

Beyond monetary policy: how social security and bank credit drive money supply in Indonesia

Hillin Qurrotu A'yun, Shofwan

Department of Economics, Faculty of Economics and Business, Universitas Brawijaya, Malang, Indonesia.

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Abstract

This study investigates the determinants of broad money supply (M2) in Indonesia, focusing on fiscal policy, banking intermediation, non-cash payment instruments, and monetary policy. Monthly data from January 2016 to December 2024 are analyzed using the Autoregressive Distributed Lag (ARDL) bounds testing approach to examine short- and long-run relationships. The results show that credit disbursement, third-party funds, and social security spending have positive and statistically significant effects on M2 in the long run. In contrast, village funds, debit/ATM cards, credit cards, and the reserve requirement have no significant effects in either the short or long run. The error correction term of -1.422 indicates rapid adjustment toward long-run equilibrium, while the model explains 92.7% of M2 variation ($R^2 = 0.927$). This study contributes empirical evidence on the role of social security in M2 dynamics by integrating fiscal, banking, payment, and monetary variables within a single ARDL framework. The findings highlight the importance of banking intermediation and targeted fiscal transfers in shaping long-run liquidity and underscore the need for policy coordination among the government, Bank Indonesia, and the Financial Services Authority (OJK).

Keywords: *Money supply (M2), banking intermediation, social security, fiscal policy, ARDL, Indonesia.*

Introduction

A country's economy is inextricably linked to economic transactions within society, the smooth flow of which depends heavily on the liquidity and stability of the financial system. In this context, money serves as a key indicator of financial system liquidity because it reflects the scale of economic activity. Beyond functioning as a medium of exchange, money also serves as a store of value, a unit of account, and a means of deferred payment. These functions make money fundamental to supporting the smooth flow of transactions, maintaining payment system stability, and fostering economic development (Yuliadi, 2020).

Maintaining economic stability requires effective intervention by the monetary authority to regulate liquidity and preserve financial system stability. In Indonesia, this responsibility is entrusted to Bank Indonesia, whose primary objective is to achieve and maintain the stability of the rupiah, as stipulated in Article 7 of Law No. 23 of 1999 concerning Bank Indonesia (Rasyidin et al., 2022). In addition, Bank Indonesia is responsible for maintaining payment system stability and strengthening financial system stability to support sustainable economic growth. To achieve these objectives, Bank Indonesia formulates and implements monetary policy by managing key monetary indicators, particularly the Money Supply, to maintain equilibrium in the money market (Angin et al., 2025).

In this context, the Money Supply serves as a key indicator of the effectiveness of monetary policy because it reflects the level of liquidity in the economy, and its fluctuations significantly influence economic activity (Sliwinski, 2023). Bank Indonesia classifies the Money Supply into two categories: narrow money (M1), which consists of currency and demand deposits that can be directly used for transactions, and broad money (M2), which comprises M1 plus time deposits, savings, and other highly liquid deposits. Among these measures, M2 is considered the most representative indicator of the Money Supply because it reflects public liquidity and purchasing power, has a broader scope than M1, and more comprehensively captures the dynamics of economic activity. Therefore, M2 is employed as the primary variable in this study.

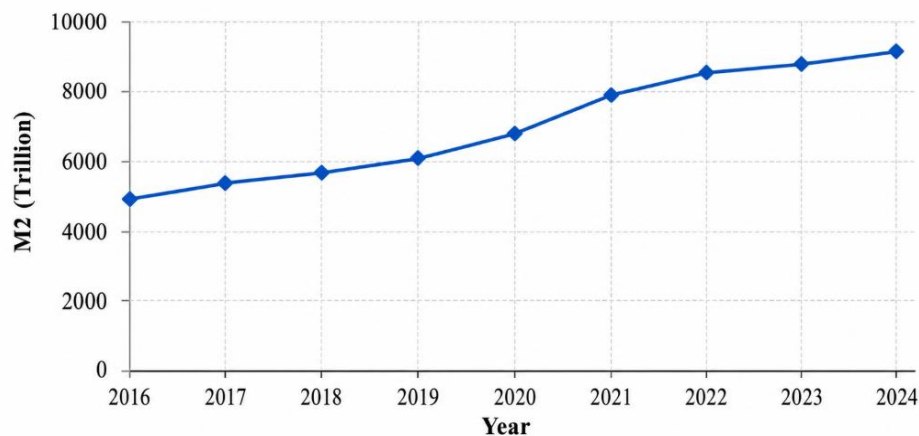


Figure 1. M2 Data in Indonesia, 2016–2024

M2 in Indonesia has shown a continuous upward trend throughout the 2016–2024 observation period. According to Statistics Indonesia (BPS), M2 increased from Rp5,004.98 trillion in 2016 to Rp9,210.82 trillion in 2024. This persistent increase reflects the growing demand of the public to hold money and suggests that various monetary, banking, fiscal, and payment system factors may contribute to changes in M2. These potential determinants provide the basis for further investigation in this study. The continuously rising M2 requires special attention regarding its control. This is crucial to prevent uncontrolled inflation resulting from excessively high M2, or to avoid an economic recession caused by excessively low M2, as both could worsen economic stability (Ridha & Mutia, 2021). Therefore, to achieve M2 control targets, Bank Indonesia employs various primary monetary policy instruments that can influence M2.

In addition to being influenced by monetary policy instruments, M2 dynamics also heavily depend on credit and financing activities. In this regard, the banking sector plays a crucial role as a financial intermediary capable of influencing M2. As an intermediary, the banking sector plays a role in mobilizing and channeling funds to the public through deposit and credit mechanisms, thereby expanding the economy's liquidity capacity through the credit multiplier process (Yakubu & Abdallah, 2021). The banking sector is also a key player in the concept of money creation, which is the process by which new money is created when banks extend credit to the public, known as bank money (Hook, 2022).

Credit disbursement by commercial banks in Indonesia continues to rise; as of December 2024, data released by the Financial Services Authority (OJK) shows that credit disbursed

by commercial banks reached Rp7,943 trillion. This growth reflects an expansion of financing in the real sector, which has the potential to expand economic liquidity through the money creation mechanism by commercial banks. Given its role as a driver of economic liquidity expansion, credit disbursement by commercial banks serves as a key indicator that requires analysis to understand its contribution to changes in M2. This is because if credit disbursement increases excessively without proper control, it could potentially lead to uncontrolled inflation, thereby triggering macroeconomic instability (Ridha & Mutia, 2021).

