Keynes' Absolute Income Hypothesis and Kuznets Paradox

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Abstract

The study investigates how consumption expenditure is determined by income according to Keynes' Absolute Income Hypothesis (AIH) for the case of Nigeria and thus presents a consumption function for Nigeria for the period 1970 to 2011, estimating total household consumption expenditure against total income. The AIH model was tested by ordinary least squares over the period using data obtained from the World Bank national accounts data and Ivan Kushnir's Research Center. We described and tested two important theoretical predictions of the Keynesian AIH model; first, that the marginal propensity to consume (MPC) is constant and, second, that the average propensity to consume (APC) declines as income increases. Using Nigeria economic data, we estimated parameter MPC and APC both for short run and long run time series. The results shows that MPC conform with Keynes earlier proposition that MPC is less than one, however it is not stable and the value of the autonomous consumption is negative in the long run. We found also that the APC did not vary systematically with income as conjectured by Keynes that it declines as income increases. As a result, the income elasticity of consumption does not follow Keynes prediction. The absolute income hypothesis fits well for Nigeria data in the short run. In the long run, with the elasticity of consumption of about 1 or above 1, evidently there are other important determinants of consumption other than income.

JEL classification: C22; E21

Keywords: Consumption function; Average Propensity to Consume; Marginal Propensity to Consume

1.0 Introduction

Consumption expenditure constitutes the largest proportion of the Gross Domestic Product in most countries. In the words of Muellbauer and Lattimore (1994:292), 'consumer expenditure accounts for between 50% and 70% of spending in most economies. Not surprisingly, the consumption function has been most studied of the aggregate expenditure relationships and has been a key element of all the macroeconomic model building efforts since the seminal work of Klein and Goldberger (1955).' It therefore becomes imperative to investigate how people spend income in an economy in order to understand consumer behaviour.

Prior to Keynes, consumption had been viewed as a passive residual, the amount of income remaining after saving. In this view, the decision of any economic agent to save was determined by the payment for the utility lost from consuming, by implication consumption was depended on the interest rate - a key factor of saving behaviour (Bunting, 2001). Keynes observed that "(t)here are not many people who will alter their way of living because the rate of interest has fallen from 5 to 4 percent" (Keynes, 1936: 94). Thus, the modern consumption theory begins with his ideal of "fundamental psychological law" of consumption proposed in his General Theory; *"The fundamental psychological law, upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income"*(Keynes, 1936:96).

Keynes postulates that as a rule households increase their utility by consuming more of the produced goods and services as their income increases. They increase their well-being by this major component of the aggregate demand. For this reason the possible determinants of the aggregate consumption function have been analyzed intensively in the economic literature. Different consumption theories exist in literature; nevertheless, there is no single theory of consumption that can possibly explain consumption behavior in all economies.

The aim of this study is to investigate how consumption expenditure is determined by income according to Keynes' AIH for the case of Nigeria and test the two important theoretical predictions of the Keynesian AIH model; first, that the marginal propensity to consume (MPC) is constant and, second, that the average propensity to consume (APC) declines as income increases.

2.0 Theoretical Framework and Literature Review

There is need to review the fundamental models of consumptions in order to understand the modern consumption research. These models are; Keynes' (1936) Absolute Income Hypothesis (AIH), Duesenberry's (1949) Relative Income Hypothesis (RIH), Modigliani's (1949) Life Cycle Hypothesis (LCH), Friedman's (1957) Permanent Income Hypothesis (PIH).

Absolute Income Hypothesis

Research on the aggregate consumption function is thought to have begun with Keynes's *General Theory,* though we need not disregard excellent earlier work of Ramsey (1928) and Fischer (1930). Since then consumption has been the subject of countless theoretical and

empirical studies. Keynes treated consumption on a very "common sense" level. He relied almost entirely on intuition - like most other economists of his day, his methods included neither mathematical theory nor detailed econometrics, as he demonstrated the central principle of his consumption theory. According to Keynes an economic agent by natural instinct tend as a rule and on the average, to increase his consumption as his income rises, but not by as much as the increase in his income. In his work on the relationship between income and consumption, he came out with the finding that income is the sole determinant of consumption (Tsenkwo, 2011). Keynes gave no basis for his theory in terms of utility maximization nor indeed gave any consideration of why a consumer would behave in the way he assumed. In place of rational-choice theory, Keynes relied on his "knowledge of human nature." Moreso, he did not give any support to his postulate using numerical data, rather he claimed to glean support from "detailed facts of experience." While Keynes placed consumption theory at the center of the macroeconomic stage, he left it for future generations of economists to work out the micro-foundations for his theory. Keynes also inspired pioneers in the emerging field of econometrics to swarm over the newly invented national income and product statistics looking for verification or refutation of his model (Parker, 2010).

