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EMPIRICAL ANALYSIS OF THE EFFECT OF MACRO ECONOMIC VARIABLES ON SAVINGS AND INVESTMENT IN NIGERIA

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Abstract

The study investigated the effect of interest rate on savings and investment in Nigeria. Macroeconomic variables on interest rate, inflation rate, exchange rate and gross domestic product were proxied as the determinant of interest rate on savings and investment respectively. The data were obtained from secondary source, namely Central Bank of Nigeria Statistical Bulletin (2017) over a period of thirty (32) years (1986–2017). Unit root tests, Ordinary least square, Johansen cointegration tests and Error correction models were employed as the analytical techniques. The result of the study showed that there is long run relationship among the variables. The ECMs are correctly signed and statistically significant thus validating the presence of long run relationship amidst the variables and that about 10.30 percent and 95 percent of the short run inconsistencies are corrected and incorporated into the long run dynamics, annually. The overall models are significant, given the F-statistics probability value of 7.117448 and 2.131461 which is greater than F-tabulated 2.05 that is, 7.117448 > 2.05; 2.131461 > 2.05. The study concluded that interest rate has negative effect on savings while it has positive effect on investment in Nigeria. Therefore, the study recommended that the CBN

should adopt interest rate policy that will always boost the savings culture of the real sector. This can be achieved by increasing the interest paid on deposit made by individuals, local and foreign investors. The study further suggested that Monetary authorities should also find ways of determining the rate at which interest should be maintained to encourage borrowing for investment purposes and exchange rate policies should consider the necessity of price and interest rate stability.

Keywords: Interest rate, Inflation rate, Exchange rate, Gross Domestic Product

INTRODUCTION

Banks are statutorily vested with the primary responsibility of financial intermediation in order to make funds available to all sectors of the economy for productive investment. The intermediation process involves moving funds from surplus sectors of the economy to the deficit sectors. The extent to which this could be done depends on the level of development of the financial sector as well as the savings habit of the populace. The availability of investible funds is therefore regarded as a necessary starting point for all investments in the economy which will eventually translate into economic growth and development (Nnanna, Englama & Odoko, 2004). Interest rate policy in Nigeria is a major instrument of monetary policy considering its role in the mobilization of financial resources aiming at promoting economic growth and development. Interest rate is the price paid for the use of money. It is the opportunity cost of borrowing money from a lender. It can also be seen as the return paid to the provider of financial resources. It is an important economic price. This is because whether seen from the point of view of cost of capital or from the perspective of opportunity cost of funds, interest rate has fundamental implications for the economy by either impacting on the cost of capital or influencing the availability of credit, by increasing savings (Acha & Acha 2011).

In Nigeria, financial sector reforms began with the deregulation of interest rates in 1986. Prior to this period, the financial system operated under financial regulation and interest rates were said to be repressed. According to McKinnon (1973) and Shaw (1973), financial repression arises mostly when a country imposes ceiling on deposit and lending nominal interest rates at a low level relative to inflation.

On the other hand, it is undisputable that aggregate savings in an economy is a prerequisite for raising investment fund. Savings is really the difference between income and consumption. Temidayo and Taiwo (2011) defined savings as that aspect of income which is not instantly utilised or consumed, but kept aside for future consumption, investment or for

unforeseen situations, and it is considered as a veritable tool for economic growth and development. It promotes capital formation by raising the stock of capital thereby increase earning of more income. Really, the development of a country requires investment which depends on savings. However, investment can be referred to as expenditure channeled to increasing and maintaining the stock of capital. The stock of capital includes tangible assets such as plants and machineries and so on which aids production .

Bakare (2011) categorised investment into private investment, public domestic investment, foreign direct investment and portfolio investment. Private domestic investment refers to individuals or organizations investments which is an aspect of gross fixed capital formation. Government and public enterprises capital expenditure on social and economic assets are referred to as public investment. Really, gross fixed capital formation is a combination of private and public investments when compared with foreign investment. Foreign tangible asset is known as foreign direct investment while portfolio investments are foreign assets in form of shares, bonds, securities and so on.

Low or negative interest rates discourage mobilization of savings and channeling of the mobilized savings through the financial system. This has a negative impact on the quantity and quality of investment and hence economic growth. Therefore, the expectation of interest rate reform was that it would encourage savings and make loan able funds available to the banking institutions. But, the criticism has been that the “tunnel-like” structure of interest rate in Nigeria is capable of discouraging savings and retarding growth in view of the empirical link between savings, investment and economic growth (Simon-Oke & Jolaosho, 2013). The link between them has been emphasized such that if individuals or firms save, there is a greater possibility of investing in the near future. Consequently, a higher level of investment is capable of creating brighter chances of economic growth.

Statement of the Problem

Arguably, empirical literatures on interest rate, savings and investment in Nigeria have been put together by notable scholars such as Chete, 2002; Ikhide, 2004; Nwachukwu and Odigie 2009; Adofu, Abula and Audu, 2010; Anthony, Uzomba and Olatunji, 2010; Nasiru and Usman, 2013; Ojeaga and Omosefe, 2014; Ramond, 2014; and host of others who have all asserted that interest rate does not have any significant relationship on savings and investment in Nigeria. However, having critically assessed the empirical studies put together by these scholars, the researcher found that the subject matter was studied independently, i.e. interest rate on savings; interest rate on investment; savings on investment in Nigeria. More so, there exists mixed evidence from literature as outlined above. The researcher therefore tends to bridge the

gap existing in literature by examining the effect of bank interest on savings and investment in Nigeria for the period covering 1986-2017.

