



The Effects of Interest and Inflation Rates on Consumption Expenditure: Application of Consumer Spending Model

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ABSTRACT

Using modified consumer spending model and data that span the period of 1981–2011, the study examines the effects of interest and inflation rates (proxy - consumer price index) on consumer spending. The study extended its investigation into the causal relationship between consumer spending (proxy; private consumption expenditure [PCE]), interest and inflation rates using granger causality Wald test, so as to ascertain if consumer spending can be used to predict future interest and inflation rates in the economy. The findings suggest that all explanatory variables account for approximately 93.38% variation in consumer spending, indicating interest and inflation rates and other control variables such as per capita income, indirect tax and savings as important determinants of PCE in Nigeria. The results on the granger causality indicated that future interest and inflation rates cannot be predicted using PCE. Therefore, based on these findings, we recommend expansionary fiscal and monetary policies to influence the level of aggregate demand in the economy.

Keywords: Consumer Spending, Inflation Rate, Interest Rate, Granger Causality

JEL Classifications: D11, D12

1. INTRODUCTION

After years of destitute governance and contradictory policies under the military government, Nigeria experienced enhanced growth when the country returned to civilian rule in 1999; this marked the turning point for Nigeria. The new dawn has been attributed to incessant effort of the authorities and the policy makers in transforming the economy with particular attention to fiscal and monetary policy. According to National Bureau of Statistics (NBS), Nigeria economy has been growing at an impressive rate of 6.5% since 2003 as against 2.8% recorded in the 1990s, with a whopping drop of inflation rate from 26% to 9% in December 2006. From 2006 until February 2014, inflation rate in Nigeria averaged 10.38% reaching an all time high of 15.60 Percent in February of 2010. In like manner, foreign reserves also grown from \$4 billion in 1999 to \$43.5 billion as at December 2006, even after paying \$14 billion to the

Paris and London club with huge debt relief of \$33 billion. As a matter of fact, in December 2013 the Nigeria foreign reserve got to its peak at \$48.86 which has so far dipped by 6.77% since the beginning of the 2014. Consequently, the implied persistent improvement in the performance of the economy indicated by the statistics and growth rate of real gross domestic product (GDP) illustrated in Figure 1 expected to translate to improvement in the living standard of the households. To the greatest dismay, as the real GDP grows, the unemployment rates even grow faster.

In 2011, NBS report show an increasing growth rates of 6.64%, 7.72%, 7.40% and 8.68% in the 1st, 2nd, 3rd and 4th quarter of the year respectively with unemployment rate of 23.9%. Also, World Bank Standard 2012 has it that almost 100 million people in Nigeria live on less than US\$ 1.25 per day despite its alleged growth. Apparently, it is understood that consumption expenditure

plays a central role in macroeconomic activity affecting both short-run business cycles and long-run economic growth. The motivation behind consumption expenditures is the general process of consumption, which is the use of goods and services to satisfy human needs. Increase in private consumption expenditures (PCEs) as a measure of consumer spending invariably means reduction in the cost of living and improvement in standard of living (AmosWeb, 2014, March 2nd). Therefore, it is almost impossible for a reasonable growth in an economy without a corresponding increase in consumer spending. Thus, for a sustainable growth in the country, the need for articulated policy options geared towards promoting consumers spending should not be neglected because, the stimulation of consumers spending always means the stabilization of the economic environment. Therefore, a low interest and inflation rates could intensify borrowing and spending through the evaluation of purchasing power of the households and lowering the cost of borrowing to improve the standard of living of the people.

