

Analysis of the Impact of Monetary Policy Instruments on Economic Growth in Indonesia by 2013 to 2023



Fela Cininta Arimbi Putri¹, Taufiq Chaidir²

^{1,2}Faculty of Economics and Business, University of Mataram, Indonesia

ABSTRACT: Based on quarterly data by 2001Q1 to 2017Q2, this research and study covers theoretical debates and empirical studies on the factors that affect economic stability and their effect on the financial sector's performance. This study applies the Ordinary Least Square (O.L.S.) method to the Cointegration and Engle Granger-Error Correction Model (E.C.M.) methods. E.C.M. is done to assess the long-term validity and balance of the research model and foresee potential flaws and discrepancies among the theoretical and statistical models. Even while the M2 variable has no discernible effect on G.D.P. during the observation period, the research findings demonstrate that, over the long run, there is a balance among changes in G.D.P. and monetary variables, such as interest rates, Inflation, M2, and the rupiah value. On the other hand, the E.C.T. variable has a significant short-term effect on fluctuations in G.D.P. Interest rates, Inflation, M2, and exchange rates had no discernible effect on G.D.P. throughout this time. Thus, changes in monetary variables, particularly interest rates, Inflation, and M2, tend to effect G.D.P. The average quarterly financial deepening in Indonesia for the observation period was 3.80 per cent, according to the outcomes of the financial performance study. Furthermore, M2 growth during the same period was 3.03 per cent, compared to Indonesia's average quarterly economic growth of 1.36 per cent.

KEYWORDS: Monetary Policy Balance, Economic Growth in Indonesia (Money Supply, Interest Rate, Inflation, Error Correction Model (Ecm)).

I. INTRODUCTION

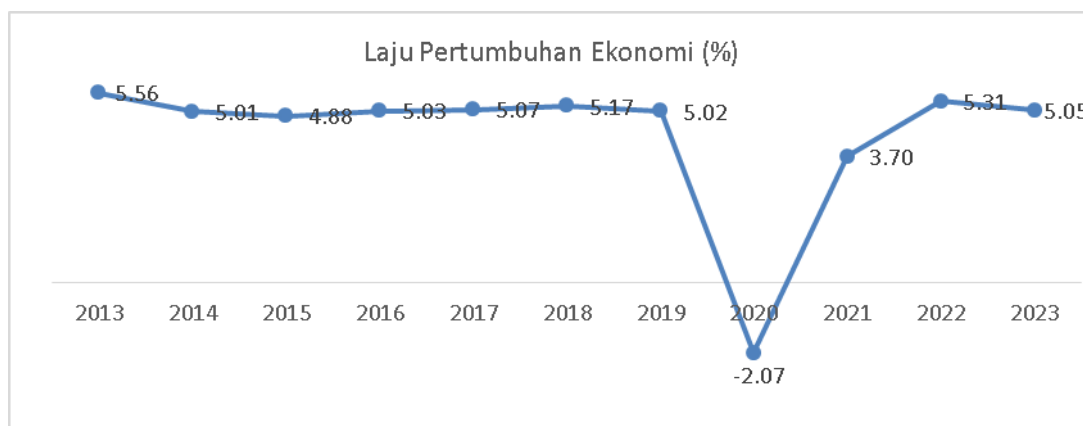
The surge in Population and its effect, particularly on economic growth, has become a primary focus in developing several economic theories. The connection among these two variables is conceptually referred to as the optimal Population theory, where an enhance in the Population will effect the output of goods and services produced by economic activities. That condition will ultimately effect changes in national income and per capita income. However, if the economic growth rate continuously enhances in certain phases, it will affect the production function, decrease marginal production, and effect per capita income. (Regina, 2022). According to the Neo-Classical view pioneered by Robert Solow, Endmund Phelps, Harry Johnson, and J.E. Maede, the factors influencing economic growth are due to the enhance in the supply of production factors and the development of technological advancement, where these two indicators will create job opportunities and the capacity of capital tools that will be used over time to the fullest. (Saktiawan et al., 2022).

Aside by several growth theories priorly mentioned, Harrod-Domar is the one who developed the macroeconomic growth theory related to Keynes, describing that each nation needs to reserve or set aside a portion of its G.D.P. so that it can be used for the addition or replacement of capital goods. (Sari et al., 2022). Next, in the theory proposed by Schumpeter, that focuses on innovation conducted by economic actors (producers), it is described that technological advancement is greatly influenced by the growth and development of the entrepreneurial spirit in society, enabling them to recognize opportunities and be brave enough to face risks in starting new businesses or developing existing ones. (Siregar et al., 2019).

The direction and strategies formulated to drive sustainable economic growth are undergoing adjustments, as they are linked to the era of globalization along by the evolution and innovation of economic digitalization as faced today. Besides internal factors, external factors are critical for the Government to consider in determining and setting the formulation and direction of fiscal and monetary policies because the economic activities of one nation tend to influence the economic activities of other countries. (J. F.