Based on Keynesian consumption function, the Absolute Income Hypothesis (AIH, hereafter), aggregate consumption is a stable, but not necessarily linear, function of disposable income,

$$C_t = \alpha + \beta Y_t \qquad (1)$$

where C_t and Y_t denote the (real values of) total personal consumption expenditure and total disposable income, respectively at time t. β, the marginal propensity to consume (MPC) is expected to be constant and positive but less than unity, so that higher income leads to higher consumption. The autonomous component of consumption, α, is assumed to be small but positive. By capturing the conjectures of the fundamental law, the absolute income hypothesis has these important features: (1) that the consumption expenditure increases or decreases with increase or decrease in income but non-proportionally. This non-proportional consumption function implies that in the short run average propensity to consume (APC) is greater than the MPC: APC > MPC, where APC = $\frac{C}{Y}$ and MPC = $\frac{\Delta C}{\Delta Y}$; this is because in the short run autonomous consumption do not change with income but over the long period horizon, as wealth and income increase, consumption also rises; the marginal propensity to consume out of the long run income is closer to the average propensity to consume. (2) as income rises, the proportion of it consumed falls: $\frac{\delta APC}{\delta Y} < 0$, so the income elasticity of consumption defined as $\frac{MPC}{APC}$ would be less than unity. (3) that consumption function is stable both in the short run and long run.

The Kuznets Paradox

The early econometric history of the consumption function made efforts to test the relationship between consumption and income as proposed by the absolute income hypothesis with available data, using whatever specification seemed reasonable (Bunting, 2001). Almost all empirical studies that were either cross-sectional or short-run time-series supported Keynes's postulation on consumption. However, the seminal study made by Kuznets (1946) - a Nobel prize winner was a turning point in the development of the consumption function literature, because his study made use of long-run time series (see Thomas, 1989). Kuznets showed that except for the Depression years, the APC in the U.S.

over the period 1869–1938 fluctuated narrowly between 0.84 and 0.89. In other words, APC was approximately mean-reverted, such that even if income increased a lot, consumption kept almost a stable fraction of income; so consumption was a proportion rather than a function of income (Baykara and Telatar, n.d). These empirical inconsistent is referred to as Kuznets puzzle or consumption puzzle as Friedman (1957) termed it, a seemingly contradictory fact with the assumptions made by the AIH.

Relative Income Hypothesis (RIH)

One of the earliest attempts to reconcile these conflicting pieces of evidence about the consumption-income relationship was the relative-income hypothesis, described by James Duesenberry (1949). Although this theory has vanished with hardly a trace from contemporary macroeconomics, it carried considerable influence in the 1950s and 1960s (Parker, 2010). Relative income hypothesis states that the satisfaction an individual derives from a given consumption level depends on its relative magnitude in the society (e.g., relative to the average consumption) rather than its absolute level. It is based on a postulate that has long been acknowledged by psychologists and sociologists, namely that individuals care about status (Kockesen, n.d.). In economics, relative income hypothesis is attributed to James Duesenberry (1949), who investigated the implications of this idea for consumption behavior in his book titled *Income, Saving and the Theory of Consumer Behavior*. Duesenberry proposes an individual consumption function that depends on the current income of other people and as a result, ‘‘for any given relative income distribution, the percentage of income saved by a family will tend to be unique, invariant, and increasing function of its percentile position in the income distribution. The percentage saved will be independent of the absolute level of income. It follows that the aggregate saving ratio will be independent of the absolute level of income’’ (as cited in Alvarez-Cuadrado & Long, 2011, p. 1489).

