



The Determinants of Domestic Private Savings in Nigeria

Elom-Obed Favour Ozioma¹, Odo Stephen Idenyi^{1*}, Udude Celina Chinyere¹
and Alfred Okonkwo Eze²

¹Department of Economics, Ebonyi State University, PMB 053, Abakaliki, Ebonyi State, Nigeria.

²Department of Social Studies, Federal College of Education, Eha-Amufu, Enugu State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author EOFO designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author OSI reviewed theoretical and empirical literature, developed the model of the study, did the econometric analysis and interpretation while author UCC supervised the research process and author AOE edited the final manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJEMT/2016/27712

Editor(s):

- (1) Igor Matyushenko, Department of Foreign Economic Relations, V. N. Karazin Kharkiv National University, Ukraine.
(2) Kamarulzaman Ab. Aziz, Director, Entrepreneur Development Centre, Multimedia University, Persiaran Multimedia, 63100 Cyberjaya, Malaysia.
(3) John M. Polimeni, Associate Professor of Economics, Albany College of Pharmacy & Health Sciences, New York, USA.

Reviewers:

- (1) Anonymous, St. Mary's University, Texas, USA.
(2) Boadi Eric Kofi, University of Electronic Science and Technology of China, China.
(3) Anonymous, University for Development Studies, Ghana.
(4) António Bento Caleiro, Universidade de Évora, Portugal.
(5) Rebecca Abraham, Nova Southeastern University, USA.

Complete Peer review History: <http://www.sciencedomain.org/review-history/16401>

Original Research Article

Received 15th June 2016
Accepted 23rd September 2016
Published 30th September 2016

ABSTRACT

This study examined 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 (INTRT) 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

*Corresponding author: E-mail: odostephen32@gmail.com;

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.

Keywords: Domestic private savings; income; household consumption; interest rate; Nigeria.

1. INTRODUCTION

1.1 Background to the Study

Savings is the amount of income per time period that is not consumed by economic units. For the households, it represents that part of disposable income not spent on domestically produced or imported consumption goods and services. For the firm, it represents undistributed business profits. It is pertinent to point out that savings is flow variable, being measured overtime. Economists believe that savings and investment are necessary requirement for the growth and development of countries, therefore decline in savings will lead to decrease in investment and in turn a decline in economic growth and development of the country. [1] stated that the higher the increase in the rate of investment, the greater the rate of capital formation, which eventually encourage growth and development. Economists see domestic savings as disposable income minus consumption expenditure. In other words, it is seen as income that is not used for purchasing of goods and services for the purpose of consumption. Therefore for the purpose of this study, the researcher emphasize that savings refer to deposits in financial institutions. Thus, the study focuses on financial savings of households held by banks, micro finance institutions, Esusu groups and other savings avenue.

Based on the definition above it is very clear that savings has relationships with investment. Therefore savings are very important in order to increase the amount of capital available and also increase in savings is vital but not a sufficient condition for investment. Savings are strategic variable in the theory of economic growth and its role as a determinant of economic growth has been emphasized by classical economists. In many developing economies particularly Africa, savings and investments are necessary engines for capital formation hence economic growth.

Sufficient savings are needed by the economy of any country in order to fund investment expenditure which will in turn boost the economic growth of such a country or else the country has no option than to borrow domestically or externally. Nonetheless, borrowing from abroad can have adverse effects on the balance of payments as these loans will have to be serviced in the future and it also carries a foreign exchange risk. So, sufficient private domestic savings are necessary for economic growth because it also forms part of the most important issues in development economics, and for developing countries, on how to stimulate investment, and how to bring about an increase in the level of savings to fund increased investment. In fact, the crucial role of domestic savings mobilization to the sustenance and reinforcement of the saving-investment-growth chain in developing countries has preoccupied development economists for decades [2]. Given this, the main thrust of this study is to empirically investigate the determinants of savings in the Nigerian economy. This study becomes crucial in the light of the need to provide necessary insight on how to foster rapid growth and development of the economy.

Historically, there is an obvious gap between the income level and savings rate in the economy due to the inability of the economic agents to benefit from accrued revenue from oil resulting in low investment and declining rate of capital formation in Nigeria. The role of savings in the promotion of economic growth and development in both developing and developed economies today had been noted by economists. Savings are very important in order to generate fund for investment [3].

Nigeria is among the developing countries that need fast and sustainable increase in investment growth; however, her private domestic saving rate was on the lowest for several decades. The savings level in Nigeria particularly in rural areas is very low and its patterns and determinants are

not empirically identified. In rural areas in Nigeria, savings is mainly made out of the income from agricultural produces, the flow of the income is irregular and seasonal which reduces the ability to save or poorly respond to the incentives which promote savings [4].

[5] and [6] agreed that the negative growth in real GDP in the mid 1980s may possibly be accredited to a multitude of factors of which decline in investment and savings are major ones. Nnanna affirmed also that savings and investment culture in Nigeria is very poor relative to most economies of the world. He indicated that private domestic savings which averaged 15.7 percent of GDP during the period 1986-1989 declined significantly to 6.0 per cent between 1990-1994 while in 1996 and 1999, this ratio stood at 13.2 per cent and 14.5 percent respectively.

Discussion of the trend of domestic private savings and income (GDPPC) in Nigeria using 5 years interval shows that domestic private savings in 1980 was 0.06% of the GDPPC and in 1985-1989 it increased to 0.4%, and in 1990-1994 domestic private savings decreased to 0.3%, from 1995-1999 it increased to 1.6%, during the period 2000-2004 domestic private savings increased to 7.6%, in 2005-2009 it declined to 7.2%, during the period 2010-2014 domestic private savings increased to 32.7%. Income (GDP per capita) was 17.3 trillion in 1980-1984 and during the period of 1985-1989 it increased to 17.5 trillion and in 1990-1994 it also increased to 20.2 trillion, from 1995-1999 it moved up to 22.5 trillion, while from 2000-2004 it increased to 37.9 trillion. In 2005-2009 the income increased to 51.4 trillion, the income (GDP per capita) also in 2010-2014 was 68.0 trillion.

