Interest Rates and Capital Formation in Nigeria

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Abstract

This study examined the effect of interest rates on capital formation in Nigeria. Time series data were sourced from Central Bank of Nigeria Statistical Bulletin from 1990-2021. Gross fixed capital formation was modeled as the function of Savings Rate, Real interest rate, Prime lending rate and Maximum Lending rate. Multiple regressions with econometrics view statistical package were used as data analysis techniques. Co-integration, Granger Causality Test and Augmented Unit Root Test were used to determine the long and the short run relationship that exist among the variables. The study found that there was variation of 73 percent on Nigeria gross fixed capital formation of the country due to changes in interest rates. The study further revealed that there was a strong positive relationship between the study variables. the study found that that savings rate and prime lending rate have positive and significant effect of Nigeria fixed capital formation, real interest rate have positive but no significant effect while maximum lending rate have negative and no significant effect on Nigeria gross fixed capital formation. The study concluded that there is statistically significant relationship between Savings rates, and gross fixed Capital formation in Nigeria. There is statistically significant relationship between prime lending rate and gross fixed Capital formation in Nigeria. There is statistically significant relationship between maximum lending rate and gross fixed Capital formation in Nigeria. It was recommended that there should be effective and implementable monetary policies to back the interest rate interest rate and there should be policies to deepen the operational efficiency of the financial market enhance Nigeria gross fixed capital formation. Interest rate should be deepened and the policies revisited to meet the financial development needs of the economy. Nigerian Interest rate structure such as lending, and prime lending rate should be harmonized with the objective of enhancing to enhance Nigeria gross fixed capital formation and Nigeria monetary authorities should increase savings rates to enable deposit institutions to mobilize fund for investment as this has great extent to effect to enhance Nigeria gross fixed capital formation.

Keywords: *Interest Rates, Capital Formation, Savings Rate, prime Lending Rate, Maximum Lending Rate*

INTRODUCTION

In Nigeria, the interest rate policy serves as a crucial tool for monetary policy, facilitating the mobilization of financial resources to foster economic growth and development. Interest rate represents the cost incurred for utilizing borrowed money, acting as the opportunity cost for borrowers and a return for financial resource providers. Its significance lies in its impact on the cost of capital, credit availability, and the promotion of savings. Investment, regarded as the driving force behind economic activity and the primary factor influencing economic conditions, refers to the change in capital stock over time, encompassing the accumulation of newly produced physical assets such as factories, machinery, and inventories. Unlike capital, investment is a flow term measured over a specific period and plays a vital role in addressing economic challenges like poverty and unemployment. Consequently, understanding the behavior of interest rates is crucial when designing policies that support economic growth, as it helps maintain equilibrium between supply and demand within the financial sector.

Banks, functioning as intermediaries, facilitate the movement of funds from surplus to deficit units through deposit acceptance and allocation, with the extent of such activities dependent on interest rates, financial sector development, and saving and investment habits. Therefore, the availability of investible funds becomes essential for overall investment, which ultimately drives economic growth and development. The International Monetary Fund (IMF) outlines three key functions of interest rates within an economy: incentivizing savers by offering returns on financial assets, influencing the demand and allocation of loanable funds as components of capital cost, and hedging against inflation while considering domestic interest rates alongside returns on foreign financial assets and goods.

The behavior of interest rates significantly influences investment activities and, consequently, the economic growth of a country. Investment decisions depend on the prevailing interest rates in the market, and economic growth is closely tied to the level of investment. Higher interest rates tend to discourage investment, while lower interest rates stimulate it. Jorgenson (1963) introduced an investment equation in his paper on capital theory and investment behavior, which highlights the impact of real interest rates on investment spending. The desired capital stock is derived as a function of real output and the opportunity cost of capital, with a decrease in real interest rates leading to a lower opportunity cost of capital and increased investment spending, as firms aim to maximize the present value of future cash flows.