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Salim, 2017). Thus, inside of the framework of monetary policy and its instruments, it is essential to conduct proof and analysis based on that policy's effect on a nation's economic growth, especially Indonesia. The following graph shows the phenomenon based on factual economic performance data, as shown by Indonesia's economic growth rate during 2013-2023.



Source: BPS Indonesia, 2013-2023

GRAPH OF ECONOMIC GROWTH RATE IN INDONESIA 2013-2023

Based on Indonesia's economic growth data, as presented in the graph above, there was a rejection in economic growth in 2014, that was 4.88 per cent, a lower figure compared to 2013 and 2014, that grew by 5.56 per cent and 5.01 per cent, respectively. One of the causes of this fact is influenced by the decrease in net exports. Then, in 2016, growth strengthened again to 5.03 per cent and continued to enhance in 2017 and 2018, reaching 5.07 per cent and 5.17 per cent, respectively. However, there was a slowdown in 2019 (5.02 per cent) and even a sharp contraction in growth in 2020, that was -2.07 per cent. In 2021, growth enhanced again to 3.69 per cent and significantly surged the following year, reaching 5.31 per cent in 2022, supported by an enhance in exports and imports. However, in 2023, growth slowed to 5.05 per cent, likely due to the global economic slowdown and high Inflation affecting domestic activities. Several other factors contribute to the slowdown in economic growth in 2023: First, household consumption decreased to 4.5 per cent compared to 5.1 per cent in the prior quarter due to the weakening purchasing power of the upper class and enhanced social and political spending ahead of the elections. Second, investment slowed to 5.0 per cent compared to 5.8 per cent in the prior quarter, that was also influenced by a slowdown in exports and foreign direct investment, although Government capital expenditure remained stable. Third, export-import performance slowed, by the net export contribution to G.D.P. growth falling to 0.4 per cent in the fourth quarter of 2023. On the business side, the food and beverage and processing industries recorded a slowdown in growth, while the construction sector became the main driver of growth. Cumulatively, throughout 2023, the transportation and accommodation sector recorded the highest growth, followed by the accommodation and restaurant sector and other services.

Several theoretical and empirical arguments state that the functioning of monetary policy mechanisms influences the economic growth rate in Indonesia through inflation instruments. Inflation is considered effective in driving Indonesia's economic growth rate. (J. F. Salim, 2017). Another target of monetary policy is to control the money supply and interest rates; these two instruments, along by the inflation instrument, form the framework of monetary policy implemented by the Government to support the target of achieving sustainable economic growth. (Amirudin & Soebagyo, 2023).

Several prior empirical studies have revealed the interdependence among instruments in monetary policy and demonstrated that monetary policy can influence economic growth. (Winarto et al., 2021) Their research revealed that the Government bond yield (J.U.B.) significantly effects Inflation in Indonesia. (Ambarwati et al., 2021) Their research revealed that the B.I. Rate interest rate positively affects economic growth. Furthermore, the research outcomes of (A. Salim 2021) found that Inflation significantly effects Indonesia's economic growth based on the Gross Domestic Product (G.D.P.) indicator. However, this contradicts several prior research findings that examined the effect of monetary policy and Inflation on economic growth, such as (Utami, 2019), that revealed that J.U.B. has a negative connection by economic growth. (Wahyuni, 2018) revealed that the B.I. Rate interest rate and Inflation negatively affect Indonesia's economic growth. According to (Simanungkalit, 2020), it is revealed that Inflation has a negative and significant connection by Indonesia's Economic Growth.

In addition to the money supply, inflation serves as a critical monetary policy instrument that influences economic growth. In this context, inflation can lead to the depreciation of currency value, that is often a consequence of an enhance in the money supply inside of society, ultimately outcomeing in higher prices for goods and services (S. Sari, 2019). Inflation is characterised as

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a general and sustained rise in the prices of goods and services over a specified period; however, it cannot be classified as inflation if only one or two items experience price enhances. Nonetheless, if the price escalation of one or two items triggers a rise in the prices of other goods, it may then be regarded as an inflationary phenomenon (Simanungkalit, 2020). In Indonesia, the Central Statistics Agency (B.P.S.) is responsible for calculating inflation, that is derived by surveys that gather data on the prices of goods and services reflective of public consumption and expenditure. The data collected is subsequently utilised to assess the extent of inflation by comparing current prices by those by a prior period. The inflation rate thus serves as a critical benchmark for evaluating its potential positive effect on economic growth, provided it remains inside of reasonable limits; conversely, should it surpass the established threshold, inflation is likely to exert a detrimental effect on economic growth (Aydın et al., 2016).