Duesenberry argued that relative income hypothesis could account for both the cross-sectional and time series evidence. He claimed that an individual’s utility index depended on the ratio of his or her consumption to a weighted average of the consumption of the others. From this he drew two conclusions: (1) aggregate saving rate is independent of aggregate income, which is consistent with the time series evidence; and (2) the propensity to save of an individual is an increasing function of his or her percentile position in the income distribution, which is consistent with the cross-sectional evidence. Despite its intuitive and empirical success, the relative income hypothesis was quickly replaced by the life-cycle/permanent-income hypothesis of Franco Modigliani and Richard Brumberg (1954) and Milton Friedman (1957), as the economists’ workhorse to understand consumption behavior. These closely related theories implied that consumption is an increasing function of the expected lifetime resources of an individual and could account for both the cross-sectional and time series.

Life Cycle Hypothesis (LCH)

Modigliani and Brumberg’s (1954 and 1980) life cycle hypothesis was designed to reconcile the discrepancy between cross-sectional findings and the findings of time-series analysis. In addition, the model was meant to capture the effect of liquid assets on consumption. Unlike the Keynesian consumption theory that is entirely based on the current income of the individuals, the concept of LCH assumes that all individuals consume a constant percentage

of present value of their life income. The life-cycle theory assumes that individuals or families try to maximise the utility deriving from their entire life-cycle consumption. Therefore consumption must be continuous, even if income through the life-cycle is discontinuous; and saving is primarily done to finance consumption during the retirement period (see Kankaanranta, 2006). According to Modigliani (1986 and 2001) the 'basic' version of the life-cycle hypothesis is based on the following assumptions: (1) Income is constant until retirement, zero thereafter (2) Zero interest rate (3) Preferences: constant consumption over the life cycle (4) Absence of bequests (Baranzini, 2005).

According to the life cycle hypothesis the average propensity to consume is larger in the old households and among young people. This is because the old people run their lives on their life savings while the young people are more into borrowing. The middle-aged people, on the other hand, incline to have higher incomes with lower consumption and higher saving.

The Life Cycle Hypothesis can be explained by the equation

$$C = (W + RY) / T \qquad (2)$$

Where W = Initial endowed wealth, R = Number of years earning labor income, Y = Labour Income, and T = Number of years of the individual's lifespan.

Rewriting the equation or consumption function in equation (2)

$$C = \frac{1}{T}W + \frac{R}{T}Y \qquad (3)$$

If every individual plans their consumption in such way, the aggregate consumption function of the economy, will take the form

$$C = \lambda W + \delta Y \qquad (4)$$

where parameter $\lambda(=\frac{1}{T})$ is the marginal propensity to consume out of accumulated wealth and $\delta\ (=\frac{R}{T})$ is the marginal propensity to consume out of income.

The first result of this model is that the marginal propensity to consume (MPC) depends on whether a change in income is expected to be temporary or permanent. First, consider a temporary change in current income, which can be considered equivalent to a change in current wealth, WR. Taking the derivative of average annual consumption, equation (4), with respect to initial wealth, W, and we get the marginal propensity to consume out of a temporary change in income. The marginal propensity to consume out of a temporary change in income will always be equal to 1 divided by the number of years an economic agent expects to live. Whereas, the marginal propensity to consume out of a change in labour income is always the number of years of labor divided by the number of years the household expects to live.

Permanent Income Hypothesis (PIH)

In response to this empirical puzzle, Milton Friedman (1957) proposed his permanent income hypothesis (PIH) which maintains that households spend a fixed fraction of their permanent income on consumption. Unlike AIH, the PIH was inspired by micro-foundations and representative agents, and highlighted the importance of not just the present but also future.

The core of Friedman's PIH was that individuals want to maximize their lifetime well-being (utility) subject to the constraint that all their lifetime resources must be spent. The Friedman's theory focused on distinguishing between consumption and current expenditure on the one hand, and income and current receipts on the other hand. This is because an individual economic agent is thought to plan his expenditures on both income received during the current period and income expected during his lifetime. Therefore, consumers plan their expenditure on the grounds of a long-run view of the resources that will accrue to them in their lifetime.

