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Cointegration of Public Sector Expenditure Patterns and Growth of Nigeria

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Abstract
This study investigates the cointegration patterns of public expenditure and growth in Nigeria for the period 1961-2010. To achieve the objective of the study, data was collected from the Central Bank of Nigeria (CBN) Statistical Bulletin. The data collected from the secondary sources were analysed using relevant econometric models such as Augmented Dickey-Fuller, Diagnostic Tests, Johansen Co-integration and Vector Error Correction models. The results from the econometric analysis reveals that pattern of public expenditure of administration, social and community services, economic services, and transfers affects the economic growth of Nigeria. On the basis of the econometric result, the paper concluded that public expenditure is a very important instrument of fiscal policy that contributes to economic growth of any country. On the basis of the conclusion useful recommendations were provided that will improve the pattern and structure of public sector expenditure and management in Nigeria.
Keywords: Public expenditure, Growth, Cointegration, Vector error correction, ADF, Nigeria

Introduction

There is this posturing among many academics and policy makers that public expenditure should aim at poverty reduction and improved economic development. Therefore any economic development effort worth its name should be directed towards the attainment of a sustainable increase in standard of living, accompanied by increase per capital income, better education and good health facilities, infrastructure, not forgetting environmental protection and security (Cookey, 2010; Ezerim, Muoghalu, Elike and Amuze, 2010; John, Appah and Buseni, 2011). It must have been in recognition of this noble role of public expenditure that Sabatini (2006) observed that "the interaction between the organization of a society and its economic performance was once considered perhaps the fundamental question of political economy". According to Asiedu (2005), both the United Nations and World Bank targeted poverty reduction as the major Millennium Development Goal (MDG) that should be attained by 2015. The New Partnership for Africa's Development (NEPAD) is more emphatic in its own declaration needs to augment an annual resource gap to the tune of US $ 64 billion which represents about 12% of the region's GDP.

The contentious issue in contemporary economy debate however is whether public expenditure impact on economic development. Secondly, once there is this affirmation, there is therefore, the need to ascertain both the direction and extent of its influence on economic development. The linkage between public expenditure and economic growth has attracted serious interest on the part of researchers both in the theoretical and empirical level. This interest is as a result of the role of public expenditure on infrastructure such as roads, ports, communication systems, public research spending, provision of basic educational and health services on the economic potential of any country (Irmen and Kuehnel, 2008; Nuruden and Usman, 2010). According to Maku (2009), the general view is that public expenditure either recurrent or capital on social or economic infrastructure can be growth-enhancing although the financing of such expenditure to provide essential infrastructural facilities-including transport, electricity, telecommunications, water and sanitation, waste disposal, education and health can be growth-retarding. Also Afonso and Furceri (2007), Minea (2008) suggest that public spending on infrastructural facilities is widely seen as having an important role in affecting economic growth. There are two opposing views on this issue. The Keynesian approach argues that public spending is an important policy tool to be used to ensure a reasonable level of economic activities; correct short term cyclical fluctuations in aggregate expenditure; and secure an increase in productive investment, thus providing a socially optimal direction for growth and development (Jhingan, 2004). The opposite view is that excessive government intervention in economic life affects growth performance in a negative way for two reasons: first, because operations are often conducted inefficiently, hence they reduce the overall productivity of the economic system; second because excessive government spending distorts economic incentives and results in sub-optimal economic decisions (Vaish, 2002). Therefore, empirical evidence on the subject is mixed. Studies like that of Abdullah (2000), Al-Yousif (2000), Ranjan and Sharman (2008) and Coorey (2009) conclude that public expenditure on economic growth is positive. On the other hand, studies like the ones by Barro (1991) and Folster and Henrekon (2001) suggested that public expenditure on economic growth is negative. The above objectives seem to have been met in many different ways, depending, of course, on which side of the coin one is viewing it.

The general view is that public expenditure, notably on physical infrastructure, or human capital, can be growth-

enhancing, although the financing of such expenditure can be growth-retarding, owing mainly to the disincentive effect of taxation. This view has been supported by Kweka and Morrisey (2000) when they amplified that public expenditure can influence economic growth whether directly or indirectly through government activities that increase the total output through its interaction with the private sector. Accordingly, Lin (1994) has succinctly asserted that the positive effect of public expenditure can readily be felt when government spends to provide public goods and infrastructure, social services and targeted interventions. In Barids (1990) view, such government spending on investment and productive activities should add positively to economic growth whereas government consumption spending is anticipated to be growth-retarding. The major problem with this line of reasoning stems from the seeming difficulty associated with the empirical determination of which particular item of expenditure should be labeled as investment or consumption, this line of thinking is influenced from one country/or region to another, the analytical tools in use, as well as categorization of public expenditure.

The relationship between government spending and development should be of particular importance to the developing countries. Most of the developing countries are associated with high level of public expenditure over time which could be associated with rising fiscal deficit, indicating that these countries lack the ability to generate sufficient revenue that is necessary to support higher levels of expenditure (Rajkumar, 2002). Expenditures are categorized as productive if they are included as arguments in private production functions and unproductive if isolated from such. This categorization would imply that productive expenditures have a direct effect on the rate of economic growth, while unproductive expenditures would either have an indirect effect or none at all (Shioji, 2001).