Research Questions

The study is carried out with aim of providing answers to the following research questions:

i. To what extent does interest rate affect savings and investment in Nigeria?
ii. To what extent does exchange rate affect savings and investment in Nigeria?
iii. To what extent does inflationary rate affect savings and investment in Nigeria?
iv. To what extent does gross domestic product affect savings and investment in Nigeria?

Objectives of the Study

The broad objective of this research work is to evaluate the effect of bank interest rate on savings and investment in Nigeria. However, the specific objectives are to:

i. Examine the effect of interest rate on savings and investment in Nigeria;
ii. Assess the effect of exchange rate on savings and investment in Nigeria;
iii. Examine the effect of inflationary rate on savings and investment in Nigeria;
iv. Evaluate the effect of the gross domestic product on savings and investment in Nigeria.

Research Hypotheses

The study provides the following initial answers to the major questions raised in 1.3 above. These answers are stated in null or testable forms as follows:

1. Interest rate has no significant effect on savings and investment in Nigeria.
2. Exchange rate has no significant effect on savings and investment in Nigeria.
3. Inflationary rate has no significant effect on savings and investment in Nigeria.
4. Gross Domestic Product has no significant effect on savings and investment in Nigeria.

Justification for the Study

The rationale for selecting the period of 1986-2017 was as a result of the fact that the period concides with the liberalization of the country's financial system, in which case, the interest rate and allocation of resources are determined by market forces.

LITERATURE REVIEW

Empirical Review

Payne (2005) employed Engle-Granger and error correction model (ECM) to study the relationship between savings and investment in Mexico over the period 1960-2002. The results

showed that savings and investment are co integrated, thereby indicating low capital mobility in accordance with F-H hypothesis. However, the coefficient of error correction model is positive and statistically significant with a binding intertemporal budget constraint and an adjustment parameter of 0.242.

Lean and Song (2009) choose the whole country and four (4) representative provinces as sample to analyse the relationship between economic growth and savings in China by using Johansen co integration and granger causality. The study found that there is bilateral causality existing between the household savings and economic growth in the short run and in the long run unidirectional causality exists from the economic growth to savings growth.

Wuhan and Adnan (2015) tested the impact of interest rate on investment in Jiangsu Province of China. For long run, nexus Johansen Co-integration test was employed. Whereas, vector error correction model (VECM) was used to find short run association over the period of 2003-2012. The results indicate that there is a long-term association among the variables, a negative relation in the long run but positive relationship in short run.

Suna (2015) investigates whether domestic credits created by the banking sector have any effect on macro-economic variables such as inflation and economic growth for ten (10) chosen European countries (Spain, Finland, France, Germany, Greece, Hungary, Italy, Poland, Turkey and United Kingdom) by using the annual data of 2006-2012 and tested via panel data analysis. The result of the panel data analysis proved that domestic credits created by the banking sector for ten (10) European countries did not affect inflation but did affect economic growth.

Saba and Danish (2015) explore the effect of interest rate on economic performance: Evidences from Islamic and Non-Islamic Economies. The study used Panel least square and fixed effect model separately for 57 non Islamic and 17 Islamic countries from 2005 to 2013. Results suggested that in Islamic countries, people don't care about interest rate while savings growth and GDP per capita income seems to affect positively the savings decision. However for non-Islamic economies GDP per capita growth as well as interest rate both has positive impact on savings. However in the case of investment, the effect of interest rate was negative while the effect on growth in GDP per capita was positive for both Islamic and non-Islamic countries.

Dhanya (2015) investigates the role of savings in Economic growth in Botswana. The study applied the Harrod–Domar growth model to the Economy of Botswana. In this study test was based on Auto Regressive Distributed Lagged (ARDL) model by Pesaran, Shin and Smith (1999) to check the existence of a long run relationship between Gross Domestic Product and Gross Domestic savings in Botswana. This study further used DOLS approach in order to

identify dynamic long run co integration between GDP and its independent variables. The study tested the stationary and co integration of Botswana's time series data for the period of 1980 to 2013. The test found out that there is significant relationship between savings and economic growth and the study supported Harrod Domar growth Model.

Wycliffe and Emmanuel (2017) investigate the effect of interest rates on business investment performance. The independent variable was interest rate and dependent variable was business investment. The data were collected by questionnaires as the research instruments. Data were analyzed by the use of descriptive statistics and it was presented and analyzed in figures and frequency tables. The findings showed that loan repayment influences financial performances of the banks.

