Enquiring into the Sustainability of Nigerian Economy: A Time Series Analysis

Mufutau Ayinla Abdul-Yakeen, Dr. Kola Subair and Felix Gbenga Olaifa
kolasubair@hotmail.com; kolasubair@gmail.com

Abstract

The study obtains time-series data of three independent variables (Public Expenditure, Debt, and Reserve) and a dependent variable (Gross National Product) between 1971 and 2011 in Nigeria with the aim of verifying the sustainability of the economy. Following Keynesian Model, it formulates hypotheses, estimates parameters, and uses Augmented Dickey-Fuller test to test their significance by using E-View 7. It discovers that Nigerian economy is solvent and sustainable with positive relationship between Public Income, Expenditure and Reserve but negative relationship between the Public Income and Public Debt. It recommends increase and judicious use of external debts and appreciates internalization of public reserves by disbursement of some of the proceeds to the Traditional Financial Institution (TFI) to attain the desired economic objectives of Nigeria. Despite its applicability, desirability and productivity; the surmountable limitations of its recommendation are fear of corruption and marginalization among others.

Key Words: Assets, Nigeria, Solvency, Sustainability, Traditional Financial System.

Introduction

Nigeria has been tagged as the "Giant of Africa". Given that the Keynesian theory is applied, Nigeria is supposed to be a very great nation in the world. Nigerian economy is highly populated but heavily dependent on the income generated from the petroleum sector while her population continues to grow and makes some pessimistic scholars, Malthusian economists, to expect abject poverty in the nearest future. Nigeria is well-endowed with a lot of natural resources but heavily dependent on the income generated from crude oil which the pessimists (Nnaji, Chukwu and Ukwueze, 2010) opine may dry-up in the nearest future but the

Abdul-Yakeen and Olaifa are associated with Department of Economics & Development studies, Kwara State University, Malete, Nigeria, while Dr. Subair, is with Department of Accounting, Banking and Finance, Olabisi Onabanjo University, Lagos Island, Nigeria.

optimists, Keynesian economists, expect immeasurable affluence through the multiplier effect of effective public expenditure on the economy. The presence, effective and efficient coordination of Nigerian assets [material resource (petroleum resource), and the human resource (labour)] are expected to yield sustainable economic growth going by Cobb-Douglas production function.

Population of Nigeria is always on the increase despite all socio-economic and political up-risings. Nigerian population is said to be growing at over three percent per annum. Thus, it is logical to think that Nigeria shall be able to sustain her solvency, ceteris paribus. Assets like crude oil, gold, silver, uranium, and many other natural resources are available in Nigeria and as such their incomes need to be efficiently managed, using a local and Nigerian financial strategy. An economy, like Nigeria, is solvent if she has necessary and sufficient resources to pay all her internal and external debts.

But due to widespread corruption, lack of trust for the leaders and the led, sit-tight government, tribalism, nepotism and sectionalism may make it difficult for Nigeria to adequately be self sustainable. Coupled with excessive income disparity and failure of so many macroeconomic policies like Operation Feed the Nation (OFN), Austerity Measure, Green Revolution, Back-To-Land, Structural Adjustment Program (SAP), Vision 2010, Vision 20-2020, National Economic Empowerment and Development Strategy (NEEDS), Seven-Point Agenda, and the current Transformation Agenda may make the sustainability of the economy a mirage.

The study assumes that there is no significant difference between the changes in value of national income vis-a-vis national expenditure, national debt and national reserve in Nigeria. Thus, the study delves into the level of solvency and sustainability of the economy.

Accordingly Wikipedia (2014) affirms that sustainability is derived from the Latin word sustinere (tenere which means "hold" and sus which implies "up"). Therefore, sustainability connotes ability to hold-up something for a reasonable period. Hence the sustainability of the Nigerian economy is thus the power to maintain and retain the resources in Nigeria for a reasonably long period.

This paper is thus organized into five main sections which include Section One that presents the Introduction with Section Two discussing the views of various authors on related literature with particular emphases on Nigeria. Section Three presents the Methodology while Section Four discusses the results. The paper is finally wrapped up with the Conclusion and Recommendation in Section Five.

Review of Relevant Literature

There is a channel that links fiscal policies to foreign reserves in the developing nations and solvency is treated as net total liabilities or removal of public reserves from public liabilities (Buiter and Patel, 1997). The argument of Greenspan (1999) that reserves must be big enough to attract global credit

worthiness is good but it excludes the fact that huge foreign reserve is not required from a nation with high rate of population growth, unemployment, depreciating value of currency to mention but few. The position of Fischer (2001) that countries should hold more foreign reserves is limited as long as there are many economic sectors that need more money for programs' execution.

