

Impact of Monetary Policy on Economic Growth in Indonesia

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Abstract

This research investigated the effectiveness of the monetary policy in Indonesia. A cumulative summary test was used to determine the response of monetary policy to economic growth between 1990-2021. Furthermore, the data on gross national income, money supply, inflation, exchange rate, and interest rate was processed using error correction model regression. The results showed that monetary policy improved economic growth through channels of inflation and money supply, and the correlation was strong and valid both in the short and long term. The correlation of exchange rate and interest rate to economic growth was also observed to be significant only in the long term. The four variables had a significant, simultaneous effect on Indonesia's GDP. Therefore, the government needs to pay special attention to the enactment of monetary policy.

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1. Introduction

The theory of the relationship between monetary policy and economic growth has been expounded in previous research. There have been significant debates between theories, as both factors are in line with the quantity theory of money. However, in the 1930s, the theory of liquidity preference emerged followed by that of monetarists. Furthermore, the Keynesian and Neoclassical Theories emerged which became the center of monetary policy analysis during the last 2 decades (Srithilat et al., 2022). These theories are geared toward the achievement of economic growth through policy instruments.

The impact of monetary policy on a country's economic growth is still debated. Most research focuses on the neutrality of monetary policy in the long term or in developing countries such as in Africa (Asongu, 2014). Asongu proved that the dynamics of development indicators in Africa support Neoclassical Theory. The monetary policy which is controlled by the central bank to influence the money supply (MS) in a country, as well as the public policy, aims to achieve the same objectives. Each of these policies is issued to achieve a country's macroeconomic goals in terms of price stability, full employment opportunities, the balance of payments surplus, reduction of poverty and national debt, as well as sustainable economic growth (Aliber & Kindleberger, 2017).

Since the early 1960s, the effectiveness of monetary policy in the real sector has been debated among economists. Generally, this policy plays an important role in the macroeconomic stability of developing countries. The Keynesian Theory stated that monetary policy has a greater influence than public policy on economic activity (Olakojo et al., 2021). The effectiveness of monetary policy is highly dependent on demand-side policies used by the government to achieve macroeconomic targets, specifically through inflation rates, exchange rates, interest rates, and the money supply.

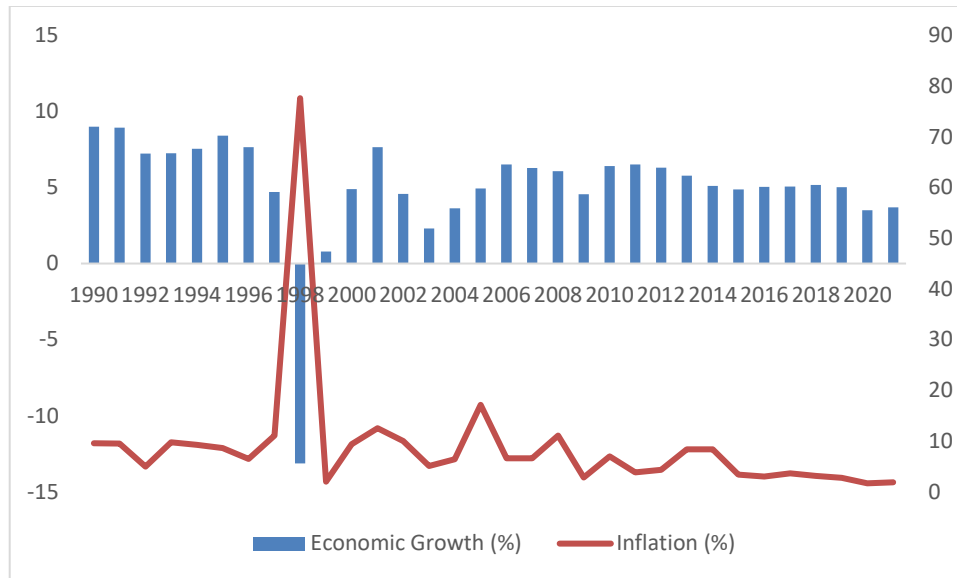
In many countries, existing monetary policies are often subject to public policies issued by the government. Therefore, the central bank attempts to overcome the state budget deficit and spending. The government should identify the right mix between both policies to achieve the desired result. In terms of implementation, the government also needs to consider 2 main issues: the overall policy mix of each policy issued and the fact that monetary policy takes time to adjust its effects to the desired economic goals (Tarawalie & Kargbo, 2020).