On the other hand, third-party funds of commercial banks also increased throughout the 2016–2024 study period. As of December 2024, data released by the OJK showed that commercial banks' third-party funds reached IDR 8,837 trillion. This increase reflects the continuous growth of public deposits within the financial system, whether in the form of savings accounts, demand deposits, or time deposits, which, in turn, strengthens banks' liquidity capacity and their ability to extend credit and expand financing (Pujiati et al., 2020). As the primary component of banks' liquidity liabilities, third-party funds are also an important factor influencing changes in M2. Within the concept of money creation, the inflow of public deposits into the banking system affects money growth and plays a crucial role in determining banks' capacity to extend credit (Hook, 2022).

Amid the ongoing digitalization of the economy, the dynamics of the money supply are no longer influenced solely by conventional monetary policy and real economic activity. The development of cashless payment systems, such as card based payment instruments which include debit/ATM cards and credit cards has helped shape public transaction patterns and influence the velocity of money in the economy. In this context, debit/ATM cards and credit cards used by the public for cashless transactions can accelerate money circulation, enhance liquidity, and contribute to M2 dynamics (Adamy et al., 2024). Bank Indonesia data indicates that the number of debit/ATM cards and credit cards in circulation continues to rise annually. By 2024, the number of debit/ATM cards and credit cards in circulation reached 325.55 million and 18.55 million units, respectively.

Several factors, such as monetary policy, banking intermediation, and the development of non-cash payment instruments, have been extensively studied in relation to M2 dynamics. However, an important aspect that has received limited attention is the role of fiscal interventions in influencing M2 through the disbursement of Social Security and Village Funds. In recent years, the Indonesian government has continuously increased the allocation of these fiscal programs, reflecting a stronger commitment to supporting household welfare and regional development. The expansion of social security and village fund allocations has the potential to increase disposable income, stimulate household consumption, encourage transaction activity, and accelerate money circulation, thereby influencing the dynamics of the money supply. Despite these potential transmission mechanisms, empirical evidence examining the direct relationship between fiscal transfers and M2 remains limited. This issue provides an important motivation for further investigation in the Indonesian context.

Social security programs are one of the fiscal policies implemented by the government, with the primary objective of injecting liquidity into the economy by ensuring basic needs are met and improving the standard of living through increased household income and consumption (Nugroho et al., 2021). In addition to Social Security, since 2015 the Indonesian government has implemented the Village Fund program, regulated under Law

of the Republic of Indonesia No. 6 of 2014 and further clarified by Government Regulation No. 22 of 2015. Similar to Social Security programs, this program is also funded by the Indonesian State Budget (APBN), but is specifically allocated to support rural infrastructure development, promote community economic empowerment, and reduce social inequality (Hardianto, 2022). Both programs represent fiscal transfers that inject liquidity into the economy through different transmission channels, thereby making them relevant variables in explaining M2 dynamics.

Several empirical studies indicate that fiscal interventions through Social Security programs play a significant role in influencing community well-being and economic dynamics. Research by (Hermawan & Widyarini, 2023) indicates that the distribution of Cash Transfer under Social Security Programs during the COVID-19 pandemic increased household purchasing power and consumption in both rural and urban areas. (Karima et al., 2022) report that the Village Fund Direct Cash Assistance (BLT-DD) program helped sustain household consumption. At the international level, (Allison & Pillay, 2024) show that social grant programs in South Africa increased consumption demand, with potential implications for prices, inflation, and household liquidity. Similarly, (Mendes et al., 2023) found that the Bolsa Familia program in Brazil generated sustainable macroeconomic effects through higher aggregate demand and local economic activity. Furthermore, (Robson et al., 2024) demonstrate that social grants in Turkey, whether provided as cash or non-cash transfers, effectively reduced income inequality and poverty while improving beneficiaries' economic stability. Likewise, (Strupat et al., 2025) show that social security programs in Kenya protected household welfare and strengthened economic resilience during periods of major shocks. Collectively, these studies confirm the important economic role of fiscal transfers; however, evidence regarding their direct relationship with broad money supply (M2) remains limited, thereby reinforcing the need for this study.

The Quantity Theory of Money serves as one of the primary theoretical foundations of this study because it explains the relationship between the money supply and economic activity. The fundamental ideas of this theory originated from classical economists, including David Hume, Jean-Baptiste Say, and John Stuart Mill, and were later developed systematically by Irving Fisher through "The Purchasing Power of Money: Its Determination and Relation to Credit, Interest, and Crises " in 1911. The theory states that the money supply has a proportional relationship with the price level in an economy (Riadina & Sugianto, 2024). An increase in the money supply that is not accompanied by growth in real output may lead to higher prices, thereby affecting purchasing power and economic stability. Nevertheless, the relationship between the money supply and economic activity is not purely mechanical, as it is also influenced by factors such as the velocity of money, economic structure, and broader economic conditions. Consequently, the Quantity Theory of Money provides an important theoretical basis for monetary authorities in managing liquidity and maintaining price stability through monetary policy instruments that influence the money supply (Hasbi et al., 2024).

The relationship between the money supply and economic activity is represented by the equation $MV = PT$, where (M) denotes the money supply, (V) represents the velocity of money, (P) refers to the price level, and (T) indicates the volume of transactions in the economy. This equation suggests that changes in the money supply can influence both the price level and the scale of economic activity (Jung, 2024). In the context of the modern

economy, however, changes in the money supply are not determined solely by monetary policy. They are also influenced by developments in banking intermediation, payment systems, fiscal policy, and the intensity of economic transactions, all of which affect liquidity and the circulation of money. Therefore, the Quantity Theory of Money provides an appropriate theoretical foundation for explaining how monetary, banking, fiscal, and payment system factors jointly contribute to the dynamics of broad money supply (M2), which constitutes the primary focus of this study.

The mobilization of third-party funds and the extension of credit by banks play a direct role in the money creation process through the credit expansion mechanism. Additionally, monetary policy via the reserve requirement can influence banks' liquidity capacity, thereby affecting the growth of the money supply. On the other hand, the intensity of transactions and the development of non-cash payment systems can affect transaction volume and the velocity of money circulation; the more frequently the public conducts transactions, the higher the velocity of money circulation in the economy. Furthermore, fiscal policy particularly through government spending also serves as a liquidity injection that can boost economic activity and money circulation in society. Thus, the quantity theory of money provides a strong foundation for explaining the dynamics of the money supply, which is closely linked to economic transactions, monetary and fiscal policies, and the development of payment systems.