The issue of which expenditure items qualify as productive or unproductive is highly debatable and hence may be difficult to define a priori. The pertinent question at this junction is, how to sensitively define and apply public expenditure in the Nigeria context. This study will investigate the Nigerian experience as it determines the impact of public expenditure on the economic development of the country. The attainment of sustainable economic development conveys to the citizens of a particular country the privilege to enjoy an improved standard of living, high level of literacy and employment, improved health care and infrastructure, including adequate protection of life and property within the country (Ogbonna, 2011). It is not debatable that all these involve a whole lot of processes, just as no appreciable amount of economic growth can be achieved without commensurate conscious, concerted efforts on the part of individuals, government and its agencies, the private sector, and the citizenry (Cookey, 2010; Ezerim, Muoghalu, Elike and Amuzie, 2010)..

While societies prefer to pursue such initiatives through private oriented programmes, some other may go for government efforts, while yet some others are caught in between the two. Some societies believe that government programmes provide valuable public goods and services such as education and social amenities. On the other hand, some societies are of the view that higher spending on revenue expenditure by the government undermines economic growth as efficiency might not be the watch word. There should be a good balance between capital expenditure and revenue expenditure in order to facilitate economic development. Kweka and Morrissey (2000) have summarized these divergent views that while numerous studies have been conducted, no consistent evidence exists for a significant relationship between public spending and growth, in a positive or negative direction. The consensus between Kweka and Morrissey (2000) is that the actual relationship between public spending and development is far from being understood and therefore calls for more empirical research. Added to this, there seems to be the short-coming arising from the adoption of cross-sectional approach, while country specific case studies appear to be rare.

Maku (2009) stressed that the structure of public expenditure will determine the pattern and form of growth in output of the economy. According to Anyanwu(1997), public expenditure structure addresses the question of how the expenditure is or should be patterned. The structure of public expenditure is usually categorized into recurrent and capital expenditure. The recurrent expenditure is composed of administration (general administration, defense, internal security); economic services (agriculture, construction, transport and communications and others); social and community services (education, health, and others); and transfers. In the same vein capital expenditure includes administration, economic services, social and community services and transfers (Musgrave and Musgrave, 2006; Bhartia, 2004; Anyanwu, 1997; Maku, 2009). Bhartia (2004) says these expenditures can be used to provide necessary economic infrastructure for the development of selected economic activities and can be used to give subsidies for increasing their profitability. Public expenditure has an active role to play in reducing regional disparities, developing social overheads, creation of infrastructure of economic growth in the form of transport and communication facilities, education and training, growth of capital goods, industries, basic and key industries, research and development and so on. This view was supported by Akpan (2005), Todaro (2006), Appah (2010) when they argued that public expenditure on infrastructure investment and productive activities ought to contribute positively to development.

On this premise therefore, the present study focuses on Nigeria, being structurally different from any other country (Asiedu 2005). Hence, there is need to address such pertinent questions as: what is the nature of

relationship between public expenditure and the economy of Nigeria? Which constituent public expenditure heads affect economic development in Nigeria? There is the problem of huge sum of money being 'pumped' into the economy without commensurate development. One would have expected such huge sums of money injected yearly into the system to contribute positively to the growth of the economy. Unfortunately, what one sees is a dwindling and near total lack of economic development in Nigeria, such that both unemployment and inflation figures continue to soar, with poor healthcare and infrastructural decay, etc being the order of the day. Consequently, this study is geared towards investigating the impact of public expenditure patterns on the economic development of Nigeria.

This paper is thus organized into five interconnected sections. Section one, is the introduction as above. Section two reviews theoretical and empirical literatures on the subject matter of the study; section three discusses the methodological issues of the paper; section four presents and discusses the results obtained from the data generated for the study; while section five gives the conclusion and recommendation.

THEORETICAL FRAMEWORK AND EMPIRICAL LITERATURE

The long run relationship between public expenditure and economic growth has attracted attention in public finance research. In particular, the ability of public expenditure to influence economic growth is questioned in two levels. First, the nature of the causality pattern is disputed: a number studies adopt the Wagner's law approach which states that public expenditure causes economic growth mainly through an increase in demand for public services (Aregbeyen, 2006; Bhartia, 2004; Maku, 2009). Within this framework, public expenditure is treated as a behavioral variable. On the other hand, a number of macroeconomic models adopt the Keynesian approach to which public expenditure is an important tool able to influence the level of economic growth. More recently, the role of public expenditure as an output-promoting control variable has been highlighted in the framework of the endogenous growth literature. Endogenous growth models postulates that the economy's output is conditioned not only on the level of physical capital and labour stock but also on additional production factors which may enter the production function with constant returns to scale alone (Afonso and Furceri, 2007).

Empirical evidence tends to reject the prediction of neoclassical models that fiscal policy cannot affect growth in the long run. However, the results are far from conclusive. In particular, with regard to the effects of public expenditure on growth, several studies analyse the growth effects of either total government expenditure or its components. For example, Gupta, Verhoeven and Tiongson (2002), Haque and Kim (2003), Fan and Rao (2003), Ramirez and Nazmi (2003). The results of these studies are often contradictory depending on the assumptions made, methodology used, the country or set of countries studied, and so on. On the other hand, public expenditure can displace private investment, and on the public hand public expenditure can encourage private investment and therefore economic growth. Table one below shows various empirical studies on the relationship between public expenditure and economic growth.

