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# The Tripartite Relationship among Savings, Investment and Economic Growth in Nigeria

LAWRENCE EHIKIOYA IMOUGHELE, EMUA EHIJIE IHIMEKPEN
Ambrose Alli University, Ekpoma, Edo State, Nigeria

**Abstract.** Despite Nigeria being regarded as the biggest economy in Africa, there have been rigorous debates on how the nexus between savings and investment can accelerate its growth sustainability. Unlike previous studies whose overreliance on simplified bivariate frameworks has constituted issues like omitted variable bias in the quest to successfully pass the diagnostic report, such approaches have hindered the true dynamic feedback of the trio and some selected control variables as it is in the real world. It is in this sense that this study investigates the dynamic interaction between savings and investment on economic growth, the extent to which a shock in savings and investment affects economic growth over time, the percentage of changes in economic growth that can be attributed to savings, investment, and other macroeconomic indicators, and the causal linkages between the underlying trio in Nigeria from 1980–2023. The study employed the Vector Autoregressive (VAR) methods, alongside Impulse Response Function (IRF), Forecast Error Variance Decomposition (FEVD), and Granger causality tests to achieve these objectives. The empirical results revealed that savings has positive and significant impact on economic growth in line with Keynesian postulations, investment showed an insignificant effect. The result further reveals the significant role of control variables such as domestic credit to the private sector and interest on lending in shaping the savings-investment-growth relationship. The IRF showed that savings shocks exert a stronger and more sustained effect on economic growth than investment shocks. Alternatively, the FEVD also revealed that variations in growth are largely explained by domestic credit to the private sector, while the Granger causality results confirmed bidirectional causality between savings and growth, as well as between savings and credit to the private sector. The study recommends that governments clamoring for growth must pay careful attention to the dynamic interaction between savings, investment, growth and the influence of certain control indicators (credits and interest on lending) that indirectly model the interdependence between the trios.

**Keywords:** Savings; Investment; Economic Growth; Vector Autoregression (VAR); Macroeconomic Indicators; Financial Intermediation; Harrod-Domar Model; & Structural Shocks

## 1. Introduction

Economic growth has been one of the major objectives cherished among nations of the world, and in attaining this objective, both governmental and private effort through expenditure and saving are necessary for its actualization (Ahamed, 2021). Despite Nigeria being regarded as the biggest economy in Africa, there have been rigorous debate on how the nexus between savings and investment can accelerate its growth sustainability.

In highly developed economies where income and savings are high, there are evidence of greater societal transformation as opposed to the economies situated in the sub-Sahara Africa (SSA) dominated by poverty, external shock and terrorism, all of which perpetuate low propensity to save among economies in the SSA region (Baafi & Asiedu, 2025). According to (Trading Economics, 2024), household savings rate in developed economies like Germany and South Korea stood at a whopping 25.7% and 32.2% with annual average Gross Domestic Product (GDP) per Capita of US$54,344 and US$33,120 in 2023 respectively.

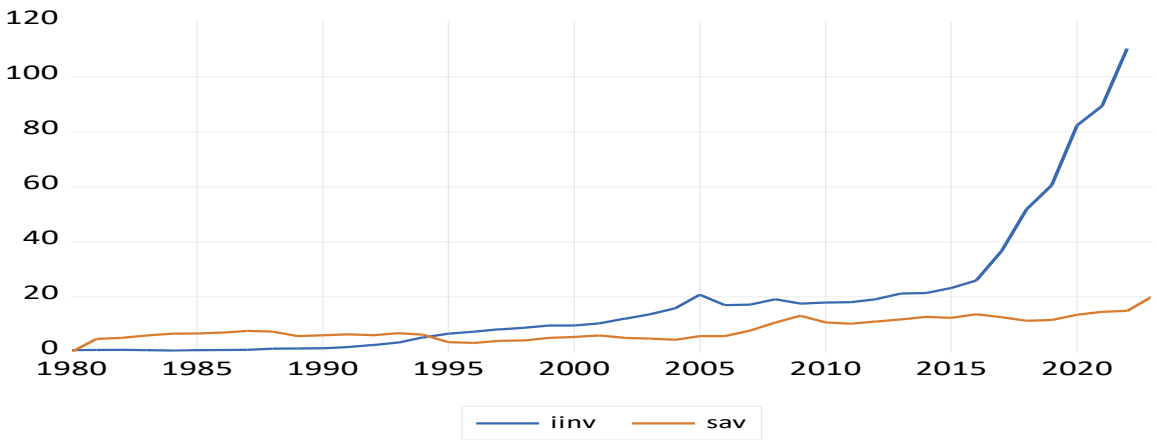
However, economies situated in sub-Saharan Africa regions' domestic savings stood at 4.1% of overall GDP, significantly lower than the high-income average of 23.8% (World Bank, 2023). It is in this context that the study of (cite) affirmed that individuals in less developed countries (LCDs) are usually unable to attain a high level of personal savings due to series of factors ranging from low per Capita income as in the case of SSA region whose GDP per Capita stood at $1,622.8 compared to high and middle income countries with GDP per Capita of $48752 and $6254 respectively (World Bank, 2023), indulgence in frivolous consumption by the few who have excess of disposable income and inconsistent policies put in place by monetary authorities. LDCs are usually overwhelmed by inequality and an inconsistent regulatory framework (UNCTAD, 2020).

It is worth noting that domestic savings and investment in Nigeria have been inconsistent and have continued in an irregular trend from the late 1990s. For instance, (CBN, 2023) documented that in 1990, total domestic savings as a ratio of GDP stood at 3.50% and maintained an upward trend until 2001 when it assumed the value of 5.93%. However, from 2002 through 2004, domestic savings fell with values of 5.15, 4.84 and 4.40 respectively but in 2010 through 2021, a rebound occurred placing domestic savings at 20.21% of GDP. Conversely, gross capital formation, a proxy for domestic investment saw a sharp collapse from its 1981 value of ₦15,789 billion to a staggering value of ₦5,688 billion in 1987. However, domestic investment rose from 2000 through 2015 reaching a peak of ₦11,445 billion in 2019.

The 2020 COVID-19 pandemic caused a temporary dip in domestic investment and domestic savings in 2020 and in 2023, both domestic savings and investment rebounded.