As a result, Friedman postulated that income, Y, is made up of two components: a permanent component (Y^P) and transitory component (Y^T). Friedman argued that some of the factors that give rise to the transitory component of income were specific to particular consumer but that for any considerable group of consumers the transitory components tend to average out so that the mean of the transitory component is expected to be zero. On the corollary, consumption expenditures comprise permanent (C^P) and transitory components (C^T). The permanent component relates to the amount that consumers plan to consume to maximize their lifetime utility. Without uncertainty, total consumption would be equal to C^P. C^T relates to all 'other' factors. (Fernandez-Corugedo, 2004)

The PIH gives rise to a consumption function of the form:

$$C^P = k(r, w, u) \times Y^p \quad (5)$$

$$Y = Y^P + Y^T \quad (6)$$

$$C = C^P + C^T \quad (7)$$

where C = current consumption spending, C^P = permanent consumption, C^T = transitory consumption, Y = current income, Y^P = permanent income, Y^T = transitory income, r = rate of interest at which the consumer can borrow or lend, w = ratio of wealth to income and u = consumer's taste preferences. Equation (5) defines the relationship between permanent consumption and permanent income, and the marginal propensity to consume out of permanent income, $k(\cdot)$ is independent of the size of permanent income but it does depend on other variables: r, w and u. The equations (6) and (7) provide a means of linking actual measured variables (C, Y) to their relevant components (Fernandez-Corugedo, 2004).

Under permanent income theory, the MPC is constant and equal to the APC, which is consistent with Kuznets' (1946) empirical findings. The MPC is also the same for all households. Friedman reconciled the difference between cross-section regression estimates of consumption and long run aggregate time series regression estimates by appeal to a statistical "errors-in-variables" argument. The argument is that cross section estimates use actual household income rather than permanent household income. Owing to the fact that more households are situated in the middle of the income distribution, the observed distribution of actual household income tends to be more spread out than permanent income. Consequently, regression estimates using actual income tend to find a flatter slope, and hence the finding that cross section consumption function estimates are flatter than time series aggregate per capita consumption function estimates. Friedman's PIH therefore offered a simple explanation of the empirical consumption puzzle. At the theoretical level, the innovation was the construct of permanent income that introduced income expectations, thereby adding a sensible forward-looking dimension to consumption theory (Palley, 2008). The Friedman's theory had important implications for fiscal policy. First, since all households have the same MPC it undermined the Keynesian demand stimulus argument for progressive taxation.

Second, it introduces a distinction between permanent and temporary tax shocks. For policy makers, the source and nature of the shocks are important. For instance, an announcement that tax cuts will be permanent would lead to different behavior of household/firm economic agent compared to when such tax changes are thought to only be transitory.

3.0 DATA AND METHODS

We use gross national income as a proxy for income and household final consumption expenditure as a proxy for consumption. Data for the series arein US billion dollar and are collected from World Bank national accounts data, OECD National Accounts data files and Ivan Kushnir's Research Center. The data is annual and spans the time period from 1970-2011, total are 41 years. We start by defining Y_{GNI} as the gross national income and C_{HTCE} as household total consumption expenditure.

We re-specify the Keynesian AIH to be tested empirically using the ordinary least squares as;

$$C_{HTCE} = \alpha + \beta Y_{GNI} \qquad (8)$$

Where;

C_{HTCE} = Total Household Consumption Expenditure

α = Autonomous Consumption (independent of the level of income)

