

THE EFFECT OF FINANCIAL INCLUSION ON ECONOMIC GROWTH IN INDONESIA DURING 2010–2023



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Abstract

Using annual data covering the years 2010 to 2023, this study examines how access to and utilization of formal financial services influence Indonesia's economic growth. To capture the level of financial inclusion, several proxies are employed, such as the expansion of ATM facilities, banking outlets, ownership of savings and deposit accounts, credit participation, current accounts, insurance accounts, and the presence of branchless banking agents. Data obtained from the Central Bureau of Statistics (BPS) are processed through a time-series regression model based on the OLS method. The estimation results demonstrate that the selected indicators of financial inclusion exert a statistically significant influence on economic growth when assessed simultaneously, with the model accounting for approximately 97.3% of the observed variation in economic growth. Partially, credit accounts and financial insurance have a positive effect on economic growth, while ATMs, bank branches, time deposit accounts, and bank agents have a negative effect. Meanwhile, savings accounts and demand deposit accounts do not have a significant effect on economic growth. These findings indicate that not all aspects of financial inclusion effectively promote economic growth. Financial inclusion will be more optimal when focused on productive financial services, such as credit distribution and risk protection through insurance. Therefore, policies are needed to enhance financial literacy and develop digital-based financial services in order to maximize the contribution of financial inclusion to economic growth.

Keywords: Financial Inclusion, Economic Growth, OLS, Credit, Financial Insurance

INTRODUCTION

Financial inclusion is an important component of inclusive economic development because it enables individuals and businesses from different socioeconomic backgrounds to access and use formal financial services. Financial inclusion generally encompasses the availability, accessibility, and utilization of financial products and services, including savings, credit, payments, insurance, and other financial facilities. Broader access to appropriate financial services can provide economic agents with greater opportunities to manage funds, finance productive activities, and cope with financial risks. In Indonesia, financial inclusion remains an important policy concern because access to and utilization of formal financial services are not yet evenly distributed across society (Zaqiyah & Sriwiyanto, 2022).

The development of financial inclusion is particularly relevant to economic growth because financial services facilitate the mobilization and allocation of financial resources. Access to banking and other formal financial services can enable households and businesses to save, obtain financing, make transactions, and manage financial risks. These functions can support productive investment, business expansion, and more efficient allocation of resources, which subsequently contribute to economic activity (Purba et al., 2023). Therefore, the Financial Services Authority places financial inclusion as an important element in strengthening the financial sector and supporting sustainable economic development (Iramayasari & Adry, 2020).

The development of financial inclusion in Indonesia has nevertheless shown fluctuations over time. These changes indicate that increasing financial inclusion is not merely a matter of expanding the number of financial service providers, but also involves ensuring that financial services are accessible and utilized effectively by the population. The development of financial inclusion in Indonesia during 2016–2025 is presented in Figure 1.

