ISSN: 2635-2966 (Print), ISSN: 2635-2958 (Online).

Available online at http://www.atreview.org
Original Research Article

Determinants of Aggregate Savings in Nigeria

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Received:29 /01/2018 Accepted: 25/03/2018

Abstract

This paper examines the impact of national income; savings deposit rate and inflation rate on Nigeria's aggregate savings from 1982 to 2016 using data collected from Central Bank of Nigeria (CBN) statistical bulletin (2016) and Databank of the Word Bank. Graphical and trend analysis, descriptive statistics and stationarity test were conducted in the study. For the estimation, we employ the Ordinary Least Squares (OLS) and Cointegration test. The regression result, in line with economic theory, suggests that national income and savings deposit rate have positive and significant impact on Nigeria's aggregate savings; while inflation rate is negative and not significant. The independent variables explain 98% of the total variation in aggregate savings. Johansen cointegration test indicates that a long-run, or equilibrium, relationship exists between savings and its determinants. The study recommends that effort should be geared towards improving per capita income in the country in a bid to accelerate investment and growth through savings.

Keywords: *Total Savings, National Income, Savings Deposit Rate and Inflation Rate*

JEL Classification Codes: *G51, G12, G13*

1.0 INTRODUCTION

Savings defines a part of disposable income not spent on current consumption of consumer goods but accumulated for investment in capital goods. Mathematically, savings is the difference between disposable income and consumption. Aggregate savings comprises of savings and time deposits with Deposit Money Banks (DMBs), deposits in federal savings and mortgage banks, national provident and life insurance funds and deposits in other deposit institutions. The importance of savings to the household, business and government sectors cannot be overemphasized. At the household level, the benefits of saving include hedging against unforeseen circumstances and rainy days, accumulation of funds for the purchase of homes and other household investments, provision for retirement, improvement of debt settlement and the acquisition of social services. Also, saving helps firms to accumulate funds necessary for investment in new capital goods and replacement of worn-out equipment and tools. To the government, saving helps to build fiscal buffers thereby encouraging fiscal spending during recession.

For a country to achieve economic growth and development, several forms of investment must be carried out in the areas of education, health, agriculture, manufacturing and other sectors. These investments require huge monetary resources. The extent to which a country can embark on these developmental projects depends largely on the volume of savings. However, the availability of savings does not automatically translate to investment and growth as intermediation must occur for accumulated savings to reach the hands of investors; the investors, in turn, must be willing to invest in productive ventures that can create income, output and employment. If the level of savings is too low (savings-investment gap), the economy will rely on foreign resources to finance domestic investments thereby making the economy susceptible to external shocks and political interference from abroad.

Theoretically, the level of aggregate savings in an economy at a particular time is determined by many factors, amongst them are: level of national income, savings deposit rate and inflation rate. This study aims to find out how these variables affect the volume of savings in Nigeria. First, the ability to save depends on the size of the national income in that the higher the national income, the higher the per capita income which consequently enhances the power to save. The low level of national income is regarded as one of the most important factors that cause insufficient savings in the Less Developed Countries (LDCs). In addition, the higher the interest paid to deposits, the higher the level of savings because people will want to take advantage of a higher interest rate by depositing more funds in banks. However, the rate of inflation has a negative impact on savings in that the value of money decreases with increase in price level causing people to save less for fear of loss in money value.

Despite the benefits accruable from saving, its level has been low in Nigeria. According to Soludo (2004), some factors that have contributed to low level of savings in Nigeria include: banks' neglect of small and medium class savers in favour of government deposits, low level of savings mobilization at the grass-

root level because banks set unrealistic requirements that must be met before accounts can be opened with them, and low and negative savings deposit rates have compounded the problems of low domestic savings.

It is in the light of the above that this study aims to examine the relationship between aggregate savings and its determinants in Nigeria from 1982 to 2016, in a bid to make recommendations on how to boost the volume of savings. This paper is organized as follows: In the next section, some previous studies on the determinants of savings are presented and it is followed by the research methods. Results and discussion are reported in the subsequent section and a final section gives the conclusion and recommendations.

2. 0. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Several studies have been carried out to determine the relationship between savings and its factors. This section will present the empirical results of those studies.