While fewer studies have shown that a link exist among savings, investment and economic growth (Omoregie & Ikpesu, 2017; Samuel, Oruta, Israel, & Lucky, 2021; Ayadi, 2021), a vast body of literature has focused on examining the relationship between two of the three variables, in savings and economic growth (Wanzala & Obokoh, 2024; Oyelowo et al., 2024; Eze, 2023) and in investment and economic growth (Gasmelsied & Mohammed 2024; Karimov & Huseynova, 2024; Ajayi, 2024 ). But none of the aforementioned study's econometrics estimation covered recent periods like the post-COVID-19 era and as such, fail to capture the structural shifts in savings behaviour, investment flows, and macroeconomic performance caused by the pandemic.

The COVID-19 crisis brought about unprecedented disruptions in financial systems, household income and investor confidence that may have altered the traditional relationships among savings, investment and economic growth in a developing country like Nigeria. Most of the prior studies failed to capture the interdependent nature of savings and investment as examined in the Harrod-Domar Model, the studies that noted the interdependent nature relied too much on simplified bivariate frameworks susceptible to omitted variable bias that is incapable of capturing dynamic feedback appropriately, thus causing a deviation from real time economic scenario that might have occurred. It is in this light that this study is primarily hinged on examining the dynamic interaction between savings and investment on economic growth, the extent to which a shock in savings and investment individually affect economic growth over time, the percentage of changes in economic growth that can be attributed to savings, investment and other macroeconomic indicators and the causal linkages between the underlying trio in Nigeria.



The rest of this study is structured as follows: next section is literature review, section three is methodology, section four is result and discussions while section five is the conclusion and recommendations.

## 2. Literature Review

### 2.1 Conceptual Clarification

#### 2.1.1 Savings

Bolus (2021) defined savings as the proportion of income that is not immediately consumed but set aside for future use as a shield against uncertainties or as a resource for investment. Savings can also be considered as an act of postponement of immediate spending, in other to have enough to cater for the future (Felici, Kenny & Friz, 2023). The act of postponement is motivated by the desire for one to be self-insured against income shocks, for continuous consumption overtime and for bequest motives (an act of transferring wealth across generations (Sibanda, Muzavazi, Setoboli, & Tshuma, 2025).

Economic units like household, firm and government have a unique drive towards savings. For instance, household savings are influenced and self-control. (Sibanda et al., 2025) affirmed that high literacy correlates with stronger saving habit, while cooperate savings exhibit multiplier effect on sustainable economic growth as attested by (Wanzala & Obokoh, 2024) whose study suggest that a 1% rise in cooperate savings can boost gross domestic product (GDP) by over 3% in the long-run with government and household savings playing a critical role.

#### 2.1.2 Investment

Investment is broadly defined as an addition to physical stock of capital in an economy, such as infrastructure, machinery, technology and building (Samuelson & Nordhaus, 2001). Investment is seen as a tool of aggregate demand and a prominent driver of economic growth and productivity. It is in this sense that the classical economists such as (Smith, 1776; Ricardo, 1817; Mill, 1848) saw investment as an indicator influenced by interest rate and savings, with lower interest rate prompting borrowing and investment while higher interest rate promotes savings which provide the needed capital to ensure investment. However, (Keynes, 1936) emphasized that expectation of future profitability and business confidence play a more decisive role than interest rate alone. For instance, in the analysis of the real option theory, Dixit and Pindyck (1994) opines that under uncertainty, firms may delay investment until they can obtain more information.

#### 2.1.3 Economic Growth

Todaro and Smith (2020) defined economic growth as the rise in real (inflation-adjusted) market value of goods and services produced in an economy at a particular time period. Economic growth is pivotal in economic theory and policy because it determines a country's capacity to improve living standards, reduce poverty and promote overall wellbeing. While classical economist like Adam Smith emphasized the impact of capital accumulation, labour and specialization in driving economic growth, Neoclassical models, such as the solow growth model introduced the idea of diminishing returns to capital and emphasis the usefulness of technological progress as an exogenous factor (Solow, 1956). In contrast, endogenous growth theories put in place by (Romer, 1999; Lucas, 1988) argued that technological innovation and human capital can promote sustained long-term growth without diminishing returns. However, modern economic growth discussion highlights qualities such as inclusivity and sustainability, thus, drifting away from mere growth feature to growth in equitable form.

### 2.2 Theoretical Review

Since the mid 20$^{th}$ century, theories of savings have had a paradigm shift from income driven model to the incorporation of psychological and institutional factors. The Life-Cycle Hypothesis (LCH) propounded by (Modigliani & Brumberg, 1954) argues that individuals plan their consumption and savings over their life time, by borrowing when young, saving during their working years or dissaving in retirement. Although several empirical studies such as (Deaton, 1991; Browning & Lusardi, 1996; Attanasio & Weber, 1995) but not limited to, have disputed the LCH, emphasizing how unrealistic it can be for lower income household. It is in this sense, that Friedman's Permanent Income Hypothesis (1957) distinguish permanent income from transitory income, affirming that only anticipated income changes affect savings.

Conversely, the investment theories have surpassed mere margin-based neo-classical model to models that incorporate for uncertainty, finance and institutions. The

Neoclassical Q-Theory by (Tobin, 1969) asserts that firm will undertake investment only when the market value of capital exceeds its replacement cost, but this theory faced limitations of being a weak predictor due to the fact that market valuation are sometimes volatile and prone to speculation (Chirinko, 1993). However, recent Financial-Friction Model propounded by Stiglitz and Weiss (1981) opines that a firm facing significant credit constraint is liable to underinvest because external funds are not available to them. This imposes a major situation in developing countries like Nigeria.

Economic growth theory, once based on factor accumulation models have seen a shift towards dynamic endogenous framework. For instance, the Harrod-Domar Model by Harrod (1939) and Domar (1946) associated growth to savings and capital output ratio, suggesting that savings influence the capital needed to drive growth productivity. The Solow-Swan Model, propounded by Solow (1956) and Swan (1956) improved on the aforementioned Harrod-Domar Model by introducing technological progress as an exogenous factor with diminishing returns in capital leading to steady state growth path determined by savings, depreciation and growth in population.

**2.3 Empirical Review**

Wanzala and Obokoh (2024) examined the relationship between domestic savings and sustainable economic growth in South African, covering the period from 1990 to 2023. The study emphasized the vital role of savings in promoting long-term economic stability and environmental resilience. Utilizing the Autoregressive Distributed Lag (ARDL) model, the researcher's analyzed data sourced from the World Bank and the South African Reserve Bank. The findings revealed that corporate savings significantly influence sustainable economic growth, particularly in the long run. Specifically, a 1% increase in corporate savings was associated with a 3.12% rise in economic growth, underscoring the strong multiplier effect of investment. The study recommended a review of current policies to promote increased domestic savings as a means of supporting sustainable economic development.