Economic growth in Indonesia is quite volatile. In general, Indonesia's inflation rate for the 1990-2021 period is in the range of 4-8 percent and its all-time low of -13.13% occurred in 1998. 1998 was a period when Indonesia was in a state of monetary crisis. This recession occurred due to the failure of the monetary policy issued by the state, specifically the increase in foreign debt which had to be paid simultaneously. Payment of this huge government debt caused the value of the IDR to weaken, observed by the drop in exchange rates. Is there any correlation between economic conditions and inflation?

Based on data on Indonesia's inflation rate for the last 30 years, inflation from 1990



to 2021 experienced constant fluctuations. The country experienced hyperinflation which occurred in 1998 with a rate peaking at 77.6 %. The surge in prices for goods and services followed by the depreciation of the exchange rate to IDR 16,000/USD caused an economic recession of more than 13% in 1998. However, in 1999, inflation decreased to 2%, which was the lowest since 1998.



Source: Central Bureau of Statistics Publications and Bank Indonesia, data processed
Figure 1. Economic Growth and Inflation in Indonesia in the 1990-2021 Period

The highest inflation rate for the last 30 years occurred in 1998 with a rate of 77.6%. At same time, the economic growth have been freefall to -13,13. This shows a strong indication that there is a mutually influencing relationship between economic growth and inflation in Indonesia. Furthermore, it highlights the effectiveness of the policies issued by the government to ensure domestic price stability. The government's failure to control the inflation rate will decline the economic growth in a country.

The inflation rate is a macroeconomic variable that expresses the real sector of a country's overall policies. Subsequently, the function of Bank Indonesia has broad independence to control the inflation rate, which is closely related to the growth of a country's economy. Bank Indonesia coordinates well with the government in issuing policies, and monetary policy focuses on a stable and controlled inflation rate. The monetary policy has been transmitted to the real sector through several channels such as the exchange rate (Pasaribu et al., 2020; Pasaribu & Septriani, 2021).

Monetary policy is closely related to the regulation of money supply taken by the government to maintain a stable inflation rate (Winarno, 2017). Specifically, monetary policy consists of open market and discount policies, controlling the number of minimum reserves as well as credit realization (Nurwani, 2016). Economists emphasize that the purpose of the monetary policy function is to



maintain a relatively stable price level using the interest rate variant. If the inflation rate is too high, the monetary authority raises the benchmark interest rate and vice versa.

Policies related to the percentage of the benchmark interest rate are closely involved with the money supply and exchange rates. If interest rates are raised, then money supply in society will decrease because people aim to save money instead of spending it. Therefore, economic activity will decrease which affects a decrease in the demand for goods and services, driving inflation lower (Ilyas et al., 2022; Qing & Kusairi, 2019) (Rossi, 2013).

However, when interest rates are raised, the demand for money will increase. This increased will push up the value of the IDR, strengthening the exchange rate against the dollar. This strengthening influences a positive response by the foreign trade sector and contributes to increasing Indonesia's economic growth (Both, 2021) (Warjiyo, 2013).

In 1998, conditions became a reference for how carelessness in monetary policy would hinder a country's economic growth. The effectiveness of monetary policy needs to be observed specifically. Based on the data in Figure 1, there has been a decline in Indonesia's economic growth. Therefore, this research aims to determine the effectiveness of the monetary policy in influencing Indonesia's economic growth rate from 1990-2021. This is determined using the exchange rate, inflation developments, interest rates, and money supply. Exchange rate variables are rarely used in monetary policy research, as well as the *cusum test*, which highlights a significant novelty.

2. Literature Review

Monetary policy is enacted by the government to influence money supply into aggregate spending, and this policy can be either expansive or contractive (Putra, 2015). Expansionary monetary policy is aimed at increasing aggregate demand and economic output by increasing money supply. Meanwhile, contractionary, commonly referred to as economic deflationary policy, aims to reduce aggregate spending and economic output by reducing money supply circulation (Doan Van, 2020).

According to the Keynesian Theory, if the total demand for society (*aggregate*) exceeds the number of goods available (*output*) this causes an *inflationary gap* (Sukirno, 2016). This connection drives an increase in the price of goods, known as inflation.

In economics, Keynesian Theory also examines the relationship between monetary policy and economic growth in a country. Keynes stated that there was a linear negative effect between two distinct factors: if the government issued an expansionary monetary policy, there is a decline in economic activity. Conversely, a contractionary monetary policy enhances a country's economic growth (Menyah & Wolde-Rufael, 2013).