By employing the Vector Auto regression (VAR), Simon-Oke and Jolaosho (2013) empirically assessed the impact of real interest rate on savings mobilization in Nigeria using the time series data from 1980 to 2008 and found out that real interest rate has negatively impacted on the level of savings mobilization in Nigeria.

However, Eze and Okpala (2014) investigated the impact of selected proximate determinants of domestic private savings (gross domestic product, money supply, real interest rate, and inflation rate) in Nigeria for the sample period 1970 to 2010. The variables became stationary after first differencing and are cointegrated. The estimated regression result proves that the independent variables are positively related to domestic private savings and long run regression indicated that all the variables are highly significant determinants of private domestic savings in Nigeria.

In South Africa, Precious and Asrat (2014) examined the determinants of household savings (age dependency ratio, the level of household income, inflation and real interest rate) from 1990 to 2011 by basing their study on the life cycle hypothesis. The results of the study reveal that contrary to a theoretical expectation, the level of income and household savings are negatively related, implying that South African households do not only save but increasingly rely on debt to finance their spending. On the other hand, age dependency ratio, inflation and real interest rate have positive long run relationships with household savings rate. Ogbokor and Samahiya (2014) empirically examined how income, inflation, deposit rate, money supply and population growth determine savings in Namibia through the use of cointegration and error correction mechanisms for the period running from 1991 to 2012. The results suggest that inflation and income have positive impact on savings, whilst population growth rate has negative effects on savings. In addition, deposit rate and financial deepening have no significant effect on savings. The results of the cointegration tests suggest that there is a long-run relationship between savings and the explanatory variables.

Using the error correction model, Adelakun (2015) proved that a positive relationship exist between savings, investment and economic growth in Nigeria. Inflation rate, which was used as a determinant of savings, negatively affects saving, while interest rate positively affects saving. Adesoye and Maku (2015) critically investigated the key determinants of financial savings and implications of monetary policy instruments on its variability in Nigeria between 1980 and 2008. The empirical results from the Engle Granger Cointegration test show a negative influence of GDP growth per capital income, broad money supply and debt service ratio and positive influence of real interest rate, interest rate spread and domestic inflation rate in the long-run.

Ozioma *et al.* (2016) employed vector error correction model and Granger causality test to examine how gross domestic product per capita, household consumption, nominal interest rate and domestic credit to private sector affected private domestic savings in Nigeria from 1980 to 2015.The results show that stable long run relationship was found to exist between the dependent and explanatory variables and 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. Furthermore, income was found to have significant and negative impact on domestic private savings in the long run and insignificant impact in the short run in Nigeria within the period under study.

3. 0 RESEARCH METHODS

The study employed pre-estimation analysis such as descriptive statistics and stationarity test. The descriptive statistics was used to reveal the behaviour of the time series while the stationarity test was employed to find out if the time series is stationary or not. The estimation methods adopted are: cointegration test for testing the long run, or equilibrium, relationship between the variables and Ordinary Least Squares. Results are derived from **EViews 8**.

3.1. Theoretical Framework and Model Specification

This study is based on the Classicalist theory and the Life Cycle Hypothesis. According to the classical theory, the supply of savings comes from the household. By spending a portion of their disposable income in the current period, the household contributes to future investment and growth. The Classicalists regard interest as a positive determinant of saving. That is, the higher the level of interest, the higher the volume of savings and *vice versa.* This can be expressed mathematically as:

$S = f(R)$ (1)

$$\frac{dS}{dR} > 0$$

Where;

S = savings

R = interest

On the other hand, the life-cycle hypothesis was formulated by Modigliani and has been applied to the study of savings over the years. According to this hypothesis, an individual has an income stream that is relatively low at the beginning and at the end of his life when his productivity is low and high during the middle (most productive) years of his life. The model stipulates that in the early years of a person's life, he is a net borrower. In the middle years, he saves to repay his debts and to provide for retirement. In the later years, he dissaves. An important contribution of this hypothesis is that it identified level of income as a determinant of savings.