Before the implementation of SAP in 1986, interest rates in Nigeria were generally fixed by the CBN, with occasional adjustments based on government priorities in different sectors. The government aimed to promote investment in key sectors such as agriculture and manufacturing by offering special interest rates on loans taken by these sectors. This approach aimed to stimulate sectoral output growth and ultimately improve economic growth (Udoka, 2000). The government regulated interest rates through the Central Bank of Nigeria (CBN) to guide the economy towards growth in these key sectors. This period was characterized by a highly regulated monetary policy environment known as financial repression, involving government regulations and non-market restrictions that limited the functioning of financial intermediaries (Mckinnon& Shaw, 1973). Directed credits, interest rate ceilings, and restrictive monetary expansion were common during this period (Soyibo and Olayiwola, 2000). Although interest rate instruments remained fixed, there were

increases over time. The deposit rate increased from 4% in 1975 to 9.5% in 1986, while the lending rate rose from 6% to 10.5% within the same period. However, these low interest rates were not sustainable. The low, and at times negative, real interest rates discouraged savings and increased the demand for loanable funds. Consequently, the demand for credit exceeded the available funds, causing essential sectors of the economy to be deprived of necessary financial resources (Obute, Asor, and Idoko, 2012).

On 31st July 1987, the CBN deregulated interest rates, allowing market forces of supply and demand to determine interest rate levels. This policy shift was prompted by the economic shocks of the 1980s and the financial repression that had distorted financial prices, including interest rates, and hindered real economic growth. The deregulated interest rate aimed, among other things, to provide sufficient funds for investors, particularly manufacturers who were considered key agents in promoting economic growth, stimulating exports, and correcting price distortions. However, in 1994, there was a policy reversal, and interest rate regulation measures were reintroduced due to claims of high and variable rates under the deregulated system. Deposit rates were set at 12% to 15% per annum, while a lending rate ceiling of 21% per annum was imposed. A minor modification towards flexibility occurred in 1995, where interest rates for bank deposits and lending were determined by the forces of supply and demand (Udoka&Anyingang, 2012) (Omole&Falokun, 1999).

Since 2004, the monetary policy committee of the Central Bank of Nigeria has been setting interest rates based on the performance of the economy. In 2013, the lending rate stood at 17.10%, while the monetary policy rate was 12%, and the savings rate was 2.39% (CBN, 2012). The relationship between the financial sector and the real sector of the economy allows interest rates to play a significant role and have an effect. For instance, the lending rate, which determines the cost of capital, directly impacts investment. High lending rates discourage borrowing for investment purposes, while high savings rates encourage saving and provide more funds available for investment. This interplay of interest rates and investment necessitates an examination of the impact of interest rates on capital formation in Nigeria, thus motivating the need for this research work.

REVIEW OF RELATED LITERATURE

Conceptual Review

Interest Rates

Interest rates refer to the cost of borrowing or the return earned on savings or investments. In Nigeria, interest rates are influenced by various factors, including monetary policy decisions by the Central Bank of Nigeria (CBN), inflation rates, market forces, and government policies.

Capital Formation

Capital formation refers to the process of increasing the stock of physical and financial assets in an economy. It involves investment in machinery, equipment, infrastructure, and other productive assets. Capital formation is crucial for economic growth and development as it contributes to increased productivity and employment opportunities.

Relationship between Interest Rates and Capital Formation

Interest rates play a significant role in shaping capital formation in Nigeria. Lower interest rates generally encourage borrowing and investment, as they reduce the cost of capital for businesses and individuals. This can stimulate economic growth and increase capital formation. Conversely, higher interest rates may discourage borrowing and investment due to increased borrowing costs, which can hinder capital formation.

Monetary Policy and Interest Rates

The CBN utilizes monetary policy tools such as open market operations, reserve requirements, and the benchmark interest rate (the Monetary Policy Rate or MPR) to manage inflation and influence interest rates. When the CBN increases the MPR, it generally leads to higher interest rates, which can potentially reduce borrowing and investment. Conversely, when the MPR is lowered, it can stimulate borrowing and investment by reducing interest rates.

Government Policies and Capital Formation

Government policies also play a crucial role in promoting capital formation. Policies that foster a favorable business environment encourage domestic and foreign investment; provide incentives for saving and investment, and support infrastructure development can contribute to increased capital formation in Nigeria. Understanding the interplay between interest rates, capital formation, monetary policy, and government policies is essential for policymakers, investors, and individuals seeking to analyze and promote sustainable economic growth in Nigeria.

Theoretical Framework

The neo-classical loanable fund theory, proposed by Dennis Robertson, asserts that savings and investment determine long-term interest rates. The interest rate is the price that balances the supply and demand of loanable funds (Jhingan 1997). The demand for loanable funds for investment purposes, such as capital goods or construction, depends on the expected rate of profit compared to the interest rate. This demand is fulfilled through past savings or dis-saving and is sensitive to changes in interest rates. According to this theory, the interest rate is influenced by four variables: savings, investment, hoarding preferences, and the money supply.

