Government Expenditure in Nigeria: Determinants and Trends

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Abstract

This study empirically examines the pattern and drivers of government expenditure with specific reference to capital and recurrent expenditure in Nigeria. The study employs a public choice framework and the model is estimated with time-series data from 1974 to 2012, using the Johansen estimation technique. The results show that capital and recurrent expenditure are resilient to shocks in total government spending and, similarly, total government expenditure is found to be resilient to shocks in capital and recurrent spending. However, whereas total and capital expenditure tend to be resilient to shocks in government revenue, recurrent expenditure is found to be significantly affected by shocks in government revenue. The effects of governance show that recurrent expenditure is not affected by any elements of poor governance as much as are capital and overall expenditure. Increased per capita income was found to be in support of Wagner's law, given the response of total and capital expenditure, but this law was refuted by the recurrent expenditure response.

Keywords: *government expenditure; public choice framework; determinants; Wagner's law; governance; Nigeria*

1. Introduction and Background

Government expenditure remains an important demand management tool and, if well-managed, it could put an economy on a long-term sustainable growth and development trajectory. Prudent government spending, through an efficient allocation of its resources to the different sectors of the economy, translates into an inclusive and sustainable growth pattern, which serves as a driver for eradicating poverty and inequality within society.

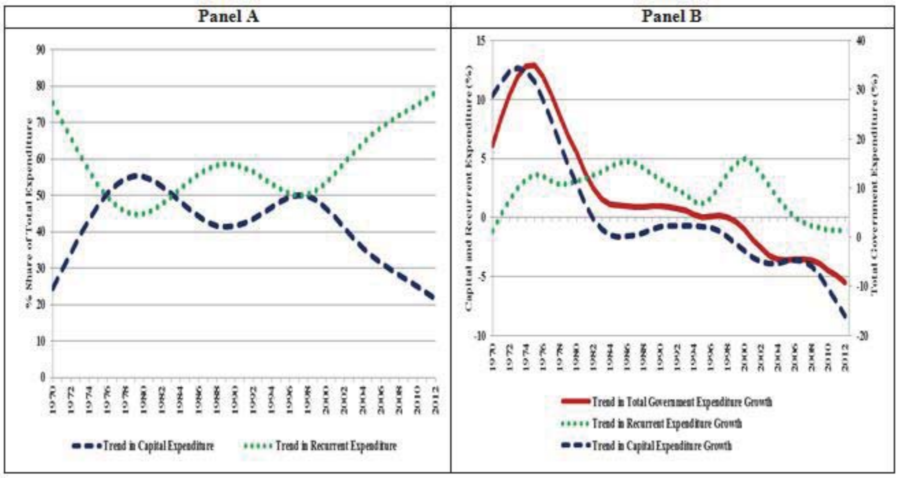
The pattern of government expenditure in Nigeria over the years has to a large extent been driven by crude oil endowment, which is reflected in the generated revenue (Akanbi, 2014). This study aims to establish the determinants of government expenditure, by further disaggregating expenditure into two components: capital and recurrent expenditure.

The empirical literature on the determinants of government expenditure is vast, with varying techniques and methodologies adopted in their investigations. Many of these empirical studies focus on the determinants of military spending (Davoodi, Clements, Schiff & Debaere, 2001; De Masi & Lorie, 1989; Schiff, Gupta & Clements, 1998; Gupta, Sanjeev, McDonald& Ruggiero, 1998; Hewitt, 1991, 1992 & 1993), since military expenditure absorbs more than 5 percent of world resources annually. Related studies investigated for Nigeria (Taiwo, 1989; Babatunde, 2011; Aregbeyen & Akpan, 2013) suggest that per capita income, government revenue, demographics and institutional variables are significant determinants of government expenditure. These variables are in line with existing empirical literature and have also been included in this study. However, the distinctive feature of this study, compared to other empirical work carried for Nigeria, is the adoption of the public choice framework in estimating the determinants of government expenditure. The study aims to augment the literature by looking at allocational expenditure priorities in Nigeria, with a specific focus on capital and recurrent expenditure. The hypothesis is, therefore, to investigate the drivers behind these spending allocations.

The evolution of government expenditure in Nigeria has revealed some basic trends over the years with regard to the patterns of capital, recurrent and total government expenditure. Figure 1 (Panels A & B) shows the percentage share of capital and recurrent expenditure in total government expenditure, and their percentage growth rates as a share of GDP. Panel A reveals the divergence and convergence of capital and recurrent expenditure in total government expenditure. In the 70s (a period of massive physical infrastructure building), capital expenditure was on the rise, reaching its peak in 1980 at about a 55 percent share, while recurrent expenditure fell to about a 45 percent share of total government spending. Thereafter, a reverse trend ensued, with capital spending reaching a trough of about 41 percent and recurrent spending peaking at about 59 percent. From 1990, the rising trend in capital spending and falling trend in recurrent spending converged with equal shares in 1998, which happened to be the end of the deregulation period.