Omidi and Pierre analyzed the effects of monetary policy on economic growth using the Solow model. Monetary policy does not directly affect economic growth but is transmitted through other variables, such as inflation. The results showed that controlling the inflation rate is effective in influencing economic growth (Agénor, 2021; Omidi & Shahabadi, 2021).

Meanwhile, Sang studied the relationship between economic growth and monetary policy using the factor of international trade, based on the model of economic growth with capital accumulation. Simultaneous inflation-related policies enacted alongside technology and increased output sufficiently improved the country's economy (Sang, 2019).

The Lebanese central bank developed targeting exchange rates to stimulate cash flow. Monetary policy was transmitted through the credit channel where in the 2002-2017 period, the monetary policy used by the Lebanese central bank sufficiently enhanced long-term economic growth. However, regardless of the balance, financial flows are important, as inflows due to a weakening currency can hinder short-term and long-term economic activity (Awdeh, 2019).

3. Research Methods

Economic growth is a macroeconomic variable that is of great concern and is believed to increase people's welfare (Precious & Palesa, 2014) (UFOEZE et al., 2018). Theoretically, there is a relationship between monetary policy and economic growth. The link between these two forms the basis of economic policies issued by policymakers in terms of targeting macro variables quantitatively. This research is significant as it enables the government to analyze output in terms of social welfare (Engle & Granger, 2015).

$$PE = f(INF, KURS, JUB, SBI) \quad (1)$$

$$\Delta PE_t = \beta_0 + \beta_1 \Delta INF_t + \beta_2 \Delta KURS_t + \beta_3 \Delta JUB_t + \beta_4 \Delta SBI_t + ECT_{t-1} \quad (2)$$

Description:

PE_t : Indonesia's *Gross Domestic Product* (GDP) growth (data in LN)

INF_t : change in Indonesia inflation rate (%)

$KURS_t$: changes in the annual IDR exchange rate against the dollar (in the form of LN)

JUB_t : the value of money supply M2 circulation every year in Indonesia (data in the form of LN)

SBI_t : BI Rate issued by Bank Indonesia (%)

ECT_t : *error correction term*

t : time

β_0 : long-term constant

$\beta_1, \beta_2, \beta_n$: long-term relationship coefficient

The data was processed using the *cusum test* to determine the response of economic growth to monetary policies issued by the government. Furthermore, the long-term relationship between the independent variables (inflation, exchange rate, and

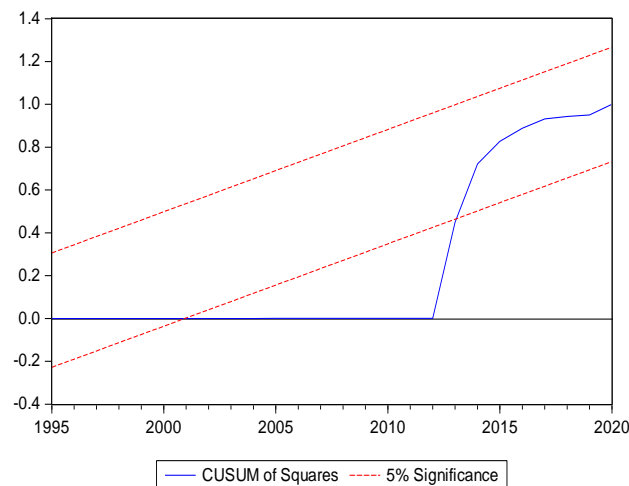


money supply) and the dependent (economic growth) was analyzed. An *error correction model* (ECM) was also performed as a test to observe the short-term influence of these variables.

4. Results

The analysis of certain variable changes in the structure using the *Cumulative Sum* (CUSUM) test was carried out on Indonesian GDP data. Figure 4 showed that the GDP data (blue line) is within the critical line (5 percent critical line - orange line). This indicates whenever a significant response is given to this variable during the research period raised.

The pattern of monetary policy response to economic growth was most evident when the *CUSUM test square* value leaves the critical line. This was marked by a critical line that exits the boundary line in 2001.



Source: Processed data, 2022

Figure 2. *Cusum Test Squares* The Influence of Monetary Policy in Indonesia

The effect of GDP contraction due to monetary policy was already visible in 2001 when the *Cusum of Squares* line came out of the boundary line. In that year, Bank Indonesia as the policymaker enacted a strict monetary policy. The agenda for economic recovery that year was marked by a weakening of the exchange rate and an increase in the inflation rate. Therefore, BI carried out a tight monetary policy by raising the BI Rate from 11.48% to 14.53 %. The government also issued bonds in December 2020 which totaled IDR 24.5 trillion.

