

INTEREST RATE AND PRIVATE CONSUMPTION BEHAVIOUR IN NIGERIA: SOME EMPIRICAL EVIDENCES

Hammed, Agboola Yusuf^a, Irwan Shah Zainal Abidin^b, Joel Ede Owuru^c,
Saad Babatunde Akanbi^d, Hammed Oluwaseyi Musibau^e

^{a,b,e}Universiti Utara Malaysia

^cUniversity of Ibadan, Nigeria

^dUniversity of Ilorin, Ilorin, Nigeria

Corresponding email: agboolayusuf2007@gmail.com

Abstract

This study examines the impacts of interest rates on private consumption behaviour in Nigeria between the period of 1981 and 2013 using autoregressive distributed lag (ARDL) cointegrations framework. The data were sourced from the World Bank development indicators and the interest rate was augmented with other macroeconomic variables like per capita income, money supply, and banking sector credit to the private sector as regressors in determining the behaviour of private consumption in Nigeria. The results confirm the existence of a relationship between private consumption and its determinants, except real interest rate and the dummy for the impact of interest rate deregulation. The study, therefore, recommends an increase in government capital expenditures that will create an enabling environment for the private sector to thrive so that the welfare of the citizenry could be enhanced.

Keywords: Private Consumption, Interest Rate, ARDL, and Nigeria, JEL Classification: C22, D11 and E43.

1. Introduction

The pursuit of sustainable and pro-poor growths that could improve the living standard of the people has been one of the development policy objectives of many nations of the world, including Nigeria. Various macroeconomic policies are, therefore, directed towards improvement in the welfare of the masses. Although, there are various sources of economic growth but consumption, which is one of the components of national income is integral. Basic macroeconomics reveals that consumption expenditure constitutes a vital part of National Income accounting. In terms of magnitude, private consumption expenditure (PCE hereafter) approximately takes a share of 81% in total gross domestic product (GDP) in Nigeria.

In a simple sense, consumption is simply defined as the total demand for all consumer goods and services in a particular economy expressed in monetary terms. Consumption is commonly known as the spending by households on goods and services such as clothing, food items, entertainment, health services and acquisition of assets among others. Consequently, financing such expenditures or to have effective demand for such goods and services requires money (income). Consumption function is, therefore, expressed primarily as income-dependent behavior of total consumption. Originally, consumption function has its theoretical undertone from John Maynard Keynes' psychological law which says that men are disposed, as a rule and

on the average to increase their consumption as income increases, but not by as much as the increase in their income. This law is dubbed as absolute income hypothesis (AIH).

Aside from AIH, which is indicative of the eminent role of income in consumption, other determinants of consumption include interest rate, relative prices or inflation, capital gains, wealth, liquid assets, attitude, expectation of future rise in price and the availability of credit facilities among others (Poole, 1972; Hansen, 1996; Hall, 2001; and Iyoha, 2001). Interest rates can also be seen as the rental payments for the use of credit by borrowers or the returns to lenders of loanable funds for parting with liquidity. An interest rate is a price and like other prices, it allocates limited supply of financial resources among the numerous competing demands for such resources. The general understanding is that interest rate is simultaneously seen as the price one pays for acquiring credit from the financial markets (lending rate) and the return paid to the provider of financial resources (saving rates) for foregoing their funds or technically for parting with liquidity which could have been used for current consumption, but for investors to utilize such funds.

Viewing from the spectrum of the monetary sector, aggregate money supply and interest rate have been the major monetary policy variables often utilized in controlling monetary growth. From the perspective of the monetarists, a general decrease in money supply leads to decrease in demand, thereby causing interest rate (especially lending rate) to increase. However, viewing from the spectrum of the Keynesian school, expanding the supply of money in circulation in turn leads to excess demand which causes decline in interest rates. When this occurs, it is believed that consumption will increase as the households tend to decrease their deposits with the financial institutions (commercial banks). These descriptions of the instrumentality of interest rate may be more efficient in developed countries than in developing countries due to efficient functioning of the money and credit institutions.

It may not be untrue that some countries, even within Africa may have more virile financial and credit institutions than Nigeria; hence a monetary policy role that will target interest rate that will boost economic growth and development should not be downplay in Nigeria. The effectiveness of monetary policy depends on the adjustment response of Central Banks short-term interest rate on the real interest rates charged by commercial banks and ultimately on macroeconomic indicators of investment and consumption in the economy (Ogundipe & Alege, 2013).

Indeed, fluctuations in consumption due to non-stationary of interest rate (volatility of the exchange rate) may not be uncommon in Nigeria, especially as wide differences between lending rates and savings rates has persisted over the years. The difference is termed as interest rate margin or spreads, which, over the years have significantly constitutes a disincentive to efficient financial intermediation because many depositors are more willing to restrain from parting with liquidity to the banks (Awoyemi, et al, 2014). Various factors including (but not limited to) taxes, risk of investment, inflationary expectations, liquidity preference, market imperfections cause the interest rate to be volatile. Such volatility causes instability in the level of consumption; hence there is a possibility of inter-temporal consumption paths in which households do defer consumption in the current times until later periods depending on the magnitude or the weight of the discount factors (time preference) and the interest rates that the household expects in the future.

It should be noted however that in Nigeria, extant literature are more in the area of empirical evidences on the link between interest rate and investment than interest rate-consumption nexus, thus, empirical determination of the impact of interest rate on the level of consumption is relatively unexplored by researchers in Nigeria (Eregha, 2010). In our attempt to fill this empirical gap by expanding the frontiers of knowledge on the interest rate-consumption linkage

in Nigeria, among the arrays of questions that pertinently come to our minds include: what is the trajectory or direction of consumption series in Nigeria? What is the extent of interest rate spread in Nigeria? What is the size of the effects of real interest rate on private consumption? Do other macroeconomic variables significantly affect private consumption than interest rate in Nigeria?