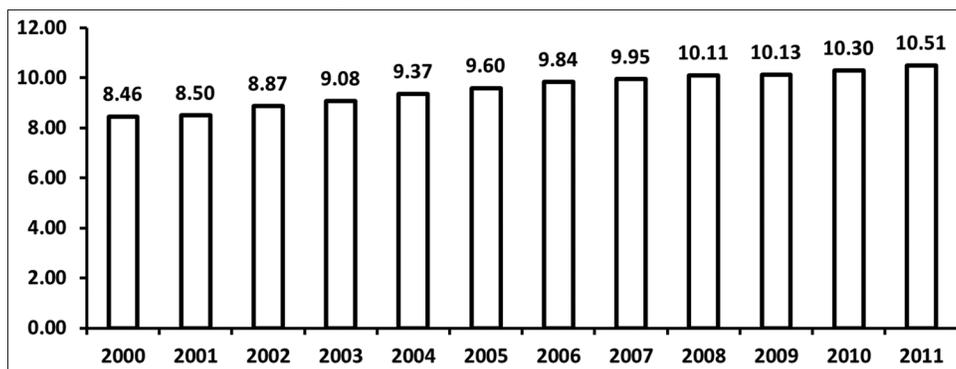
However, even in the presence of the recorded growth which has not been impressed, consumers spending have been threatened by high inflation rate mostly measured with consumers' price index (CPI). As the annual percentage changes in the price level of basket goods and services purchased by households, it also serves as a measure of the real values of wages, salaries and pensions. Be that as it may, in 2004 the CPI in Nigeria averaged 97.43 index points, which reaches an all time high points of 152.30 in 2013. In January 2014, it increases from 152.30 to 153.30 index points (NBS, 2014). In addition, further survey on consumer price index (CPI) shown in Figure 2 also reveals a persistent increase in the

prices of all items. Thus, continues increase in CPI over the year undermines the consumers spending by reducing the purchasing power of their income.

Hence, the understanding of CPI and its influence on consumer spending plays a significant role in the growth of every economy and maintenance of the standard of living of the households. It is obvious that an economy that has recorded persistent lower CPI inversely depict healthy economic environment which signifies growth (Seabury, 2011). Consequently, it equally shows the veracity of the economy and also serves as an incentive for both local and foreign investors. Therefore, a persistent rise in the CPI amidst the improvement in real GDP should be a source of worry to policy makers in Nigeria because; they constitute a very useful tool for economic planning and help to understand the degree of economic stability (Seabury, 2011).

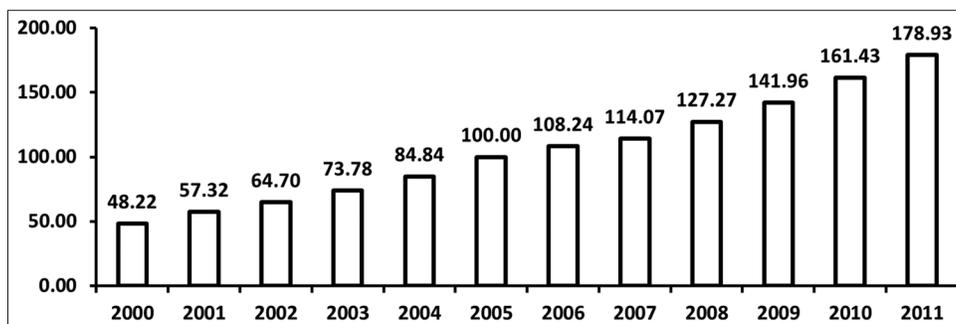
Similarly, the lower the interest rate (INTR), people become eager to borrow money for investment purposes and to make large purchases. This implies that when consumers pay less in interest, it encourages them to finance more businesses due to the low cost of borrowing or make more purchases, which may in turn create a ripple effect of increased spending throughout the economy. Thus, higher INTRs translate into cutting spending because consumers may not have as much disposable income for more spending. Therefore, higher INTR together with increased lending standards discourages spending hence the high cost of borrowing. This affects not only consumers but also businesses and the rate of production (Seabury, 2011).

Figure 1: Real gross domestic product in Nigeria – real gross domestic product - (2000–2011)



Sources: Author's Concept

Figure 2: Consumer price index (2009–2013)



Source: Author's Concept

The impacts of high interest and inflation rates have overtime exert negative influence on consumption expenditure and the economy in general. It should be noted that the consumption pattern of a country depicts the aggregate demand of goods and services in the country, and in most cases it constitutes about 60% of the total GDP of the country. It also represents the level of welfare and poverty that a nation is experiencing (HNLSS, 2009/2010). However, from Figure 3, it was noticed that consumption expenditure from 2000 to 2011 is almost horizontal, implying poor spending habit by household due to the ugly influence of high interest and inflation rates which resulted to a high cost of borrowing and fall in the purchasing power of the household. It is obvious that increase in either of the instrument most likely have direct effect on consumers spending by reducing current consumption through the altering of the disposable income of the household (Ndou and Ncube, 2011). In a situation like this, the outcome of low investment activities and decline in production due to fall in aggregate demand for goods and services could result to unemployment, low per-capita income and poor standard of living.