In addition to the Quantity Theory of Money, the dynamics of the money supply can also be explained through modern Financial Intermediation Theory. This theory explains that financial institutions, particularly banks, perform an intermediary function by mobilizing funds from surplus units and channeling them to deficit units through deposit and credit mechanisms. Through this intermediation process, banks not only facilitate the allocation of financial resources but also reduce transaction costs, manage risk, provide liquidity, and improve the efficiency of resource allocation within the economy. More importantly, the theory explains the process of money creation, whereby new money enters the economy through credit disbursement by commercial banks and is subsequently recorded as deposits within the banking system before circulating as a means of payment (Hook, 2022). Accordingly, Financial Intermediation Theory complements the Quantity Theory of Money by explaining the institutional mechanism through which banking activities influence changes in the money supply.

In the context of this study, the Quantity Theory of Money and Financial Intermediation Theory provide complementary perspectives for explaining the determinants of broad money supply (M2). From the perspective of Financial Intermediation Theory, credit disbursement and the mobilization of third-party funds are fundamental to the money creation process because credit expansion increases deposits within the banking system and strengthens liquidity. Monetary policy, particularly through the reserve requirement, influences banks' lending capacity by regulating the proportion of deposits that must be held as reserves, thereby affecting the money creation process. From the perspective of the Quantity Theory of Money, fiscal policy in the form of Social Security and Village Funds represents liquidity injections that stimulate household consumption and transaction activity, while the development of non-cash payment instruments, including debit/ATM cards and credit cards, improves transaction efficiency and influences the velocity of money. Taken together, these theoretical perspectives provide a comprehensive framework for

explaining how banking intermediation, fiscal policy, payment system development, and monetary policy jointly influence the dynamics of broad money supply (M2) in Indonesia.

Credit is financing extended by banks to customers based on a lending agreement with the obligation to repay principal and interest or profit-sharing within a specified period (Mamuaja et al., 2024). In Financial Intermediation Theory, credit represents the primary mechanism through which banks channel funds to sectors requiring financing (Yakubu & Abdallah, 2021). Through the process of money creation, every new loan extended by commercial banks generates new deposits within the banking system, thereby increasing liquidity and expanding the money supply (Hook, 2022). In addition to increasing banking liquidity, credit expansion stimulates investment, production, consumption, and transaction activities, all of which contribute to greater money circulation in the economy. Empirical evidence by (Haga et al., 2025) further confirms that credit disbursement plays a strategic role in influencing the dynamics of the money supply and economic growth in Indonesia. Based on the theoretical and empirical arguments above, the first hypothesis is formulated as follows:

H1: Credit disbursement is hypothesized to have a positive and significant effect on the money supply (M2).

Third-party funds are funds collected by banks from the public in the form of savings, checking accounts, and time deposits, which constitute the primary source of liquidity for the banking sector (Mamangkey et al., 2021). The availability of third-party funds determines banks' capacity to extend credit and therefore plays a central role in supporting the financial intermediation function (Alfaini & Amin, 2023). From the perspective of Financial Intermediation Theory, larger third-party funds strengthen banks' lending capacity and facilitate the creation of new deposits through credit expansion, thereby contributing to money creation and increasing the money supply (Li & Wang, 2020). Consequently, the growth of third-party funds not only enhances banking liquidity but also supports the expansion of economic transactions through greater credit availability. Based on these theoretical and empirical considerations, the second hypothesis is formulated as follows:

H2: Third-party funds are hypothesized to have a positive and significant effect on the money supply (M2).

In addition to banking intermediation, fiscal policy may also influence the dynamics of the money supply through the distribution of Social Security. Social Security is a non-contributory government program funded through the State Budget that aims to assist poor and vulnerable households in meeting their basic needs and reducing social risks (Noerkaisar, 2021). The distribution of Social Security increases the disposable income of beneficiary households, thereby encouraging consumption and transaction activities within the economy. According to the Quantity Theory of Money, higher transaction intensity and money circulation increase the velocity of money, which may subsequently contribute to changes in the money supply (Adamy et al., 2024). Therefore, Social Security functions not only as a social protection instrument but also as a fiscal mechanism capable of injecting liquidity into the economy. Based on this theoretical explanation, the third hypothesis is formulated as follows:

H3: Social Security is hypothesized to have a positive and significant effect on the money supply (M2).

Village Funds are fiscal transfers provided by the central government to villages through the State Budget to support rural development, community empowerment, and the improvement of public welfare (Hardianto, 2022). Unlike Social Security, which directly increases household disposable income, Village Funds primarily stimulate economic activity through infrastructure development, public services, and productive community programs. These expenditures generate income, encourage local economic transactions, and strengthen economic activity within rural areas. From the perspective of the Quantity Theory of Money, the increase in transaction activity resulting from Village Fund implementation may contribute to higher money circulation and influence the dynamics of the money supply. Empirical evidence by (Karima et al., 2022) also indicates that Village Fund programs supported household consumption through Direct Cash Assistance (BLT-DD), suggesting their potential role in increasing economic liquidity. Based on these theoretical and empirical arguments, the fourth hypothesis is formulated as follows:

H4: Village Funds are hypothesized to have a positive and significant effect on the money supply (M2).

The development of non-cash payment instruments has transformed transaction patterns by improving the efficiency, speed, and convenience of payment activities. Debit/ATM cards are among the most widely used payment instruments because they enable users to access deposits directly for transaction purposes. According to the Quantity Theory of Money, improvements in payment efficiency may increase the velocity of money by facilitating more frequent and efficient transactions. Consequently, although debit/ATM cards do not directly create new money, their widespread use has the potential to influence money circulation and the dynamics of the money supply (Jung, 2024). This argument is supported by (Puswanti & Nasrullah, 2020), who found that the expansion of digital payment instruments contributes to changes in monetary activity. Based on these theoretical and empirical considerations, the fifth hypothesis is formulated as follows:

H5: Debit/ATM cards are hypothesized to have a positive and significant effect on the money supply (M2).