Udede (2015) examines the impact of interest rate on savings in the Nigeria's economy between 1981-2013. The study adopted VAR test. The result showed that 1% increase in a period lag of interest rate on deposit; on the average will cause 0.1% increase in savings. This implies that any attempt made to increase the propensity to save will always cause increase in the savings level ceteris paribus. More so, 1% increase in a year period lag of the income will cause 0.04% increase in savings. This indicated that as income generated by the country increases, all things being equal, the desire to save will be on the increase. The result also showed that level of significance [0.05] was less than its P-value for loan interest. Thus, interest rate does not significantly impact on savings in Nigeria within the period under study. However, considering the factor like income (GDP), it was found that both variables significantly impacts on savings in Nigeria within the period under study. The result indicated that by combining interest rate and income, savings can be significantly influenced. This is also supported by the positive relationship between the dependent variable; Savings (LASV) and the explanatory variables (interest rate on deposit [LINT and LGDP].

Davis-Ojima and Emerenini (2015) investigate the impact of interest rate on Investment in Nigeria. The study specified gross capital formation as a proxy for investment on interest rate, inflation rate and exchange rate. Multiple regressions were used as the statistical method for the study which revealed that all the independent variables have negative effect on investment in Nigeria except inflation at lag 1 which has positive effect on investment. The study concluded that high interest rate negatively affects investment in Nigeria. In line with the findings, the study suggested that the monetary authority should evolve policies that will encourage savings and reduce prime lending rate to genuine investors.

Ozioma, Idenyi, Chinyere and Eze (2016) examine the determinants of private domestic savings in Nigeria (1980- 2015), using data obtained from CBN and IMF-IFS online. The econometric analytic tools used are, co integration test, vector error correction model, Granger

causality test. In the model, domestic private savings (DPS) is a function of gross domestic product per capita (GDPPC), household consumption (HHC), nominal interest rate (INTR) and domestic credit to private sector (DCPS%GDP). The study obtained the following results (i) Stable long run relationship was found to exist between the dependent and explanatory variables in the model. (ii) Interest rate has positive significant relationship with domestic private savings in the long run and insignificant influence in the short run in Nigeria within the period under review. (iii) Income has significant negative impact on domestic private savings in the long run and insignificant impact in the short run in Nigeria within the period under study. (iv) There is a unidirectional causality running from GDPPC, DCPS%GDP to DPS and bidirectional causality existing between HHC and DPS in Nigeria within the period under consideration. Based on the findings, the study recommends conscious policy aimed at reducing the cost of living of the people, so that the part of disposable income spent on social services will reduce thereby increasing domestic private savings. More so, there is need for the authorities to increase the volume of credit to the private sector and also create an investment friendly environment that will support effective and efficient use of the credit which will in turn increase income and then lead to increase in domestic private savings.

Oniore, Gyang and Nnadi (2016) seek to undertake an empirical analysis of the link between exchange rate fluctuations and private domestic investment in Nigeria. Descriptive statistics and econometric method were employed. Thus, simple averages of descriptive statistics, and Error Correction Model (ECM) technique within the Ordinary Least Square estimation were employed to analyze the various trends in the data. The descriptive statistics of the variables included in the model shows the existence of wide variations in the variables as depicted by the standard deviation of the exchange rate variable that was unusually high. This depicts a high degree of volatility in the exchange rate during the period under investigation. The findings suggest that, the depreciation of the currency and interest rate does not stimulate private domestic investment activities in Nigeria. On the other hand, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria. It is thus recommended that monetary authorities should adopt appropriate policy in appreciating the value of the naira, reduce borrowing and lending charges to boast the performance of private domestic investment through stable macroeconomic environment.

Hassan (2016) reviews the effect of interest rate on commercial bank deposits in Nigeria between 2000 and 2013. The study made use of secondary data sourced from the Central Bank of Nigeria statistical bulletin and the National Bureau of Statistics. 2013. The model for the study has as its dependent variable the Commercial Bank Deposits (CBD) while its explanatory variables were the interest rates and the Gross Domestic Product (GDP).

Using the Ordinary Least Square (OLS) multiple regression techniques; the study revealed that there is a negative relationship between the interest rates and the commercial bank deposits suggesting that interest rates has not been responsible for customers deposits in commercial banks in Nigeria.

George-Anokwuru (2017) investigates the relationship between interest rate and domestic private investment in Nigeria from 1980 to 2015. Ordinary Least Square Regression was adopted to determine the relationship among the variables employed in the study. Gross domestic product served as the dependent variable while the real interest rates and prime lending rates were the independent variables. The findings showed that the real and prime lending rates are negatively related to private domestic investment and statistically significant at 5%. The coefficient of determination showed that only 23% of the variation in the private domestic investment was accounted for by interest rates. This showed that the predictive power of the model is very weak. This study concluded that the success of promoting the Private Domestic Investment does not depend only on interest rates though it should not be neglected.

