British Journal of Economics, Management & Trade
16(2): 1-15, 2017; Article no.BJEMT.26967
ISSN: 2278-098X

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Econometric Modelling of Income-consumption Relationship: Evidence from Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author RKA conceptualized and designed the study and analyzed the data. He also did the interpretation of results and wrote the first draft of manuscript. Author KFA managed the literature searches, did critical review and comments on the manuscript. Author RKA read and approved the final manuscript.

Article Information

DOI: 10.9734/BJEMT/2017/26967
Editor(s):
(1) Chiang-Ming Chen, Department of Economics, National Chi Nan University, Taiwan.
Reviewers:
(1) Afsin Sahin, Gazi University, Turkey.
(2) Beatrice Njeru Warue, Africa International University, Kenya.
(3) Fabrício Pitombo Leite, Federal University of Rio Grande do Norte, Brazil.
Complete Peer review History: http://www.sciencedomain.org/review-history/17618

Original Research Article

Received 12th May 2016
Accepted 2nd November 2016
Published 26th January 2017

ABSTRACT

This paper seeks to empirically verify the dynamic relationship between consumption expenditure and income in Nigeria by experimenting with two major income hypotheses, the habit persistence and permanent income hypotheses. The major research question centred on which of the consumption theories best describe the relationship between consumption and income in Nigeria? Time series data on per capita personal consumption expenditure (PPCE) and per capita disposable income (PPDI) in Nigeria for the period 1980 – 2014 were used. The result of the AR(p) time series estimation showed the weak existence of habit formation by Nigerian consumers. The speed of the short-run adjustment of consumption expenditure to changes in disposable income is 0.5569, which is averagely high; an indication that consumption habits are quickly adjusted to changes in disposable income. Due to the high level of poverty, unemployment and low standard of living, consumers in Nigeria find it difficult to form a consumption habit for long. Modelling consumption along the assumptions of Permanent income hypothesis; the results of the ARDL bound testing cointegration showed that the long-run multiplier effect of marginal propensity to consume out of permanent income is 0.2953; an indication that consumers save more than spend.

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This also implies that Nigerians on the average have a low permanent income and a higher transitory income which does not affect consumption according to the assumption of Permanent Income of hypothesis. The study therefore recommends that policies towards reducing the rate of unemployment and alleviate poverty in the Nigeria economy should be put in place to encourage good consumption habits.

Keywords: Habit persistence; permanent income; per capita personal consumption; per capita income; ARDL.

1. INTRODUCTION

Nigeria, mostly referred to as the giant of Africa [1] and endowed with natural resources is characterized by poverty, poor savings geared by high consumption for basic needs among her people and high rate of unemployment. This feature tends to be a general form of the sub Sahara region thereby resulting into stagnation of the region. [2] attested to this by identifying that the rates of saving in the past three decades doubled in East Asia and stagnated in Sub-Saharan Africa, Latin America and the Caribbean constituted to poor growth and development of the region.

Consumption which can be described as the final purchase of goods and services by individuals is largely determined by income level. Many theories view the response of household consumption to household economic resources; [3]' General Theory in 1936 identified the relationship between income and consumption as a key macroeconomic relationship. The theory asserts that as income rises, consumption also rises but not necessarily with the same amount. Rich people are expected to consume a lower proportion of their income than poor people. Habit persistence hypothesis of [4] identified past consumption habits as a major determinant of present growth rate of consumption. The permanent income hypothesis of [5] on the other hand is a theory of consumer spending which states that people will spend money at a level consistent with their expected long term average income.

The consumption pattern of households in Nigeria is such that is determined by their income, past behaviour, or future expectations thus leading to a dynamic approach to the study. People in different positions in respect to income have different structures of consumption. National saving at the macro level is low because Nigeria's economy is a consuming nation with a low national income as a result of low consumption of locally made products in the country. The persistent budget deficit in Nigeria is an indication of high expenditure and of this, consumption occupies the share of gross domestic expenditure composition.

The major objective of this paper is to study the dynamic relationship between consumption expenditure and income in Nigeria by experimenting with the Habit Persistence and Permanent Income Hypotheses respectively. The major research question is which of the consumption theories best describe the relationship between consumption and income in Nigeria?

The paper is divided into five sections. Section two after the introduction is the review of literature. Section three is the data and descriptive analysis, section four is the theoretical framework and empirical analysis. Section five is the conclusion and policy recommendations.

