

SIMULTANEOUS ANALYSIS OF INFLATION AND MONEY SUPPLY IN INDONESIA

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Abstract

This study investigates the structural relationship between inflation and money supply in Indonesia using a simultaneous equations framework. Specifically, it examines how money supply, interest rates, fuel prices, and government expenditure affect inflation, and how inflation, interest rates, exchange rates, and household consumption affect money supply. Using annual data (1993–2024), a two-stage least squares (2SLS) model was applied. Results show inflation is jointly influenced by all tested variables, though only money supply and interest rates exert significant partial effects. Similarly, money supply is simultaneously affected by its four variables, but only inflation remains partially significant. These findings confirm a bidirectional relationship between inflation and money supply, supporting that monetary expansion drives inflationary pressures. The study highlights the value of simultaneous equation modeling for understanding macroeconomic interdependence and guiding reliable policy formulation.

Keywords: inflation; money supply; interest rate; fuel prices; government expenditure

INTRODUCTION

Maintaining price stability remains one of the primary objectives of macroeconomic policy, particularly in emerging economies where inflation volatility can significantly affect economic growth, investment decisions, and social welfare (Stewart, 2024). Within monetary economics, the relationship between money supply and inflation has long occupied a central theoretical and empirical position, originating from the classical quantity theory of money and continuing through modern monetary policy frameworks (Carballo, 2025). Empirical evidence suggests that changes in monetary conditions may influence inflation dynamics through multiple channels, while structural economic characteristics and policy credibility determine how effectively monetary policies Translate into price stability (Tanuwidjaja & Meng, 2006; Malikane & Mokoka, 2012).

In emerging economies, monetary dynamics have become increasingly complex due to globalization, financial innovation, and exposure to external shocks. Recent studies show that inflation dynamics are influenced not only by domestic monetary factors but also by global conditions, exchange-rate channels, and structural macroeconomic factors (Inogamov & Leon-gonzalez, 2024). In the Indonesian context, monetary authorities actively manage policy instruments such as interest rates and monetary aggregates to preserve macroeconomic stability. However, empirical findings indicate that monetary transmission mechanisms in Indonesia are shaped by

structural and institutional factors, including financial sector behavior and policy credibility, which complicate the inflation money supply relationship (Zulverdi et al., 2007).

Inflation and money supply (M2) in Indonesia during the 1993-2024 period exhibited a dynamic relationship influenced by both domestic and global economic shocks. The 1997/1998 Asian Financial Crisis triggered a sharp surge in inflation, reaching approximately 77.6% in 1998 due to the depreciation of the rupiah, banking sector instability, and liquidity expansion. In the post-crisis period, the implementation of the Inflation Targeting Framework (ITF) in 2005 contributed to maintaining relatively stable inflation despite the continuous growth of M2 driven by credit expansion and financial sector development. Inflation temporarily increased following fuel subsidy adjustments in 2005 and 2013. During the Covid-19 pandemic, expansionary monetary policies significantly increased M2; however, inflation remained low due to weakened aggregate demand. Furthermore, the 2022–2024 period was characterized by rising inflationary pressures resulting from higher global energy prices and international supply chain disruptions before returning to Bank Indonesia's target range in 2024. These conditions indicate that the relationship between inflation and money supply in Indonesia is not solely determined by monetary factors, but also by exchange rate movements, government policies, and global economic conditions.

It appears that dynamic behavioral changes in the economic variables involved are encouraged by the dynamic evolution of the Indonesian economy (Fibriyani et al., 2024). The money supply and inflation are two critical macroeconomic factors that significantly influence a nation's economic activity, including the economy of Indonesia (James, 2005). Indonesia possesses an economic structure that is particularly susceptible to disruptions in the stability of economic activity (Rahman et al., 2025). One notable shock is inflation. Inflation is a phenomenon characterized by rising prices that impacts an economy (Coleman & Nautz, 2025; Wimanda et al., 2011).

Inflation is a macroeconomic variable present in every country (Z. Chen & Valcarcel, 2025; Gobbi et al., 2025; Okedigba et al., 2024). The inflation rate can exert both positive and negative effects on a nation's economy (Gargiulo et al., 2025). Severe inflation and hyperinflation are forms of undesirable inflation that can adversely affect the economy (Nguyen, 2015). Low and moderate inflation does not adversely affect the economy and may even enhance a nation's economic performance (Bilgin, 2025); Jeworrek & Tonzer, 2025). Nonetheless, its presence remains essential for a nation's economic development, raising the question of the extent to which inflation can sustain economic growth (Brobbey et al., 2025). Consequently, the government and the central bank exercise caution in establishing the annual inflation rate during the preparation of the state revenue and expenditure budget (Hayo & Méon, 2024; Dubey & Mishra, 2023), as each determination of the inflation rate influences the attainment of the desired growth rate (Hajdúchová et al., 2015; Gobbi et al., 2025; Runtunuwu & Hussin, 2024). Inflation is influenced by the money supply (Gobbi et al., 2025) interest rates, fuel prices and government expenditure (Schnorpfeil et al., 2025)

Money acts as a legal instrument for exchange and payment, enabling economic agents to conduct Transactions both domestically and internationally (Bajrami et al., 2025). The stability of money circulation in society is essential, as it can significantly impact the economy (Thadden, 2025). The money supply refers to the total quantity of money, including cash and account balances, available to the public and circulating within an economy at a specific point in time (Mwakalila et al., 2025). The money supply plays a crucial role as a Transactional instrument that stimulates economic activity (Hirota, 2023). The circulation of money influences individuals' real purchasing power and the accessibility of essential commodities within the community. The money supply is influenced by the inflation rate (Y. Chen et al., 2021), interest rates, the rupiah exchange rate, and household consumption (Okedigba et al., 2024).