Having viewed this challenge a constraint to economic growth and welfare of the citizenry, the government authorities and Central Banks of Nigeria (CBN) Monetary Policy Committee (MPC), in their effort opted for the reposition of the economy through the review of the past monetary policy instruments. From the review, moderation inflationary pressure, which began in the fourth quarter of 2012 and continued in 2013, was observed. The year-on-year headline inflation fell consistently from 9.0% in January to 8.6% and 8.4% in March and June, respectively, before ending the year at 8.0 per cent. Also, food inflation, which constitutes 51.8% of the CPI basket, declined from 10.1 per cent in January to 9.5, 9.6, 9.4 and 9.3% in March, June, September, and December 2013, respectively. However, it was also observed that core inflation initially declined to 7.2 and 5.5% in March and June from 11.3% in January, but rose during the second half of the year to 7.4 and 7.9% in September and December, 2013, respectively (Sanusi, 2014). Since the moderation in domestic price level was largely due to the tight monetary policy stance in 2013, resulting to single digit inflation for the whole year, the committee, thought it wise to re-introduce the monetary policy rate (MPR) of 12 percent which was also adopted in 2011 and 2012 with the asymmetric corridor of interest rate (INTR) remaining at ± 200 points basis in 2014 as a way to restrain the challenges facing domestic and international economic development in Nigeria. To influence the country's borrowing and INTRs, 12% cash reserve ratio (CRR) on private sector deposits is maintained with increase from 50%

in 2013 to 75% CRR on public sector deposits to enhance the availability of fund for commercial banks to make loans (CBN, 2014) so as to strengthened investment spending. While the liquidity ratio remains at 30% of total assets, net open position of 1.0% of shareholders' funds was initiated.

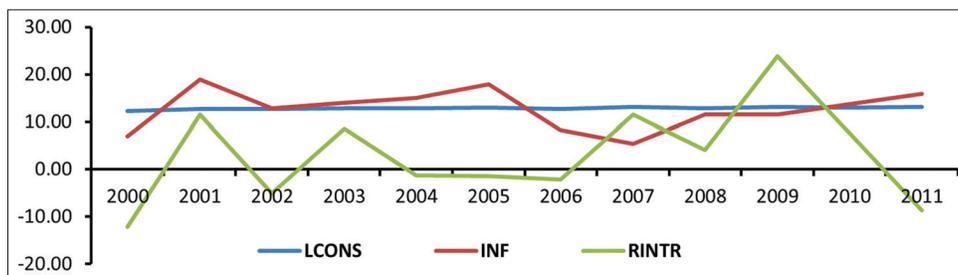
Therefore, considering the reintroduction of tight monetary policy (12% MPR) and the increase from 50% to 75% CRR on public sector deposits as well as the ongoing policy reforms in the economy currently to address the challenges facing consumption expenditure, this study intend to provide a preliminary evidence on the influence of interest and inflation rates on consumption expenditure and also, investigate the causal relationship between them. Given the significance of interest and inflation rates in an economy, several empirical investigations (e.g. Audu, 2012; Onodje, 2009) have been conducted to unravel the complexities on the need to maintain a moderate interest and inflation rates and its implications on consumer's spending. This paper differs from other studies in Nigeria in various ways; (a) the model for the study was built on the framework of Keynes (1936) general theory of employment, interest and money which stipulated that consumption expenditure is the most important short run determinant of economic performance; (b) Nnadi (2011) for instance, measures consumption expenditure with retail price index while our paper uses PCE. Thus, retail price index could be most suited for inflationary measure because; retail price index measures changes in the cost of basket of retail goods and services. Furthermore, this paper is divided into five sections. Section two is a review of literature; Section three outlines the methodology, and Section four results presentations and analysis of findings while section five is the conclusion and policy recommendations.