This paper therefore investigates determinants of domestic private savings in Nigeria for the period of 1980-2015. The variables for the study are as follow; domestic private savings, income proxied by GDPPC, nominal interest rate and credit to private sector % of GDP (proxy for financial development) and household consumption.

2. THEORETICAL REVIEW

2.1 Classical Theory

The Classical Economists was the first group of economists that offered theoretical explanation on the determinants of savings and its significance. [7] observed the importance of savings when he stated that, "Capital is

increased by parsimony and reduced by prodigality and misconduct". Prior to 1936; the classical economists propounded their theory on the savings and asserted that a negative relationship existed between savings and interest rate. There exist negatively sloped supply curve of capital, implying that supply of capital increases in response to a decline of interest rate.

According to Adam Smith, the rate of investment which is an important determinant of economic growth is determined by the rate of savings in an economy. He did not believe in the possibility of any sort of leakage occurring between savings and investment, even though the activities are performed by different sets of people. In his system, savings and investment have been identified with each other and both are determined by the consideration of private profit. However he also notes that, the ability to save is constricted by income. In other words, when no profit can be made from investment, entrepreneurs lose their interest in investment activity and the economy reaches the Stationary state. He was of the view that savings is equal to investment, [7].

[8] held different view from that of Smith when he explained savings to bring about a reduction in effective demand by reducing the ability of people to consume, in turn bringing a decline in profits and investments. This is compared to Smith's view which postulated that savings always equals investment; hence, any act of savings would lead to an increase in wealth of the economy. According to Malthus, the capitalist wages is very poor and so, the total amount of the capitalist savings is not invested and savings can only produce income to the extent being invested. He argues that abstinence to consume on the part of the capitalist only contributes to growth if the savings are then invested. This means that if consumption is not controlled, growth will be retarded. He stated further that when the opportunities for profitable investment are exhausted, savings cannot be converted into investment. At this point abstinence on the part of the capitalist only reduces the amount of effective demand in the economy, thereby reducing the possibility of growth.

2.2 Keynesian Theory

[9] defined savings as the surplus of income over expenditure on consumption; this implies that savings are part of disposable income that has not been voted for consumption.

He maintained that on the aggregate, the surplus of income over consumption (otherwise called savings) is not different from additional capital equipment (i.e. Gross fixed capital formation or gross domestic investment). Savings are therefore a mere residual, the decision to consume and the decision to invest between them determines the volume of national income accumulated over a period.

Keynes also stated that, increase in income would result in higher savings rates, thereby making savings complementary to the consumption function. In its simplest form, the savings function is derived from the linear consumption function when the autonomous consumption expenditure is separated off. Keynes emphasised that, varying levels of income cannot be sustained in an economy unless the amounts of savings at these levels of income are offset by an equivalent amount of investment. Therefore, Keynesian theory draws the equilibrium relations between income, savings and investment. Savings are also the difference between income and planned consumption, i.e.

$$S = Y - C \quad (1)$$

Saving function is derived from the consumption function. Planned saving is a function of aggregate income, i.e.

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

Keynes' savings function has the following characteristics: Savings are stable function of income, varies directly with income and the rate of increase in savings are less than the rates of increase in income. This means that at very low levels of income as well as at zero income, since consumption is positive, savings must be negative. As income increases, dissaving vanishes and savings becomes positive. In Keynes' terminology, this feature suggests that the value of the marginal propensity to save (MPS) is positive but less than one, stated linearly as;

$$S = Y - C = Y - (a + bY); \text{ [where } C = a + bY \text{]} \quad (3)$$

$$\text{Or } S = -a + (1 - b) Y \text{ [} 0 < (1-b) < 1 \text{]} \quad (4)$$

2.3 Permanent Income Hypothesis

[10] in his Permanent Income Hypothesis (PIH) attempts to elucidate proportional and non proportional relationship between consumption and disposable income. In his view, he attributed

the causes of proportional relationship between consumption and disposable income on changes of wealth rather than measured income. He classified actual income and consumption into permanent and temporary components. According to him, the effect of a change is permanent or temporal, if such change affects consumption. His theory described how agents spread consumption over their lifetimes. The hypothesis supposed that a person's consumption at a point in time is determined not just by their current income but also by their expected income in future years, ie, their "permanent income". In its simplest form, the hypothesis states that changes in permanent income, rather than changes in temporal income are what drive the changes in a consumer's consumption patterns.

Friedman further explained income to consists of a permanent (anticipated and planned) and a transitory (windfall gain/unexpected) component. In the permanent income hypothesis model, the key determinant of consumption is an individual's lifetime income, not his current income. A consumer's permanent income is determined by their assets; physical (shares, bonds, property) and human (education and experience), these influences the consumer's ability to earn income. Workers save if they expect that their long-term average income, i.e. their permanent income, will be less than their current income. It is true that permanent income theory is concentrated mainly on long-run dynamics and relations, while Keynes focused primarily on short-run considerations. The emergence of the permanent income hypothesis (PIH) raised serious debates and different views tried either to verify or to falsify the theory of Friedman. In the later case, arguments were directed mainly towards stressing that the relation between consumption and disposable income still follows (more or less) the mechanism supposed by Keynes.

2.4 Financial Liberalization Theory

[11] and [12] explained that savings are not determined by income as postulated by [9] and [13] but by real interest rate. They viewed low interest as a cause of low saving which means that firms or business enterprises are discouraged to invest funds through the formal banking system. High real interest rate is seen as strengthening the market institution and increasing the level of savings. The authors argued that financial liberalization brings forth a shift from lower productivity investment to higher productivity investment intermediated by the

financial sector. It can equally discourage savings, especially if the saver targets a given level of future income [14].