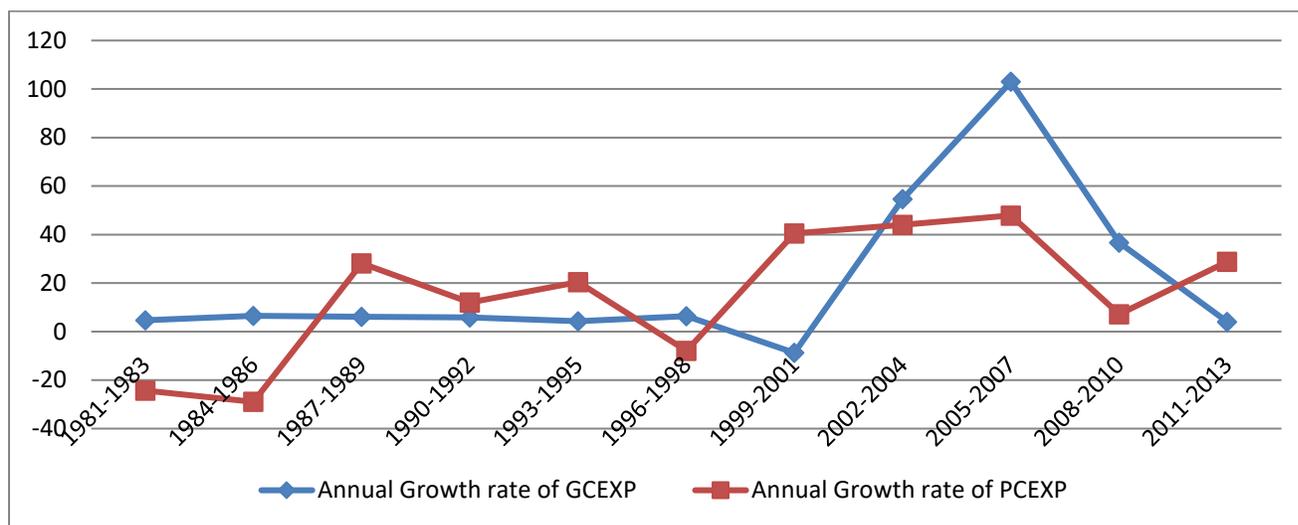
Various approaches could be used to address some of these questions, but the innovation that this present study provides is in the area of characterizing the trajectory of interest rate and consumption variable in Nigeria so that a non-quantitatively oriented reader can, at a glance have a picture of the trend of these variables over the period of 1981 to 2013. We also model the dynamics of the determinants of private consumption in Nigeria by controlling for other variables aside interest rate so that empirical evidences from the estimated model could inform relevance policy that would enhance the behaviour of household consumption in Nigeria. The choice of this time span is premised on the ground that the period represents a time frame before and after the SAP episode. This helps in capturing the economy-wide structural reform effects on interest rate as it impacts private consumption behaviour in Nigeria.

Following the above introduction, the rest of this paper is structured as follows: some facts and figures are used to characterize the structure and the policy environment of consumption and interest rate in Nigeria in section 2. Section 3 reviews existing theoretical and empirical literature on consumption-interest rate nexus. Section 4 presents the theoretical framework and specifies the model for the empirical analyses. Presentation of the results of data analyses and the discussions of findings are discussed in section 5, while section 6 concludes the paper with relevant policy recommendation.

2. Stylized Facts and Policy Environment of Consumption and Interest Rate in Nigeria

Basically, increasing volatility of interest rate in Nigeria has made the monetary policy environment to be unstable over the years. That is, the monetary authority of Nigeria has not fully realized a stable interest rate over the years. This is indicated in the wide spread between lending rate and savings rate with its attendant effects on the level of consumption. For instance, an increase in saving rate (interest rate paid on deposits with the bank or simply returns on deposits) triggers households to part with more liquidity and save, hence, consumptions shrinks. Conversely, low savings rate results to increase in consumption as the propensity to save by the household decreases. On the other side, when the lending rates (interest paid for borrowing money from the bank) increase, investors will be discouraged to borrow, and in the long run the level of economic growth will decrease. Figure 1 describes the trends in the annual percentage growth of government and private consumption expenditure for the period of 1981-2013.

Figure 1: Trends in annual growth rate of Government and Private Consumption Expenditures (1981-2013)



Source: Author's computation based on data from the World Development Indicators, 2013

It is clearly seen from the above graph that the growth paths of government and private expenditures over the years are not the same in Nigeria. Basically, these two types of consumption expenditures oscillate over the years. This type of instability in the consumption paths reflects the fact that various factors affect or determine consumption expenditures in Nigeria. From 1981 to 1998, the trajectory of the growth rate of government expenditures in Nigeria is relatively stable unlike private expenditure trends. It can be seen that the policy incentives of the Structural Adjustment Program (SAP) has immediate impact on private consumption as the trend significantly rose from -28.3% in 1981-1983 to 28.2% in 1987-1989. This increasing trend was however not maintained as the rate fell gradually to -7.9% in 1996-1998. There is relative stability in the trend of PCE from 1999-2007. This period coincided with the democratic transition periods in Nigeria and the global financial crisis whose attendant effects might have been felt by the masses, hence the nature of the consumption pattern in this periods.

It is significant to note as well that from 2008 to 2013, the trajectory of PCE fell. This period is symbolic of both political and economic shocks to the economy of Nigeria in terms of crude oil production disruptions and terrorism, among others. It is also glaring from figure 1 that government consumption expenditure experienced wide swing in its growth paths between 2001 and 2007, but fell to 3.98% in 2011-2013. Relative stability is evidenced in the growth paths of annual government consumption expenditures in both pre and post-SAP periods until the periods of financial crisis where the pattern significantly outweighs that of private consumption within the fiscal periods under considerations. Therefore, any macroeconomic policy shift, especially monetary policy, will greatly have impacts more on private consumption.

In terms of the monetary policy environment to the interest rate, it is observed that in the recent years, many developing and transition countries have allowed market forces to play a greater role in their economies. Thus, liberalization of the financial sector so that interest rate is allowed to be set by the market forces in Nigeria became important. This was hoped to develop financial markets so that credit can be allocated more efficiently. The Central Bank of Nigeria (CBN) liberalized the interest rate regime and adopted the policy of fixing only its minimum rediscount rate to indicate the desired direction of interest rate in August, 1987. The policy was further modified in 1989 by the CBN with the issuance of directives on the required spreads between

deposit (saving) and lending rates. To further pin down the wide variability of interest rate spread, the government, through the CBN prescribed a maximum margin between each bank's average cost of funds and its maximum lending rates in 1991. Subsequent deregulations of interest rate occurred in 1992 and finally in 2006 where the minimum rediscount rate (MRR) imposed by the CBN on commercial banks was changed to monetary policy rate (MPR). In short, the margin continues to worsen, especially from 1996 till 2013. Further, the savings interest rate paid by the banks to depositors significantly decreased over the years especially from 1990 till 2013, while lending rate significantly increased though with some periods of declines. It is actually hard to notice the impacts of the reforms in interest rate as worsening nominal interest rate spread (implied by a widening in the margin) was experienced throughout the periods under study.