2. REVIEW OF LITERATURE

2.1. Theoretical Literature

There has been a serious debate on the determinants of consumption. Theoretically, many arguments have been raised on what could be the determinants of consumption. Some view consumption as a function of income while other argued that consumption aren't depend on income alone, observing other behavioural factors as a significant factor. For instance, John Maynard Keynes general theory in 1936 recognizes the relationship between income and consumption as a key macroeconomic relationship. He asserted that real consumption is a function of real disposable income (i.e. income after taxes), and that as income rises, consumption also rise but not necessarily

Figure 3: Graph of consumption, inflation and real interest rate



Sources: Author's Concept

proportional. However, as a result of Keynes' postulates, many eyebrows were raised. Some scholars did not see the relevance of his theory when applied across the population, claiming that rich people are expected to consume less amount of income than their counterpart poor. Conversely, Duesenberry (1949) study on income, saving and the theory of the consumer behaviour titled "relative income hypothesis" stated that individual view of consumption and savings (SAV) is guided more by their income in relation to others than their standard of living. He maintained that the percentage of income consumed by an individual depends on the income distribution. In addition, he suggested that present consumption is not prejudiced just by present levels of absolute and relative income, but also by levels of consumption attained in preceding periods; hence it is difficult to reduce level of consumption once attained. Also that the aggregate ratio of consumption to income is assumed to depend on the level of present income relative to past peak income.

In the same vein, in 1957, Milton came up with his ideology embodied in permanent income hypothesis which assume rational behaviour by agents. The hypothesis stated that a change in permanent income, rather than a change in temporary income, affects the choices that determine consumer's consumption patterns. He concluded that transitory, temporary changes in income have little effect on consumer spending behavior, whereas permanent changes can have large effects on consumer spending behavior. He sees consumption as a function of individual's real wealth, but not current real disposable income because, he assumed that an individual saves only when they expect that their long-term average income, their permanent income, will be less than their current income. But Modigliani (1963) has a seemingly different perception in his life-cycle theory. He hypothesized that individuals strategize their consumption and SAV behaviour over the long period and aim to level their consumption in the best possible manner over their entire lifetimes, suggesting that they 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.

Apart from the discussed consumption theories, monetarists also air their views on other issues that may likely affect consumption directly or indirectly. Milton (1976) sees money supply as one of the major causes of inflation and emphasizes the role of governments in controlling the amount of money in circulation. He is of the view that variation in the money supply has major influences on national output in the short run and the price level over longer periods, and suggested that monetary authorities to focus solely on maintaining price stability. In addition, Irving Fisher's theory of capital investment and interest expounded in his work titled "the nature of capital and income in 1906," elaborated more in a work on "the rate of INTR in (1907)," postulated that subjective economic value is not only a function of the amount of goods and services owned or exchanged, but also of the moment in time when they are purchased. He added a good available now has a different value than the same good available at a later date; value has a time as well as a quantity dimension. The relative price of goods available at a future date, in terms of goods sacrificed

now, is measured by the INTR. Irving Fisher's theory of INTRs relates the nominal INTR to the rate of inflation and the "real" INTR. The real INTR is the INTR after adjustment for inflation. It is the INTR that lenders have to have to be willing to loan out their funds. Therefore, increase in the real INTR discourages borrowing which invariably affect investment and consumption expenditure.

2.2. Related Empirical Literature

A number of studies have been carried out on the relationship between consumption and INTR, inflation and the related. Some of these studies include the work of Fazel (2005) which suggested that disposal income is a good predictor for consumption expenditure and that index for consumer sentiment does not have explanatory power to predict future level of consumption; and Saad (2011) that revealed the significant effect of private consumption by changes in real disposable income, real INTR, anticipated inflation and wealth.

Furthermore, Nnadi (2011) assessed the effectiveness of the government's fiscal measures to stabilize the economy through spending. He developed a consumer spending model (CSM) and assessed its impact on intrinsic fiscal policies such as bank rate, inflation, percentage earning increase and mortgage rate. Using the retail price index and data obtained from the office of National Statistics. He found bank rate and annual inflation as most significant factors affecting consumer spending and suggested that fiscal measures targeted at reducing bank ending rates and controlling inflation should be the government's policy priority. Also, Onodje (2009), examine the effects of fiscal policy shocks on private consumption to the Nigerian. He examined whether government expenditure shocks and tax revenues shocks have Keynesian Effects. Using data spanning the period 1980–2004. Vector error correction model was used in the estimation. The results of his findings indicated that both government consumption and tax revenue shock have Keynesian effect on private consumption Nigeria.