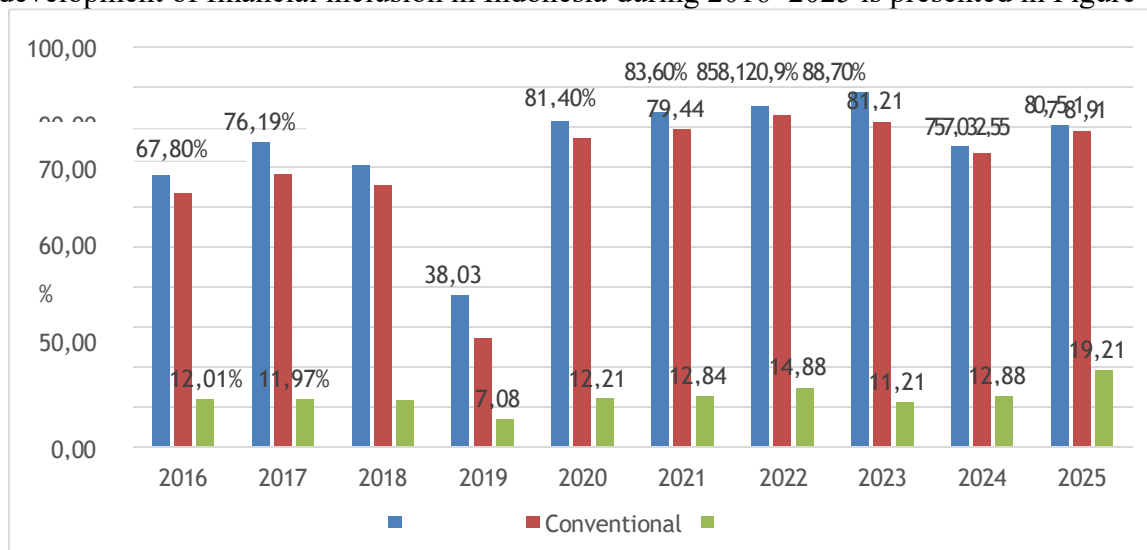


Figure 1.
Financial Inclusion in Indonesia 2016-2025
Source: Financial Services Authority, 2025

Figure 1 illustrates that Indonesia's financial inclusion experienced substantial changes during the observed period. The decline recorded in 2019 was followed by a considerable improvement in subsequent years, indicating that financial inclusion is influenced by economic and institutional conditions and requires continuous policy support. The improvement in financial inclusion also has implications for the ability of households and businesses to conduct transactions and access financial resources. Consequently, changes in financial inclusion may influence economic activity through both the expansion of financial access and the increasing utilization of financial services.

Conceptually, financial inclusion can be understood through several dimensions, particularly financial access, financial usage, and financial quality. Financial access refers to the availability and physical or institutional reach of financial services, which can be reflected through the distribution of automated teller machines (ATMs), banking offices, and banking agents. Financial usage refers to the extent to which individuals and businesses actually utilize available financial services, including savings accounts, time deposits, demand deposits, credit accounts, and insurance-related financial products. Meanwhile, financial quality concerns whether financial services are affordable, reliable, secure, appropriate, and capable of meeting the financial needs of users. Distinguishing these dimensions is important because the existence of financial infrastructure does not necessarily guarantee that financial services will be actively used or generate productive economic outcomes.

The relationship between financial inclusion and economic growth can be explained by the Endogenous Growth Theory. This theory argues that long-term economic growth is determined not only by external factors but also by internal economic processes, including human capital accumulation, technological progress, knowledge development, innovation, investment, and productivity improvement (Boachie & Adu-Darko, 2024). From this perspective, financial inclusion can contribute to economic growth by facilitating the mobilization of savings and directing financial resources toward productive activities. Greater access to financial services can provide households and businesses with opportunities to obtain financing, accumulate savings, manage risks, and invest in productive activities. These processes can increase productivity and support the accumulation of capital that contributes to long-term economic growth.

The contribution of financial inclusion to endogenous growth can also occur through human capital accumulation. Access to savings and credit can improve the ability of households to finance education and skills development, while access to business financing can support entrepreneurship and the expansion of productive activities. Financial services can also help economic agents manage unexpected financial risks, allowing them to maintain productive investments and economic activities during periods of financial uncertainty. In this way, financial inclusion may indirectly strengthen productivity through improvements in human capital, investment capacity, and financial resilience (Ibrohim et al., 2025). Therefore, the effect of financial inclusion on economic growth may depend not only on whether financial services are available, but also on whether those services are actually utilized for productive purposes.

Empirical findings regarding the relationship between financial inclusion and economic growth, however, remain inconclusive. Previous studies have reported different results depending on the indicators used to measure financial inclusion, the economic

conditions of the countries examined, and the analytical approaches applied. Studies conducted in Indonesia have generally indicated a positive contribution of financial inclusion to economic growth, whereas evidence from broader Asian contexts has produced mixed findings across individual financial inclusion indicators. Some indicators associated with the expansion of financial infrastructure have been found to have limited or even negative relationships with economic performance, while indicators reflecting the actual utilization of financial services have demonstrated positive growth-enhancing effects. These differences suggest that financial inclusion should not be treated as a single-dimensional concept because access to financial services does not automatically result in productive financial usage or improved economic outcomes.

