Understanding the Nexus between Savings, Investment and Economic Growth in Nigeria: An Empirical Analysis

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Abstract. For economic growth to take place, certain variables must be triggered. Among these variables are savings and investment. The economic theory establishes equity between savings and investment which is expected to translate into economic growth. However, in reality, certain factors may disrupt this equity. Individually, savings and investment are also influenced by certain variables that might influence the supply of savings and demand for investment. This study investigated the savings-investment and economic growth nexus while examining the determinants of savings and investment in Nigeria between 1981 and 2020. The study used secondary data sourced from the World Development Indicators and the Central Bank of Nigeria Statistical Bulletins. Vector Autoregressive model was adopted for the econometric analysis. Analysis was done using three separate models. The VAR results reveal an insignificant relationship between gross domestic savings, gross capital formation and economic growth. It was also found that gross domestic savings, gross domestic product and lending rate have insignificant impacts on gross capital formation. In contrast, gross domestic product and lending rate was found to impact gross domestic savings significantly. The Granger causality test shows that unidirectional causality runs from lending rate to gross capital formation and lending rate to the gross domestic product. In contrast, bidirectional causality was found to exist between gross domestic product and gross capital formation. These relationships imply that the blame of a poor link between savings, investment and economic growth in Nigeria should be primarily attributed to the inefficient financial intermediation in allocating savings to productive uses, underutilisation of monetary and fiscal policies to stimulate investment as well as other socio-economic and political factors that are not included in this study. The study recommends, among other things, that more savings should be encouraged by rising per capita income in Nigeria. This can be achieved by increasing productivity in all sectors of the economy. The study also recommends adopting 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.

Keywords: savings; investment; Gross Domestic Product; VAR; monetary policy; lending rate.

INTRODUCTION

The central idea of the traditional theory of savings is that increased saving would accelerate economic growth, while investment theories specified investment as the key to promoting economic growth [14]. Author [11] pointed out that the gap between aggregate income and consumption as a result of savings can be filled by increasing the levels of investment. This is to ensure that the economy does not run into depression. However, since savings is regarded as the

portion of a consumer's income not spent on current consumption, there can be a situation of overproduction in the economy whereby all products are not sold, or the market does not become transparent. If this happens, firms will be forced to keep unplanned inventories, eventually leading to a fall in commodities prices. Firms will be forced to lay off workers, resulting in a fall in employment, output, and income. This contradicts the classical idea that the market will always be transparent and that the problem of overproduction or unemployment is abnormal. Therefore, there is the need to match savings (leakages) and investment (ejection) to maintain aggregate demand.

According to Keynesian economics, investment is regarded as a change in capital stock; this includes purchasing machines, inventories, and intermediate goods used in the production process. Contrary to financial investment, which involves acquiring existing shares, [11] sees the investment as purchasing new capital goods such as plants, machinery and equipment, and new shares. To him, this kind of investment is regarded as a real investment [14]. Investment is divided into gross and net investment. The gross investment represents total investment without deducing depreciation, while net investment is gross investment less depreciation due to wear and tear. Therefore, net investment can be positive if the gross investment is more significant than depreciation. However, disinvestment occurs when depreciation is more significant than gross investment. On the other hand, net investment is zero if gross investment equals depreciation.

Savings are the portion of the consumer's disposable income that is not spent on current consumption but kept for future use, either for future investment or consumption. According to [11], the propensity to consume declines as a consumer's income increases. This is because the consumer's wants are met side by side as his income increase. Thus, the marginal propensity and average propensity to consume falls as income rises. By implication, the consumer saves a more significant percentage of his income as income rises. This widens the gap between income and consumption, which is required to be filled by investment.

Economic growth is seen as the increase in production or output over time. When there is a sustained rise in potential output, one can think of it as economic growth. Economic growth can be positive (expansion) or negative (contraction) depending on the values of current and past national output as given by the gross domestic product (GDP).

Since economic growth is significant, it is essential to examine some critical factors that can influence economic growth. Saving and investment are two variables that have a strong implication on how the economy performs. Savings is regarded as a necessary condition for capital accumulation. Authors [12, 18] favoured financial liberalisation because saving is complementary to investment in the development process. Investment, on the other hand, is necessary for the creation of employment, output and income. Therefore, it implies that savings and investment are prerequisites for the attainment of economic growth. Authors [3] noted that the endogenous growth theory argued that high investment and savings rates are crucial due to their strong positive correlation with the economic growth rate.

It is vital to note that these three variables can cause each other. While savings provides a pool of funds from which investment capital can be drawn, investment causes a positive change in employment, output, and income, which implies more savings due to more income, bearing in mind the declining propensities to consume as income rises. More savings results in the more investible fund, more investment, employment, output and income, and the circle continue until disrupted by a shock.

Economic theories like the Harrod-Domar model explain that countries need to save a certain amount of national income from achieving real investment and growth. Keynes also noted that investment is required to fill the gap between income and consumption to maintain balance. However, investment can only be equal to savings if the propensity to invest is high at any point in time. The Harrod-Domar model implies that a nation's economic growth level depends on its ability to save. That is to say that the poorer countries will attain a lesser rate of economic growth when compared to more affluent countries. Even if savings are high, we still need to have a high propensity to invest (PI) to equate savings with investment. Authors [10] noted that national savings might not be used for domestic investment; they may be invested abroad if the international private rate of return is promising. The desire to invest is influenced by a lot of fac-

tors such as the rate of capital stock available in a given economy, interest rate, cost of capital assets, rate of return on investment and other socio-economic, institutional and political environment such as the soundness of financial institutions to allocate savings to productive uses, government policies, rate of demand, resource availability and social coherence. This is to say that a smooth link does not exist between savings, investment and economic growth.