Emerole et al. (2007) study on the determinants of consumption expenditure and its share to total income in small farm household in Ikwano, Abia State Nigeria, using a multi-stage random sampling technique on a panel of small-scale farmers who supplied cross-sectional and longitudinal information for their research, found that food and drinks accounted for 48.7% of the total consumption spending with consumption spending 40.0–60.0% of the household income. They found perhousehold income (in net farm income plus off-farm income) to have high positive influence on consumption. Per-household member wealth (proxied by per-household-member beginning fortnight saving) is also found to be negatively related to consumption. They therefore recommended that programmes that enhance per-household-member income and better living standards of members should be implemented. On the other hand, Adedeji and Adegboye (2013) conducted a study on the determinants of PCE in Nigeria, using a time series data that covers the periods 1975–1998. From the results obtained, it was indicated that only disposable income portrayed a significant influence on PCE within the period of study other variables like money supply, INTR and import were insignificant.

Okoro (1998) in his work carried out extensive study on how INTR wealth, income and inflation has affected consumption behaviour in Nigeria which spans the period 1975–1995. Using secondary data obtained from Central Bank of Nigeria, he found that Nigeria’s MPC was high at about 0.89. He also found that rate of inflation and INTRs both for the banks and the capital market and accumulated wealth affected consumption pattern in Nigeria. In like manner, Attama (1998) performed a test on the determinants of consumption in Nigeria. The study covers the period’s 1976–1995. Using ordinary least square technique, he found that 1% increase in money supply will increase consumption by 23% while 1% increase in INTR will reduce consumption by 19%. Also, it was noticed that 1% increase in import increases consumption by 7% while 1% increase in disposable income increases consumption by 54%. Audu (2012) in an investigative study on the dynamic analysis of fiscal policies on consumer’s spending in Nigeria: a time series approach, using the ordinary least squares technique and data collected for the period 1970–2010, the study assessed the effectiveness of government’s fiscal measures to stabilize the economy through spending. From the CSM used to assessed the effectiveness of the key variables like inflation rate, INTR, mortgage rate and annual earnings increase on retail price index, the study depict that inflation rate and INTR were the key variables that affects consumer spending. As such, he recommends that fiscal measures targeted at reducing INTR (lending rate) as well as controlling inflation should be the policy priority of the Nigerian government.

Fasoranti (2012) conducted a study in Akoko North West Local Government Area of Ondo State. The study examined the determinants of consumption among rural dwellers in the local government area. The influence of some selected variables as identified by literatures related to consumption on the level of consumption in the study area was considered. Data for the study was obtained through primary and secondary sources. The data obtained was analysed with the aid of simple multiple regression analysis. Results shows that current income, expected pension fund, shares and durable assets are positively related to consumption while expected future income and deposits in banks are negatively related. Among other things, the study revealed that expected future income, deposits at banks and shares are significant determinants of consumption in the study area. However, consumption can be reduced in the study area if INTRs on deposits are increased.

3. METHODOLOGY AND DATA SOURCE

The study used annual data which covers the periods of 1981–2011. The data for the study is generated from Nigeria Bureau of Statistics and Central Bank of Nigeria Statistical Bulletin. The relationship between INTR, inflation rate and consumer’s spending was examined looking at the econometric evidence. To facilitate comparison to widely recognise econometric specification, we adopt a simple standard empirical model of consumption expenditures whose theoretical framework is based on Keynes (1936). Therefore, households are presumed to base their spending on their wealth, income and INTRs which is also deeply affected by inflation. Hence, basic representation of the consumer expenditure in a functional form is:

$$CONS=f(SAV, INTR, INDTAX, INF, PCI) \tag{1}$$

The econometric model of the function is expressed as:

$$PCE_t = \beta_0 + \beta_1 INTR_t + \beta_2 CPI_t + \beta_3 PCI_t + \beta_4 INDTAX_t + \beta_5 SAV_t + \epsilon \tag{2}$$

Where, Con is consumption expenditure captured with PCE. PCE measures the value of goods and services purchased by individual consumers, families and institutions. It excludes the purchase of residential structures by individuals, families and institutions such as buildings or equipments. Other explanatory variables in the model include; INTR, inflation captured with CPI; per capita income (PCI), indirect tax (INDTAX) and SAV, while ϵ_t represents the error term. CPI measures the annual percentage changes in the price level of basket goods and services purchased, as well as the real values of wages, salaries and pensions of the household. INTR is the rate at which interest is paid by a borrower for the use of money borrowed from a lender. It is the rate that may cause household to defer their consumption expenditure. When there is high INTR, consumers reduce their consumption. Hence, high INTR is a disincentive to consumer. PCI is the income per head. An increase in PCI of an individual invariably increases the consumption expenditure of the individual. The a priori expectation for the above estimation becomes;

$$\beta_0 < 0, \beta_1 < 0, \beta_2 < 0, \beta_3 > 0, \beta_4 < 0, \beta_5 < 0$$

Based on a priori therefore, the signs of $\beta_0, \beta_1, \beta_2, \beta_4$ and β_5 are expected to be negative while β_3 is expected to be positive.