Table 1: Empirical Studies on Public Expenditure

Author	Sample and Method	Main Result
Canning and Pedroni (2004)	A panel of countries over the period 1950-1992 using simple panel based tests	*The results show clear evidence that in the vast majority of cases infrastructure does induce long run growth effects. *The results demonstrate that telephone, electricity, generating capacity and paved roads are provided at close to the growth maximizing level of average.
Bose, Haque and Osborne (2007)	A panel of 30 developing countries over the 1970-1990 using OLS regression	*The share of government capital expenditure in GDP is positively significantly correlated with economic growth, while the growth effect of current expenditure is insignificant. *Government investment in education and total expenditure in education are the only outlays that remain significantly associated with growth throughtout the analysis.
Bagdigen and Cetintas (2004)	Turkish public expenditure over the period 1965-2000 using co-	The result shows no causality in both directions; neither Wagner's

	integration and the Granger causality test.	law nor Keynesian hypothesis is valid for the Turkish case.
Ando (2009)	A panel data over the period 1995-2003 using OLS economic growth equation based on Feder model.	The result shows that defense expenditure has a positive impact on economic growth.
Maku (2009)	A time series data for 1977-2006 using classical least square, regression model and Durbin Watson test.	The result shows that private and public investments have insignificant effect on economic growth.
Leeuwen and Foldvari (2007)	A sample of Japan, Indonesia and India for the period 1890-2000 using Johansen cointegration test	The result shows that in India and Indonesia the level of human capital is cointegrated with the level of aggregate income during the whole 20th century. In Japan, the Lucasian approach was verified only for the first half of the century, while after 1950 there is a cointegration between growth rate of aggregate income and the level of human capital.
Yuk (2005)	A time series analysis of the United Kingdom for the period 1830-1993 using a trivariate VAR model, Multiple regression and Dickey-Fuller tests.	The result supports the export-led growth and although the support for Wagner's law is sensitive to the choice of the sample period, there is evidence that GDP growth Granger-causes the share of government spending in GDP indirectly through export share of GDP during the period.
Arpaia and Turrini (2008)	A sample of EU-15 countries over the period 1970-2003 using panel unit root tests and cointegration analysis.	The paper shows that the estimation method matters substantially for the measurement of the relation between government expenditure and potential output.
Yasin	A panel data from 26 sub-saharan African countries for the period 1987-97 using fixed –effects and random effects estimation technique.	The results from both estimation techniques indicate that government spending on capital formation trade-openness, and the private investment spending all have positive and significant effect on economic growth.
Colombier (2009)	A time series data set using ordinary least square regression for the period 1965-2005 in Switzerland.	The result provide strong evidence that government outlays for transport infrastructure, justice and general government are vital for output growth. Whereas the evidence for a growth effect of education is weak and therefore a reversed causation effect could be ascertained. The evidence concerning the growth effect of social justice and health care are not clear cut.

Source: Adopted from various authors

Nigerian Economy The Nigerian economy has the potentialities of becoming one of the twenty leading economies of the world before the year 2020 if her abundant crude oil wealth, human and natural resources would be properly managed, corruption mitigated, the key national institutions such as power, energy, road, transportation, political, financial, socio-economic, legal, investment environment systems etc developed.

Accountability of petroleum income, its profitable investment and the diversification of the economy are very crucial for economic development. Unfortunately, according to Odularu (2008) crude oil discovery has had certain impacts on the Nigerian economy both positively and negatively. On the negative side, it has caused environmental degradation, which leads to deprivation of means of livelihood and other economic and social factors.

Nwezeaku (2010), Thomas (2008) et al posit that the economy has been bedeviled by perennial underdevelopment, poverty, increasing debt burden due to multiple problems such as poor energy supply and power outages , systematic collapsing of industries and infrastructures, lack of proper turn around maintenance in the oil and gas industries, high rate of corruption, militant insurgencies, criminal activities, observable neglect, unprecedented restiveness, violence, conflict, environmental degradation, horrible and hostile investment environment, incessant bombing in public places, inconsistency and conflicting financial reporting from various government agencies on petroleum income. The economy is really faced with poor human developmental and economic indices as evidenced by high rate of perennial and persistent inflation, low per capita income, poor income distribution, GDP and sustained impoverishment. Mismanagement of abundant natural, human and material resources, insatiable creed and loss for excessive wealth, corrupt practices at all levels and political banditry have been the bane of Nigerian economy.

Collier et al (2003) and Yakub (2008) et al have linked abundant natural resources to slow economic growth, civil conflict and socio-economic collapse. They further state that of all natural resources, oil has been found to have the highest risk of civil conflict because of the large rents it offers. Therefore, Nigeria needs to be more careful about the way it manages her oil revenue **to avoid socio-economic collapse**.