Given that savings may not always equate to domestic investment to stimulate economic growth, examining the link between savings, investment, and economic growth in Nigeria becomes imperative. Therefore, this study goes further to examine the determinants of savings and investment in Nigeria.

The primary objective of this research work is to examine the savings-investment-economic growth relationship in Nigeria. The specific objectives include:

1. To investigate the impact of savings on the economic growth in Nigeria.

2. To examine the impact of investment on economic growth in Nigeria.

3. The examine the determinants of investment in Nigeria

4. To examine the determinants of savings in Nigeria

Literature review

Saving is the part of current income not spent but reserved for future use or investment. Author [11] defined savings as the leftover disposable income (Y-T) after subtracting consumption spending. That is, $S= Y^d$-C, where S represents savings, Y^d is disposable income, and C is consumption. Savings are usually accumulated for future consumption, contingencies, or invested directly in the capital market or purchase capital goods.

Before Keynesian economics came to the limelight, classical thought had dominated economic literature. The classical economist saw savings as having a negative influence on economic growth. The presence of savings is capable of disrupting the classical belief on the non-existence of overproduction. To save the economy from collapse, savings must equal investment. Author [11] regarded interest rate as the equilibrating force between savings and investment. Since savings is a function of interest rate, $S=f(i)$ and investment is also a function of interest rate, $I=f(i)$, savings can be equated with investment; $S=I$, thus making interest rate the equilibrating force.

Keynesian economics stated that the decision to invest depends on the level of interest on capital, the cost of acquiring the capital asset and the rate of return. This is represented by the marginal efficiency of capital (MEC) which measures the highest rate of return of an additional unit of capital over cost. Thus, savings is a necessary but not sufficient condition for investment or capital accumulation. The interest rate and, primarily, income levels determine the amount saved at any income level; the higher the interest rate and income, the higher the amount saved and vice-versa.

Investment is regarded as a positive change in capital stock. In economic literature, investment is defined differently from financial investment. Only currently produced or newly acquired goods, machines, shares, buildings etc., are considered as an investment.

Author [24] defines economic growth as the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. Economic growth is sometimes viewed as an economy's capacity to increase the productivity of goods and services. Thus, the change in GDP is often used to represent economic growth.

Savings-Investment and Economic Growth Trend in Nigeria

Historical data on the national savings ratio shows that between 1970 and 1975, the national saving ratio averaged at 6.3%, 1976-1980 was 9%, 1981-1990 was 8.31%, and 1986-1990 was 5.69%. However, due to the marginal GDP growth rate and increasing debt profile, the nation's saving ratio (savings-GDP ratio) has declined. Statistics from the Central Bank of Nigeria revealed that the savings to GDP ratio have only grown marginally over the past years. For instance, in 2000, the ratio was 5.74%, with an improvement of 1.34% in 2001. By 2004, the ratio had fallen to 6.99% before rising to 9.37% in 2007. It had a peak of 23.25% in 2009, and ever since then up to 2019, the ratio had fluctuated between the regions of 10% to 12%, with an average of 11.61% within those periods [5]. Data

from ceicdata.com revealed that the savings to GDP ratio were 21.7% in 2020. However, the problem is that the savings rate in Nigeria has not significantly impacted investment and economic growth, probably due to the low rate of savings or the efficiency of allocation.

According to [20], the gross domestic savings of Nigeria has been relatively high as a proportion of gross domestic product (GDP); however, gross capital formation, which is a proxy for investment, has been low. This is probably the reason for the poor rate at which the Nigerian economy grows. The World Bank data revealed that gross capital formation has been on a downward trend since 1981. For instance, in 1981, the gross capital formation (GCF) percentage of GDP was 89% in 1981 but fell to 86%, 76% and 59% from 1982 to 1984. By 1988, it had fallen to 44%. It continued the downward trend and averaged at 43% from 1989 to 1999. By 2008, it had fallen to 19%. Between 2009 and 2018, the rate averaged 16% but improved to 25% and 29% in 2019 and 2020, respectively [5]. Figure1 below reveals the downward trend of gross capital formation in Nigeria within the periods under study.

