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Testing Nigeria's Marginal Propensity to Consume (MPC) Within the Period 1980-2004 *(pp. 15-25)*

J.B. Tsenkwo.
Department of Economics, University of Jos, Nigeria
Correspondence Email: tsenkwoj@unijos.edu.ng

Abstract: The study is an attempt to gauge Nigeria's marginal propensity to consume (MPC),and average propensity to consume(APC).Relevant variables were identified and data on them obtained spanning from 1980-2004.The econometrics methodology of unit root, and co integration were used to determine the stationary and the long run relationship among the variables. The computation of MPC and APC were carried out using the nominal data obtained from the identified variables. The results of MPC and APC conform to Keynes proposition that is less the one and stable, however our results for MPC though less than one and stable exhibit the tendency to grow above one. This has serious policy implications for saving, capital formation, and investment on whole. The author therefore suggest for a policy to discourage consumption and encourage production.

Key words: consumption function, marginal propensity, permanent income hypothesis, macroeconomic variable

1 INTRODUCTION

Nigeria is a low saving and a low investment economy, many factors account for this. Low interest rate on savings and high interest rate on loan able funds can be responsible, also high consumption out National income can also account for this scenario. This is because the tendency for increase in consumption as a result of increase in income can lead to little or t\nothing to save. The gross domestic expenditure reveals that consumption in Nigeria grows faster than the growth in National Income. Availability statistics shows that while National Income increase by slightly above 100% from 1980 to 1990, consumption made up of private and public consumption put together grows to about 15% percent. (Anyanwu; Oyefusi, Oaikhenan, & Dimowo, 1997). The analysis of the structure and growth of gross domestic expenditure according to Ajakaiye (2001) is considered pertinent because it will further illuminate the structure of the economy as whole as well as its growth potentials. In this connection, the following elements are important, Private and government consumption expenditure. National saving, gross capital formation (Investment Expenditure) Ajakaiye (2001) posits that the composition of gross domestic expenditure from 1990 – 1999 was the

largest and infact the largest component was consumption which accounted for well over 80 percent of total gross domestic expenditure. What is more, private consumption is really the dominant component of total domestic expenditure implying that majority of Nigerians spends a large part of their income on consumption.

This revelation also suggested that virtually all classes of Nigerians devote a large of not all proportion of their income to consumption and a small or none proportion of income to saving. A cursory look at gross capital formation as a proxy of gross investment in Nigeria shows that from 1991-1999, accounted for less than 6 percent of gross domestic expenditure for most of the period.

This reflection is both at the micro and macroeconomic levels. While private savings is low because consumption has eaten the tire income; national saving at the macro level is also low because Nigeria's economy is a consuming nations and National income is low. The persistent budget deficit in Nigeria is an indication of high expenditure and of this, consumption occupies the share of gross domestic expenditure composition. According to Alade & Adam (2003) to restore macroeconomic stability the economy must adjust by reducing the deficit. The standard approach to fiscal adjustment is to increase revenue by raising taxes ore reduce expenditure. If government raises taxes, disposal income decline and consequently private spending will reduce. Government can also affect disposable income by changing the level and composition of its own expenditure. Another macroeconomic variable that is closely related to raising consumption is savings (National avinsg). According to Agba (2006), for Nigeria to sustain its current investment programmes and its associated imports needs, priority must be given to the expansion of domestic savings. This can only happen if current consumption is postponed for the future. Savings in this context is seen as the conserves of consumption that is an individual may either consume or save his/her disposable income. Saving becomes available when an individual refrain from consumption. This is also the same with a nation. In this case gross national savings is seen as a residual of what is consumed from gross domestic income.

According to Adam and Agba (2006) the stock of savings rose steadily from ₦3416 million in 1970 to ₦1,815.2 million in 1975m vt 1980, the figure trebled to N5,769.9 million, again moved to N12,521.8 million in 1985 and by 1990 it had reached an all time high of N29,651.2 million. The upward trend continued with the reaching N108,490.3 million in 1995, moved to N379,528 million in 2000 and climbed to N592,094 million 2002 by 2004, it moved to N1,033,400.0 million.

The main thrust of this paper is to guage the value of marginal propensity to consumption (MPC) in Nigeria that would be a guide to monitor savings and thus investment in Nigeria. Following the introduction in Section 1 above, section II will dwell on conceptual issues and theoretical construct on subject. Section III will present data, the methodology and analysis of same to be use for the study. Section IV discusses the results and conclusion drawn from it.

