided into two, namely tight money policy and loose money policy. Tight money policy is a policy that is intended to reduce the amount of money in circulation, so that it involves the provision of very selective bank credit facilities (selective credit control). Loose money policy is a policy that can easily provide bank credit to increase the amount of money in circulation. In general, three monetary policy instruments are known, namely open market operations, discount interest rate policies (rediscount policy), and central bank reserve or decking policies (reserve requirements).(anik, 2008).

The tool for measuring and analyzing the level of economic development of a country is economic growth, which is calculated from the difference between the Gross Domestic Product (GDP) of a certain year and the previous year. A country's economy will grow if the total output of goods production and service provision is greater than the previous year, or the total allocation of output is greater than the previous year. With a higher level of economic growth, economic development can be considered better. As a result, every country strives to achieve high economic growth.

Various economic sectors support economic growth, and the financial sector is one that plays a role in supporting economic growth. Financial inclusion means that a person or group has the ability to have access to formal financial goods and services that are useful and cheap and are able to meet their needs responsibly and sustainably, such as transactions, payments, savings, credit, and insurance.

The rupiah exchange rate on December 16, 2020 strengthened evenly, although it weakened only slightly point to point compared to the November 2020 level. The maintained development of the rupiah exchange rate was driven by an increase in foreign capital inflows into the domestic financial market in line with decreasing uncertainty in the global financial market and positive investor perceptions of the prospects for improving the domestic economy. Bank Indonesia continues to strengthen the rupiah exchange rate stabilization policy in accordance withfundamentals and the functioning of market mechanisms, through the effectiveness of monetary operations and the availability of liquidity in the market. Core inflation remains low in line with the influence of domestic demand which is not yet strong, the consistency of Bank Indonesia's policy in directing inflation expectations within the target range, and the stability of the exchange rate being maintained. Meanwhile, inflation in the

volatile food group increased mainly due to seasonal factors due to the increase in horticultural commodity prices along with the passing of the harvest season and the increase in global commodity prices. Inflation in the administered prices group also increased driven by the increase in air transportation fares amid deflation in electricity commodity rates in line with the tariff adjustment policy(E. Mulya Samsul, 2021).

The government is implementing monetary policy to continue the Rupiah exchange rate policy to maintain exchange rate stability in line with fundamentals and market mechanisms, continuing to strengthen the monetary operations strategy to strengthen the effectiveness of the accommodative monetary policy stance, strengthening the transparency policy of the basic credit interest rate (SBDK) with an emphasis on increasing new credit interest rates, extending the policy of reducing the late payment fine for credit cards by 1 percent of the outstanding, accelerating the money market deepening program by strengthening the money market regulatory framework and implementing the Electronic Trading Platform (ETP) Multimatching, especially the Rupiah and foreign exchange money markets, as well as facilitating the implementation of trade and investment promotions and continuing the socialization of the use of Local Currency Settlement (LCS) in collaboration with related agencies. Monetary policy aims to ensure that the performance of the world economy continues to improve according to forecasts, amid the declining uncertainty of the global financial market.(Ratna, 2022)

The exchange rate or foreign exchange rate indicates the price or value of a country's currency expressed in the value of another country's currency". The foreign exchange rate can also be defined as the amount of domestic money needed, namely the amount of rupiah needed, to obtain one unit of foreign currency. The exchange rate between two countries will change over time (Supriana, 2008).

High inflation rates in a country will make domestically produced goods more expensive, making them less competitive in the global market (Bendesa, 2015). However, according to Sukirno in Djayastra (2016), the inflation rate is an economic condition in which prices and costs usually continue to rise. If domestic inflation increases higher than foreign inflation, import demand increases. As a result, the Rupiah exchange rate against the US Dollar declines or decreases (Dzakiyah, 2018).

If the credit interest rate increases, the loan interest burden will increase, which means that the bank interest received from the loan will also increase. Increasing credit interest rates can cause bad debts for debtors who borrow money from the bank. high probability that they will not be able to pay their debts. So to avoid the risk of bad debts, credit interest rates must be considered. To determine the credit interest rate (base lending rate), the bank must calculate the cost of funds and other costs associated with calculating the base lending rate. The calculation of the cost of funds is calculated using the weighted average cost of funds approach or the Weighted Average Cost of Fund approach. isk factor, spread, and tax(Agustin, 2018).