3. Brief Literature Review

3.1 Theoretical Review

In theory, scholars have seriously debated on what determines consumption behaviour of a typical household. One of the earlier theoretical positions on the determinants of consumption expenditures is the work of Lord Keynes (1936). Keynes postulated the psychological law, otherwise known as the absolute income hypothesis (AIH). The law says that current consumption expenditures is a function of current disposable income and that as income increases, consumption expenditure increases but at a decreasing rate. In this framework, the marginal propensity to consume (MPC) is less than the average propensity to consume (APC) and that APC falls as income increases. This earlier propositions of Keynes is however criticized, hence the emergence of other theoretical postulation of other components or determinants of a typical consumption function. For instance, Duesenberry (1949) developed the relative income hypothesis (RIH) which states that the APC of a family depends on the family's level of income relative to the income of the neighbourhood with which he identifies. The idea is that a family with any given level of income spends more on consumption if it lives in a community in which the income is relatively high. This is probably due to pressure on the family to keep up with other families in the environment. Hence, consumption is a function of the income of the individual and the average income of the group he belongs. Moreover, Duesenberry argued that current consumption depends not only on current income, but also on the history of income. Thus, individuals often build up consumption standard that is geared towards their peak income level. In this case, when income changes, precisely declines, the level of consumption does not change instantaneously.

Milton Friedman (1957) argued on his part that it is permanent income, rather than current disposable income that determine the level of consumption of the individual, hence the permanent income hypothesis (PIH). Permanent income (PI) is the income an individual is expected to receive over a long period of time. Friedman believes that transitory income or temporary unexpected income does not affect consumption. Another theoretical position that counteracts the assertions of PIH is the work of Ando and Modigliani (1963) in the life cycle Hypothesis (LCH). He maintained that an individual plans his/her consumption and savings over a long period of time that covers their entire life time. In this case, all resources available to the consumer are relevant to consumption decision. The consumer allocates his income so as to maximize satisfaction over his life time while saving is to enable him to secure the most desirable level of consumption at old age. Therefore, the theoretical concern or thrust of LCH is that consumption is a function of life time expected income of consumers. In this hypothesis, consumption depends on the resources available to the consumer, the rate of return on capital, the spending plan and the age at which the plan is made. One of the apparent fallouts from LCH is that consumption is a function of price; interest is stable and that the consumer does not inherit any asset; thus, the net assets of the consumers depend on their savings.

3.2 Empirical Review

Various studies have empirically tested the plausibility of different theoretical premises upon which discussions of the determinants of consumption are based. In the earlier times, Kuznets (1952), in objection to Keynesian Theory of AIH analyzed the long run relationship between consumption and income in US and found contradictory results with Keynes. To him, consumption does not decline as income increases. The findings of Mankiw, (2010) support this position by revealing that in the short run, Keynesian consumption function gives accurate results, but in the long run, consumption function has a constant average propensity to consume. On the part of Branson, (1995), during the period of a business cycle or in the short run, because of the fluctuations in income, marginal propensity to consume is smaller than average propensity to consume as Keynes indicated. But, in the long run, average propensity to consume is constant and equals to marginal propensity to consume.

For Tanzania, Kweka and Morrissey (1998) investigated the impact of economic growth on consumption expenditure. Using the Granger causality test approach on time series data showed no evidence or impact of growth of GDP on consumption expenditure. For Cameroon, Forgha, (2008) formulated econometric models of consumption and savings functions during the period 1970 to 2007 using co-integration error correction methodology. He found that disposable income, general price level, expected inflation, interest rate and dependency ratio impacted positively on private consumption and only family wealth had a negative impact while disposable income, numbers of financial institutions and branches, political stability had positive impacts on savings. Interest-inflation rate differential had a negative impact on savings. The speed of adjustment in the consumption function was found to be 45.291 percent and that savings was 35.65 percent.

For Kenya, Ofwona (2013) empirically determined a consumption function for the period 1992 to 2011 by using Keynes's Absolute Income Hypothesis. In the study, the relation between total household consumption expenditure and total income were analyzed with the method of Ordinary Least Square (OLS). The results showed that consumption is determined by income in accordance with AIH. For India, Mishra, (2011) investigated the relationship between real consumption expenditure and economic growth with the co-integration test and the vector error correction regression for the years of 1950 to 2008. The results of that study indicate that there is a long-run equilibrium relationship among variables. According to the results of causality test in the error correction model, it has been found that there is unidirectional causal relationship from real PCE to economic growth in the long-run, but in the short run applied Granger causality test indicated that there is no causality between them.

In Bangladesh, Sakib-Bin-Amin, (2011) examined a causal relationship between consumption expenditure and economic growth in using annual data from 1976-2009. The method used in the study is Johansen and ARDL cointegration tests. This author found that there is cointegration between consumption expenditure and economic growth in the long run. Granger causality test used in the study, revealed a long run unidirectional causal relationship running from economic growth to consumption expenditure. For Mexico and United States, Guisan (2004) revealed the presence of causal relationship between real consumption and real GDP using several tests ranging from Granger Causality, Modified Granger Causality, Engle-Granger Cointegration and Hausman. The findings obtained from the Granger Causality test showed that there is no causality between these variables in Mexico, but there is bilateral causality in US. Modified Granger Causality test indicated that there is bidirectional relation in both countries. According to Engle-Granger Cointegration, there is cointegrated relationship between consumption and GDP in the US, but the results for the case of Mexico is uncertain.