2 CONCEPTUAL ISSUES AND THEORETICAL CONSTRUCTION

The macroeconomic concepts employed in this study are consumption, Gross Domestic Production (GDY) as a proxy for MPC, income and national savings. It is proper from the onset to provide their conceptualization in order to grasp the issues in the work.

According to Agba (1994) GDP is the value of the aggregate level of output of goods and services by resident producing units independent of whether or not the factor of production are owned by citizens or foreigners. This elaborate definition is necessary to separate a line between GDP and GNP, where the later is the level of national output with account taken of the nationality of the producers. In addition, the GNP taken into accounts the factor earnings of citizen resident abroad and subtracts the earnings that though earned in the domestic economy have to be remitted abroad.

Aggregate consumption is one key macroeconomic variable that usually occupied 70% discuss in Macroeconomic and income determination (Agba, 1994). Consumption according to the classical economist like Alfred Marshal (1961:53-54) is the antithesis of production. Thus, while production is the creation of utilities, consumption is of destroying or using up. The utilities create in production. Consumption here is taken to include durable and non durable goods and services.

According to Ajayi and Ojo (1980) Marginal propensity to consume (MPC) is the ratio of the change in consumption to change in come the counterpart of MPC is MPS which is the rate of change in savings to change in income written as:

$$\text{MPC} = \frac{\text{DC}}{\text{DY}} \text{ and } \text{MPS} = \frac{\text{DS}}{\text{DY}}$$

According to Adam and Agba (2006), saving is a flow while savings is stock. This means that saving is the rate of change in savings part time period. Savings, being a stock in cumulative amount put aside over time. In a simple income – expenditure model, the economy is in equal equilibrium when investment is equal to saving.

2.1 Theoretical Construction

The aggregate consumption function is a core element in the Keynesian theory of income determination. In the general theory Keynes gave primary importance to disposal national income as the chief determinant of aggregate consumption. Keynes is noted as the first to postulate the theory of consumption popularly known as the absolute income hypothesis (AIH), where he worked on the relationship on income and consumption and came out with the finding income is the sole determinant of consumption. This assertion sparked a lot of intellectual curiosity from his fellow scholars like Kuznets (1946); Dueseberry (1949); Friedman (1957); Ando and Modigliani (1957), which culminated into other theories as the relative income hypothesis (RIH) the permanent income hypothesis (PIH) and the life cycle hypothesis (LIH). All these theories used Keynes work as the watershed for their further funding.

In this original work Keynes said "Consumption follow a fundamental psychological law. The fundamental psychological law upon which we are entitled to depend with great confidence as an apiori from our facts of experience is that men are disposed, as a rule on the average to increase their consumption as their income increases, but not as much as the increased income (Keynes, 1973).

In other words, as the level of income in the economy increases less income increase is consumed, while savings increases. The argument that consumption depends on current income can be shown as:

$$c_t = a + by_t$$

His thesis was based on the following axiom.

- Real consumption purchasing is stable function of real income.
- Marginal propensity to consume (MPC) is positive but less than one 0<b<1.
- The MPC is less than average propensity to consume (APC) (MPC<) APC) but as income increases APC declines faster than MPC.

The post-Keynes thesis particularly the permanent income and life cycle theories distinguishes between the consumption and saving effects of changes in permanent and temporary income using aggregate data, their ultimate motive is the smoothing of consumption even not earning an income.

According to Levacic and Revmann (1982), consumption function can be a useful simplification of the main purpose of the model is to emphasize those features which are of fundamental importance to a particular theoretical approach. Thus, for instance, in a

Keynesian model of absolute income-consumption function is an important ingredient because it is a simple way of obtaining a multiplier process. They cautioned have ever that in economic models with a more immediate policy application, a simple consumption function is inadequate since the effect of adjustment lags are an important consideration. A more complex function in which consumption depends in a specific way on the current and lagged valued of its determinants is needed. The inclusion of lagged relationships makes an economic model dynamic. Also in the empirical evidence, the most consistent result is that lagged consumption is a significant explanatory variable in consumption function.

2.2 Data and Methodology

In their earlier work Keynes and his critics used time series and cross-sectional data to estimate consumption function both in the short and long run.