Drawing from the analysis above on the classical theory and the life cycle framework, the following model wasspecified:

$$TSV = f(GDP, SDR, IFR) \quad (2)$$

Specifically, the linear econometric form of Equation (2) is presented as follows:

$$TSV = \beta_0 + \beta_1 GDP + \beta_2 SDR + \beta_3 IFR + U \quad (3)$$

Where;

TSV = Total Savings

GDP = Gross Domestic Product (Nominal)

SDR = Savings Deposit Rate

IFR = Inflation Rate

β_0 = Intercept

$\beta_1, \beta_2, \beta_3$ = the coefficients (parameters) of the explanatory variables. β_1 and$\beta_2 > 0$; $\beta_3 < 0$

U = the error term which captures all the variables that affect the TSV but are not included in the model.

4.0 RESULTS AND DISCUSSION

The type of data required for this study is the secondary data sourced from the publication of the Central Bank of Nigeria (CBN) and Online databank of the Word Bank for the time period 1982 to 2016. Total Savings (TSV)is used as a proxy for aggregate savings while Gross Domestic Product(GDP), Savings Deposit Rate (SDR) and Inflation Rate (IFR) are used as the determinants of savings in Nigeria.

4.0. Graphical and Trend Analysis of Data

Figure 1: Graph showing TSV

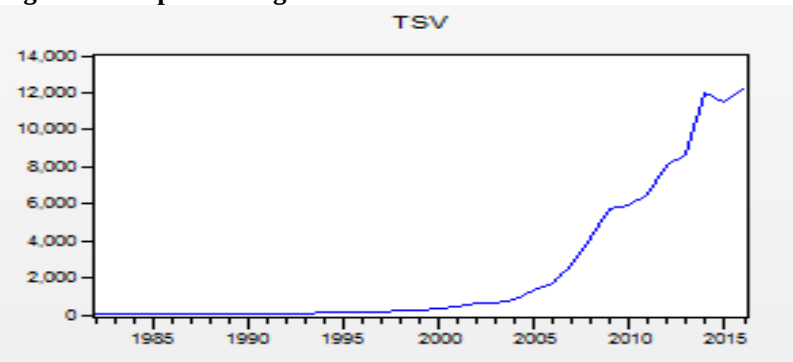


Figure 2: Graph showing GDP

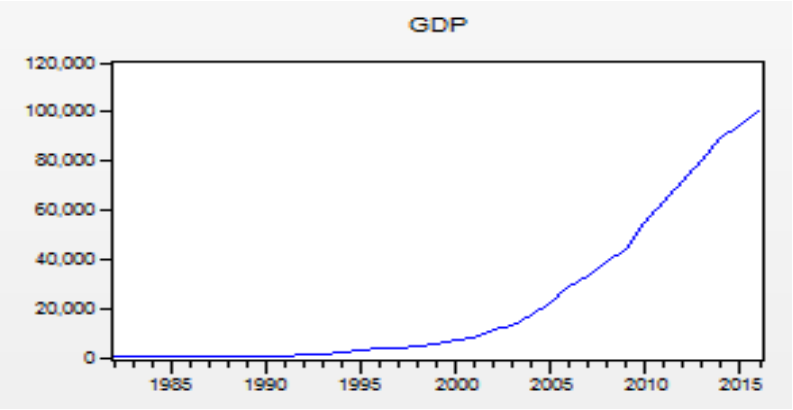


Figure 3: Graph showing SDR

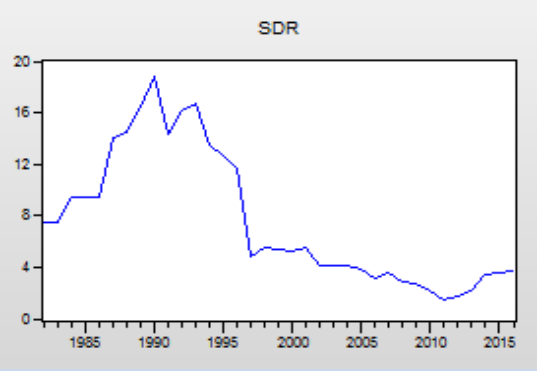
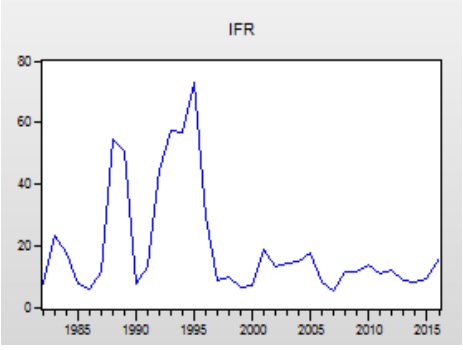