3.1. Granger Causality Test

To investigate if PCE granger causes interest and inflation rates, granger causality Wald test is applied.

$$PCE_t = \beta_0 + \sum_{t=1}^n \lambda PCE_{t-1} + \sum_{t=1}^n \phi CPI_{t-1} + \psi_t \tag{3}$$

$$CPI_t = \chi_0 + \sum_{t=1}^n \phi PCE_{t-1} + \sum_{t=1}^n \partial CPI_{t-1} + v_t \tag{4}$$

$$PCE_t = \rho_0 + \sum_{t=1}^n \beta PCE_{t-1} + \sum_{t=1}^n \gamma INTR_{t-1} + \xi_t \tag{5}$$

$$INTR_t = \mu_0 + \sum_{t=1}^n \zeta PCE_{t-1} + \sum_{t=1}^n \theta INTR_{t-1} + \epsilon_t \tag{6}$$

Where ψ_t, v_t, ξ_t and ϵ_t are mutually uncorrelated error terms. $\lambda, \phi, \beta, \zeta, \phi, \partial, \gamma$ and θ are the coefficients of PCE, CPI and INTR in equations 3, 4, 5 and 6 while β_0, χ_0, ρ_0 and μ_0 are the constants.

4. RESULTS PRESENTATIONS AND ANALYSIS OF FINDINGS

Before assessing the relationship between INTR, inflation rate and consumption expenditure, pre-estimation test such as stationarity, multicollinearity and autocorrelation were conducted. From

Table 1: ADF test statisticw

Variable	ADF value	Critical values			Trend	Order of integration
		1%	5%	10%		
PCE	-12.009	-4.343	-3.584	-3.230	Yes	I~(1)
INTR	-3.160	-3.716	-2.986	-2.624	No	I~(0)
CPI	-5.451	-4.352	-3.588	-3.233	Yes	I~(2)
PCI	-3.680	-4.343	-3.584	-3.230	Yes	I~(1)
SAV	-4.168	-4.380	-3.600	-3.240	Yes	I~(1)
INDTAX	-10.448	-4.371	-3.596	-3.238	Yes	I~(0)

ADF: Augmented Dickey Fuller, PCE: Private consumption expenditure, INTR: Interest rate, CPI: Consumers’ price index, PCI: Per capita income, SAV: Savings, INDTAX: Indirect tax

Table 2: ADF residual test result

	ADF value	Critical values		
		1%	5%	10%
Z (t)	2.148	-3.716	-2.986	-2.624

McKinnon approximate P value for Z (t) = 0.9988. ADF: Augmented Dickey Fuller

Table 1, it is evident that all the variables were stationary at 5% level of significance.

From the test above, PCI and SAV are integrated of the same order with the dependent variable – PCE. Hence, we suspected the existence of cointegration on the variables. Therefore, to ascertain if actually there exists a cointegration problem, we conducted a unit root test on the generated residuals (Table 2).

From the reported cointegration test above, the augmented Dickey Fuller (ADF) is less than the critical value at 5% significance level. Though, the ADF is positive. Hence, the null hypothesis of no cointegration is not rejected. In addition, we also conducted the Durbin-Watson test to ascertain if the variables are auto correlated. The DW (6, 31) = 2.759982 test result fall within the indecision zone. To make sure that there is no omitted variables in the model, specification test was conducted. The results F (3, 22) = 3.54 with $p > F = 0.0312$ indicated that the model is well specified. Even the normality result, using the Jarque Bera test ($JB_{cal} 3.46187 < 5.99$) also suggests that the residual is normally distributed.