2. REVIEW OF LITERATURE

[6] conducted a research on the impact of change in income on Private Consumption Expenditure in Nigeria from 1981 to 2010 with the use of Ordinary Least Regression techniques. Their analysis indicated that a positive significant impact of Gross Domestic Product /income is felt on Private Consumption Expenditure in the country. This conforms to a priori expectation but the use of ordinary least regression technique is not statistically sufficient and robust for the analysis and this renders their work invalid.

[7] analysed relations between per capita consumption expenditure and personal income in India using ordinary least square technique, Granger Causality and Koyck transformation approach for the period covering 1950 to 1993. The result indicated that unidirectional causality flows from per capita consumption expenditure to personal disposal income in the country while the Koyck Model indicates that per capita personal

consumption expenditure adjusts to personal disposable income within a relatively long period of time. This is an indication that major part of the people's income is being spent on consumption expenditure in India thus militating against savings.

[8] analysed how private saving in Nigeria is determined using data covering 1970-2007 using the Error-Correction modelling procedure and found that savings rate increases as the interest on deposits with banks and the disposable income of individuals' increases. He concluded that income based for the nation must be increased to enhance savings.

[9] empirically verified if the habit persistence hypothesis holds in the Jamaican economy. He used the Generalized Method of Moments time series estimation on Jamaican data of income, domestic interest rate inflation and exchange rate from 1980 to 2011. His results show that the existence of habit formation is very high among the Jamaicans and past consumption and habits of the consumers have effect on the consumption growth rate in the country. He concluded that to encourage good consumption habits and confidence, domestic interest rate inflation rates and exchange rate have to be adjusted moderately.

[10], while attempting to gauge the marginal propensity to consume (MPC) and the average propensity to consume (APC) in Nigeria in the period 1980-2004 found conformity in both MPC and APC result with the Keynesian proposition. Argument against this study lies in the used of co-integration regression estimate with dataset of only 25 years span which is not accepted under asymptotic analysis.

[11], analysed household consumption expenditures in EA-18 using panel data model with data between 2000-2012 and found that a one dollar increase in gross domestic product will have an increase of 0.57 dollar on household consumption. The study used gross domestic product as a proxy for income and concentrated on the effect of increase in gross domestic product on household consumption without consideration on the role of saving on the household consumption expenditure.

[12] identified the effect of consumption function on aggregate demand and the multiplier effect on the Nigerian economy. Using ordinary least square techniques with quarterly data between 2009 and 2014, the study found that the performance of the economy was better in the post global financial recession period than the period that precede it. Macroeconomic variables such as Consumption, balance of trade, investment and government expenditure also exhibit positive relationship with the growth of aggregate demand in the period.

3. DATA AND DESCRIPTIVE ANALYSIS

This study uses both statistical and descriptive analysis to model income-consumption relationship in Nigeria using data spanning from 1980 to 2014. The statistical analysis involved the use of pairwise granger causality, the Koyck's transformation Model and the Auto Regressive Distribution Lag model which helps in modeling the relationship existing between consumption expenditure and disposable income in Nigeria using both the habit persistence hypothesis and the permanent income hypothesis. This section presents the trend analysis of the per capita personal consumption expenditure (PPCE) in relation to per capita disposable income (PPDI) in Nigeria for the period 1980 – 2014. The data measured in million current US dollar, were sourced from the World Bank data bank.

From the trend analysis above income (PCDI) appears to be more volatile than consumption (PPCE). While consumption (PPCE) looks stable or durable over the years, income fluctuates. The more stable or durable consumption may imply that consumers may find it difficult to form consumption habit and sustained it for long. Also the more volatile income follows the Permanent Income hypothesis tenet that believes that individuals base their consumption on a longer term view of an income measure. There is a jump in consumption between 2000 and 2008 and from 2011 in Fig. 1. These periods were the period of minimum wage increase in Nigeria. The drop in PCDI witnessed from 2008 to 2010 was probably due to high tax rate which led to clamouring for a new minimum wage that eventually took effect from January 2011. It is necessary that we study the direction of causality between the two variables.

The result of the pair wise Granger causality test is shown in Table 1. The test is sensitive to the lag length, the choice of 2 lags was made using the iterative method, that is gradually increasing the lag length until there is no further improvement in the decision making [13].