METHOD

The approach taken by quantitative researchers is based on secondary data from the period 2005-2022 through the Worldbank. The conceptual framework of the research is as follows:

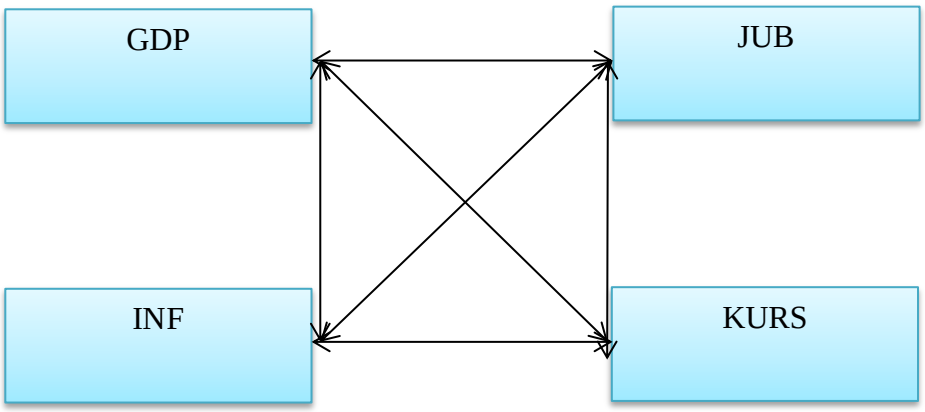

Figure 1 Conceptual Framework of Research

The conceptual framework image explains the model used is the Vector Autoregression (VAR) test to analyze monetary policy in strengthening economic fundamentals in Indonesia by looking at the formation of vectors that influence each other between variables. According to Manurung (2009) it is impossible to distinguish between endogenous and exogenous variables if simultaneity between several variables is true. Testing simultaneous relationships and degrees of integration between variables in the long term using the VAR method is used because it is easier to use and to empirically prove the complex long-term reciprocal relationship of endogenous variables. The VAR analysis model consists of the following formula:

$$INF_t = \beta_{10}\, INF_{t-p} + \beta_{12}\, PDB_{t-p} + \beta_{13}\, JUB_{t-p} + \beta_{14}\, KURS_{t-p} + \beta + e_{t1}$$

$$PDB_t = \beta_{10}\, INF_{t-p} + \beta_{12}\, PDB_{t-p} + \beta_{13}\, JUB_{t-p} + \beta_{14}\, KURS_{t-p} + \beta + e_{t1}$$

$$JUB_t = \beta_{10}\, INF_{t-p} + \beta_{12}\, PDB_{t-p} + \beta_{13}\, JUB_{t-p} + \beta_{14}\, KURS_{t-p} + \beta + e_{t1}$$

$$KURS_t = \beta_{10}\, INF_{t-p} + \beta_{12}\, PDB_{t-p} + \beta_{13}\, JUB_{t-p} + \beta_{14}\, KURS_{t-p} + \beta + e_{t1}$$

Where :
INF = Inflation
GDP = Economic Growth
JUB = Amount of Money in Circulation
KURS = Currency Value
p = length lag

Next is the analysis of the Impulse Response Function (IRF) model, conducted to understand how each variable affects the standard deviation of innovation. Ariefianto (2012) explains that IRF conducts a search related to the impact of shocks or shocks on a variable in the system within a certain period of time. The purpose of the IRF analysis is to determine whether each transmission variable is cointegrated in both the short and long term. Manurung (2005) stated that IRF is an indicator of changes in the direction of movement of transmission

variables as a result of changes in other transmission variables. To find out how important various shocks are to the variable itself and other variables, the Forecast Error Variance Decomposition (FEVD) is used. Manurung (2005) stated that the purpose of the FEVD analysis is to determine the contribution or influence between transmission variables.