For instance Krugman, Obstfeld and Melitz (2013) claim that "... as at the end of 2009, the United States had a negative net foreign wealth position far greater than that of any other country" and this implies that huge external debt does not necessarily prevents hard working nations from becoming and retaining the status of their socio-political, economic and technological development. It is said that:-

> *Countries that borrow money in the international market will be those where highly productive investment opportunities are available relative to current productive capacity while countries that lend will be those where such opportunities are not available domestically (Krugman, et.al, ibid)*

This statement implies that nations need to ensure that they have exhausted all investment opportunities at home before lending money abroad. This invariably raises the question of whether nations with high rate of unemployment of human and material resources as well as poverty should keep on increasing their external reserves.

Keynes (1964) recommends effective aggregate demand through the use of deficit financing to stimulate the economy. Hence while increase in public expenditure increases the effective aggregate demand, deficit financing on the other hand increases the public debt. Since Keynes postulates that savings is the unspent income after the consumption expenditure has been met and assumes further that the lower the marginal propensity to consume the higher the marginal propensity to save, hence a leakage in the stream of national income (Lamartina and Zaghini, 2013). As such developing nations do not need huge foreign reserves. Going by Wagner's (1911) Law of Expansionist State Spending cited by Udoh, Ebong and Ekpenyong (2007), there are tendencies that activities of government on the different sectors of the economy would increase intensively and extensively. As such, public expenditure is proved to be increasing from time to time. Thus, the growth of public expenditure vis-à-vis public income, debt and reserves in nations like Nigeria may be consistent with the Wagner's Law.

For instance, the consequence of the intermittent oil windfall in the Nigerian economy is the focus on education and health sectors of Nigeria. Furthermore the external borrowing would increase as a result of increase in the country's creditworthiness in anticipation that the windfall will continue to flow in order to pay the principal and the interest on the debt to be settled (Sanni, 2012). The study of Udoh et al (2007) did not cover the informal sector which contains a chunk of unemployed youths that are

looking for jobs within the economy. But for Sanni (2012) if there exist a channel through which the windfall could reach the young ones, there would be growth, development and sustainability of the Nigerian economy.

Further to this is that capital inflow according to Akpan and Afagideh (2009) allows recipient nations to invest and consume more than it produces. Sanni (2012) thus recommends that economic policies should focus on the issues that would enhance more foreign capital inflow into the Nigerian Economy. This statement thus implies that when a nation is buoyant, fund from many sources including loans from abroad would necessitate increase in the state spending and economic sustainability. Akpan and Afagideh (2009) in an attempt of confirming the country's sustainability evaluated aggregated data of trade, foreign direct investment and financial sector development between 1970 and 2006 and conclude that Nigerian economy had nothing but a dismal performance. This view is however subject to controversy that warrants further study to determine the true performance of Nigerian economy.

In the general content provisions of infrastructure in Nigeria have been biased toward urban areas while their developments lag behind and below that of low income group used as the bench-mark. Thus Abdulya Keen (2012) suggests proper demand and supply management of infrastructures as a basis of enhancing investment and sustainability of the sector. This singular action will invariably improve the performance of the economy in all ramifications.

Methodology: Source of Data, Model Specification and Estimation Techniques

Time Series data is culled from World Bank Data for the period between 1971 and 2011 because there is no on-line data available for some of the variables for the period before 1971 and after 2011 as at the time of writing this paper.

Keynesian model of income determination was adopted in accordance with Keynes (1964) Theory of Employment, Output, Income and Prices. This is stated below:

$Y = β0 + β1X1 + β2X2 + β3X3 + … + μi$

Where:

Y = Gross National Income [GNI (current US$)]

$X1$ = Public Expenditure [(Gross National Expenditure (current US$)]

$X2$ = Public Debt [(External Debt Stocks, Total (current US$)]

$X3$ = Public Reserves [Total Reserves (current US$)]

$μi$ = Stochastic error term

Y is the dependent variable while $X1$, $X2$, and $X3$ are the independent variables. $β0$, $β1$, $β2$, and $β3$, are the estimated parameters of the variables standing in for the autonomous income, change in government income with respect to Public Expenditure, Public Debt and Public Reserves respectively. It is assumed that with the exception of $β2$ and for a nation to be solvent, $β1$ and $β3$ are expected to be positively related to the Gross National Income.