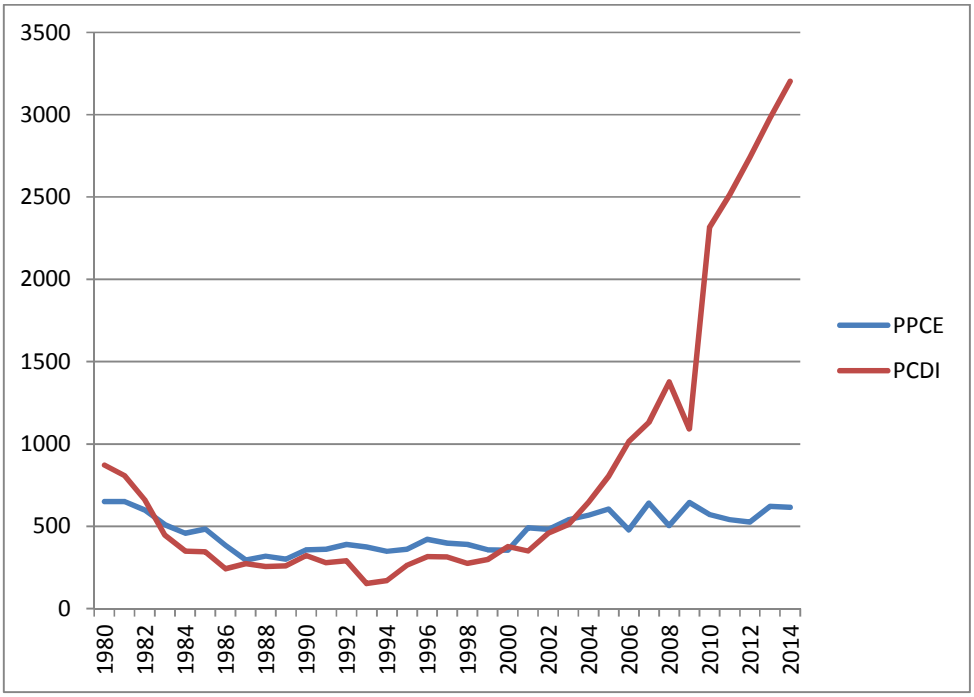

Fig. 1. Trend in per capita personal consumption expenditure and per capita disposable income in Nigeria (1980-2014)

Table 1. Pairwise granger causality

Null hypothesis	Obs.	F-statistic	Prob.	Decision
PCDI does not Granger Cause PPCE	31	4.49747	0.021	Reject
PPCE does not Granger Cause PCDI	31	5.63177	0.0093	Reject

The idea behind causality test is that, although regression analysis deals with the dependence of one variable on the other variable, it does not necessarily imply causation. In other words the existence of a relationship either the dynamic or equilibrium, between variables does not prove causality or the direction of influence.

Table 1 presents the direction of influence between the variables in a pair-wise manner. The decision whether to reject or accept the null hypothesis is made based on the probability of the F – statistics. Wherever the null hypothesis is rejected it implies the acceptance of the alternative hypothesis. At 0.05 level of significance, the result shows that there is a bi-directional causality between PPCE and PCDI. That is private personal consumption expenditure granger cause per capita disposable income and vice-versa as shown by the probabilities. Following our objective, PPCE is a made the endogenous variable for this study.

4. THEORETICAL BACKGROUND, MODEL SPECIFICATION AND ESTIMATION

4.1 Habit Persistence Hypothesis Model

If we base our consumption function on the Habit Persistence Hypothesis of [4], the model follows a distributed lag system, *DL (p)* where p is the lag length. The lag length here represents the length of consumption habit already formed by the consumer. Following the assertion that "habit fades away but gradually", we can assume that the impact of the habit on present consumption follows a declining lag. Thus we have:

$$PPCE_t = \alpha + \beta_0 PCDI_t + \beta_0 \lambda PCDI_{t-1} + \beta_0 \lambda^2 PCDI_{t-2} + \cdots + u_t \ldots\ldots\ldots(1.0)$$