BBC (2006) once said in one of its reports that Nigerian leaders stole $389 billion. The corrupt practices manifest themselves in inflated contracts prices that are hardly executed satisfactorily and most of them are deliberately abandoned after receiving the money meant for the contracts. Some of the bad roads we have today are as a result of abandoned contracts by successive administration. The Federal Account Allocation Committee (FAAC) has to recoup some N450 billion un-remitted oil proceeds which the Nigerian National Petroleum Corporation (NNPC) currently owes it (Nwachukwu,2011), just to state a few. Where there is proper accountability NNPC will always remit oil revenue to FAAC.

For many reasons, Nigeria's petroleum industry according to Eromosele (1997) is unique – actually like no other in the world. History, geography, economics and not the least politics, have combined to shape the size, define the nature and determine the complexion of the country's most strategic industry. Despite being the poorest oil-rich country in the world, Nigeria will in the years ahead continue to contribute to world energy. Much will depend on how it is able to husband its resources while balancing the demand imposed by the four identified influences.

Nigeria is an oil-rich country with poor citizens - a nation that has wealthy leaders but with highly impoverished followers. What a paradox! Much as the statement may seem to be strange, that is the reality on ground, and the root cause is the intractable canker worm called 'corruption' that has eaten deep into the nation's petroleum income. Indeed, it is painful for Nigerians to be undergoing extreme poverty and sustained underdevelopment in the midst of plenty of wealth in the "oil-rich country in the world". This unfortunate and ugly trend must be reversed by systematic and well focused diversification strategy of the economy if Nigeria must make any economic progress. Nigeria as a nation under distress, is therefore crying for a leader who would fight corruption to a standstill. Ibaba (2005) posits that the Nigerian economy has been facing developmental crises such as high level of poverty, declining economic growth, collapse of local economies and social infrastructure. There have been Corruption, financial indiscipline, lack of proper accountability of oil money, co-existence of abundant oil wealth with extreme poverty; depleting foreign reserves have become the order of the day (Yakub 2008).

Nigeria with all its oil wealth has performed poorly with GNP, per capita income today not higher than at independence in 1960 (Bawa and Mohammed, 2007). That is, an average Nigerian was better off before independence. Recently, the Nigerian National Petroleum Corporation (NNPC), which is government representative in every matter relating to petroleum business in Nigeria, was reported to be insolvent as result of corruption. Crude oil royalties accruing to government are subject to the whims and caprices of government officials and their oil companies' counterparts. Therefore, the economy is not swinging or progressing the way it ought to be. Nigeria is a major world supplier of crude oil, producing about 2mn barrels per day, and is an influential member of the Organization of Petroleum Exporting Countries (OPEC). Sales of oil account for more than 90 per cent of the nation's total foreign-exchange earnings, and therefore, the lion's share of the funds Nigeria puts into its multi-faceted development programmes. Because of this substantial contribution, Nigeria could well be described as an oil-based mono-cultural economy, and the country's fortunes often rise and fall with the price of oil.

Table 2: Economic and social indicators for Nigeria

Key Economic Indicators		**Key Social Indicator**	
GDP per capital (constant 1995 prices)	$ 254	Life expectancy at birth	47 years
Annual Average economic growth 1995-2001	2.8	Illiteracy rate	36%
Inflation rate 2002 (IMF estimate)	13.4%	Share of labour force with tertiary education	27.3%
Investment share of GDP	23%	Military spending (% government expenditure)	8.1%
Domestic Bank credit share of GDP	11.3%	Mortality rate under 5 (per 1000 live births)	153

Source: World Bank (WDI), and IMF (2003)

Economic Growth and Growth Models

According to Boopen (2006), Appah (2010), economic growth is the long run process that results from the compounding of economic events over time. Similarly, Dwivedi (2002) stated that economic growth means a sustained increase in per capita national output or net national product over a long period of time. It implies that the rate of increase in total output must be greater than the rate of population growth. To measure economic growth, economists generally examine the rate of change in real GDP from one year to the next. The Central Bank of Nigeria (2008) stated that GDP is the money value of goods and services produced in an economy during a period of time irrespective of the nationality of the people who produced the goods and services. It is usually calculated without making any allowance for capital consumption (or deductions for depreciation). Also, GDP by expenditure based is the total final expenditure at purchases' prices (including the f.o.b. value of exports of goods and services) less the f.o.b. value of imports of goods and services. Buhari (1993) clearly states that the GDP or Gross Domestic Product is the total volume of production that has taken place in the economy irrespective of the nationality of the people who produced the goods and services. According to him, it is the total production that has taken place in Nigeria by Nigerians themselves and foreigners living in Nigeria by Nigerians themselves and foreigners living in Nigeria.