β =Marginal Propensity to Consume (MPC), $0 < \beta < 1$

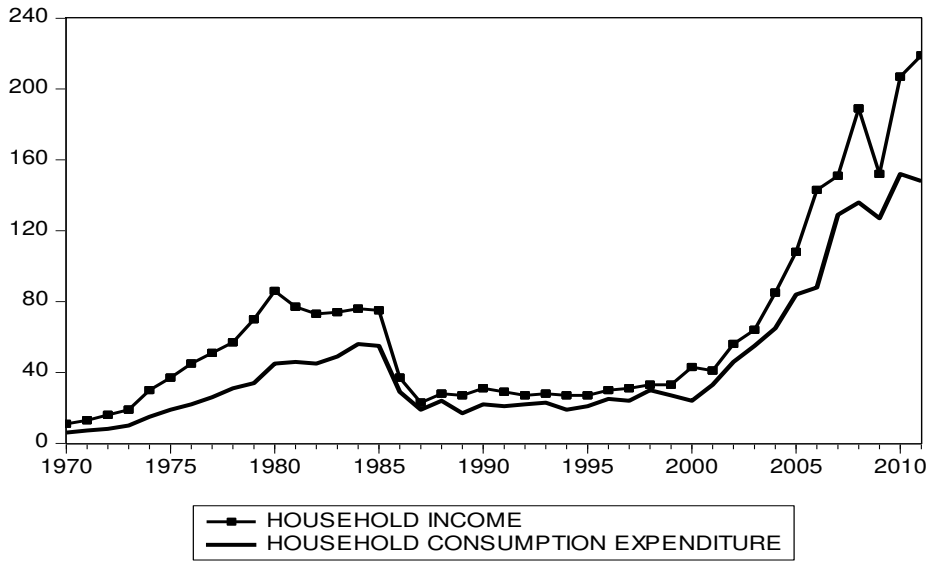
Y_{GNI} = Total Disposable Income in year t

In the analysis of the common components of household consumption expenditure and GNI per capita, standard time series unit root tests can be applied. To ensure robustness we use several unit root tests, including the Augmented Dickey and Fuller (1979) (ADF) test, the Phillips and Perron(1988) (PP) test, as well as the Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPPS) test. The latter tests the null of stationarity whereas the former two investigate the null of a unit root. We do not further discuss the details of these well-known time series unit root tests but instead call attention to Maddala and Kim (1998) for their excellent treatment of ADF, PP and KPSS. Nelson and Plosser (1982) indicate that many macroeconomic time series data have a stochastic trend plus a stationary component, that is, they are difference stationary processes. It is also of great importance to discern the temporary and permanent movements in an economic time series. Economic theory in this line assumes that at least some subsets of economic variables do not drift through time independently of each other and some combination of the variables in these subsets reverts to the mean of a stable stochastic process. Granger (1986) and Engle and Granger (1987) indicate that even though economic time series may be non-stationary in their level forms, there may exist some linear combination of these variables that converge to a long run relationship over time, which also requires the existence of Granger causality in at least one direction in an economic sense as one variable can help forecast the others.

A lot of techniques are available to test for the existence of long-run equilibrium relationships in the levels among variables. Two popular cointegration tests, namely, the Engle-Granger (EG) test and the Johansen test are used. The EG test is contained in Engle

and Granger (1987) while the Johansen test is found in Johansen (1988) and Johansen and Juselius (1990). The EG test involves testing for stationarity of the residuals. If the residual series is stationary, the variables C_{HTCE} *and* Y_{GNI} are cointegrated and if it is non-stationary, the variables are not cointegrated. The EG approach could exhibit some degree of bias arising from the stationarity test of the residuals from the chosen equation. The EG test assumes one cointegrating vector in systems with more than two variables and it assumes arbitrary normalization of the cointegrating vector. Nevertheless we adopted EG test because the variables of interest in this study are two, C_{HTCE} *and* Y_{GNI}. Figure 1 shows the trend of household income and consumption.

FIGURE 1 TREND OF HOUSEHOLD INCOME AND HOUSEHOLD CONSUMPTION EXENDITURE IN NIGERIA (1970-2011)



4.0 RESULTS AND INTERPRETATIONS

Our main reason for conducing unit root tests is to determine the stationarity of the series. The unit root tests are conducted both in level and first difference forms using both constant and linear trend. Table 1 show that both C_{HTCE} *and* Y_{GNI} series are integrated of order one at the 1% significance level under unit root tests except KPSS, where the null hypothesis of stationarity is rejected at 5% for both C_{HTCE} *and* Y_{GNI} series.

Table 1: Unit Root Tests for both C_{HTCE} *and* Y_{GNI}

Variables	ADF	Philip-perron	KPSS
Levels			
C_{HTCE}	0.748430	0.272828	0.153966**
Y_{GNI}	-0.062131	-0.364838	0.154125**
1st Difference			
C_{HTCE}	-7.192712***	-7.133317***	-
Y_{GNI}	-5.896398***	-6.004023***	-

Therefore, we next present the EG test results in Table 2 which shows that the residuals from household consumption expenditure equation are not stationary at level, that is, it is integrated of order one. Thus, the Engel - Granger cointegration test indicates that the variables in question are not cointegrated.