Further analysis is carried out with the Assumption test consisting of the Data Stationarity Test (Unit Roots Test) and the Johansen Cointegration Test. Data stationarity can be obtained from data that is initially non-stationary through testing the degree of integration or stationarity at the level of data differentiation. This process involves testing the availability of data stationarity at one level and then repeating the test at the differentiation level until it reaches a stationary condition. Dickey-Fuller recommends applying certain regression models to determine the presence of unit roots in the data, as follows:

$\Delta Yt = \theta Yt\text{-}1 + et$ (1)

$\Delta Yt = \beta 1 + \theta Yt\text{-}1 + et$ (2)

$\Delta Yt = \beta 1 + \beta 2t + \theta Yt\text{-}1 + et$ (3)

In equation (1), the variable that shows the difference in time trend is denoted as t, and there are two additional regressors that include constant and time trend variables. Each model has two hypotheses considered: the null hypothesis $\Theta = 0$, which indicates the non-stationarity of the data, and the alternative hypothesis $\Theta < 0$, which indicates that the data is stationary. The DF statistic, represented by the t value of the coefficient $\Theta Yt\text{-}1$, is compared with its critical value; the rejection of the null hypothesis occurs if the absolute value of the DF statistic exceeds the critical value, indicating that the observed data is stationary. Conversely, if the value of the DF statistic is smaller than the critical value of the t distribution, then the data is considered non-stationary. The residuals et and autocorrelation elements are often related and interrelated according to the assumptions in equations (1) and (2). Dickey Fuller then included the autocorrelation element into his model, known as the Augmented Dickey-Fuller (ADF) to develop the unit root test. This ADF test is commonly used to assess the stationarity of data. The formulation of the ADF test can be explained as follows:

$\Delta Yt = \gamma Yt{-}1 + \sum \beta \Delta Yt{-}1{+}1n\ t{-}1 + et$(4)

$\Delta Yt = \alpha 0 + \gamma Yt{-}1 + \sum \beta \Delta Yt{-}1{+}1n\ t{-}1 + et$(5)

$\Delta Yt = \alpha 0 + \alpha 1T + \gamma Yt{-}1 + \sum \beta \Delta Yt{-}1{+}1n\ t{-}1 + et$(6)

Where: Y = Research variable Yt = Yt – Yt-1 T = Time trend N = lag value The process of assessing whether the data is stationary or not involves comparing the ADF statistic value with the Mackinnon critical distribution value. The t statistic value of the coefficient $\gamma Yt\text{-}1$ is given in equations (4 to 6). If the absolute value of the ADF statistic exceeds its critical value, then the observed data shows a stationary nature. Conversely, if the absolute value of the ADF statistic is smaller than its critical value, then the data is considered non-stationary. It is also important to determine the length of the lag in the ADF test, and the Aikake Information Criterion (AIC) or Schwarz Information Criterion (SIC) can be used tothe purpose. The model with the lowest AIC and SIC values is considered the most appropriate model. After knowing

that the Export and Import data are stationary, the next step will determine whether there is a long-run equilibrium relationship between the two. There is one direction of Granger causality that is most uncertain if the two variables are integrated in degree one, I (1) and cointegrated. Based on the representation theorem, it is said that if a vector of n/ (1) of time series data Xt is cointegrated with the cointegration vector, then there is an error correction representation, which can be mathematically represented by: A (L).Xt = -yaXt-1 + β(L) εt (7) Where: A(L) is a polynomial matrix in the lag operator with A(0) = I; Y is a (nx1) constant vector that is not equal to zero; β(L) is a polynomial scalar in L; and εt is a vector of error variables that are white noise. In the short term, any deviation from long-term equilibrium (a'X=0) will affect the change in Xt and will adjust back towards equilibrium. The cointegration test that will be used here uses a test procedure.