If we rationalise our choice of distributed lags of past consumption expenditure in equation 1.0 using the Koyck's transformation, the Habit persistence model for this study is defined as an AR(p) model as follows:

$$PPCE_t = \alpha + \beta_0 PCDI_t + \lambda PPCE_{t-j} + u_t .....(2.0)$$

$$where \quad \alpha = \alpha(1-\lambda); \quad v_t = (u_t - \lambda u_{t-1}), \, a \ moving \ average$$

$$\lambda \ is \ such \ that \ 0 < \lambda < 1 = rate \ of \ decline \ of \ the \ distributed \ lag.$$

$PPCE_t$ = per capita personal consumption expenditure

$PCDI_t$ = per capita disposable income

Explaining equation 2.0 in terms of Euler's relation, λ is the parameter representing habit persistence which is expected to be less than zero if there is evidence of habit formation and greater than zero if the effect durability dominates. If both effects are present the sign of the coefficient which of the two effects dominates. Habit persistence implies that the coefficient of lagged consumption expenditure is negative, while durability implies positive coefficient for the variable [14].

Equation 2.0 was estimated using the OLS. But a major hindrance is the choice of the number of lag. We resort to the method of iteration, testing for serial correlation using the LM test and heteroscedasticity using the ARCH test in each case. Lag 2 was chosen as free from serial correlation and heteroscedasticity problem. The result of the AR (2) estimation of consumption expenditure is presented in Table 2.

The two coefficients of lagged consumption are both positive, implying that there is evidence of durability rather than habit formation in the consumption expenditure in Nigeria.

If we assume the distribution effect of past consumption expenditure on the present consumption expenditure follows the Koyck's relation [15], the rate of decline of the distributed lag is λ which is 0.1699 the median lag is

$-\frac{\log 2}{\log \lambda} = 0.3911$ And the Mean lag is $\frac{\lambda}{1-\lambda} = 0.2048$

Table 2. Koyck's model of consumption expenditure in Nigeria

Dependent variable: PPCE				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
PCDI	0.141723	0.048711	2.909486	0.0072
C	355.6675	42.34674	8.398935	0.0000
AR(1)	0.169952	0.171082	0.993397	0.3293
AR(2)	0.461365	0.15781	2.923548	0.0069
R-squared	0.708688		F-statistic	21.89474
Adj. R-squared	0.67632		Prob(F-statistic)	0.0000
Breusch-godfrey serial correlation LM test:				
F-statistic	0.751161	Prob. F(2,25)		0.4822
Obs*R-squared	1.757279	Prob. Chi-Square(2)		0.4153
Heteroskedasticity test: ARCH				
F-statistic	0.797415	Prob. F(1,28)		0.3795
Obs*R-squared	0.830715	Prob. Chi-Square(1)		0.3621
Inverted AR Roots	0.77	-0.6		

The median lag is the time required for the first half, or 50 percent, of the total change in consumption expenditure following a unit sustained change in per capita disposable income. Here it is 0.3911 that is, in less than 1 period of time, 50% of the total response of private personal consumption expenditure responds to changes in per capita disposable income. On the average it seems as if consumption expenditure adjusts to per capita disposable income in a relatively short time (0.2048) which is very fast. This also suggests that consumption expenditure shows durability rather than habit formation. This implies Nigeria consumers find it difficult to form habit in their consumption decision for long period. The next model explains both the Habit Formation and Expected income simultaneously.

3.2 Permanent Income Hypothesis Model

On the other hand if we model our consumption function following the Permanent Income Hypothesis of [5], the ingredients of such model are permanent consumption ($ppce_p$) , permanent income ($pcdi_p$) , transitory consumption and transitory income. Present income is the sum of permanent and transitory income and consumption at time t is the sum of the permanent and transitory components. Friedman also postulated that there is no correlation between the permanent and the transitory components. That is an increase or decrease in transitory income does not affect permanent consumption. The equation determining permanent consumption is given by:

$$ppce_p = k(r,z)\,pcdi_p \qquad (3.0)$$

Where k(r,z) is the average (or marginal) propensity to consume out of permanent income. This depends on the rate of interest r and the taste shifter variable z.