The inconsistent empirical evidence creates an important research gap concerning which aspects of financial inclusion are more relevant to economic growth. Differences in findings may arise because previous studies have frequently relied on aggregate financial inclusion measures or have focused on only a limited number of indicators. Consequently, examining individual indicators can provide a more detailed understanding of whether the availability of financial infrastructure and the utilization of financial services contribute differently to economic growth. Such an approach is particularly relevant in Indonesia, where the expansion of financial service infrastructure continues alongside efforts to increase the effective use of formal financial services.

Based on this research gap, this study examines the effect of financial inclusion on economic growth in Indonesia during the 2010–2023 period. Rather than relying on a single composite measure, this study uses several indicators representing the availability and utilization of financial services, namely automated teller machines (ATMs), banking offices, savings accounts, time deposit accounts, credit accounts, demand deposit accounts, insurance-related financial accounts, and banking agents. The use of these indicators is expected to provide a broader and more detailed representation of financial inclusion and to identify which aspects of financial access and usage are associated with economic growth. Accordingly, this study aims to provide empirical evidence regarding the role of financial inclusion in supporting economic growth in Indonesia and to contribute to the understanding of how different dimensions of financial inclusion operate within the framework of Endogenous Growth Theory.

REVIEW OF LITERATURE

Previous studies have extensively examined the relationship between financial inclusion and economic growth using different indicators, geographical settings, observation periods, and econometric approaches. Overall, the empirical evidence indicates that financial inclusion can contribute to economic growth by expanding access to financial infrastructure and increasing the utilization of financial services. However, the effects are not uniform across indicators, suggesting that financial inclusion is multidimensional and that different forms of financial access and usage may generate different economic outcomes.

Several studies conducted in Indonesia provide evidence of a positive relationship between financial inclusion and economic growth. Anwar and Amri (2025), using Indonesian data for the 2004–2015 period and the Ordinary Least Squares (OLS) approach, found that bank offices, ATMs, and credit accounts positively affected GDP. The positive effects of

these indicators suggest that the expansion of financial infrastructure and access to credit can facilitate economic activity. Similarly, Dewi (2022), using monthly data for January 2014–December 2021 and a Vector Autoregressive (VAR) approach, found that financial inclusion positively affected economic growth. The Granger causality test further indicated a bidirectional causal relationship between financial inclusion and economic growth, implying that financial development can stimulate economic activity while stronger economic performance may simultaneously encourage greater financial inclusion.

Consistent with these findings, Lumintang (2024), using panel data from six regions in Indonesia during the 2019–2022 period, found that saving accounts and commercial bank lending positively and significantly affected GRDP, whereas bank offices and fintech lending were not significant. This finding is important because it indicates that the utilization of financial services may be more closely associated with economic output than the mere availability of financial infrastructure. Hamidi (2025), examining 33 provinces in Indonesia during 2018–2022, also found that third-party funds and Islamic bank financing positively affected economic growth. However, Islamic financial access had a negative effect, indicating that greater access alone does not necessarily translate into stronger economic performance. These findings reinforce the distinction between financial access and financial usage.

Evidence from other countries and developing economies also generally supports the growth-enhancing role of financial inclusion, although the magnitude and significance of individual indicators vary. Saha (2023), using dynamic panel data from 104 developing countries over the 2004–2019 period and the two-step System GMM method, found that greater access to financial services was associated with higher economic growth. The study also found that financial inclusion contributed to reducing income inequality, suggesting that its economic contribution may operate not only through aggregate output but also through broader participation in economic activities. Boachie (2024), examining 47 countries in Sub-Saharan Africa during 2010–2020, similarly found that ATMs and commercial bank depositors positively affected economic growth. Furthermore, the interaction between financial inclusion and human capital development significantly affected economic growth, providing support for the argument that financial inclusion may promote growth partly through human capital accumulation.

The positive contribution of financial inclusion is also reflected in studies focusing on credit and financial intermediation. Laratmase (2020), using panel data and the Fixed Effect Model (FEM), found that working capital credit, investment credit, and consumption credit positively and significantly affected economic growth. The findings indicate that credit availability can facilitate economic activity by providing financial resources for productive and household purposes. In a regional Indonesian context, Lumintang (2024) similarly found a positive and significant effect of commercial bank lending on GRDP. These findings are consistent with the mechanism proposed by the Endogenous Growth Theory, whereby financial intermediation can facilitate investment and resource allocation, thereby supporting productivity and economic growth.