The classical theory of interest rates defines the interest rate as the factor that equates savings and investment. This theory is based on the general equilibrium theory of interest rates, which is determined by the demand for and supply of capital. The demand for capital arises from investment decisions, while the supply of capital is derived from community savings. The Keynesian liquidity preference theory determines the interest rate based on the demand for and supply of money in a stock theory. It emphasizes that the interest rate is primarily a monetary phenomenon. This theory analyzes the supply of money as a given factor in the short run and determines the interest rate based on liquidity preference or the demand for money.

According to the Keynesian theory, low interest rates, as a component of administered costs, discourage savings and, consequently, reduce investment demand. The theory argues that an increase in the real interest rate will positively impact savings, which can be utilized for investment. This would lead to excess liquidity being saved due to higher interest rates,

allowing banks to lend more money to investors, thereby increasing productive investment. The Financial Liberalization Theory, proposed by McKinnon and Shaw (1973), suggests that interest rate regulations often result in low and negative real interest rates, which hinder economic growth in developing countries.

Financial repression, which leads to low interest rates, discourages savings and reduces investment. Additionally, investment quality tends to be low under a repressive regime, as projects undertaken under such conditions yield low returns. McKinnon and Shaw advocate for interest rate deregulation to address the problems caused by financial repression in developing countries. They argue that deregulation would increase interest rates, encouraging both savings and investment, which would boost economic growth. The Clark (1917) accelerator theory of investment proposes that changes in income are the main determinant of current net investment. This theory suggests that firms maintain a stable relationship between the stock of capital and aggregate output, with the rate of investment being proportional to changes in the economy's output. According to the Keynesian marginal efficiency theory, investment decisions are influenced by the disparity between the internal rate of return generated by a specific asset and the prevailing market interest rate. In 1969, James Tobin introduced the Tobin Q theory of investment, which relates investment expenditure to the market value of financial assets (equity and debt) in relation to the replacement cost of real assets. This theory suggests that incremental returns from capital additions should exceed the cost of these additions. The neoclassical theory of investment asserts that the demand for capital is determined by maximizing the present value of a firm, considering various market and non-market constraints.

Empirical Review

Akani and Obiosa (2020) examined the effect of financial intermediation on Nigeria gross fixed capital formation was proxy for dependent variables while banking sector credit, banking sector deposit, savings prime lending and maximum lending rates was proxy for independent variables. The study found that financial intermediation can explain 47.1 percent variation on Nigeria gross fixed capital formation. The estimated F-statistics and probability found that the regression model is fixed and adequate to explain variation on Nigeria gross fixed capital formation. The beta coefficient of the variable found that commercial banks deposit and savings rate have negative relationship with Nigeria gross fixed capital formation while commercial banks credit, maximum lending rate and prime lending rate. The variable was stationary at first difference and there was presence of long run effect from the cointegration test.

Akujuobi (2008) examined foreign direct investments and capital formation in Nigeria, posits that, FDI, is a significant positive contributor to the overall capital formation efforts in Nigeria. However, the gains of FDI do not come so automatically. He therefore, recommended that efforts must be directed at removal of such impediments as poor transparency in laws, especially in the areas of property rights, patent rights, copy right protection and commitment to enforcement of contracts. Uremadu (2008) tried to explore the possible determinants of capital formation in Nigeria for the period 1980- 2004. Empirical results showed a positive influence of cumulative foreign private investment (CFPI), Index of energy consumption (INDEXEC) and total banking system credit to the domestic economy (BSTCr), and a negative influence of gross national savings (GNS), domestic inflation rate (INFR), maximum lending rate(MLR),foreign exchange

rate(EXCHR) and debt service ratio(DSR) on capital formation. It was discovered that foreign exchange rate leads capital formation in Nigeria, followed by index of energy consumption and then debt service ratio. The paper therefore recommended a reduction in exchange rate distortions / misalignment; increase in energy supply by providing constant electricity and infrastructure to boost industrial energy consumption; and continuous minimization of foreign debts to reduce amount of national income used for debt servicing.