The relationship between money supply and inflation is causal, where an increase in the money supply leads to a general rise in prices (Van, 2020). The money supply is the cause of inflation, rather than inflation leading to an increase in the money supply. The relationship between inflation and the money supply is characterized by causality, wherein an increase in the money supply, not accompanied by a corresponding rise in the production of goods and services, can lead to inflation

(Granger, 1988); (Wang & Hausken, 2024), or a general rise in prices. This phenomenon arises when an increased money supply pursues a relatively constant quantity of goods, resulting in diminished purchasing power and elevated prices (Hossain, 2010). This study seeks to examine: 1) The simultaneous and partial effects of the money supply, interest rates, fuel prices, and government expenditure on inflation; 2) The simultaneous and partial effects of inflation, interest rates, the rupiah exchange rate, and household consumption on the money supply in Indonesia.

Monetary theory is widely regarded as one of the most persuasive explanations for the fundamental causes of inflation. According to monetarist economists, inflation is primarily a monetary phenomenon. Milton Friedman and other modern monetarists argue that there is a direct causal link between the growth of the money supply and inflation, emphasizing that inflation occurs when the quantity of money increases faster than real output (Mishkin, 1984). This view is grounded in two main arguments. First, inflation is believed to arise when aggregate demand exceeds aggregate supply, a condition mainly driven by excessive money circulating in the economy. Second, the causal direction is assumed to run from changes in the money supply to changes in the price level, rather than the reverse (Bordo, 2026).

To explain this relationship, economists describe a chain reaction within the economy. Under the assumption of market equilibrium, an increase in the money supply initially creates disequilibrium in the money market by generating excess liquidity. To restore balance, economic agents spend part of this excess money on goods and services (Ireland, 2004). However, because production capacity is limited by scarce resources, aggregate supply cannot expand sufficiently to match the growing demand. As a result, excess demand arises in the goods market, putting upward pressure on prices until a new equilibrium is achieved (Van, 2020). Within the aggregate demand aggregate supply framework, this process is illustrated by a rightward shift in the aggregate demand curve following an increase in the money supply, which ultimately raises the price level since aggregate supply is considered vertical in the long run (Okedigba et al., 2024).

Although the empirical literature on inflation and money supply is extensive, most studies rely on single-equation regressions, VAR frameworks, or causal approaches that treat key variables as exogenous or sequentially related. This modeling strategy may overlook the endogenous and simultaneous interactions between inflation and monetary aggregates, potentially leading to biased or incomplete interpretations of monetary dynamics. Early econometric literature emphasized that money demand and money supply are structurally interdependent and therefore better analyzed within simultaneous systems (Spitzer, 1977). Nevertheless, recent empirical studies in emerging economies including Indonesia still predominantly employ partial or one-directional approaches, leaving limited room for understanding feedback effects between inflation and monetary expansion (Inogamov & Leon-gonzalez, 2024). This gap becomes increasingly important as modern monetary environments are characterized by nonlinear responses, evolving policy regimes, and dynamic transmission mechanisms (Schmidt, 2001).

Addressing this limitation, the present study proposes a simultaneous analytical framework that explicitly models the bidirectional relationship between inflation and money supply. By treating both variables as endogenous within a system of equations, this study captures feedback effects and structural interdependence that are often ignored in conventional empirical designs. This approach provides a more realistic representation of monetary dynamics, particularly in emerging-market economies where policy responses and macroeconomic outcomes evolve jointly. The main objective of this study is to examine the simultaneous interaction between inflation and money supply in Indonesia and to identify the macroeconomic mechanisms that shape these interactions within an integrated econometric framework. Specifically, the study seeks to explore how monetary expansion and inflation jointly influence each other and to evaluate their implications for price stability in an emerging economy context.

This study contributes to the literature in three key aspects. First, it provides methodological advancement by employing a simultaneous modeling approach that accounts for endogeneity and reciprocal monetary interactions, extending earlier single-equation or causal analyses. Second, it

enriches the empirical evidence on Indonesian monetary dynamics by offering a structural perspective on the inflation money supply nexus. Third, the findings generate policy-relevant insights into monetary Transmission mechanisms, supporting more effective and coordinated monetary policies aimed at sustaining long-term price stability in emerging-market economies.