Nevertheless, not all empirical studies report positive effects of financial inclusion. Zaqiyah (2022), examining 33 provinces in Indonesia during 2013–2017, found that financial inclusion indicators represented by bank branches per 100,000 adults and third-party funds

negatively affected economic growth. In contrast, financial development measured by the credit-to-GRDP ratio had a positive effect. This contrast suggests that the availability of financial institutions and the accumulation of financial resources do not necessarily produce the same economic consequences as the actual provision of productive credit. The finding is particularly relevant because it demonstrates that different measurements of financial inclusion can generate different conclusions regarding its contribution to economic growth.

Similar mixed findings were reported by Febriaty (2020), who examined Indonesia during the 2005Q1–2019Q4 period. The number of ATM machines had a negative effect on economic growth, while savings or deposits had a positive effect. Meanwhile, bank offices, credit accounts, and MSME credit were not statistically significant. The contrasting effects of ATM infrastructure and deposits indicate that the expansion of financial access does not automatically result in productive economic outcomes. Rather, the economic contribution of financial inclusion may depend on how financial services are utilized and whether the resources mobilized through the financial system are allocated to productive activities.

Evidence from other Asian countries further demonstrates the importance of distinguishing financial inclusion dimensions. Saraswati (2023), examining Indonesia, India, Thailand, the Philippines, and Cambodia during 2015–2019, found that the availability dimension, represented by bank branches, negatively affected economic growth, whereas the usage dimension, represented by commercial bank loans, positively affected economic growth. Bank account ownership and fintech payment indicators representing the access dimension were not significant. These results provide direct evidence that different dimensions of financial inclusion may have different relationships with economic growth. Thus, an increase in financial infrastructure alone may not be sufficient to stimulate economic activity unless financial services are actually used for productive purposes.

The mixed evidence is also apparent when financial inclusion is examined in relation to financial sector outcomes. Rachmawati (2025), using data from 19 banking companies listed on the Indonesia Stock Exchange during 2019–2023, found that savings accounts and deposit accounts positively affected bank stability, whereas the number of ATMs negatively affected bank stability. Although the dependent variable in this study was financial stability rather than economic growth, the findings provide supporting evidence that different financial inclusion indicators can have different consequences within the financial system. Ratnawati (2020), examining 10 developing Asian countries during 2009–2018 using a dynamic panel GMM approach, found that commercial bank branches, ATMs, outstanding deposits, and outstanding loans positively affected financial stability, while the number of accounts was not significant. These findings suggest that the economic implications of financial inclusion may depend on the specific function performed by each financial service and the institutional context in which it operates.

Other studies provide additional evidence concerning the indirect mechanisms through which financial inclusion may influence economic outcomes. Christine (2024), examining MSMEs in the Bangka Belitung Islands Province, found that financial inclusion positively and significantly affected MSME financial performance. This result suggests that financial inclusion can strengthen economic activity at the firm level by improving access to financial resources and supporting business operations. Hana (2023), using Indonesian monthly data for 2016–2021, found that ATM/debit card and credit card transactions affected

inflation, while inflation subsequently affected economic growth. However, the Sobel test indicated that inflation did not significantly mediate the relationship between either type of transaction and economic growth. This finding suggests that financial transactions may influence macroeconomic conditions through mechanisms that are not necessarily captured by a simple indirect relationship through inflation.

Taken together, the empirical literature reveals three important patterns. First, a number of studies report that financial inclusion positively contributes to economic growth, particularly when financial inclusion is represented by credit, deposits, savings, lending, or actual utilization of financial services (Anwar & Amri, 2025; Dewi, 2022; Saha, 2023; Boachie, 2024; Laratmase, 2020; Lumintang, 2024). These findings indicate that financial inclusion can facilitate the mobilization of savings and the allocation of financial resources to productive activities. Second, several studies report negative or insignificant effects for indicators associated primarily with financial infrastructure or access, including bank branches, ATMs, and account ownership (Zaqiyah, 2022; Febriaty, 2020; Saraswati, 2023; Hamidi, 2025). Third, the results suggest that financial usage, particularly credit and deposits, tends to exhibit a more consistent positive relationship with economic performance than the mere availability of financial infrastructure.