Otiwu, Okere and Uzowuru (2018) empirically evaluate the determinants of private domestic savings in Nigeria from 1981 through 2015. Secondary data were sourced from CBN statistical bulletin and bureau of statistics. The variables used in the study are per capital income, interest rate, financial deepening, inflation rate and financial inclusion on domestic savings. Hypotheses were formulated and tested using vector error correction model (VECM) and the test for stationarity proved that the variables are integrated in 1(1) order which implies that unit roots do not exist among the variables. There is also long-run equilibrium relationship between the variables and the result also confirms about 29 percent short-run adjustment speed from long-run disequilibrium. The coefficient of determination indicated that about 78 percent of the variations in private domestic savings are explained by changes in its determinants in Nigeria. The results showed that per capita income and financial inclusion are major determinants of domestic savings in Nigeria whereas inflation, interest rate and financial deepening are not a good determinant of domestic savings. Specifically, interest rate has non-significant negative effect on domestic savings, financial inclusion has significant positive effect on domestic savings, financial deepening has non-significant negative effect on domestic savings, inflation rate has non-significant negative effect on domestic savings and per capital income has significant positive effect on domestic savings. The study therefore recommends that concerted and well articulated efforts should be made to make available and affordable credits to productive investments through small scale industries as they constitute an integral part of the growth and transformation process of an agro based economy like

Nigeria, this will induce employment, increase financial access and income of the various economic agents which will have a spillover effect on private savings.

METHODOLOGY

Model Specification

The model used for this study is structured and modified from Olayemi and Micheal (2013) and Davis-Ojima and Emerenini (2015) who examined interest rate on savings and interest rate on investment respectively.

Olayemi and Micheal (2013) model is specified as;

SAV = f (INT) ---------- 1

Davis-Ojima and Emerenini (2015) model is specified as

INV = f (INT) ---------- 2

The present study thereby modified the models above to form a suitable model for the study. Hence, the study included exchange rate, inflation rate and gross domestic product to the model, the justification is to account for the macroeconomic effects on savings and investment respectively. The study expresses aggregate savings rate (ASR) and Investment (INV) as the dependent variables respectively while interest rate (INT), exchange rate (EXR), and inflation rate (INF), gross domestic product (GDP) represent the independent variables.

The model for the study thereby becomes;

Model 1:

ASR = f (INT, EXR, INF, GDP)…….. 3

Model 2:

INV = f (INT, EXR, INF, GDP)…….. 4

Where;

ASR = Aggregate savings rate

INV = Investment

INT = Interest rate

EXR = Exchange rate

INF = Inflation rate

GDP = Gross domestic product

The econometric form of equation (1) is represented as:

$ASR=\beta_o + \beta_1 INT + \beta_2 EXR + \beta_3 INF + \beta_4 GDP + \mu$……..……5

$INV=\beta_o + \beta_1 INT + \beta_2 EXR + \beta_3 INF + \beta_4 GDP + \mu$……..…6

Where:

β_o= Intercept/constant parameter

β_1-β_4= Coefficients of each independent or explanatory variable

μ=Stochastic or Error term

By log linearizing, the model becomes;

$ASR=\beta_o + \beta_1 INT + \beta_2 EXR + \beta_3 INF + \beta_4 GDP + \mu$……..…….7

$INV=\beta_o + \beta_1 INT + \beta_2 EXR + \beta_3 INF + \beta_4 GDP + \mu$……..8

$LogASRt = \beta_o + \beta_1 logINT_t + \beta_2 \log EXR_t + \beta_1 logINF_t + \beta_2 \log GDP_t + \mu$ ……..9

$LogINVt = \beta_o + \beta_1 logINT_t + \beta_2 \log EXR_t + \beta_1 logINF_t + \beta_2 \log GDP_t + \mu$ ……10

***Apriori* Expectation**

It is expected that at the end of the analysis that interest rate, exchange rate, gross domestic product variables are expected to have positive impact on savings and investment respectively while inflation is expected to have a negative effect on savings and investment. The above explanation can be summarized thus: $B_1 > 0$, $B_2 > 0$, $B_3 < 0$, $B_4 > 0$.

Estimation Technique

Since most time series data are non-stationary, Augmented Dickey Fuller (ADF) unit root test and Johansen co-integration test shall be employed in determining the stationarity of the variables and existence of long run relationship respectively. ADF helps to avoid spurious regression results. The study shall also apply Error Correction Model (ECM) for the determination of short run dynamics and direction of errors between dependent and explanatory variables. Reliability of the predictors will be determined using standard error test.

Sources of Data

The model is estimated using time series annual data for the period 1986-2017. The data needed for the study are secondary in nature; implying data is obtained from published source. The rationale for selecting this period of 1986-2017 was as a result of the fact that the period concides with the liberalization of the country's financial system, in which case, the interest rate and allocation of resources are determined by market forces. The source of data is central bank of Nigeria (CBN) statistical Bulletin.