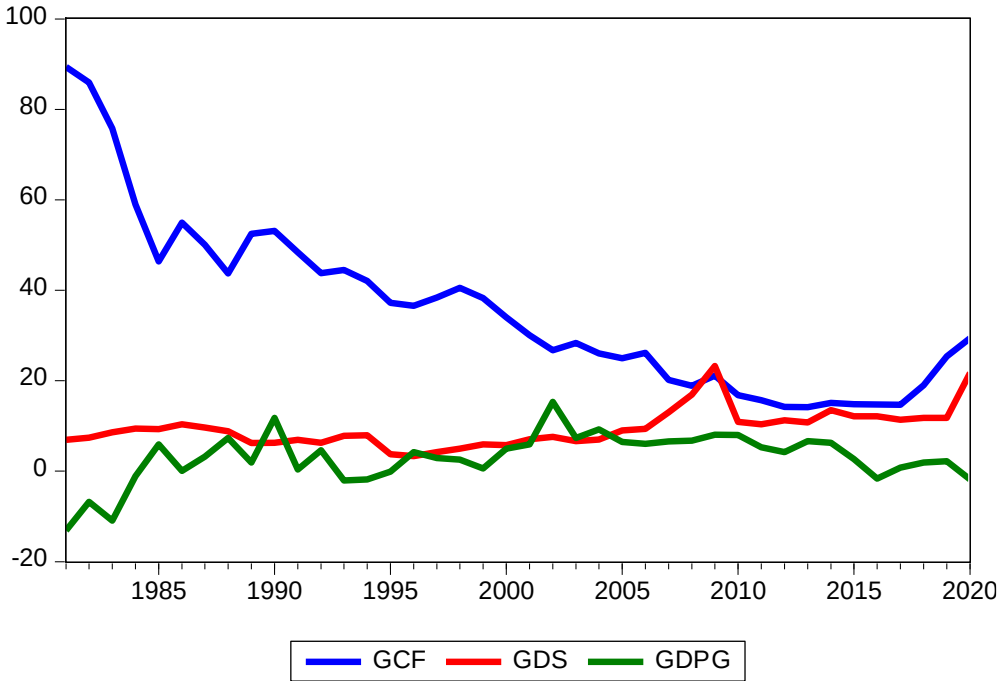

Figure 1 – Savings, Investment and Economic Growth Trends [5, 21]

Historical data shows that from 1966 to 1968, the Nigerian economy growth rate fluctuated between -4.25% and -1.25%. The real GDP growth rate was less than 3% on average for most late 1980s and 1990s. World Bank data revealed that from 1981 to 1984, the GDP growth rate has been in the negative territory; for instance, in 1981, GDP growth rate was -13%, -7% in 1982, -11% in 1983 and -1% in 1984, respectively. There was, however, an improvement in the economy; the growth rate remained positive from 1985 to 1992 before falling into recession with a growth rate of -2%, -2% and -0.07% from 1993 to 1995. The economy, however, recovered in 1996 with a 4% growth rate. In 2002, the GDP growth rate peaked at 15% and averaged 6% from 2003 to 2015. The global oil glut of 2016 led to a recession with a growth rate of -1.6 in 2016 and ever since then. The Nigerian economy has been recovering very slowly, with a growth rate between 0.8% and 2% [21]. The global pandemic of late 2019 had a significant blow on the global economy and Nigeria inclusive; this led to a contraction in the GDP growth rate to negative territory. However, with COVID-19 fading away, the Nigerian economy has been witnessing improvement in economic activities.

The figure above indicates that gross capital formation has been higher than the levels of savings in most cases. This indicates the contributions of foreign capital in augmenting local savings and thus, placing capital formation higher than gross domestic savings in Nigeria. However, the gross capital formation (GCF) trend line has declined for the periods under review. Gross domestic savings have been relatively stable with no significant improvement. GDP growth rates have fluctuated from negative to positive territories, with

a most recent decline of -1.79% in 2020. These trend lines show no positive correlation; however, an empirical analysis is needed to examine the actual relationship between them.

Theoretical Review

The theoretical underpinning of this study is based on the Harrod-Domar growth model, Keynesian model and the Solow-Swan Model.

The Harrod-Domar model was developed independently by authors [6 and 7]. The model explains the link between savings (S), capital-output ratio ($\frac{K}{Y} = c$) and national output (Y). In the words of [8], "both Harrod and Domar were interested in discovering the rate of growth necessary for a smooth and uninterrupted working of the economy". He further stated that the Harrod-Domar model explained the dual character of investment, which includes creating income and augmenting the economy's productive capacity by increasing capital stock. According to the model, more investment leads to more capital accumulation and economic growth. The model further states that countries need to save a certain amount of GDP to replace worn-out capital. Accordingly, the model expresses economic growth as a direct savings function and is inversely related to the capital-output ratio.

$$G=\frac{\Delta Y}{Y}=\frac{s}{k} \quad (1)$$

$$G=\frac{S}{k} \quad (2)$$

The level of savings *s* equals the average propensity to save *APS*, the national savings ratio to national income. Capital output ratio *k* equals *1/MPk* (marginal product of capital); it is inversely related to the natural growth rate *G*. Capital output ratio *K* is the amount of capital needed to produce an output unit. A high capital-output ratio means that investment is inefficient.

The primary purpose of savings, according to the model, is an investment; thus, when savings increases, investment increases and an increase in investment will lead to an increase in economic growth. This will hold if and only if the equality between savings and investment is established. Thus, in a simple sense, capital formation depends on the level of savings, generating economic growth. In other words, there is a positive relationship between saving and output. In contrast, an inverse relationship exists between output and capital-output ratio, which is the amount of capital required to produce a given unit of output.

It is believed that the poor rate of growth in less developed countries is due to the low rate of savings in those economies. This creates a vicious cycle from low savings to low investment, then low growth rate, low per capita income and then back to low savings given the high rates of marginal propensity to consume in those countries.

In Keynesian thought, equilibrium between savings and investment is necessary for economic growth to take place. Since *S=Y-C* and *I=Y-C* and both investment and savings are interest rate functions, savings are equal to investment. Disequilibrium occurs at any point where the equity does not hold**.** Concerning savings, Keynes noted that savings are private virtue but a social vice. Effective demand, which comprises consumption and investment, creates output, output creates income, and income creates employment. However, pointing that the MPC is stable in the short run, Keynes noted that the gap between income and consumption could only be filled by investment. Author [15] noted that if saving exceeds investment, people will reduce their expenditure on goods and services. This will reduce the velocity of money in circulation, thereby leading to deflation, a fall in investment and economic growth [16]. On the other hand, if investment exceeds savings, the domestic interest rate would rise to increase savings. As a result, the inflow of foreign capital can cover the deficit in savings.