Donwa and Odia (2009) considered the impact of globalization on the gross fixed capital formation in Nigeria from 1980 to 2006.Using the ordinary least square, it was found that globalization proxy by openness was negatively and insignificantly related to gross fixed capital formation. In other words, globalization has not helped in assisting fixed capital formation. Foreign Direct Investment and Gross Domestic Product were positive and significant while exchange rate had a negative impact on GFCF. Interest rate had positive and insignificant relationship with GFCF. Suggestions on how Nigerian could benefit from globalization and improve on her gross fixed capital formation were proffered. Aiyedogbon (2011) tried to explore the relationship between military expenditure and capital formation in Nigeria. The study spanned a period of 1980–2010. It employed the econometric methodology of vector error correction model and testing the results using stationarity test, co-integration and variance decomposition. Findings reveal that military expenditure (Milex) and lending rate have negative impact on gross capital formation (GCF) in Nigeria in both the short- and long-run. The GDP is positively significant in the long run while it is positive and insignificant in the short run. The study recommends that the present funding of the military should be cut to release more funds for other sectors. The military authority should utilize the available resources and discharge their role in creating investment-friendly environment in order to enhance economic development in Nigeria.

Ezekwesili (2012) posited that Nigeria's poor capital formation comes from low education development of her people. She reiterated that, the resurgence of entrepreneurial spirit based on hard work and sound education are the panacea or critical factors to changing Nigeria. Orji and Mba (2012) studied the relationship between foreign private investment, capital formation and economic growth in Nigeria using a two-stage least squares (2SLS) method of estimation. The study finds that the long run impact of capital formation and foreign private investment on economic growth is larger than their short-run impact. There is thus, a long-run equilibrium relationship among the variables as the error correction term was significant, but the speed of adjustment was found to be small in both models.

Kanu, Ozurumba and Anyanwu (2014), writing on ―Capital expenditures and capital formation in Nigeria posits that Capital Expenditures (CAPEX) had a negative significant relationship with Gross Fixed Capital Formation (GFCF) in Nigeria at both 1% and 5% Alpha levels, while other macro-economic variables such as Imports, National Savings and Gross Domestic Product maintained a positive significant relationship with GFCF in the short run. In the long run, CAPEX still maintained a significant negative relationship with Gross Fixed Capital Formation; while Imports and National Savings equally had a positive significant relationship with GFCF. It was also observed that the lagged value of GFCF had no significant impact on GFCF in the preceding year; however this degenerated into a significant negative relationship in the second year. Outcome of that study did not come by chance, as a functional classification of the nation's expenditure profile for the period under

review reveals that; outlays on capital expenditure accounted for only about 32% of total expenditures, while the remaining balance of 68 % went to recurrent expenditures

Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of fiscal policy on the growth of the Nigerian economy using time series data from 1960-2012. The paper tested the stationarity through Group unit root test, and stationarity found at first differenced at 5% level of significance. Factor method, Goodness-of- fit summary, VAR and its properties were tested. Also, the Co-integration Technique and Pairwise- Granger Causality were employed in this study to test and determine the long-run relationship among the variables examined. Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of inflation rate on the economic growth in Nigeria. The study explored secondary data for the period of 1960 to 2012 and used E-view 7.2 statistical window in processing and analyzing the time series data. The empirical result of the test showed that for the periods, 1960-2012, there was no cointegrating relationship between Inflation and economic growth for Nigeria data. Furthermore, we examined the causality relationship that exists between the two variables by employing the Pairwise-Granger causality at two lag periods.

Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of corruption on the growth of Nigerian economy using time series data from 1960 to 2012. The paper utilized secondary data and the paper explored various econometrics and/or statistical analytical (Eview 7.2) method to examine the relationship between corruption and economic growth. The paper explored unit root, Cointegration analysis to test for the Nigeria's time series data and used an error correction mechanism to determine the long-run relationship among the variables examined. From the results of the findings, it was discovered that corruption has an inverse relationship with growth of an economy.

Majed and Ahmad (2010) investigated the impact of interest rates on investment in Jordan from 1990 to 2005 using co-integration techniques. Their study revealed that real interest rates had a negative effect on investment, with a 1% increase in real interest rates resulting in a 44% reduction in investment levels. - Greene and Villanueva (1990) studied the determinants of private investment in less developed countries from 1975 to 1987 and found that real deposit interest rates had a negative impact on private investment. Hyder and Ahmad (2003) examined the slowdown in private investment in Pakistan and concluded that higher real interest rates led to reduced private investment. Mahmudul and Gazi (2009) conducted a study on stock investment in Jordan, analyzing monthly data from January 1988 to March 2003. They found a significant negative relationship between interest rates and share prices in various markets. Olubanjo, Atobatele, and Akinwumi (2010) utilized the two-stage least squares method to simulate the inter-relationships among interest rates, savings, and investment in Nigeria from 1993 to 2010. Their findings suggested that a significant decrease in the real lending rate would not automatically result in increased domestic investment. Eregha (2010) examined variations in interest rates and investment determination in Nigeria, concluding that investment had an indirect relationship with interest rate variations and other variables considered in the study.