Earlier convergence in the two components of expenditure was reported in 1976 and 1983, with the latter year almost coinciding with the beginning of a structural adjustment programme (SAP). However, since the return to a democratic dispensation in 1999, there has been an increasing divergence between capital and recurrent expenditure, with capital expenditure falling to about a 22 percent share, while recurrent expenditure has risen to about a 78 percent share, as at 2012. The average shares in total government expenditure over the period 1970 to 2012 amount to 42 percent and 58 percent for capital and recurrent expenditure respectively.

Figure 1: Government Expenditure Performance in Nigeria



Source: Central Bank of Nigeria (July 2014)

The total government expenditure growth and capital expenditure growth have revealed similar trends over the years (Panel B). After rising to a peak in the mid-1970s, the trend in annual growth rate of capital and total government expenditure has fallen, reaching negative growths of about 16 percent and 6 percent of GDP respectively in 2012. On the other hand, the trend in annual growth rate of recurrent expenditure as a share of GDP has been positive for most years, although not growing beyond a 5 percent trend level. A negative growth of about 1.1 percent was recorded in 1970, and between 2007 and 2012 recurrent spending has grown negatively on average by about 0.9 percent. However, the average growth in the trend of capital, recurrent and total government expenditure as a share of GDP over the period 1970 to 2012 amounts to 5.4 percent, 2.3 percent and 1.8 percent respectively.[1] The question then is what drives expenditure priorities and are there any common characteristics to be found in such expenditure allocation decisions in the Nigerian economy? This study is limited to expenditure patterns only as reflected in capital, recurrent and total expenditures.

Against this background, Nigeria's government expenditure function was specified and estimated. The results of the estimates are mixed and suggest that a disaggregation is necessary when estimating the determinants of government expenditure.

The rest of the study is organised as follows: section two presents the theoretical framework, methodology and estimation techniques adopted in the study, as well as the data analysis, while section three contains an analysis of the various estimation results. Section four concludes the study.

2. Theoretical Framework, Methodology and Data

2.1 Theoretical framework

The framework used in this study follows a public choice approach similar to that used by Hewitt (1991, 1992, 1993), Davoodi et.al (2001), Nyamongo (2007) and Akanbi and Schoeman (2010). The model analyses the relationship between government capital (infrastructure) spending, recurrent spending and overall government spending. Previous studies

[1] *Note: Figure 1 depicts the trend of these variables and is calculated using a Hodrick-Prescott Filter.*

mostly used the public choice model to analyse the relationship between military spending and overall government spending, in which the former is regarded as pure public good. A slight deviation from this is seen in Akanbi and Schoeman (2010), where the relationship between education spending and overall government spending is explored. Therefore, what distinguishes this study from previous studies is that it disaggregates capital and recurrent spending from overall government spending, rather than the split of military and education spending from overall government spending in the previous studies. Thus, the determination of capital and recurrent expenditures is modelled as a government optimisation problem, meaning that the decision on the size of a budget for capital and recurrent expenditure is taken by the political leadership.

Assuming the welfare function of the government to be as follows:

$$W = f(P, C, R, Z), \tag{1}$$

Where

P = private consumption;

C = government capital spending;

R = government recurrent spending; and

Z = state variables (i.e. GDP per capita, government revenue, governance index, population and urbanisation index, etc.)

The government's choice of the level of capital and overall government spending is affected by the state variables. Overall government spending is represented by the following equation:

$$G = C + R. \tag{2}$$

Abstracting from private investment and the external account, the budget constraint is determined by the available resources in the economy:

$$G = Y - P, \tag{3}$$

where Y represents the value of gross domestic product.

To get a simple analytical solution, a Cobb-Douglas specification for equation (1) is assumed, while abstracting from the presence of state variables. Thus,

$$W = P^{\alpha} C^{\beta} R^{\gamma}. \tag{4}$$

Choices of G, C and R that maximise equation (4) subject to equations (2) and (3) will result in[2]:

$$G = \frac{\beta}{\gamma} R + \frac{\gamma}{\beta} C \tag{5}$$

and

$$C = \frac{\beta}{\beta+\gamma} G \tag{6}$$

while

$$R = \frac{\gamma}{\gamma+\beta} G \tag{7}$$

Equations (5), (6) and (7) show the simultaneous relationship between the two categories of spending and overall government spending. Higher capital and recurrent spending will lead to higher overall spending and vice versa. Allowing for the state variables to enter the equations, results in the following equations:

$$G = f_1(C; R; Z), \tag{8}$$

$$C = f_2(G; Z), \tag{9}$$

$$R = f_3(G; Z) \tag{10}$$

Equations (8), (9) and (10) form a structural model.

