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ECM Insights into Domestic Savings, Investment and Economic Growth Dynamics in Nigeria

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Abstract

It is impossible to overstate the importance of investments and savings for the overall growth of an economy. The study examined Nigeria's dynamics of domestic savings, investment and economic growth through the Error correction mechanism (ECM). With the use of time series data from 1990 to 2021, the study seeks to discover the interplay between foreign direct investment, interest rates, capital formation, and domestic savings within the Nigerian economy. The study found that foreign direct investment coupled with a relatively stable interest rate played a critical role in enhancing domestic savings and fostering economic growth. Additionally, the analysis showed that capital formation and foreign direct investment positively and significantly impacted domestic savings. The error correction model shows that any short-term deviations from long-term equilibriums between savings, investment and growth are corrected over time, reinforcing the importance of policy consistency.
A key recommendation is that the government implement policies that encourage saving and maintaining macroeconomic stability, creating a stable environment with investment opportunities and attractive interest rates that will strengthen savings, foster capital formation, and drive long-term economic growth. The paper shows the need for a strategic approach to managing both domestic and foreign investments to ensure sustainable economic development in Nigeria.

Keywords: *Savings, Investment, Growth Model, Harrod Domar, Real Interest Rates, Capital formation.*

1. Introduction

There is a global discussion on the effects and consequences of savings and investment in stimulating economic growth in numerous countries. According to the conventional theory of saving, a rise in savings will lead to a faster economic growth rate. The neoclassical hypothesis posits that a rise in the savings rate has a greater impact on steady-state production than investment. This results from the increase in income, which raises savings and leads to a further rise in investment (Verma, 2007). Igbatayo and Agbada (2012) also noted that higher levels of national savings lead to higher investment and, consequently, higher output.

According to reports, Nigeria's gross domestic savings rate was 30.6% in 2022 and 32.7% in 2021. Just 6% of domestic investors join mutual funds (collective investment schemes, or CIS), while less than 4% of Nigerians invest in the country's capital market. This adds to Nigeria's low level of investment and savings and the country's low level of capital market involvement. The correlation between savings, investments, and economic growth has been demonstrated to be substantial. Nigeria's savings culture is very poor

compared to other developing countries (Uremadu, 2006), and the resources needed to create a coherent policy that will create a suitable environment for encouraging saving are not in place. However, Mantey (2017) said a poor national economic performance would negatively impact savings and investment as households grapple to meet personal needs. This is one of the reasons that Nigerians adopt a negative view towards saving, as the prevailing economic condition shuts out every room for saving.

Odoko and Englama (2004) opined that the level of mobilization of funds by financial institutions is quite deficient because of the low savings deposit rates, poor banking practices of the citizens, and other factors. A Nigerian fintech conducted a test and found that the older population (millennials), ages 43-59, invested more, while the younger population, ages 18-26 (Gen Z), saved more. This inclination implies Nigeria's economic condition and the fluctuating nature of the naira against the dollar. Nigeria has no strong investment culture, hence the reluctance to invest, plus the risk and uncertainties involved in receiving the returns on investment. (Forbes Africa, 2024). Several factors, including low income, high lending rates, inconsistent policies, excessive reliance on crude oil revenue, corruption, low labour productivity and inefficiency, and a lack of capital equipment, contribute to Nigeria's weak links between domestic savings, investment, and economic growth.

This study uses an empirical technique to investigate the relationship and dynamics between Nigeria's domestic savings, investments, and economic growth. Additionally, the savings trend will be examined, and an effort will be made to emphasize the effects of a savings deficit on the Nigerian economy. Additionally, the impact of investments on Nigeria's economy will be explained.

2. Literature Review

2.1 Overview of Savings and Investment

Savings are the portions of disposable income that are not utilized to buy consumer items but are instead invested in capital goods, accrue over time, or are used to buy securities. Household, public, and private company savings comprise domestic savings (gross domestic savings). It is derived from deducting final consumption expenditure from gross domestic product (GDP). Olusoji (2003) defines savings as the portion of income not spent on consumption, and when it is directed to capital investment, it spurs economic growth as capital formation via the mobilization of savings is a necessary factor in economic growth. Higher savings lead to increased investment, which in turn promotes economic growth. (Akinbobola & Olamide, 2011). Savings is the total amount of deposits in financial Institutions (Fry, 1978); higher savings means higher investment and, thereby, higher output. Also, the level of savings determines the magnitude of capital accumulation; meanwhile, the total earnings depend on the level of output, which in turn determines the amount to be saved and invested by households and businesses.