Ahamed (2021) investigated the impact of public and private investments on the economic growth of developing countries, covering the period from 1990 to 2019. The study utilized panel data from 39 developing countries to assess the relationship. The findings revealed that public investment has a stronger positive impact on economic growth compared to private investment. Additionally, gross capital formation, labour growth, and government final consumption expenditure were found to be significant determinants of economic growth. The study concluded that both public and private investments play a vital role in driving economic growth and development in developing countries.

Using both qualitative and quantitative research methodologies, Ribaj and Mexhuani (2021) examined the relationship between savings and economic growth in Kosovo, the study analyzed data from 2010 to 2017, employing the Augmented Dickey-Fuller test, Johansen cointegration test, and Granger causality test. The unit root test confirmed stationarity of the data, and regression results indicated that deposits have a significant positive impact on Kosovo's economic growth. The study emphasized that savings stimulate investment, production, and employment, thereby fostering sustainable economic growth. Additionally, loans and remittances were found to contribute positively to economic expansion through their influence on investment. The study concluded that countries with higher national savings rates are less dependent on foreign direct investment, thereby reducing the risks associated with volatile external capital flows.

Liu and Ma (2022) investigated the impact of saving rates on economic growth in Asian countries, using panel data from 46 countries and regions between 1969 and 2021. The study analyzed the relationship using variables such as gross domestic saving rate, GDP per capita, and urban population growth rate. Results showed that the saving rate had a significant positive impact on economic growth during 1960–1990, but was insignificant from 1991–2021. Urban population growth had a stronger effect in the later period, while GDP per capita showed a consistent negative impact. Regionally, the saving rate positively influenced growth in East and South Asia, while urban population growth and GDP per capita had varying impacts across regions. The study concluded that a high saving rate remains a key driver of economic growth, especially in high- and upper-middle-income countries.

Soylu (2019) investigated the impact of savings and foreign direct investment (FDI) on economic growth in Poland over the period 1992 to 2016. The study employed the Autoregressive Distributed Lag (ARDL) bounds testing approach to analyze the

relationship. The findings revealed a cointegration relationship among the variables. A 1% increase in savings led to a 0.81% increase in the economic growth rate, while a 1% increase in FDI resulted in a 1.52% increase in growth. The study emphasized the importance of high saving rates in fostering sustainable growth and enhancing resilience to financial shocks, particularly in the context of reduced foreign financing after the global financial crisis.

In the case of Nigeria, Ugochukwu, Oruta, Israel and Lucky (2021) investigated the savings-investment-growth nexus in Nigeria from 1981 to 2020, using secondary data from the World Development Indicators and the Central Bank of Nigeria. The study employed a Vector Autoregressive (VAR) model and analyzed three separate models. Results revealed an insignificant relationship between gross domestic savings, lending rate and economic growth on gross capital formation. While GDP and lending rate significantly influenced gross domestic savings, they had no significant effect on investment. Granger causality tests showed unidirectional causality from lending rate to investment and GDP, and bidirectional causality between GDP and investment. The study attributed the weak savings-investment-growth link to inefficient financial intermediation and underutilized policy tools. The study recommended flexible and efficient use of monetary and fiscal policies that are in line with current economic realities in the country to link savings and investment efficiently and, hence, promote economic growth.

Alzghoul, Alsheikh and Yamin (2023) examined the relationship between savings and investment in Jordan from 1980 to 2020. The study employed Augmented Dickey-Fuller, Phillips-Perron, and Lumsdaine and Papell unit root tests, along with the ARDL Bounds testing approach. The findings revealed a long-run cointegration relationship between savings and investment, indicating that they are interlinked over time. The study emphasized that maintaining a stable savings supply is crucial for ensuring economic stability and guiding policy decisions.

Mahara (2022) examined the relationship between gross domestic savings, gross capital formation, and economic growth in Nepal. The study applied the ARDL cointegration method and the Zivot-Andrews unit root test to account for structural breaks. The findings revealed a positive and significant long-run relationship among the variables. The causality results showed unidirectional causality from investment to growth and from growth to savings, along with a bidirectional relationship between savings and investment. The study concluded that increasing savings and channeling them into productive investment are essential for boosting economic growth in Nepal.

Osuka, Ihejirika and Felix (2024) investigated the relationship between savings, investment, and economic development in Nigeria over the period 1990 to 2022. The study aimed to determine whether total consumption from GDP, net investment in government non-financial assets, government spending, private consumption, consumer price index, and GDP deflator significantly affect economic development. Using the Autoregressive Distributed Lag (ARDL) model, the results revealed that in the short run, GDP per capita positively impacted economic development, while domestic savings had an insignificant or negative effect. In the long run, domestic savings had a weak negative effect, investment showed a strong negative impact, and consumption had a strong positive relationship with economic development. Inflation and interest rates exhibited weak negative effects. The study recommended that macroeconomic policies be adopted to improve the domestic investment climate and ensure its positive contribution to economic development in Nigeria.

Solomon (2024) analyzed the impact of national savings on economic growth in Nigeria from 1990 to 2020. The study aimed to determine whether national savings significantly affect Nigeria's GDP. Using secondary data from the CBN Statistical Bulletin and applying the Ordinary Least Squares (OLS) method along with the Augmented Dickey-Fuller test and Johansen cointegration test, the study found a positive and significant relationship between national savings and economic growth. Conversely, inflation had a negative but significant effect on GDP. The study recommended that policymakers improve citizens' income levels and develop the financial sector to encourage savings and promote economic growth.

Kuhe (2024) investigated the causal relationship between domestic savings, domestic investment, and economic growth in Nigeria from 1970 to 2015. The objective was to examine both the short-run and long-run interactions among these variables. Using Augmented Dickey-Fuller tests, Johansen

cointegration, Fully Modified Least Squares, Vector Error Correction Model (VECM), and Toda-Yamamoto Granger causality tests, the study found that all variables were cointegrated. The results showed that domestic investment had a positive and significant long-run impact on economic growth, while the short-run impacts of domestic savings and investment were limited but persistent. Bidirectional causality existed between investment and growth, and between savings and investment, but not between savings and growth in the short run. The study recommended policies that prioritize investment-led growth, supported by savings mobilization for long-term development.