Another card-based non-cash payment instrument that also has the potential to influence the money supply is the credit card. A credit card is an instrument that allows users to make transactions without having to provide funds directly, as payments are made through credit facilities provided by the card issuer (Tangel et al., 2023). The delayed payment mechanism enables increased consumption and transaction frequency among the public. From the perspective of the quantity theory of money, this can accelerate the circulation of money in the economy and ultimately influence the growth of the money supply (Adamy et al., 2024). Based on this explanation, the sixth hypothesis is formulated as follows:

H6: Credit cards are hypothesized to have a positive and significant effect on the money supply (M2).

In addition to banking, fiscal, and payment system factors, monetary policy through the

regulation of the reserve requirement also plays a crucial role in controlling the money supply. Within the framework of the money multiplier concept, the central bank sets the proportion of public deposits that banks are required to hold as reserves, thereby limiting the amount of funds that can be channeled as credit (Hook, 2022). Bank Indonesia defines the reserve requirement as funds that commercial banks are required to hold in the form of demand deposit balances at Bank Indonesia, amounting to a certain percentage of third-party funds. An increase in the reserve requirement reduces the liquidity banks can use to extend credit, thereby limiting the money creation process and having a contractionary effect on the money supply (Angin et al., 2025). Based on this explanation, the seventh hypothesis is formulated as follows:

H7: The reserve requirement is hypothesized to have a negative and significant effect on the money supply (M2).

Previous empirical research has consistently demonstrated that the money supply is influenced by various monetary, banking, fiscal, and payment system factors. Studies by (Haga et al., 2025) and (Li & Wang, 2020) emphasize the important role of banking intermediation, particularly credit and third-party funds, in the money creation process. Other studies, including (Adamy et al., 2024), highlight the influence of non-cash payment instruments on monetary dynamics through improvements in transaction efficiency. Meanwhile, research by (Hermawan & Widyarini, 2023) (Karima et al., 2022) (Allison & Pillay, 2024) (Mendes et al., 2023) (Robson et al., 2024) and (Strupat et al., 2025) demonstrates that fiscal transfer programs contribute to household welfare, consumption, and broader economic activity. Although these studies provide valuable insights into the determinants of economic activity and liquidity, they generally examine these factors separately and do not explicitly evaluate their combined influence on broad money supply (M2).

Furthermore, previous studies have predominantly focused on banking variables, monetary policy, or payment system development, while the direct role of fiscal transfers, particularly Social Security and Village Funds, in influencing M2 has received relatively limited empirical attention. Existing studies primarily examine the effects of fiscal transfers on poverty reduction, household welfare, consumption, and regional development rather than on monetary aggregates. Consequently, the transmission mechanism through which fiscal transfers influence broad money supply remains insufficiently explored, especially within the Indonesian context.

Accordingly, this study addresses these gaps by integrating banking intermediation, fiscal policy, payment system development, and monetary policy variables into a single empirical framework using the Autoregressive Distributed Lag (ARDL) approach. In addition, this study examines the distinct short-run and long-run effects of these variables on broad money supply (M2), thereby providing a more comprehensive understanding of the transmission mechanisms affecting monetary liquidity in Indonesia. These aspects constitute the primary contribution of this study and distinguish it from previous empirical research.

Based on the research gaps identified above, this study aims to examine the determinants of broad money supply (M2) in Indonesia by simultaneously analyzing the roles of banking intermediation, fiscal policy, payment system development, and monetary

policy. Specifically, this study investigates the effects of credit, third-party funds, Social Security, Village Funds, debit/ATM cards, credit cards, and the reserve requirement on M2 using the Autoregressive Distributed Lag (ARDL) approach. By integrating these variables into a single empirical framework and distinguishing their short-run and long-run effects, this study is expected to provide a more comprehensive understanding of the transmission mechanisms affecting broad money supply in Indonesia. The findings are expected to enrich the literature on money supply determinants and provide empirical evidence to support the formulation of monetary and fiscal policies aimed at maintaining monetary and financial system stability.

Methods

This study employs a quantitative approach to examine the relationships among variables over a specific period in a structured manner and based on objective data. Grounded in the positivist paradigm, which aims to test pre-formulated hypotheses to obtain objective, measurable, and valid analytical results (Sugiyono, 2023). The data used consists of secondary time-series data with a monthly frequency covering the period from January 2016 to December 2024, comprising 108 observations. Secondary data was selected because it has undergone systematic recording and publication processes and possesses sufficient reliability and accuracy for empirical analysis.

In this study, the data used is sourced from several official institutions with high credibility. These include the Statistics Indonesia (BPS), Indonesian Banking Statistics (SPI) published by the Financial Services Authority (OJK), the State Budget (APBN) implementation reports issued by the Ministry of Finance, and the Statistics on Payment Systems and Financial Market Infrastructure (SPIP) published by Bank Indonesia. The data consists of one dependent variable, namely the broad money supply (M2), and seven independent variables, which include the realized disbursement of commercial bank loans, third-party funds of commercial banks, social security, village funds, the number of debit/ATM cards, the number of credit cards, and the reserve requirement.

Based on the data characteristics and research objectives, the analysis method used in this study is the Autoregressive Distributed Lag (ARDL) model, which combines the Autoregressive (AR) and Distributed Lag (DL) models to analyze the short-term and long-term dynamic relationships among variables in time series data (Ridha & Mutia, 2021). The ARDL model in this study is used to test the effects of credit disbursement, third-party funds, social security, village funds, the number of debit/ATM cards, the number of credit cards, and the reserve requirement on the money supply (M2) in Indonesia, both in the short and long term.