For Nigeria, there is plethora of empirical works on the determinants of consumptions. Earlier work by Uwujaren (1977) related consumption in Nigeria to Friedman's permanent income Hypothesis by showing that consumption is a function of current and permanent income. Adedotun (1978) found positive correlation between consumption expenditure and per capita income. Similarly, Apere, (2013) found a positive relationship between PCE and national income. Also, Iyoha (2001) perceived consumption as a function of disposable income and lagged value of income. Akekere and Yousuo (2012) investigated the impact of change in gross domestic product (income) on PCE in Nigeria over the period 1981 to 2010. Using the OLS simple regression analysis, they showed a positive and significant impact of Gross Domestic Product (income) on Private Consumption Expenditure. Further, Santos (2013) investigates the relationship between Consumption expenditure and income according to Keynes' Absolute Income Hypothesis (AIH) in Nigeria and found that as income increases, the average propensity to consume is reduced as Keynes indicated. But in the long run, although MPC is less than one, it is not stable. Nwabueze, (2009) investigated the casual relationship between gross domestic product and personal consumption expenditure with regression analysis by using the data of Nigeria for the period of 1994 to 2007. The results indicated that an increase in gross domestic product has no significant effect on the personal consumption expenditure of Nigeria and the gross domestic product explained about 3.5% of the personal consumption expenditure of Nigeria.

However, most of these empirical results reviewed above did not unearth the nexus between interest rate and consumption. Therefore, empirical process for filling this gap in Nigeria is what this study pursued.

4. Theoretical Framework and the Model Specification

In view of various theoretical cruxes on consumption determinants as reviewed earlier, this present study adopts the LCH of Franco Modigliani where a consumer's life time can be segmented into three periods: The young age; when little or no income is earned, a relatively long year of working life; when income tends to rise with experience and seniority in the place of work, and a period between retirement and death when income drops to near zero. Although Modigliani theory can be criticized on the ground that interest rates are not stable and household inherit wealth. Drawing from this framework, and by taking into cognizance of reality of life in Nigeria, an inter-temporal consumption function which is interest rate dependent is derived as the basis for the empirical estimations in this study. Like in other countries, this type of consumption function has been derived for Kenya (Maureen, et al., 2013).

4.1 The Model Derivation

In this model, the consumption function is derived from an intertemporal choice model in which a representative consumer faces the following utility function:

$$U = U(C_0, C_1, C_2, \dots, C_T) \quad (1)$$

Equation (1) implies that the utility function of a typical household is made up of consumption bundles of different goods. By assuming a logarithmic utility function, at time T , consumption will be:

$$U(C) = \ln C_0 + \frac{1}{1+p} \ln C_1 + \frac{1}{1+p} \ln C_2 + \dots + \frac{1}{1+p} \ln C_T \quad (2)$$

The weight attached to future consumption is represented by $\frac{1}{1+p}$, and p is the discount factor depending on the movement of interest rate. Equation (2) can be shortened as:

$$U(C) = \ln C_0 + \frac{\ln C_1}{1+p} + \dots + \frac{\ln C_T}{1+p} \quad (3)$$

By implication, the consumption of the consumer at any time is weighted on the discount factor, which determines the level of preference between current and future consumption. This discount factor is basically a function of the expected changes in interest rate. Also, given a level of income in each period, and by expressing $i = \rho$, the budget constraint (BC) of the consumer becomes

$$C_0 + \frac{C_1}{(1+i)^1} + \dots + \frac{C_T}{(1+i)^T} \leq Y_0 + \frac{Y_1}{(1+i)^1} + \dots + \frac{Y_T}{(1+i)^T} \quad (4)$$

The BC in equation (4) is re-specified in equation (5), and it implies that the difference between income and consumption weighted on the prevailing interest rate.

$$Y_0 + \frac{Y_1}{(1+i)^1} + \dots + \frac{Y_T}{(1+i)^T} - C_0 - \frac{C_1}{(1+i)^1} - \dots - \frac{C_T}{(1+i)^T} = 0 \quad (5)$$

To satisfy the BC with equality, the compact form of equation (4) and (5) is stated as:

$$\sum_0^T \frac{Y_t}{(1+i)^t} - \sum_0^T \frac{C_t}{(1+i)^t} = 0 \quad (6)$$

Since the principle of transversality condition where the household is not has existing assets overlapping to another generation, all income would be used for consumption purpose(s); hence, the path of consumption of the household weighted on interest rate is equal to the income paths weighted on the interest rate as shown in equation (7).

$$C_t + \frac{C_{t+1}}{(1+i)} = Y_t + \frac{Y_{t+1}}{(1+i)} \quad (7)$$

The intertemporal problem of the private sector (household in this case) is how to maximize total consumption subject to the BC as expressed in equation (8).

$$\sum_0^T \frac{\ln C_t}{(1+p)^t} \text{ Subject to } \sum_0^T \frac{Y_t}{(1+i)^t} - \sum_0^T \frac{C_t}{(1+i)^t} = 0 \quad (8)$$

To address this, we form a Lagrangian multiplier expression as:

$$L = \sum_0^T \frac{\ln C_t}{(1+p)^t} + \lambda \left[\sum_0^T \frac{Y_t}{(1+i)^t} - \sum_0^T \frac{C_t}{(1+i)^t} \right] \quad (9)$$

Noting that $\frac{C_t}{(1+p)^t} = \frac{C_0}{(1+p)^0} + \frac{C_1}{(1+p)^1} + \dots + \frac{C_{T-1}}{(1+p)^{T-1}}$, the first-order conditions for optimization are obtained as follows:

$$\frac{\partial L}{\partial C_0} = \frac{1}{C_0} - \lambda = 0 \quad (10)$$

$$\frac{\partial L}{\partial C_1} = \frac{1}{(1+p) C_1} - \frac{\lambda}{(1+i)^1} = 0 \quad (11)$$

$$\frac{\partial L}{\partial C_{T-1}} = \frac{1}{(1+p)^{T-1} C_{T-1}} - \frac{\lambda}{(1+i)^{T-1}} = 0 \quad (12)$$

$$\frac{\partial L}{\partial \lambda} = \sum_0^T \frac{Y_t}{(1+i)^t} - \sum_0^T \frac{C_t}{(1+i)^t} \quad (13)$$

For the consumption in the current and the future times, say period t and period $t+1$, we can solve for λ from the first two equations to obtain:

$$\frac{C_{t+1}}{C_t} = \left(\frac{1+i}{1+p} \right) \text{ or } C_{t+1} = \left(\frac{1+i}{1+p} \right) C_t \quad (14)$$

$$\text{If } i = \rho, \text{ then } C_{t+1} = C_t \quad (15)$$

This equation says that present consumption is purely a function of immediate past consumption, as shown by Friedman (1957). Combining this result with the budget constraint in equation (7) yields:

$$C_{t+1} = C_t = \frac{(1+i)}{(2+i)} Y_t + \frac{1}{(2+i)} Y_{t+1} \quad (16)$$

$$\text{This can be generalized as: } c = f(y, i, z) \quad (17)$$

Where y refers to current and future incomes, i is the interest rate and z is the vector of other factors that affect determine the level of consumption.

