

DYNAMIC INTERACTION BETWEEN SAVINGS, INVESTMENT AND ECONOMIC GROWTH IN NIGERIA: A VECTOR AUTOREGRESSIVE (VAR) APPROACH

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ABSTRACT

The study investigated the dynamic interaction between savings, investment and economic growth in Nigeria within the period 1981 to 2014, using annual time series data obtained from the World Bank Development Indicator (WDI). The study employed the impulse response function (IRF) and the variance decomposition of VAR as well as the granger causality test. The variance decomposition revealed that GDP account more for the variation in GDS while GDS account more for the variation in GDI. In addition, GDS account more for the variation in GDP. The impulse response function showed positive influences between the variables. The causality test however revealed that a uni-directional relationship running from GDP to GDS only exist, which suggest that GDP granger cause GDS. This invariably suggests that despite the positive interactions between the variables, they do not influence each other except for GDP influencing GDS. By implication the outcome of this study signal the fact that GDP significantly influence the GDS in the Nigerian economy. From the study, it was shown that GDS do not result to GDI, to resolve this, the Central Bank of Nigeria (CBN) through its policy formulation on sectoral credit allocation, should ensure that the savings with deposit money banks are properly channelled to long-term investment. The study further revealed that GDI do not result to GDP, to resolve this, government should ensures that all investment are properly channelled to the productive sector of the economy. Finally, to ensure improvement in economic growth, government must pay special attention to the dynamic interaction between GDS, and GDI by ensuring that the savings generated are properly channelled to viable project that will lead to the overall growth of Nigeria economy.

JEL classification codes: C01, C22, E20, E21, E22

Key words: Gross Domestic Savings, Gross Domestic Investment, Gross Domestic Product, Nigeria, VAR

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INTRODUCTION

Several empirical studies abound in the literature that examines the causal link between savings, investment, and growth, but there seems to be no harmony as regards the existence and direction of the relationship between these variables. While some scholars supported the classical growth theory that is of the view that savings stimulates growth (Tang & Chua, 2009; Olajide, 2009; Abiodun, 2010; Tang, 2010; Hafizah et al. 2011), others lend credence to the Keynesian hypothesis, which posit that growth causes and drives savings (Carroll & Weil, 1994; Romm, 2005; Rasimidatta, 2011; Sekantsi, & Kalebe, 2015). From the time of the empirical work of Harrod (1939) and Domar (1946), the significance of savings and investment in advancing the growth of the economic has gained a considerable interest in growth theories as Mishra, Das & Mishra, (2010) in their research findings also documented that the origin of savings-investment relationship is attributable to the seminal work of Fledstein and Horioka (1979).

Since savings and investment has been regarded as the two vital variables in achieving economic growth, the need to have an in-depth knowledge of the dynamic interaction between savings, investment and economic growth is crucial as it will aid policy makers in designing and employing appropriate macroeconomic policies. This entails identifying which of the economic variables required attention in order to attain macroeconomic goals and objectives (Sajid & Sarfraz, 2008) as well as the various implications of those policies. In a study conducted by Cyril & Oscar (2014), the researchers explored the link between aggregate savings and investment in Namibia between the periods 1995 to 2011 using Error Correction Model (ECM) and granger causality test. The empirical evidence from the study indicates the existence of long-run association between savings and investment in Namibia and that savings drives investment.

In a more recent study, Mohammad & Anas (2015) explored the link between savings and investment in Jordan between the periods 1980 to 2013 using Augmented Dickey-Fuller (ADF) test and Johansen cointegration test. The result of their research showed that there exist a significant, positive and long-run

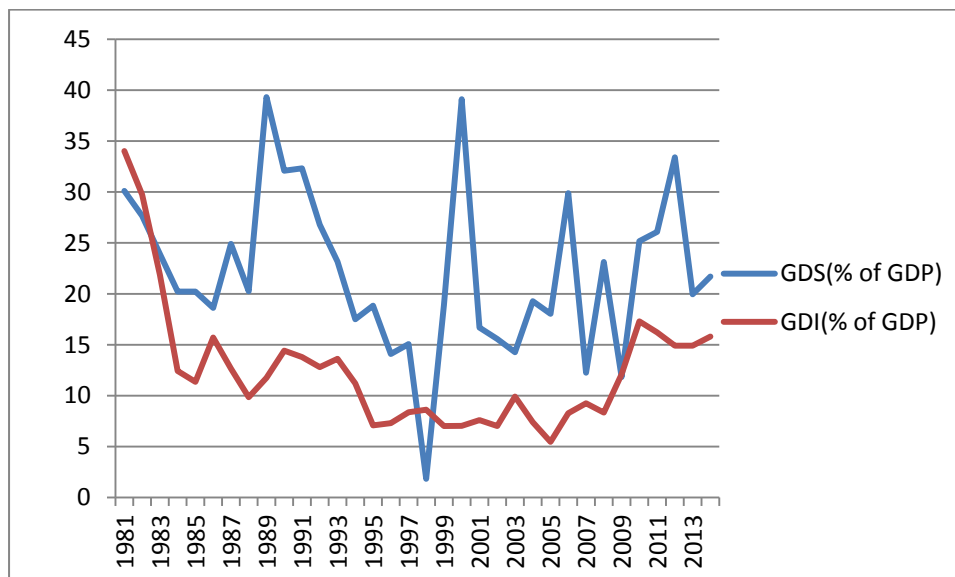
association between savings and investment. Adelakun (2011) noted that while the positive link which exists between savings, investment and growth is well recognized in empirical literature, the growth rate observed in most less developed countries (Africa) relative to other continent of the world is a concern for developmental economist. This concern arose because of the disparity between the growth rate recorded and the level of investment, which could be due to corruption (i.e. over invoicing, inflated public sector contract etc that has led to the actual level of investment being lower than the reported).