The framework of monetary policy is predominantly centred around the instruments of interest rates, the J.U.B., and inflation. The primary objective of establishing the benchmark interest rate by Bank Indonesia (B.I.) is to ensure the stabilization of the targeted monetary policy goals. In this context, the stabilisation efforts undertaken by B.I. serve to mitigate the effects outcomeing by fluctuations in interest rates. When interest rates are enhanced, individuals generally reveal a higher propensity to save in banks, leading to a consequent reduction in the money supply. In contrast, if the central bank opts to reduce interest rates, individuals are less likely to deposit their funds in banks, thereby demonstrating a higher inclination towards borrowing, as the lower interest rates on loans make this option more appealing. This, in turn, leads to an enhance in the money supply. During periods of recession in Indonesia, it is common practice to lower interest rates, that subsequently raises the J.U.B., given that both the J.U.B. and interest rates play a significant role in influencing economic growth. Nonetheless, it has been asserted that inflation does not exert an effect on economic growth (Ambarwati et al., 2021).

Drawing upon the aforementioned arguments and prior empirical studies, this research seeks to further explore and substantiate the notion that monetary policy, as gauged by various instruments or indicators such as M2 (money supply), inflation, and the B.I. Rate, has a tangible effect on the economic growth of Indonesia.

II. THEORETICAL REVIEW

A. Economic Growth

Adam Smith is widely recognised as one of history's preeminent thinkers, particularly for his influential theory of value, that meticulously examines the various factors that determine the price or value of goods—an aspect for that he is most renowned. His seminal work, **The Nature and Causes of the Wealth of Nations**, delves into the pathways that nations may follow in their pursuit of prosperity, asserting that a "market economy" represents the sole viable means of achieving such an objective. The theory of economic growth was initially articulated in detail in a publication by Landerth and Colander (2002), that has led to Smith's theory of economic growth being regarded as a foundational driving force in this area. Smith delineates this theory into five distinct stages of economic growth, progressing sequentially by the hunting stage to the pastoral stage, followed by the agricultural stage, then the commercial stage, and culminating in the industrial stage (Fatimatuzzahro, 2022).

B. Money Supply

The traditional theory concerning the circulation of money is predicated on a rather simplistic explanation that can be illustrated through the gold standard system, wherein gold serves as the sole medium of exchange. In this framework, the money supply—defined as the quantity of money available inside of society—fluctuates in accordance by the availability of gold. Specifically, an enhance in the money supply can occur due to a surplus in the balance of payments or a rise in gold production, among other factors. Gresham's Law articulates the notion that "money (or metal) that is overvalued relative to its production cost (or marginal cost) tends to displace other forms of money (or metal) as a medium of payment." In Gresham's terminology, this principle is encapsulated in the phrase "bad money drives out good money."

C. Inflation

As posited by Natsir (2014), inflation can be characterised as a general and persistent tendency for the prices of goods and services to rise. This tendency implies that, in instances where the prices of the majority of goods are regulated or set by the Government, the figures reported by the Bureau of Statistics may not reflect any enhance, given that they represent the "official" prices established by the Government. Furthermore, a price enhance in only one or two items is only classified as inflation if it triggers a widespread rise in the prices of most other items. In contrast, price enhances attributed to seasonal fluctuations, holiday-related surges, or isolated incidents that do not produce lasting effects are not considered inflationary in nature..

D. Interest Rate

Interest rates serve as the "price" associated by the utilisation of loanable funds, a term that translates to "funds available for lending." Commonly referred to as "investment funds," this concept is grounded in Classical theory that posits that interest

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represents the "price" inside of the "market" for investment funds (Anindita, 2016). In the context of Indonesia, interest rates are governed by Bank Indonesia that has established the BI-Rate—formerly known as the BI-7 Day Reserve Repo Rate (B.I.D.R.R.). This newly instituted benchmark interest rate reveals a more robust correlation by money market interest rates. Functioning as a transactional rate traded inside of the market, the BI-Rate fosters the development of a deeper financial market, particularly through the utilisation of repo instruments. Furthermore, the BI-Rate is acknowledged as an exemplar of international best practices in the execution of monetary operations. In pursuit of its inflation targets, Bank Indonesia is committed to continuously enhancing its monetary operation framework to bolster the effectiveness of its policies (Bank Indonesia, 2020).

E. The connection among the Money Supply and Economic Growth

Investigations into the interplay among money supply and economic growth have produced a range of findings. For instance, research conducted by Budiyanto, V., and Wibowo, W. (2021), Ambarwati, A. D. et al. (2021), and Winarto, H., Poernomo, A., and Prabawa, A. (2021) suggests a negative correlation among these two elements. Conversely, other studies by Amirudin, A., Soebagyo, D. (2023), Hutomo, R. T., Faridatussalam, S. R. (2023), and Syakur, R. M., Reviane, I. T. A., and Paddu, A. H. (2022) assert that the money supply exerts no significant influence on economic growth. The discrepancies in these research outcomes highlight the intricate nature of the connection among the two variables and suggest that various study-specific factors may play a role in shaping these findings.