In general, the ARDL model equation in this study is formulated as follows:

$$\begin{aligned} \Delta M2_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta M2_{t-i} + \sum_{i=0}^{q1} \alpha_2 \Delta Kredit_{t-i} + \sum_{i=0}^{q2} \alpha_3 \Delta DPK_{t-i} + \sum_{i=0}^{q3} \alpha_4 \Delta Bansos_{t-i} \\ & + \sum_{i=0}^{q4} \alpha_5 \Delta DD_{t-i} + \sum_{i=0}^{q5} \alpha_6 \Delta KD_{t-i} + \sum_{i=0}^{q6} \alpha_7 \Delta KK_{t-i} + \sum_{i=0}^{q7} \alpha_8 \Delta GWM_{t-i} \\ & + \beta_1 M2_{t-1} + \beta_2 Kredit_{t-1} + \beta_3 DPK_{t-1} + \beta_4 Bansos_{t-1} + \beta_5 DD_{t-1} \\ & + \beta_6 KD_{t-1} + \beta_7 KK_{t-1} + \beta_8 GWM_{t-1} + \varepsilon_t \end{aligned}$$

(1)

Where $M2_t$ represents M2 in period t ; $\Delta M2_t$ denotes change in M2 in period t ; α_0 is the constant (intercept); $\alpha_1, \alpha_2, \dots, \alpha_8$ are the short-run coefficients; $\beta_1, \beta_2, \dots, \beta_7$ are the long-run coefficients; p, q indicate the maximum lag length for the dependent and independent variables; ε is the error term; Kredit refers to credit; DPK denotes third-party funds; Bansos represents social security; DD refers to village funds; KD denotes debit cards; KK represents credit cards; and GWM refers to the reserve requirement.

The data analysis process in this study began with a stationarity test to ensure that the time series data used were stationary at the $I(0)$ level as well as at the first-differenced $I(1)$ level. This test was conducted to avoid using non-stationary data, which could lead to spurious regression (Asratie, 2021). The next step is a cointegration test using the Bounds Testing approach to ensure that the model is suitable for analyzing both short-term and long-term dynamics by comparing the f -statistic and t -statistic values against the critical values at the lower bound for $I(0)$ and the upper bound for $I(1)$. Subsequently, the optimal lag is determined using the Akaike Information Criterion (AIC) by selecting the smallest AIC value and the highest number of asterisks (*) as indicators of optimal model fit, signifying the most efficient model in explaining the data (Suminto & Huda, 2025). ARDL model estimation was then performed to test the influence of independent variables on the dependent variable in both the short and long term. At this stage, an Error Correction Term (ECT) test was also conducted to indicate the speed of adjustment toward long-run equilibrium. The final step in the model estimation process is the model stability test to detect any structural changes or parameter instability during the observation period (Ridha & Mutia, 2021).

After the model estimation process is completed, the next step is to test the classical assumptions to ensure that the regression model used does not violate basic statistical assumptions, so that the estimation results are *BLUE* (*Best Linear Unbiased Estimator*) and can be validly interpreted (Ghozali, 2012) as cited in (Kurniawan, Anom, 2022). The classical assumption tests conducted include tests for autocorrelation, heteroscedasticity, multicollinearity, and normality (Wicaksono Abizar & Huda, 2023).

Result and Discussions

The stationarity findings reported in Table 1 show that the variables in the model generally satisfy the unit root requirement, although the reserve requirement variable exhibits a different pattern. At the level form, its ADF test produces a probability value of 0.4941, which is above the 5% significance threshold. Consequently, the null hypothesis (H_0) of the presence of a unit root cannot be rejected, indicating that the reserve requirement series is not stationary at its level.

The stationarity condition is achieved after the reserve requirement variable is transformed into its first difference, where the probability value decreases to 0.0000. This result confirms that the variable is integrated of order one, or $I(1)$. Meanwhile, M2 and the remaining explanatory variables already have probability values below 5% when tested at the level, demonstrating that these series are stationary without requiring differencing and can therefore be classified as $I(0)$.

The combination of variables integrated at $I(0)$ and $I(1)$ provides the necessary condition for applying the Autoregressive Distributed Lag (ARDL) estimation technique. Thus, the unit

root test results confirm that the data structure is compatible with the ARDL approach used in this study.

Table 1. Results of the Stationarity Test Using the ADF Test

Variable	Level	1 st Difference	Results
JUB (M2)	0.0000	0.0000	Stasioner level I(0)
Credit	0.0000	0.0000	Stasioner level I(0)
Third-Party Funds	0.0000	0.0000	Stasioner level I(0)
Social Security	0.0000	0.0000	Stasioner level I(0)
Village Funds	0.0000	0.0000	Stasioner level I(0)
Debit/ATM Card	0.0000	0.0000	Stasioner level I(0)
Credit Card	0.0000	0.0000	Stasioner level I(0)
Reserve Requirement	0.4941	0.0000	Stasioner 1 st difference I(1)

Table 2. Results of the Optimum Lag Test Using AIC

Lag	LL	LR	DF	P	FPE	AIC	HQIC	SBIC
0	-2673.88				3.5e+12	51.5747	51.6571	51.7781
1	-2460.5	426.77	64	0.000	2.0e+11*	48.7019*	49.4436*	50.5326*
2	-2401.01	118.99	64	0.000	2.2e+11	48.7886	50.1895	52.2466
3	-2355.68	90.657	64	0.016	3.3e+11	49.1476	51.2079	54.233
4	-2302.47	106.41*	64	0.001	4.5e+11	49.3552	52.0747	26.0679

Table 2 presents the results of the optimal lag selection based on the Akaike Information Criterion (AIC). Among the alternative lag structures, lag 1 produces the lowest AIC value (48.7019) and is also supported by the highest number of selection criteria, as indicated by the asterisks. Therefore, lag 1 is selected as the optimal lag for estimating the ARDL model.

Table 3. Cointegration Test Results Using the Bound Test

Test Statistic	Value	Significance Level	Critical Values I(0)	Critical Values I(1)	Decision
F-statistik	42.700	1% (0.01)	2.96	4.26	Reject H0
T-statistik	-17.052	1% (0.01)	-3.43	-5.19	Reject H0

The cointegration test is conducted based on the selected optimal lag structure obtained from the AIC. Based on Table 3, the F-statistic value of 42.700 is greater than the critical value I(1) at a 1% significance level, which is 4.26. Thus, H0, which states that there is no long-term relationship between the variables, is rejected. Therefore, it can be concluded that there is a long-term relationship between the variables in this study. Furthermore, the t-statistic value of (-17.052) is also smaller than the critical value I(1) at a 1% significance level, which is (-5.19). The negative t-statistic indicates the presence of an adjustment mechanism toward long-term equilibrium, thereby further strengthening the existence of a cointegration relationship in the model. Given the existence of cointegration among the variables, the ARDL model can be estimated to analyze both long-run and short-run dynamics.