In most of the years, domestic savings as a percentage of GDP exceeds that of investment in Nigeria except in 1981, 1982, 1998 and 2009 where gross domestic investment as a share of GDP exceeds that of gross domestic savings by 3.92%, 2.08%, 6.79%, and 0.26% respectively. This implies that most of the savings do not translate or are not channelled into investment and this is inimical to the growth of the economy. More so, it contradicts both the Classical and the Keynesian theory which assumes that savings is equal to investment presuming that all savings are channelled to investment. The gross domestic savings as a proportion of GDP fell drastically from 30.10% to 1.83% in 1998 reflecting a decline in household and government savings. Between 2000 to 2013 domestic savings as a percentage of GDP shows a fluctuating trend. In 2014, the proportion of domestic savings as a share of GDP stood at 21.70% while the gross domestic investment to GDP stood at 34.02% in 1981 but fell to 8.62% in 1998. Between the periods of 1999 to 2013, gross domestic investment as a proportion of GDP also shows a fluctuating trend. In 2014, the percentage of gross domestic investment to GDP stood at 15.8%. These trends are depicted in Figure 1.

In Nigeria, most empirical literatures focus on savings-growth nexus, while few studies only investigated the association between savings, investment, and growth (Eigbiremolen, 2014; Nwanne, 2014), but none has critically examined the dynamic interaction between these variables by totally accounting for the feedback effect among the variables, hence, the uniqueness of this paper. Also the methodology adopted with the use of Vector Auto-regressive (VAR) approach is best-fit for this study because of the behaviour of the variables used in this study.

The other section of the paper is arranged as follows: section 2 presents a review of related literature. In section 3 the methodology adopted for the study was discussed. Section 4 analyzed the empirical result. Finally, section 5 concludes the paper.

Figure 1: Gross Domestic Savings and Gross Domestic Investment as a share of GDP



Source of data: World Bank Development Indicator (WDI)

REVIEW OF LITERATURE

The Classical school of thought are of the opinion that savings causes growth i.e. savings induce growth, the Keynesian school of thought on the other hand are of the view that growth causes and drives savings. This divergent view has led to many country specific studies to see where the weight of evidence lies.

There are various studies which show that there is a uni-directional relationship between savings and investment. One of these studies is the work of Dritsaki (2015), who explored the link between savings and investment rates in Greece by adopting ARDL bound testing approach between the periods 1980 to 2012. Empirical evidence from the study showed that the variables have long-run association and the direction of causality is unidirectional. Also, the variance decomposition result revealed that domestic savings are the major driver of investment in the long-run. Likewise, Sinah (2002) investigated the link between savings and investment rates for Japan and ten other Asia countries. The result from the research findings showed that growth in savings granger causes growth in investment rates in Malaysia, Singapore, Sri Lanka and Thailand.

Among the literature on the causal link between savings, investment and growth in the India economy is the work by Seshaiyah & Vuyyuri (2005) who used a cointegration approach and granger causality test, documented in their research findings that the causality running from savings to investment is uni-directional in India between the period 1970/1971 to 2001/2002. This implies that in India, savings influence investment. Using ARDL bounds testing approach, Verma (2007) explored the link between savings, investment and economic growth between the period 1950/1951 to 2003/04. The research findings from the study supported Carroll-Weil hypothesis. Also, the result revealed that in India, savings determines investment both in the short and long-run. In a more recent study by Mehta & Rami (2014) using vector error correction model and cointegration techniques, the researchers look at the link between savings, investment and economic growth in India during the period 1951 to 2012. Empirical findings from the study shows that long-run relationship exists between gross domestic savings, gross domestic investment and gross domestic product and that uni-directional causality runs from gross domestic savings, gross domestic investment to gross domestic product both in the short-run and in the long-run.