Gap in Literature

The reviewed literature reveals that significant research has been conducted on the relationship between interest rates and capital formation within the economy. Most of these studies focus on the positive impact of interest rates on the behavior of the local currency.

However, limited research has been conducted on investigating the impact of interest rates on capital formation in Nigeria. This study aims to address this gap and contribute to policy-making in this area.

RESEARCH METHODOLOGY

In order to investigate the relationship between interest rate and capital formation in Nigeria, the study adopted a quasi- experimental research design. The study adopted a secondary source of data, from the CBN statistical bulletin and World Bank data base. The research design encompasses the structure and strategy for investigating the relationship between the variables of the study. This section focuses on the study's design, data sources, analysis methods, and model specification.

Model Specification

To understand the impact of interest rates on capital formation in the Nigerian economy, we specify a model that states Capital formation depends on interest rates. Considering the widespread embrace of globalization, exchange rates also influence investment. Obadan (2006) revealed that a devaluation or depreciation of the Nigerian exchange rate (resulting in a stronger Naira) encourages exports, which, in turn, stimulates investment and capital formation for the production of exportable goods. This study will employ econometric techniques, specifically the Ordinary Least Squares (OLS) method, to estimate the relationship between the selected variables.

GFCF = f (SR, RIR, PLR, MLR)……..(1)

Where:

GFCF = Gross fixed capital formation

SR = Savings Rate

RIR = Real interest rate

PLR = Prime lending rate

MLR = Maximum Lending rate

To formulate a regression model using the variables GFCF, SR, RIR, PLR, and MLR, the following equation:

$GFCF = \beta_0 + \beta_1 SR + \beta_2 RIR + \beta_3 PLR + \beta_4 MLR + \varepsilon$

In this equation:

- GFCF represents the Gross Fixed Capital Formation as percentage of gross domestic product, which is the dependent variable we want to predict.

- SR denotes the Savings Rate.

- RIR represents the Real Interest Rate.

- PLR stands for the Prime Lending Rate.

- MLR represents the Maximum Lending Rate.

- β_0, β_1, β_2, β_3, and β_4 are the coefficients (parameters) that need to be estimated.

- ε represents the error term, which accounts for the unexplained variation in GFCF that is not captured by the predictor variables.

By estimating the coefficients β_0, β_1, β_2, β_3, and β_4 using regression analysis, you can determine the relationship between GFCF and the other variables, SR, RIR, PLR, and MLR.

The A-priori expectation from this model =

$\beta_1>0$, $\beta_2>0$, $\beta_3>0$, $\beta_4>0$

ANALYSIS AND DISCUSSION OF FINDINGS

Table 1: Test of Unit Root

MacKinnon	ADF Statistic	1%	5%	10%	
GCFC	-4.7520	-3.6793	-2.9677	-2.6229	I(1)
SR	-6.1313	-3.6394	-2.9511	-2.6143	I(1)
PLR	-7.4429	-3.6537	-2.9571	-2.6174	I(1)
MLR	-10.348	-3.6616	-2.9604	-2.6191	I(1)
RIR	-4.6249	-3.6891	-2.9718	-2.6251	I(1)

Source: Extract from E-view 9.0

Following Granger and Newbold (1974) and Engel and Granger (1987) assertion that many of the variables that appear in time series econometric models are non-stationary (or are integrated variables) the study therefore perform unit root test on the univarite time series to ascertain the stationarity or otherwise of the series. The null hypothesis in these tests is that the underlying process which generated the time series is non-stationary. This was be tested against the alternative hypothesis that the time-series information of interest is stationary. If the null hypothesis is rejected, it means that the series is stationary i.e. it is integrated to order zero. If, on the other hand, the series is non-stationary, it is integrated to a higher order and must be differenced till it becomes stationary.

As can be seen from the results given in table 1, all the variables are not stationary in levels. This implies that the null hypothesis cannot be rejected and that the time-series has to be differenced. We then conduct the same tests on the first difference of the time series. As can be seen from the test results on the first difference given in table (4.2), the null hypothesis has been rejected for all the variables indicating that all variables become stationary at their first difference and are thus integrated of order zero I(0) as the variables do not require further differencing (Gujarati, 2003).