The differences in empirical findings can be attributed to several factors. First, differences in measurement may explain the inconsistent results. Financial inclusion is a multidimensional concept, and indicators such as ATMs, bank branches, accounts, deposits, and loans capture different aspects of financial access and usage. An increase in the number of bank branches or ATMs indicates greater availability of financial infrastructure but does not necessarily indicate that the services are being used productively. In contrast, credit, deposits, and transaction-related indicators more directly capture financial usage and intermediation. Therefore, studies using different proxies may reasonably produce different results.

Second, differences in geographical and institutional contexts may affect the relationship between financial inclusion and economic growth. The effectiveness of financial services depends on the development of banking infrastructure, financial literacy, technological adoption, income levels, and the regulatory environment. The positive findings in Sub-Saharan Africa reported by Boachie (2024), the mixed evidence across five Asian countries reported by Saraswati (2023), and the inconsistent results among Indonesian provinces reported by Zaqiyah (2022) demonstrate that the economic impact of financial inclusion is context-dependent.

Third, differences in observation periods and data structures may contribute to variations in empirical findings. Previous studies have employed annual, quarterly, monthly, and semi-annual data, as well as cross-sectional and panel datasets. Studies have also used different periods that may capture different economic conditions and stages of financial sector development. In addition, the use of OLS, VAR, ARDL, FEM, and GMM approaches reflects differences in how dynamic relationships, individual heterogeneity, and long-run effects are modeled. Consequently, the results cannot be interpreted independently of the methodological framework used.

Overall, the literature indicates that financial inclusion has the potential to support economic growth, but its contribution depends on the form, intensity, and utilization of

financial services. The existing studies also reveal a gap in the simultaneous examination of multiple financial inclusion indicators within a single Indonesian macroeconomic framework. Many previous studies have focused on a limited number of indicators or used an aggregate measure of financial inclusion, making it difficult to determine which specific financial services are associated with economic growth. Furthermore, the inconsistent findings regarding ATMs, bank offices, accounts, deposits, and credit indicate the need for a more comprehensive examination of individual financial inclusion indicators.

Therefore, the present study extends the existing literature by examining several financial inclusion indicators simultaneously, namely ATMs, banking offices, savings accounts, time deposit accounts, credit accounts, demand deposit accounts, insurance-related financial accounts, and banking agents. These indicators represent different dimensions of financial access and financial usage and enable the study to identify whether their effects on economic growth are consistent or differ across financial services. By focusing on Indonesia during the 2010–2023 period, this study is expected to provide more comprehensive empirical evidence regarding the relationship between financial inclusion and economic growth and to clarify which dimensions of financial inclusion are most relevant to economic performance.

RESEARCH METHOD

The analytical tool employed in this study is Ordinary Least Squares analysis using the following econometric model:

$$Growth_t = \beta_0 + \beta_1 ATM_t + \beta_2 BB_t + \beta_3 SA_t + \beta_4 TD_t + \beta_5 CA_t + \beta_6 DDA_t + \beta_7 FI_t + \beta_8 BA_t$$

where:

Growth	: Economic Growth
ATM	: Number of Automated Teller Machines
BB	: Number of Bank Branches
SA	: Number of Savings Accounts
TD	: Number of Time Deposit Accounts
CA	: Number of Credit Accounts
DDA	: Number of Demand Deposit Accounts
FI	: Number of Financial Insurance Accounts
BA	: Number of Bank Agents
β_0	: Constant coefficient
$\beta_1 - \beta_6$	: Regression coefficients of independent variables
t	: Time period (year t)

The econometric model above is a combination of several previous research models. The ATM variable was adopted from Fundji (2024), the bank branches variable was adopted from Odame et al. (2024), the credit accounts variable was adopted from Febriaty et al. (2020), the savings accounts variable was adopted from Saraswati (2023), the financial

insurance variable was adopted from Ibrohim et al. (2025), and the bank agents variable was adopted from Febriaty et al. (2020). In this research, several indicators of financial access and banking outreach are assumed to contribute to economic expansion. Specifically, the availability of automated teller machines, banking offices, savings account ownership, financial insurance participation, and banking agent networks is hypothesized to stimulate economic growth. Conversely, a larger number of credit accounts is anticipated to exert an adverse influence on economic performance.