The year 2012 was a period when Indonesia's GDP showed a contraction by touching a critical line, which highlighted the effect of the monetary policy issued by Bank Indonesia. The direction of monetary policy takes into account macroeconomic control, with the central bank optimizing its role to stimulate economic activity and minimize the risk of an economic slowdown.



Table 1. Data Stationarity Test Results

Variable	Unit Root Test	Test Critical Values			ADF-Test Statistics
		1%	5%	10%	
PDB	First Differ	-3.679322	-2.967767	-2.622989	-4.267184***
INF	First Differ	-3.769597	-3.004861	-2.642242	-11.32699***
KURS	First Differ	-3.752946	-2.998064	-2.638752	-5.046095***
JUB	First Differ	-3.679322	-2.967767	-2.622989	-3.070727***
BIRATE	First Differ	-3.737853	-2.991878	-2.635542	-3.796653***

Notes: *** stationary at a critical value of 1%
 ** stationary at a critical value of 5%
 * stationary at a critical value of 10 %

Source: Calculation results, 2022

Meanwhile, when viewed simultaneously, all variables are significant at the level. All variables passed the stationary test at the level, and all have a probability value that is below 0.05, therefore, all variables passed the test. Before the cointegration test was carried out, the ECT value of the existing model was determined. This ECT value was also tested for stationarity at the level, and the results are shown below.

Table 2. Engle-Granger Cointegration Estimation Results

Residual	Unit Root Test	Test Critical Values			ADF-Test Statistics	Result
		1%	5%	10%		
ECT	Level	-3.679322	-2.967767	-2.622989	-5.850001 ***	Co-integrated

Notes: *** stationary at a critical value of 1%
 ** stationary at a critical value of 5%
 * stationary at a critical value of 10 %

Source: Calculation results, 2022

When viewed from the processed data, the ECT variable was even. Therefore, all variables passed the stationary test at the first difference level. All variables are also at a probability value below 0.05 and can be continued to the next stage. Table 2 showed that the ECM model is valid and appropriate for answering research questions. This is reinforced by the residual coefficient value of ECT (*error correction term*) which is negative and proven significant at a critical level of 1%. The fulfillment of these requirements supports that the test can be carried out at a later stage, namely the OLS regression model test to determine a long-term relationship and the ECM test to highlight a short-term relationship.



Table 3. Long-Term Regression Results

Variable	Coefficient
C	4.778065***
INF	-0.028348***
LNKurs	-1.225249***
LNJUB	2.080918***
BI-Rate	0.069461***
R-squared : 0.960058 F-Statistik : 156.2342 Prob F-Statistik : 0.000000	

Notes: *** stationary at a critical value of 1%
** stationary at a critical value of 5%
* stationary at a critical value of 10 %

Source: Calculation results, 2022

The results of the monetary policy based on long-term regression by the Indonesian government provide a coefficient value of the influence each independent variable, namely inflation, exchange rate, money supply, and BI interest rates has on the determined dependent variable, namely Indonesia's gross domestic product. The long-term regression processing was carried out using *ordinary least squares* (OLS) using Eviews 9. The regression results are shown in Table 3.

From the processing of long-term regression data, the model raised explains the long-term relationship of the factors that influence Indonesia's GDP growth with a very strong correlation value. This model explains the changes in Indonesia's GDP by 96%, while the other factors are outside the scope of this model. Each independent variable has a significant effect with an error rate below 10%. Therefore, this model is proven to sufficiently explain the effect of independent variables on Indonesia's GDP for the 1990-2021 period.

Based on the table above, the long-term regression equation is obtained as follows:
GDP = -4.778065 – 0.028348INF - 1.225249KURS + 2.080918MS + 0.069461 BI Rate