4.2 The Model specification

Following equation (17) above, the functional form of the model for this study is specified as:

$$PCEXP = f(IR, MS, PCGDP, BSCPS) \quad (18)$$

$PCEXP$ = Private consumption expenditure

IR = Real Interest Rate

MS = Money supply

$PCGDP$ = per capital Gross Domestic Product

$BSCPS$ = Banking sector credit to the private sector

Further, equation (18) can be put in an econometric model as:

$$PCEXP_t = \alpha_0 + \alpha_1 IR_t + \alpha_2 MS_t + \alpha_3 PCGDP_t + \alpha_4 BSCPS_t + \mu_t \quad (19)$$

Where

α_0 = Intercept, $\alpha_1, \dots, \alpha_4$ are the coefficients of the regressors of the model. It is theoretically expected that the magnitude of the impact of interest rate, α_1 will signed negatively with the dependent variable $PCEXP$. But, we expect the theoretical signs of $\alpha_1, \dots, \alpha_4$ to be positive.

Having carried out a pretest to determine the time series property of the data, the results show that all the variables were not stationary at the same level, therefore, the approach of the Autoregressive Distributed Lag (ARDL) model is used. The ARDL model deals with single cointegrations, introduced originally by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001). This approach has the advantage that it does not require all variables to be I (1) as the Johansen framework emphasized; it is still applicable if we have I (0) and I (1) variables in model. Thus, the model is stated as:

$$\begin{aligned} \Delta PCEXP_t = & \alpha_0 + \alpha_1 \Delta PCEXP_{t-1} + \alpha_2 \Delta IR_t + \alpha_3 IR_{t-1} + \alpha_4 \Delta MS_{t-1} + \alpha_5 MS_{t-1} + \alpha_6 \Delta PCGDP_{t-1} \\ & + \alpha_7 PCGDP_{t-1} + \alpha_8 \Delta BSCPS_{t-1} + \alpha_9 BSCPS_{t-1} + \alpha_{10} IRdum + \mu_t \end{aligned} \quad (20)$$

Where

$IRdum$ = Interest rate dummy variable for the policy of SAP and other interest rate related deregulations. It takes the value of 0 and 1 for the pre-SAP and Post SAP era, while other variables remained as defined. We use diagnostic statistics like coefficient of the determination and its adjusted R^2 , F-statistics, DW and t-statistics to determine the plausibility and efficacy of the results obtained.

5. Empirical Results

5.1 Stationarity Test

The empirical analyses for testing the long-run relationship between consumption and interest rate and other macroeconomic variables in the model start with the Augmented Dickey Fuller (ADF) test for the unit root. This helps avoid making inferences from a spurious regression. The test results are presented in table 1

Table 1: Unit Root Test

Variable	Order of Cointegrations
IR	I (0)
PCEXP	I (1)
PCGDP	I (1)
CBCPS	I (1)
MS	I (0)

Source: Computed by the Author from Eview7

The results in table 1 indicate that some variables, IR and MS are integrated at level, i.e. I (0), while the remaining variables, PCEXP, PCGDP, and CBCPS are integrated at first difference. That is, the table shows that IR and MS were naturally stationary at levels, while stationarity of the series for the remaining variables were achieved after taking the first difference.

5.2 Bound Test

Table 2: ARDL Bounds Test for Cointegration

Model	F- Statistics	
F(BCSPS, PCEXP,MS,PCGDP,BSCPS, IR)	6.2126	
Critical Value	Upper Bound	Lower Bound
	K=2: n=34	
10%	3.03	1.84
5%	3.79	4.85

Source: Computed by the Author from Eview7

The computed F-statistics with corresponding Likelihood ratios are for the higher than the upper critical bound at 5% and 10% critical values as indicated in Table 2. Given the values of the F statistics relative to the upper and lower bound critical values, the ARDL co-integration tests therefore confirm that the null hypothesis of no long run relationship among the variables in the models is rejected and alternatively confirming that at least a long run co-integration relationship exists among the variables based on the computed F-statistic (6.2126) is higher than the upper critical bound at 5% and 10% critical values as indicated in Table 2. This provided evidence to reject the null hypothesis of no co-integration at 5% and 10% significance level for the growth model. It can therefore be concluded from the ARDL bounds test that there is a long-run relationship among the variables. The seven variables have long run association. Private consumption expenditure, Private consumption expenditure, Money supply, Per capita domestic product and Banking sector credit to the private sector move together in the long run.

5.3 Autoregressive Distributed Lag Results

The implication of the above is that since all the series are not stationary at the same level, an Autoregressive Distributed Lag modeling approach for the cointegrations of the model. The main advantage of this approach lies on the fact that it precludes the need to classify variables into I (0) or I (1) and variable cointegrations can be achieved irrespective of the order of integration of the series. Thus, having established the variables are stationary as shown above, the result for the regression analysis in the framework of ARDL is summarized in table 2 below.