Ogbokor & Musilika (2014) using a cointegration test and granger causality approach, studied the empirical relationship between savings and investment in Namibia. The result from their study indicated that there is no long-run relationship between savings and investment and that a unidirectional causal link existed between savings and investment in Namibia as causality runs from savings to investment. Another recent study by Sekantsi & Kalebe (2015) using autoregressive distributed lag (ARDL) bounds testing approach to cointegration and vector error correction model (VECM) the researchers, examined the relationship between savings, investment and economic growth in Lesotho for the period 1970 to 2012. Evidence from the research findings revealed that the variables have a long-term relationship and short run causality flows from economic growth to savings

Some others studies reported that the relationship between savings and investment is bi-directional. For instance, in a study conducted by Mishra, Das & Mishra (2010), the researchers explored the causal link between savings and investment in India between the periods 1950-51 to 2008-09 using cointegration test and granger causality test. The outcome of their research findings revealed the existence of a long-run association between savings and investment and the direction of causality is bi-directional. Similarly, Hundie (2014) explored the link between savings, investment and economic growth in Ethiopia adopting ARDL approach during the period 1969/1970-2010/2011. The empirical result revealed the existence of long-run relationship between GDS, GDI, RGDP, labour force and human capital. The result further revealed that the relationship between labour force and investment has a significant and positive effect on economic growth while gross domestic savings and human capital are statistically insignificant. In addition, bi-directional causality was found between GDI and GDP and also between GDS and GDI.

In another study carried out by Jangili (2011), the researcher investigated the direction of causality between savings, investment and economic growth in India for the periods 1950/1951 to 2007/2008 using granger causality test. Evidence from the research shows that savings and investment granger cause economic growth collectively. Another study conducted by Budha (2012) investigated the causal relationship between savings, investment and growth in Nepal using Autoregressive Distributed Lag (ARDL) model approach. The outcome of the research findings revealed the existence of long-run association between savings, investment, and growth. Also, the result showed a short run bi-directional causality between investment and gross domestic product but no short-run causality between savings and growth.

However, the research conducted by Ramakrishna, & Rao (2012), using a cointegration and Error Correction Model (ECM) approach investigated the causal link between savings and investment in Ethiopia between the periods 1981 to 2009. Empirical findings revealed the absence of cointegration between savings and investment. Also, the research outcome revealed the absence of causality between savings and investment in Ethiopia.

Among the literature on the causal link between savings, investment and growth in the Nigeria economy is the work of Eigbiremolen (2014), who examined the relationship between savings, investment and economic growth in Nigeria during the period 1970 to 2012 using a forecast error variance decomposition analysis. The result showed that gross domestic product does not have a direct effect on private savings and private investment variability in Nigeria and that private savings contribute more to the variability of gross domestic product and private investment in Nigeria. In addition, Nwanne (2014) adopted ordinary least square techniques (OLS) to examine the implication of savings, investment and economic growth in Nigeria. The empirical results showed that gross domestic product (GDP) and gross domestic savings are negatively significant and that long-run relationship existed between savings, investment and economic growth in Nigeria.

The foregoing literature suggests mixed result as the debate on the relationship between savings, investment and growth is still inconclusive. Hence the need to further the investigation on the study by using vector autoregressive (VAR) approach in Nigeria.

METHODOLOGY

Sources of Data

In a bid to explore the dynamic interaction between gross domestic savings, gross domestic investment, and gross domestic product, the researchers used time series data which was sourced from World Bank Development Indicator (WDI), a World Bank publication. The span of the study covers the periods between 1981-2014. The variables used in the study are Gross Domestic Savings (GDS), Gross Domestic Investment (GDI) and Gross Domestic Product (GDP).

Table1. Data Description

Variables	Abbreviation	Description and Sources
Gross Domestic Savings	GDS	This refers to savings made by household, the private sector, and the public sector.
Gross Domestic Investment	GDI	This consists of expenditure on additions to the fixed assets of the economy plus net changes in the level of inventories.
Gross Domestic Product	GDP	This refers to an increase in the amount of goods and services produced by an economy over time.

Source: Authors', 2016

Notes: This table shows the data description and abbreviation.

Analytical Techniques

The study adopts the use of a vector autoregressive (VAR) model in examining the dynamic interaction among the three variables (GDS, GDI, & GDP). The choice of technique was based on the behaviour of the variables being stationary at first difference and absence of cointegration between the variables. However, before estimating the model using VAR approach, the time series data was tested for stationarity using Augmented Dickey-Fuller (ADF), the data set was also tested to determine the existence of a long-run relationship among the variables used in the study by carrying out Johansen co-integration test. The VAR Granger Causality/Block Exogeneity Wald Tests was also tested to see the direction of causation among the variables. In addition, the impulse response function and the variance decomposition were also used to examine the impact of shocks and variation induced by the variable itself and other variables respectively. The inverse root graph was plotted to determine if the VAR model is stable or stationary and if the impulse response functions is reliable. Finally, a diagnostic test was carried out to test for serial correlation and heteroskedasticity on the residual.