Table 2
Panel A: Stationarity Test of the Residual from C_{HTCE} equation

Variable	ADF	PP	KPSS	Order of Integration
Residual	-5.483742*	-5.577382*	0.099781	I(1)
Panel B: OLS Result of Consumption Function				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-1.714208	2.027478	-0.845488	0.4029
Y_{GNI}	0.730309	0.024344	29.99989	0.0000
R-squared	0.960853	Durbin-Watson stat		1.349837
F-statistic	981.7846	Prob(F-statistic)		0.0000

Panel B of Table 2 gives preliminary results of equation (8), using OLS with the HAC or Newey-West standard error that take into account the autocorrelation. The result shows that there are positive and significant long run relationships between household consumption expenditure and income; MPC = 0.730309.

$$C_{HTCE} = -1.714208 + 0.730309Y_{GNI} \quad (9)$$

LONG RUN TIME SERIES ANALYSIS

From the estimated model (9), we found that the sign and coefficient for income (GNI) are consistent with many consumption theories which states that the consumption depends on income; a rise in income increases the consumption.

FIGURE 2: HOUSEHOLD CONSUMPTION EXPENDITURE VERSUS HOUSEHOLD INCOME (1970-2011)

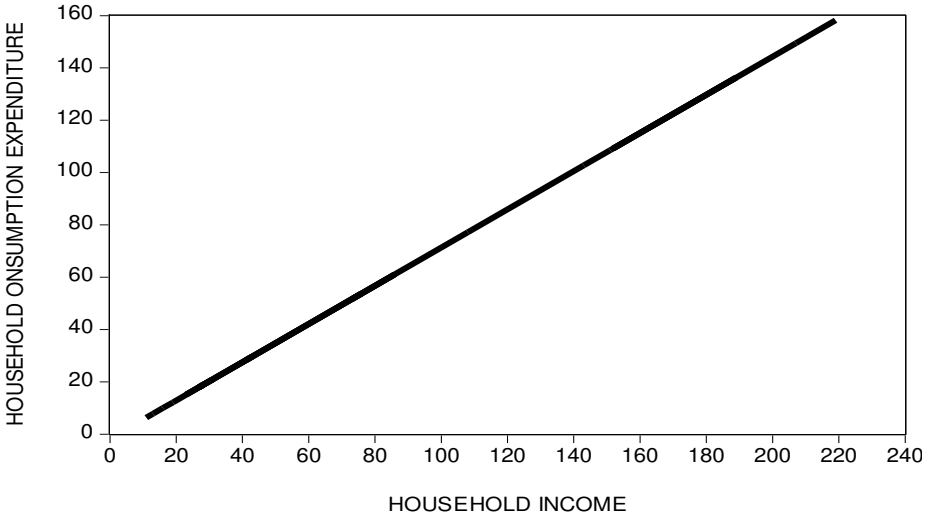


Figure 2 illustrates the relationship between estimated consumption expenditures and household income over the last 42 years. The straight line relationship implies that the marginal propensity to consume is constant at about 0.73. This implies that a $100.00 increase in income from one year to the next results in an increase in consumption spending of $73.00, holding other factors constant. The $1.71 billion is not significantly different from zero, at least when we compare it with about $160 billion of total consumption expenditure. The regression line appears to hit close to the origin (if income equals zero then consumption almost equals zero). The small intercept implies that the average propensity to consume is constant.