The emergence of economic growth theories can be traced back to Adams Smith's Wealth of Nations. In Smith's view, economic growth of a nation strictly speaking, 'wealth of Nations' depends on the division of labour and is limited by the limits of division of labour. The Smithian view was later superceded by the view of Richardo, Malthus and Mill. The growth theories suggested by these great economists are collectively called classical theory of economic growth. And then, during the nineteen thirties and forties, R.F. Harrod and Dumar developed a path breaking theory of economic growth-the capital accumulation theory of economic growth, popularly called Harrod-Domar growth model. The following theories of economic growth would be discussed:

1. **Harrod-Domar Theory of Growth:** The Harrod –Domar models are based on economic growth on the experiences of advanced economists. They are primarily addressed to an advanced capitalist economy and attempt to analyse the requirements of steady growth in such an economy. Harrod –Domar assign a key role to investment in the process of economic growth. But they lay emphasis on the dual character of investment. Firstly, it creates income, and secondly, it augments the productive capacity of the economy by increasing its capital stock. The former may be regarded as the demand effect and the later the supply effect of investment. Hence so long as net investment is taking place, real income and output will continue to expand. However, for maintaining a full employment equilibrium level of income from year to year, it is necessary that both real income and output should expand at the same rate at which productive capacity of the capital stock is expanding. Ultimately, it will adversely affect the economy by lowering incomes and employment in the subsequent periods and moving the economy into equilibrium path of steady growth.
2. **The Kaldor Model of Distribution:** The Kaldor model is an attempt to make the saving-income ratio variable in the growth process. It is based on the classical saving function which implies that saving equals the ratio of profits to national income, i.e. S = P/Y.
3. **The Pasinetti Model of Profit and Growth:** The Pasinetti model is based on the Kaldor model of distribution by incorporating workers profits as returns on their savings. It shows that there exists a distribution of income between profits and wages which keeps the system in a long-run equilibrium.
4. **Joan Robinson's Model of Capital Accumulation:** Mrs Joan Robinson in her book "The Accumulation of capital" builds a simple model of economic growth based on the capital rules of the game. The model is where net national income is the sum of the total wage bill plus total profits which may be shown as: $Y = wN + p K$.
5. **Meade's Neo Classical Model of Economic Growth:** Professor J.E. Meade has constructed a neo-classical model of economic growth which is designed to show the way in which the simplest form of

economic system behave during a process of equilibrium growth. In the model, the net output produced depends upon four factors: (i) the net stock of capital available in the form of machines, (ii) the amount of available labour force; (iii) the availability of land and natural resources; (iv) the state of technological knowledge which continues to improve through time.

6. **The Solow Model of Long –Run Growth:** Solow postulates a continues production function linking output to the inputs of capital and labour which are sustainable. He shows in his model that with variable technical efficient there would be a tendency for capital – labour ratio to adjust itself through time in the direction of equilibrium ratio.

On the basis of the theoretical and empirical literature, the following research question and hypothesis are proposed:

Research Question:

How significant is the relationship between public expenditure patterns and the growth of Nigeria?

Hypothesis:

There is no significant relationship between public expenditure patterns and the growth of Nigeria.

METHODOLOGY OF THE STUDY

In carrying out this study, time series data sourced from Statistical Bulletin, Economic and Financial Review and Annual Reports and Statement of Accounts of the Central Bank of Nigeria (CBN) of various issues were made use of. The macroeconomic data covers gross domestic product (GDP), and capital expenditure (administration, social and community services, economic services and transfers) and recurrent expenditure (administration, social and community services, economic services and transfers) between 1961 and 2010 in Nigeria. The data gathered were then subjected to various econometric tests using E-views.

The Model: The model for this study uses Granger causality test to ascertain the direction of causality between GDP and government capital and recurrent expenditure based on sectoral function classification (administration, social and community services, economic services and transfers) between 1961 and 2010. Other econometric tests such as unit root test, co-integration test and vector error correction mechanism were also performed to determine the stationarity of the data and long run relationship between the variables.

The test procedure is illustrated below:

$$NE_t = \sum_{j=I}^{K} A_j FGE_{t-1} + \sum_{j=I}^{K} nB_j NE_{t-j} + U_{it} \quad (1)$$

$$FGEt = \sum_{J=I}^{K} Cj\ FGE\ t\text{-}I + \sum_{j=I}^{K} Dj\ NE\ t\text{-}I + U_{2t} \quad (2)$$

Equation (1) postulates that NE is related to past values of itself as well as that of FGE and vice-versa for equation (2). Unidirectional causality from FGE to NE is indicated if the estimated coefficient on the lagged FGE in equation (1) is statistically different from zero as a group (i.e., $\sum Ai \neq 0$) and the set of estimated coefficients on the lagged NE in equation (2) is not statistically different from 0 (i.e., $\sum Dj = 0$). The conserve is the case for unidirectional causality from NE to FGE.

Feedback or bilateral causality exists when the sets of FGE and GDP coefficient are statistically different from 0 in both regressions (Gujarati and Porter, 2009).