F. The connection among Interest Rates and Economic Growth

Research examining the connection among interest rates and economic growth has yielded a range of outcomes. Several studies, including those by Ambarwati, A. D. et al. (2021), Ningsih, L. et al. (2024), Dara, R. R. (2023), and Ambarwati, A. D. et al. (2021), have concluded that a positive correlation exists among the two variables. Conversely, other investigations conducted by Hutomo, R. T., Faridatussalam, S. R. (2023), Syakur, R. M., Reviane, I. T. A., & Paddu, A. H. (2022), and Winarto, H., Poernomo, A., & Prabawa, A. (2021) suggest that interest rates do not significantly affect economic growth. The variations in the findings of this research underscore the intricate nature of the connection among the two variables and suggest that it may be affected by a range of additional factors unique to each individual study.

G. The connection among Inflation and Economic Growth

Investigations into the effects of inflation on economic growth reveal a range of conclusions. The majority of studies, including those by Salim, J. F. (2017), Ambarwati, A. D. et al. (2021), and Budiyanto, V., & Wibowo, W. (2021), indicate a significant negative correlation among inflation and economic growth. Conversely, research conducted by Aydın, C., Esen, Ö., & Bayrak, M. (2016) suggests that inflation has a positive effect on growth. In contrast, other research, including that of Amirudin, A., & Soebagyo, D. (2023), Ningsih, L. et al. (2024), and Hutomo, R. T., & Faridatussalam, S. R. (2023), contends that inflation does not exert a significant influence on economic growth. The disparities in the findings of these studies highlight the intricacies of the connection among inflation and economic growth, as well as the potential effect of various factors unique to each investigation.

H. Conceptual Framework

The conceptual framework is the author's foundation for understanding how economic growth theories relate to the identified problem formulation. This foundation will better guide the researcher in finding data and information in this study to solve the priority presented problem. In this research, the conceptual framework is structured as follows.

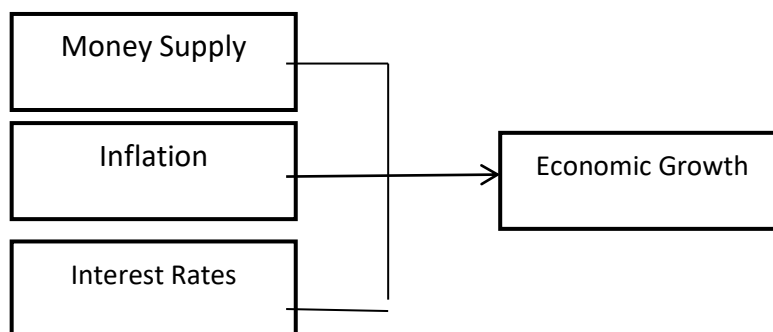


Image 1. Research Conceptual Framework

I. Hypothesis

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A hypothesis serves as a provisional response to the formulation of the research problem that has been articulated in the form of a question (Mentari, W. A. & Pagidoan, E., 2020). In the context of this research, the hypothesis has been delineated as follows.

1. H1: The money supply significantly effects Indonesia's economic growth by 2013 to 2023.
2. H2: Inflation significantly affects Indonesia's economic growth by 2013 to 2023.
3. H3: Interest rates significantly affect Indonesia's economic growth by 2013 to 2023.

III. RESEARCH METHODOLOGY

This research adopts a quantitative scientific methodology that employs numerical data for the purposes of collecting, analysing, and presenting information (Sugiyono, 2013). The quantitative approach is instrumental in testing theories, developing factual insights, illustrating connections among variables, offering statistical descriptions, and estimating as well as predicting outcomes (Elfia, 2010). This study utilises secondary time series data obtained by the Central Statistics Agency (B.P.S.) in Indonesia, specifically encompassing the money supply data (X1), inflation rates (X2), interest rates (X3), and GDP (Y) spanning the period by 2013 to 2023.

The Error Correction Model (E.C.M.) is employed inside of the estimation, hypothesis testing, and analytical framework of this study. It serves to adjust the regression equation among individually non-stationary variables, facilitating their return to equilibrium values over the long term (Rahmawati, D. D., & Riyanto, W. H., 2017). The equation representing the long-term model utilized in this research is articulated as follows.

$$\text{Log (PDB)}_t = \beta_0 + \beta_1 \text{Log (JUB)}_t + \beta_2 \text{Log (Inf)}_t + \beta_3 \text{(BIRate)}_t + \epsilon_t$$

Where:

GDP = Gross Domestic Product (dalam satuan Miliar Rupiah)

JUB = Amount of Money in Circulation (dalam satuan Miliar Rupiah)

BIRate = Interest Rate (BI Rate) (in percentage)

INF = Inflation (in percentage)