The deliberate decision to forgo consumption and allocate cash towards acquiring securities or other assets issued by a financial institution to realize intended returns within a set time frame is known as investing. Keynes (2007) defined investment as the production of new capital goods, plants and equipment, which he referred to as real investment, not financial investment. Investible funds used to expand growth are also termed investments (Elliot, 1984). Investment is usually financed from savings, either domestic or foreign.

In a closed economy, investment is crucial in determining aggregate demand and the gross national product (GNP), calculated as Y= C+I+G, with Y as output and C, I, G, as consumption, investment, expenditure and government expenditure, respectively.

Investment is positively related to the level of income equilibrium and aggregate demand. An economy's long-term growth is mostly dependent on investment, and it expands the productive capacity. By investment here, we mean gross private domestic capital formation, the physical goods for further production. Domestic and foreign direct investment (FDI) have two forms. Private and governmental investment makes up a significant portion of overall investment: domestic investment.

2.2 Link Between Savings, Investments, And Economic Growth

Every nation's economic expansion requires investment to improve, and it is financed through savings, especially private savings. Economic growth depends on investment through private savings and capital accumulation (Mohamed, 2014). As they say in economics, savings are equal to investment, and investment, in turn, reflects the macroeconomic climate and the government's deliberate actions. Wusu (2017) stated that savings create a capital formation that leads to technical innovation and progress to accelerate productivity, increasing national output and economic growth. According to the endogenous growth theory, high investment and savings rates are crucial due to their strong positive correlation with the economic growth rate (Agrawal, 2001). Savings and investment are basic requirements for economic growth and development in any nation. Two macroeconomic variables help achieve price stability and promote employment opportunities, contributing to sustainable economic growth (Hundie, 2014).

Uremadu (2002) observed that countries that accumulate high capital levels in the form of investment consistently achieve rapid economic growth rates. Therefore, sufficient savings must be generated by borrowing or sufficient capital accumulation for a country to finance substantial investments for proper economic growth. Investments, industrialization, and economic progress correlate with continuous savings, which fosters growth.

2.3 Theoretical Literature

The Harrod-Domar growth model, an economic theory that postulates that increased investment leads to increased growth, is the foundation of this study. This model is based on linear production, where output is obtained by multiplying a constant (A) by the capital stock (k). Investment is thought to be essential to the expansion of the economy. Investment is considered to create income and increase the economy's potential for production by increasing the capital stock so long as net investment, real income, and output all rise. According to the hypothesis, net investment must increase further, and real income growth must quicken to the point where the equity stock of capital is fully used if the economy is to maintain full employment over the long run. The flow of national output will rise proportionately to the net number of new investments made into the capital stock. Assuming a constant percentage of production (a capital-output ratio of k) and a national net savings ratio of S, we may state that total savings dictate the amount of new investment. The national capital-output k and net national savings ratios determine the GDP growth rate. The GDP will expand at a higher rate without government if the economy can save and invest a more significant portion of its GDP. This means that the GDP will grow faster in the absence of government. That means the economy needs to save and invest a particular percentage of GDP to ensure growth.

2.4 Empirical Literature

Numerous empirical studies have examined the connection between domestic savings and investment in Nigeria, wealthy nations, and developing nations.

Obadan and Olusola (2001) empirically investigated savings, investment and growth patterns in developed and developing countries, applying the Granger causality test to Nigerian data. His empirical study found that savings were not income-induced in Nigeria, as no savings-income growth was found. Investment was savings constrained, and there was no causality running from investment to savings, which reflects a high propensity to consume. High correlations between savings and investment were observed in developed countries with developed financial systems. Nigeria's GDS has been too inadequate to fund and sustain the level of investment consistent with the economic growth potential. Capital formation also played a vital role in the growth process. He recommended that the government should recognize the role of a stable macroeconomic environment in investment planning to encourage capital accumulation.

Budha (2012) empirically studied a multivariate analysis of savings, investment and growth in Nepal, employing the Autoregressive distributed lag (ARDL) approach to test for the co-integration and error correction based on Granger causality analysis to identify the causality between the variables. The data demonstrated that there was a short-term, two-way causal relationship between GDP and savings as well as between investment and GDP. There was a co-integration between gross domestic savings, investment, and GDP, but the study discovered no short-term causal relationship between them.

Verma (2007) in the study of savings, investment and economic growth in India, where annual time series data was used from 1950 to 2004. Autoregressive Distributed Lag (ARDL) was used to test for co-integration. According to the study, long- and short-term investment decisions are influenced by savings.

Turan and Olesia (2014) looked at the impact of savings on growth, observing a small open economy in Albania. The study discovered a causal association between domestic savings, foreign direct investment, and gross domestic investment. For Albania's economy, an increase in savings and Foreign direct investment enhances Economic growth.