Author [19] model relates changes in output to changes in labour and capital. Both Harrod-Domar and Solow model explains long term growth as determined by exogenous factors. Also, each model assumes a constant population growth rate. While Harrod and Domar emphasised savings, Solow's model emphasised technical progress. The Solow-model was built on the Cobb-Douglas model, which assumes a constant return to scale and is homogeneous at first degree; the model is also subject to decreasing marginal return.

$$Y=f(L,K) \quad (3)$$

where *Y* is output, *L* as labour and *K* as capital.

Thus, the model explains that there must be changes in labour and capital accumulation for

economic growth to occur. Capital is accumulated through investment. The model places a high degree of importance on technological advancement due to the advancement in knowledge. It emphasises that labour and capital will adjust accordingly given to technological advancement. If productivity increases through technological progress, per capita output will increase even when the economy is steady. If productivity increases constantly, per capita output will also increase at a related steady-state rate. The implication is that growth can occur either by increasing the share of GDP invested or technological progress. Authors [10] differentiated the Solow and Romer model by stating that the saving rate influences steady-state in the Solow-Swan model and can temporarily impact output growth rate. However, in the [16] model, the impact of the saving rate is not on a steady-state output but a growth rate of output directly [10].

Empirical Review

Several studies have been conducted to understand the relationships between savings, investment, and economic growth, especially in developing countries. Some of these empirical findings are given below.

Authors [14] examine the implications of savings and investment on economic growth in Nigeria from 1981 to 2014. The method of analysis was the OLS. The study revealed that there is a long-run relationship between savings, investment and economic growth in Nigeria. The study also found that savings have a negative and significant impact on economic growth while investment has a significant positive impact on economic growth in Nigeria. On studying the relationship between savings and economic growth in Nigeria, [1, 19] found unidirectional causality running from economic growth to savings. On the other hand, [2] found that a bi-directional causality exists between Savings and Economic Growth in Nigeria. Authors [13] studied the relationship among savings, investment and economic growth in Ethiopia between 1970 and 2011 a multivariate framework was used. The ARDL Bounds Testing revealed co-integration among savings, investment, and gross domestic product when GDP is taken as a dependent variable. In the work of [15] titled savings-investment and economic growth nexus in Nigeria, the researchers investigated the savings-investment and economic growth relationship for periods between 1970 and 2015. Their analysis indicates that Gross Domestic Savings (GDS), Gross Fixed Capital Formation (GFCF), Labour Force (LAF) and Savings Facility (SF) are the main determinants of economic growth in Nigeria. They also found out that Real Gross Domestic Product and Gross Domestic Savings (GDS) are the two drivers of Investment in Nigeria. Author [10] examined the effect of savings and investment on the economic growth of Nigeria for the periods between 1980 and 2014. The ordinary least square method of analysis was adopted. The result of the study revealed that there is a long relationship between saving, investment and economic growth in Nigeria. Author [17] employed Vector error correction model to examine the relationship between savings and economic growth in Nigeria for 1986 and 2015. He found out that a positive relationship exists between GDP and savings and that a percent change in savings would result in an 8.29% change in GDP. In Nepal, [4] examined the relationship between the gross domestic savings, investment and growth for 1975 to 2010 by employing the Autoregressive Distributed Lag (ARDL) approach and Granger causality test. Co-integration was found between gross domestic savings, investment, and gross domestic product when each is taken as a dependent variable. The granger causality test revealed short-run and long-run bidirectional causality between investment and gross domestic product and between gross domestic savings and investment. However, there was no evidence of short-run causality between gross domestic savings and gross domestic product

This research work is an improvement from previous works on the subject matter. In addition to previous research on this topic, the analysis timeframe was extended to 2020 to cover Nigeria's current economic realities.

METHODOLOGY

The ex-post research design was adopted to explain the relationships between savings, investment and economic growth of Nigeria. Using ex-post design was because the research had no prior influence or control of the variable being used; the researcher seeks to explore cause and effects relationship where cause already exists and cannot be manipulated.

Three separate models were adopted to investigate the relationship between savings, invest-

ment, and Nigeria's economic growth. The variables used include Gross Domestic Product growth rate (GDP), gross domestic savings (GDS), gross capital formation (GCF) and lending rate (LNR). The estimation period was between 1981 and 2020. Data analysis was done using E-Views 9.0 econometric package.

Model Specification. Based on Keynes (1936) model, aggregate demand Y equals aggregate supply $C+I$ in a closed economy.

$$Y=C+I, \quad (4)$$

where Y equals national output or GDP; C is private consumption; I is private investment expenditures.

The accounting or definitional approach provides that savings are equal to investment. Given this, we can conveniently substitute savings for investment so that the expression in equation (4) becomes:

$$Y=C+S \quad (5)$$

The researcher adopts three separate models to explain the relationship between savings, investment, and economic growth and Nigeria's determinants of investment and savings.