The analysis relies on annual observations spanning the years 2010–2023. Information used in the study was compiled from official statistical reports published by Statistics Indonesia. The dataset includes indicators related to banking infrastructure and financial inclusion, namely automated teller machines, bank branches, savings accounts, time deposit accounts, credit accounts, demand deposit accounts, financial insurance accounts, banking agents, and the economic growth rate.

To estimate the relationship between the selected variables and economic growth, an econometric framework is employed. The analytical procedure begins with parameter estimation of the specified model. Subsequently, a series of diagnostic examinations are carried out to assess model adequacy and ensure compliance with the assumptions of regression analysis. These examinations encompass tests for multicollinearity among explanatory variables, normality of residuals, serial correlation, and heteroscedasticity. Model specification tests are also conducted, including model existence testing and interpretation of the coefficient of determination (R^2). The final stage involves testing the validity of the variables' effects using the t-test.

RESULTS AND DISCUSSION

Estimation Results

Table 1 contains a comprehensive presentation of the model estimation findings and the supporting diagnostic test results used for evaluation purposes.

Table 1
Econometric Model Estimation Results

$GROWTH_t = -678,779 - 7,566 \text{ LogATM}_t - 14,060 \text{ LogBB}_t - 5,315 \text{ LogSA}_t$				
	(0,011)**	(0,003)*	(0,163)	
$-7,269 \text{ LogTD}_t + 4,949 \text{ LogCA}_t + 2,200 \text{ LogDDA}_t +$				
95,629 LogFI_t	(0,032)*	(0,024)**	(0,581)	(0,002)*
$-47,098 \text{ LogBA}_t$				
	(0,003)*			
$R^2 = 0,973; \text{DW-Stat.} = 2,103; \text{F-Stat.} = 22,794; \text{Prob. F-Stat.} = 0,001$				
1. Multicollinearity (VIF)				
$\ln(\text{ATM}) = 30.933; \ln(\text{BB}) = 14.209; \ln(\text{SA}) = 120.073; \ln(\text{TD}) = 8.081; \ln(\text{CA}) = 3.811; \ln(\text{DDA}) = 150.324; \ln(\text{FI}) = 356.338; \ln(\text{BA}) = 250.130$				
2. Residual Normality Test				
$\text{JB}(2) = 0.870; \text{Prob. JB}(2) = 0.647$				

3. Autocorrelation Test
 $\chi^2(3) = 6.615$; Prob. $\chi^2(3) = 0.085$
4. Heteroscedasticity Test
 $\chi^2(8) = 5.549$; Prob. $\chi^2(8) = 0.697$
5. Linearity Test
 $F(2,3) = 0.456$; Prob. $F(2,3) = 0.671$

Source: Statistics Indonesia, estimate.

Notes: *Significant at $\alpha = 0.01$; **Significant at $\alpha = 0.05$; ***Significant at $\alpha = 0.10$. Values in parentheses indicate the empirical probability (p-value) of the t-statistics.

The diagnostic results show that the residuals are normally distributed ($p = 0.647$), free from heteroscedasticity ($p = 0.697$), and the linearity specification is appropriate ($p = 0.671$). However, the autocorrelation test indicates a potential autocorrelation problem at the 10% significance level ($p = 0.085$). The multicollinearity test also reveals severe correlation among several explanatory variables, particularly Savings Accounts ($VIF = 120.073$), Demand Deposit Accounts ($VIF = 150.324$), Financial Insurance ($VIF = 356.338$), and Bank Agents ($VIF = 250.130$). Therefore, the individual coefficient estimates should be interpreted cautiously because multicollinearity may affect the stability and precision of the estimated coefficients.