Unit root test

The study employed the use of Augmented Dickey- Fuller (ADF) test to ascertain the existence of unit root, that is, to determine if the variables are stationary. ADF was selected because the approach is simple and very suitable when dealing with a set of time series data that are large and complex.

Cointegration Test

The Trace test and the Maximum Eigenvalue test of Johansen Cointegration were employed to detect the existence of cointegration among the variables i.e. whether the variables have a long-run relationship. If cointegration is detected among the variables, the Vector Error Correction Model (VECM) is used. In the absence of cointegration, VAR becomes appropriate.

Impulse Response Function

The impulse response function explains the response of a dependent variable to one of the innovations. It traces the impact on the present and future values of the dependent variable of one standard deviation shock to one of the innovations.

Variance Decomposition

The variance decomposition shows the percentage of a variable forecast error variance that occurs due to the shock from a variable in the system. It provides information on the relative significance of each random innovation in affecting the variables in the VAR.

Inverse Roots of AR

The inverse root of AR graph tests the stability or stationarity of the VAR model and the reliability of the impulse response function.

Granger Causality Test

The VAR Granger Causality/Block Exogeneity Wald Tests test the causality that existed between the variables.

Model Specification

The VAR models adopted to examine the dynamic interaction among the variables used in this study are expressed as follows:

$$\log GDS_t = \alpha_1 + \sum_{j=1}^n \beta_j \log GDS_{t-j} + \sum_{j=1}^n \theta_j \log GDI_{t-j} + \sum_{j=1}^n \gamma_j \log GDP_{t-j} + \mu_{1t} \quad (1)$$

$$\log GDI_t = \alpha_2 + \sum_{j=1}^n \theta_j \log GDI_{t-j} + \sum_{j=1}^n \beta_j \log GDS_{t-j} + \sum_{j=1}^n \gamma_j \log GDP_{t-j} + \mu_{2t} \quad (2)$$

$$\log GDP_t = \alpha_3 + \sum_{j=1}^n \gamma_j \log GDP_{t-j} + \sum_{j=1}^n \beta_j \log GDI_{t-j} + \sum_{j=1}^n \theta_j \log GDS_{t-j} + \mu_{3t} \quad (3)$$

Where:

Log (GDS) = Logarithm of Gross Domestic Savings

Log (GDI) = Logarithm of Gross Domestic Investment

Log (GDP) = Logarithm of Gross Domestic Growth

μ_s are the stochastic error term called impulses or innovations or shocks in VAR

t = Current time

RESULTS AND DISCUSSION

Unit Root

Table 2 depicts the result of the unit root test. The result shows that the variables became stationary at first differences. Since all the variables used became stationary after first differences, it is necessary to test if the variables were cointegrated that is whether a long-run relationship exists between the variables. Hence, it is important to determine the optimum lag length so as to estimate the cointegration test.

Table2. Augmented Dicker-Fuller Unit Root Test Result

Variable	T-Statistics	Critical Values			Order of Integration
		1%	5%	10%	
LOG(GDS)	-5.872534	-3.670170	-2.963972	-2.621007	I(1)
LOG(GDI)	-4.702103	-3.661661	-2.960411	-2.619160	I(1)
LOG(GDP)	-5.529608	-3.653730	-2.957110	-2.617434	I(1)

Source: Authors' Computation and EViews 9 Output.

Notes: This table shows the unit root test result.

VAR Lag Order Selection Criteria

Table 3 depicts the optimum lag structure for the VAR. The result indicates that all of the selection criteria, such as sequential modified LR test statistic (LR), the FPE, AIC, Schwarz Information Criteria (SC) and the Hannan-Quinn Information Criteria (HQ), selected the optimum lag length of 1 at 5 percent level of significance. Hence, the lag length of 1 will be used in estimating Johansen cointegration test and VAR.

Table 3: Optimal VAR Lag Selection

Lag	LR	FPE	AIC	SC	HQ
0	NA	0.178712	6.791589	6.929001	6.837137
1	174.6869*	0.000615*	1.115271*	1.664922*	1.297465*
2	2.959511	0.000975	1.559391	2.521280	1.878230

* indicates lag order selected by the criterion

Source: Author estimation using EViews 9

Notes: These figures show the optimum lag result.

Cointegration Test

Tables 4 both shows the results of the Johansen Cointegration Test of both the Trace test and the Maximum Eigenvalue tests. The outcomes of the results indicate that there is no cointegration test between the variables i.e. there is no long-run relationship among the three variables (GDS, GDI, & GDP). Hence, the VAR model becomes appropriate.