The Financial Liberalization hypothesis as developed by [11] and [12] sees the role of government intervention in the financial markets as a major constraint to savings mobilization, investment, and growth. Government's role in controlling interest rates and directing credit to priority sectors of the economy in developing countries inhibits savings mobilization and impedes the holding of financial assets, capital formation, and economic growth. Indirectly, ceiling on deposit interest rates discourages financial savings, which leads to excess liquidity outside the banking system. According to [11] and [12], persistent government intervention and involvement in the financial system through the regulatory and supervisory network, particularly in controlling interest rates and the allocation of credit, tends to distort financial markets. Government intervention, thus adversely affect savings and investment decision of market participants and lead to fragmentation of financial mediation. The ultimate result is a financial repressed economy.

The central idea of [11] and [12] is that financial markets should be liberalized and allocation of credit determined by the free market. In this case, the real interest rate will adjust to its equilibrium levels and low yielding projects will be eliminated. This will lead to increase in overall efficiency of investment, savings and total real supply of credit would increase. This in turn induces a higher volume of investment which will then lead to economic growth. The main critique of the financial liberalization theory emanates from the imperfect information Paradigm. This school of thought disagrees with the proposition of these scholars and examines the problem of financial development in the context of information asymmetry and costly information that results in credit rationing. As observed by [15], asymmetric information leads to two serious problems, viz; adverse selection and moral hazard. The implication is that the information asymmetries of higher interest rates which actually follow financial reforms and financial liberalization policies in particular worsen risk taking throughout the economy and hence threatens the stability of the financial system, which can easily lead to financial crises while the Feedback theory suggests a two-way causality between economic growth and financial development.

2.5 Life Cycle Income Hypothesis

[16] propounded theories on life –cycle saving which agreed with Friedman's line of argument. They postulated the Life-Cycle Income Hypothesis (LIH) in which an individual maximizes present value of labour income over the remaining working life. Hence, the determinants of savings are current income, expected labour income and non-wealth. The life-cycle hypothesis suggests that individuals plan their consumption and savings behaviour over their life-cycle. They intend to level out their consumption in the best possible manner over their entire lifetimes, by accumulating when they earn and dis-saving when they are retired. The assumption is that all individuals choose to maintain stable lifestyles. This mean that people usually don't save up a lot in one period to spend furiously in the next period, but keep their consumption levels approximately the same in every period. The first period should be ignored otherwise housing depreciates below its marginal rate of substitution.

3. EMPIRICAL REVIEW

[3] empirically investigated the determinants of savings in Namibia through the use of co-integration and error correction mechanisms for the period running from 1991 to 2012. The study made use of quarterly and annual time series data sets. The paper relied heavily on unit root tests, co-integration and error correction procedures as ways of investigating the characteristics of the variables and the long-run relationship between savings and its determinants. The results of the co-integration tests suggest that there is a long-run relationship between savings and the explanatory variables used in the study. The results suggest that inflation and income have positive impact on savings, while population growth rate has negative effects on savings. They also explained that the deposit rate and financial deepening have no significant effect on savings. In addition, the results reinforced the work of [17] and opined that the need to achieve a higher rate of savings in Namibia by improving upon income levels cannot be overstretched.

[18] examined determinants of rural household Savings in the East Hararghe Zone, Oromia Regional State of Ethiopia using survey data generated from 700 sample households. The results of this study showed that 79.2% of the entire sample households had savings during the

survey time. From the probit model used for analysis, nine (9) variables, namely household head education level, livestock holdings, access to credit service, income, investment, training participation, contact with extension contacts, forms of savings and saving motives were found to have significant influence on the amount of households savings. The results of the study showed that rural households do save irrespective of their low income, which they save mainly in an informal savings institutions showing that there are high need for provision of formal financial savings institution for ease accessibility.

[19] investigated the determinants of domestic savings in West Africa from 1980-2006. The theoretical foundation for the study was anchored on Hall hypothesis of consumption. The Hall hypothesis states that consumption is a function of lifetime "permanent income", rather than income in each period independently. The model assumes that capital markets are perfect and interest rate varies over time across countries and consumers have rational expectations regarding the income generating process. The result showed that the sizes of effect of the dependency ratio and interest rate on domestic savings were negative and insignificant, growth of GDP though positive but statistically insignificant, only the government budget surplus and inflation rate are found to be statistically significant. The development of West Africa financial market has a positive effect on savings, and finally, the real interest rate, and terms of trade have insignificant impact on the level of saving in West Africa.

[20] studied the determinants of domestic savings in Ethiopia using time series annual data from 1970/71-2010/11. In the study, he made effort to identify the long run and short run determinants of domestic savings in Ethiopia using an ARDL bounds testing Approach and Error correction model (ECM) to capture both short run and long run relationships. The Estimated results revealed that growth rate of income (gPCI), budget deficit ratio (BDR) and inflation rate (INF) were statistically significant short run and long run determinants of domestic savings in Ethiopia. But, deposit interest rate (IR), current account deficit ratio (CADR) and financial depth (DFD) were found to be statistically insignificant determinants in the long run. However, in the short run, DFD and IR found to have statistically significant meaning in explaining domestic savings in Ethiopia. The speed of adjustment has value 0.63768 with negative sign, which showed the convergence of

savings model towards long run equilibrium. The overall findings of the study underlined the importance of raising the level of income in a sustainable manner, minimizing the adverse impacts of budget deficit and inflation rate and creating competitive environment in the financial sector.

[21] examined the role of various determinants of household savings in India with the latest available data. It employed ARDL approach for this purpose due to its suitability for estimating an equation with a mix of stationary and non stationary variables of order (1) and address potential endogeneity problems. The estimated results revealed that GDP, dependency ratio, interest rate, and inflation have statistically significant influence on household savings in India, both in the long run and short run. As regards policy implications, they suggested that ensuring price stability and avoiding any disruption to the growth process will be useful for augmenting savings and sustaining the savings-growth spiral in India.

[22] analyzed the determinants of savings behaviour of cooperative members in Tigray region of Ethiopia. The data for the study was obtained from randomly selected 120 rural household savers from eight financial cooperatives. The empirical analysis, using multiple regression model shows that gender, household income, amount of loan borrowed and year of cooperative membership significantly raise household savings. Therefore, these factors have to be considered in designing strategies aimed at improving the savings pattern of cooperative members.