RESULTS AND DISCUSSION

Table 1a: ADF and PP Unit Root Test Results At Level

Variables	ADF Test Statistics	PP Test Statistics	CRITICAL VALUES			Integration	ADF & PP REMARKS
			1%	5%	10%		
ASR	-1.633332	-1.721609	-3.661661	-2.960411	-2.619160	I(0)	NS
INV	-1.437880	-1.437880	-3.661661	-2.960411	-2.619160	I(0)	NS
INT	-4.445380	-4.444661	-3.661661	-2.960411	-2.619160	I(0)**	S
EXR	-3.373529	-3.769971	-3.661661	-2.960411	-2.619160	I(0)**	S
INF	-3.244125	-2.994748	-3.661661	-2.960411	-2.619160	I(0)**	S
GDP	-3.526089	-3.135798	-3.661661	-2.960411	-2.619160	I(0)**	S

Source: Author's Computation from E-view 9 software

*Note: *(**)(***) - Significant at 1%(5%)(10%) percent level*

To investigate the randomness of the series, the ADF and PP tests are employed. The ADF and PP are primarily used to check whether a given series is stationary or non-stationary. From Table 1a, it can be seen that some of the variables namely; interest rate, exchange rate, inflation rate and gross domestic product were stationary at 5% level of significance while aggregate savings rate and investment variables were not stationary at any of the significant level that is 1%, 5% and 10% respectively which by implication means that all some of the variables retain innovative shock passed on them. However, for the variables to be associated to one another statistically in the long-run, they must be of the same order of integration, this is shown in the first difference unit root test (Table 1b).

Table 1b: ADF Unit Root Test Results At First Difference

Variables	ADF Test Statistics	PP Test Statistics	CRITICAL VALUES			Integration	ADF REMARKS	PP REMARKS
			1%	5%	10%			
ASR	-5.093484	-5.233495	-3.670170	-2.963972	-2.621007	I(1)**	S	S
INV	-5.233755	-5.233755	-3.670170	-2.963972	-2.621007	I(1)**	S	S
INT	-7.629173	-7.775550	-3.670170	-2.963972	-2.621007	I(1)**	S	S
EXR	-6.057405	-5.974652	-3.670170	-2.963972	-2.621007	I(1)**	S	S
INF	-3.356283	-5.891017	-3.670170	-2.963972	-2.621007	I(1)**	S	S
GDP	-2.981228	-2.963171	-3.670170	-2.963972	-2.621007	I(1)**	S	S

Source: Author's Computation from E-view 9 software

*Note: *(**)(***) - Significant at 1%(5%)(10%) percent level of significant*

Shafi (2014) proposes that the ADF and PP test is given as a t-statistic which is generally negative and that the more negative the t-statistic, higher are the chances of rejecting the null hypothesis. The results give as t-statistic is compared with the critical values calculated at particular level of significance. The test critical values are calculated at 1%, 5% and 10% respectively with major emphasis on 5% level of significant. If the t-statistic is less than the critical value calculated at a given critical level, the researcher has to conclude that there is evidence of non-stationary in the time series.

Table 1b showed the time series performance of the variables using the ADF and PP Unit Root Tests Statistics. It showed the level of stationarity at first difference. The result at first difference thereby showed that all the variables, that is, savings, investment, interest rate, exchange rate, inflation rate and gross domestic product were all stationary particularly at 5% level of significance.

Confirmation of the presence of non-stationary variables in the series, which brings to book the possibility of spurious relationship in the short run, and the fact that they are integrated of the same order after differencing, suggest that long run association test should be carried out, to test for the presence of co-integrating equation amidst the multivariate series in the long run. The co-integration test was done using Johansen maximum likelihood ratio approach.

Johansen Co-integration Test

Evidence from the unit root test in Tables 1a and 1b respectively explored that all the time series became stationary after first differencing. In order for the time series to generate equilibrium relationship in the long-run; the time series must co-integrate. Hence, Johansen Co-integration test is employed to test for the presence of co-integrating equation of the multivariate series in the long-run. In the Johansen Co-integration test, the Trace Statistics and Max-Eigen Statistics is compared with 5% and 1% critical values in order to determine the number of co-integrating vectors in the model.

Table 2a: Trace Statistics Result

Series: ASR INT EXR INF GDP					**Series: INV INT EXR INF GDP**				
Model I (Dependent Variable = *ASR*) SAVINGS					**Model II (Dependent Variable = INV*)* INVESTMENT**				
Hypothesized No of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Prob.	Hypothesized No of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Prob.
None *	0.675889	101.1393	69.81889	0.0000	None *	0.712374	101.5267	69.81889	0.000
At most 1 *	0.645490	67.33920	47.85613	0.0003	At most 1 *	0.589028	64.14386	47.85613	0.0007
At most 2 *	0.503244	36.22865	29.79707	0.0079	At most 2 *	0.526072	37.46694	29.79707	0.0054

At most 3	0.257188	15.23899	15.49471	0.0546	At most 3	0.253136	15.06592	15.49471	0.0579
At most 4 *	0.189945	6.319612	3.841466	0.0119	At most 4 *	0.189679	6.309743	3.841466	0.0120
Trace test indicates 4 cointegrating eqn(s) at the 0.05					Trace test indicates 4 cointegrating eqn(s) at the 0.05				
* denotes rejection of the hypothesis at the 0.05 level					* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values 19.08594					**MacKinnon-Haug-Michelis (1999) 634.6574				