β_0 = Intercept (konstanta)

$\beta_1, \beta_2, \beta_3$ = Regression Coefficients

ϵ_t = Error Term

In the meantime, the connection in the short term is represented by the following equation.

$$\Delta \text{Log (PDB)}_t = \alpha_0 + \sum \alpha_1 \Delta \text{Log (JUB)}_{t-i} + \sum \alpha_2 \Delta \text{Log (Inf)}_{t-i} + \sum \alpha_3 \Delta \text{(BIRATE)}_{t-i} + \gamma \text{ECT}_{t-1} + \epsilon_t$$

Where:

$$\text{ECT}_{t-1} = \text{log(PDB)}_{t-1} - \beta_0 - \beta_1 \text{log(JUB)}_{t-1} - \beta_2 \text{log(Inf)}_{t-1} - \beta_3 \text{(BIRATE)}_{t-1}$$

$\Delta \text{log(G.D.P.)}_t$ = change in G.D.P. at time t.

$\Delta \text{log(J.U.B.)}_{t-i}$ = change in J.U.B. at time t-i.

$\Delta \text{log(Inf)}_{t-i}$ = change in Inflation at time t-i

$\Delta \text{(B.I.R.A.T.E.)}_{t-i}$ = change in B.I. Rate at time t-i

ECT_{t-1} = the error correction component that signifies the deviation by long-term equilibrium at time t-1.

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \gamma$ = estimated coefficients

ϵ_t = error term

IV. RESEARCH OUTCOMES

The Error Correction Model (E.C.M.) is designed to rectify the regression equation involving non-stationary individual variables, facilitating their return to equilibrium over the long term. This model, introduced and popularised by Engle and Granger, seeks to tackle the challenges posed by non-stationary time series data and to mitigate the risks associated by spurious regression. The initial step necessary for estimating the E.C.M. model involves conducting a stationarity test on the data. In this research, logarithmic transformations are frequently applied to each independent variable in order to standardise the units, thereby enabling the simultaneous and partial analysis of the data associated by each variable.

A. Stationarity Test

The stationarity test serves to ascertain whether a variable possesses a unit root, thereby classifying it as non-stationary; this is essential in research, as stationary data is vital for ensuring the validity of outcomes and preventing spurious regression. The assessment of stationarity can be conducted using the values derived by the Augmented Dickey-Fuller (A.D.F.) test.

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Table 1 outcomes of the Stationarity Test

Variable	Prob	
	Level	1st Difference
Economic Growth	0.9516	0.0127
Money Supply	0.9997	0.0056
Inflation	0.0779	0.0000
Interest Rates	0.3434	0.0000

Source: secondary data, processed

The findings of the stationarity test presented in Table 1 above indicate that economic growth, Money Supply, Inflation, and the B.I. rate have attained stationarity at the first difference level. This conclusion is substantiated by the A.D.F. test outcomes, that reveal that all variables reveal a probability value of less than 0.05.

B. Cointegration Test

Once the data has been confirmed as stationary, the subsequent step involves performing a cointegration test. In this study, the Augmented Dickey-Fuller (A.D.F.) test is employed to assess whether the residuals reveal properties of cointegration and stationarity.

Table 2 outcomes of the Cointegration Test

Null Hypothesis: E.C.T. has a unit root

Exogenous: Constant

Leg Length: 12 (Automatic – based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.041476	0.0343
Test critical values:		
1% level	-3.492523	
5% level	-2.888669	
10% level	-2.581313	

*MacKinnon (1996) one-sided p-values.

Source: secondary data, processed

The probability value corresponding to the t-statistic is calculated to be 0.0343, that falls below the threshold of 0.05 (5%). This finding leads to the conclusion that the null hypothesis can be refused at the 5% significance level, thereby suggesting the absence of a unit root in the E.C.T. This, in turn, implies that a cointegration connection exists among the variables.

C. Long-Term Balance

The outcomes of the long-term E.C.M. model were derived by an estimation conducted through O.L.S. regression, employing level data, as demonstrated in the following sections.

Table 3 Long-Term Test

Sample: 2014M01 2023M12

Included observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7019813.	296363.6	23.68649	0.0000
JUB	0.627896	0.028294	22.19157	0.0000
INFLASI	-5942207.	2750992.	-2.160023	0.0328
BIRATE	387689.8	3761931.	0.103056	0.9181

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R-squared	0.884966	Mean dependent var	10556797
Adjusted R-squared	0.881991	S.D. dependent var	1040425.
S.E. of regression	357411.7	Akaike info criterion	28.44393
Sum squared resid	1.48E+13	Schwarz criterion	28.53685
Log-likelihood	-1702.636	Hannan-Quinn criteria.	28.48166
F-statistic	297.4654	Durbin-Watson stat	0.310684
Prob(F-statistic)	0.000000		