Mohammed (2020) tested the relationship between private savings and Bahrain's economic growth from 1990 to 2013. Co-integration and Granger causality techniques were employed. He found out that private savings could accelerate economic growth, and economic growth causes private savings.

Hundie (2014) examined the causal relationship between savings, investment, and economic growth in Ethiopia, using a multivariate framework and annual time series data from 1969 -2011. A co-integration between gross domestic savings, gross domestic investment, actual gross domestic product, labour force, and human capital was found using the ARDL limits test. The Granger causality test shows a bidirectional causal relationship between GDP and GDP growth and between GDP and savings. GDP growth and gross domestic savings have a unidirectional causal relationship, though it was a weak cause, as increased savings were required, especially investment, because of the dual effect. The government was recommended to develop a long-term savings instrument to mobilize household savings that will translate to public savings.

Nwanne (2014), in the study, explains the implications of savings and investment on economic growth in Nigeria. According to the ordinary least square regression results, changes in the movement of gross domestic savings had a substantial and negative impact on economic growth. In contrast, changes in investment had a similar but considerable positive impact. The study suggested that to boost domestic savings and raise the rate of economic growth, the government should reform the economy's financial sector and establish a stable environment.

Nnenna, Ifeoma, Vitalis, and Ojiako (2022), in their study Growth impact of savings on the Nigerian economy, found total savings to have a significant and positive relationship with gross domestic product, private consumption expenditure also influenced gross domestic product negatively and significantly, the gross capital formation had significant but a negative relationship with gross domestic product. One of their recommendations was telling the government to set up a sound and fertile environment to promote domestic savings.

2.5 Theoretical Framework

Harrod-Domar's growth model has been adopted to analyze Nigeria's dynamics and interdependence among domestic savings, investment, and economic growth. Sir Harrod emphasized the importance of savings as a significant player in determining growth.

The theory presents that the identity of savings equals investment, as shown in the equation thus;

$$SY = k\Delta Y \quad (1)$$

This model assumes that savings and capital investment bring about economic growth. Looking at economic theory, savings is a function of income (S = f (Y)), among other variables. Income is a function of investment influenced by interest and inflation rates.

$$S = f(Y) \quad (2)$$

$$\text{But } Y = f(I);\ (I = f(INTR, INFL)) \quad (3)$$

In eqn. (1) the theory posits k as capital output, a function of capital formation and foreign investment.

$$K = f(GFCF, FDI) \quad (4)$$

According to the model, the rate of growth in the economy can be raised either by the savings level or a low capital-output ratio, which implies a rising productivity of capital inputs.

The theory establishes a theoretical base to show the linkage between investment, domestic savings, and economic growth.

2.6 Model Specification

Following the model already discussed in the theoretical framework, the functional model is specified thus:

$$GDS = f(FDI, GFCF, INFL, RINTR) \quad (1)$$

This implies that gross domestic savings (GDS) is a function of foreign direct investment (FDI), gross fixed capital formation (GFCF), inflation rate (INFL), and real interest rate (RINTR).

The econometric model is outlined as follows;

$$GDS = \alpha + \beta xt + et \quad (2)$$

The ordinary least square (OLS) model in linear form is specified as;

$$GDSt = \beta 0 + \beta 1 \cdot FDIt + \beta 2 \cdot GFCFt + \beta 3 \cdot INFLt + \beta 4 \cdot RINTRt + \mu t \quad (3)$$

GDSt: Gross Domestic Savings at time t

FDIt: Foreign Direct Investment at time t

GFCFt: Gross Fixed Capital Formation at time t

INFLt: Inflation rate at time t

RINTRt: Real Interest Rate at time t

β0: Intercept (constant term)

β1, β2, β3, β4: Coefficients of the independent variables, representing the rate of change in GDS with respect to each variable

μt: Error term, capturing the effect of all other variables not included in the model

In the log-linear form, the model is specified as;

$$\ln(GDS_t) = \beta_0 + \beta_1 \cdot \ln(FDI_t) + \beta_2 \cdot \ln(GFCF_t) + \beta_3 \cdot \ln(INFL_t) + \beta_4 \cdot \ln(RINTR_t) + \mu_t \quad (4)$$

Here, the variables are log-transformed, and the coefficients represent the percentage change in GDS for a 1% change in each independent variable.

The Error Correction Model (ECM) captures both the short-run dynamics and the long-run equilibrium relationship between the dependent variable (GDS) and the independent variables (FDI, GFCF, INFL, RINTR). The ECM is useful when variables are cointegrated, meaning they share a long-run equilibrium relationship but can deviate from this in the short run.