Source: Author's Computation from E-view 9 software

Table 2b: Max-eigen Value Statistics Result

Series: ASR INT EXR INF GDP **Series: INV INT EXR INF GDP**

Model I (Dependent Variable = *ASR*) SAVINGS					**Model II (Dependent Variable = INV*)* INVESTMENT**				
Hypothesized No of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob.	Hypothesized No of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob.
None *	0.675889	33.80007	33.87687	0.0511	None *	0.712374	37.38287	33.87687	0.0183
At most 1 *	0.645490	31.11056	27.58434	0.0169	At most 1	0.589028	26.67692	27.58434	0.0650
At most 2 *	0.503244	20.98966	21.13162	0.0523	At most 2 *	0.526072	22.40102	21.13162	0.0330
At most 3	0.257188	8.919378	14.26460	0.2929	At most 3	0.253136	8.756181	14.26460	0.3070
At most 4 *	0.189945	6.319612	3.841466	0.0119	At most 4 *	0.189679	6.309743	3.841466	0.0120
Max-eigenvalue test indicates 4 cointegrating eqn(s) at the					Max-eigenvalue test indicates 3 cointegrating eqn(s) at				
* denotes rejection of the hypothesis at the 0.05 level					* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values					**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Computation from E-view 9 software

Table 2c: Normalized Co-integrating Coefficients

Series: ASR INT EXR INF GDP **Series: INV INT EXR INF GDP**

Model I (Dependent Variable = *ASR*) SAVINGS					**Model II (Dependent Variable = INV*)* INVESTMENT**				
1 Cointegrating Equation(s): Log likelihood 189.1248					1 Cointegrating Equation(s): Log likelihood 183.7160				
Normalized cointegrating coefficients (standard error in parentheses)					Normalized cointegrating coefficients (standard error in parentheses)				
ASR	INT	EXR	INF	GDP	INV	INT	EXR	INF	GDP
1.0000	2.698556	-0.210573	-1.473090	-0.229908	1.0000	-0.899359	0.403056	-0.717692	-1.376101
	(0.76043)	(0.28662)	(0.25994)	(0.19556)		(0.31428)	(0.11636)	(0.10743)	(0.07772)

Source: Author's Computation from E-view 9 software

Table 2a and Table 2b showed the unrestricted cointegration rank test in which the former table showed the Trace Statistics test while the latter showed the Max-Eigen Statistics test. However, Table 3a revealed that Trace test indicates 4 cointegrating equations at 5% level of significance for both model one and model two respectively while Table 2b revealed that the Max-Eigen

value test indicates 4 cointegrating equations at 5% level of significance for model one and 3 cointegrating equations at 5% level of significance for model two.

Moreover, Table 2c indicates the long-run cointegration equation among the variables in the models. The analysis of model one in Table 2c revealed interest rate (INT) depict a positive longrun relationship with savings, the result conform to the economic *apriori* expectation of positive relationship. As a result 1% change in INT will lead to about 269% increase in savings. Conversely, exchange rate (EXR) does not conform to the *apriori* positive economic expectation, implying a negative relationship between exchange rate and savings in Nigeria. As a result 1% increase in exchange rate will further decrease the level of savings in the economy by 21%. Interestingly, inflation rate conform to the economic *apriori* negative expectation which indicate that inflation has negative long run relationship with savings in Nigeria, hence, a percentage increase in inflation will decrease the level of savings in Nigeria by 147%. Lastly on the model one, gross domestic product (GDP) failed to conform to the economic *apriori* of positive relationship. This implies that gross domestic product has a negative long run relationship with savings and will reduce the level of savings in the economy by 22%.

Taking a careful look at the analysis of model two is it evidently seen that interest rate and gross domestic product do not conform to the economic *apriori* expectation of positive relationship while exchange rate and inflation rate do conform to the economic *apriori* expectation of positive relationship. Specifically, against what was recorded in the model one, interest rate has negative longrun relationship with investment; by implication 1 percent increase in interest rate will decrease the degree of investment in the economy by 89% which is not good for the country at this point in time. Exchange rate maintained a positive relationship with investment unlike the negative relationship it posits on savings in the model one. This thereby implies that exchange rate has propensity to increase investment in an economy, hence contributing to about 40% increase in investment. The result of inflation and gross domestic product is not far fetch from what was registered in the model one implying that inflation rate and gross domestic product simultaneously have negative long run relationship with economic growth in Nigeria. As a result any attempt to increase inflation rate and gross domestic product in the country will further cause a decrease in investment by 71% and 13.76% respectively.

Error Correction Mechanism (ECM)

Having identified the co-integrating vector using the Johansen Cointegration Test, the study proceeds to investigate the dynamics of the model. The Error Correction Mechanism (ECM) intends to validate the presence of long-run relationship and incorporate the short-run dynamics into the long-run equilibrium relationship.