## 3. Methodology

The study is hinged on the Harrod-Domar growth Model that links economic growth to the level of savings and productivity of capital. To empirically examine the objectives of this study, secondary data spanning from 1980 – 2024 were utilized. These data are sourced from the Central Bank Statistical Bulletin (CBN) and the World Bank development indicator (WDI). The key indicator employed in this study includes growth rate of gross domestic product (GDP) (a proxy for economic growth), gross domestic savings as a percent of GDP (SAV) and gross capital formation (GCF) (a proxy for domestic investment). While control variables used in the study include Domestic Credit to Private Sector (DCP), Interest on Lending (LIN) and broad money (BMM)

### 3.1 Analytical Techniques

Given the likelihood of mutual interaction among the indicators in the model, the study adopts the Vector Autoregression (VAR) method. VAR is exceedingly suitable for estimating independent indicators (Sims, 1980). Prior to estimation, the Augmented Dickey Fuller (ADF) and the Philip-Peron (PP) technique will be employed to determine the order of integration among indicators in the model. If all indicators are stationary at I(0), the VAR model is estimated at level, if all indicators are stationary at I(1) and not cointegrated then the VAR model is estimated at first difference, however, if some or all the indicators are integrated of I(1) and cointegration is present, then the Vector Error Correction Model is employed instead (Gujarati & Porter, 2009).

The VAR Granger Causality/Block Exogeneity Wald Tests was also tested to see the direction of causation among the variables. The dataset was also examined for the presence of a long-run relationship among the variables by performing the Johansen co-integration test. Additionally, the impulse response function and variance decomposition were employed to analyze the effects of shocks and the variability caused by the variable itself as well as by other variables. An inverse root graph was generated to assess the stability or stationarity of the VAR model and to verify the reliability of the impulse response functions. Lastly, diagnostic tests were conducted to check for serial correlation and heteroskedasticity in the residuals.

### 3.2 Model Specification

As aforementioned above, the study relied on the Harrod-Domar Model with a baseline model specification

$$GR_t = \alpha + \beta_1 S_t + \beta_2 K_t + \beta_n X_t + e_1 \quad (3.1)$$

$$S_t = I_1 \quad (3.2)$$

Where

$GR_t$ = Current Real Gross Domestic Product

$S_t$ = Current Gross Domestic Savings as a percent of GDP

$K_t$ = Current Capital Output Ratio

$X_t$ = Other current Control Variables

$\beta_1 - \beta_n$ = Coefficient and Parameter of Estimate

$e_1$ = Error terms

One major assumption in Harrod-Dorma model is the equality of savings and investment, suggesting that savings drives investment. However, in other to examine the objectives of the study, the above model is extended to include indicators that improve the predictability of the model. The model is stated in its explicit form as;

$$GDP = f(INV, SAV, DCP, LIN, BMM,) \quad (3.3)$$

And in its econometrics form as

$$GDP_t = \beta_0 + \beta_1 INV_t + \beta_2 SAV_t + \beta_3 DCP_t + \beta_4 LIN_t + \beta_5 BMM_t + e_t \quad (3.4)$$

Where

$GDP_t$ = Current Growth Rate of Gross Domestic Product

$INV_t$ = Current Domestic Investment as a percent of GDP

$SAV_t$ = Current Domestic Savings as a percent of GDP

$DCP_t$ = Current Domestic Credit to Private Sector

$LIN_t$ = Current Interest Rate on Lending

$BMM_t$ = Current Broad Money

$\beta_1 - \beta_5$ = Parameters

$e_t$ = Error Term

The parameter $\beta_1$ - $\beta_3 > 0$ while $\beta_3$ and $\beta_4 < 0$. Affirming the theoretical prediction of Harrod-Domar that asserts that higher savings creates higher investment necessary for promoting growth while higher interest rate (in terms of interest on lending) and inflation rate (in terms of increase money supply) imped growth.

The general VAR model is specified as follows:

$$\boldsymbol{lGDP_t = \alpha_1 \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + e_t}$$

$$\boldsymbol{lINV_t = \alpha_2 \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + e_t}$$

$$\boldsymbol{lSAV_t = \alpha_2 \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + e_t}$$

$$\boldsymbol{lDCP_t = \alpha_2 \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + e_t}$$

$$\boldsymbol{lLIN_t = \alpha_2 \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + e_t}$$

$$\boldsymbol{lBMM_t = \alpha_2 \sum_{l=1}^{k} \beta_j\, lBMM_{t-j} + \sum_{l=1}^{k} \beta_j\, lGDP_{t-j} + \sum_{l=1}^{k} \beta_j\, lINV_{t-j} + \sum_{l=1}^{k} \beta_j\, lSAV_{t-j} + \sum_{l=1}^{k} \beta_j\, lDCP_{t-j} + \sum_{l=1}^{k} \beta_j\, lLIN_{t-j} + e_t}$$

Where:
$lGDP_t$ = log of Growth Rate of Gross Domestic Product
$lINV_t$ = log of Domestic Investment as a percent of GDP
$lSAV_t$ = log of Domestic Savings as a percent of GDP
$lDCP_t$ = log of Domestic Credit to Private Sector
$lLIN_t$ = log of Interest Rate on Lending
$lBMM_t$= log of Current Broad Money
$e_t$= Stochastic Error or Shock in VAR

## 4. Result and Discussion

### 4.1 Unit Root

Table 1 reveals the result of the Augmented Dickey-Fuller and Philip-Peron unit root test. The results suggest that all indicators employed (LGDP, LINV, LSAV, LDCP, LIN and LBMM) became stationary after first difference. Given that all indicators are stationary after first difference, it is highly imperative to subject the model to cointegration test to ascertain if a long-run relationship exist (Gujarati & Porter, 2009). Hence, it is equally important to determine the optimal lag length as analysis continues.

**Table 1:** Unit Root Output for Augmented Dickey-Fuller and Philip Peron Approach

| Variables | ADF T-Bar | PP | Remarks |
|---|---|---|---|
| LGDP | -12.234 (0.0000) *** | -13.183 (0.0000) *** | I (1) |
| LINV | -14.913 (0.0000) *** | -14.703 (0.0000) *** | I (1) |
| LSAV | -10.231 (0.0000) *** | 10.183 (0.0000) *** | I (1) |
| LDCP | -5.485 (0.0000) *** | -3.837 (0.0053) *** | I (1) |
| LIN | -5.608 (0.0000) *** | -7.143 (0.0000) *** | I (1) |
| LBMM | -6.933 (0.0000) *** | -8.643 (0.0000) *** | I (1) |

**Source:** Author's computation (2025). Note***, **, *denotes 1%, 5% and 10% level of significant while the P-value is enclosed by the parenthesis.