The Error correction model is specified as;

$$\Delta\ln(GDS_t) = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta\ln(FDI_{t-1}) + \sum_{i=1}^{n} \gamma_i \Delta\ln(GFCF_{t-1}) + \sum_{i=1}^{n} \delta_i \Delta\ln(INFL_{t-1}) + \sum_{i=1}^{n} \theta_i \Delta\ln(RINTR_{t-1}) + \lambda ECM_{t-1} + \varepsilon_t \quad (5)$$

Where;

Δ: Denotes the first difference of the variables (e.g., $\Delta GDS_t = GDS_t - GDS_{t-1}$)

ECM_{t-1}: The error correction term representing the long-run equilibrium deviation, derived from the residuals of the cointegrating equation

λ: The coefficient of the error correction term, representing the speed of adjustment towards the long-run equilibrium

ϵt: The error term

Short-run dynamics: The ECM includes the first differences of the independent variables (e.g., ΔFDI, ΔGFCF) to capture the short-term fluctuations and deviations from equilibrium.

Error correction term (ECM): The ECM_{t-1} measures how far the current level of GDS is from its long-run equilibrium. The coefficient λ represents the speed at which GDS adjusts back to equilibrium after a short-run deviation. A negative and significant λ indicates a correction towards the equilibrium.

Long-run equilibrium: The model assumes that in the long run, GDS, FDI, GFCF, INFL, and RINTR move together in a stable relationship. Short-run deviations from this equilibrium are corrected over time by the error correction term.

3. Methodology

The study examines how Nigerian economic growth relates to domestic savings and investment. The stationarity of the time series data will be checked for unit root. Initial tests, including the correlation and descriptive statistics of the variables, will be noted. The study will also conduct co-integration testing to verify the long-term link. The work uses an error-correcting mechanism (ECM) to rectify any imbalance. Annual statistics from 1990–2021 are taken from the World Development Index (WDI) database.

4. Results and Discussion

Table 1
Correlation Matrix

	GDS	FDI	GFCF	INFL	RINTR
GDS	1	0.354741	0.848086	0.3636	-0.26808
FDI	0.354741	1	0.24383	0.463028	-0.30769
GFCF	0.848086	0.24383	1	0.417203	-0.34316
INFL	0.3636	0.463028	0.417203	1	-0.82685
RINTR	-0.26808	-0.30769	-0.34316	-0.82685	1

Source: Computed with E-views 10

The correlation matrix provides valuable insights into the correlation between the other variables and the dependent variable GDS (Gross domestic savings). FDI (Foreign direct investment) exhibited a moderate positive correlation with domestic savings, implying that increased foreign direct investment would improve gross domestic savings. Following this, a strong correlation exists between GFCF (Gross fixed capita formation) and gross domestic savings, telling us that higher capital formation investments would increase domestic savings. Inflation also exhibited a moderate positive correlation with domestic savings, meaning that gross domestic savings will increase with an increased inflation rate. The real interest rate displayed a weak negative correlation with gross domestic savings, implying a reduction in gross domestic savings is expected should an interest rate (real) rise.

Every variable in Table 1 exhibited a positive correlation with each other except for real interest rate, which exhibited a negative correlation with all the variables, implying a negative implication on gross domestic savings, foreign direct investment and inflation rate should there be an increased interest rate.

Table 2
Descriptive Statistics

	FDI	GDS	GFCF	INFL	RINTR
Mean	1.628123	35.92328	28.22431	18.06083	3.137848
Median	1.487050	34.61241	26.45535	12.71577	5.738074
Maximum	5.790847	68.80762	53.12219	72.83550	18.18000
Minimum	0.183822	13.08044	14.16873	5.388008	-31.45257
Std. Dev.	1.198091	15.04333	11.38213	16.36505	10.29498
Skewness	1.867129	0.402318	0.416879	2.170105	-1.370559
Kurtosis	6.889064	2.287311	2.067311	6.633406	5.428489
Jarque-Bera	38.75934	1.540486	2.086746	42.71875	17.88171
Probability	0.000000	0.462901	0.352264	0.000000	0.000131

Source: Computed with E-views 10

With information on the central tendency (mean and median values) to the variability and normalcy measurements, the descriptive statistics summarize the statistical significance and characteristics of the variables in the study. The Jacque-Bera statistics is the normality indicator; the mean and median values show the average, typical values and the middle values of the variables in the series; the standard deviation shows how distributed the variable is from the mean; the skewness and kurtosis highlight the asymmetry and peaked-nature/shape of the distribution.

The variables all have a high mean, median and standard deviation except for FDI (Foreign direct investment), which have low values. Furthermore, as Table 2 illustrates, all variables are positively skewed except RINTR (real interest rate), which is negatively skewed. The distribution of real interest rates, inflation, and foreign direct investment is leptokurtic, whereas that of gross domestic savings and gross fixed capital creation is a platykurtic distribution given by the kurtosis values.