Source: secondary data, processed

The outcomes of the E.C.M. estimation are detailed in Table 3, that illustrates the long-term connection among the dependent and independent variables. Furthermore, as proven by Table 5, the adjusted R-squared value of 0.884966 suggests that approximately 88.49% of the variation in the dependent variable can be accounted for by the independent variables included in the model. Additionally, the F-statistic probability value of 0.0000 implies that, in the long term, the independent variables—namely J.U.B., inflation, and the B.I. rate—exert a collective influence on the variable representing economic growth. The coefficient value for J.U.B. stands at 0.627896, by a significance level of 0.000, that is below $\alpha = 5\%$, thereby indicating that J.U.B. exerts a significant positive effect on economic growth. Conversely, inflation has a coefficient value of -5942207 and a significance level of 0.0328, also below $\alpha = 5\%$, leading to the conclusion that inflation has a significantly negative effect on economic growth in the long term. Additionally, the BI rate variable demonstrates a positive yet insignificant influence on economic growth, as proven by its coefficient value of 387689.8, that has a significance level of 0.9181, exceeding $\alpha = 5\%$.

D. Short-Term Balance

Table 4 Short-Term Test

Sample (adjusted): 2014M02 2023M12
Included observations: 119 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	35728.86	4375.347	8.165950	0.0000
D(JUB)	0.003855	0.014905	0.258632	0.7964
D(INFLASI)	-584195.4	834655.3	-0.699924	0.4854
D(BIRATE)	2480598.	2226454.	1.114147	0.2676
ECT(-1)	-0.028326	0.012636	-2.241741	0.0269

R-squared	0.052621	Mean dependent var	35893.12
Adjusted R-squared	0.019380	S.D. dependent var	47363.50
S.E. of regression	46902.30	Akaike info criterion	24.39063
Sum squared resid	2.51E+11	Schwarz criterion	24.50740
Log-likelihood	-1446.242	Hannan-Quinn criter.	24.43805
F-statistic	1.583010	Durbin-Watson stat	1.329597
Prob(F-statistic)	0.183586		

Source: secondary data, processed

Table 4 presents the estimation outcomes obtained by the E.C.M. model, demonstrating that the E.C.T. value has surpassed the 0.05 significance level, given that the probability value of 0.0269 is less than 0.05 and is negative. The E.C.T. value of -0.028326 indicates that the adjustment process towards long-term equilibrium occurs relatively swiftly in the short term. In contrast, the variables J.U.B., inflation, and the BI rate suggest that these factors do not exert a short-term effect on G.D.P., as proven by a probability value exceeding $\alpha = 5\%$.

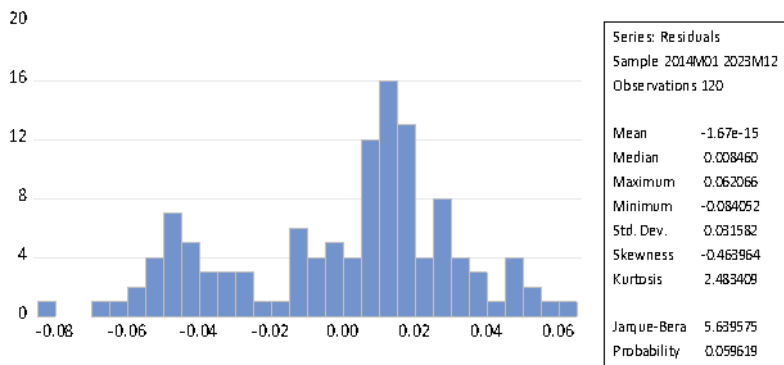
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E. Classical Assumption Test

1. Normality

The normality test is conducted to ascertain whether the data is normally allocated or approximates a normal distribution. This assessment is conducted using the histogram-normality test; should the probability value exceed 0.05, it is assumed that the data follows a normal distribution.

Table 5 outcomes of the Normality Test



Source: secondary data, processed

The outcomes of the normality test revealed a probability value of 0.059619, that is higher than 0.05. Consequently, it can be concluded that the data is normally allocated, as the probability value exceeds $\alpha = 5\%$.

2. Autocorrelation

The autocorrelation test is performed to establish whether a correlation exists among the predictive variable and temporal changes. As stated by Singgih Santoso (2012), the criteria for decision-making regarding the D-W test are as follows:

- 1) A D-W number below -2 means positive autocorrelation.
- 2) A D-W value among -2 and +2 means there is no autocorrelation.
- 3) A D-W number above +2 means there is negative autocorrelation.