### 4.2 VAR lag Order Selection Criteria Output

Table 3 reveals the optimal lag structure of the VAR model. The result suggests that all selection criteria (LR, FPE, AIC, SC and HQ) selected the optimum lag length of 1 and 5% level of significance. Thus, the lag length "1" will be used to estimate the cointegration test and the VAR output.

**Table 2:** Optimal VAR lag Selection

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -433.1986 | NA | 138.7575 | 21.95993 | 22.21326 | 22.05152 |
| 1 | -338.9236 | 155.5536* | 7.696447 | 19.04618 | 20.81950* | 19.68736* |
| 2 | -293.4815 | 61.34689* | 5.438710 | 18.57407 | 21.86739 | 19.76483 |
| 3 | -250.0037 | 45.65171 | 5.317539* | 18.20018* | 23.01349 | 19.94052 |

***Source:*** *Author's computation (2025) using E-Views 12*

### 4.3 Johansen Cointegration Test

Table 3 shows the output of the Johansen Contegration test of both the Trace statistics and Max-Eigen statistics. The result fails to reject the null hypothesis, suggesting that the indicators ((LGDP, LINV, LSAV, LDCP, LIN and LBMM) have no long-run relationship/cointegration. The revealed result of the cointegration test affirmed the use of VAR approach for this analysis.

**Table 3:** Output of the Johansen Cointegration Test

| Trace Statistic | 0.05 Critical Value | Prob.** | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|---|
| 89.93646 | 95.75366 | 0.1175 | 28.28375 | 40.07757 | 0.5417 |
| 61.65271 | 69.81889 | 0.1881 | 23.51431 | 33.87687 | 0.4915 |
| 38.13840 | 47.85613 | 0.2960 | 19.65127 | 27.58434 | 0.3658 |
| 18.48713 | 29.79707 | 0.5302 | 11.89515 | 21.13162 | 0.5581 |
| 6.591979 | 15.49471 | 0.6255 | 6.244755 | 14.26460 | 0.5820 |
| 0.347224 | 3.841465 | 0.5557 | 0.347224 | 3.841465 | 0.5557 |

***Source:*** *Author's computation (2025) using E-Views 12*

### 4.4: Vector Autoregressive Model Output (VAR)

Table 4 shows the VAR output. The result reveals that the past realization of LGDP is associated with 44.98% increase in current LGDP, implying that the past realization of LGDP has a moderate influence in determining current LGDP. The result further discloses that a percentage increase in LSAV account for a 473% increase in LGDP. Additionally, the past realization of LINV, LSAV, LDCP, LIN and LBMM is accompanied with a 53%, 55%, 69%, 74% and 193% increase in their respective current indicators. This suggest that all indicators significantly influence themselves individually. LDCP and LIN shows a weak significant influence on LSAV, suggesting that a percentage rise in both indicators (domestic credit to private sector and interest on lending) accounts for a 15% and 2% decrease in LSAV respectively.

LSAV exert a strong negative influence on LDCP and a strong positive influence in LBMM, suggesting that a percent increase in LSAV is associated with a 51.5% decrease in LDCP and 61% increase in LBMM respectively.

**Table 4:** Vector Autoregressive Model Output (VAR)

| | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
|---|---|---|---|---|---|---|
| LGDP(-1) | 0.449881 | 0.049079 | 0.009992 | -0.004533 | 0.049226 | -0.001072 |
| | (0.14693) | (0.14913) | (0.00592) | (0.01481) | (0.09775) | (0.02266) |
| | [ 3.06194] | [ 0.32911] | [ 1.68811] | [-0.30612] | [ 0.50360] | [-0.04732] |
| LINV(-1) | -0.044604 | 0.530104 | 0.001855 | -0.013023 | 0.099094 | 0.004415 |
| | (0.18013) | (0.18283) | (0.00726) | (0.01816) | (0.11984) | (0.02778) |
| | [-0.24762] | [ 2.89941] | [ 0.25568] | [-0.71730] | [ 0.82687] | [ 0.15892] |
| LSAV(-1) | 4.734904 | -2.121457 | 0.555772 | -0.514665 | 0.762320 | 0.610993 |
| | (1.54500) | (1.56813) | (0.06224) | (0.15572) | (1.02788) | (0.23830) |
| | [ 3.06467] | [-1.35286] | [ 8.92923] | [-3.30516] | [ 0.74165] | [ 2.56399] |
| LDCP(-1) | 1.965021 | 0.247109 | -0.157053 | 0.690268 | 0.603653 | -0.289529 |
| | (1.19085) | (1.20868) | (0.04797) | (0.12002) | (0.79226) | (0.18367) |
| | [ 1.65010] | [ 0.20445] | [-3.27366] | [ 5.75117] | [ 0.76193] | [-1.57632] |
| LIN(-1) | 0.125163 | 0.027919 | -0.019246 | 0.004153 | 0.742272 | 0.035565 |
| | (0.15844) | (0.16081) | (0.00638) | (0.01597) | (0.10541) | (0.02444) |
| | [ 0.79000] | [ 0.17362] | [-3.01536] | [ 0.26007] | [ 7.04204] | [ 1.45539] |
| LBMM(-1) | -0.947034 | -1.005514 | 0.054858 | 0.045980 | -0.404302 | 0.008741 |
| | (1.05022) | (1.06595) | (0.04231) | (0.10585) | (0.69871) | (0.16198) |
| | [-0.90174] | [-0.94330] | [ 1.29659] | [ 0.43439] | [-0.57864] | [ 0.05396] |
| C | -12.74362 | 4.163517 | 1.528434 | 1.688263 | 2.522542 | 1.937093 |
| | (6.20877) | (6.30174) | (0.25013) | (0.62576) | (4.13066) | (0.95763) |
| | [-2.05252] | [ 0.66069] | [ 6.11062] | [ 2.69792] | [ 0.61069] | [ 2.02280] |

***Source:*** *Author's computation (2025) using E-Views 12*

### 4.5 Impulse Response

Fig 4.1 reveals the output of the impulse response function (IRF) for each of the indicators, the vertical and horizontal axis measures the response and the number of periods passed after impulse. Ten period was evaluated, with period 1-5 as short-term and period 6-10 as long-term period. The response of (LGDP to LSAV) indicates that a shock to LSAV (savings) lead to a positive response in LGDP (economic growth) with an immediate impact at the short-term period 2. However, the effect diminishes gradually overtime, with response declining to near zero at period 10. This suggest that the effect of LSAV shock on LGDP is positive but decline overtime, indicating short-term responsiveness with decreasing influence in the long-run.