Adjusting equation 3.0 by differentiating totally we have

$$dppce_p = krdpcdi_p + kzdpcdi_p$$

$$dppce_p = kzdpcdi_p + krdpcdi$$

$$ppce_t^{**} = \beta_0 + \beta_1 pcdi_t^{**} + u_t \ldots\ldots\ldots\ldots 4.0$$

$$\beta_0 = kzdpcdi_p \ldots\ldots\ldots change\ in\ taste\quad shift\quad factor$$

$$\beta_1 = kr \ldots\ldots\ldots marginal\ \ propensity\ to consume\ out\ of\ \ permanent\ income$$

Where $ppce_t^{**}$ and $pcdi_t^{**}$ are desired change in personal consumption expenditure (permanent consumption) and expected change in income (permanent income) respectively. These are not directly observable; we used the partial adjustment mechanism to derive the desired consumption expenditure and the adaptive expectation model for the expected level of income, called the permanent income. The resultant model is an ARDL model [13]. Since Permanent income hypothesis is a long run measure of relationship between consumption expenditure and income, cointegration analysis was therefore employed.

Table 3. Unit root tests

	AT levels				1st difference				I(p)
Variable	**ADF test**	**1% C.V.**	**5% C.V.**	**Prob.**	**ADF test**	**1% C.V.**	**5% C. V.**	**Prob.**	
PCDI	-1.81367	-4.28458	-3.56288	0.6737	-8.05868	-4.28458	-3.56288	0.00	I(1)
PPCE	-3.00793	-4.28458	-3.56288	0.1462	-8.70717	-4.28458	-3.56288	0.000	I(1)

To test for stationarity of the variables, the Augmented Dickey Fuller (ADF) and Philip Peron (PP) unit root tests were conducted on each series. The correct specification is to include trend variable and intercept since the descriptive analysis in Fig. 1 shows that the two variables are trended. Accordingly the null hypothesis in each case is that there is a unit root in each series that is each variable is non-stationary. The result is presented in Table 3.

The results of the ADF unit root test in Table 3 shows that the variables are integrated of the same order. Likewise the result of the PP unit root test did not deviate from the ADF. (see Appendix 1). This implies that the condition for cointegration using the Johannsen method was met by the series. The major objective of this study is to analyse both the long run and short run dynamic relationship between the two variables via the ARDL. The Bound test cointegration approach developed by [16] was used along with the Johanssen technique, to test the long-run equilibrium relationship between the variables. The result of the Johannsen technique is presented in Appendix 2. Only the trace test reports the presence of one cointegrating equation. We prefer to use the ARDL approach because it effectively corrects for possible endogenity of explanatory variables [17], and the estimates exhibit desirable small sample properties and our sample is not too large.

The bound test regression is theoretically specified in two ways, the original version as shown in equation 5.0 and the E-views version.

The original version of the specification

$$\Delta(\log ppce_t) = \beta_0 + \sum \beta_j \Delta(\log ppce_{t-1}) + \sum \gamma_1 \Delta(\log pcdi_{t-j}) + \theta_0 \log(ppce_{t-1}) + \theta_1 \log(pcdi_{t-1}) + e_t$$

$$where \quad j = 0,1,2,3..... \qquad .....5.0$$

Equation 5.0 is the ARDL model of the consumption-income relationship which is also known as the ***"unrestricted ECM"***. It was used to estimate the short-run (cointegrating form) of the permanent income hypothesis and the long run coefficients. Using E-views 9 version, the maximum lag for the endogenous and exogenous variables was selected in such a way that the degree of freedom (defined as n-k) must not be less than 30. The Linear Trend option was also selected because the two variables were trended. The appropriate lag selection for the optimal lag was determined using the Schwartz (SC) criterion. One lag was selected as optimal for the PPCE while zero lag was selected for PCDI. The result as shown in Appendix 3, is the preferred regression on which the Bound test was conducted.

The Bound test was conducted on the unrestricted ECM in Appendix 3, by conducting the F statistics of the hypothesis, $H_0 : \theta_0 = \theta_1 = \theta_2 = 0$ against the alternative. As a check we perform a "Bounds" F-test" of $H_0 = 0$, if the F-statistic is greater than the Critical Value Bounds for the upper bound I(1), this would support the conclusion that there is a long-run relationship between the variables. If the computed F – statistic falls below the lower bound we would conclude that the variables are I(0), so no cointegration is possible by definition. Finally if the F – statistics falls between the bounds, the test is inconclusive, we may rely on the result of Granger causality and/or the short-run analysis. The result is shown in Table 5.