Table 6 Autocorrelation Test

R-squared	0.052621	Mean dependent var	35893.12
Adjusted R-squared	0.019380	S.D. dependent var	47363.50
S.E. of regression	46902.30	Akaike info criterion	24.39063
Sum squared resid	2.51E+11	Schwarz criterion	24.50740
Log-likelihood	-1446.242	Hannan-Quinn criter.	24.43805
F-statistic	1.583010	Durbin-Watson stat	1.329597
Prob(F-statistic)	0.183586		

Source: secondary data, processed

The processing outcomes obtained by EViews indicate that Table 6 presents a D.W. statistic value of 1.329597. This figure falls inside of the range of -2 to +2, suggesting the absence of autocorrelation.

3. exists.

Heteroscedasticity

In this study, the Breusch-Pagan test is employed to assess heteroscedasticity, as indicated by the Obs*R-squared value present in the generated output. Should the probability value exceed $\alpha = 5\%$, it can be concluded that the data does not reveal issues related to heteroscedasticity.

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Table 7 outcomes of the Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.357935	Prob. F(3,116)	0.0753
Obs*R-squared	6.897134	Prob. Chi-Square(3)	0.0752
Scaled describeed SS	4.780278	Prob. Chi-Square(3)	0.1886

Source: secondary data, processed

The outcomes of the normality test indicated that the probability value stands at 0.059619, that exceeds 0.05. Therefore, it can be concluded that the data is normally allocated, as the probability value is higher than $\alpha = 5\%$.

4. Autocorrelation

The autocorrelation test is performed to ascertain whether a correlation exists among the predictive variable and temporal changes. As noted by Singgih Santoso (2012), the criteria for decision-making in relation to the D-W test are as follows:

- 1) A D-W number below -2 means positive autocorrelation.
- 2) A D-W value among -2 and +2 means there is no autocorrelation.
- 3) A D-W number above +2 means there is negative autocorrelation.

Table 6 Autocorrelation Test

R-squared	0.052621	Mean dependent var	35893.12
Adjusted R-squared	0.019380	S.D. dependent var	47363.50
S.E. of regression	46902.30	Akaike info criterion	24.39063
Sum squared resid	2.51E+11	Schwarz criterion	24.50740
Log-likelihood	-1446.242	Hannan-Quinn criter.	24.43805
F-statistic	1.583010	Durbin-Watson stat	1.329597
Prob(F-statistic)	0.183586		

Source: secondary data, processed

The outcomes obtained through EViews reveal that Table 6 presents a D.W. statistic value of 1.329597. This figure falls inside of the range of -2 to +2, indicating the absence of autocorrelation..

5. Heteroscedasticity

This study employs the Breusch-Pagan test to assess heteroscedasticity, as indicated by the Obs*R-squared value in the output generated. If the probability value exceeds $\alpha = 5\%$, it can be concluded that the data does not reveal issues related to heteroscedasticity.

Table 7 outcomes of the Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.357935	Prob. F(3,116)	0.0753
Obs*R-squared	6.897134	Prob. Chi-Square(3)	0.0752
Scaled describeed SS	4.780278	Prob. Chi-Square(3)	0.1886

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Source: secondary data, processed

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According to Table 7, the probability value of Obs*R-Squared is 0.0752, exceeding the threshold of $\alpha = 5\%$. Consequently, it can be inferred that the data employed in this study are free by issues related to heteroscedasticity.

V. DISCUSSION

A. The connection among the Money Supply and Economic Growth

prior research has revealed divergent findings concerning the connection among the money supply (M1) and economic growth. While some studies have identified a negative correlation, others have found no significant effect at all. For instance, Budiyo, V., and Wibowo, W. (2021) asserted that a negative correlation exists. In contrast, Amirudin, A., and Soebago, D. (2023) concluded that the money supply does not significantly influence economic growth.

Nevertheless, the long-term regression estimation outcomes of this study reveal that J.U.B. exerts a significant positive influence on G.D.P., proven by a coefficient value of 0.627896 and a significance level of 0.0000. This indicates that, over the long term, an enhance in the money supply can effectively stimulate economic growth. Such findings align by Keynesian economic theory, that posits that a rise in the money supply enhances liquidity, thereby promoting consumption and investment, ultimately outcomeing in a favourable effect on economic growth. In contrast, the regression outcomes for the short term demonstrate that the money supply does not have a significant effect on G.D.P., as indicated by a probability value of 0.7964. This suggests that, inside of the short term, variations in the money supply are insufficient to produce a significant effect on economic growth, potentially attributable to factors related to time adjustments or delays in the transmission mechanism of monetary policy.

B. The connection among Inflation and Economic Growth

The influence of inflation on economic growth has also demonstrated considerable variability in prior studies. A majority of these studies, including those by Salim, J. F. (2017) and Ambarwati, A. D. et al. (2021), identified a negative correlation, whereas Aydın, C., Esen, Ö., and Bayrak, M. (2016) concluded that inflation exerts a positive effect. In contrast, the long-term regression estimation outcomes of the present study reveal that inflation has a significant negative effect on G.D.P., characterised by a coefficient value of -5942207 and a significance level of 0.0328. This suggests that the enhance in inflation adversely affects economic growth, supporting the hypothesis that elevated inflation diminishes consumer purchasing power, escalates production costs, and reduces investment, all of that contribute to a deceleration in economic growth. Conversely, in the short term, inflation does not exert a significant influence on G.D.P., as proven by a probability value of 0.4854. This implies that the effects of inflation on economic growth may require a considerable amount of time to manifest significantly, and that short-term fluctuations in inflation have not yet had a direct effect on economic performance.