As shown in Table 3, all the variables are statistically significant except INTR. The explanatory variables account for approximately 93.38 percent variation in PCE while the $P > F = 0.0000$ indicates that the explanatory variables are jointly significant and are capable of explaining changes in PCE in Nigeria. However, it is observed that all the explanatory variables have a positive relationship with PCE except SAV. The results equally shows that a percentage increase in INTR, CPI, PCI and INDTAX account for 13.377%, 21.655%, 0.7131% and 0.01368% increase in PCE respectively while a percentage fall in SAV account for 0.0002768% fall in PCE. The findings on the relationship between INTR, CPI, INDTAX and PCE are contrary to the a priori expectation. While the findings on PCI and SAV is in accordance with the postulates of Maynard Keynes’ theory on income and consumption expenditure, the results on INTR and inflation (CPI) is contrary to Irving Fisher’s theory of interest and inflation rates. Considering the core variables of the study – interest and inflation rates (CPI), the finding on the relationship between inflation (CPI) and consumer spending (PCE) supported the work of Nnadi (2011) and

Audu (2012) while that of INTR is contrary with their findings. Beside, interest and inflation rates are important determinants of consumer’s spending in Nigeria. To promote consumption expenditure (proxy; PCE) in Nigeria, there is the need for policies that will encourage the reduction of high INTR, inflation rate (proxy; CPI) and INDTAX, and stimulate increase in PCI and reduction in SAV. This is because; increase INTR could make SAV more attractive to consumers and investors, than spending because of the expected higher return that may accrue to their money if saved. Conversely, this can make them put more of their money into saving thus, leaving them with little or no money to spend. And as the inflation rate increases SAV that has been accumulated over a long periods by the investor and households get devaluated, hence resulting in lower consumption. This in turn will not only affect consumers but the aggregate output in the economy.

To investigate if PCE granger causes INTR and CPI, we resort to granger causality Wald test presented on Table 4. The results suggest that PCE does not granger-cause INTR and CPI. This implies that PCE cannot be use to predict future INTR and changes in the price level of basket of goods and services purchased by households.

5. CONCLUSION AND POLICY RECOMMENDATION

The study investigates the effects of interest and inflation rates on consumers’ spending in Nigeria. The effects inflation which was measured with CPI on consumer spending is found to be statistically significant, while INTR is insignificant. The outcome of the granger causality using Wald tests shows that future interest and inflation rates cannot be predicted using PCE.

Furthermore, the findings suggest that explanatory variables account for approximately 93.38% variation in consumer spending as measured by PCE. This shows that INTR, inflation rate (proxied with CPI), PCI, INDTAX and SAV are important determinants of PCE in Nigeria which supported the work of Emerole et al. (2007), Adedeji and Adegboye (2013), Audu (2012); and postulates of the work of Fisher (1906; 1907) and Keynes (1936). Therefore, based on these findings, we recommend expansionary fiscal and monetary policies to influence the level of aggregate demand in the economy in order to achieve price stability, full employment and economic growth in the economy by increasing government spending and decreasing tax rates. Also lower INTRs are recommended for easy access to credit to induce business activities.

Table 3: Estimated results

PCE	Coefficient	Robust standard error	t-statistic	Probability value
INTR	1337.668	1368.371	0.98	0.338
CPI	2165.528	422.5237	5.13	0.000
PCI	71.30967	30.41788	2.34	0.027
SAV	-0.0276848	0.0122104	-2.27	0.032
INDTAX	1.368405	0.2581901	5.30	0.000
CONS	-87003.55	73622.73	-1.18	0.248

R²=0.9338; P>F = 0.0000. PCE: Private consumption expenditure, INTR: Interest rate, CPI: Consumers' price index, PCI: Per capita income, SAV: Savings, INDTAX: Indirect tax

Table 4: Granger causality wald tests

Equation→Excluded	χ^2	df	P> χ^2
PCE→INTR	4.7344	2	0.094
PCE→CPI	5.3375	2	0.069
PCE→ALL	14.801	4	0.005
INTR→PCE	3.3074	2	0.191
INTR→CPI	2.2155	2	0.330
INTR→ALL	4.1260	4	0.389
CPI→PCE	1.5685	2	0.456
CPI→INTR	1.6706	2	0.434
CPI→ALL	3.6087	4	0.462

PCE: Private consumption expenditure, INTR: Interest rate, CPI: Consumers' price index, PCI: Per capita income

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