Figure 4: Graph showing IFR



Figures 1, 2, 3 and 4 are graphs of the data for TSV, GDP, SDR, and IFR. The first impression that we get from these graph is thatwhile TSV and GDP seem to be trending upwards; SDR and IFR show irregular patterns.

The time series for total savings tends upwards. In 1982, its value was ₦7.51billion. TSV maintained an increasing trend until in 1995 when it slightly fell to ₦108.49billion from ₦110.97billion that was recorded the previous year. From 1995, it rose steadily but dropped to ₦11,485.13billion in 2015 from the ₦12,008.24billion recorded in 2014.TSV in Nigeria witnessed an all time high of ₦12,320.23 billion in 2016 and a record low of ₦7.51 billion in 1982. Similarly, the GDP maintained an increasing trend throughout the period under review. In the year 1982, GDP was ₦154.98 billion; it rose to ₦499.68 billion in year 1990. Ten years later, GDP was at ₦6,897.48 billion and in 2010, its value increased to ₦54,612.26 billion. GDP in Nigeria witnessed an all time high of ₦101,489.49 billion in 2016 and a record low of ₦154.98 billion in 1982.

From Figure 3, Savings Deposit Rate (SDR) stood at 7.5% in 1982, increased to18.80% in 1990, greatly fell to 5.29% after ten years. In 2010, savings deposit rate continued its free fall and was recorded at 2.21% but marginally rose to 3.75% in 2016. SDR in Nigeria reached an all time high of 18.80% in 1990 and a record low of 1.41% in 2011. Figure 4 shows thatthe rate of inflation in Nigeria stood at 7.7% in 1982. The IFR maintained an irregular trend throughout the period under review, increasing to 23.2% in 1983 and falling to 17.8% the following year. IFR was at 7.3% in 1990, dropped to 6.9% in 2000, increased significantly to 13.7% in 2010 and 15.7% in 2016. Inflation rate was at its highest in 1988 when it recorded 54.5% and a record low of 5.3% billion in 2007.

4.1. Descriptive Statistics

The characteristics of the distribution of the variables are presented in Table 1 below. Skewness and Kurtosis are measures of shape, that is, they provide insights into the shape of a distribution. Specifically, skewness is a measure of symmetry in a distribution. A perfectly symmetrical dataset (e.g. a normal distribution) will have a skewness of zero. TSV, GDP, SDR and IFR are positively skewed, implying that they have long right tails. Kurtosis measures peakedness or flatness of a distribution. Since the TSV, GDP and IFR exceed 3, they are leptokurtic (peaked) while SDR (being lower than 3) is platykurtic (flat) relative to normal.

Table 1: Descriptive Statistics Result

	TSV	GDP	SDR	IFR
Mean	2425.121	23029.06	7.574703	19.56848
Median	277.6675	5307.362	5.330000	12.21701
Maximum	12320.23	101489.5	18.80000	72.83550
Minimum	7.514400	154.9784	1.410541	5.382224
Std. Dev.	3848.958	31507.40	5.198982	17.94746
Skewness	1.514742	1.287464	0.688555	1.647443
Kurtosis	3.915542	3.276330	2.066752	4.414909
Jarque-Bera	14.60665	9.780479	4.035767	18.75161
Probability	0.000673	0.007520	0.132937	0.000085
Sum	84879.22	806017.0	265.1146	684.8969
Sum Sq. Dev.	5.04E+08	3.38E+10	918.9999	10951.79
Observations	35	35	35	35

4.2. Stationarity Test

The results of the Augmented Dickey-Fuller Test are shown in Tables 2, 3 and 4 for all the variables. As revealed, GDP isintegrated of order 0, (stationary before differencing); TSV and IFR are integrated of order 1, (stationary after first differencing); while SDR is integrated of order 2, (stationary after second differencing). The ADF observed statistic for TSV, GDP, SDR and IFR are -2.75,-2.89, -10.21 and -5.30 respectively. All are more negative than their corresponding 5% critical values at their respective differences and thus null hypotheses of nonstationarity are rejected, implying the absence of unit roots among the variables.