Table 2: cointegration test

Series: GFCF MLR PLR RIR SR

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.669047	88.62391	69.81889	0.0008
At most 1 *	0.604390	52.13324	47.85613	0.0188
At most 2	0.372564	21.53147	29.79707	0.3253
At most 3	0.146046	6.149717	15.49471	0.6778
At most 4	0.028076	0.939758	3.841466	0.3323

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.669047	36.49066	33.87687	0.0238
At most 1 *	0.604390	30.60177	27.58434	0.0199
At most 2	0.372564	15.38176	21.13162	0.2630
At most 3	0.146046	5.209959	14.26460	0.7152
At most 4	0.028076	0.939758	3.841466	0.3323

Source: Extract from E-view 9.0

Having tested the time series for stationarity, the next step in the time series analysis is to test for co-integration which amounts to checking whether the linear combination of the variables is (also) stationary or not. It requires that the variables of interest have the same order of integration. It is only when the variables are integrated of the same order that a linear relationship among them can be expected. Variables are said to be co-integrated if a long run equilibrium relationship exists among them. Engel and Granger (1987) argued that for such relationships to exist, the error terms of the model should be stationary. The first stage of the co-integration test involves estimating equations and saving the error terms. Then the Augmented Dickey-Fuller and Phillip-Perron tests are applied on the error terms. If the error terms are found to be stationary, the variables are said to be co-integrated and this necessitates the estimation of an Error Correction Model involving long run relationship. If, on the other hand, the variables are not co-integrated, then the modeling should proceed with differenced time-series.

The two basic test statistics used in this study for the detection of the number of cointegrating vectors are Trace Statistics and Maximum Eigen-value Statistics. The results of the co-integration test using the Johansen methodology, which in this case is based on the likelihood ratio test is presented in table 2 which shows the Max Eigen value indicates one co-integrating equation, because the Max-Eigen statistics of 88.62391 is greater than 5 percent critical value of 69.81889 at None hypothesized (None*). the table further showed the test for long-run co-integration among the variables as the trace statistics is compared with the 5 percent critical value at None* hypothesized no of CE(S). The results show that there exists a long-run relationship among the variables because the Trace Statistic of 30.60177 is greater than the 5 percent critical value of 27.58434 at the none-hypothesized None*

Table 3: Presentation of Granger Causality Test

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
MLR does not Granger Cause GFCF	33	0.53931	0.5891
GFCF does not Granger Cause MLR		0.00694	0.9931
PLR does not Granger Cause GFCF	33	1.45558	0.2504
GFCF does not Granger Cause PLR		5.36207	0.0107
RIR does not Granger Cause GFCF	33	0.53172	0.5934
GFCF does not Granger Cause RIR		3.09289	0.0611
SR does not Granger Cause GFCF	33	0.74081	0.4858
GFCF does not Granger Cause SR		0.09065	0.9136

Source: Extract from E-view 9.0

Following the pioneering work of Granger (1969), a number of other scholars have attempted to measure the direction of causality between variables in a functional relationship. These include Sims (1972), William et al (1976), Feize and Pearce (1979). Results of the granger causality test as presented in table 3 found that there is uni-directional causality from gross fixed capital formation toprime lending rate while there was no causality among other variables in the model.

Table 4: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-770.8135	NA*	3.76e+15*	50.05248*	50.28377*	50.12787*
1	-749.4988	34.37842	4.89e+15	50.29025	51.67798	50.74261
2	-735.7994	17.67665	1.16e+16	51.01932	53.56349	51.84865

Source: Extract from E-view 9.0

The information criteria are the Akaike information criteria (AIC), and Bayesian information criteria (BIC) (Stock and Watson, 2012). Since the value proposed by both AIC, HQIC is lag 1, the optimal lag length in this study is 1

Table 5: Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.066540	0.602970	0.110354	0.9132
D(GFCF(-1))	0.082342	0.308667	0.266767	0.7924
D(GFCF(-2))	0.202076	0.286210	0.706040	0.4883
D(GFCFP(-3))	-0.392732	0.253878	-1.546932	0.1376
D(SR(-1))	0.866882	0.085548	2.343699	0.0347
D(SR(-2))	0.103543	0.450620	0.229779	0.8206
D(SR(-3))	-0.140443	0.375646	-0.373870	0.7124
D(PLR(-1))	0.980311	0.357079	2.504960	0.0191
D(PLR(-2))	0.094767	0.329728	0.287411	0.7768
D(PLR(-3))	0.190374	0.255791	0.744253	0.4654
D(MLR(-1))	-0.001226	0.203715	-0.006019	0.9953
D(MLR(-2))	-0.222490	0.186021	-1.196052	0.2457
D(MLR(-3))	0.091220	0.156414	0.583199	0.5663
D(RIR(-1))	0.000771	0.000481	1.602640	0.1330
D(RIR(-2))	0.001049	0.000645	1.627066	0.1277