Model I

$$GDPg = f(GCF, GDS) \quad (6)$$

The variables were not normally distributed so, after log transformation, we have:

$$LGDPg=\beta_0+\beta_1 GCF_t+\beta_2 GDS_t+\mu_t \quad (7)$$

$$LGDPg=\beta_0+\beta_1 LGCF_t+\beta_2 LGDS_t+\mu_t \quad (8)$$

Model II

$$LGCF=f(GDS, GDP, LNR) \quad (9)$$

$$LGCF=\beta_0+\beta_1 LGDS_t+\beta_{2+} LGDP+\beta_2 LNR_t+\mu_t \quad (10)$$

Model III

$$GDS=f(GDP, LNR) \quad (11)$$

$$LGDS=\beta_0+\beta_1 GDP_t+\beta_2 LNR_t+\mu_t \quad (12)$$

where *GCF* is Gross Capital Formation; *LNR* as lending rate; *GDP* as Gross Domestic Product Growth rate; *GDS* as Gross Domestic Savings, *L* represents natural log and ƒ for the functional relationship, β_0 represents the constant term, while βk represents the estimated coefficients of the exogenous variables, and μ represents the error term.

From theoretical postulations, the coefficients of savings, investment and GDP are expected to be positive. At the same time, that lending rates should be negative in model II but positive in model III. The higher the interest rates, the lower the investment rate; conversely, the higher the rate of interest, the higher the savings rate and vice versa.

Estimation Procedure. The first step was to employ the ADF unit root test to check for the presence of unit root in the series. This was done to avoid a spurious regression. The unit root is said to exist if the test outcome produces a probability value greater than 5% or if the critical value at 5% is greater than the value of the ADF statistics in absolute terms.

The estimation revealed that the gross domestic product growth rate, gross capital formation and gross domestic savings possess unit root but were stationary at first difference. At the same time, the interest rate also possessed unit root but was stationary after the second difference. The partitioning of the analysis model into I and II allowed the research to run a Johansen Co-integration test combining GDPG, GDS and GCF. The outcome revealed the absence of a long-run relationship among them. This led to the adoption of the Vector Autoregressive Model (VAR) to ascertain short-run relationships. Similarly, the VAR model was used in models II and III since a variable (interest rate) was stationary after the second difference. The Granger causality test was employed to check for short-run causalities in the models.

RESULTS AND DISCUSSION

The first attempt to empirically investigate the relationships between savings, investment and economic growth in Nigeria was to subject the variables concerned to a descriptive test. The descriptive test indicated that only the lending rate is usually distributed. Other variables except

were subjected to log transformation and were observed to be normally distributed afterwards. The unit was then conducted using the linearised log values.

Unit Root Test

The Augmented Dickey-Fuller (ADF) unit root test was employed for the unit root test. The result is as presented below.

Decision rule. The unit root is assumed to exist if the ADF statistic is less than the critical value at a 5% level of significance in absolute terms. The probability value is another way to check this; if the probability value is more than 5%, we assume that series have a unit root.

The ADF test result above indicates that all the variables exhibit unit root at level but were stationary after the first differencing except for the stationary lending rate at the second difference.

Table 1 – ADF Unit Root Test Results

AT LEVEL				1st DIFFERENCE			
Variables	ADF Statics	5% CV	Remark	ADF Statics	5% CV	Order of Integration	Remark
GDPG	-1.693487	-1.950394	Non-stationary	-3.928083	-1.950394	I(I)	Stationary
LGDS	-1.962080	-3.529758	Non-stationary	-5.344843	-3.533083	I(I)	Stationary
LGCF	-0.004710	-3.529758	Non-stationary	-5.108278	-3.533083	I(I)	Stationary
LNR	-2.599897	-2.945842	Non-stationary	-10.48929	-2.945842	I(II)	Stationary
LGDP	-1.019773	-3.529758	Non-stationary	-5.621947	-3.533083	I(I)	Stationary

Estimating Model I. Model I is given as:

$$LGDPg=\beta_0+\beta_1 LGCF_t+\beta_2 LGDS_t+\mu_t \quad (8)$$

The variables concerned (GDP, LGCF and LGDS) were all stationary at the first difference. Hence, Johansen co-integration test was employed to test for the long-run relationship among the variables.

Decision Rule. Using the Trace Statistics, co-integration is said to exist if the value of the Trace Statistics is greater than the critical value at any hypothesised equation.

Table 2 – Johansen Co-integration Test Result (Trace Statistics)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.226372	18.32951	29.79707	0.5418
At most 1	0.147886	8.576277	15.49471	0.4060
At most 2	0.063547	2.494940	3.841466	0.1142

The Johansen co-integration test estimate reveals the absence of a long-run relationship among the variables since the trace statistics were less than the critical value in all the hypothesised equations.

Since a long-run relationship does not exist among the variables, the Vector Autoregressive model estimates the short-run relationship among the variables. Finally, a system equation drawn from the VAR estimate was used to reveal the probability values.

Decision Rule. The parameter coefficient is statistically significant if the probability value is less than 5%.

The VAR result, as shown above, reveals a negative and insignificant relationship between gross capital investment and GDP growth rate.

Table 3 – Vector Autoregressive Estimates I

	Coefficient	Std. Error	t-Statistic	Prob.
GDPG	0.458744	0.141892	3.233055	0.0027
LGCF	-1.145390	1.697311	-0.674826	0.5042
LGDS	-0.444029	1.988600	-0.223287	0.8246
C	6.936185	9.107968	0.761551	0.4514
R^2	0.35			
F-statics	6.225790			0.001676

The estimate shows that an increase in gross capital formation by 1% will lead to a fall in GDP by

115%. Conversely, a fall in gross capital formation by 1% will cause an increase in GDP by 115%. For a short-run analysis, the negative sign on GCF does not conform to a priori expectation or theoretical knowledge. Theoretically, gross domestic investment, as represented by gross capital formation, is supposed to impact GDP in the short run positively. In the long run, it is believed that when capital stock is increased, the rate of return on investment (MEC) will fall; thus, leading to less impact on GDP. The estimated negative sign in our model may be due to the efficiencies of investment in Nigeria instead of an optimum stock level situation.