Table 4: Results of Johansen-Juselius Cointegration

HYPOTHESIS			TRACE TEST		MAXIMUM EIGENVALUE		
Null	Alternative	Statistic	5% Critical Value	P-Value	Statistic	5% Critical Value	P-Value
$r = 0$	$r = 1$	28.54413	29.79707	0.0692	20.06978	21.13162	0.0699
$r \leq 1$	$r = 2$	8.474343	15.49471	0.4162	7.933119	14.26460	0.3855
$r \leq 1$	$r = 3$	0.541224	3.841466	0.4619	0.541224	3.841466	0.4619

Note: See Appendix II –for more information

Source: Author estimation using EViews 9

Granger Causality

Table 8 depicts the result of the VAR granger causality between the variables. The outcome of the test revealed that there is an existence of a unidirectional causality from GDP to GDS, which implied that growth causes savings as the p-value is less than 5%. This lends credence to the Keynesian hypothesis which posited that growth induces savings and corroborate the findings of other researchers (Carroll & Weil, 1994; Romm, 2005; Rasmidatta, 2011; Sekantsi, & Kalebe, 2015) who also found causation running from economic growth to savings.

Table 5: Granger Causality Test

Causality	χ^2	P-Value
GDI \nrightarrow GDS	0.847354	0.3573
GDP \nrightarrow GDS	4.868952	0.0273
GDS \nrightarrow GDI	0.481612	0.4877
GDP \nrightarrow GDI	3.693558	0.0546
GDS \nrightarrow GDP	0.361040	0.5479
GDI \nrightarrow GDP	0.231883	0.6301

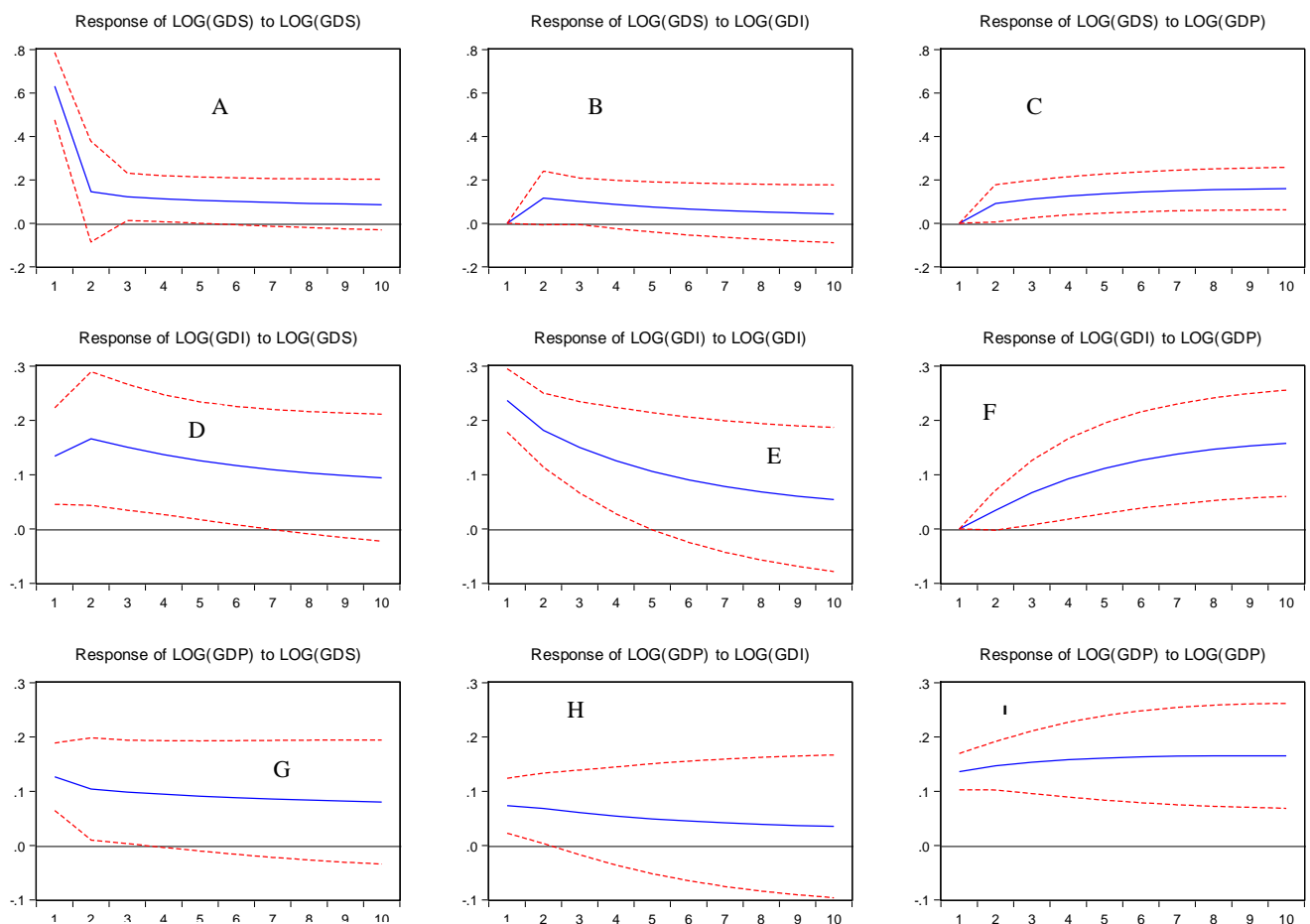
Note: See Appendix II –for more information