METHODS

This research specifically focuses on Indonesia as the subject of study. The data type consists of time series data covering the period 1993 to 2024. The researcher's reason for using time series data was to observe patterns of change in each variable, thus providing more comprehensive information in analyzing each variable. data collection techniques using documentation, sourced from the central statistics agency. The research variables are categorized as exogenous and endogenous variables. The exogenous variables include the Interest Rate (IR), Rupiah Exchange Rate (ER), Fuel Prices (FP), Household Consumption (HC), and Government Expenditure (GE). The endogenous variables include Inflation (Inf) and Money Supply (M2).

The first analysis method is carried out using bibliometric analysis. Bibliometrics refers to the quantitative analysis of books, papers, or other published works. Bibliometric analysis is a quantitative method used to analyze scientific publications based on bibliographic data such as citation counts, authors, journals, keywords, institutions, and collaboration networks. This approach is employed to map the development of knowledge and identify research trends within a particular field (Donthu et al., 2021). Bibliometric analysis can be conducted using a combination of Publish or Perish (PoP) and VOSviewer software, as both tools complement each other in the processes of collecting, processing, and visualizing bibliographic data (Awang, 2023; Abdelwahab et al., 2023; Patra et al., 2023; Kurniawan et al., 2024; Deste et al., 2024).

For the purpose of this research, bibliometric analysis was carried out using specific keywords, namely money supply and inflation. The network visualization result is seen in Figure 1.

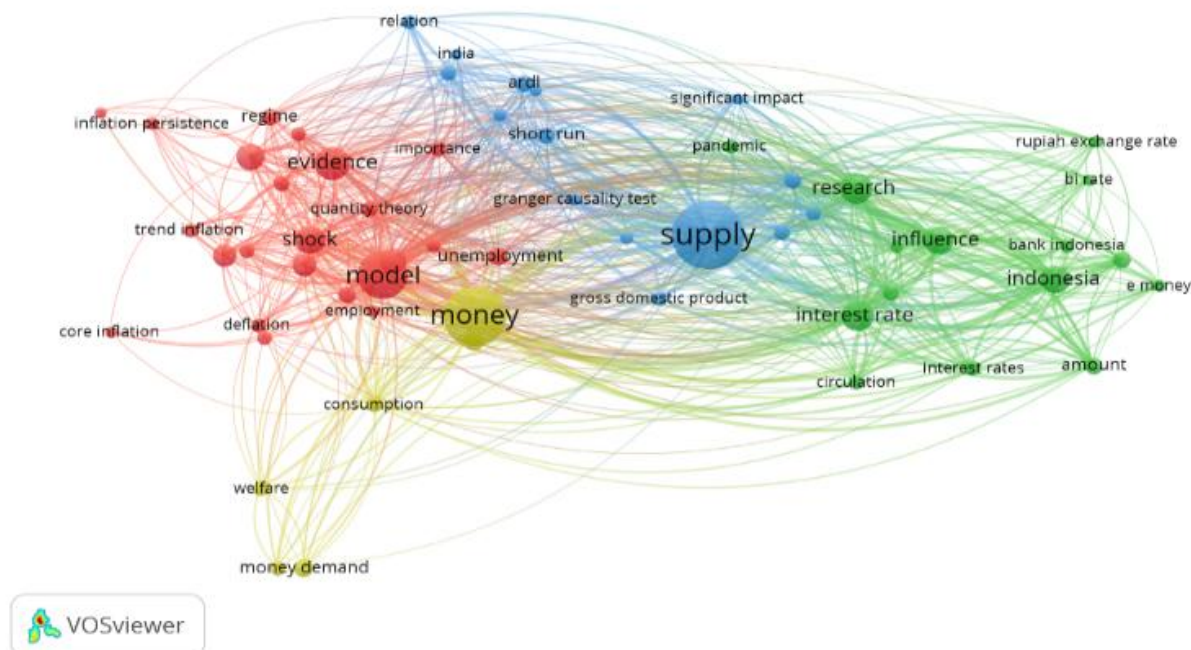


Figure 1. Network Visualiation

Despite the extensive literature on the relationship between money supply, inflation, and interest rates, existing studies largely rely on partial or single-equation approaches that overlook the endogenous and bidirectional nature of monetary variables, resulting in limited understanding of their dynamic interdependence, particularly in emerging economies such as Indonesia. This study

advances the literature by employing a simultaneous modeling framework that captures the reciprocal interactions among key monetary and macroeconomic variables, enabling a more realistic representation of monetary Transmission mechanisms compared with conventional linear or one-directional analyses. The study contributes theoretically and empirically by providing robust evidence on the structural linkages between monetary aggregates and macroeconomic outcomes, offering methodological refinement for monetary analysis and generating policy-relevant insights that support more effective and coordinated monetary management in emerging-market contexts.

Following this, the output overlay visualization is shown. The purpose of an overlay is to present the historical evidence of research activities (Deste et al., 2024). A darker visualization in bibliometric analysis indicates that the research has been conducted for a longer period of time. Conversely, lighter colors in the visualization suggest that the research is more recent (Figure 2).