Finally, as indicated by the corresponding probability values of the Jacque-Bera statistics in Table 2, gross domestic savings and gross fixed capital creation are demonstrated to be distributed normally save for foreign direct investment, inflation rate, and real interest rate.

Table 3
Unit Root Test Results
Augmented Dickey-Fuller Statistics of the Variables

Variables	ADF Statistics	1%	5%	10%	Order of Integration	Decision
LnFDI	-5.969006	-3.670170	-2.963972	-2.621007	I (1)	Stationary***
LnGDS	-7.472285	-3.670170	-2.963972	-2.621007	I (1)	Stationary***
LnGFCF	-3.268184	-3.670170	-2.963972	-2.621007	I (1)	Stationary**
LnINFL	-4.511443	-3.661661	-2.960411	-2.619160	I (1)	Stationary***
LnRINTR	-4.246727	-3.689194	-2.971853	-2.625121	I (1)	Stationary***
	Phillips-Perron Statistics of the Variables					
Variables	PP Statistics	1%	5%	10%	Order of Integration	Decision
LnFDI	-9.309717	-3.670170	-2.963972	-2.621007	I (1)	Stationary***
LnGDS	-8.787976	-3.670170	-2.963972	-2.621007	I (1)	Stationary***
LnGFCF	-3.275269	-3.670170	-2.963972	-2.621007	I (1)	Stationary**
LnINFL	-4.498573	-3.670170	-2.963972	-2.621007	I (1)	Stationary***
LnRINTR	-12.24619	-3.670170	-2.963972	-2.621007	I (1)	Stationary***

NB: * significant at 10%. ** significant at 5% and * significant at 1%**
Source: Computed with E-views 10

Testing for stationarity levels of the variables can be done effectively using the Phillips-Perron and the Augmented Dickey-Fuller tests. Both tests ensured that the model's variables were free of unit roots. Test results either accept or reject the null hypothesis, which asserts that the series is non-stationary. In case the t-ratio is observed to be less

than the critical values, the null hypothesis is accepted, and if it is more than the crucial values, it is rejected.

The variables in Table 3 were found to be stationary at first difference I (1) based on the stationarity test.

Table 4a
Johansen Co-integration Test (Trace Value) Result
Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.746294	115.3530	69.81889	0.0000
At most 1 *	0.665043	74.20562	47.85613	0.0000
At most 2 *	0.529869	41.39304	29.79707	0.0015
At most 3 *	0.420929	18.75072	15.49471	0.0156
At most 4	0.075677	2.360800	3.841466	0.1244

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Source: Computed with E-views 10

Table 4b
Johansen Co-integration Test (Maximum EigenValue) Result
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.746294	41.14740	33.87687	0.0057
At most 1 *	0.665043	32.81257	27.58434	0.0097
At most 2 *	0.529869	22.64233	21.13162	0.0304
At most 3 *	0.420929	16.38992	14.26460	0.0227
At most 4	0.075677	2.360800	3.841466	0.1244

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Source: Computed with E-views 10

Co-integration indicates that separate non-stationary series might become stationary over time after the unit root test and eventually move in the same direction. It follows that there is a statistically significant long-term link between those variables and gross domestic savings. This study aims to identify the variables that show a long-term association with GDP.

The trace and maximal eigenvalues are used in the Johansen co-integration test, which was adopted to help decision-making. The variables are cointegrated if the trace eigenstatistics are determined to be greater than the critical value at a particular significance level. Four cointegrating equations were identified at the 5% level of significance, according to Table 4a's results, suggesting a long-term association between them. There are four cointegrating equations, as shown in Table 4b.

Table 5
Error Correction Mechanism Results

Dependent Variable: LGDS
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/07/24 Time: 05:54
Sample: 10 32
Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.477245	0.549766	2.687046	0.0276
LFDI	0.320390	0.094354	3.395604	0.0094
LGFCF	0.535798	0.138939	3.856354	0.0048
LINFL	-0.110897	0.177317	-0.625419	0.5491
LRINTR	0.202129	0.097952	2.063557	0.0730
ECM(-1)	-0.605148	0.206484	-2.930731	0.0190
AR(4)	-0.617125	0.356198	-1.732534	0.1214
R-squared	0.857115	Sum squared resid		0.311637
Adjusted R-squared	0.732091	F-statistic		6.855602
Durbin-Watson stat	2.436317	Prob(F-statistic)		0.007229

Source: Computed with E-views 10

A t-statistic of -2.930731, a probability value of 0.0190, and the error correction model's coefficient of -0.605148 suggest statistical significance at the 5% level. A significant adjustment within a year is implied by the negative number, which is consistent with theory and indicates that the system corrects a disequilibrium or a divergence from the long-run equilibrium at a rate of about 60.51% yearly. The dependent variable, GDS (gross domestic savings), had a coefficient of determination (R-squared) of 0.857115, meaning that the explanatory variables explained 86% of the total variations, with the error term accounting for the remaining 14%. This indicates that the model is well-specified. An excellent fit of the model is indicated by the adjusted R-squared of 0.732091, which indicates that around 73% of the fluctuations in the dependent variable GDS are explained by the model taking the number of predictors into account.