Source: Author estimation using EViews 9

Impulse Response Function

In Figure 4.2, one standard deviation in the model is calculated in percentage. For each of the variables, the horizontal axis of the impulse response function (IRF) shows the number of periods that have passed after the impulse has been given while the vertical axis measures the responses of the variables. From panel B, it is observed that a shock in GDI produced a positive response to GDS. However, it declines in the third period. For instance, a positive response of 0.12 percent in the second period decline to 0.10, 0.07, and 0.04 percent in the third, sixth and tenth period, respectively. In Panel C, it is seen that a shock in GDP produced a positive response to GDS. For instance a positive response of 0.09 percent in the second period continuously increase positively to 0.11, 0.14, and 0.16 in the third, sixth and tenth period respectively, similarly, in Panel D, a shock in GDS produced a positive response to GDI. For instance, a positive response of 0.13 percent in the first period increase to 0.17 percent in the second period but decline to 0.15, 0.12, and 0.09 percent in the third, sixth and tenth period respectively. Also, in Panel F, it is observed that a shock in GDP produced a positive response to GDI. For instance a positive response of 0.03 percent in the second period continuously increase to 0.07, 0.013, and 0.16 percent in the third, sixth and tenth period respectively, whereas in Panel G, a shock in GDS produced a positive response to GDP although, a positive response of 0.13 percent in the first period decline to 0.10, 0.09, and 0.08 percent in the third, sixth and tenth period respectively. Similarly, in Panel H, a shock in GDI produced a positive response to GDP. However, a positive response of 0.07 in the first period decline to 0.06, 0.05, and 0.04 in the third, sixth and tenth period respectively.

Response to Cholesky One S.D. Innovations ± 2 S.E.



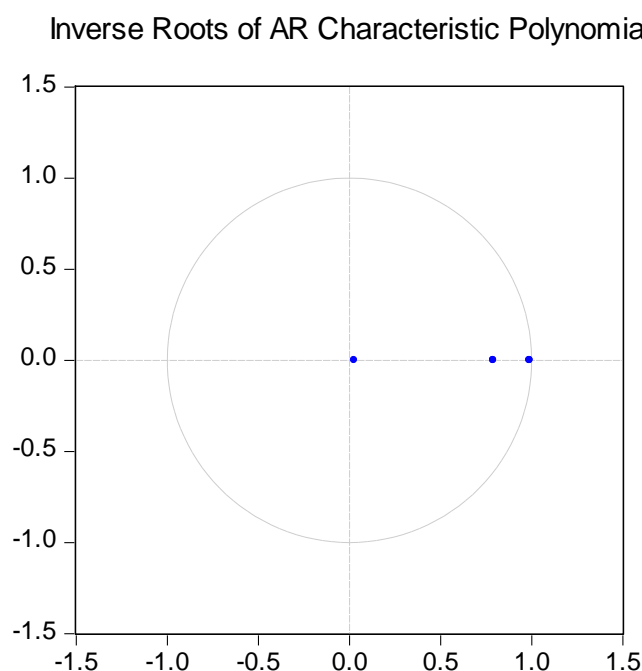
Source: Authors' Computation and EViews 9 Output

Notes: These graphs show the impulse response function.

Inverse Roots of AR

Figure 4.2 shows the graph of AR inverse root of the VAR. All the polynomial roots fall within the unit circle. This implies that the VAR model is stable or stationary and the impulse response functions are reliable.

Figure 4.3: Graph of AR Inverse Root



Source: Authors' Computation and EViews 9 Output

Variance Decomposition

Table 9 depicts the amount of information contributed by each variable to other variables in the auto regression. It shows the percentage of a variable forecast error variance that occurs due to the shock from a variable in the system. The result of the variance decomposition in table 6.1 revealed that GDP account for 23.83% while GDI account for 7.04% in GDS. This implies that GDP account more for the variation in GDS. The result of the variance decomposition of Table 6.2 revealed that GDS account for 34.77% while GDP account for 29.01% in GDI. This implies that GDS account more for the variation in GDI. Similarly, the variance decomposition result in table 6.3 revealed that GDS account for 24.30% while GDI account for 7.37% in GDP. This implies that GDS account more for the variation in GDP.