[4] observed the relationship between savings, investment and economic growth. The outcome of the work was the determination of which of the inputs of production contributes more to economic growth in Nigeria. The study made use of time series data spanning twenty-nine years using error correction model. The result showed a positive relationship between savings, investment and economic growth in Nigeria. Of the determinants of savings considered in the study, inflation rate contributes negatively to savings, while interest rates positively affect savings. All these confirm economic theory. The striking feature of the study however is the confirmation of the impact of labour on economic growth, which according to the study far outweighs the contribution of capital.

[23] investigated private domestic savings by commercial banks and economic growth in

Nigeria. They reviewed theories on the determinants of private domestic savings and the impact of savings on economic growth; they also examined the determinants of private domestic savings in Nigeria during the period covering 1986 – 2010. The broad objective is to identify instruments to be used by commercial banks to mobilize savings and to also examine the impact of that private domestic savings on economic growth of Nigeria. They made an important contribution to the literature by evaluating the magnitude and direction of the effects of money supply, interest rate, inflation rate, exchange rate and per capita income on private domestic savings. They went further to examine the impact of private domestic savings and commercial banks credit to private sector on economic growth of Nigeria. The framework for analysis involved the estimation of a private domestic savings function and economic growth function derived from the Life Cycle Hypothesis. The study employed classical least squares method with the aid of Error-Correction modelling procedure, co-integration, Granger causality and stationarity test which minimize the possibility of estimating spurious relations, while at the same time retaining long-run information in the work; as well as the nature of causality between independent variables and dependent variables of the two functions specified in this research work. The results of the analysis showed that the money supply and per capita income are strong determinants of private domestic savings for the period under study and private domestic savings and commercial banks credit to private sector turnout to be the leading factors that propel economic growth in Nigeria according to this research results. It was also revealed that, unethical banking practices by Nigerian commercial banks have rendered interest rate impotent to drive savings mobilization.

[24] studied the determinants of household savings in South Africa over the period 1990-2011. Based on the life cycle hypothesis upon which the study is based as well as empirical literature, they paid attention to the effects of age dependency ratio, the level of household income, inflation and real interest rate on household savings. The study employed the Augmented Dickey-Fuller and Phillips Perron unit root tests to test for stationarity in the time series. The Johansen co integration and the Error Correction Mechanism were employed to identify the long-run and short-run dynamics among the variables. The results of the study revealed 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. The study recommends that the government should embark on counter-cyclical fiscal policy to avoid the development of excessive current account deficits during periods of more rapid economic growth, rising investment and falling savings.

[25] studied the determinants of savings: empirical evidence from Pakistan. They analyzed the impact and relationship between national savings rates and some selected determinants of savings namely inflation, real interest rate, real GDP growth rate and Government current expenditure, by using annual data for the period of 1980-2010. The variables in their model are based on well-established economic theory and long standing relationship. Supplemented in a dynamic regression model with the ARMA specification and well specified model; it was found that inflation, interest rate and government expenditures are negatively affecting the national savings rate during the length of this study for the economy of Pakistan.

[31] investigated the determinants of Private Savings in Nigeria and reviewed savings behaviour and policy options to increase domestic savings. He made an important contribution to the literature by evaluating the magnitude and direction of the effects of the following key policy and non-policy variables on private savings, Income growth, interest rate, fiscal policy, and financial development. The framework for analysis involves the estimation of a savings rate function derived from the Life Cycle Hypothesis while taking into cognizance the structural characteristics of a developing economy. The study employs the Error-Correction modelling procedure which minimizes the possibility of estimating spurious relations, while at the same time retaining long-run information. The results of the analysis showed that the savings rates rise with both the growth rate of disposable income and the real interest rate on bank deposits. Public savings seem not to crowd out private savings; suggesting that government policies aimed at improving the fiscal balance has the potential of bringing about a substantial increase in the national savings rates. Finally, the degree of financial depth has a negative but insignificant impact on savings behaviour in Nigeria.

Table 1. Major gaps in literature

Author/year	Topic	Analytical tools used	Variables employed	Findings	Gap
[26]	Determinants of private Domestic savings in Nigeria	OLS and co integration	Domestic private savings, gross domestic product, money supply, interest rate and inflation	All variables are found to co integrated showing long run relationship	The study used OLS with co integration contrary to econometric theory while the current study use co integration and ECM and also that the variables in employed are different from the variable of the current study such as gross domestic product, money supply and inflation; the study was done in 2010 the 5years gap gave good reason for the current study
[27]	Determinants of savings in Nigeria	The coefficient of multiple determination(R^2) was claimed to be the method of analysis which is not agreeable to us since R^2 is an output of regression and not a tool of analysis	Aggregate financial savings, gross domestic product, per capita disposable income, trade openness, interest rate and net capital inflow	The study found out that per capita disposable income has positive and significant impact on aggregate savings	The study was carried out in 2011 while the current study is in 2015 given a 4 yrs gap which is a good reason for the current study to continue; The variables are different from the current study such as ,gross domestic product, trade openness and net capital inflow, the study did not indicate her tools of analysis thereby casting doubts on the validity of the result
[4]	Determinants of savings and investment in Nigeria	Co integration Ecm, Granger causality	Gross national savings, savings deposit rate, inflation, aggregate consumption, gross domestic product, aggregate demand	The result shows a positive relationship between savings, investment and economic growth in Nigeria	Though their model is contradicting, the variables are different from the current study variables, the topic is also different from the current study topic in terms of determinant of investment
[28]	Population growth and savings in Nigeria	ECM	Savings rate, population, real per capita income, real	The study showed that income & rapid population growth	The study was carried out in 2011 while the current study is in 2015 given a 4 yrs gap; The variables are