Table 4. Model Estimation Analysis Results

Variable	Coefficient	Std.error	t-statistic	Prob	Interpretation
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ADJ					
JUB L1	-1.4223	0.0834	-17.05	0.000	Significant
Long Run					
Credit	0.2230	0.0725	3.08	0.003	Significant
Third-Party Funds	0.9219	0.0777	11.86	0.000	Significant
Social Security	1.5328	0.5570	2.75	0.007	Significant
Village Funds	-0.5385	0.8524	-0.63	0.529	Not Significant
Debit Card	-1.4729	1.1209	-1.31	0.192	Not Significant
Credit Card	-37.1674	30.5462	-1.22	0.227	Not Significant
Reserve Requirement	-12.0979	16.0523	-0.75	0.453	Not Significant
Short Run					
Third-Party Funds D1	-0.4136	0.1113	-3.71	0.000	Significant
Social Security D1	-1.0428	0.6305	-1.65	0.101	Not Significant
Credit Card D1	48.7382	32.379	1.51	0.136	Not Significant
Reserve Requirement D1	-29.1179	15.4057	-1.89	0.062	Not Significant
Cons	-18.3637	10.9777	-1.67	0.098	Not Significant
Number of obs	107				
R-squared	0.9269				
Adj R-squared	0.9176				
Root MSE	43.5488				
Log likelihood	-548.70162				

As presented in Table 4, the Error Correction Term (ECT), represented by the dependent variable coefficient (JUB L1), has a value of -1.4223 with a p-value of 0.0000. Since the probability value is below the 5% significance threshold and the coefficient is negative, the ECT satisfies the condition required to confirm the existence of an adjustment mechanism toward long-run equilibrium. The coefficient of -1.4223 implies that approximately 142.23% of the disequilibrium occurring in the preceding period is adjusted within the current period. This relatively large adjustment coefficient indicates that the model returns to its long-run equilibrium at a comparatively rapid rate. Furthermore, the estimated ARDL model produces an R-squared of 0.9269. Hence, approximately 92.69% of the variation in M2 can be accounted for by the explanatory variables included in the model, while the remaining 7.31% is attributable to other determinants not incorporated into the analysis.

The long-run estimation captures the equilibrium relationship between the explanatory variables and M2 after the adjustment process has been completed. In contrast, the short-run specification describes how M2 responds to temporary changes in the explanatory variables, with these relationships represented using their first-difference values.

The estimation results reveal that commercial bank credit disbursement contributes positively and significantly to M2 over the long term. This relationship is indicated by a coefficient of 0.2230 and a probability value of 0.003, which is below the 5% significance criterion. In economic terms, a one-trillion-rupiah increase in credit disbursement is associated with an estimated 0.22 trillion rupiah rise in M2 in the long run. Nevertheless, the corresponding short-run coefficient does not demonstrate a statistically significant relationship with M2. Accordingly, H1, which proposes a positive and significant relationship between credit disbursement and M2, is supported for the long-run relationship.

A different short-run pattern is observed for third-party funds. Over the long term, third-

party funds have a positive and statistically significant relationship with M2, as reflected by a coefficient of 0.9219 and a p-value of 0.000. Therefore, an additional one trillion rupiah in third-party funds is associated with an estimated increase of 0.92 trillion rupiah in M2 over the long run. In the short run, however, the relationship changes direction and becomes significantly negative, with a coefficient of -0.4136 and a probability value of 0.000. This finding implies that a one-trillion-rupiah increase in third-party funds is associated with a reduction of approximately 0.41 trillion rupiah in M2 during the short-term period. Consequently, H2 is supported in the long-run specification but is not supported in the short-run specification.

Social security expenditure likewise exhibits a statistically significant positive relationship with M2 in the long run. The estimated coefficient is 1.5328, accompanied by a p-value of 0.007, which remains below the 5% significance level. The coefficient indicates that an increase of one trillion rupiah in social security expenditure is associated with an estimated 1.53 trillion rupiah increase in M2 over the long term. The short-run results, however, do not provide sufficient statistical evidence of an effect. Although the estimated coefficient is negative at -1.0428, its p-value of 0.101 exceeds the 5% significance threshold. Therefore, H3 is accepted for the long-run relationship but rejected for the short-run relationship.

The remaining explanatory variables do not demonstrate statistically significant relationships with M2 in either estimation period. Specifically, village funds, debit/ATM cards, credit cards, and the reserve requirement all produce probability values exceeding the 5% significance level. Consequently, there is insufficient empirical evidence to establish a significant effect of these variables on M2. Based on these findings, H4, H5, H6, and H7, which propose significant relationships between village funds, debit/ATM cards, credit cards, the reserve requirement, and M2, respectively, are rejected.

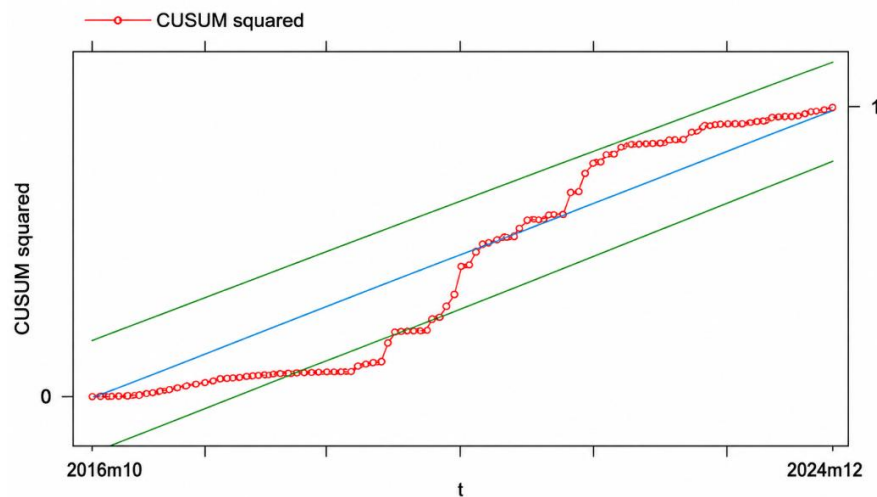


Figure 2. Results of the Stability Test Using CUSUM Squared

Taken together, the ARDL estimation indicates that the long-run movement of M2 is significantly associated with three variables, namely credit disbursement, third-party funds, and social security expenditure. In contrast, village funds, debit/ATM cards, credit cards, and the mandatory reserve requirement do not exhibit statistically significant long-run effects. The short-run specification provides more limited evidence, as only third-party funds significantly affect M2, and the direction of this relationship is negative. The other

explanatory variables fail to demonstrate statistically significant short-run effects on changes in M2.