Table 6.1: Variance Decomposition of LOG (GDS)

Horizons	S.E	LOG(GDS)	LOG(GDI)	LOG(GDP)
1	0.630997	100.0000	0.000000	0.000000
2	0.663944	95.08652	3.028390	1.885091
3	0.691497	90.74900	4.918855	4.332149
4	0.716982	86.88149	6.023603	7.094906
5	0.741196	83.33222	6.649942	10.01784
6	0.764506	80.04089	6.980659	12.97845
7	0.787077	76.98480	7.127230	15.88797
8	0.808974	74.15322	7.159263	18.68751
9	0.830217	71.53736	7.120864	21.34177
10	0.850807	69.12700	7.040223	23.83277

Source: Authors' Computation and EViews 9 Output

Notes: These figures show the variance decomposition of LOG (GDS)

Table 6.2: Variance Decomposition of LOG (GDI)

Horizons	S.E	LOG(GDS)	LOG(GDI)	LOG(GDP)
1	0.272131	24.30668	75.69332	0.000000
2	0.368664	33.59300	65.54434	0.862668
3	0.430781	36.81079	60.16149	3.027716
4	0.478001	38.07691	55.75798	6.165111
5	0.517621	38.35569	51.73820	9.906107
6	0.552925	38.05799	48.01510	13.92692
7	0.585504	37.42174	44.59665	17.98161
8	0.616154	36.60025	41.49495	21.90480
9	0.645278	35.69372	38.70782	25.59847
10	0.673091	34.76624	36.21970	29.01406

Source: Authors' Computation and EViews 9 Output

Notes: These figures show the variance decomposition of LOG (GDI)

Table 6.3: Variance Decomposition of LOG (GDP)

Horizons	S.E	LOG(GDS)	LOG(GDI)	LOG(GDP)
1	0.199559	40.20194	13.49275	46.30531
2	0.277213	34.90126	13.05747	52.04127
3	0.337226	32.13092	12.04342	55.82566
4	0.387973	30.20525	11.05083	58.74392
5	0.432669	28.71574	10.17573	61.10853
6	0.472944	27.50775	9.424646	63.06761
7	0.509760	26.50310	8.784255	64.71265
8	0.543746	25.65440	8.237895	66.10771
9	0.575339	24.92949	7.770052	67.30046
10	0.604866	24.30498	7.367451	68.32757

Source: Authors' Computation and EViews 9 Output

Notes: These figures show the variance decomposition of LOG (GDP)

Diagnostic Test

Table 5 depicts the diagnostic test which comprises VAR residual serial correlation LM test and VAR residual heteroskedasticity test. The outcome of the VAR residual serial correlation LM test and VAR residual heteroskedasticity test indicates that the model is well-behaved (i.e. there is absence of serial correlation and heteroskedasticity in the model) as the p-value of the VAR residual serial correlation LM test and VAR residual heteroskedasticity test are more than 5%.

Table 7: Diagnostic Tests

Test	Test Statistic	P-Value
VAR Residual Serial Correlation LM	LM = 2.339493	0.9849
Test (Lags 1 to 2)	LM = 10.71965	0.2954
VAR Residual Heteroskedasticity Test	$\chi^2 = 32.25537$	0.6474

Source: Authors' Computation and EViews 9 Output

Notes: These figures show the diagnostic test result

Conclusions

The study investigated the dynamic interaction between savings, investment and economic growth in Nigeria using the impulse response function (IRF) and the variance decomposition of VAR as well as the granger causality test.

The variance decomposition revealed that GDP account more for the variation in GDS while GDS account more for the variation in GDI. In addition, GDS account more for the variation in GDP. The impulse response function showed positive influences between the variables. The causality test however revealed that a uni-directional relationship running from GDP to GDS only exist, which suggest that GDP granger cause GDS. This invariably suggests that despite the positive interactions between the variables, they do not influence each other except for GDP influencing GDS. By implication, the outcome of this study signal the fact that GDP significantly influence the GDS in the Nigerian economy. The study tends to lend credence to the Keynesian preposition that GDP stimulate savings. The outcome of this study further justifies the work of (Carroll & Weil, 1994; Romm, 2005; Rasmidatta, 2011; Sekantsi, & Kalebe, 2015).

Although empirical result from the study shows that GDS, GDI and GDP are positively related certain salient point is noted from the outcome of the study. From the study, it was shown that GDS do not result to GDI, to resolve this, the Central Bank of Nigeria (CBN) through their policy formulation on sectoral credit allocation, should ensure that the savings with deposit money banks are properly channelled to long-term investment. The study further revealed that GDI do not result to GDP, to resolve this, government should ensures that all investment are properly channelled to the productive sector of the economy rather than embarking on irrelevant project that cannot culminate to economic growth.

Finally, to ensure improvement in economic growth, government should pay special attention to the dynamic interaction between GDS, and GDI by ensuring that the savings generated are properly channelled to viable project that will lead to the overall growth of Nigeria economy.

Limitation of the Study

This research work concentrates on single country study. Further research should focus on multi-country study for comparative analysis.

Further Study

It could be deduced from the study that savings do not cause investment in Nigeria. This tends to contradict the classical theory which proposed that savings stimulate growth. Hence, it is pertinent that more study should be carried out to provide evidence to this assertion.