Author/year	Topic	Analytical tools used	Variables employed	Findings	Gap
			interest rate, inflation rate and financial depth	have positive and negative significant impact respectively on savings in Nigeria	different from the current study such as population, inflation rate and financial depth, the study didn't do Granger causality
[29]	An Econometric Analysis of the Determinants of Private Domestic Savings in Nigeria	Co integration, ECM	Income per capital, inflation rate, term of trade and financial deepening	Results show that income per capital, inflation rate, term of trade and financial deepening are significant determinants of private savings in Nigeria.	The variables are different from the current study such as inflation rate, term of trade and financial deepening; The study was carried out in 2014, A year gap is enough reason for the current study to be carried out ; the study didn't do Granger causality
[30]	An Error-Correction Model of the Determinants of Private Saving in Nigeria	Co-integration, ECM	Private saving rate, real per capita GNDI, growth rate of real per capita GNDI, real interest rate, rate of inflation, public saving rate, external debt service ratio, terms of trade and degree of financial depth.	The study compared estimation results of the Error-Correction Model with those of three conventional models: Partial-Adjustment, Growth Rate and Static Models. The study conclude that the ECM performs much better than the other models	The study has different order of integration in their test of unit root and ought to have adopted ARDL MODEL and not ECM. The study was done 2007 and the current study is 2015 given 8 years gap which is a good reason for the current study to continue; also the study didn't do Granger causality, the variables of the study is different from the current research variables such as capita GNDI, growth rate of real per capita GNDI, rate of inflation, public saving rate, external debt service ratio, terms of trade and degree of financial

[32] examined factors that affect household savings of rural agro-based firm workers in the South-south region of Nigeria. They used two-stage least squares method of simultaneous equation model for the analysis. Cross-sectional data were collected from 250 randomly selected workers of five agro-based firms in the study areas. The results of the analysis revealed that income, tax, job experience, education, family size and membership of a social group influence savings attitude of workers. To promote household savings among agro-based workers in Nigeria, policies aim at periodic increase in worker's salary and reduction in tax rate in line with the changing pattern of macro-economic variables in the country were advocated. Others include policies that will promote birth control, increase public awareness on the on-going family planning programmes in the country, and encourage social group formation among workers as well as those aimed at reduction in agricultural production constraints.

4. DATA AND METHOD OF ANALYSIS

4.1 Data

The data used for this study are time series covering 1980 – 2015 period and are obtained from the statistical Bulletin of Central Bank of Nigeria (CBN), annual reports and Statement of Account of various issues and online service from – data.worldbank.org/indicators.

4.2 Model Specifications

This study is anchored on Keynesian Theory which specifies savings as the following:

$$S = Y - C \tag{5}$$

$$C = a + by \tag{6}$$

$$S = Y - a + by \tag{7}$$

Thus, in other to realise the objective of the study, the specification of the Keynesian savings function will incorporate variables such as domestic private savings, GDP per capita, and Household Consumption, Domestic Credit to Private Sector (% GDP) and nominal interest rate. Therefore the modified form of the model can be specified as:

$$DPS = f(GDPPC, HHC, INTRT, DCPS) \tag{8}$$

Equation 4 can be stated linearly as:

$$DPS_t = \beta_0 + \beta_1 GDPPC_{t-1} + \beta_2 HHC_{t-1} + \beta_3 INTRT_{t-1} + \beta_4 DCPS\%GDP_{t-1} + \mu_t \tag{9}$$

Where, DPS=Domestic Private Savings, GDPPC = GDP per capita, HHC = Household consumption, INTRT= Nominal Interest Rate, DCPS%GDP = Domestic Credit to Private Sector (% GDP) $\beta_1 - \beta_4$ = Coefficients of the parameters, β_0 = Constant Term and μ_t = Error Term.

4.3 Estimation Procedure

The researcher first carried out a unit root test on the variables in this model. This is because most macroeconomic time-series have unit root and the regression of a non-stationary time series on another non-stationary time series would produce a spurious regression. So to produce a meaningful estimate, the researcher conducted a unit root test. Thus, this study tested the nature of the time series first to determine if they are stationary or not and if stationary of what order are they integrated. The order of integration helped the researcher in determining the long-run relationship among the variables. To carry out this, the Augmented Dickey Fuller and Philip Perron test was used.

A non-stationary series which can be transformed to a stationary series by difference d time is said to be integrated of the order d. A series X_t integrated of order d is conventionally denoted as:

$$X_{t-1} (d) \tag{10}$$

If X_t is stationary, then there is no need for differencing; that is integration order of zero denoted as:

$$X_{t-1} (0) \tag{11}$$

These series with time variant mean and covariance function is said to be integrated of order zero. While series that are differenced once to achieve stationarity, is said to be integrated of order one, that is

$$X_{t-1} (1) \tag{12}$$

The Augmented Dickey-fuller (ADF) and the Saragn-Bahrgv Dub-Watson (SBDW) test used is in this general format

$$X_t = a + \beta x_{t-1} + \beta T + \sum t \tag{13}$$

$$\text{and } X_t = a + \beta x_{t-1} + \sum C_i p X_{t-1} + \beta T \tag{14}$$

Where the n's are large enough to guarantee white noise residuals and T is trend.

The relevant test statistics for PP and ADF test is the ratio of β over its OLS standard error. The Null hypothesis is

$$H_0: X_{t-1}(1) \tag{15}$$

The test statistic has no t-distribution under the null hypothesis because of the theoretical variance of X_t though; [33] reports tables and critical values for those t- ratios.

The next step is to evaluate the order of integration of the residual generated from the static model. If the series of the model is co-integrated, that is the residuals is stationary, the researcher is guided towards error correction specification regression are non-stationary. Otherwise, we can apply the Unit root to check their stationarity.

The unit root test of the DF and ADF are respectively as follows:

$$\rho U_t = \Phi U_{t-1} + dT \tag{16}$$

$$\rho U_t = \Phi U_{t-1} + \sum \delta_i \rho U_{t-i} + dT \tag{17}$$

In a case where co integration does not exist, it means the linear combination is not stationary and the variable does not have a mean to which it returns. The presence of co integration however implies that a stationary long-run relationship among the series is present. This study employed the error correction mechanism based on [34] two-step error correction model (ECM) approach. This procedure involves the estimation of static or long-run relationship using the Johansen multivariate co integration test. A statistically significant ECM indicates the speed of adjustment in the short-run of an economy when disequilibrium occurs.