The data adopted for this work is time series spanning from 1980-2004 obtained from National Bureau of Statistics and Central Bank of Nigeria statistical Bulletin of various sources. The data for the identified variable are shown in the table below

Table 1: Aggregate Income (GDP); Consumption expenditure and Gross National Savings(GNS)

YEAR	GDP Mkt Price	Gross Consumption	Gross National Saving
1980	50,848.6	36,746.1	11.189.1
1981	102,686.8	41,182.1	5,604.3
1982	101,029.8	43,113.3	4,237.1
1983	119,117.1	48,549.0	3,607.5
1984	125,074.8	54,355.2	2678.7
1985	144,724.1	60,675.1	3944.5
1986	143,623.9	63,422.6	-1494.7
1987	209,037.1	87,023.3	3573.7
1988	275,198.2	122,266	361.1
1989	403,762.9	146,645	48,589.9
1990	497,351.3	180,777.9	61,785.2
1991	574282.3	231,381.8	56,601.6
1992	909,734.2	416,588.3	57,119.1
1993	1132,181.2	1640388.2	63,408.9
1994	1457,129.7	2474,393.1	58,987.7
1995	299,941.7	2572,866.3	173,984.1

1996	413,5813.6	2474393.1	114,411.4
1997	4300209.0	2572866.3	215,394.9
1998	4101028.3	2916850.4	-168,128.10
1999	479996.0	2342057.9	942,399.5
2000	6850228.8	2592213.9	20,3351.7
2001	7055331.0	4501,4381	740,593.1
2002	7984385.3	6148668.6	-71,517.70
2003	10136,364.0	5265430.0	736,740.0
2004	11,673,602.2	56,53900.0	751,710.0

Sources: *CBN Statistical Bulletin Vol.8 (2007)*
National Bureau of Statistic (NB S)(2009)

The above table is a macroeconomic time series datan, inherent in its analysis is the need for them to be treated before usage. Therefore, the first and necessary step is test for their stationary. According to Ekanem and Iyoha (2004) testing for the existence of unit root is a key preoccupation in the study of time series models and co-integration. The popular test for unit not is Augmented Dickey Fuller (ADF) and Philip Person Test). The results are presented below:

Table 2: Order of Integration

Variable	**ADF**	**5% Critical Value**	**Order of Integration**
Gross National Income(GDP)	4.96299	-2.9965	I (0)
Gross National Consumption	-3.918407	-2.966	I (0)
Gross National Saving (GNS)	-7.492379	-2.996	I (0)

In the above table all the variables except Gross National Savings (GNS) are stationary at levels, While, GNS is stationary at first difference. Having decided the stationary status of the variables, the next step is test for their co-integration to help clarify the Long run relationship between the integrated variables. The Johasen's procedure is the trace test and is easily calculated for such systems.The results of the co-integration test are presided in table 2.

Table 2: Johansen Hypothesized Co-integration Relations

Date: 03/31/11 Time: 19:36
Sample(adjusted): 1983 2004
Included observations: 22 after adjusting

endpoints				
Trend assumption: Linear deterministic trend				
Series: GDP GNC GNS				
Lags interval (in first differences): 1 to 2				
Unrestricted Co-integration Rank Test				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.953716	112.4421	29.68	35.65
At most 1 **	0.835034	44.83705	15.41	20.04
At most 2 *	0.210246	5.192750	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 3 co-integrating equation(s) at the 5% level				
Trace test indicates 2 co-integrating equation(s) at the 1% level				
Hypothesized		Max-Eigen	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.953716	67.60509	20.97	25.52
At most 1 **	0.835034	39.64430	14.07	18.63
At most 2 *	0.210246	5.192750	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Max-eigenvalue test indicates 3 cointegrating equation(s) at the 5% level				
Max-eigenvalue test indicates 2 cointegrating equation(s) at the 1% level				
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):				
GDP	GNC	GNS		
-1.83E-06	1.62E-06	-3.89E-06		
3.62E-05	-3.88E-05	-2.19E-05		
5.44E-05	-5.49E-05	-4.30E-05		
Unrestricted Adjustment Coefficients (alpha):				
D(GDP)	-418988.8	-47507.81	84041.47	
D(GNC)	-37380.59	220572.8	36484.14	
D(GNS)	-80952.67	-242816.5	51646.89	
1 Co-integrating Equation(s):		Log likelihood	-879.4026	

Table 2: Continuation of Table 2

Normalized cointegrating coefficients (std.err. in parentheses)				
GDP	GNC	GNS		
1.000000	-0.888522	2.124661		
	(0.05908)	(0.24758)		