The stability test is conducted to ensure the robustness of the estimated ARDL model. Based on Figure 2, the results of the model stability test using the Cumulative Sum of Squares of Recursive Residuals (CUSUM Squared) method based on data processed using Stata 17, indicate that most residual values fall within the critical limits at a 5% significance level throughout the observation period. Although there are a few points that slightly exceed the critical limits, these deviations do not occur consistently. Therefore, the ARDL model in this study can still be considered relatively stable throughout the observation period. This study also conducted classical assumption tests to ensure that the regression model used met the necessary statistical criteria. Based on the results of the autocorrelation test using the ARCH-LM Test, a probability value of 0.9958 was obtained, which is greater than the 5% significance level; this indicates that there is no autocorrelation issue in the model's residuals. Furthermore, the results of the heteroscedasticity test using the White Test showed a probability value of 0.2945, which is greater than the 5% significance level, indicating that the model does not suffer from heteroscedasticity and has stable residual variance.

Additionally, the results of the multicollinearity test using the Variance Inflation Factor (VIF) show that all independent variables have VIF values below the general tolerance limit of 10; the mean VIF value of 2.77 indicates that there is no strong linear correlation among the independent variables in the model, allowing the regression coefficients to be interpreted more reliably. Furthermore, the normality test of the residuals using the Skewness and Kurtosis Test yielded a probability value of 0.4317, which is also greater than the 5% significance level; thus, the residuals in the regression model can be assumed to be normally distributed, and the model used meets the classical assumptions required for regression analysis.

The results of the model estimation in this study, which show a positive and significant relationship between the variables of credit, third-party funds, and social security on M2, indicate that M2 dynamics in Indonesia are influenced by banking intermediation activities through deposit mobilization and credit disbursement, as well as central government fiscal policies through government spending in the form of transfers to the public, particularly the distribution of social security. Based on the analysis conducted, the results of this study show that an increase in credit disbursement by commercial banks in Indonesia leads to an increase in M2 in the long run. This indicates that the financial intermediation functions performed by the banking sector operate effectively through the credit disbursement mechanism, which plays a role in expanding economic liquidity after long-run equilibrium is achieved. In this context, credit not only serves as a financing tool but also contributes to shaping the dynamics of the money supply through financial intermediation (Yakubu & Abdallah, 2021). Theoretically, these results can be explained through the concept of money creation in modern financial intermediation theory, wherein when banks extend credit to the public, they simultaneously create new deposits in the form of demand deposits, which constitute a component of M2 (Hook, 2022). Through this mechanism, the funds disbursed subsequently circulate back through consumption, investment, and other economic transactions, thereby increasing M2 liquidity in the economy.

Furthermore, these research findings are also consistent with the quantity theory of

money via the equation $MV = PT$. In this context, credit expansion has the potential to increase consumption and investment activities, thereby expanding the volume of transactions and accelerating the circulation of money in the economy (Jung, 2024). This situation also reflects an increase in demand deposits, which are part of M2. However, if not balanced by an increase in real output, this could potentially trigger rising prices and inflation. Therefore, the role of banking intermediation through credit disbursement becomes a key mechanism in the monetary transmission process. These findings are supported by research (Haga et al., 2025), which indicates that credit plays a strategic role in influencing the dynamics of the money supply. Meanwhile, in the short term, the credit variable does not show an effect on M2. This indicates that the impact of credit on M2 does not occur instantly, as there are still adjustment processes such as the gradual disbursement of funds, the use of funds by borrowers, and the circulation of funds within economic activities. Thus, the impact of credit on M2 is more evident in long-term, structural relationships.

The findings of this study have important implications for the policies of the OJK as the regulatory body responsible for overseeing the banking sector. In this context, credit expansion must be conducted in accordance with the principle of prudence to protect public interests and maintain financial system stability (Pikahulan, 2020). The OJK also plays a role in ensuring that the financial system operates in an orderly, transparent, and accountable manner (Heriyadi, 2023). Additionally, the findings of this study have implications for Bank Indonesia's policies as the monetary authority responsible for maintaining the stability of the rupiah's value through the management of monetary policy and the payment system (Permana et al., 2022). Bank Indonesia needs to monitor developments in banking liquidity and adjust monetary policy instruments such as the BI-Rate or the BI 7-Day Reverse Repo Rate, which influence credit interest rates (Riadina & Sugianto, 2024).

The results of this study also indicate that an increase in third-party funds leads to an increase in M2 in the long term. This suggests that the banking sector's mobilization of public funds can strengthen banks' capacity to perform their intermediary functions, thereby driving M2 expansion in the economy. In the long term, an increase in third-party funds provides greater liquidity for banks to channel financing to the household and corporate sectors through credit mechanisms, thereby increasing the circulation of demand deposits and quasi-money as components of M2.

Theoretically, this relationship can be explained through financial intermediation theory and the concept of money creation, where an increase in third-party funds expands the funding base that banks can manage, thereby enabling monetary expansion through credit disbursement (Hook, 2022). Furthermore, third-party funds comprising demand deposits, savings, and time deposits constitutes the primary component of M2; thus, its increase directly reflects an expansion in the money supply. An increase in third-party funds also enhances banks' ability to extend credit, which ultimately boosts consumption and investment activities in the economy (Jung, 2024). This aligns with research (Mamangkey et al., 2021) showing that an increase in third-party funds significantly enhances banks' ability to extend credit, which implies an increase in the money supply.

However, in the short term, the results of this study indicate that an increase in third-party funds actually suppresses M2 growth. This condition suggests that in the initial phase, an increase in third-party funds reflects the process of absorbing funds from the public into

the banking system, thereby temporarily acting as a contractionary force on the money supply. This is because the funds collected have not yet been immediately channeled back to the public; thus, the positive impact on M2 only becomes evident after banks perform their intermediary functions through credit disbursement.