Conversely, the response of (LGDP to LINV) suggests that a shock to LINV (investment) lead to a mild immediate positive response in LGDP (economic growth) with 0.001 in the short-term period and no influence in the long-run. In response of (LGDP to LDCP), it is seen that a shock in LDCP (domestic credit to private sector) produced a positive response to LGDP in the short-term assuming values of about 0.7 in period 1, 0.5 in period 4 and a diminishing value of about 0.01 and 0 in period 8 and 10. Additionally, in response of (LGDP to LIN), a shock in LIN (interest on lending) produced an immediate positive response to LGDP in the short-term (period 2) and it assumed a dwindling value in subsequent periods.

Other result reveals a negative response of (LBMM to LDCP, LBMM to LINV), (LSAV to LDCP), (LSAV to LIN) and (LINV to LSA) to a shock to their respective indicators across periods. An immediate negative response in short-term before a mild positive response in subsequent periods for (LGDP to

LBMM), (LINV to LBMM), (LIN to LBMM), (LDCP to LIN), (LIN to LSAV), (LDCP to LGDP), (LSAV to LGDP), a strong positive response in short-term period followed by period of dip response in long-run for (LINV to LGDP), (LIN to LGDP), (LIN to LINV), (LDPC to LINV), (LBMM to LSAV), (LBMM to LIN), (LSAV to LBMM). However, a strong negative response in immediate period followed by a positive response in the long-term period. While a strong positive response occurs from the immediate period to the long-term period as in the case of (LIN to LDCP) and (LDCP to LIN).

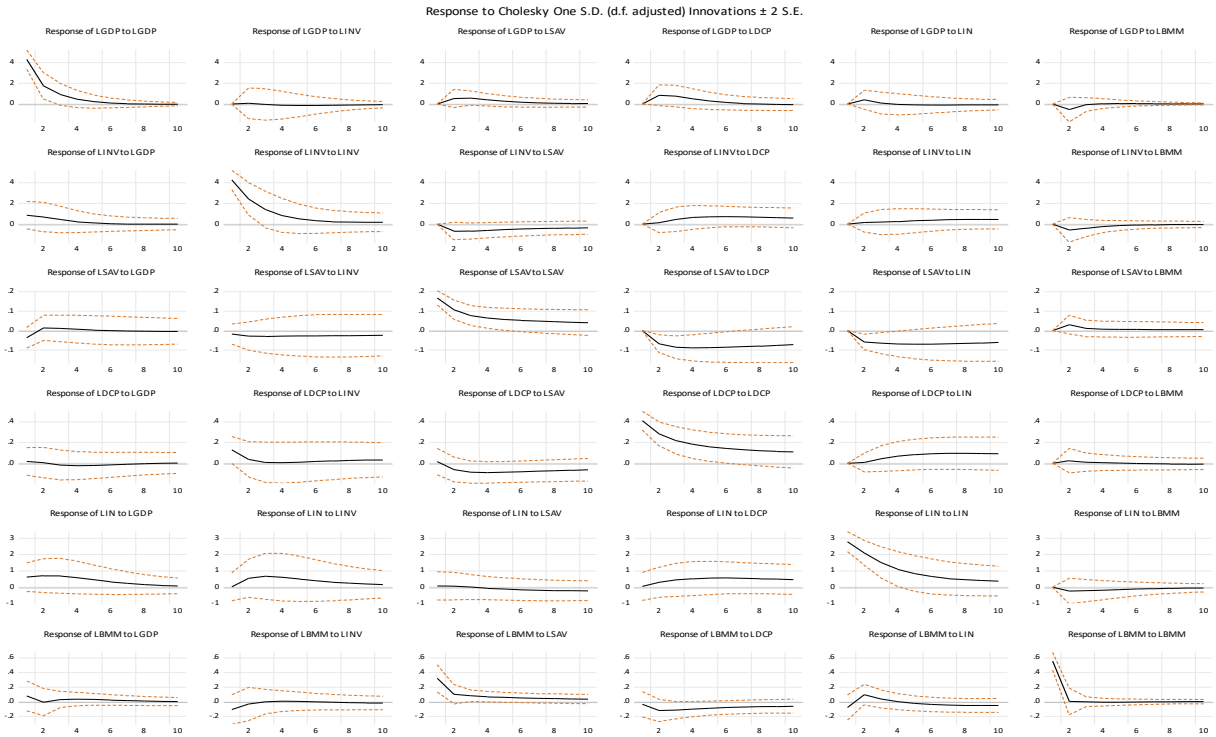



**Fig 4.1** Impulse Response Output
**Source:** Author's computation (2025) using E-Views 12

### 4.6. Variance Decomposition

Table 5 depicts the proportion of forecast variance of the indicators analyzed that is attributable to shocks in each of the indicators present in the system. Period 1-5 will be referred to as the short-term period, while period 6-10 will be referred to as the long run period. In Table 5, the result reveals that in period 1, 100% of forecast error of LGDP is explained by itself, thus suggesting a strong exogeneity in the other indicators. Period 4, 6 and 10 further reveals the perceived weakness of the other indicators in influencing LGDP, thus, suggesting that LGDP shows a continuous influence itself from the short-run period into the future.

Table 5.1 reveals that in period 5, the indicators (LGDP, LSAV, LDCP, LIN and LBMM) accounts for 4.6%, 4.85, 3.6%, 0.7% and 1.7% of LINV respectively, with 4.1%, 6.6%, 9.2%, 3.2% and 1.5% for period 10. This suggest that LINV is weakly influence by these indicators. Table 5.2 indicates that in period 5, LGDP, LINV, LDCP, LIN and LBMM accounts for 1.7%, 3.3%, 26.3%, 16.3% and 1.1% of LSAV respectively, with 1.0%, 4.0%, 34.2%, 22.5% and 0.8% for period 10. This suggest that LDCP and LIN is showing a strong influence on LSAV in the short-term period into the future.