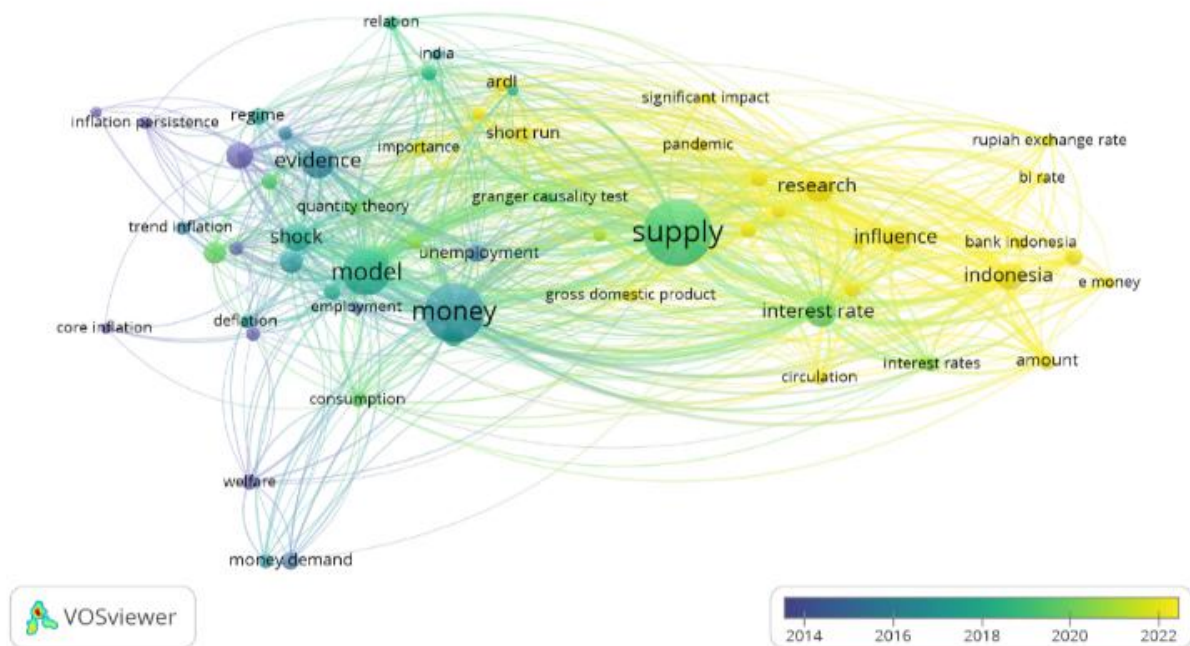


Figure 2. Output Overlay Visualization

Overlay visualization indicates a clear temporal evolution of research themes in monetary economics. Earlier studies primarily emphasized classical issues such as inflation persistence and money demand, while subsequent research shifted toward empirical modeling and econometric approaches. More recent studies increasingly focus on money supply dynamics, monetary policy instruments, digital financial innovation, and country-specific contexts such as Indonesia, reflecting a transition toward policy-oriented and contemporary monetary research.

The final image is focused on density, which is used to represent the concentration or highlight the study group. This bibliometric analysis visualization may be used to identify the areas of study that are either underexplored or extensively studied. The intensity of the red hue indicates the amount of study conducted on the issue under analysis. A deeper shade of red signifies a scarcity of literature on the research subject (Sarker & Bartok, 2024). For researchers, this is undeniably beneficial while doing study (Figure 3).

resulting from credit expansion and financial deepening. Several episodes of inflationary pressure emerged, particularly following fuel price adjustments in 2005 and 2013, while the COVID-19 pandemic in 2020–2022 prompted expansionary monetary measures that significantly increased money supply but generated relatively low inflation because of weakened aggregate demand. In the subsequent 2022–2024 period, inflation rose again due to global energy price increases and supply chain disruptions before gradually returning to Bank Indonesia's target range. Overall, the Indonesian experience indicates that the relationship between inflation and money supply is dynamic and influenced not only by monetary expansion, but also by exchange rate volatility, government intervention, and global economic conditions.

This section will provide a detailed explanation of each research variable, as shown in Table 1.

Table 1. Descriptive Variables

	INF	M2	IR	ER	FP	HC	GE
Mean	8.537500	14.97875	9.716250	12.80156	4452.188	60.30000	8.306250
Median	6.435000	12.97000	7.625000	3.760000	4500.000	58.80000	8.350000
Maximum	77.63000	62.35000	38.44000	261.2900	10000.00	73.90000	9.700000
Minimum	1.570000	3.500000	3.500000	-57.38000	700.0000	53.00000	5.700000
Std. Dev.	13.14592	10.74356	6.623902	50.36447	3110.018	4.784046	1.058586
Skewness	4.729822	2.794445	2.738638	3.972261	0.280173	0.888336	-0.591006
Kurtosis	25.43323	12.94113	12.16715	20.10483	1.822623	3.371548	2.519821
Jarque-Bera	790.3129	173.4156	152.0495	474.2540	2.266938	4.392814	2.170300
Probability	0.000000	0.000000	0.000000	0.000000	0.321915	0.111202	0.337851
Sum	273.2000	479.3200	310.9200	409.6500	142470.0	1929.600	265.8000
Sum Sq. Dev.	5357.274	3578.144	1360.158	78633.98	3.00E+08	709.5000	34.73875
Observations	32	32	32	32	32	32	32