The VAR estimate also revealed a negative and insignificant relationship between savings and economic growth. This makes sense to assume that savings are low or not efficiently allocated for productive investment as both savings and investment have the same impact on GDP. The estimate reveals that a 1% increase in Gross domestic savings will cause a fall in GDP by 44%. This does not conform to theoretical knowledge. We also find in model II that savings hurt investment thus, indicating the inadequacy of savings or inefficiencies in the allocation of savings or both.

Economist assumes savings to be a necessary and sufficient condition for development. Harrod-Domar and Solow emphasised the importance of savings in the economy. Savings is required for capital formation (investment), which in turn translates into economic progress. However, factors like low per capita income, low marginal propensity to invest (MPI), the low marginal efficiency of capital, low deposit rate, high lending rate, inefficiencies in the banking sector, high cost of capital, high exchange rates, insecurity and other social ills and government policies may be cumulating forces that led to the negative and insignificant impact observed by these variables on GDP.

The model I explains 34% of the total changes in GDP for the study period as indicated by the R^2. The F-statics was also statistically significant, indicating the independent variables' joint influence on GDP growth rate. Though the R^2 may be negligible, a significant F-statics implies that the model is a good fit for the entire population.

Summary on Model I

$$LGDPg=\beta_0-1.145390LGCF_t-0.444029LGDS_t+\mu_t$$

The VAR estimate reveals that both savings and investment have negative and insignificant impacts on the economic growth of Nigeria.

Test of Hypotheses. The model I is used to test the null hypotheses I and II as given below:

$H0_1$: Savings does not significantly impact the economic growth in Nigeria.

$H0_2$: There is no significant relationship between investment and economic growth in Nigeria.

Decision Rule. Reject the null hypothesis if the probability value is less than 0.05 levels of significance; otherwise, accept null hypotheses.

$H0_1$. The probability value for gross domestic savings is 0.8246 (82.46%). This is statistically more significant than 5%. Hence, the null hypothesis is accepted. It is therefore concluded that savings have an insignificant impact on the economic growth in Nigeria.

$H0_2$. As revealed by the VAR result, the probability value associated with gross capital formation is 0.5042 (50.42%). This is also statistically more significant than 5% and hence, considered insignificant. Thus, the null hypothesis is accepted. Therefore, savings and investment are concluded to have insignificant impacts on the economic growth of Nigeria for the periods studied.

Model II

$$LGCF=\beta_0+\beta_1LGDS_t+\beta_{2+}LGDP+\beta_2LNR_t+\mu_t \quad (10)$$

According to Keynes (1936), the investment model is given as $I=\beta_0+\beta_1Y_t-\beta_2R_t$, where $\beta_1$is expected to be a positive value and β_2 a negative value. According to the Harrod-Domar, investment is a positive function of savings such that $K=f(S)$, where K is the capital formation and S – savings. Combining these perspectives gives model II where GDP represents national income, GDS represents savings, lending rate represents interest rate and gross capital formation as an investment. Given the order of integration of the variables, the VAR model will estimate the short-run relationships among the variables.

Decision Rule. The parameter coefficient is statistically significant if the probability value is less than 5%.

The VAR model of model II below indicates a negative and insignificant relationship between gross domestic saving and economic growth, re-

futing a priori expectations. GDP also followed suit with the same conclusions. The negative coefficient of lending rate is in line with economic theories, but the coefficient is insignificant as observed.

For example, a 1% increase in GDS is observed to reduce investment by approximately 8%, a 1% increase in GDP will cause investment to fall by approximately 0.4%. In comparison, an increase in the lending rate will lead to a decline in investment by about 0.3%.

Table 4 – Vector Autoregressive Estimate II

	Coefficient	Std. Error	t-Statistic	Prob.
LGCF	0.868133	0.136483	6.360726	0.0000
LGDS	-0.077716	0.071247	-1.090789	0.2830
LGDP	-0.003501	0.027793	-0.125956	0.9005
LNR	-0.003253	0.004896	-0.664505	0.5108
C	0.678945	0.783103	0.866993	0.3920
R^2	0.94			
F-statics	145.0543			0.000000

Model II had an overall performance of 94%, as indicated by the $R^{2,}$ while the F-static indicated a significant joint influence by the independent variables on investment.

Summary of Model II

$LGCF=\beta_0-0.077716LGDS_t-0.003501+LGDP-0.003253LNR_t+\mu_t$

The outcomes on model II revealed that gross domestic saving, gross domestic product, and lending rates do not significantly impact the gross capital formation (investment) in Nigeria during the periods studied.

Test of Hypothesis.$H0_3$: savings does not have any significant relationship with investment in Nigeria.

Model II is instrumental in testing hypothesis III.

Decision Rule. Reject the null hypothesis if the probability value is less than 0.05 levels of significance; otherwise, accept the null hypothesis.

The VAR model II indicates that a probability value of 0.2830 (28.30%) is associated with gross domestic savings. This is greater than 5% and, thus, insignificant. Hence, the null hypothesis that savings have an insignificant relationship with investment is accepted.

The same conclusion is reached for the relationship between GDP and investment (GCF) and the relationship between lending rate (LNR) and investment (GCF).