4.4 Co Integration Test

This test was developed to estimate variables (Yt and Xt) that has the same order of integration 1(1) and usually conducted after the unit root test when stationarity have been established. It is also used to extract the long run equation which determines the long run relationship among variables. Co integration test indicates its significance through the trace or rank statistical and the probability values of variables under consideration [35]. It is therefore estimated thus;

$$Y_t = \mu + \Delta 1Y_{t-1} + \dots \dots \dots \Delta PY_t - p + \epsilon_t \tag{18}$$

In testing the null hypothesis that the number of distinct co integrating vector is less than or equal to q against a general unrestricted alternatives q = r, it is calculated as follows:

$$\lambda \text{ trace } (r) = -T \Sigma \ln (1- \lambda_i) \tag{19}$$

Where T is the number of usable observations and the λ_i is the estimated Eigen value from the matrix.

4.5 Error Correction Model

The error correction mechanism (ECM), assume that some variable y has an equilibrium path. If the variables are co integrated, there must exist an error-correction representation that may take the following form:

$$\Delta \ln DPSt \theta_0 + g\delta t - 1 + \Sigma \theta_{ij} \beta_{ij} \Delta \ln DPSt - j + \Sigma \theta_{ij} \beta_{ij} \Delta \ln GDPt - j + \Sigma \theta_{ij} \beta_{ij} \Delta \ln HHt - j + \Sigma \theta_{ij} \beta_{ij} \Delta \ln INTRT - j + \Sigma \theta_{ij} \beta_{ij} \Delta \ln DCPS\%GDPt - j + \epsilon_t \tag{20}$$

Where $\delta t-1$ are the error correction terms.

4.6 Granger Causality Model

In the short-run, there are adjustments to deviations from the long-run path which are defined by long-run causality. Short-run causality is ascertained by a test on the joint significance of the lagged explanatory variable. The study tries to find the causality direction between the two variables, income and domestic private savings by using Granger type causality methodology, i.e., standard Granger causality test. The test relies on estimating two basic equations as follows:

$$Y_t = \alpha_0 + \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^n \beta_j X_{t-1} + \epsilon_t \tag{21}$$

$$X_t = \lambda_0 + \sum_{i=1}^n \lambda_i Y_{t-1} + \sum_{j=1}^n \theta_j X_{t-1} + \epsilon_t \tag{22}$$

5. PRESENTATION OF RESULTS

5.1 Unit Root Test

The Augmented Dickey-Fuller (ADF) and Philip Peron statistic was employed to test for the existence of unit roots in the data using trend and intercept. The test results are presented below.

Table 2. Augmented dickey fuller unit RootTest

Trend and intercept (series at level)				
Series	ADF test statistic	5% critical values	10% critical values	Remarks
DPS	-1.770258	-3.544284	-3.204699	Not stationary
GDPPC	-1.606899	-3.544284	-3.204699	Not stationary
HHC	-2.700599	-3.544284	-3.204699	Not stationary
INTRT	-2.841819	-3.544284	-3.204699	Not stationary
DCPS	-2.728355	-3.544284	-3.204699	Not stationary

Source: Authors' computation from E views 7

Table 3. Augmented dickey fuller unit RootTest

Trend and intercept (series at 1 st difference)				
Series	ADF test statistic	5% critical values	10% critical values	Remarks
DPS	-9.734730	-3.548490	-3.207094	Stationary
GDPPC	-4.896502	-3.548490	-3.207094	Stationary
HHC	-12.35241	-3.548490	-3.207094	Stationary
INTRT	-7.534719	-3.548490	-3.207094	Stationary
DCPS	-5.238271	-3.548490	-3.207094	Stationary

Source: Authors' computation from E views 7

Table 4. Phillips Perron unit RootTest

Trend and intercept (series at level)				
Series	PP test statistic	5% critical values	10% critical values	Remarks
DPS	-1.636948	-3.544284	-3.204699	Not stationary
GDPPC	-1.605330	-3.544284	-3.204699	Not stationary
LHHC	-2.478914	-3.544284	-3.204699	Not stationary
INTRT	-2.657152	-3.544284	-3.204699	Not stationary
DCPS	-2.442382	3.544284	-3.204699	Not stationary

Source: Authors' computation from E views 7

Table 5. Phillips Perron unit RootTest

Trend and intercept (series at 1 st difference)				
Series	PP test statistic	5% critical values	10% critical values	Remarks
DPS	-20.68910	-3.548490	-3.207094	Stationary
GDPPC	-4.896502	-3.548490	-3.207094	Stationary
LHHC	-14.86076	-3.548490	-3.207094	Stationary
RINTR	-7.655979	-3.548490	-3.207094	Stationary
DCPS	-9.156031	-3.548490	-3.207094	Stationary

Source: Authors' computation from E views 7

Observing the variables; DPS, GDPPC, HHC, INTRT and DCPS, all series are not stationary at levels. However, the series became stationary at first difference that is 1(1). The results showed that the time series are integrated of the same order; I(1), with the application of both ADF and PP tests.

5.2 Co-integration Test

Johansen co-integration test was used to test for the presence of co-integration between the series of the same order of integration. Johansen

co-integration test for the series; DPS and the explanatory variables; GDPPC, HHC, INTRT and DCPS are summarized under Table 6. Based on the lag length criteria, the model with lag 1 was chosen with the linear deterministic test assumption.

The Johansen co-integration test indicated that there is one co-integrating equation. As observed from the trace statistic, its value is greater than 5% critical value (i.e. [82.01482 >69.81889]). In other words; the null hypothesis of no co-integration among the variables is rejected since

at least one co integrating equation at 5% level is significant, implying the existence of a long-run equilibrium relationship among the variables.