To test for the presence of cointegration in the permanent income model, we compare the F-statistics of the null hypothesis with Critical values. In Table 4. the value of our F-statistic is 6.995257, which is greater than the upper bound at 10% level of significance. As the value of our F statistic exceeds the upper bound at the 10% level we can conclude that there is evidence of a long-run relationship, even though weak, between PPCE and PCDI. This supports the results of the Johannsen method earlier discussed. To give room for seasonality in the variables, as suggested by the trend analysis in Fig. 1, a dummy exogenous variable was included in equation 5 and we experimented by tesing for cointegration using the two methodologies. The result of the Johannsen technique is not different from when no dummy variable was included. The result of the Bound Test with dummy variable did not perform better either. The two results are presented in Appendix 4 and 5 respectively. Our preferred result is the result in Table 4.

Table 4. ARDL bounds test

H0: No long-run relationship exist		
Test statistic	Value	K
F-statistic	6.99526	1
Critical value bounds		
Significance	I(0) Bound	I(1) Bound
10%	5.59	6.26
5%	6.56	7.3
2.50%	7.46	8.27
1%	8.74	9.63

We can therefore estimate both the short-run and the long-run dynamics form of the underlying ARDL result of Appendix 3. The result is shown in Table 5. The long-run marginal propensity to consume from permanent income is derived from the following equation.

The ARDL Result in Table 5. presents both the short-run dynamic, that is error correction mechanism and the long-run dynamics of the impact of income on consumption expenditure. Recall that the major objective of this study is to study the dynamics of Consumption-Income relationship by experimenting with the Habit Persistence and the Permanent Income Hypotheses. Our selection of ARDL over the Johannsen technique was based on the fact that the former model the two hypotheses simultaneously.

The results in Table 5. are interpreted in three dimensions. The first is the short-run adjustment of consumption expenditures to changes in per capita income. This is the components of habit formation captured by the coefficients of cointEq.1, which is the ECM(-1) coefficient. The coefficient is -0.5569, significant at 5% as shown by the probability (0.0024). This implies that consumers in Nigeria form habit in their consumption, but not permanently. The speed of adjustment is 0.5569, which implies that consumers quickly adjust to changes in their disposable income by shelving their former consumption habits. This result can also be explained in direction of irregular payments of wages, high rate of inflation, witnessed in Nigeria that always lower the real income of consumers.

The second influence is captured by the coefficients of DLOG (PCD). This is a measure of the impact of short-run income on consumption decision, the short-run marginal propensity to consume. The short-run MPC is positive (0.16443) and significant at 5% as shown by the probability (0.0402). This implies that as income increases, consumers in Nigeria tend to increase their consumption expenditure. A one percent increase in income leads to a less than one percent increase in expenditure.

The third influence is the impact of permanent (expected long-run) income on consumption decision. This is captured by the long-run coefficient of PCDI, which is positive (0.295277), and significant at 5% as shown by the probability (0.0015). This implies that the influence of long-run or expected income on present consumption expenditure is high and significant. Consumers are conscious of their permanent income when taking present consumption expenditure decisions. It also implies that present consumption decisions among consumers in Nigeria are influenced by permanent income rather than the current income or past habit.

Table 5. ARDL Cointegrating and long –run form

Cointegrating form (Short-run estimates)				
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
DLOG(PCDI)	0.16443	0.07644	2.15125	0.0402
D(@TREND())	-0.0004	0.00357	-0.0984	0.9224
CointEq(-1)	-0.5569	0.16666	-3.3413	0.0024
Long run coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(PCDI)	0.29528	0.08368	3.52888	0.0015
C	4.30069	0.45065	9.54341	0.0000
@TREND	-0.0006	0.00634	-0.0996	0.9214

*Cointeq = LOG(PPCE) - (0.2953*LOG(PCDI) + 4.3007 -0.0006*@TREND)*

5. CONCLUSION AND POLICY RECOMMENDATIONS

The objective of this paper was to study the dynamic relationship between consumption expenditure and income in Nigeria by experimenting with the Habit Persistence and Permanent Income hypotheses. The major research question is which of the consumption hypotheses of Habit persistence and permanent income best describe the relationship between consumption and income in Nigeria.

The study revealed that on the average, consumption expenditure adjusts to changes in per capita disposable income quickly. That means consumers tend to shelve their higher consumption habit in response to a fall in per capita disposable. This implies Nigeria consumers do form consumption habits but find it difficult to sustain such habit in their consumption decision for long. This result partially supports the findings of [9] in Jamaican economy.