Model III

$$LGDS=\beta_0+\beta_1GDP_t+\beta_2LNR_t+\mu_t \quad (12)$$

Among other determinants of savings is per capita income which is a function of national income and population. It is believed that a country's national savings should increase with the levels of national income. National savings is defined as the part of current GDP that is not spent on current consumption expenditure but reserved for future spending or investment.

Model I revealed that gross domestic savings have an insignificant impact on GDP growth. In contrast, the model II revealed that savings also have a negative and insignificant impact on gross capital formation. These outcomes may be due to the inadequate nature of savings in Nigeria, inefficient savings mobilisation by financial institutions or inefficient monetary policies. For instance, the study revealed that the lending rate has an insignificant impact on investment in Nigeria. The aforementioned makes model III essential to check if national income and interest rates significantly impact savings in Nigeria. The VAR model is used to estimate the short-run relationship on this model.

Decision Rule. The parameter coefficient is statistically significant if the probability value is less than 5%.

Table 5 – Vector Autoregressive Model III

	Coefficient	Std. Error	t-Statistic	Prob.
LGDS	0.696556	0.116946	5.956202	0.0000
LGDP	0.042998	0.018592	2.312674	0.0267
LNR	-0.017985	0.009031	-1.991396	0.0543
C	0.633154	0.297358	2.129264	0.0403
R^2	0.72			
F-statics	29.93667			0.000000

The VAR result of model III, as shown above, reveals that a positive and significant relationship between national income and national savings. The lending rate is shown to be statistically insignificant as well as negative ($\frac{\beta 2}{2}=\frac{0.017985}{2}=0.0089925<\delta(\beta i)0.009031$). By implication, a 1% increase in the gross domestic product will lead to about a 4% increase in national savings, while a 1% decrease in lending rate will increase

national savings by about 2%. In practice, people will be willing to save and lend more if the interest rate is high; this makes the sign on interest rate contrary to a priori expectations, but the sign on gross domestic product validates a priori expectation.

Since national income has a significant impact on savings, why do savings have a negative and insignificant impact on investment and economic growth? Savings involves taking from sectors of surplus to sectors of the deficit through intermediaries (financial institution and non-financial institutions). These estimated outcomes from the model I to III imply inefficiency from intermediaries and policy sides of savings. It is either that the financial intermediaries have not efficiently allocated these excesses of income to productive sectors of the economy or that monetary policies like lending rates have not been used efficiently in promoting investment. As seen in model II, the lending rate had an insignificant impact on the gross capital formation (investment) while it also insignificantly influences savings in model III.

Summary of model III

$LGDS=\beta_0+0.042998GDP_t-0.017985LNR_t+\mu_t$

Model III reveals that national income has a positive and significant impact on national savings, while lending rates have a negative and significant impact on national income.

Test of Hypothesis.$H0_4$: national income does not have a significant impact on savings in Nigeria.

Decision Rule. Reject the null hypothesis if the probability value is less than 0.05 levels of significance; otherwise, accept the null hypothesis.

The Vector Autoregressive Estimate of model III revealed that the probability value associated with national income (GDP) is 0.0267 or 2.67%. This is less than 5% and, thus, statistically significant. Therefore, the null hypothesis of no significance is rejected.

Models Summary. From the three models, it was found that investment and savings have negative and insignificant impacts on the economic growth in Nigeria. Savings were found to have a negative and insignificant impact on investment. Although national income was shown to improve the levels of savings in Nigeria, these savings have not significantly affected the levels of investment or/and economic growth. Interest rates were also shown to impact savings and investment in Nigeria insignificantly. The researchers suggest that these poor links between savings to investment and economic growth may be due to the inadequacies of savings or/and inefficiencies in allocating savings to its best productive uses and the inefficient use of monetary policies like interest rates in stimulating savings and investment in Nigeria.

Causal Relationship

This section tries to ascertain the existence or otherwise of a significant causal relationship between savings, investment and economic growth in Nigeria; this is done using the VAR Granger causality test.

Decision Rule. If the probability value is less than 5%; otherwise, it does not exist.

Table 6 – GDP Growth Rate as Dependent Variable

Excluded	Chi^2	Df	Prob.
LGCF	0.876652	1	0.3491
LGDS	0.110705	1	0.7393
LGDP	0.593493	1	0.4411
LNR	0.106963	1	0.7436

When GDP growth rate was used as the dependent variable, we observed no Granger causality among GDP's explanatory variables. Thus, the null hypotheses of no significant causal relationships in these regards are accepted.

Table 7 – LGCF as Dependent Variable

Excluded	Chi^2	Df	Prob.
GDPG	0.082888	1	0.7734
LGDS	1.097984	1	0.2947
LGDP	0.000104	1	0.9918
LNR	0.512003	1	0.4743

Using GCF as the dependent variable, no significant causal relationship was found to exist. Therefore, the null hypotheses of no significant causal relationships are accepted.

Table 8 – LGDS as Dependent Variable

Excluded	Chi^2	Df	Prob.
GDPG	1.482172	1	0.2234
LGCF	2.701472	1	0.1003
LGDP	5.228239	1	0.0222
LNR	5.051243	1	0.0246

When LGDS was used as the dependent variable, LGDP and LNR were found to Granger cause LGDS, thereby confirming the significant relationship found in model III. The null hypotheses of no significant causal relationship between GDS and GDP and LNR are rejected.

Table 9 – LGDP as Dependent Variable

Excluded	Chi^2	Df	Prob.
GDPG	0.058102	1	0.8095
LGCF	0.012850	1	0.9097
LGDS	6.181906	1	0.0129
LNR	7.742632	1	0.0054

Using GDP as dependent variables reveals a significant causal relationship between LGDP, LGDS and LNR while no significant causal relationship exists between LGDP, GDPG and GCF. Thus, bidirectional causality exists between LGDP and LGDS, while a unidirectional causality runs between LNR to LGDS and LNR to LGDP.