Table 2: An ARDL Regression Output

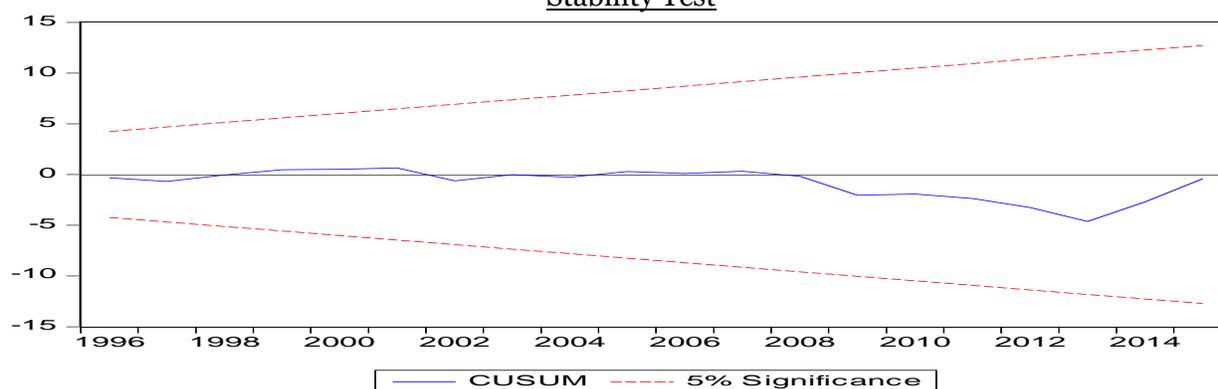
Variables	Coefficient s	t-statistics	P-values
C	2.492480	3.185022	0.0047***
D(PCEXP(-1))	-0.820830	-4.948268	0.0001***
D(MS(-1))	-7.013440	-1.753556	0.0948*
MS(-1)	7.046580	2.272820	0.0342**
D(PCGDP(-1))	1.338080	3.101431	0.0056***
PCGDP(-1)	-1.136730	-3.399133	0.0028***
D(BSCPS(-1))	6.927680	2.691350	0.0140**
BSCPS(-1)	-5.876220	-2.020858	0.0569*
D(IR)	9.180040	0.287062	0.7770
IR(-1)	-1.584310	-0.325633	0.7481
IRDUM	-2.774390	-1.239354	0.2296
ECT(-1)	-0.299130	-2.550938	0.0170
R-squared		0.758132	
Adjusted R-squared		0.637198	
F-statistic		6.268967	
AIC		5.717419	
SC		6.306953	
Prob(F-stat)		0.000255	
Durbin-Watson stat.		2.010350	

***, **, * represents 1%, 5%, and 10% respectively

Source: Author's computation using Eview7

The results of table 2 show through the coefficient of the determination of the model (R^2) that all the explanatory variables explain variation in the dependent variable for about 76%. Using the result for the adjusted R^2 , which has taking care of the lost in the degree of freedom; the regressors explain about 64% variation in the dependent variable. By implication, all the included exogenous variables in the model (as defined in our model specification significantly determine the level of changes or variability in personal consumption expenditure. This result is supported by the value of F-statistic, which indicates the overall goodness of fit of the model. The goodness of fit of the model as indicated by the p-value of F-statistic show the variables (exogenous) are jointly significant in determining total variation in the level of total consumption. ECM result shows about 30 percent speed of adjustment towards the long run relationship and it is significant. All the independent variables converge to long run association at about 30 per cent spend of adjustment.

Model Stability Test/Diagnosis Stability Test



The CUSUM tests on residuals of ARDL model have been carried out. The results show that the estimated parameters of ARDL from consumption equation for Nigeria are stable over the sample period under study.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.134398	Prob. F(2,18)	0.8751
Obs*R-squared	0.485541	Prob. Chi-Square(2)	0.7845

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.705341	Prob. F(12,20)	0.1406
Obs*R-squared	16.68924	Prob. Chi-Square(12)	0.1617
Scaled explained SS	4.390059	Prob. Chi-Square(12)	0.9753

The analysis of the autoregressive characteristics polynomial inverse roots shows that the conditional equilibrium model satisfies the stability condition. The LM test statistic value of 0.1344 with p-value of 0.8751 shows that the residuals are uncorrelated but not normally distributed and homoskedastic. This is also shown in the value of the Durbin-Watson statistic which is approximately 2 in the table 4.3.3.

However, it is not all the variables included in the model as contained in table 1 above that proved to be statistically significant in determining private consumption variability in Nigeria for the period of time considered in this study. For example, a unit increase in one year lagged value of change in private consumption decreased current consumption by 0.82 million naira. This implies, implicitly that savings may be low in the immediate past years, hence current year's consumption level decreased by 0.82 million naira. Thus, this variable does not sign positively as theoretically expected; if it has positive coefficient instead, changes in private consumption expenditure of last year could have led to increase in current year's consumption. Since consumption seemed not to follow the path of last years, random walk behaviour of private consumption in Nigeria is apparent.

Also, a unit increase in the lagged value of change in money supply for the preceding year led to a decrease of about 7 million naira in the level of change in current consumption (dependent variable). By implication, instability in the quantum of money supply in the economy within the previous year had a negative impact on the level of present consumption as at 2013. It is important to note by comparison that while changes in one period lagged value of money supply had negative impact on level of private consumption for the proceeded years, a unit increase in

the nominal volume of money supply for last a one period lag had positive impact of about 7 million naira in the level of change in current consumption. By implication, it is only the quantum of money supply in the economy in one period lag that is statistically significant with positive effects or influence on change in consumption behaviour of the household in the current year. Further, a unit increase in changes in the quantum of per capita GDP (a measure of welfare) in the previous year has a positive impact of about 1.3 million naira on changes in the current year's consumption expenditure of the household, while nominal growth in per capita GDP had negative impacts.

On the part of banking sector credit to the private sector, the result shows that a unit increase in changes in the quantity of credit or loans given to the private sector in the previous year has a positive impact of about 6.9 million naira on changes in the current year's consumption expenditure of the household. But the nominal amount of credit granted to the private sector for the immediate preceded year had negative impact of about 5.9 million naira on changes in current consumption expenditures of the household.

In terms of the interest rate as a determinant of consumption behaviour in Nigeria, the result shows that both the estimate of changes in current year's real interest rate and the immediate past year's level of real interest rate do not affects the consumption behaviour of the citizens in Nigeria. To critically examine the effects of policy change due to SAP and other deregulation of money market (interest rate in this case), we controlled for these expected policy effects by adding a policy dummy variable in the our specified model and estimated. However, the results for the policy effects of interest rate on changes in current consumptions behaviour are not significant, implying that the Nigeria macroeconomic policy environment on interest rate has not effectively impacts private consumptions behaviour in Nigeria during the time span of this study.