Table 5.3 reveals that in period 5, LGDP, LINV, LSAV, LIN and LBMM accounts for 0.4%, 4.4%, 6.3%, 3.3% and 0.2% of LDCP respectively, with 0.3%, 4.0%, 9.1%, 10.2% and 0.2% for period 10. This shows that LSAV and LIN weakly influenced LDCP in the short-term and long-run period while other indicators show no significant influence. Table 5.4 indicates that in period 5, LGDP, LINV, LSAV, LDCP and LBMM accounts for 9.3%, 6.7%, 0.1%, 4.3% and 0.7% of LIN respectively, with 8.9%, 7.4%, 0.9%, 9.4% and 0.7% for period 10. This indicates that LGDP and LINV have a weak influence on LIN in both the short-term and long-run periods. Finally, table 5.5 reveals that in period 5, LGDP, LINV, LSAV, LDCP and LIN accounts for 1.9%, 2.3%, 24.7%, 8.7% and 3.3% of LBMM respectively, with 1.9%, 2.1%,

24.5%, 11.9% and 4.9% for period 10. This shows that LSAV and LDCP moderately influenced LBMM in the short-term and long-run period while other indicator's influences is insignificant.

**Table 5:** Variance Decomposition Output

| Variance Decomposition of LGDP: | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 5.079956 | 88.23435 | 0.158241 | 3.297295 | 6.445749 | 0.750294 | 1.114071 |
| | | (12.6448) | (7.94023) | (3.89071) | (6.44946) | (4.37443) | (2.72953) |
| 10 | 5.099349 | 87.61193 | 0.349249 | 3.515686 | 6.521775 | 0.869387 | 1.131975 |
| | | (16.2954) | (10.3875) | (4.31202) | (7.13628) | (5.81855) | (2.71824) |

**Table 5.1**

| Variance Decomposition of LINV | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 5.674333 | 4.584944 | 84.60358 | 4.826742 | 3.574464 | 0.712105 | 1.698166 |
| | | (8.49666) | (12.0992) | (4.61563) | (6.94104) | (4.72344) | (2.85905) |
| 10 | 6.040015 | 4.050422 | 75.39516 | 6.558251 | 9.231442 | 3.226751 | 1.537972 |
| | | (8.93059) | (14.7899) | (6.84169) | (10.0193) | (7.84352) | (3.00821) |

**Table 5.2**

| Variance Decomposition of LSAV | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 0.323125 | 1.657856 | 3.316724 | 51.26034 | 26.33275 | 16.31896 | 1.113376 |
| | | (6.30721) | (10.0657) | (13.0133) | (15.7518) | (9.60566) | (2.66091) |
| 10 | 0.413918 | 1.033064 | 3.930849 | 37.56674 | 34.19757 | 22.49748 | 0.774294 |
| | | (8.49830) | (11.8071) | (13.8720) | (18.5471) | (13.7287) | (2.79929) |

**Table 5.3**

| Variance Decomposition of LDCP | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 0.648534 | 0.382341 | 4.359616 | 6.294008 | 85.44861 | 3.319383 | 0.196042 |
| | | (6.59166) | (8.81505) | (6.95544) | (14.8710) | (6.30896) | (1.98072) |
| 10 | 0.757214 | 0.338438 | 3.872952 | 9.126780 | 76.26181 | 10.23321 | 0.166806 |
| | | (8.64029) | (10.4148) | (7.86035) | (19.1423) | (10.7087) | (2.15815) |

**Table 5.4**

| Variance Decomposition of LIN | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 4.569713 | 9.294113 | 6.708000 | 0.128777 | 4.278823 | 78.86399 | 0.726301 |
| | | (12.5953) | (11.2554) | (3.46437) | (7.99145) | (15.5719) | (2.71288) |
| 10 | 4.935407 | 8.907190 | 7.395298 | 0.884990 | 9.355710 | 72.72289 | 0.733918 |
| | | (12.5894) | (13.2592) | (5.02128) | (11.2768) | (17.5762) | (2.91020) |

**Table 5.5**

| Variance Decomposition of LBMM | | | | | | | |
|---|---|---|---|---|---|---|---|
| Period | S.E. | LGDP | LINV | LSAV | LDCP | LIN | LBMM |
| 5 | 0.726242 | 1.900678 | 2.262635 | 24.70074 | 8.674009 | 3.323902 | 59.13804 |
| | | (5.48053) | (7.78357) | (9.22040) | (8.84666) | (4.41542) | (10.9731) |
| 10 | 0.756822 | 1.938978 | 2.192195 | 24.52286 | 11.96166 | 4.923936 | 54.46037 |
| | | (7.48107) | (9.59769) | (9.23573) | (11.4712) | (6.90734) | (13.2368) |

***Source:*** *Author's computation (2025) using E-Views 12*

### 4.7. Diagnostic Test

This subsection depicts the diagnostic test of VAR residual serial correlation LM test, Inverse Roots of AR, and VAR residual heteroskedasticity test respectively. The outcome of the VAR residual serial correlation LM test and VAR residual heteroskedasticity test indicates that the model is free from absurdity. There is absence of second order serial correlation and heteroskedasticity in the model as the p-value of the VAR residual serial correlation LM test in the second order and VAR residual

heteroskedasticity test are above 5%. Furthermore, Figure 4.2. Shows the graph of the AR inverse root of the vector autoregressive (VAR) model. The graph reveals that all the polynomial roots fall within the unit circle, suggesting that the VAR model is stationary and stable.

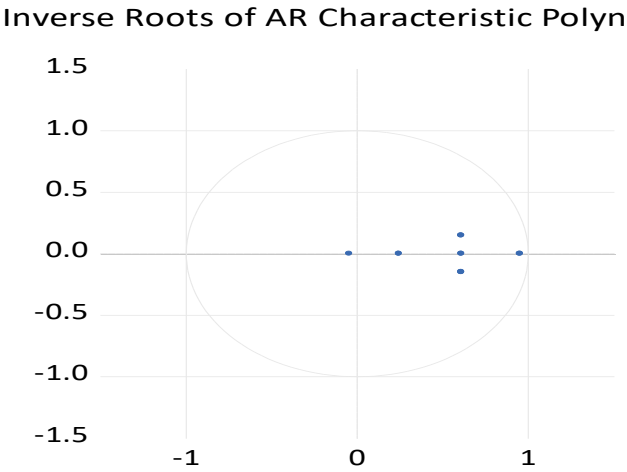



**Fig 4.2** Graph of AR Inverse Root
**Source:** Author's computation (2025) using E-Views 12

**Table 6:** VAR Residual Serial Correlation LM Tests

| Lag | LRE* stat | df | Prob. | Rao F-stat | df | Prob. |
|---|---|---|---|---|---|---|
| 1 | 66.06771 | 36 | 0.0016 | 2.089039 | (36, 108.2) | 0.0019 |
| 2 | 50.30579 | 36 | 0.0571 | 1.486332 | (36, 108.2) | 0.0616 |