Thus we carried out an econometric analysis of the relationship between growth of national income, expenditure, debt and re-

Table 1: Regression Analysis of the Variables

Dependent Variable: Y
Method: Least Squares
Date: 10/29/13   Time: 12:07
Sample: 1971 - 2011

Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.25E+09	1.11E+09	2.032848	0.0493
X1	0.842059	0.019517	43.14546	0.0000
X2	-0.029029	0.039487	-0.735148	0.4669
X3	0.629779	0.071160	8.850202	0.0000

R-squared	0.997263	Mean dependent var	5.61E+10
Adjusted R-squared	0.997042	S.D. dependent var	5.54E+10
S.E. of regression	3.01E+09	Akaike info criterion	46.58235
Sum squared resid	3.36E+20	Schwarz criterion	46.74953
Log likelihood	-950.9382	Hannan-Quinn criter.	46.64323
F-statistic	4494.461	Durbin-Watson stat	1.965375
Prob(F-statistic)	0.000000		

Source: Field work, 2013.

Table 2: Table of Unit Root Test on Variables

Variable	ADF At Level	ADF at 1st Difference	Status
Y	1.830952	-6.721841*	I(1)
X1	2.902719	-5.872369*	I(1)
X2	-1.532055	-4.309317*	I(1)
X3	-0.320728	-3.341768**	I(1)

Source: Field Work, 2013.

Note: */** denotes stationarity at one percent and five percent respectively.

Data Interpretation

Based on the data analyzed above, we have the following equation:
$Y = 2.25E+09 + 0.842059X1 + -0.029029X2 + 0.629779X3 + ….. + \mu i$

Standard Error	(1.11E+09)	(0.019517)	(0.039487)	(0.071160)
t-Statistic	2.032848	43.14546	-0.735148	8.850202
Probability	0.0493	0.0000	0.4669	0.0000

$R2 = 0.997263$, Adjusted $R2 = 0.997042$; F-statistic = 4494.461, Probability = 0.0000; and Durbin-Watson statistic = 1.965375.

serves in order to suggest proper means of managing the Nigerian economy for sustainable economic growth and development.

The time series data was regressed and analyzed using inferential statistics with a unit root tests conducted to test for the stationarity of these data in accordance with Augmented Dickey-Fuller test statistic at 1%, 5%, and 10% significant levels using the E-Views version 7 Statistical Package without any lag.

Data Analysis, Interpretation, Results and Discussion

Tables of the analysis of time series data obtained from World Bank Statistics using E-View version 7 in order to estimate the parameters of the variable, determine goodness of fit of the equation, analyze the variance and test for autocorrelation is shown in Table 1.

Table 1 shows all explanatory variables are statistically significant as indicated by their respective t-statistic and probability values except X 2 which is not significant and also shows an inverse relationship with the dependent variable. The model is a good fit for the adjusted R2 of over 99% which shows that the equation obtained explains almost every change in explained variable brought about by the explanatory variables. In addition, the fact that the value of Durbin-Watson test is 1.97 or less than two implies that the regression ran on the variables eliminates all possibilities of autocorrelation in the model. This shows that the result of the data analyzed is not spurious. Moreover, the probability of F-statistic in the model (0.000000) shows that the model is acceptable.

In accordance with Table 1 above, and with reference to the Keynesian Model of Income Determination, the implication

of the above equation is that the federal government of Nigeria would realize US $2,250,000,000 without the public expenditure, debts and reserves. The multiplier effect of public expenditure on the economy would be 6.33147 or [1 / (1 − 0.842059)]. Following this, the multiplier effect of public debt on the economy is likely to be 0.97179 or [1 / (1 − -0.029029)]. Finally, based on multiplier concept, the likely effect of public reserve on the economy is expected to be 2.701089 or [1 / (1 − 0.629779)] if it is expended or given out as loans to productive investors within the nation.

Using the Table 2 and reference to Augmented Dickey-Fuller test statistic, the implication of the data analyzed is that D(Y) which represents Public Income is stationary after the first difference. Similarly, D(X1) and D(X3) representing public expenditure and public reserves, respectively are stationary after the first difference. Conversely, D(X2) is not stationary at all levels and after the first difference. In addition, I(1) means that the results of the data are integrated of order one.

Results and Discussion

Based on the data analyzed above, it is discovered that:

1. There is a positive relationship between the Public Income and Public Expenditure of the federal government of Nigeria. Public Expenditure is capable of leading to multiplication of national income of Nigeria by six times in the nearest future, going by Keynesian Multiplier. The rate of growth of public expenditure and debt were moving pari-passu with the rate of growth of public income. This portends that Nigeria is expected to witness greater economic growth than we witnessed.