Lastly, variables used in the estimated model were free from the problem of autocorrelation as indicated by the value of the Durbin-Watson (2.010350). Thus, result reveals that there is absence of autocorrelation in the estimated model.

The Concluding Remarks and Policy Implications of the Study

This study examined the impacts of real interest rate on private consumption in Nigeria for the period of 1981 to 2013. It also controlled for other such as per capita GDP, money supply, and banking sector credit to the private sector among other which were considered to have relationship with private consumption as revealed from the life-cycle income hypothesis in the framework of intertemporal consumption function. Based on these theoretical underpinnings, a stochastic (econometric) model was specified. The data were sourced from the World Bank development indicators, (2013), and after testing for the unit root property of the series, real interest rate and money supply did not have unit root, i.e these variables were stationary at level, I (0), while the remaining variables were first difference stationary, I (1), hence an ARDL modelling approach was adopted. The study found the existence of a long-run relationship between the variables considered. The study found private consumption to be responsive to the extent of money stock in the economy and per capita income. These findings imply policy-wise that there is need for the government to provide enabling environment for the private sector to thrive in Nigeria. Since credit granted to private sector by the commercial banks enhances the level of consumption, it is necessary for the government to embark on policies that are welfare enhancing for the private sectors. In this case, the monetary authority should target interest rate by putting a minimal level beyond which interest rate (lending rate) would not rise for investment to increase in the country. We envisage, in this study, based on the empirical findings that long-run balanced growth path of economic growth and development can be achieved if some of these recommendations are strictly employed.

References

- i. Adetotun, P., 1978. Nigeria's Public Consumption Expenditure.. *The Journal of Economics and Social Studies*, 20(3), pp. 13-15.
- ii. Akekere, J. & Yousuo, P., 2010. "Empirical Analysis of Change in Income on Private Consumption Expenditure in Nigeria from 1981 to 2010". *International Journal of Academic Research in Business and Social Sciences*, 2(12).
- iii. Ando, Albert & Modigliani, F., 1963. The 'life-cycle' hypothesis of saving: aggregate implication and tests. *American Economic Review*, 53(1), pp. 55-84.
- iv. Apere, T., 2014. Private Consumption Expenditure Function in Nigeria: Evidence from the Keynes' Absolute Income Hypothesis. *International Journal of Research in Social Sciences*.
- v. Awoyemi, B. O., Owuru, J. E. & Ibimilua, S. T., 2014. Monetary Policy and Nigerian Banking Sector Performance: Evidence from some stylized Facts. *Internation Journal of Humanities and Social Studies*, 2(11), pp. 89-96.
- vi. Ben, B., 1985. Adjustment Costs, Durables and Aggregate Consumption. *Journal of Monetary Economics*, Volume 15, pp. 41-68.
- vii. Branson & William, H., 1995. *Makro İktisat Teorisi ve Politikası, Çev. İbrahim Kan Yılmaz, Alfa Makro İktisat Teorisi ve Politikası, Çev. İbrahim Kan Yılmaz*. Istanbul: Alfa Yayınları.
- viii. Chioma, N. J., 2009. Causal relationship between gross domestic product and personal consumption expenditure of Nigeria. *African Journal of Mathematics and Computer Science Research*, 2(8), pp. 179-183.
- ix. Duesenberry, J., 1949. *Income, Saving and the Theory of Consumer Behavior*. Cambridge: Havard University Press.
- x. Eregha, P., 2010. Interest rate variations and Investment Determinations in Nigeria. *International Business Management. Medwell Journal*, 4(2), pp. 41-46.
- xi. Forgha, N., 2008. Econometric Models of Consumption and Savings Functions in Cameroon: An Error Correction Methodology. *International Review of Business Research Papers*, 4(3), pp. 298-308.
- xii. Franco, M. & Richard H. Brumberg, 1954. Utility Analysis and The Consumption Function: an Interpretation of Cross-section Data. In: K. K. Kurihara, ed. *Post- Keynesian Economics*. New Brunswick: Rutgers University Press, pp. 388-346.
- xiii. Friedman, M., 1957. *A Theory of the Consumption Function*. Princeton, NJ.: National Bureau of Economic Research.
- xiv. Guisan, M., 2004. A Comparison of Causality Tests Applied to the Bilateral Relationship between Consumption and GDP in the USA and Mexico. *International Journal of Applied Econometrics and Quantitative Studies*, Volume 1, pp. 115-130.
- xv. Hall, R., 2001. Stochastic Implications of the Life-cycle permanent Income Hypothesis: Theory and evidence. *Journal of Political Economy*, 2(3), pp. 10-14.
- xvi. Hansen, H., 1996. *The impact of interest rates on private consumption in Germany Discussion paper 3/96*, s.l.: Economic Research Group of the Deutsche Bundesbank.
- xvii. Iyoha, M., 2001. Policy simulation with Macro Econometric models of the Nigerian Economy. *Economic and Financial Review*, 2(1), pp. 21-25.
- xviii. Keynes, J., 1936. *The General Theory of Employment, Interest and Money*. New York: Harcourt Brace.