Overparameterized Error Correction Model

Table 3a: Overparameterized Error Correction Model Result

Model I (Dependent Variable = *ASR*) SAVINGS					**Model II (Dependent Variable = INV*)* INVESTMENT**				
Variable	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**	**Variable**	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**
C	-0.003688	0.123141	-0.029948	0.9764	C	0.028671	0.085389	0.335766	0.7409
ASR(-1)	0.001259	0.133570	0.009429	0.9926	INV(-1)	-0.008103	0.029487	-0.274806	0.7866
D(INT,2)	0.047624	0.287120	0.165869	0.8701	D(INT,2)	0.482153	0.331678	1.453675	0.1633
D(INT(-1),2)	-0.124573	0.223771	-0.556700	0.5846	D(INT(-1),2)	0.411180	0.263453	1.560736	0.1360
D(EXR,2)	-0.581146	0.273773	-2.122727	0.0479	D(EXR,2)	-0.068881	0.324119	-0.212518	0.8341
D(EXR(-1),2)	-0.205666	0.228852	-0.898686	0.3807	D(EXR(-1),2)	0.055774	0.266774	0.209069	0.8367
D(INF,2)	0.019724	0.064872	0.304046	0.7646	D(INF,2)	0.012761	0.076580	0.166641	0.8695
D(INF(-1),2)	0.079414	0.090502	0.877484	0.3918	D(INF(-1),2)	-0.053767	0.107608	-0.499657	0.6234
D(GDP,2)	-0.686779	0.786611	-0.873086	0.3941	D(GDP,2)	1.334122	0.844137	1.580456	0.1314
D(GDP(-1),2)	0.641681	0.668898	0.959310	0.3501	D(GDP(-1),2)	0.011986	0.779929	0.015367	0.9879
ECM(-1)	-0.852990	0.289764	-2.943739	0.0087	ECM(-1)	-1.020487	0.270074	-3.778543	0.0014
R-squared			0.706945		*R-squared*			0.615873	
Adjusted R-squared			0.544136		*Adjusted R-squared*			0.402468	
F-statistic			4.342189		*F-statistic*			2.885945	
Durbin-Watson stat			2.554148		*Durbin-Watson stat*			2.105429	
Prob(F-statistic)			0.003376		*Prob(F-statistic)*			0.024285	

Source: Author's Computation from E-view 9 software

The overparameterized error correction mechanism (ECM) was carried out in order to identify the main dynamic of the model and ensure that the model have not been constrained by a too short lag length. The overparameterized ECM presented in Table 3a shows that there truly exist long-run equilibrium relationship among the variables. This is evident by the coefficient of one period lag of ECM in the model one and two which is statistically significant and the correctly signed ECM (-0.852990) and (-1.020487) respectively.

Hence, about 85% and 102% (an increase) of the short-run inconsistencies are being corrected and incorporated into the long-run equilibrium relationship annually. However, looking at the result carefully, it is evidently seen that all the other variables were not significant at 5% which implies further enquiry of ECM. Therefore for concise interpretation of the error correction model, less significant variables or variables with higher values were removed from each pairs in the over-parameterized model for a parsimonious error correction model to be generated.

Parsimonious Model

Table 3b: Parsimonious Error Correction Model Result

Model I (Dependent Variable = *ASR*) SAVINGS					**Model II (Dependent Variable = INV*)* INVESTMENT**				
Variable	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**	**Variable**	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**
C	0.004021	0.115973	0.034670	0.9727	C	0.036883	0.077312	0.477061	0.6380
ASR(-1)	-0.005227	0.125329	-0.041709	0.9671	INV(-1)	-0.011102	0.026490	-0.419110	0.6792
D(INT(-1),2)	-0.178272	0.198414	-0.898485	0.3787	D(INT(-1),2)	0.276669	0.223422	1.238326	0.2286
D(EXR,2)	-0.527975	0.175803	-3.003229	0.0065	D(EXR(-1),2)	0.061679	0.179986	0.342690	0.7351
D(INF(-1),2)	0.029287	0.054537	0.537017	0.5966	D(INF(-1),2)	0.046110	0.068183	0.676271	0.5059
D(GDP(-1),2)	0.710840	0.482810	1.472296	0.1551	D(GDP,2)	1.286058	0.590899	2.176442	0.0405
ECM(-1)	-1.030797	0.239692	-4.300497	0.0003	ECM(-1)	-0.955175	0.235573	-4.054684	0.0005
R-squared			0.659994		*R-squared*			0.564369	
Adjusted R-squared			0.567265		*Adjusted R-squared*			0.445560	
F-statistic			7.117448		*F-statistic*			4.750234	
Durbin-Watson stat			2.349479		*Durbin-Watson stat*			2.131461	
Prob(F-statistic)			0.000260		*Prob(F-statistic)*			0.003027	

Source: Author's Computation from E-view 9 software

The results of the parsimonious error correction model as presented in Table 3b for model one and model two above shows the coefficient of the parameters estimated, alongside with the standard errors, t-values and the probability values used in conducting diagnostic test to verify the stability and predictive accuracy of the series. The result revealed that there existed pronounced feed-back of the previous period disequilibria, from the long-run trends of the series. Specifically, the results indicated feed-backs of about 103 percent and 95 percent for model one and two respectively, from the previous period disequilibria between the present and past values of variables. The result showed that the ECM coefficients of the series is significant and correctly signed, thus validating the presence of long run relationship amidst the variables and that about 103 percent for model one and 95 percent for model two of the short run inconsistencies are corrected and incorporated into the long run dynamics, annually.