Adjustment coefficients (std.err. in parentheses)				
D(GDP)	0.766201			
	(0.10347)			
D(GNC)	0.068358			
	(0.12428)			
D(GNS)	0.148037			
	(0.14132)			
2 Co-integrating Equation(s):		**Log likelihood**	**-859.5804**	
Normalized co-integrating coefficients (std.err. in parentheses)				
GDP	GNC	GNS		
1.000000	0.000000	15.45794		
		(1.13374)		
0.000000	1.000000	15.00613		
		(1.06096)		
Adjustment coefficients (std.err. in parentheses)				
D(GDP)	-0.955455	1.161912		
	(2.00063)	(2.14044)		
D(GNC)	8.061791	-8.616155		
	(1.22708)	(1.31283)		
D(GNS)	-8.651496	9.286657		
	(1.52266)	(1.62907)		

From the result the Johansen co-integration test revealed that the trace statistics show the existence of three co-integrating relationships between consumption and its determinants at 5% percent level of significance.

3 CORRELATION ANALYSIS

The relationship between the variables is very strong. Gross Domestic Product (GDP) a proxy to National in Y and Gross domestic consumption shows a correlation coefficient of 74%; GDP with Gross National Saving GNS is 59%. The correlation matrix is presented below:

Table 3: Correlation Matrix

	GDP (Y)	GDC(C)	GNS(S)
GDP (Y)	1.0000	0.744737	0.59411

GDC (C)	0.744737	1.00000	0.281537
GNS (S)	0.596411	0.281537	1.00000

MPC and APC in Nigeria (1980 – 2004).

The values of marginal propensity to consume and average propensity to consume are obtained from table 1and presented here in table 4.

Table 4: Computed MPC and APC

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MPC	-	0.91	1.43	0.33	0.035	0.189	4.153	1.44	1.45	8.06	3.46	0.515
APC	0.72	0.40	0.42	0.40	0.43	0.41	0.44	0.41	0.44	0.36	0,36	0.40

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
MPC	1.124	0.87	0.94	1.52	1.35	0.76	1.34	0.67	0.89	0.97	0.89	0.56	1.57
APC	0.48	0.49	0.53	0.54	0,05	0.59	0.06	0.48	0.37	0.63	0.77	0.52	0.48

4 DISCUSSION OF RESULTS

Disturbed by the growing deficit in the national economy, coupled with low level of saving and investment in Nigeria,the author attempt to test the marginal propensity to consume (MPC),and average propensity to consume(APC).The relevant variables identified, and data on them collected.

The necessary steps in econometrics analysis were taken, and that is first deciding whether the macroeconomic time series data are stationary, after that the cointegration test was carried out. It is evident from the results presented in the work shows that all the variables were found to be stationary at level, and are cointegrated signifying that there is a long run relationship among the variables. The data on gross national income(gdp),and gross national consumption were then used to compute the marginal propensity to consume(mpc),and average propensity to consume(apc).The results presented in table 4 shows that though MPC conform with Keynes earlier proposition that MPC is less than one($0<b<1$), but not stable which is does not agree with Keynes stability of MPC.The Nigeria's case shows a tendency to grow over time. The average propensity to consume (APC) on the other hand also agrees with theory that the value of average propensity to consume is less than one and is stable over the period; this stability is stemmed from

Kuznets study. From the result above it shows that on the average about 40 percent is devoid for consumption over the period under review.

The application of Keynesian demand management policies require a reasonable knowledge of the determinants of short run consumption, however the quantitative effects of determinants other than income is still an unresolved issue. There is still a disagreement concerning the channels through which macroeconomic policy affects consumption expenditure. The traditional Keynesian view is that disposable income is the predominant channel in the transmission mechanism, while changes in the money supply and interest rates have very little influence.

Consumption function in which the major determinant is the flow variable,income are much favoured by Keynesians. Monetarists often prefer a stock adjustment approach whereby consumption depends on wealth and the rates of return on different types of assets, this has culminated to further development of other theories such the relative income hypothesis; the permanent income hypothesis; and the life cycle hypothesis respectively, where the effect of lagged relationship among macroeconomic variables makes it more dynamic and realistic

5 CONCLUSION

The results of MPC and APC conform to Keynes proposition that is less the one and stable, however our results for MPC though less than one and stable exhibit the tendency to grow above one. This has serious policy implications for saving, capital formation, and investment on whole. The author therefore suggest for a policy to discourage consumption and encourage production.

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