- xix. Kweka, C. & Morrissey, O., 1998. Impacts of Economic Growth on Consumption Expenditures, The case of Tanzania. *Tanzanian. Econ. J*, 15(1), pp. 1-34.
- xx. Mankiw, G., 2010. *Makroekonomi*, Çev.Ömer Faruk Çoklak. Ankara: Efil Yayınevi.
- xxi. Maureen, W., Kamau, Sichei, M. & Kiptui, M., 2013. *A theoretical Framework for Kenya's Macroeconometric Model*. Africa Growth Initiative Working Paper. s.l.:Brookings Institution.
- xxii. Mishra, P., 2011. Dynamics of The Relationship Between Real Consumption. *Indian Journal of Economics and Business*, 10(4).
- xxiii. OECD , 2009. *National Accounts of OECD Countries 2009, Volume I, Main Aggregates, OECD Publishing*. [Online]
Available at: http://dx.doi.org/10.1787/na_vol_1-2009-enfr.
- xxiv. Ofwona & Alice, C., 2013. An Estimation of the Consumption Function for Kenya Using Keynes Absolute Income Hypothesis for the Period 1992-2011. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)*, 4(1), pp. 103-105.
- xxv. Ogundipe & Alege, 2013. Interest Rate Pass-Through to Macroeconomic Variables: The Nigerian Experience. *International Journal of Economics and Finance*, 10(5).
- xxvi. Pesaran, M. & Shin, Y., 1999. An autoregressive distributed lag modeling approach to cointegration analysis". In: S. Strom & H. P. Diamond, eds. *Centennial Volume of Rangar Frisch*. Cambridge: Cambridge University Press.
- xxvii. Pesaran, M., Shin, Y. & Smith, R., 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, Volume 16, pp. 289-326.
- xxviii. Poole, W., 1972. *The Role of Interest Rates and Inflation in the Consumption Function..* s.l.:Brookings Papers on Economic Activities.
- xxix. Sakib-Bin-Amin, 2011. Causal Relationship between Consumption Expenditure and Economic Growth in Bangladesh. *World Journal of Social Sciences*, 1(2), pp. 158-169.
- xxx. Santos & Alimi, R., 2013. *Keynes' Absolute Income Hypothesis and Kuznets Paradox*". [Online]
Available at: <http://mpira.ub.uni-muenchen.de/49310/>.
- xxxi. Tsenkwo, J., 2011. Testing Nigeria's Marginal Propensity to Consume (MPC) within the period 1980-2004. *Journal of Innovative research in Management and Humanities*, 2(1), pp. 15-25.
- xxxii. Uwujaren, G., 1977. Specification and estimation of an economy-wide macro econometric model of Nigeria. *Nigerian Journal of Economic and Social Studies*, 19(2), pp. 23-25.
- xxxiii. World Bank, n.d. [Online]
Available at: <http://data.worldbank.org/indicator/NE.CON.PRVT.CD1>

Appendix

1)

Dependent Variable: D(PCEXP)

Method: Least Squares

Date: 05/23/15 Time: 18:32

Sample (adjusted): 1983 2013

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.492480	7.825640	3.185022	0.0047
D(PCEXP(-1))	-0.820830	0.165882	-4.948268	0.0001
D(IR)	9.180040	3.197930	0.287062	0.7770
IR(-1)	-1.584310	4.865330	-0.325633	0.7481
D(MS(-1))	-7.013440	4.00E+09	-1.753556	0.0948
MS(-1)	7.046580	3.999550	2.272820	0.0342
D(PCGDP(-1))	1.338080	4.314410	3.101431	0.0056
PCGDP(-1)	-1.136730	3.344170	-3.399133	0.0028
D(BSCPS(-1))	6.927680	2.574060	2.691350	0.0140
BSCPS(-1)	-5.876220	2.907780	-2.020858	0.0569
IRDUM	-2.774390	2.238580	-1.239354	0.2296
R-squared	0.758132	Mean dependent var	9.690000	
Adjusted R-squared	0.637198	S.D. dependent var	4.210000	
S.E. of regression	2.540000	Akaike info criterion	60.23445	
Sum squared resid	1.290000	Schwarz criterion	60.74328	
Log likelihood	-922.6339	Hannan-Quinn criter.	60.40031	
F-statistic	6.268967	Durbin-Watson stat	2.010350	
Prob(F-statistic)	0.000255			

2)

Wald Test:

Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	6.212577	(6, 14)	0.0024
Chi-square	37.27546	6	0.0000

Null Hypothesis:

$C(13)=C(14)=C(15)=C(16)=C(17)=C(18)=0$

Null Hypothesis Summary:

Normalized Restriction (=0)	Value	Std. Err.
C(13)	-0.014606	0.007810
C(14)	-0.414635	0.286694

C(15)	-3.57E-12	1.82E-12
C(16)	0.000174	0.007773
C(17)	1.66E-10	9.39E-11
C(18)	0.104144	0.074805

Restrictions are linear in coefficients.

3

There is no serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.134398	Prob. F(2,18)	0.8751
Obs*R-squared	0.485541	Prob. Chi-Square(2)	0.7845

Test Equation:

Dependent Variable: RESID

Method: Least Squares

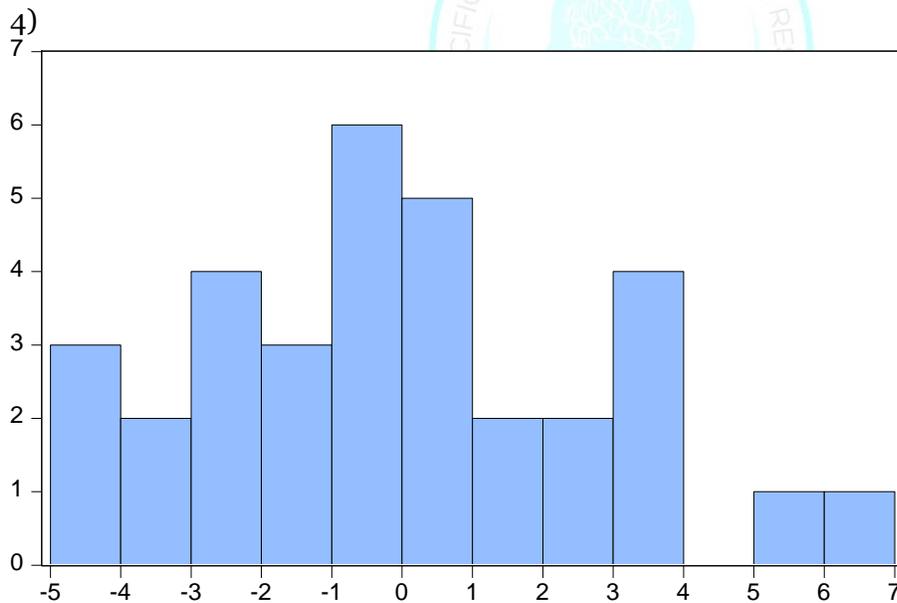
Date: 12/27/16 Time: 05:07

Sample: 1983 2015

Included observations: 33

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
----------	-------------	------------	-------------	-------



Series: Residuals	
Sample 1983 2015	
Observations 33	
Mean	-2.42e-16
Median	-0.162469
Maximum	6.185069
Minimum	-4.688333
Std. Dev.	2.889888
Skewness	0.291236
Kurtosis	2.432292
Jarque-Bera	0.909653
Probability	0.634558