Summary of Causality Test. Unidirectional causality was found to run from lending rate to gross capital formation and from lending rate to gross domestic product. In contrast, bidirectional causality was found to exist between gross domestic product and gross capital formation.

Post Estimation Test

The VAR serial correlation test is used as a diagnostic test to check the reliability of the research outcomes.

Decision Rule: Null hypothesis: Serial correlation exists if the probability value is less than 5%.

The VAR serial correlation test for the three models (I, II and III) had the probability values of 0.3825 (38.25%), 0.5713 (57.13%) and 0.3691 (36.91%), respectively. These are statistically greater than 5%. Hence, the null hypotheses of the presence of serial correlation are rejected.

Implications of the Finding

The study was based on three models; this was done to get a clearer picture of the relationships between savings, investment, and Nigeria's economic growth. The first model where GDP growth rate was used as the dependent variable revealed a negative and insignificant relationship between gross capital formation (a proxy for investment), gross domestic savings, and GDP growth rate. In a nutshell, GCF and GDS had a negative and insignificant impact on the economy of Nigeria. This goes against theoretical knowledge proposed by the Harrod-Domar and Solow models that decleared savings and investment necessary and sufficient conditions for economic growth. To examine the possible cause of the contrary outcome in model I, model II and III were used to examine the determinants of savings and investment. The estimate of model II (where Gross Capital Formation was used as a dependent variable) revealed that gross domestic savings, gross domestic product and lending rates all have negative and insignificant impacts on gross capital formation. These outcomes imply that savings are either insufficient or that monetary and fiscal policies have not been efficiently utilised in raising or attracting sufficient investment (local and foreign direct investment) or maybe due to other socio-economic problems detrimental to investment. To ascertain the cause of the insignificant relationships in model II, model III was estimated (Gross Domestic Savings as dependent variable). Model III revealed that national income has a positive and significant impact on gross domestic savings while lending rates have a negative and significant impact on gross domestic savings. The significant relationship between national income and national savings rules out the possibility of insufficient national savings. Thus, the possible cause of the estimated negative and insignificant impacts of gross domestic savings on gross capital formation and economic growth is attributed to inefficient policy measures, institutional factors and other socio-economic and political factors. For instance, while lending rate had an insignificant impact on investment, it had a significant impact on savings; this means that interest rate as a medium of influencing investment through savings mobilisation was inefficient and that factors beyond lending rate disrupted the savings-investment equity.

CONCLUSIONS

Summary. The study investigated the savings-investment and economic growth nexus and the determinants of savings and investment in Nigeria between 1981 and 2020.

The study found the following:

1. Gross domestic savings and gross capital formation have a negative and insignificant impact on the economic growth of Nigeria.

2. Gross domestic savings, gross domestic product, and lending rates have negative and insignificant impacts on gross capital formation.

3. Gross domestic product has a positive and significant impact on gross domestic savings, while lending rate has a negative and significant impact on gross domestic savings.

4. A unidirectional causality runs from lending rate to gross domestic product and gross capital formation, while a bidirectional causality exists between gross domestic product and gross capital formation.

5. No long-run relationship exists among the variables.

Conclusion. The study investigated the savings-investment and economic growth nexus and the determinants of savings and investment in Nigeria between 1981 and 2020. The study adopted the Vector Autoregressive model and VAR Granger Causality test. The VAR result found an insignificant relationship between gross domestic savings, gross capital formation and economic growth. It was also found that gross domestic savings, gross domestic product and lending rate have insignificant impacts on gross capital formation. In contrast, gross domestic product and lending rate were found to impact gross domestic savings significantly. Unidirectional causality moves from lending rate to gross capital formation and from lending rate to gross domestic product, while bidirectional causality exists between gross domestic product and gross capital formation. The study concludes the blame of a poor link between savings, investment, and economic growth in Nigeria should be primarily attributed to the inefficient financial intermediation in allocating savings to productive uses, the underutilisation of monetary and fiscal policies to stimulate investment as well as other institutional, socio-economic and political factors not included in the study.

Based on the study findings, the following recommendations were made:

1. Given the hostile and insignificant relationship between savings and economic growth, the study recommends that more savings be encouraged by rising per capita income in Nigeria; this can be done by adopting economic policies to create jobs and make Nigerians self-reliant.

2. The insignificant relationship between investment and economic growth can be corrected by adopting flexible and efficient monetary and fiscal policies in line with the country's current economic realities. Also, policies addressed to curtailing other socio-economic ills such as insecurity should be put in place. Economic considerations should also be placed over political considerations in allocating public investments.

3. The estimated insignificant relationship between gross domestic savings and gross capital formation can be corrected by encouraging efficient intermediation. Furthermore, as a matter of urgency, the central bank should address financial institutions on the need to prioritise the economy's productive base rather than allocating savings based on mutual or selfish interests.

4. Though a significant relationship was observed between gross domestic product and gross domestic savings, it does not imply that the level of savings is enough. Savings are still meagre in Nigeria due to the low per capita income. Therefore, policies should further be directed to increasing the per capita income of Nigerians. This can be in the form of implementing diversification policies and raising productivity levels in all sectors of the economy to provide more jobs and income.

5. Adopting these policies will ensure that economic growth is not only increased but sustained.

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