D(RIR(-3))	0.001307	0.000382	3.425904	0.0045
ECM(-1)	-0.726975	0.408646	-1.778984	0.0904
R-squared	0.796102	Mean dependent var		-0.084412
Adjusted R-squared	0.733568	S.D. dependent var		3.825431
S.E. of regression	3.122902	Akaike info criterion		5.408303
Sum squared resid	195.0503	Schwarz criterion		6.036805
Log likelihood	-77.94116	Hannan-Quinn criter.		5.622640
F-statistic	8.270572	Durbin-Watson stat		1.727441
Prob(F-statistic)	0.000000			

Source: Extract from E-view 9.0

The result shows the equilibrium structure of the over parameterized error correction model (ECM 1) and the estimated error correction models were a good fit. This is indicated by R-squared of 0.733568 and implies that 73 percent variations in Nigeria gross fixed capital formation are explained by the variables included in the model. Moreover, the Durbin Watson (DW) Statistic also shows that the estimated models are free from the problem of positive first order serial correlation since the computed Durbin Watson value of 1.727441 isless than the tabulated value of 1.900. The f-statistic also shows that the model is statistically significant since the f-calculated value of 8.270572 is greater than f-tabulated value of 2.42 at 95% confidence level. Apart from these diagnostic statistics, the error correcting terms are appropriately negative as the theory predicts. The error correction term shows significant correction of about 72.6 percent from short run disequilibrium to long run equilibrium.

Discussion of Findings

The result of the relationship between gross fixed capital formation (the dependent variable) and savings rate, prime lending rate, maximum lending rate and real interest rate (explanatory variables) shows that savings rate, prime lending rate and real interest rate have positive relationship with gross fixed capital formation. There were studies that have found similar positive effect on gross fixed capital formation in Nigeria that shared similar experience with Nigeria. Akani and Obiosa (2020) found that financial intermediation can explain 47.1 percent variation on Nigeria gross fixed capital formation. that commercial banks deposit and savings rate have negative relationship with Nigeria gross fixed capital formation while commercial banks credit, maximum lending rate and prime lending rate. The positive effect of the variables confirm our a-priori expectations and in line with financial intermediation theories. the positive effect of the variables also confirm the the reform in interest rate such as the deregulation of interest rate in the last quarter of 1986 to allow market forces od demand and supply.

However, Maximum lending rate had negative effects on gross fixed capital formation, suggesting that increase in maximum lending rate can lead to decrease in gross fixed capital formation. This finding also confirm the a-priori expectation of the study as increase in maximum lending rate serve as demotivating factor and crowd out investment. Empirically, the findings contradict the findings of Akani and Obiosa (2020) whose findings revealedthat financial intermediation can explain 47.1 percent variation on Nigeria gross fixed capital formation. that commercial banks deposit and savings rate have negative relationship with Nigeria gross fixed capital formation while commercial banks credit, maximum lending rate and prime lending rate have positive effect on gross fixed capital formation.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study was to establish the effect of interest rate on gross fixed capital formation. Secondary Data were collected from Central Bank and multiple regression analysis was used in the data analysis. From the findings on the Adjusted R squared, the study found that there was variation of 73 percent on Nigeria gross fixed capital formation of the country due to changes in interest rates. The study further revealed that there was a strong positive relationship between the study variables. From the findings, the study found that that savings rate and prime lending rate have positive and significant effect of Nigeria fixed capital formation, real interest rate have positive but no significant effect while maximum lending rate have negative and no significant effect on Nigeria gross fixed capital formation. From the findings, the study concluded that there is statistically significant relationship between Savings rates, and gross fixed Capital formation in Nigeria. There is statistically significant relationship between prime lending rate and gross fixed Capital formation in Nigeria. There is statistically significant relationship between maximum lending rate and gross fixed Capital formation in Nigeria

Recommendations

1. There should be effective and implementable monetary policies to back the interest rate interest rate and there should be policies to deepen the operational efficiency of the financial market enhance Nigeria gross fixed capital formation.
2. The interest rate should be deepened and the policies revisited to meet the financial development needs of the economy. Nigerian Interest rate structure such as lending, and prime lending rate should be harmonized with the objective of enhancing to enhance Nigeria gross fixed capital formation
3. Nigeria monetary authorities should increase savings rates to enable deposit institutions to mobilize fund for investment as this has great extent to effect to enhance Nigeria gross fixed capital formation

REFERENCES

Adekunle, K.A., & Aderemi, A. K., (2012). Domestic investment, capital formation and population growth in Nigeria. Developing Country Studies, 2(7), 28 – 39.