The more general model with instantaneous causality is expressed as:

$$NE_t + b_oFGE_t = \sum_{J=I}^{K} C;FGE_{t-1} + \sum_{J=I}^{K} DjNE_{t-1} + ?U_{it} \quad (3)$$

$$FGE_t + C_oNE = \sum_{J=I}^{K} CiFGE_{t-I} + \sum_{J=I}^{K} DjNE_{t-j} + U_{2t} \quad (4)$$

Instantaneous causality occurs and knowledge of NE will improve prediction or goodness of fit of the first equation for FGE. In this study, a bivariate regression of the form presented below is estimated:

$$FGEt = \infty_0 + \propto_1 FGE_{t-1} + \ldots + \propto_1 FGEt_{-1} + B_1 NEt_{-1} + \text{---} + B_1 NEt_{-1} \quad (5)$$

$$NEt = \infty_o + \propto_1 NE_{t-1} + \text{---} + \propto_1 NE_{t-1} + B_1 FGE_{t-1} + \text{---} + B_1 NE_{t-1} \quad (6)$$

The equation for the second model is stated thus:

$$NEt = f\,(ADMt + SCSt + ECSt + TRFt) \quad (7)$$

$$GDPt = \alpha + ADMt + SCSt + ECSt + TRFt + Ut \quad (8)$$

To avoid spurious regression outcomes on time series data, unit root test that affirms the stationary of the series and co-integration test that affirms at least one co integration equation were conducted. Sequel to the above, the OLS in equation (8) is re-specified to take care of possible short term disequilibrium as follows:

$$\Delta NEit = \alpha + \beta 1 \Delta ADMt + \beta 2 \Delta SCSt + \beta 3 \Delta ECSt + \beta 4 \Delta TRFt + \beta 5 U_{t-1} + \sum_t \quad (9)$$

B1, β2, β3, β4, β5 are expected to be greater > 0

Where: NE = Nigerian Economy is proxied by RGDP (real gross domestic product); IF (inflation) ADM = Administration; SCS = Social and Community services; ECS = Economic services; and TRF = transfer.

Test for stationarity: To avoid spurious regressions which may arise as a result of carrying out regressions on time series data without subjecting them for test whether they contain unit root, we first subject the data to stationarity test by using the Augmented Dicker fuller (ADF) tests (Asterious and Hall, 2007).

RESULTS AND DISCUSSION

Empirical Analysis and Result

The data generated from the CBN 2008 Annual Bulletin was analyzed empirically using Financial Econometrics Software (E-Views). The trend analysis and the OLS result were shown below:

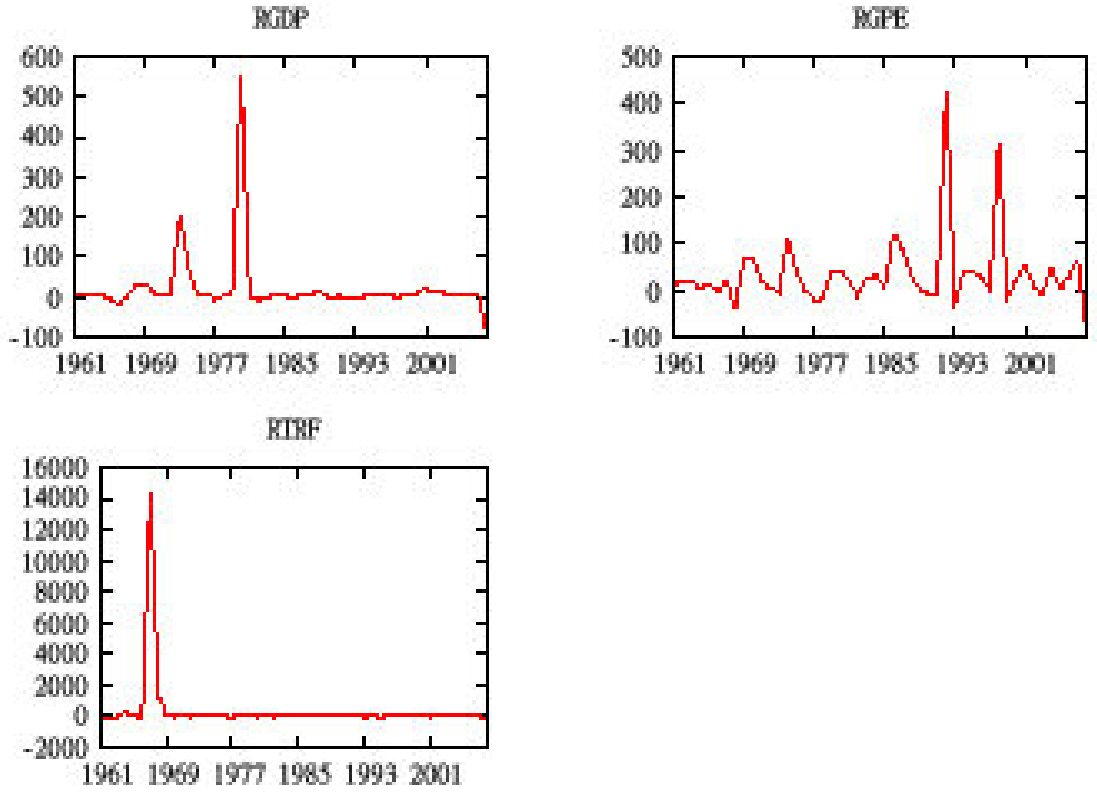


Fig 1,2 and 3 indicated by trend analysis of growth rates in RGDP, RGPE and RTRF from 1961 through to 2008 that high growth rates was significantly recorded in the Nigerian real GDP between 1971 to 1975 but fall between 1976 to 1983 and raised significantly in 1979 through to 1983 while in the other years low raise and fall in growth rates were recorded. In terms of RGPE, growths were steadily recorded with highest rates in 1988 to 1992 and 1995 to 1999 respectively. For RTRF between 1963 to 1969 high growths rate was recorded while in the other years low growth rates were experienced without transfer in 1976.