RESULTS AND DISCUSSION

The results of Vector Autoregression (VAR) show that with a lag of 1, the vector autoregression analysis shows the contribution of each variable to the variable itself and other variables, which is more clearly described in the following table:

Table 1 VAR Results

Lag 1	Lag 2
Vector Autoregression Estimates Date: 08/10/24 Time: 15:16 Sample (adjusted):2 17 Included observations: 16 after adjustments Standard errors in()&t-statistics in[] Determinant resident covatiance (dofadj.) 4650749. Determinant residual covariance 1038996. Log likelihood -201.6422. Akaike informationcriterion 27.70527 Black criterion 28.67101 Number of coefficients 20	Vector Autoregression Estimates Date: 08/10/24 Time: 15:16 Sample (adjusted):3 17 Included observations: 15 after adjustments Standard errors in()&t-statistics in[] Determinant resid covatiance (dofadj.) 52060.83. Determinant residual covariance 1332.757 Log likelihood -139.0989 Akaike informationcriterion 23.34651 Black criterion 25.04583 Number of coefficients 36

Source: Author's processed data, 2024

In Table 1. above, the VAR results show the Lag 1 AIC value of 27.20 < Lag 2 AIC value of 23.34 also shows that the past variable (t-1) contributes to the current variable, both to the variable itself and to other variables. The analysis results show that there is a reciprocal relationship between the variables. Next is the Impulse Response Function (IRF) analysis with the results described as follows:

Table 2. Summary of Impulse Response Function (IRF) results

Response of INF:				
Period	INF	JUB	EXCHANGE RATE	GDP
1	0.705111	0.000000	0.000000	0.000000
5	-3.947931	-8.409645	-0.666176	1.711035
10	15.29608	26.02502	12.66712	-8.429630
Response of KURS:				
Period	INF	JUB	EXCHANGE RATE	GDP
1	272.2670	-27.33949	397.5472	0.000000
5	252.2659	-64.61109	2.275627	218.2436
10	-4626.280	-10324.24	-316.1004	2499.944
Response of PDB:				
Period	INF	JUB	EXCHANGE RATE	GDP
1	-1.040101	-1.756013	-0.450059	0.540260
5	-4.668907	-9.591760	-0.796295	2.155627
10	23.97064	43.52074	15.69939	-12.83669
Response from JUB:				
Period	INF	JUB	EXCHANGE RATE	GDP
1	0.621547	1.506628	0.000000	0.000000
5	3.384726	6.615858	1.151798	-1.585486
10	-8.860997	-13.76353	-9.656296	5.135463

Source: Author's processed data, 2024

Based on Table 2. Above, the results obtained state that the inflation variable is responded positively in the short and long term but in the medium term it is responded negatively. Then for the exchange rate variable in the increase in the exchange rate is responded positively in the short and medium term but in the long term it is responded negatively. After that for the economic growth variable in the increase in economic growth is responded positively by the short and medium term but responded negatively in the long term. For the variable of the amount of money in circulation, the increase in the amount of money in circulation is responded positively in the short and medium term but responded negatively in the long term.

Figure 2.Impulse Response Function (IRF) graph

Source: Author's processed data, 2024

Based on Figure 2. above, it is known that changes to one standard deviation between variables can be responded to byother variables, both inflation variables, exchange rate variables, GDP variables and JUB variables. The analysis in the image above shows that the stability of the response of all variables is formed in the short term or in period 1 (one) and the medium term or in period 5 (five). Stable response stability is caused by the movement behavior between variables that are responded to by all variables almost the same as the movement in the short term period that has been analyzed. Next is the model recommendation for monetary policy in strengthening economic fundamentals as follows:

Table 3. Monetary Policy Recommendations in Strengthening Economic Fundamentals

Period	JUB itself	Biggest 1	Biggest 2
Short-term	85.45%	JUB 85.45%	INF 100.00%
Medium term	73.32%	JUB 73.32%	INF 18.84%
Long-term	71.65%	JUB 71.65%	INF 18.26%

Source: Author's processed data, 2024

Table 3. mshows that the JUB variable itself is responsible as a monetary policy in strengthening economic fundamentals in the short, medium, and long term. Furthermore, JUB control is responsible for other variables that can be used to control short-term, medium-term, and long-term INF.