Using the rule of thumb, which states that a given parameter estimate is statistically significant at the 5% level if the t-value is more than or equal to 2, one can observe the individual significance of the variables and judge the t-values. With p-values of 0.0276, 0.0094, and 0.0048, respectively, it can be observed that the coefficient estimates of GDS, FDI, and GFCF are statistically significant at the 5% level. RINTR is statistically significant at 10%, while INFL is non-significant at all significance levels.

The intercept coefficient is at 1.477245, which means that when all the explanatory variables are held at zero, gross domestic savings are expected to increase at approximately 1.477245%, meaning that factors not outlined in the model influence gross domestic savings. The coefficient of 0.320390 for foreign direct investment (FDI) suggests a positive correlation with gross domestic savings. A 1% increase in FDI is expected to result in a roughly 0.320390% increase in gross domestic savings. This correlation is statistically significant. The coefficient of 0.535798 of GFCF Gross fixed capital formation is both positive and significant, and it implies that gross domestic savings are expected to increase by 0.535798% when gross fixed capital formation increases by 1%.

The inflation rate (INFL) demonstrates a statistically insignificant negative correlation with a coefficient of -0.110897. This implies that a percentage rise in the inflation rate will result in a 0.110897% reduction in gross domestic savings, aligning with theoretical expectations. The real interest rate (RINTR) exhibits a coefficient of 0.202129, indicating a statistically significant positive correlation with gross domestic savings. A 1% rise in interest rates is anticipated to result in a 0.202129% increase in Nigeria's gross domestic savings.

Finally, when outlining the factors that influence gross domestic savings in Nigeria, we can say with 99% confidence that the explanatory variables are simultaneously significant because the F-statistics is significant at the 1% significance level. Furthermore, the model's Durbin-Watson statistics 2.44 show that autocorrelation is absent, making it dependable and appropriate for policy concerns.

Table 6
Breusch-Godfrey Serial Correlation LM Test Result

F-statistic	0.003056	Prob. F (2,8)	0.9969
Obs*R-squared	0.012214	Prob. Chi-Square (2)	0.9939

Source: Computed with E-views 10

Table 6 shows the test for serial correlation and the non-significance of the F-statistics, clearly revealing that the model has no serial correlation. Autocorrelation does not exist in the model.

Table 7
Breusch-Godfrey Heteroskedasticity Test Result
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.310507	Prob. Chi-Square(5)	0.2751
Obs*R-squared	6.333807	Prob. Chi-Square(5)	0.9828

Source: Computed with E-views 10

Table 7 tests heteroskedasticity and the non-significance of the F-statistics, clearly revealing that no heteroskedasticity problem is in the model. The model is free from heteroskedasticity.

Table 8
Ramsey Reset Test Result

Specification: LGDS C LFDI LGFCF LINFL LRINTR ECM (-1)
Omitted Variables: Squares of fitted values

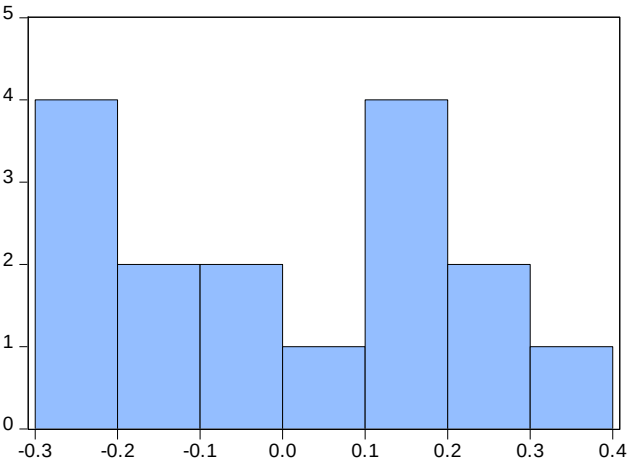
	Value	df	Probability
t-statistic	0.048846	9	0.9621
F-statistic	0.002386	(1, 9)	0.9621

Source: Computed with E-views 10

In Table 8, the t- and F-statistics probability values reflect that no specification errors were found in the model.