For the OJK, the findings of this study imply the need to continue promoting the strengthening of banking intermediation functions through policies that support the sustainable growth of public deposit mobilization. Such efforts can be achieved through strengthened banking regulations, enhanced transparency, customer protection, and oversight of bank stability and soundness to ensure public confidence in the banking system remains intact (Rohmah et al., 2025). Additionally, Bank Indonesia must maintain financial system stability by managing monetary policy instruments such as liquidity management and policy interest rates, which can influence the public's preferences for depositing funds in the banking sector (Riadina & Sugianto, 2024). Beyond banking intermediation factors, this study's findings also highlight the significance of fiscal authority policies on M2 liquidity in Indonesia, particularly through the disbursement of social security. Social security constitutes part of the government's fiscal policy, allocated via the State Budget (APBN) as an instrument for social protection and economic stabilization. Unlike other forms of government spending, social security involves direct transfers, meaning funds allocated by the government are directly channeled to the public in both cash and non-cash forms. These characteristics make social security have a more direct transmission channel to the household sector.

The results of this study indicate that an increase in the distribution of social security leads to an increase in M2 in the long term. This occurs because the social security funds received by the public tend to be used to meet consumption needs, thereby increasing transactional activity in the economy. Furthermore, since the distribution is carried out through the banking system or cash transfer mechanisms, these funds become part of the M2 component, whether in the form of currency in circulation or demand deposits and savings. Theoretically, this condition can be explained through the quantity theory of money, which states that increased transaction activity and money circulation can drive an increase in the money supply within the economy (Hasbi et al., 2024). However, the results of the short-term analysis indicate that social security does not have a significant impact on M2. This suggests that the distribution of social security does not directly increase liquidity during the same period due to its non-continuous and scheduled nature. This situation creates a time lag between the receipt of social security and the use of funds by the public, meaning that its impact on the money supply is more evident in the long term.

The findings of this study have important implications for government policy as the fiscal authority in formulating state spending policies, particularly social security programs. In this regard, the government needs to ensure that the allocation of the social security budget in the State Budget is carried out appropriately and measurably so that the distribution of social security not only functions as a social protection instrument but is also capable of maintaining economic stability. On the other hand, Bank Indonesia, as the monetary authority, also needs to monitor the liquidity dynamics arising from social security disbursements, as increased public consumption activity has the potential to affect the money supply. Therefore, policy coordination between fiscal and monetary authorities is crucial for maintaining M2 stability in the economy. In addition to the variables showing a

significant influence on M2, the model estimation results also indicate that several other variables do not have a significant influence, either in the long term or the short term. These variables include village funds, non-cash payment instruments represented by debit/ATM cards and credit cards, as well as the reserve requirement. This lack of significance indicates that although these variables have the potential to influence economic liquidity in theory, their impact has not been statistically proven in this research model.

The results of this study show that village funds have a non-significant effect on M2. This indicates that although village funds are part of fiscal expenditure instruments that channel funds to the community, their allocation has not yet been able to make a strong contribution to increasing M2. This situation may occur because the majority of village fund usage is directed toward physical village development, and its implementation is carried out gradually through village government administrative mechanisms, so that some funds may be temporarily held in village government accounts before allocation. Additionally, the circulation of money within the village community tends to proceed more slowly because its use does not entirely immediately drive community consumption and transaction activities. Theoretically, this aligns with the quantity theory of money, which states that an increase in the money supply is influenced not only by the magnitude of funds flowing into the economy but also by the velocity of money (Hasbi et al., 2024).

Card-based non-cash payment instruments, such as debit/ATM cards and credit cards, also show no significant impact on M2. This indicates that an increase in the number of debit/ATM cards reflects the availability of non-cash payment instruments but does not directly reflect an increase in transaction activity or monetary liquidity in the economy. Theoretically, non-cash payment instruments have the potential to accelerate transaction processes, which can increase the velocity of money (Wicaksono Abizar & Huda, 2023). However, the number of cards held by the public does not always reflect the intensity of their use. On the other hand, the insignificant influence on the credit card variable indicates that while credit cards can stimulate consumption and transaction frequency through deferred payment mechanisms, the number of credit cards in circulation does not represent the intensity of use or the transaction value conducted by cardholders. Furthermore, credit card transactions do not fundamentally create new money in the economic system; rather, they merely represent a shift in the timing of payments from the time of the transaction to the billing settlement period.

In addition, the reserve requirement variable, which represents Bank Indonesia's monetary policy, also showed no significant impact on M2. Theoretically, changes in the reserve requirement can influence the money creation process through the money multiplier mechanism, where an increase in the reserve requirement has the potential to limit banks' ability to extend credit, thereby having a contractionary effect on M2, while a decrease can encourage the expansion of demand deposits, which has an expansionary effect on M2 (Angin et al., 2025). However, in practice, banks have flexibility in managing liquidity through various funding sources and the management of assets and other liabilities, so changes in the reserve requirement are not always directly reflected in changes in the volume of credit disbursement and M2 dynamics.

Conclusion

The results of this study indicate that banking intermediation and fiscal policy play a significant role in influencing M2 liquidity in Indonesia. Specifically, increases in third-party funds, credit disbursement, and social security spending significantly increase M2. Empirically, these findings confirm that banking activities in mobilizing public funds and extending credit, together with fiscal interventions through social security spending, contribute to the circulation of money in the economy. These findings also enrich the empirical evidence on the determinants of broad money supply by demonstrating the complementary roles of banking intermediation and fiscal policy in influencing monetary liquidity.

The findings of this study provide several practical implications for policymakers, particularly the Financial Services Authority (OJK), Bank Indonesia, and the Government of Indonesia. The OJK is expected to continue strengthening the banking intermediation function through policies that promote financial system stability and maintain public confidence in the banking sector. Bank Indonesia, as the monetary authority, is expected to optimize monetary policy to support healthy bank fund mobilization and sustainable credit disbursement while maintaining monetary stability. Meanwhile, the government is expected to improve the planning, allocation, and targeting of the social security budget within the State Budget and ensure that its distribution mechanism is implemented effectively. Therefore, stronger policy coordination among the OJK, Bank Indonesia, and the Government is essential to maintain stable M2 liquidity and support overall monetary and financial system stability. Nevertheless, this study has several limitations because the macroeconomic variables included are limited to selected indicators that may not fully capture the complexity of Indonesia's macroeconomic conditions. Therefore, future studies are encouraged to incorporate additional relevant macroeconomic variables or alternative indicators to provide a more comprehensive understanding of the factors influencing broad money supply dynamics.

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