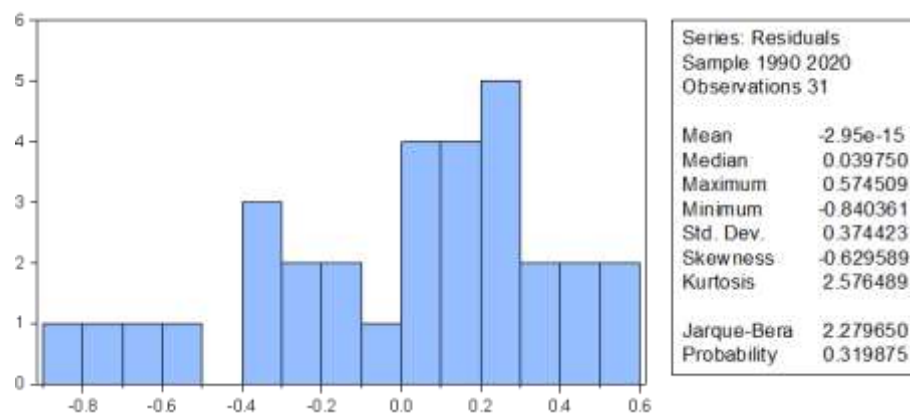
From the equation, the constant coefficient value is -4.778065 meaning that if other independent variables do not change, then the size of Indonesia's GDP can drop to -4.78%. The regression coefficient value of the inflation variable is negative, which is -0.028348, meaning that every 1% increase in inflation reduces the GDP by 0.028%, assuming other variables are constant.

For the value of the exchange rate variable regression coefficient, it is negative, which is -1.225249, meaning that for every 1% appreciation of the IDR, GDP is



expected to increase by 1.22% assuming other variables are constant. Meanwhile, the value of the money supply variable regression coefficient is positive and equal to 2.080918%. This means that for every 1% increase in the money supply, GDP is expected to increase 2,08%, assuming other variables remain constant. The coefficient value of the BI Rate variable is 0.069461 meaning that every 1% increase in the BI Rate increased economic growth by 0.07% assuming other variables are constant.

The validity of this model was tested using classical assumptions. The first step was the normality test to determine if all variables are normally distributed in the regression model. In this research, the results of normality using the *Jarque-Bera* test and Eviews 9 are shown in the figure below.



Source: Processed data, 2022

Figure 3. Normality Test Results

From the picture above, it is evident that the *Jarque-Bera* value found was $0.460116 > 0.05$. Therefore, this model is concluded to be free from normality problems. Meanwhile, the results of the multicollinearity test were also carried out to ascertain any similarity between the independent variables. A very strong resemblance will produce a strong correlation, causing problems in the data processing.

Table 4. Multicollinearity Test Results

	INF	KURS	JUB	BI RATE
INF	1.000000	-0.032744	-0.514217	-0.028831
KURS	-0.032744	1.000000	-0.254026	-0.155357
JUB	-0.514217	-0.254026	1.000000	0.113467
BI RATE	-0.028831	-0.155357	0.113467	1.000000

Source: Processed data, 2022

Based on the results of the multicollinearity test, the correlation value is less than 0.90, signifying no symptoms of multicollinearity. Based on these results, there is no high linear correlation between the independent variables raised in this research. Furthermore, the heteroscedasticity test ascertains the presence of inequality of variance and residuals in the observations between one period to another in the



regression model. The White test was carried out, and the results are shown the following table.

Table 5. Heteroscedasticity Test Results

Heteroskedasticity Test : White			
F-statistic	4.794427	Prob. (8,22)	0.2888
Obs*R-squared	19.70027	Prob. Chi-Squared (14)	0.2804
Scaled explained SS	12.13376	Prob. Chi-Squared (14)	0.0076

Source: Processed data, 2022

The Obs*R-squared probability value was 0.2804 which was greater than 0.05. This shows that the data in the existing model does not have heteroscedasticity problems. Therefore, data processing can be continued on the ECM test. The ECM test was conducted to determine the relationship between inflation, exchange rates, money supply, and BI interest rates on GDP in the short term. The equations in the economic growth model are shown using the ECM in Table VI. The short-term equation is obtained as follows.

Table 6. Error Corection Model (ECM) Calculation

Variable	Coeffisient
C	3.767423*
INF	-0.015454***
Kurs	-0.940894
JUB	1.780108***
BI_Rate	0.098662*
ECT	-0.482229***
R-squared : 0.552807	
Adj R-squared : 0.365256	
F-Statistik : 5.171929	
Prob(F-Statistik): 0.003550	

Notes: *** stationary at a critical value of 1%
 ** stationary at a critical value of 5%
 * stationary at a critical value of 10 %

Source: Calculation results, 2022

From Table 6 above, only 2 variables showed a significant effect, namely inflation and money supply, while there was no effect from the exchange rate and BI Rate variables. However, the four variables had a significant effect on Indonesia's GDP simultaneously with a coefficient of 55%.