Ainabor, A.E., Shuaib I.M & Kadiri, A.K., (2014). Impact of capital formation on the growth of Nigerian economy 1960-2010: vector error correction model (vecm).School of Business Studies, Readings in Management and Social Studies, 1(1), 132-154.

Aiyedogbon, J. O. C., (2011). Military expenditure and gross capital formation in Nigeria. 1980 – 2010. European Journal of Humanities and Social Sciences. 7(1), 290-310.

Ajao, M. G., (2011) .Stock market development, capital formation and growth in Nigeria. International Journal of Current Research 33(6)382-388.

Akani, H. W & Uzah, C. K. (2018). Microfinance and macroeconomic instability in Nigeria. Banking and finance journal, 1(1), 186-208.

Akani, H. W., Lucky, A. L., & Anyamaobi, C., (2016)

Akani, H. W., Lucky, A. L., & Uzah, C. K., (2016). Financial sector development and macroeconomic stability in Nigeria: A long –run analysis. International Journal of Empirical Finance, 5 (2), 112 – 128.

Akujuobi, A.B.C., (2008). Foreign direct investments and capital formation in Nigeria. Journal of Research in National Development; 5 (2), 13 – 26.

Beddies, C., (1999). Investment, capital accumulation and growth: Some Evidence from Gambia: 1964-1998. IMF Working Paper 99/117, August.

Chekwube, M., Anne, M., Chibuike, O., & Chukwunonso, E., (2014). Financial development and economic growth in Nigeria: A reconsideration of empirical evidence. Journal of Economics and Sustainable Development, 5(28), 3-11.

Diamond, D. W & Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: a theory of banking. Journal of Political Economy, 109(2), 287.

Engle, R.F., & Granger, C.W.J., (1987). Co-integration and error correction representation estimations and testing. Econometrica, 35: 251-276.

Jhingan, M.L., (2005).The Economic of Development and Planning, 38th Ed. New Delhi: Virade Publications (P) Ltd, India.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in gaussian Vector Autoregressive Models, Econometrica.

Johansen, S., (1988). Statistical analysis of cointegration vectors. Journal of Economic Dynamics and control, 12: 231-254.

Kanu, S. I., & Ozurumba, B. A., (2014). Capital formation and economic growth in Nigeria, Global Journal of Human-Social Science: Economics, 14 (4), 36-55.

Kanu, S.I., Ozurumba, B.A., & Anyanwu, F.A., (2014). Capital Expenditures and Gross Fixed Capital Formation in Nigeria. Journal of Economics and Sustainable development, the International Institute for Science, Technology and Education (IISTE).

Nwezeaku, N. C., (2010). The Impact of public sector financial management on the economies of Sub-Saharan Africa. International Research Journal of Finance and Economics Issue 40 (8), 20 - 31

Orji, A., and Mba, P. N., (2010). Foreign private investment, capital formation and economic growth in Nigeria: a two stage least square approach. Journal of Economics and Sustainable Development.

Pathania, R., (2013). Empirical investigation of impact of capital formation by agriculture and industry on industrial productivity in india. Research Journal of Management Sciences, 2(3), 8-11.

Pathania, R., (2013). Linkages between export, import and capital formation in India. International Research Journal of Social Sciences, 2(3), 16-19.

Schumpeter, J.A., (1911). The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Oxford: Oxford University Press.

Shuaib, I. M., & Dania, E.N., (2015). Capital formation: Impact on the economic development of Nigeria 1960 – 2013. European Journal of Business, Economics and Accountancy, 3 (3), 1 – 16.

Torbira, L.L., & Ogbulu, O.M., (2014). Fund mobilization by insurance companies and fixed capital formation: Evidence from the Nigerian Economy. International Journal of Financial Research, 5(2), 69-81.

Ugwuegbe S. U., & Uruakpa, P. C., (2013). The impact of capital formation on the growth of Nigerian economy. Research Journal of Finance and Accounting, 4(9), 36-40