The model produces an R^2 of 0.973, indicating that 97.3% of the variation in economic growth within the sample is explained jointly by the financial inclusion indicators included in the model, while the remaining 2.7% is explained by factors outside the model. However, the high R^2 should not be interpreted as evidence that financial inclusion causes 97.3% of economic growth. The F-statistic is statistically significant ($p = 0.001$), indicating that the explanatory variables are jointly associated with economic growth. Given the small sample of 14 annual observations and the diagnostic problems identified above, these results should be interpreted with caution.

Partially, ATM ($p = 0.011$), Bank Branches ($p = 0.003$), Time Deposit Accounts ($p = 0.032$), Credit Accounts ($p = 0.024$), Financial Insurance ($p = 0.002$), and Bank Agents ($p = 0.003$) are statistically significant, while Savings Accounts ($p = 0.163$) and Demand Deposit Accounts ($p = 0.581$) are not statistically significant. The significant coefficients indicate statistical associations with economic growth after controlling for the other variables in the model, rather than definitive causal effects.

The positive coefficients of Credit Accounts, Financial Insurance, and other significant indicators suggest that financial services related to credit provision, risk management, and financial access may be associated with stronger economic activity. In contrast, the insignificance of Savings Accounts and Demand Deposit Accounts indicates that their individual relationships with economic growth cannot be statistically distinguished from zero in the estimated model. Nevertheless, the very high VIF values indicate that these findings may be influenced by the strong correlation among financial inclusion indicators and should therefore be interpreted cautiously.

Discussion

The estimation results indicate that the relationship between financial inclusion and economic growth in Indonesia varies across indicators. ATM, Bank Branches, Time Deposit

Accounts, and Bank Agents show negative statistical associations with economic growth, while Credit Accounts and Financial Insurance show positive associations. Meanwhile, Savings Accounts and Demand Deposit Accounts are statistically insignificant. These findings indicate that financial inclusion is multidimensional and that the availability of financial infrastructure does not necessarily produce the same economic outcomes as the utilization of financial services.

However, these results should be interpreted cautiously because the model contains severe multicollinearity and evidence of autocorrelation. Several variables have very high VIF values, particularly Financial Insurance, Bank Agents, Demand Deposit Accounts, and Savings Accounts. Therefore, the estimated signs, magnitudes, and significance of individual coefficients may be unstable and should be understood as conditional statistical associations rather than definitive causal effects.

The negative association between ATM and economic growth suggests that greater ATM availability is not necessarily accompanied by higher economic activity. One possible explanation is the increasing substitution of physical financial infrastructure by digital financial services, including mobile banking and fintech. Digital services can provide financial access without requiring users to rely on geographically limited physical infrastructure. Ozili (2021) argues that digital financial inclusion can provide broader and more efficient access than traditional physical infrastructure. Nevertheless, given the high VIF of the ATM variable, this negative coefficient should not be interpreted independently of other financial inclusion indicators.

The negative association between Bank Branches and economic growth similarly indicates that the expansion of physical banking infrastructure does not automatically correspond to stronger economic performance. The increasing adoption of mobile and internet banking may reduce the relative importance of physical branches for routine financial transactions. Demirgüç-Kunt et al. (2021) emphasize the increasing role of digital financial services in expanding convenient and accessible financial services. However, the Bank Branch variable also exhibits substantial multicollinearity, so its estimated negative relationship should be interpreted cautiously.

Time Deposit Accounts also show a negative statistical association with economic growth. One possible explanation is that funds placed in time deposits may have limited immediate circulation in productive economic activities when they are not effectively intermediated into investment or credit. Sahay et al. (2015) emphasize that savings contribute to economic growth when financial resources are effectively transformed into productive investment. Thus, the finding suggests that the accumulation of deposits alone may not be sufficient to generate stronger economic activity.

In contrast, Credit Accounts show a positive and statistically significant association with economic growth. Credit can facilitate the transfer of financial resources to households and businesses and support investment, consumption, and business expansion. This finding is consistent with Laratmase et al. (2024), who reported positive relationships between working capital, investment, and consumption credit and economic growth. Nevertheless, this relationship should be interpreted as a conditional association because of the multicollinearity present in the overall model.