According to the results of the Forecast Error Variance Decomposition (FEVD) analysis, there are many relationships between variables as monetary policy in strengthening economic fundamentals. The most effective policy variables on economic fundamentals are determined by this Forecast Error Variance Decomposition. The following is an example of the relationship between variables as monetary policy in strengthening economic fundamentals in Indonesia:

Table 4. Interaction of Monetary Policy in Strengthening Economic Fundamentals

Variables	Monetary Policy in Strengthening Economic Fundamentals				Period
	Inflation	KURS	GDP	JUB	
Inflation	100.00%	0.00%	0.00%	0.00%	Short-term
	18.84%	1.02%	3.44%	76.68%	Medium term
	18.26%	5.21%	4.84%	71.66%	Long-term
KURS	31.82%	67.85%	0.00%	0.32%	Short-term
	28.23%	5.57%	5.90%	60.28%	Medium term
	16.57%	1.76%	4.78%	76.86%	Long-term
GDP	23.21%	4.34%	6.26%	66.17%	Short-term
	18.65%	1.42%	4.24%	75.67%	Medium term
	18.44%	4.62%	4.87%	72.04%	Long-term
JUB	14.54%	0.00%	0.00%	85.45%	Short-term
	19.02%	3.12%	4.53%	73.32%	Medium term
	18.21%	5.36%	4.76%	71.65%	Long-term

Source: Author's processed data, 2024

: Largest 1

: Largest 2

Based on Table 4. above, it is known that all variables, namely inflation, exchange rate, GDP and JUB in the 1-year period (short term) against shocks or changes in the model through the inflation variable are very small and are only influenced by inflation itself (100%). In the medium term, inflation (18.84%) and JUB (76.68%) are more effective or can be used as recommendations for taking through controlling monetary policy of the inflation variable. In the long term, inflation (18.26%) and JUB (71.66%) are more effective or can be used as recommendations for taking monetary policy through controlling the inflation variable. Furthermore, in the short term, the JUB variable shows that monetary policy is more effective and can be used as recommendations, as seen in the value of the JUB variable (85.45%) and inflation (14.54%), in the medium term, monetary policy is carried out by the JUB variable (73.32%) and inflation variable (19.02%) and in the long term, the more effective control model is in JUB (71.65%) and inflation (18.21%). In the exchange rate variable, the most effective monetary policy in the short term is obtained through the exchange rate variable with exchange rate results (67.85%) and inflation (31.82%), in the medium and long term by JUB (76.86% - 66.17%) and inflation (28.23% - 16.57%). Monetary policy through the GDP variable obtained results in the short term, medium term and long term more effectively controlled by JUB (66.17%, 75.67% and 72.94%) and inflation variables (23.21%, 18.65% and 18.44%).

CONCLUSION

Based on the analysis that has been carried out in Indonesia, the main focus isMonetary Policy Analysis in Strengthening Economic Fundamentals in Indonesia with the Vector Autoregression (VAR) analysis method obtained the results of the VAR analysis using the lag 2 basis. Where according to the lag 2 basis, the contribution of each variable to itself and other variables can be seen clearly. Vector autoregression analysis also revealed that not only is there an influence of past variables (t-1) on the current variables, but the influence can also be felt both on the variables themselves and on other variables. Therefore, the results of the analysis confirm the existence of a significant reciprocal relationship between the various variables, illustrating the complexity and interconnectedness in the system. The results of the Impulse Response Function (IRF) test show that the increase in Inflation provides a positive response in the long term, however, in the short and long term, a negative response appears from the Exchange Rate, GDP, and JUB variables. The Exchange Rate variable provides a positive response in various short and medium terms, however, a negative response appears in the short and long term from the Inflation, JUB, and GDP variables. A change in one standard deviation between variables can be responded to by other variables. Response stability is formed in the medium term (period 5) and long term (period 10). Forecast Error Variance Decomposition (FEVD) analysis shows the relationship between variables and determines effective policies. In the short term, the Inflation and CURS variables contribute significantly to changes, while in the medium and long term, the JUB and Inflation variables are more effective as recommendations for developing monetary policy. Monetary policy through the GDP variable is most effective involving inflation and JUB in the short, medium and long term. Overall, the results of the FEVD analysis provide in-depth insights for developing monetary policy in strengthening economic fundamentals.

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