2. There is an inverse relationship between the income and debt of the Federal Government of Nigeria. The public debt, though negatively sloped, has the capacity of increasing the economic growth of Nigeria by over ninety-seven percent or less than hundred percent, if Keynesian Multiplier is something to go by. This is not good at all, for it shows the under-utilization of the credit-worthiness of Nigeria at the international market.

3. Money kept as reserves by the Federal government of Nigeria can lead to almost three times the tune of our national income, if it were expended locally.

4. Nigerian economy is solvent and her solvency is sustainable. This is because both national expenditure and reserves are rising while national debt is falling. If this kind of situation persists, Nigeria would sustain her solvency and thus be referred to as a credit worthy nation.

5. The national income of Nigeria is not auto correlated with national expenditure, public debt and public reserves. By implication, none of the variables causes changes in another. As such, policy makers in Nigeria have to formulate policies that would link these variables with each other.

Policy Recommendation

It is suggested that Federal Government of Nigeria should maximize the utilization of her credit worthiness by incurring more foreign debts and minimizing foreign reserves in order to internalize by extending credits to the Traditional Financial Institutions (TFIs) popularly known in Nigeria as Rotating Savings and Credit Associations (ROSCAS). This will enhance indigenous capital formation, reduce unemployment, alleviate poverty, foster sense of belonging to mention but few. However, many Nigerians may fear corruption whenever the government wishes to increase external debts, and complain of marginalization during the disbursement of funds to indigenous financial institutions. Despite the likely challenges of increase in foreign debt and internalization of excess income, the policy remains the best method of retaining and recycling the national income within the nation (Nigeria) and sustaining the economy.

References

Abdul-Yakeen, M. A (2012). An empirical study of the contributions of rotating savings and credit associations (ROSCAS) to economic development of Ilorin metropolis. European Scientific Journal, 8(19), pp. 267-274.

Akpan, G. E and Afagideh, U. J (2009). Nigeria's economic performance in the global economic: A small macroeconomic analysis. Selected Papers of the 50th Annual Conference by The Nigerian Economic Society, Ibadan: Oluberi Printers.

Buiter, W.H and Patel, U.R (1997). Budgetary aspects of stabilization and structural macroeconomic dimensions of Public Finance, In Blejer, M and Ter-Minassian, T. (Eds.) Fiscal Policy and Economic Reform: Essays in Honour of Vito Tanzi. London: Routledge.

Fischer, S (2001). Opening remarks - Policy Issues Forum. Washington D.C: IMF/World Bank International Reserves

Greenspan, A (1999). Currency reserves and debt. BIS Review, 47(2), pp. 19 – 23.

Keynes, J. M (1964). The General Theory of Employment, Output, Income and Prices. New York: Herbinger Book.

Krugman, P. R:, Obstfeld, M and Melitz, M. J (2013). International Economics: Theory and Policy. Essex: Pearson Education Limited, 9th edition.

Lamartina, S and Zaghini, A (2013). Increasing public expenditures: Wagner's law in OECD countries. http://campus.usal.es/~XVEEP/PAPERS/J1S6/XVEEP-29%20LAMARTINA-ZAGHINI.pdf …. 22/1/2014…3:30pm.

Nnaji, C. E:, Chukwu, J. O and Ukwueze, E . R (2010). Fiscal Policy and the Management of Foreign Reserves in the Nigerian Economy In Distortions in the Nigerian Economy: Implications for Sustainable Development (Selected Papers of the 51st Annual Conference - 2010), The Nigerian Economic Society, Ibadan: Oluben Printers.

Omojimite, B. U (2009). Infrastructure and growth in Nigeria: Benchmarking productivity and sustainability. Selected Papers of the 50th Annual Conference by The Nigerian Economic Society, Ibadan: Oluberi Printers.

Sanni, G. K (2012). Foreign capital inflows, financial deepening and economic growth in Nigeria. The Nigerian Journal of Economic and Social Studies, 54 (1), pp. 111 - 115.

Udoh, E:, Ebong; F. S and Ekpenyong, C. D (2007). Oil windfall revenues and public expenditure on social services in Nigeria. Selected Papers for the 2007 Annual Conference of The Nigerian Economic Society, Ibadan: Daily Graphics Nigeria, Ltd

Wikipedia.Org http://en.wikipedia.org/wiki/Sustainability#History_of_sustainability ….22/1/2014 …3:20pm.

World Bank (2013) http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators# …..26/10/2013 6:20pm.