Table 2: Augmented Dickey-Fuller Test on TSV, GDP, SDR and IFR (Levels)

Variable	**ADF Statistic**	**5% critical value**	**Order of Integration**
TSV	**-0.82**	**-1.95**	**I(0)**
GDP	**-2.89**	**-1.95**	**I(0)**
SDR	**-0.80**	**-1.95**	**I(0)**
IFR	**-1.72**	**-1.95**	**I(0)**

Table 3: Augmented Dickey-Fuller Test on TSV, GDP and IFR (First Difference)

Variable	ADF Statistic	5% critical value	Order of Integration
TSV	**-2.75**	**-1.95**	**I(1)**
GDP	**0.51**	**-1.95**	**I(1)**
SDR	**-1.81**	**-1.95**	**I(1)**
IFR	**-5.30**	**-1.95**	**I(1)**

Table 4: Augmented Dickey-Fuller Test on SDR (Second Difference)

Variable	ADF Statistic	5% critical value	Order of Integration
SDR	**-10.21**	**-1.95**	**I(2)**

4.3. Cointegration Test

Johansen's test was carried out to check if the total savings function has a long-run, or equilibrium, relationship. Tables 5 and 6 show that both the trace and maximum eigenvalue statistics reject the null of no cointegration at the 5 percent level. Both the trace and maximum eigen value tests indicated that there is one cointegrating equations at the 5 percent level. This means that that a linear combination of all the four series was found to be stationary and thus, are said to be cointegrated. In other words, there is a stable long-run, or equilibrium, relationship between total savings and its determinants in Nigeria; so we can avoid both the spurious and inconsistent regression problems which otherwise would occur with regression of non-stationary data series.

Table 5: Unrestricted Cointegration Rank Test (Trace)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.700889	66.89597	47.85613	0.0003
At most 1	0.424213	27.06688	29.79707	0.1000
At most 2	0.232000	8.850309	15.49471	0.3794
At most 3	0.004217	0.139449	3.841466	0.7088

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 6: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.700889	39.82908	27.58434	0.0008
At most 1	0.424213	18.21657	21.13162	0.1219
At most 2	0.232000	8.710860	14.26460	0.3110
At most 3	0.004217	0.139449	3.841466	0.7088

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

4.4. Regression Analysis

The result obtained using the Ordinary Least Squares (OLS) is presented below in Table 7.This result agrees with the findings ofEze and Okpala (2014) that gross national income and real interest rate are positive determinants of savings.

The intercept appears with a negative sign and is statistically significant. Thus, there is a significant relationship between savings and the intercept. The regression coefficients of GDP and SDR appear with positive signs, suggesting that increase in national income and savings deposit rate will lead to an increase in total savings. These results conform to a priori expectation and they are statistically significant. Furthermore, the negative sign of IFR conforms to economic theory meaning in that the value of money decreases with increase in price level causing people to save less for fear of loss in money value but the coefficient is not statistically significant.

The R-Squared of 0.98 suggests that the variation in the dependent variable, TSV, that is explained by the independent variables, GDP, SDR and IFR, is

98%; the remaining 2% is explained by other factors that affect the total savings of Nigeria but are not included in the model but are accounted for by the error term. Therefore, the explanatory power of the model is 98% which is a good fit. The F-Statistic tests the overall significance of the model. The overall model is found to be significant at 5% level of significance. The test for serial correlation was carried out using the Breusch-Godfrey Test, as against the D-W test, because the former is a more general test than the latter which is only valid for testing the possibility of a first order autoregressive model.