5.3 Vector Error Correction Model

The essence of this estimation procedure is to ascertain the speed of adjustment since the deviation from the long run equilibrium is corrected through the short run adjustments. Having established that there is co-integration equation among the variables, the result justifies the use of vector error correction model (VECM). The result for the VECM is stated in Table 7.

The Error correction term met the required conditions. The significance of rule of ECM holds that negative and statistical significant error correction coefficients are necessary conditions for any disequilibrium to be corrected. In light of this, the coefficient of ECM(-1) is -0.941858. The negative sign of the coefficient satisfied one condition while the fact that its P-value [0.0010]

is less than 5% [0.05] level of significance satisfied the second condition of statistical significance. The coefficient indicated that the speed of adjustment between the short run dynamics and the long run equilibrium is 94%. Thus, ECM will adequately act to correct any deviations of the short run dynamics to its long-run equilibrium by 94% annually.

The computed coefficient of multiple determination (R^2) value of 0.602741 indicated that 60.3% of the total variation in domestic private savings (DPS) is accounted for, by the explanatory variables: gross domestic product (GDPPC), household consumption (HHC), nominal interest rate (INTRT), and domestic credit to private sector (DCPS%GDP) while 39.7% of the changes in domestic private savings (DPS) is attributable to the influence of other factors not included in the regression equation. The F – statistics of 6.827612, with p value of 0.000173 which is less than 0.05 shows that the influence of explanatory variables on the

Table 6. Co integration test

Hypothesized no. of CE(s)	Eigen value	Trace statistics	0.05 critical value	Prob.*
None	0.645477	82.01482	69.81889	0.0039

Trace test indicates 1 co integrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

Table 7. VECM result

Error correction:	Coefficient	Std. error	T – statistics	P – values
ECT (-1)	-0.941858	0.255590	-3.685033	0.0010
D (DPS(-1)) =C(2)	-0.242156	0.211231	-1.146405	0.2617
D(DCPS(1)) =C(3)	-1.33E+11	8.59E+10	-1.554678	0.1317
D(GDPPC(-1)) =C(4)	-0.466994	0.272497	-1.713757	0.0980
D(HHC(-1)) =C(5)	0.261598	0.138551	1.888098	0.0698
D(INTRT(-1)) =C(6)	1.11E+11	1.23E+11	0.900131	0.3760
C=C(7)	1.17E+12	5.02E+11	2.328409	0.0276

$R^2 = 0.602740$, F -statistics = 6.827612, $Prob$ (F -statistic) = 0.000173 $DW = 1.86$

Source: Authors' computation from E views 7

Table 8. Granger causality test

Null hypothesis:	Obs	F-statistic	Prob.
DCPS does not Granger Cause DPS	35	4.16836	0.0495
DPS does not Granger Cause DCPS42		0.09141	0.7643
GDPPC does not Granger Cause DPS	35	19.5646	0.0001
DPS does not Granger Cause GDPPC		3.44704	0.0726
HHC does not Granger Cause DPS	35	18.5704	0.0001
DPS does not Granger Cause HHC		10.2349	0.0031
INTRT does not Granger Cause DPS	35	1.43846	0.2392
DPS does not Granger Cause INTRT		0.37844	0.5428

dependent variables is statistically significant. The Durbin Watson test determines the presence or level of autocorrelation among the residuals, since the DW has the value of 1.856504; it indicates the absence of auto correlation among the residuals.

Based on causality result from Table 8, there is a uni directional causality running from DCPS to DPS and a bi directional causality from GDPPC to DPS and back to GDPPC. The study also found another bi directional causality from HHC to DPS and also from DPS to HHC. However, no causality was found between INTRT and DPS as indicated in the above result.

6. IMPLICATION OF THE RESULTS AND CONCLUSIONS

Based on the estimation result above, the presence of 1 co integrating equation confirms the existence of long run equilibrium relationship between the dependent and independent variables. From the normalized co-integrating coefficients and the upper chamber of the VECM, we found the nature of long run relationship in the equation as stated below;

$$DPS = 1.35 + 3.01DCPS\%GDP - 0.61GDPPC + 0.25HHC + 2.69INTRT$$

Where DPS is the dependent variable, 1.35 is the constant term, 3.01 is the coefficient of DCPS, -0.61 is the coefficient of GDPPC, 0.25 is the coefficient of HHC and 2.69 is the coefficient of INTRT. The signs borne by the coefficient estimate of the variables DCPS, HHC and INTRT have positive significant relationship with DPS while GDPPC have negative significant relationship with DPS. This result agrees with the findings in [3] which also reported long run relationship between domestic private savings, income and interest rate. GDPPC a proxy for income in this study did not meet the appriori expectation in the long run as it is expected based on Keynesian economic theory, that as income increases, savings should increase also. HHC maintained a positive relationship with domestic savings in the long run contrary to the economic assumption, supposing that as consumption increases domestic savings should fall. However, INTRT and DCPS%GDP met the economic condition of positive relationship with DPS. A rise in savings interest rate leads to increase in DPS just as a rise in DCPS%GDP causes an increase in DPS, depending on the efficiency of investment through the DPS. In the

short run, GDPPC maintained a negative but insignificant correlation with DPS. INTRT had the supposed relationship with DPS in the short run, though insignificant while HHC and DCPS%GDP did not meet the appriori expectation in the short run.

This result agrees with the findings in [4] and [24] which is in contrast with the findings in a similar study by [25] and [19].

The findings from the pair wise Granger causality test reveal a unidirectional trend from DCPS%GDP to DPS supporting the long run result from the VECM indicating a positive significant relationship among the two variables. This means that credit to private sector of the economy contributes significantly to the level of domestic private savings in the economy within the study period. GDPPC representing income in this study Granger causes DPS, implying that increase in income leads to increase in domestic savings. A bi directional causality exists between HHC and DPS, meaning that increases in HHC leads to reduction in DPS just as a rise in DPS causes an increase in HHC.