The inflation variable has an average value of 8.54 with a standard deviation of 13.15, indicating quite high fluctuations during the observation period. The maximum inflation value reached 77.63 and a minimum of 1.57, with a distribution that is highly skewed to the right (skewness of 4.73) and high kurtosis (25.43), indicating the presence of extreme outliers. The money supply variable has an average of 14.98 with a standard deviation of 10.74. The data range is quite large, namely from 3.50 to 62.35. The skewness value of 2.79 and kurtosis of 12.94 indicates an asymmetric and leptokurtic distribution. The interest rate variable has an average of 9.72 with a standard deviation of 6.62. The minimum and maximum values are 3.50 and 38.44, respectively. The data distribution tends to be skewed to the right (skewness of 2.74) with high kurtosis (12.17). The exchange rate variable had an average of 12.80 with a very large standard deviation of 50.36, indicating high volatility. The minimum value was recorded at -57.38 and a maximum of 261.29. Skewness was 3.97 and kurtosis was 20.10.

The fuel price variable had an average of 4452.19 with a standard deviation of 3110.02. The minimum value of 700 and the maximum value of 10,000 indicate significant price changes. However, its distribution is relatively more normal than the other variables. The household consumption variable had an average of 60.30 with a standard deviation of 4.78, indicating relatively low variation. The skewness value was 0.89 and kurtosis was 3.37. The government expenditure variable had an average of 8.31 with a standard deviation of 1.06, indicating relatively stable fluctuations. A skewness value of -0.59 indicates a slight leftward skew, while a kurtosis of 2.52 approximates a normal distribution.

Overall, most macroeconomic variables, such as inflation, money supply, interest rates, and exchange rates, exhibit high volatility and non-normal distributions. However, fuel prices, household consumption, and government spending tend to be more stable and approximate a normal distribution. This indicates that monetary variables are more susceptible to economic fluctuations than fiscal and consumption variables.

Stationarity is essential in time series analysis, as regression models and other time series models yield more accurate and dependable findings when applied to stationary data. When data is stationary, its statistical properties remain constant throughout time, facilitating more reliable predictions and analysis. The stationarity test is a procedure employed to ascertain whether time series data exhibits stationarity. Stationary time series data possesses specific features, including a constant mean, variance, and covariance that remain unchanged over time. The data is unaffected by trends or seasonal fluctuations. A concise overview of the stationarity test is presented in the Table 2.

Table 2. Stationary Test Results

No	Variable	Statistic ADF		Test Critical Values			Information	Variables Used
		Value	Prob.	1%	5%	10%		
1.	INF	-5.369539	0.0001	-3.661661	-2.960411	-2.619160	Stationary at level	INF _t
2.	M2	-3.752703	0.0080	-3.661661	-2.960411	-2.619160	Stationary at level	M2 _t
3.	IR	-6.520108	0.0000	-3.679322	-2.967767	-2.622989	Stationary at first difference	IHC _{t-1}
4.	ER	-5.172252	0.0002	-3.661661	-2.960411	-2.619160	Stationary at level	ER _t
5.	FB	-6.384129	0.0000	-3.670170	-2.963972	-2.621007	Stationary at first difference	CE _{t-1}
6.	HC	-6.170818	0.0000	-3.679322	-2.967767	-2.622989	Stationary at first difference	HC _{t-1}
7.	GE	-5.307907	0.0001	-3.670170	-2.963972	-2.621007	Stationary at first difference	GS _{t-1}

Source: Data Processing Results, 2025

It is evident from the previous description of the stationary test that not all of the variables in the unit root level test are stationary. Only the inflation variable, the money supply, and the rupiah exchange rate exhibit stationary data. The inflation variable exhibits an ADF statistic exceeding the McKinnon Critical Values at the 5% level, with a probability value of 0.0001. The money supply variable also demonstration an ADF statistic surpassing the McKinnon Critical Values at the 5% level, accompanied by a probability value of 0.0080. Furthermore, the rupiah exchange rate variable presents an ADF statistic greater than the McKinnon Critical Values at the 5% level, with a probability value of 0.0002. Consequently, non-stationary variables will undergo unit root testing on their first difference.

The unit root test is thereafter conducted on the first difference. The aforementioned explanation of the stationary test indicates that the variable data for interest rates, fuel prices, household consumption, and Government Expenditure exhibit stationarity. This is apparent from the ADF statistic exceeding the McKinnon Critical Values at the 5% level, where the interest rate exhibits a probability value of 0.0000. Additionally, gasoline costs exhibit a probability value of 0.0000, household consumption a probability value of 0.0000, and Government Expenditure a probability value of 0.0001. Consequently, all variables exhibit stationarity. This indicates that all variables to be estimated in this investigation are stationary and prepared for further analysis.