Figure 1

Normality Test Result



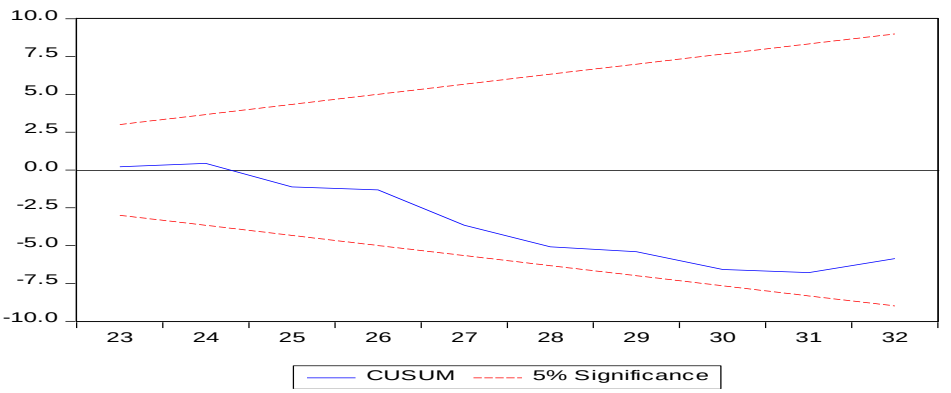
Series: Residuals	
Sample 10 32	
Observations 16	
Mean	-1.23e-16
Median	0.001870
Maximum	0.302937
Minimum	-0.244783
Std. Dev.	0.193199
Skewness	0.086298
Kurtosis	1.568008
Jarque-Bera	1.386927
Probability	0.499842

Source: Computed with E-views 10

The normality test is to ascertain if there is a normal distribution for the error term. The Jacque-Bera normalcy test was used. We determine that the residual term is normally distributed if the probability value is greater than 0.05 at the 5% significance level. We can infer that the error term is normally distributed from Figure 1. Additionally, we can conclude that the distribution is normal by looking at the histogram.

Figure 2

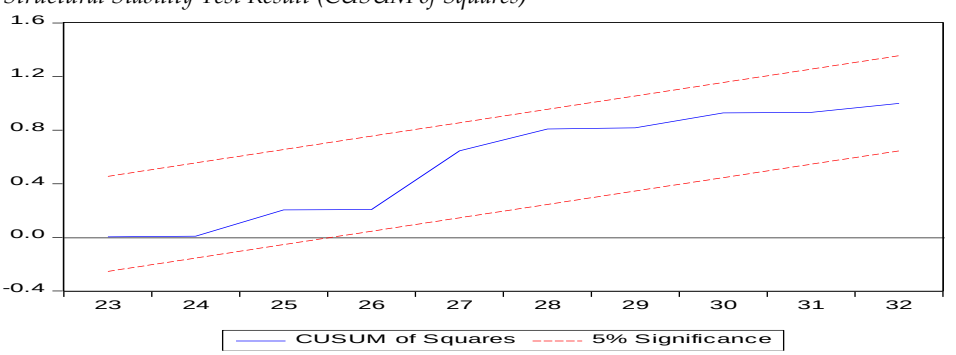
Structural Stability Test Result (CUSUM)



Source: Computed with E-views 10

Figure 3

Structural Stability Test Result (CUSUM of Squares)



Source: Computed with E-views 10

The estimated model's stability qualities were evaluated using the cumulative sum of recursive residual (CUSUM). Figures 2a and 2b show that the CUSUM and CUSUM of square stay within the 5% critical lines; the blue line was within the red lines, indicating parameter stability.

5. Conclusion and Recommendations

This study explored the relationship and interplay between domestic savings, investment, and economic growth in Nigeria. The research employed the following variables: real interest rate, gross fixed capital formation, gross domestic savings, and foreign direct investment. Using time series data from the World Development Index (WDI), the study concentrated on 1990–2021. In the investigation, the unit root test, co-integration test, and error correction mechanism were applied.

The findings of the Johansen co-integration, Phillips-Perron (PP), and Augmented Dickey-Fuller (ADF) co-integration tests indicated that the study's variables were stationary and had a long-term relationship.

The research findings indicate that real interest rate, gross fixed capital formation, and foreign direct investment were positively related to gross domestic savings and were statistically significant. This implies that foreign direct investment and relatively stable interest rates will improve savings and extensive economic growth. The gross domestic savings displayed the adjustment from a disequilibrium at a more than 60% rate yearly. Policymakers can use the outcome as a guide to capitalize on the positive spillover effects of foreign direct investment. Furthermore, it is crucial to note that interest rates and foreign direct investment aided Nigeria's economy's expansion during the examined period.