In the parsimonious ECM result of model one, the study indicates that interest rate is negative and statistically insignificant at 0.05% level of significance. This result does not conform to the earlier expectation of positive relationship but in consonance with empirical findings of Nwakeze and Omoju (2011) who concluded that interest rate has insignificant negative effect on national savings in Nigeria. However, 1% change in interest rate will reduce savings rate by 17%. Also, the result of exchange rate does not conform to the positive expectation. This means that exchange rate has a negative though with a significant effect on

savings rate in Nigeria and by implication 1% change in exchange rate will decrease the savings rate by 52%. It should therefore be noted that the result does not conform to the *apriori* expectation of positive relationship but consistence with empirical findings of Simon-Oke and Jolaosho (2013) who concluded negative relationship between exchange rate and savings in Nigeria. Inflation rate revealed a positive and insignificant relationship with aggregate savings rate which does not conform to the *apriori* expectation of positive relationship but it is in conformity with the empirical study of Adesoye and Maku (2015) and Okere and Ndugbu (2015). As a result, 1% increase in inflation rate will yield about 2% increase in savings rate. Lastly, gross domestic product revealed an insignificant positive relationship with savings in Nigeria. This implies that 1% change in the level of gross domestic product will yield to about 71% change in aggregate savings rate in Nigeria. The positive relationship is in conformity with the earlier stated *apriori* expectation and in consistence with the study of Udede (2015) who concluded that gross domestic product has positive effect on savings in Nigeria.

The result also showed that the overall model is significant, given the F-statistics probability value of 7.117448. This implies that the R-square value of 66% is significantly different from zero. Thus the series is a good-fit. The Durbin Watson Statistics of 2.349479 revealed that there is no presence of serial auto-correlation between successive error terms.

Considering the analysis of ECM parsimonious result in model two, it is clear that interest rate depict an insignificant positive relationship with investment in the economy which by implication denotes that a percentage change in interest rate will yield to about 27% increase in investment. However, the result is in consistence with the *apriori* expectation of positive relationship. While the result is at variance with the finding of Durechi and Ojiegbe (2015) it is in consistence with Wuhan and Adnan (2015) who found positive relationship between interest rate and investment. More so, value of exchange rate is pronounced to be positive but with an insignificant effect on investment level in Nigeria. This denotes that 1% increase in exchange rate will increase the level of investment by 6%. This result however conformed to the expected positive relationship and in connection with the study of Oniore, Gyang and Nnadi (2016) who concluded significant relationship between exchange rate and domestic investment in Nigeria.

Conversely, inflation rate revealed a positive relationship with investment against the positive expected *apriori* expectation but in alignment with empirical finding of Davis-Ojima and Emerenini (2015) who found positive relationship between inflation rate and level of investment in Nigeria. This implies that a percentage change in inflation will positively affect investment in Nigeria by 4%. Gross domestic product conformed to the expected positive relationship with investment. This implies that gross domestic product has a significant positive relationship with investment in Nigeria. As a result, a percent change in the level of gross domestic product will

significantly increase investment by 12.86%. This conformation is in consistence with the study of Ocaya, Ruranga and Kaberuka (2013).

The result of the second model further showed that the overall model is significant, given the F-statistics probability value of 4.750234. This implies that the R-square value of 56% is significantly different from zero. Thus the series is a good-fit. The Durbin Watson Statistics of 2.131461 revealed that there is no presence of serial auto-correlation between successive error terms.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of study, it was observed that there is negative relationship between interest rate on deposit and savings which is not in conformity with the economic expectation. It was however revealed that there is a positive between interest rate on deposit and investment in Nigeria within the studied period which is in conformity with the economic expectation. No doubt, when money deposits in the bank increase due to increase in the interest rate of deposit, the propensity to save will rise. This implies that total savings will increase. More so, the volume of savings will boost investment level in the economy when the interest rate on loan is maximally reduced.

The result of this study is at variance with Ozioma, Idenyi, Chinyere and Eze (2016), concluded that interest rate has positive significant relationship with domestic savings in the long run and with an insignificant influence in the short run in Nigeria. Also at variance with Davis-Ojima and Emerenini (2015), concluded that high interest rate negatively affect investment. However, it is in agreement with findings of Otiwu, Okere and Uzowuru (2018), concluded that interest rate has non-significant negative effect on domestic savings in Nigeria. It also validates the findings of Wuhan and Adnan (2015), concluded that interest rate has negative relation in the long run but positive in short run.

RECOMMENDATIONS

Following the findings of the study, the following recommendations were of importance;

i. The CBN should adopt interest rate policy that will always boost the savings culture of the real sector. This can be achieved by increasing the interest paid to deposit made by individuals, local and foreign investors.
ii. Income generation by the sectors of the economy can be enhanced by providing enabling environment for business to thrive. This will certainly cause increase in the income (GDP) thereby contributing to the increase in the total savings of the country.

iii. There is greater need for government to retain tight monetary and fiscal policies in order fight inflation in the Nigeria economy since inflation has insignificant influence on domestic savings in Nigeria.

iv. A considerable portion of the savings should be directed into productive domestic investment so as to set in motion a virtuous cycle of saving, capital accumulation and growth.

v. Monetary authorities should also find ways of determining the rate at which interest should be maintained to encourage borrowing for investment purposes and exchange rate policies should consider the necessity of price and interest rate stability.

vi. Government should accelerate the pace of interest rate liberalization, improve investment channels and environment and improve the sensitivity of investment to rate in firms.

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