The Granger causality test seeks to ascertain the existence of a reciprocal link between variables, as each variable in the analysis may be either exogenous or endogenous. This Granger test employs the VAR Pairwise Granger Causality Test with a 5% significance level. The subsequent results pertain to the Pairwise Granger Causality Test analysis (Table 3).

Table 3. Granger Causality Test Results

Pairwise Granger Causality Tests			
Date: 08/11/25 Time: 22:11			
Sample: 1993 2024			
Lags: 2			
Null Hypothesis:		Obs	F-Statistic Prob.
M2 does not Granger Cause INF		30	5.79505 0.0086
INF does not Granger Cause M2			5.67581 0.0093

Source: Data Processing Results, 2025

The data analysis indicates that the inflation variable (INF) significantly influences the money supply (M2) with a probability of 0.0093, leading to the rejection of the null hypothesis. The quantity of money in circulation greatly influences the inflation variable, with a probability of 0.0086. Consequently, it may be inferred that a bidirectional link exists between the inflation variable and the money supply, wherein the inflation variable (INF) statistically influences the money supply and vice versa. In simultaneous equations, the Two Stage Least Squares approach is required to determine the values of the more identifiable structural parameters in the equation. The subsequent outcome pertains to the analysis of the two-stage least squares model of the inflation model as detailed (Table 4).

Table 4. Inflation Model Estimation Output

Dependent Variable: INF				
Method: Two-Stage Least Squares				
Date: 08/16/25 Time: 14:54				
Sample (adjusted): 1994 2024				
Included observations: 31 after adjustments				
Instrument specification: M2 D(IR) D(CE) D(GS)				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.661952	2.555146	-2.215902	0.0357
M2	0.939997	0.144088	6.523772	0.0000
D(IR)	0.501540	0.271618	1.846493	0.0762
D(FP)	0.001479	0.001421	1.040789	0.3076
D(GE)	2.292408	2.714647	0.844459	0.4061
R-squared	0.768221	Mean dependent var		8.497742
Adjusted R-squared	0.732563	S.D. dependent var		13.36127
S.E. of regression	6.909694	Sum squared resid		1241.341
F-statistic	21.54394	Durbin-Watson stat		1.197476
Prob(F-statistic)	0.000000	Second-Stage SSR		1241.341
J-statistic	7.51E-45	Instrument rank		5

Source: Data Processing Results, 2025

The subsequent equation is derived from these results:

$$\text{Inf}_t = \alpha + \beta_1 \text{M2}_t + \beta_1 \text{IR}_t + \beta_3 \text{FP}_t + \beta_4 \text{GE} \dots\dots\dots (3)$$

$$\text{Inf}_t = -5.66 + 0.93 \text{ M2} + 0.50 \text{ IR} + 0.0014 \text{ FP} + 2.29 \text{ GE} \dots\dots\dots (4)$$

Based on the equation above, the constant value of -5.66 indicates that if the money supply, interest rates, fuel prices, and government spending variables are all equal to 0, the baseline inflation rate stands at -5.66 percent. Looking at the specific variables, the regression coefficient for the money supply is 0.93, indicating a positive or unidirectional relationship where a 1% increase in the money supply concurrently raises inflation by 0.93%, provided other variables remain constant. Similarly, the regression coefficient for the first difference of last year's interest rate is 0.50, suggesting a positive relationship where a 1% increase in the interest rate from the previous year is associated with a 0.50% rise in current-year inflation. Furthermore, the first difference of last year's fuel prices has a coefficient of 0.0014, meaning that the impact is positive and a 1% rise in fuel prices from the prior year is projected to elevate inflation by 0.0014%, assuming other variables are held constant. Lastly, the regression coefficient for last year's government expenditure (first difference) is 2.29, indicating another positive relationship where a 1% increase in government spending from the previous year is expected to result in a 2.29% increase in current inflation, provided all other variables remain constant.

The outcomes of analyzing the simultaneous two-stage least squares model for the equation concerning the money supply are as shown in Table 5.

Table 5. Estimation Output of the Money Supply Model

Dependent Variable: M2				
Method: Two-Stage Least Squares				
Date: 08/16/25 Time: 15:02				
Sample (adjusted): 1994 2024				
Included observations: 31 after adjustments				
Instrument specification: INF D(IR) ER D(HC)				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.593931	1.659941	5.779682	0.0000
INF	0.504168	0.219713	2.294667	0.0301
D(IR)	-0.107552	0.297251	-0.361822	0.7204
ER	0.064273	0.065916	0.975070	0.3385
D(HC)	-0.100345	0.403935	-0.248420	0.8058
R-squared	0.736133	Mean dependent var		14.74258
Adjusted R-squared	0.695538	S.D. dependent var		10.83638
S.E. of regression	5.979305	Sum squared resid		929.5542
F-statistic	18.13363	Durbin-Watson stat		0.642569
Prob(F-statistic)	0.000000	Second-Stage SSR		929.5542
J-statistic	1.20E-43	Instrument rank		5