5.1 Recommendations

The following suggestions are made after reviewing the study's results and conclusions.

- The investment authorities should check and monitor the magnitude of investment contributions made by investors in Nigeria, not just the number of investors but the quality of investments. Also, foreign investors should be encouraged and maintained.
- The Nigerian government should retain tight monetary and fiscal policies to combat inflation in Nigeria, as it was predicted that inflation would negatively affect savings.
- Since small-scale industries play a significant role in the transformation process, efforts must be made to offer short-, medium--, and long-term loans to profitable ventures like them.
- Financial market development is necessary. Deregulation of the financial industry would allow it to operate as it should and present a challenge to construct a robust, competitive industry that can satisfy the savings demands of the expanding business community.

References

Abanikanda, E. O., & Akinbobola, T. O. (2023). Does financial deepening matter in the nexus between exchange rate volatility and foreign investment? Insight from Nigeria. *African Journal of Economic Review, 11*(1), 33-49.

Abu, N. (2010). Saving-economic growth nexus in Nigeria, 1970-2007: Granger causality and co-integration analyses. *Review of Economic and Business Studies (REBS)*, (5), 93-104.

Agrawal, P. (2001). The relation between savings and growth: Co-integration and causality evidence from Asia. *Applied Economics, 33*(4), 499-513.

Akinbobola, T., & Ibrahim, T. (2011). Descriptive analysis of savings and growth in Nigeria's economy. *Journal of Economics and Sustainable Development, 2*(7), 46-60.

Budha, B. (2012). A multivariate analysis of savings, investment and growth in Nepal. *MPRA Paper No. 43346*, University Library of Munich, Germany. Retrieved from mpra.ub.uni-muenchen.de/43346

Cooper, R. N., Dornbusch, R., & Hall, R. E. (1982). The gold standard: Historical facts and future prospects. *Brookings Papers on Economic Activity, 1982*(1), 1-56.

Elliot, J. W. (1984). *Money, banking and financial markets*. West Publishing Company.

Fry, M. J. (1980). Money and capital or financial deepening in economic developments? In *Money and monetary policy in less developed countries* (pp. 107-113). Pergamon.

Dhaene, G., & Barten, A. P. (1989). When it all began: The 1936 Tinbergen model revisited. *Economic Modelling, 6*(2), 203-219.

Hundie, S. K. (2014). Savings, investment and economic growth in Ethiopia: Evidence from ARDL approach to co-integration and TYDL Granger-causality tests. *Journal of Economics and International Finance, 6*(10), 232-248.

Igbatayo, S., & Agbada, A. O. (2012). Inflation, savings and output in Nigeria: A VAR approach. *Journal of Emerging Trends in Economics and Management Sciences, 3*(5), 447-453.

Mohamed, S. A. E. (2014). Testing the relationship between private savings and economic growth in Bahrain. *Global Journal of Commerce and Management Perspective, 4*(6), 1-6.

Nnanna, O. J., Englama, A., & Odoko, F. O. (Eds.). (2004). *Financial markets in Nigeria*. Central Bank of Nigeria Publication.

Nwanne, T. F. I. (2016). Implication of savings and investment on economic growth in Nigeria. *International Journal of Small Business and Entrepreneurship Research, 2*(4), 74-86.

Nwonye, N. G., Ihegboro, I. M., Onah, V. C., & Ijeoma, O. (2022). Growth impact of savings on the Nigerian economy. *European Journal of Economic and Financial Research, 6*(1).

Obadan, M. I., & Odusola, A. F. (2001). Savings, investment and growth patterns in developed and developing countries (No. 2062-2018-452). National Centre for Economic Management and Administration.

Olusoji, M. O. (2003). Determinants of private savings in Nigeria: An error correction approach. *NDIC Quarterly, 13*(3), 29-38.

Sajid, G. M., & Sarfraz, M. (2008). Savings and economic growth in Pakistan: An issue of causality. *Pakistan Economic and Social Review, 46*(1), 17-36.

Soyibo, A., & Adekanye, F. (1992). *Nigerian banking system in the context of policies of financial regulation and deregulation*. African Economic Research Consortium. Retrieved from https://idl-bnc-idrc.dspacedirect.org/bitstream/10625/10078/1/95967.pdf

Turan, G., & Gjergji, O. (2014). What is the impact of savings on growth? The case of a small open economy (Albania). *Mediterranean Journal of Social Sciences, 5*(13), 360.

Uremadu, S. O. (2002). *Introduction to finance*. Mindex Publishing Company Ltd.

Verma, R. (2007). Savings, investment and growth in India: An application of the ARDL bounds testing approach. *South Asia Economic Journal, 8*(1), 87-98.

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