FIGURE 3 AVERAGE PROPENSITY TO CONSUME (1970-2011)

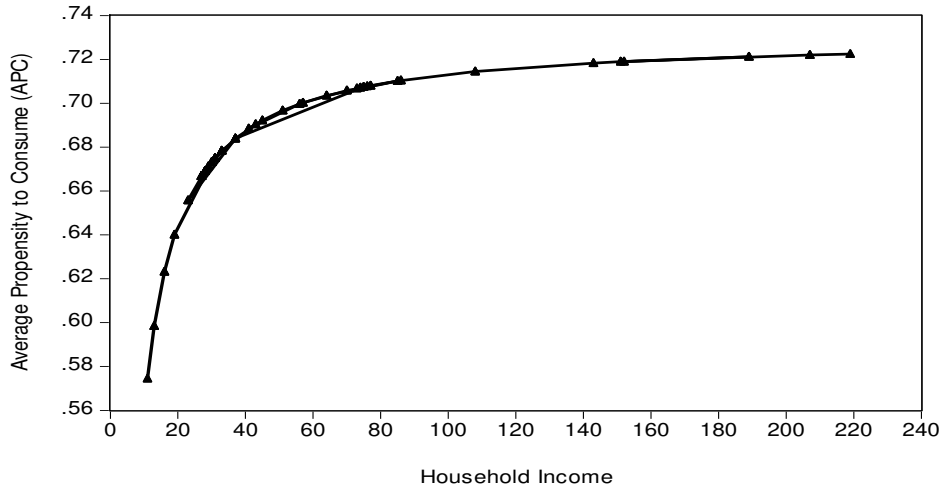


Figure 3 presents a plot of calculated average propensities to consume at the different levels of income from the last 41 years. The average propensity to consume has not been declining as suggested by the simple Keynesian consumption function.Over the last 41 years we might say the average propensity to consume is at about 0.68, on average; at first it started rising up

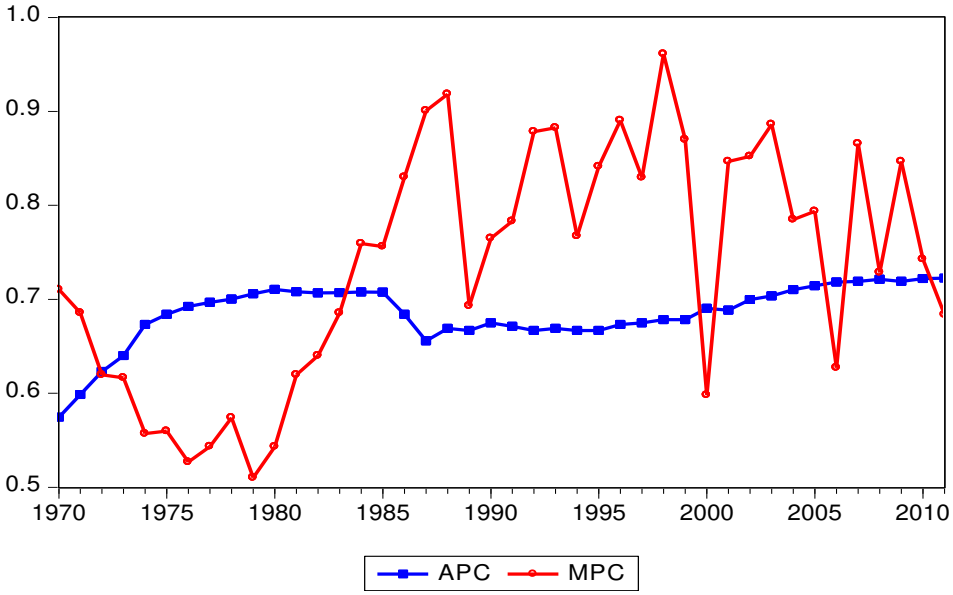
to 0.71 in 1980, then declining to a trough of about 0.66 and thereafter pick up to about 0.72 in 2011.

Applying Nigeria data, the second important implication of Keynesian consumption function does not hold. We found that the average propensity to consume did not vary systematically with income as conjectured by Keynes that APC, which is total consumption divided by total income declines as income increases. As a result, the income elasticity of consumption does not follow Keynes prediction that $\frac{MPC}{APC} < 1$. Table 3 presents the statistical description of the income elasticity of consumption to be greater than 1 while Figure 4 shows that out of the 42-year study period, APC is greater than MPC only in 14 years. The implication is that in the long run, there are other important determinants of consumption other than income.