Source: Data Processing Results, 2025

The subsequent equation is derived from these results:

$$M2_t = \alpha + \beta_1 Inf_t + \beta_2 IR_t + \beta_3 ER_t + \beta_4 HC_t \dots\dots\dots (5)$$

$$M2_t = 9.59 + 0.50 Inf - 0.10 IR + 0.064 ER - 0.10 HC \dots\dots\dots (6)$$

Based on the equation above, the constant value of 9.59 indicates that if the variables for inflation, interest rates, the rupiah exchange rate, and household consumption are all equal to 0, the baseline value of the money supply stands at 9.59. Examining the specific variables, the current regression coefficient for inflation is 0.50, signifying a positive or unidirectional influence where a 1% rise in inflation concurrently augments the money supply by 0.50%, provided other factors remain unchanged. Conversely, the regression coefficient for the first difference of last year's interest rate is -0.10, indicating an inverse relationship where a 1% increase in the previous year's interest rate diminishes the current year's money supply by 0.10%, assuming other variables are constant. Furthermore, the present rupiah exchange rate (level) has a positive coefficient of 0.06, meaning that a 1% appreciation in the exchange rate expands the money supply by 0.06% within the same year. Lastly, the regression coefficient for last year's household consumption (first difference) is -0.10, demonstrating a negative or inverse correlation; an increase of 1% in household spending from the prior year will diminish the current money supply by 0.10%, provided all other factors stay the same.

DISCUSSION

The empirical results reveal a statistically significant causal relationship between inflation and money supply in Indonesia, suggesting that monetary aggregates and price dynamics evolve within a mutually reinforcing framework rather than through a one directional mechanism. This finding strengthens the argument that monetary variables remain relevant in explaining inflation processes, particularly in emerging market economies where structural rigidities and external shocks often influence the monetary transmission mechanism.

From a theoretical standpoint, the observed causality from money supply to inflation is consistent with the classical quantity theory of money, which argues that sustained monetary expansion ultimately exerts upward pressure on the general price level when real output growth does not adjust proportionately. The monetarist perspective emphasizes that inflation is fundamentally a

monetary phenomenon, implying that long-run price stability requires prudent control over liquidity expansion. The empirical evidence from Indonesia supports this proposition by indicating that variations in money supply contain predictive power for inflation dynamics, despite the evolution of modern monetary policy frameworks that prioritize interest rate instruments over monetary aggregates.

However, the reverse causal relationship from inflation to money supply highlights the endogenous nature of monetary policy implementation. Rather than acting as an exogenous policy variable, money supply adjusts in response to macroeconomic developments, particularly inflationary pressures. This result aligns with the policy reaction function framework in which central banks respond to deviations in inflation from target levels through monetary tightening or easing. In Indonesia, this mechanism is reflected in the adoption of the Inflation Targeting Framework (ITF), where inflation becomes the overriding policy objective and monetary conditions are adjusted to maintain price stability.

The bidirectional causality identified in this study provides empirical support for the argument that inflation and monetary policy interact through a dynamic feedback loop. Under such conditions, monetary aggregates cannot be treated as strictly exogenous explanatory variables. Instead, they should be interpreted as policy outcomes shaped by central bank responses to inflation expectations and macroeconomic shocks. This interpretation is consistent with contemporary monetary theory suggesting that policy credibility, expectations management, and institutional frameworks influence the effectiveness of monetary control, especially in emerging economies operating under inflation targeting regimes.

Furthermore, the findings suggest that Indonesia's monetary environment reflects a hybrid structure in which both traditional monetary channels and modern interest-rate-based policy transmission coexist. Although the country formally shifted toward inflation targeting since July 2005, monetary liquidity remains an important operational consideration within policy decisions. The persistence of this interaction indicates that monetary aggregates still carry informational value regarding inflationary pressures, especially when supply-side shocks or exchange rate fluctuations amplify domestic price movements.

Another important implication concerns the role of policy coordination and macroeconomic context. The causal link between inflation and money supply is likely moderated by fiscal conditions, exchange rate stability, and external economic developments an idea emphasized in fiscal-monetary interaction theories. Classical contributions such as Sargent and Wallace's "unpleasant monetarist arithmetic" demonstrate that monetary outcomes cannot be separated from fiscal sustainability, as inflationary pressures may arise when monetary expansion implicitly accommodates fiscal imbalances. Thus, interpreting the inflation-money supply nexus in Indonesia requires recognizing the broader institutional environment, including fiscal-monetary coordination and financial market development.

Empirically, the feedback mechanism observed in this study also reflects the practical behavior of Bank Indonesia in maintaining inflation within a predetermined target corridor through adjustments in policy rates and liquidity conditions. Recent policy reports show that monetary decisions explicitly consider inflation projections, exchange rate stability, and economic growth simultaneously, indicating that monetary expansion or contraction is often a response to evolving inflation dynamics rather than an independent shock. This reinforces the argument that inflation and money supply should be modeled as jointly endogenous variables.

Methodologically, the presence of bidirectional causality validates the use of simultaneous or dynamic modelling approaches. Single-equation regressions that assume exogeneity may underestimate the complexity of monetary transmission and produce biased policy interpretations. By acknowledging feedback effects, the analysis offers a more realistic depiction of macroeconomic interactions and contributes to the growing literature emphasizing endogeneity in monetary policy analysis.