On the other hand, modelling consumption along the assumptions of Permanent income hypothesis shows that the long-run effect of marginal propensity to consume out of permanent income is positive but very low (0.2952); an indication that consumers save more than spend. 29 percent of increase in permanent income is devoted to consumption while the rest 71 percent is saved. The kind of saving common among consumers in Nigeria is savin with informal financial institutions where they would borrow for capital project in a very near future. This may not mean that consumers in Nigeria have poor consumption pattern. The best argument for this is that Nigerians on the average have a low permanent income and a higher transitory income which does not affect consumption according the assumption of Permanent Income Hypothesis. This result supports the findings of [18], which found that permanent income hypothesis hold for five developing African countries, Nigeria inclusive.

There are observable macroeconomic conditions in Nigeria that support these conclusions.

i. Poverty is rampart in Nigeria, a phenomenon that suggests that transitory income which does not affect consumption, is larger than permanent income in Nigeria.
ii. Unemployment in also high in Nigeria, a phenomenon that makes self-employed and unemployed larger than the salaried workers or farm household larger than non-farm households.
iii. Self employed and unemployed have larger transitory components to their income.

In concluding this paper it is to be noted that only permanent fiscal and monetary policies that are discretionary in nature may have a sustained impact on consumption in Nigeria, given this results. We therefore recommend that government should regulate interest rate a major determinant of the marginal propensity to consume out of permanent income. Also the shift factor of the propensity which is the taste shifter has a direct link with the type of employment and rate poverty. Government should therefore device policies towards reducing the rate of unemployment and alleviate poverty in the Nigeria economy.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Ojukwu CC, Shopeju JO. Elite corruption and the culture of primitive accumulation in 21st century Nigeria. International Journal of Peace and Development Studies. 2010;1(2):15-24.
2. Loayza, Schmidt-Hebbel, Serven. Does income inequality raise aggregate saving? Journal of Development Economics. 2000;61:417–446.
3. Keynes JM. The general theory of employment, interest and money; 1936.
4. Brown TM. Habit persistence and lags in consumer behaviour. Econometrica. 1952; 20(3).
5. Friedman M. A theory of the consumption function, National Bureau of Economic Research, Princeton, NJ; 1957.
6. Akekere J, Yousuo PO. Empirical analysis of change in income on private consumption xpenditure in Nigeria evidences from 1981 to 2010. International Journal of Academic Research in Business and Social Sciences. 2012;2(12). ISSN: 2222-6990.
7. Lingaraj Mallik, Kalandi Charan Pradhan. Per capita consumption expenditure and personal disposal income in India-an econometric analysis. International Journal

of Economics Res. 2012;3(2):96-102. ISSN: 2229-6158.

8. Adelakun OJ. The nexus of private savings and economic growth in emerging economy: A case of Nigeria. Journal of Economics and Sustainable. 2011;2(6).
9. Oluwafemi OB. The habit persistence hypothesis: Evidence from Jamaica, Munich Personal RePEc Archive, MPRA 2013; 57077.
   Available:http://www.mpra.ub.uni-munchen.de/57077/content/3/7/14
10. Tsenkwo JB. Testing Nigeria's marginal propensity to consume (MPC) within the period 1980- 2004. Journal of Innovative Research in Management and Humanities. 2011;2(1):15-25.
11. Tapsin G, Hepsang A. An analysis of household consumption expenditure in EA-18. European Scientific Journal. 2014;10(16).
12. Okwori J, Sule A, Abu J. The multiplier effect of consumption function on aggregate demand in Nigeria: Aftermath of the global financial recession. The Journal of Business and Management (ISSN 2321-8916). 2016;4(5):144-155.
13. Gujarati DN, Sangeetha. Dynamics econometric models, Basic Econometrics. 1st ed. New Delhi, Tata McGraw-Hill Publishing Company. 2007; chapter 17: 671-727.
14. Ferson WE, Constantinides GM. Habit persistence and durability in aggregate consumption. National Bureau of Economic Research Working Paper No. 3631. Development ISSN2222-1700 (Paper). ISSN 2222-2855. 1991;2(6):201.
   Available: http://www.iiste.org
15. Koyck LM. Distributed lags and investment analysis. Amsterdam, North Holland Publishing Company; 1954.
16. Pesaran MH, Shin Y, Smith RJ. Bounds testing approaches to the analysis of level relationship. Journal of Applied Econometrics. 2001;16(3).
17. Sahin, Afsin, Cengiz, Sibel. Another brick for the aggregate consumption puzzle in Turkey. International Research Journal of Finance and Economics. 2010;45:135-160.
18. Nwala K. Does permanent income hypothesis hold for some selected African countries? Empirical evidence. African Journal of Business and Economic Research. 2010;5(2&3):27-43.