Table 3: Statistical Description of The Income Elasticity of Consumption

	Minimum	Maximum	Median	Mean
Income Elasticity of Consumption	0.722851	1.416699	1.108055	1.079861

FIGURE 4: TREND OF APC AND MPC FOR NIGERIA (1970-2011)



SHORT RUN TIME SERIES ANALYSIS

Equations 4-7 provided the results for short run consumption models and we found that the sign and coefficients for income in the period 1970-1979, 1980-1989, 1990-1999 and 2000-2011 are consistent with Keynes consumption theory except 1990-1999 where the MPC is greater than one (i.e MPC = 1.142857).

(2000-2011), $C_{HTCE} = 5.045609 + 0.704014Y_{GNI}$ (4)

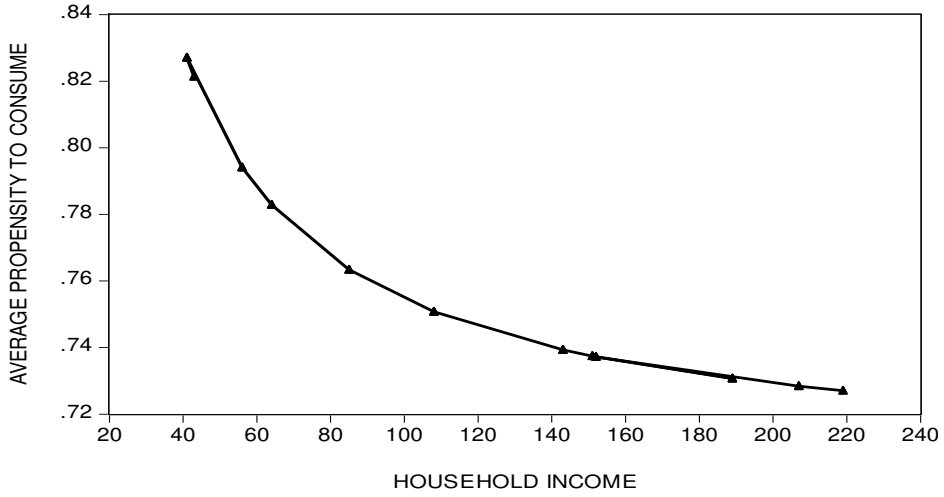
(1990-1999), $C_{HTCE} = -10.42857 + 1.142857Y_{GNI}$ (5)

(1980-1989), $C_{HTCE} = 6.834189 + 0.549754Y_{GNI}$ (6)

(1970-1979), $C_{HTCE} = 0.559187 + 0.495439Y_{GNI}$ (7)

Figure 4 presents a plot of calculated average propensities to consume at the different levels of income only for the period 2000-2011, which confirms Keynes postulate that the average propensity to consume declines as income increase (the same assertion holds for the other period).

FIGURE 4 AVERAGE PROPENSITY TO CONSUME (2000-2011)



This presented a puzzle: why did Keynes' conjectures hold up well in the cross sectional studies of household consumption and in the studies of short time-series, but fail when long time series were examined?

This study is in consonance with Kuznets (1946), who used a five-year moving averages of consumption spending and found that long run time series consumption data for the U.S. economy are characterized by a constant aggregate APC, a finding that is inconsistent with Keynesian consumption theory. At the same time, short sample aggregate consumption time series estimates and cross-section individual household consumption regression estimates both confirm Keynes' theory of a diminishing APC.

SUMMARY AND CONCLUSION

The purpose of the study was to test the Keynesian AIH and analysis Kuznets Puzzle for Nigeria. We have described and tested two important theoretical predictions of the Keynesian AIH model; first, the marginal propensity to consume is constant and, second, the average propensity to consume declines as income increases. Using Nigeria economic data, we

estimated parameter MPC and APC for both short run and long run time series. The results shows that MPC conform with Keynes earlier proposition that MPC is less than one (0<b<1), however it is not stable and the value of the constant (autonomous consumption) is negative in the long run. We found also that the APC did not vary systematically with income as conjectured by Keynes declines as income increases, as a result, the income elasticity of consumption does not follow Keynes prediction. The absolute income hypothesis fits well for Nigeria data in the short run. In the long run, with the elasticity of consumption of about 1 or above 1, evidently there are other important determinants of consumption other than income.

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