***Source:*** *Author's computation (2025) using E-Views 12*

**Table 7:** VAR Residual Heteroskedasticity Tests

| Chi-sq | df | Prob. |
|---|---|---|
| 270.3087 | 252 | 0.2044 |

***Source:*** *Author's computation (2025) using E-Views 12*

### 4.8. Granger Causality Test

Table 8 reveals the result of the VAR granger causality/clock exogeneity wald test between the indicators (LGDP, LINV, LSAV, LDCP, LIN and LBMM). The test result suggests the existence of a bidirectional causality from (LGDP to LSAV) implying that economic growth causes savings and savings on the other hand causes economic growth as the p-value is less than 5%. This affirms with the Keynesian hypothesis that opine that growth induced savings as illustrated in the studies (Rasmidatta, 2011; Sekantsi, & Kalebe, 2015). The result further shows a bidirectional causal relationship from (LSAV to LDCP) and a unidirectional causal relationship from (LSAV to LIN), indicating that savings cause domestic credit to private sector and domestic credit to private sector causes savings and savings cause interest on lending.

**Table 8:** VAR Granger Causality/Block Exogeneity Wald Tests

| | Chi-sq | df | Prob. |
|---|---|---|---|
| LGDP - LINV | 0.061315 | 1 | 0.8044 |
| LGDP - LSAV | 9.392208 | 1 | 0.0022*** |
| LGDP - LDCP | 2.722837 | 1 | 0.0989 |
| LGDP - LIN | 0.624097 | 1 | 0.4295 |
| LGDP - LBMM | 0.813144 | 1 | 0.3672 |
| LINV - LGDP | 0.108315 | 1 | 0.7421 |
| LINV - LSAV | 1.830222 | 1 | 0.1761 |
| LINV - LDCP | 0.041798 | 1 | 0.8380 |
| LINV - LIN | 0.030143 | 1 | 0.8622 |
| LINV - LBMM | 0.889819 | 1 | 0.3455 |

| | | | |
|---|---|---|---|
| LSAV - LGDP | 2.849719 | 1 | 0.0914* |
| LSAV - LINV | 0.065370 | 1 | 0.7982 |
| LSAV - LDCP | 10.71685 | 1 | 0.0011*** |
| LSAV - LIN | 9.092397 | 1 | 0.0026*** |
| LSAV - LBMM | 1.681155 | 1 | 0.1948 |
| LDCP - LGDP | 0.093707 | 1 | 0.7595 |
| LDCP - LINV | 0.514518 | 1 | 0.4732 |
| LDCP - LSAV | 10.92408 | 1 | 0.0009*** |
| LDCP - LIN | 0.067636 | 1 | 0.7948 |
| LDCP - LBMM | 0.188694 | 1 | 0.6640 |
| LIN - LGDP | 0.253612 | 1 | 0.6145 |
| LIN - LINV | 0.683712 | 1 | 0.4083 |
| LIN - LSAV | 0.550038 | 1 | 0.4583 |
| LIN - LDCP | 0.580544 | 1 | 0.4461 |
| LIN - LBMM | 0.334828 | 1 | 0.5628 |
| LBMM - LGDP | 0.002239 | 1 | 0.9623 |
| LBMM - LINV | 0.025256 | 1 | 0.8737 |
| LBMM - LSAV | 6.574070 | 1 | 0.0103** |
| LBMM - LDCP | 2.484774 | 1 | 0.1150 |
| LBMM - LIN | 2.118162 | 1 | 0.1456 |

***Source:*** Author's computation (2025) using E-Views 12
***Note:*** See Appendix I; ***, **, *denotes 1%, 5% and 10% level of significant

## 5. Conclusion and Recommendations

The study examined the dynamic interaction between savings, investment and economic growth in Nigeria, it further examines the extent to which a shock in savings and investment individually affect economic growth over time using Impulse response function (IRF), to determine what percentage of changes in economic growth that can be attributed to savings, investment and other macroeconomic indicators using forecast error variance decomposition (FEVD) as well as the granger causality link between the underlying trio in Nigeria. The VAR output result revealed that the indicators studied, positively influences themselves and further shows that savings (LSAV) promotes growth (LGDP) in Nigeria in affirmation to the Keynesian theory while the influence of investment (LINV) is insignificant. Also control variables like domestic credit to private sector (LDCP) and interest on lending (LIN) significantly imped savings, the result finally uncovers LSAV impeding LDCP but promoting money supply (LBMM). The impulse response showed that a shock to savings has a substantial positive influence on economic growth in the short-term but this influence wanes overtime in Nigeria. In contrast, a shock in investment is statistically detectable but economically suggest a negligible positive influence that is confined to the immediate short-term period, thus not contributing meaningfully to sustained growth, this implies that savings shock affect growth to a much greater extent than investment shock in the model. The variance decomposition revealed that domestic credit to private sector (LDCP) account more for the variation in economic growth (LGDP), domestic credit to private sector account more for the variation in investment (LINV), domestic credit to private sector account more for the variation in savings (LSAV), interest on lending (LIN) account more for the variation in domestic credit to private sector while savings account more for the variation in money supply (LBMM). The granger causality test shows the existence of a bidirectional causality from (LGDP to LSAV) implying that economic growth causes savings and savings on the other hand causes economic growth, the result further shows a bidirectional causal relationship from (LSAV to LDCP) and a unidirectional causal relationship from (LSAV to LIN), indicating that savings cause domestic credit to private sector and domestic credit to private sector causes savings and savings cause interest on lending. This study aligns with the study of (Omoregie & Ikpesu, 2017; Eigbiremolen, 2014)

Given the findings from this study, it is imperative that government clamoring for growth must pay careful attention to the dynamic interaction between LSAV and LINV and the influence of certain control indicators (credits and interest on lending) that indirectly model the interdependence between the trio. It must be therefore noted that this study concentrates on one particular country of interest using time series analysis, thus, necessitating the need for further research that focuses on panel analysis of multi-country.

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