Based on the ECM analysis, the inflation variable had a negative effect on GDP with a coefficient of -0.015454. An inflation rate that increases by 1% can cause the GDP to fall by 0.015% from its current value in the next 1 year. This is in line with the relationship between inflation to Indonesia's GDP growth which is negative.



Meanwhile, the long-term estimation also showed similar results where a significant negative effect of the inflation rate on GDP was observed. The long-term effect coefficient is -0.028330, where every 1 increase in the inflation rate can reduce the GDP by 0.028% in the following 1-year period. This result is based on the hypothesis in this research that there is a negative effect between inflation and Indonesia's GDP.

This is in line with the results of Akinsola and Odhiambo where inflation had a negative and significant effect on economic growth in many countries (Akinsola & Odhiambo, 2017). Likewise, research conducted in Tanzania (Kasidi & Mwakanemela, 2017), in industrialized and developing countries (Aliyev et al., 2020), as well as in Nepal proved that in the long term, the inflation rate has a significant, negative effect on economic growth (Karki, Banjara, and Dumre, 2020).

The IDR exchange rate affects economic growth in Indonesia with an exchange rate coefficient of -0.940894, meaning that every 1% strengthening of the exchange rate increased the GDP value by 0.94% from the previous figure. Meanwhile, the long-term estimation results of the exchange rate variable have a significant negative effect on GDP of -1.224125, where if the exchange rate against the US Dollar increased by 1% from the previous, the GDP value decreases by 1.22%.

The negative relationship between exchange rate and economic growth is in line with Barguellil et al on 45 developing countries from 1985-2015 period where the IDR against the dollar negatively affected economic growth (Barguellil, Ben-Salha, and Zmami, 2018). Furthermore, in Vietnam, a positive relationship was found between the two variables from 2007-2017 (Do, 2019) as well as in Indonesia (Ismanto, 2019).

The ECM results also showed that there was a positive influence between the money supply variables and Indonesia's GDP. The coefficient value of the money supply variable is 1.780108, meaning that every time money supply increased by 1%, the GDP value also increased by 1.78%. Furthermore, the results of the money supply variable estimation also have a significant and positive effect on the long-term GDP of 2.080103, signifying that every 1% increase in the money supply increased the value of GDP by 2.08% from the previous year.

Money supply has a positive influence on economic growth. When it increased, public consumption spending also increased, which influences an increase in a country's GDP. Therefore, the greater the money supply, the better for economic growth. This has also been proven in Rwanda where the money supply had a positive effect on economic growth from 2008-2018 (Ntezimana & Mulyungi, 2020)

Kunwar also observed a positive relationship between money supply and economic growth. In Nepal, from 1974-2018 between the money supply and economic growth, there was a strong relationship with a negative ECT coefficient of less than 5% (Kunwar, 2020). A similar occurrence was also observed in Indonesia, where the money supply had a positive influence on economic growth (Kristianingsih, 2019).



Finally, the coefficient value of the BI Rate variable is 0.098662, indicating that when the BI Rate increased by 1%, economic growth in Indonesia also increased by 0.098662% from the previous value. These results agree with the hypotheses in this research that there is a positive influence of the BI Rate on economic growth in Indonesia. Furthermore, the relationship between the BI Rate and GDP is not significant in the short term, based on the relatively high probability of 10%.

This result is in line with Bosworth where the relationship between interest rates and economic growth is weak (Bosworth, 2014). The BI Rate is a variable that has a partial, simultaneous effect in the long term, but no effect in the short term.

5. Conclusion and Suggestion

This research proved that there is a correlation between monetary policy variables and economic growth in Indonesia from 1990-2020, both in the long and short-term. Inflation had a negative, significant effect on economic growth, where if the inflation rate rises, the GDP decreased. However, the money supply variable had a positive effect on economic growth, where if there is an increase in the money supply, the GDP value increased. Although the exchange rate and BI rate variables showed a relationship to long-term GDP growth, it is not applicable for short-term periods. The effect of the exchange rate is negative where when the IDR appreciates, the GDP increased. Conversely, when the BI rate rises, Indonesia's GDP will also increase. The effect of the relationship between these variables is not significant in the short term, but applicable only in the long term.

In general, economic growth is heavily influenced by the Indonesian government through monetary policy, especially in the short term. Therefore, the government should be more thrifty in the enactment of monetary policy as it has a large contribution to Indonesia's GDP, especially in the intermediate variables of the inflation rate and money supply. For the future, research can adding other macro variables that related to economic growth and monetary policy. Updating data methodologies especially analysis techniques is also can be better.

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