Table 1 OLS
Dependent Variable: RGDP
Method: Least Squares
Date: 02/18/12 Time: 13:01
Sample: 1961 2010
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGPE	0.052199	0.157692	0.331017	0.7422
RTRF	-0.001161	0.006156	-0.188555	0.8513
C	18.48384	13.75753	1.343543	0.1858

R-squared	0.003302	Mean dependent var	19.75767
Adjusted R-squared	-0.040996	S.D. dependent var	85.45772
S.E. of regression	87.19182	Akaike info criterion	11.83456
Sum squared resid	342108.6	Schwarz criterion	11.95151
Log likelihood	-281.0294	F-statistic	0.074545
Durbin-Watson stat	1.972112	Prob(F-statistic)	0.928281

Source: Eviews 3.0

OLS Model

Estimation Command:
==========
LS RGDP RGPE RTRF C

Estimation Equation:
==========
RGDP = C(1)*RGPE + C(2)*RTRF + C(3)

Substituted Coefficients:
==========
RGDP = 0.0521988355*RGPE - 0.00116067341*RTRF + 18.48383863

Source: Eviews 3.0

The R-squared is found to be 0.7358 implying that the analysis was adjudged accurate at 73.6% and the dependent variable(RGDP) is explained by the independent variables(ADM,SCS,ECS and TRF) at the same percentage level while the unexplained value at 26.4% captured by error.

The model estimation is:

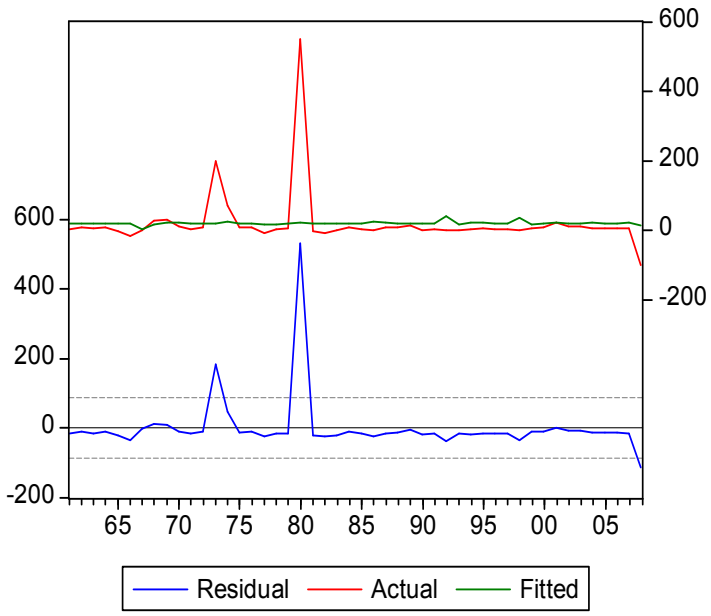
$$RGDP = \alpha_0 + \alpha_1 RGPE + \alpha_2 RTRF + \varepsilon$$

$$RGDP = 18.4838 + 0.05219\,RGPE - 0.00116\,RTRF$$

Se = (1.3435) (0.3310) (-0.188)
t = (0.1888) (0.7422) (0.8513)
R2=0.003 AdjR2= -0.004 F-Stat= 0.07 Prob= 0.928 Dw-test =1.97

The model established that there is very weak and low relationship among the growth in the real (RGDP), RGPE and RTRF. The independent variables (RGPE and RTRF) can only explain the dependent variable (RGDP) by -4%. This implied that RGPE and RTRF explained the changes in the growth rate of RGDP by -4%. A unit change in RGPE generated a correspondent increase in the RGDP and a unit change in RTRF has decreasing effect on the growth of the Nigerian GDP by 5.2% and 0.1% respectively.

Based on the model parameters, the RGPE and RTRF are not statistically significant at 5% level. The Graph showed the behaviour of the fitted graph.



Source: Eviews 3.0

Table 2a
Serial Correlation Test
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.058926	Probability	0.942853
Obs*R-squared	0.131196	Probability	0.936507

Source: Eviews 3.0

Table 2b
White Heteroskedasticity Test
White Heteroskedasticity Test:

F-statistic	0.079164	Probability	0.988299
Obs*R-squared	0.350892	Probability	0.986296

Source: Eviews 3.0

Table 2c:
Stability Test
Ramsey RESET Test:

F-statistic	0.941583	Probability	0.429150
Log likelihood ratio	3.124358	Probability	0.372846

Source: Eviews 3.0

The null hypothesis is rejected in the table 2a, b and c because the p-values are greater than the critical values (0.942893 ,0.988200, & 0.429150>0.05). We concluded that the series are not serially correlated, homoskedasticity and that the model is stable and in functional form.

To test for stationarity of series for the purpose of co-integration as suggested by the research paper, we test the individual variable using ADF unit root test and Johansen procedure for normalization and co-integrating equations see table 3 below: The table3a test for stationary at level I(o) with 5% critical value.