APPENDIX 1

Philip Peron Unit Root Tests for PPCE at Levels and First Difference

Null Hypothesis: PPCE has a unit root Exogenous: Constant Bandwidth: 1 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	**Prob.***
Phillips-Perron test statistic		-2.077493	0.2545
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			4344.889
HAC corrected variance (Bartlett kernel)			2948.860
Null Hypothesis: D(PPCE) has a unit root Exogenous: Constant Bandwidth: 2 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.237525	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			4141.654
HAC corrected variance (Bartlett kernel)			5673.719

Philip Peron Unit Root Tests for PCDI at Levels And First Difference

Null Hypothesis: PCDI has a unit root Exogenous: Constant Bandwidth: 3 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.289200	0.9740
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			15645.40
HAC corrected variance (Bartlett kernel)			21155.03

Null Hypothesis: D(PCDI) has a unit root Exogenous: Constant Bandwidth: 3 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.351521	0.0001
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			16126.35
HAC corrected variance (Bartlett kernel)			21350.38

APPENDIX 2

Result of the Johansen Method Cointegration Test

Trend assumption: Linear deterministic trend (restricted)
Series: PPCE PCDI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.470168	26.94310	25.87211	0.0367
At most 1	0.231187	7.887222	12.51798	0.2610

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.470168	19.05587	19.38704	0.0558
At most 1	0.231187	7.887222	12.51798	0.2610

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

PPCE	PCDI	@TREND(81)
0.000104	-0.002854	0.246144
-0.014967	0.002146	-0.036274

Unrestricted Adjustment Coefficients (alpha):

D(PPCE)	21.29018	23.65593
D(PCDI)	58.74291	-25.17067

1 Cointegrating Equation(s): Log likelihood -335.7846

Normalized cointegrating coefficients (standard error in parentheses)

PPCE	PCDI	@TREND(81)
1.000000	-27.49074	2370.827
	(8.49456)	(517.021)

Adjustment coefficients (standard error in parentheses)

D(PPCE)	0.002210
	(0.00115)
D(PCDI)	0.006099
	(0.00173)

APPENDIX 3

Results of ARDL Model of PCDI on PPCE

Dependent Variable: LOG(PPCE); Selected Model: ARDL(1,0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
LOG(PPCE(-1))	0.443133	0.166661	2.658881	0.0128
LOG(PCDI)	0.16443	0.076435	2.151253	0.0402
C	2.394916	0.709323	3.376339	0.0022
@TREND	-0.000351	0.003573	-0.098351	0.9224
R-squared	0.738048	Mean dependent var		6.106501
Adjusted R-squared	0.709982	S.D. dependent var		0.23883
S.E. of regression	0.128618	Akaike info criterion		-1.14747
Sum squared resid	0.463191	Schwarz criterion		-0.96426
Log likelihood	22.35958	Hannan-Quinn criter.		-1.08674
F-statistic	26.29664	Durbin-Watson stat		2.300929
Prob(F-statistic)	0.0000			

APPENDIX 4

Johansen Cointegration Test Using Seasonal Dummy Variable

Johansen cointegration test using seasonal dummy				
Series: PPCE PCDI DUM				
Lags interval (in first differences): 1 to 1				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.553233	49.45593	42.91525	0.0098
At most 1	0.436151	24.47868	25.87211	0.0738
At most 2	0.194801	6.716624	12.51798	0.375
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.553233	24.97725	25.82321	0.0644
At most 1	0.436151	17.76205	19.38704	0.0848
At most 2	0.194801	6.716624	12.51798	0.375
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

APPENDIX 5

ARDL Bounds Test with Dummy Variable

ARDL bounds test (Seasonal dummy included)		
H0: No long-run relationship exist		
Test Statistic	Value	K
F-statistic	3.25632	2
Critical value bounds		
Significance	I(0) Bound	I(1) Bound
10%	4.19	5.06
5%	4.87	5.85
2.50%	5.79	6.59
1%	6.34	7.52

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/17618