From a policy perspective, the results imply that maintaining macroeconomic stability requires balancing money supply growth with real sector expansion while ensuring that inflation expectations remain anchored. The effectiveness of monetary policy does not solely depend on restricting liquidity but also on maintaining institutional credibility and transparent communication strategies. In inflation-targeting economies, credibility enhances policy transmission by shaping expectations, thereby reducing the inflationary impact of temporary monetary fluctuations.

Overall, this study contributes to the broader debate regarding the relevance of monetary aggregates under modern monetary frameworks. The evidence from Indonesia demonstrates that even within an inflation-targeting regime, money supply and inflation continue to influence each other in a dynamic and endogenous manner. This finding suggests that policymakers should not entirely disregard monetary aggregates, but rather integrate them into a broader analytical framework that considers expectations, institutional credibility, and macroeconomic structure.

This study determined that inflation is concurrently affected by the money supply, interest rates, fuel prices, and government expenditure, while it is partially influenced by the money supply and interest rates. This demonstrates that inflation levels are dictated by the money supply and interest rates. The money supply in a country is regulated by the Central Bank, which is affected by multiple factors, including the average prices of goods and services. As the prices of goods and services rise, individuals typically require additional cash to engage in transactions. Ultimately, the demand for money and the money supply will attain a new balance in the economy. The equilibrium between the supply and demand for money affects the correlation between the inflation rate and the money supply. An increase in the money supply within the community typically leads to inflation. This transpires as individuals' purchasing power escalates, while the supply of commodities remains static, resulting in an increase in prices. The findings of this study are relevant to the results of previous research which found that inflation will be determined by money in circulation. (Gobbi et al., 2025), interest rate, fuel prices, Government Expenditure.

This study additionally determined that inflation is affected by interest rates. This demonstrates that interest rates function as a standard for banks in determining the rates on their financial products, including savings accounts, time deposits, and loans. Fluctuations in these rates can affect macroeconomic variables that influence inflation. As interest rates increase, both loan and deposit rates also elevate. Rising deposit rates incentivize individuals to retain their funds in banks, thereby diminishing the money supply. A reduction in the money supply typically leads to a decline in demand for goods and services, so assisting in the mitigation of inflation. Conversely, rising loan interest rates elevate borrowing costs, prompting corporations to curtail investment. A decline in investment can impede economic growth and may also lead to reduced inflation.

Moreover, it was determined that the money supply is concurrently affected by inflation, interest rates, the rupiah exchange rate, and household spending, while it is only partially impacted by inflation. Inflation is a tangible occurrence in the market, rather than a just theoretical concept. This indicates that the prices of the majority of products and services do not increase solely in one or two categories. Moreover, inflation transpires incessantly, rather than sporadically. Conversely, deflation refers to a widespread decrease in prices, also termed negative inflation. This aligns with the quantity theory, which posits a relationship between inflation and the money supply. Alterations in the money supply influence fluctuations in inflation, and conversely: escalating prices lead to an augmented demand for money, which subsequently impacts the money supply. A reduction in inflation can influence the money supply, resulting in a delayed adjustment of its level. If the money supply expands substantially without corresponding economic development, it may result in elevated inflation. If inflation declines, individuals may exercise greater caution in their expenditures, perhaps leading to a reduction in the need for money. Consequently, the central bank must meticulously manage the money supply to ensure economic stability and prevent excessive inflationary swings. The findings of this study are relevant to the results of previous research which found that the amount of money in circulation will be determined by the inflation rate, interest rate, exchange rate, household consumption (Y. Chen et al., 2021).

CONCLUSIONS

Inflation in Indonesia is simultaneously influenced by the money supply, interest rates, fuel prices, and government expenditure, while the money supply and interest rates are identified as variables that significantly affect inflation at the partial level. Furthermore, the money supply is simultaneously influenced by inflation, interest rates, the rupiah exchange rate, and household consumption, whereas inflation is the only variable that exerts a significant partial effect on the money supply.

Based on these findings, several policy recommendations can be proposed. (1) The Indonesian government, particularly through the Ministry of Finance and relevant economic institutions, should continue strengthening inflation control measures to maintain macroeconomic stability. (2) Bank Indonesia should maintain effective monetary policy management, particularly in regulating money supply growth, to support price stability and sustainable economic development. (3) Efforts to preserve the stability of the rupiah exchange rate against the US dollar should be strengthened, as exchange rate depreciation may contribute to rising domestic prices and inflationary pressures. (4) Fuel subsidy policies should be carefully evaluated, as the findings indicate that fuel prices do not have a substantial direct impact on inflation. Therefore, alternative policy instruments may be considered to achieve more effective inflation control. (5) The government should promote policies that enhance household income, including wage improvement programs, employment creation initiatives, and support for micro, small, and medium-sized enterprises (MSMEs), thereby strengthening household purchasing power and economic resilience. (6) Policies aimed at improving income distribution and ensuring the efficient allocation and utilization of public expenditure should be prioritized to support inclusive and sustainable economic growth.

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