Table 3. Unit root Test ADF result

S/N	Variable	ADF Test	At Level	Prob*	Decision
1.	RGDP	-6.597237	-2.925169	0.0000	Stationary
2.	RGPE	-8.033635	-2.925169	0.0000	Stationary
3.	RTRF	-6.364524	-2.925169	0.0000	Stationary

*MacKinnon (1996) one-sided p-values.

Source: Eviews 3.0

Table 4: Co integration Analysis Result
Date: 02/18/12 Time: 13:15
Sample(adjusted): 1961 2010
Included observations: 47 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: RGDP RGPE RTRF
Lags interval (in first differences):

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.609093	105.1508	29.68	35.65
At most 1 **	0.498784	61.00439	15.41	20.04
At most 2	0.455152	2.54065	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 2 cointegrating equation(s) at both 5% and 1% levels

Source: Eviews 3.0

Using the Johanson co integration procedure, the variables RGDP, RGPE and RTRF were co integrated at 5% level at most 1 co integrating equation with at least 2 co integrating equations. Since the variables were stationary at level. VEC model is adopted which indicated that there is a long run relationship with RGPE being statistical significant at 5% level both in the current and the previous years as the t-statistic is greater than 2.0 by the rule of thumb while the RTRF and RGDP werenot statistical significant. See VEC estimate analysis below:

Table5: VEC Estimation Result
Vector Error Correction Estimates
Date: 02/18/12 Time: 13:19
Sample(adjusted): 1961 2010
Included observations: 45 after adjusting Endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
RGDP(-1)	1.000000	
RGPE(-1)	1.586581 (0.40583) [3.90951]	
C	-79.83871	
Error Correction:	**D(RGDP)**	**D(RGPE)**
CointEq1	-0.586528 (0.21030) [-2.78895]	-0.640802 (0.19017) [-3.36970]
D(RGDP(-1))	-0.253724 (0.19395) [-1.30817]	0.482853 (0.17538) [2.75316]
D(RGDP(-2))	-0.120351 (0.15919) [-0.75600]	0.229027 (0.14395) [1.59102]
D(RGPE(-1))	0.656041 (0.26931) [2.43597]	-0.098169 (0.24353) [-0.40311]
D(RGPE(-2))	0.283578 (0.18474)	-0.069194 (0.16705)

	[1.53499]	[-0.41421]
C	-2.118675	-1.547150
	(15.3849)	(13.9117)
	[-0.13771]	[-0.11121]
RTRF	-0.002500	-0.002755
	(0.00729)	(0.00659)
	[-0.34293]	[-0.41790]
R-squared	0.418470	0.550308
Adj. R-squared	0.326649	0.479304
Sum sq. resids	392325.4	320787.2
S.E. equation	101.6088	91.87909
F-statistic	4.557473	7.750378
Log likelihood	-267.9989	-263.4693
Akaike AIC	12.22217	12.02086
Schwarz SC	12.50321	12.30190
Mean dependent	-2.318170	-2.704116
S.D. dependent	123.8257	127.3282
Determinant Residual Covariance		85650741
Log Likelihood		-531.0763
Log Likelihood (d.f. adjusted)		-538.6847
Akaike Information Criteria		24.65265
Schwarz Criteria		25.29502

Source: Eviews 3.0

CONCLUSION AND RECOMEMNDATIONS

The purpose of this study is to investigate the cointegration of public sector expenditure patterns and growth in Nigeria. To capture this, time series macroeconomic data were culled from the Central Bank of Nigeria (CBN) statistical Bulletin 1961-2010. The econometric analysis reveals that a long run relationship exists between economic growth and the patterns of public expenditure in Nigeria. The Johansen Co-integration test affirmed that a long run relationship exists between the explanatory and explained variable. The vector error correction analysis result also confirms the relationship between public sector expenditure and economic growth. This result is consistent with Irmen and Kuehnel, (2008; Nuruden and Usman, (2010) that government expenditure affects growth of countries.. According to Maku (2009), the general view is that public expenditure either recurrent or capital on social or economic infrastructure can be growth-enhancing although the financing of such expenditure to provide essential infrastructural facilities-including transport, electricity, telecommunications, water and sanitation, waste disposal, education and health can be growth-retarding. Also Afonso and Furceri (2007), Minea (2008) suggest that public spending on infrastructural facilities is widely seen as having an important role in affecting economic growth. Therefore, the following recommendations were provided to improve the public sector expenditure patterns in Nigeria:

1. The government in Nigeria should restructure the financial management system in the public sector for transparency in government business to meet the demands of the 21st century.
2. The level of corruption in the management of government revenue should be minimized to achieve the goals and objectives of public sector and the citizens of Nigeria.
3. The level of tax evasion in Nigeria should be reduced through an efficient and effective tax administration.
4. The economy of Nigeria should be restructured to reduce the level of dependence on oil revenue.
5. There should be accountability and transparency from government officials on the management of revenue and also citizens should be able to benefit from expenditures of government.
6. The Nigerian government should ensure that the patterns of government expenditure should be tailored towards more of capital expenditure than current for the provision of more infrastructural facilities in the country.

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