Table 7: Regression Result

Dependent Variable: TSV
Method: Least Squares
Date: 12/11/17 Time: 11:58
Sample: 1982 2016
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1119.065	242.0216	-4.623821	0.0001
GDP	0.129129	0.003606	35.81269	0.0000
SDR	88.51339	26.27393	3.368867	0.0020
IFR	-5.110537	6.211269	-0.822785	0.4169

R-squared	0.984155	Mean dependent var	2425.121
Adjusted R-squared	0.982622	S.D. dependent var	3848.958
S.E. of regression	507.3909	Akaike info criterion	15.40365
Sum squared resid	7980812.	Schwarz criterion	15.58141
Log likelihood	-265.5639	Hannan-Quinn criter.	15.46501
F-statistic	641.8333	Durbin-Watson stat	1.343500
Prob(F-statistic)	0.000000		

4.5. Robustness Check

To test for the robustness of the results obtained, the study used tests for serial correlation, heteroskedasticity and normality at 5% level of significance. The results obtained using all these tests confirm that findings are reliable and robust.

4.5.1. Serial Correlation Test

Table 8: Breusch-Godfrey Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.599450	Prob. F(2,29)	0.2193
Obs*R-squared	3.477185	Prob. Chi-Square(2)	0.1758

From the result above, we accept the null hypothesis of no autocorrelation in the residuals since the *p*-value of the R-Squared, 0.17, is greater than 0.05.

4.5.2. Heteroskedasticity Test

Table 9: Breusch-Pagan-Godfrey Test

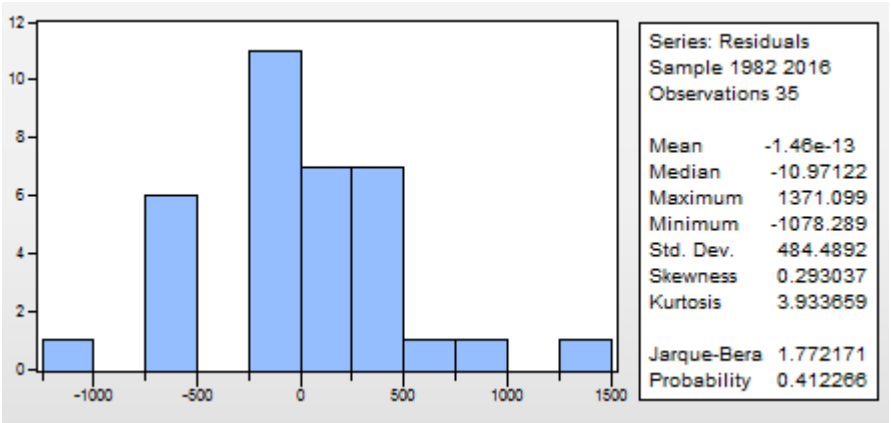
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.279796	Prob. F(3,31)	0.0989
Obs*R-squared	6.326175	Prob. Chi-Square(3)	0.0968
Scaled explained SS	7.279611	Prob. Chi-Square(3)	0.0635

From the result above, we accept the null hypothesis of homoskedasticity in the residuals since the *p*-value of the R-Squared, 0.09, is greater than 0.05.

4.5.3. Histogram - Normality Test

Table 10: Jacque-Bera Normality Test



From the Jacque-Bera test, we accept the null hypothesis that the residuals are normally distributed since the *p*-value of Jacque-Bera, 0.41, is greater than 0.05.

5. 0. CONCLUSION AND RECOMMENDATIONS

This paper has followed a systematic and logical process to investigate the impact of national income; savings deposit rate and inflation rate on Nigeria's total savings from 1982 and 2016. The estimated regression result shows that national income and savings deposit rate have positive and significant impact on total savings in Nigeria for the period under review; while inflation rate is negative and insignificant. The cointegration test shows a long run relationship between savings and its determinants. Based on the findings of this research, we proffer the following recommendations:

First, efforts must be made towards expanding the productive base of the economy in order to promote real national income growth. For this to be

achieved, the Nigerian economy needs to be restructured to promote competition and diversification. This policy thrust should include an increase in capital expenditures which will promote agricultural and infrastructural development, stable electricity and an enterprising private sector.

In addition, it is advisable for the CBN to continue its efforts to control inflation in the country as that would lead to a general improvement in savings; while concomitantly encouraging an increase in the interest paid to deposits.

Finally, this paper suggests the expansion of the model used in this study to accommodate other determinants of savings. The use of more advanced econometric tests may be used for a more robust empirical result.

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