C. The connection among Interest Rates and Economic Growth

prior research examining the connection among interest rates and economic growth has yielded a range of outcomes. For instance, studies conducted by Ambarwati et al. (2021) and Dara, R. R. (2023) have identified a positive correlation among the two variables. In contrast, other investigations, such as those by Hutomo, R. T., and Faridatussalam, S. R. (2023), have concluded that interest rates do not exert a significant effect. In the context of this study, the long-term regression estimation outcomes reveal that the interest rate (BI rate) possesses a positive coefficient of 387689.8; however, its significance level is measured at 0.9181, that indicates that the influence of the BI rate on G.D.P. is not significant over the long term. This suggests that fluctuations in interest rates might not exert a direct influence on economic growth, or their effects may be obscured by various other factors, including market confidence, levels of investment, and overall economic stability. Furthermore, the short-term estimation outcomes indicate that the BI rate does not significantly affect G.D.P., as proven by a probability value of 0.2676. This implies that alterations in interest rates may not have an immediate and substantial effect on economic activity, or alternatively, that such effects may require a longer timeframe to manifest in terms of investment and consumption.

D. The Process of Short-Run to Long-Run Equilibrium Adjustment

The short-term estimation outcomes reveal that the significant E.C.T. value of -0.028326 suggests an adjustment process occurring in the short term, guiding the system towards long-term equilibrium. This adjustment transpires relatively swiftly, rectifying short-term imbalances as it moves towards the long-term state. Although the findings indicate that variables such as J.U.B., inflation, and interest rates do not reveal significance in the short term, there remains an inherent adjustment process that ultimately influences economic growth over the long term.

VI. CONCLUSION AND RECOMMENDATION

A. CONCLUSION

To begin by, the outcomes of the cointegration test indicate that the null hypothesis can be refused at a 5% significance level, signifying that the E.C.T. does not possess a unit root, thereby confirming the existence of cointegration among the variables in question. Secondly, the aforementioned outcomes by the stationarity test reveal that G.D.P., J.U.B., inflation, and the BI rate are stationary at the first difference level. The findings by the Augmented Dickey-Fuller (A.D.F.) test further demonstrate that all variables reveal a probability of less than $\alpha = 0.05$.

The outcomes of the E.C.M. estimation indicate that the adjusted R-squared value stands at 0.884, suggesting that the independent variables inside of the model account for 88.40% of the variation in the dependent variable. Furthermore, the F-Statistic probability value is 0.000 that signifies that the independent variables— namely, J.U.B., inflation, and the BI rate— collectively exert a long-term influence on the G.D.P. variable. Specifically, the coefficient for J.U.B. is 0.627896, by a significance level of 0.000, that is less than $\alpha = 5\%$, demonstrating a significant positive effect on G.D.P. In contrast, inflation has a coefficient of -5942207 and a significance level of 0.0328, also below $\alpha = 5\%$, thereby indicating a significant negative effect on G.D.P. over the long term. Additionally, while the BI rate variable presents a positive coefficient of 387689.8, its significance level of 0.9181 exceeds $\alpha = 5\%$, suggesting that it has an insignificant effect on G.D.P.

Thirdly, the estimation outcomes derived by the E.C.M. model reveal that the E.C.T. value is significant, given that the probability of 0.0269 is lower than the threshold of 0.05, thus satisfying the criteria due to its negative sign. This E.C.T. value suggests that a short-term adjustment is taking place, indicating that long-term equilibrium is attained relatively swiftly. In contrast, the variables of J.U.B., inflation, and the BI rate demonstrate a lack of short-term effect.

B. RECOMMENDATION

The findings of the aforementioned research yield several significant recommendations, notably emphasising the necessity for both the Government and the central bank to focus more closely on monetary policy, particularly concerning the variables of J.U.B., inflation, and the BI rate. Consequently, it is vital to prioritise the development of strategic plans and formulate concrete measures aimed at enhancing the rate of economic growth while ensuring that interest rate policies remain judicious, thereby maintaining a stable level of money circulation inside of society, reflective of prevailing economic conditions, whether characterised by inflation or deflation.

To prevent inflation by eroding individuals' purchasing power, ongoing improvements are essential. Furthermore, it is imperative to fortify and develop a more cohesive financial system that ensures transparency and facilitates the exchange of accurate information among the Central Bank, Government, Stakeholders, and the International Community, thereby fostering stability in both the short and long term.

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