According to [11] and [12], persistent government intervention and involvement in the financial system through the regulatory and supervisory network, particularly in controlling interest rates and the allocation of credit, tends to distort financial markets. Government intervention, thus adversely affect savings and investment decision of market participants and lead to fragmentation of financial mediation. The ultimate result is a financial repressed economy. This study therefore believe that the financial authorities should allow market forces to determine savings interest rate, to enable the economy achieve desired growth both in the short and long run period.

This study investigates the determinants of private domestic savings in Nigeria for the period of 1980-2015. In the model specified, domestic private savings (DPS) is a function of gross domestic product per capita (GDPPC), household consumption (HHC), nominal interest rate (INTRT) and domestic credit to private sector (DCPS%GDP). With the aid of statistical and econometric techniques employed, the following results were found:

A stable long run relationship was found to exist between the dependent and explanatory variables in the model. 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. 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.

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.

Since income was found to have significant negative influence on domestic private savings, the study recommends conscious policy aimed at reducing the cost of living 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.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Thirlwall AP. Growth and development: With special reference to developing economies' (6th ed.); 1979.
2. Lewis A. The theory of economic growth. New York: Harper and Row; 1970.
3. Ogbokor CA, Samahiya OM. A time series analysis of the determinants of savings in Namibia. *Journal of economics and Sustainable Development*. 2014;5(8): 52.
4. Adelokun OJ. An investigation of the determinants of savings and investment in Nigeria: *International Economics and Business*. 2015;1(2):1-16.
5. Iyoha MA. Rekindling investment for economic development in Nigeria: the macroeconomic issues: In *Rekindling Investment for Economic Development in Nigeria*; 1998.
6. Nnanna OJ. Promoting savings and investment culture for national development: Central Bank of Nigeria Economic and Financial Review. 2003; 4:3.
7. Smith A. An enquiry into the nature and causes of the wealth of nations. University of Glasgow; 1776.
8. Malthus RT. Principles of political economics. New York; 1951; 317.
9. Keynes JM. General theory of employment, interest and money. London: MacMillan Company Ltd; 1936.
10. Friedman M. Permanent income hypothesis: A theory of the consumption function. Princeton University Press; 1957. ISBN: 0-691-04182-2.
11. Mackinnon RI. Money and banking in economic development. Washington D.C: The Brookings Institute; 1973.
12. Shaw ES. Financial deepening in economic development. New York: Oxford University Press; 1973.
13. Kaldor N. A model of the trade cycle. *Economic Journal*. 1940;50:78-92.
14. Dornbusch R, Edwards S, eds. The Macroeconomics of Populism in Latin America. Chicago: The University of Chicago Press; 1991.
15. Stiglitz JE, Weiss A. Credit rationing in markets with imperfect information. *The American Economic Review*. 1981;71(3): 393-410.
16. Ando A, Modigliani F. The life cycle hypothesis of savings: Aggregate implications and economic growth; 1963.
17. Ipumbu W, Kadhikwa G. Savings and investment in Namibia. Bank of Namibia Occasional Paper No. 2; 1999.
18. Teshome G, Kassa B, Emana B, Haji J. Determinants of rural household savings in Ethiopia: The case of East Hararghe zone, Oromia Regional state. *Journal of Economics and Sustainable Development*. 2013;4(3):66-75.
19. Kudaisi BV. Savings and its determinants in West Africa countries. *Journal of Economics and Sustainable Development*. 2013;4:18.
20. Ayalew HA. Determinants of domestic saving in Ethiopia: An autoregressive. *Journal of Economics and International Finance*. 2013;5(6):248-257.
21. Samantaraya A, Patra SK. Research Article determinants of household savings in India: an empirical analysis using ARDL. *Economics Research International*; 2014. Article 8.

22. Sebhatu KT. Determinants of saving behaviour of cooperative members survey evidence from Tigray region, Ethiopia. *Journal of Research in Economics and International Finance (JREIF)*. 2012;1(5): 150-158.
23. Jibrin MS, Danjumab I, Blessing SE. Private domestic savings mobilization by commercial banks and economic growth in Nigeria. *Beykent University Journal of Social Sciences*. 2014;7(1):1307-5063.
24. Chipote P, Tsegaye A. Determinants of household savings in South Africa: An econometric approach. *Mediterranean Journal of Social Sciences MCSER Publishing, Rome-Italy*. 2014;5(15):183.
25. Aleemi AR, Ahmed S, Tariq M. Determinants of savings: Empirical evidence from Pakistan. *International Journal of Management Sciences and Business Research*. 2015;4:63.
26. Eze TC, Okpala CS. Determinants of private domestic savings in Nigeria. *Journal of Economics and Sustainable Development*. 2014;5(8):2222-2855.
27. Onuoha O. The determinants of savings in Nigeria: A research project submitted to the department of economics. Caritas University Amorji, Enugu State; 2011.
28. Nwakeze NM, Omoju OE. Population growth and savings in Nigeria: America *International Journal of Contemporary Research*. 2011;1:3.
29. Imoughele LE, Ismaila M. An econometric analysis of the determinants of private domestic savings in Nigeria: *International Journal of Humanities and Social Science*. 2014;4(5):12-21.
30. Nwachukwu TE, Egwuikhide FO. An error-correction model of the determinants of private savings in Nigeria: A Paper Presented at the African Economist Society (AES) Conference, Cape Town, South Africa; 2007.
31. Nwachukwu T. Determinants of private saving in Nigeria. *Journal of Monetary and Economic Integration*. 2010;11(2): 84.
32. Akpan SB, Udoh EJ, Aya AE. Analysis of savings determinants among agro-based firm workers in Nigeria: A simultaneous equation approach. *Research on Humanities and Social Sciences*. 2011; 1(3):1.
33. Fuller WA. *Introduction to statistical time series*, New York John Wiley; 1976.
34. Engle RF, Granger CWJ. Co-integration and error correction: representation, estimation and testing. *Econometric*. 1987;55:251–276.
35. Johansen S, Juselius K. Maximum likelihood estimation and inference on co integration: with the application to the demand for money. *Oxford Bulletin of Economics and Statistics*. 1990;52:169-209.

© 2016 Elom-Obed et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/16401>