Financial Insurance has a positive and statistically significant coefficient. This relationship may reflect the role of insurance in reducing financial risks and supporting economic agents' capacity to maintain investment and business activities. Insurance institutions can also mobilize long-term funds that may be invested in financial and productive assets. Tripustikasari (2025) highlights the role of the insurance industry in supporting financial system resilience and economic development. However, Financial Insurance has the highest VIF in the model (356.338), meaning that its large coefficient should be interpreted with particular caution because severe multicollinearity may affect coefficient stability.

The negative association between Bank Agents and economic growth indicates that greater availability of banking agents is not statistically associated with stronger economic performance in the estimated model. Although bank agents such as BRILink expand access to basic financial transactions, their utilization may remain concentrated on withdrawals, transfers, and bill payments rather than productive financial activities. Winarno (2025) identifies infrastructure limitations, training, and socio-cultural factors as challenges in optimizing banking agents. The very high VIF of Bank Agents (250.130) further requires caution in interpreting this coefficient independently.

Savings Accounts do not show a statistically significant relationship with economic growth. This finding suggests that account ownership alone may not be sufficient to generate measurable economic effects. Accounts may primarily be used for saving or routine transactions rather than productive investment. Demirgüç-Kunt et al. (2021) similarly emphasize that financial inclusion should consider actual usage rather than merely account ownership. Therefore, the absence of statistical significance may indicate that access to savings facilities does not automatically translate into productive economic activity.

Finally, Demand Deposit Accounts are not statistically significant. Demand deposits primarily facilitate transactions and liquidity management, so their contribution to economic growth may depend on whether the funds are subsequently channeled toward productive credit and investment. Beck et al. (2023) emphasize the importance of credit in supporting economic activity, while transaction-oriented financial instruments may primarily improve payment efficiency. Thus, demand deposits may support economic activity indirectly rather than having a direct statistical relationship with economic growth.

Overall, the findings suggest that the relationship between financial inclusion and economic growth differs according to the type and function of financial services. Indicators related to financial utilization, particularly credit and insurance, show positive associations, while several physical-access indicators show negative or insignificant relationships. However, because of the small sample size, severe multicollinearity, and evidence of autocorrelation, these findings should be interpreted as empirical associations rather than causal effects. The results therefore provide indicative evidence that the economic contribution of financial inclusion depends not only on the availability of financial services but also on how effectively those services are utilized within the economy.

CONCLUSION

The diagnostic tests of the estimated model indicate that the residuals are normally distributed, free from heteroscedasticity problems, and have the correct model specification (linear). However, the model reveals the presence of autocorrelation and multicollinearity problems in the variables of ATMs, Bank Branches, Savings Accounts, Demand Deposit Accounts, Financial Insurance, and Bank Agents. The model remains robust, with an R^2 of 0.973, indicating that 97.3% of the variation in Indonesia's economic growth during 2010–2023 is explained by the variables included in the analysis. Credit Accounts and Financial Insurance positively influence economic growth, while ATMs, Bank Branches, Time Deposit Accounts, and Bank Agents show negative effects. Savings Accounts and Demand Deposit Accounts, however, do not significantly affect economic growth.

These findings highlight the importance of financial inclusion in supporting economic development. Expanding access to financial services, particularly credit and insurance, can enhance economic activity and contribute to sustainable growth in Indonesia. However, its impact is not always consistent and varies across different financial instruments, where physical banking infrastructure and certain types of savings instruments tend to show lower efficiency in stimulating economic growth compared to instruments that directly facilitate investment and risk mitigation.

Therefore, financial inclusion policies should not solely focus on increasing the number of financial facilities but should also emphasize improving service quality, enhancing financial literacy, and optimizing the use of financial services for productive activities. The government and financial authorities need to encourage productive credit distribution, particularly for MSMEs, so that financial inclusion can directly contribute to economic growth. In addition, serious efforts are needed to optimize the allocation of funds from savings, particularly Time Deposit Accounts, so that such funds do not remain idle but can be effectively channeled into the real sector and productive activities through various investment and financing instruments. For future research, it is recommended to incorporate qualitative approaches to better understand public behavior in using financial services and the challenges associated with financial inclusion implementation. Furthermore, spatial analysis may also be beneficial in identifying differences in the impact of financial inclusion across various geographical regions.

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