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Appendix 1

Table 11: Data on GDS, GDI, GDP

YEAR	GDS	GDI	GDP
1981	15,572,590,000.00	17,599,590,000.00	51,731,790,000.00
1982	14,841,270,000.00	15,957,820,000.00	53,658,950,000.00
1983	13,858,970,000.00	12,679,330,000.00	57,963,310,000.00
1984	13,008,490,000.00	7,989,760,000.00	64,326,340,000.00
1985	14,875,910,000.00	8,352,480,000.00	73,542,020,000.00
1986	13,946,260,000.00	11,762,460,000.00	74,908,220,000.00
1987	27,867,420,000.00	14,172,580,000.00	111,912,930,000.00
1988	29,951,550,000.00	14,569,710,000.00	147,941,130,000.00
1989	89,821,570,000.00	26,835,510,000.00	228,451,460,000.00
1990	90,338,240,000.00	40,621,310,000.00	281,550,270,000.00
1991	106,352,440,000.00	45,390,230,000.00	329,070,750,000.00
1992	148,803,660,000.00	71,109,160,000.00	555,445,510,000.00
1993	165,670,220,000.00	97,365,510,000.00	715,241,870,000.00
1994	165,547,640,000.00	105,867,990,000.00	945,557,020,000.00
1995	378,380,990,000.00	142,271,240,000.00	2,008,564,010,000.00
1996	394,380,270,000.00	204,433,710,000.00	2,799,036,110,000.00
1997	437,776,840,000.00	243,346,820,000.00	2,906,624,880,000.00
1998	51,530,590,000.00	242,770,340,000.00	2,816,406,010,000.00
1999	626,154,030,000.00	232,240,030,000.00	3,312,240,870,000.00
2000	1,845,007,560,000.00	331,678,450,000.00	4,717,332,100,000.00
2001	818,766,210,000.00	372,819,540,000.00	4,909,526,480,000.00
2002	1,109,724,100,000.00	500,423,550,000.00	7,128,203,100,000.00
2003	1,247,611,890,000.00	866,703,810,000.00	8,742,646,650,000.00
2004	2,250,050,660,000.00	864,000,250,000.00	11,673,602,240,000.00
2005	2,657,161,770,000.00	805,582,420,000.00	14,735,323,980,000.00
2006	5,591,806,190,000.00	1,547,995,450,000.00	18,709,786,480,000.00
2007	2,565,378,160,000.00	1,938,379,370,000.00	20,940,910,900,000.00
2008	5,703,369,350,000.00	2,054,569,590,000.00	24,665,244,300,000.00
2009	2,985,169,300,000.00	3,052,201,790,000.00	25,236,056,300,000.00
2010	13,960,297,590,000.00	9,591,062,090,000.00	55,469,350,300,000.00
2011	16,614,842,510,000.00	10,329,197,510,000.00	63,713,359,400,000.00
2012	24,251,941,580,000.00	10,822,927,780,000.00	72,599,630,000,000.00
2013	16,165,424,340,000.00	12,073,648,920,000.00	81,009,964,600,000.00
2014	19,562,029,490,000.00	14,242,017,410,000.00	90,136,985,000,000.00

Source: Compiled from World Bank Development Indicator (WDI)

Note:

GDS: Gross Domestic Savings
GDI: Gross Domestic Investment
GDP: Gross Domestic Product

Appendix 11

Table 4. Johansen Cointegration Trace Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.465905	28.54413	29.79707	0.0692
At most 1	0.219570	8.474343	15.49471	0.4162
At most 2	0.016771	0.541224	3.841466	0.4619

Trace test indicates no cointegration at the 0.05 level

Source: Authors' Computation and EViews 9 Output

Table 5. Johansen Cointegration Maximum Eigenvalue Test

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.465905	20.06978	21.13162	0.0699
At most 1	0.219570	7.933119	14.26460	0.3855
At most 2	0.016771	0.541224	3.841466	0.4619

Max-eigenvalue test indicates no cointegration at the 0.05 level.

Source: Authors' Computation and EViews 9 Output

Table 5: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: LOG(GDS)

Excluded	Chi-sq	Prob.
LOG(GDI)	0.847354	0.3573
LOG(GDP)	4.868952	0.0273
All	18.22223	0.0001

Dependent variable: LOG(GDI)

Excluded	Chi-sq	Prob.
LOG(GDS)	0.481612	0.4877
LOG(GDP)	3.693558	0.0546
All	6.589830	0.0371

Dependent variable: LOG(GDP)

Excluded	Chi-sq	Prob.
LOG(GDS)	0.361040	0.5479
LOG(GDI)	0.231883	0.6301
All	0.827768	0.6611

Source: Authors' Computation and EViews 9 Output

Table 6. VAR Residual Serial Correlation LM Test

Lags	LM-Stat	Prob
1	2.339493	0.9849
2	10.71965	0.2954

Probs from chi-square with 9 df

Table 6. VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)

Chi-sq	df	Prob.
32.25537	36	0.6474

Source: Authors' Computation and EViews 9 Output