In line with the existing empirical specification, the econometric models are specified in natural logarithms, based on equations (8), (9) and (10), which are presented below:

$$\ln\_G_t = f[\ln\_C_t, \ln\_R_t, \ln\_rev_t \ln\_ypc_t, gov_t, \ln\_pop_t] \tag{11}$$

$$\ln\_C_t = f[\ln\_G_t, \ln\_R_t, \ln\_rev_t \ln\_ypc_t, gov_t, \ln\_ur_t] \tag{12}$$

$$\ln\_R_t = f[\ln\_G_t, \ln\_C_t, \ln\_rev_t \ln\_ypc_t, gov_t, \ln\_lfpr_t] \tag{13}$$

where

ypc = real per capita GDP,

rev = government revenue

[2] *The solution for the optimal choice of C, R and G is shown in Appendix 1.*

pop = total population,
gov = governance index,
ur = urbanization ratio,
lfpr = labour force participation rate.

The state variables specified in the above equations include the real per capita GDP, total population, governance index, government revenue, labour force participation rate and urbanization ratio. These variables are assumed to influence the parameters of the different categories of government expenditure, similar to the approach followed by Davoodi et.al (2001), Hewitt and Van Rijckeghem (1995), Mauro (1998) and Heller, Peter and Diamond (1990).

The directional effect from total government expenditure to the two categories of expenditure is found to be ambiguous. That is to say that, an increase in total government expenditure results in a corresponding rise in capital expenditure, but such a rise in overall government expenditure may also be directed towards recurrent expenditure in the budget. On the other hand, an increase in capital and/or recurrent expenditure is expected to result in an increase in total government expenditure.

The GDP per capita, which serves as a measure of welfare or development, is expected to show evidence in favour of Wagner's law. This means that a higher level of welfare is accompanied by an increase in government expenditure. However, in the literature, evidence in favour of this phenomenon is mixed (Easterly, William & Rebelo (1993); Rodrik & Dani (1996); and Commander, Simon, Hamid, Davoodi & Une (1997)).

Considering the population structure and density that are used in this paper as evidence from Hewitt (1992), it is expected that the size of the urban population should correlate positively with capital expenditure. This is because the majority of active population will likely move to the urban centre where better physical infrastructure facilities are available, thereby leading to increased pressure on government to spend more on capital projects. Total population is also expected to correlate positively with overall government expenditure, since an increase in population size also results in an increase in both capital and recurrent government expenditure. Likewise the rise in active population (lfpr) will significantly increase government recurrent expenditure, mainly through salaries, wages and transfer payments.

Poor governance (i.e. corruption and government ineffectiveness) which can be regarded as a symptom of bad management of a country's resources will also affect expenditure priorities. A rise in the level of public expenditure and lower revenue as a result of corrupt systems may have adverse budgetary implications, resulting in poor infrastructure and public services. It is expected that a government with a poor governance structure will vote more funds to capital projects than to recurrent expenditure, where corrupt expenditure is less visible. This is because it might be easier to collect substantial bribes on large infrastructural projects such as road constructions, than on payment of workers' salaries and wages. Also, overall government expenditure will rise as governance becomes weaker. The composition of government expenditure may be distorted, as corrupt and inefficient government officials choose to direct expenditure to other sectors that tend to favour bribery (Mauro, 1997; Akanbi & Schoeman, 2010). This is also similar with the effect of government revenue on the two components of government expenditure.

3. Methodology

As mentioned earlier, this study estimates the link between the categories (capital and recurrent) of government expenditure and overall government expenditure in Nigeria. In line with the Johansen (1988) cointegration estimation technique, as set out in Enders (2004:348), the reduced-form vector autoregression (VAR) of equations (11), (12) and (13) is re-specified as follows:

$$X_t = \delta_0 + \delta_1 X_{t-1} + ... + \delta_j X_{t-j} + \varepsilon_t \qquad (14)$$

where X_t is a vector of variables:

$$X_t^{'} = [\ln\_pop_t, \ln\_lfpr_t, \ln\_ur_t, gov_t, \ln\_ypc_t, \ln\_rev_t, \ln\_R_t, \ln\_C_t, \ln\_G_t] \qquad (15)$$

Cholesky decomposition is used for orthogonalisation, which means that the Cholesky factor is lower triangular. Therefore, each variable in the vector is allowed to react contemporaneously to all variables above it. This means that the government expenditure variables will be affected contemporaneously by all the other variables.

Based on the long-run relationship that is captured by the government expenditure model specified in equations (11), (12) and (13), a vector error correction model (VECM) of the following form is estimated to reveal the short-run dynamics:

$$\Delta X_t = \phi X_{t-1} + \sum_{i=1}^{p-1} \phi_i \Delta X_{t-i} + \varepsilon_t \qquad (16)$$

The estimation procedure is as follows: Firstly, the reduced-form VAR in equation (14) is estimated and all the diagnostic tests are performed. Secondly, the Johansen cointegration test is performed and the cointegrating vectors and loading matrices are identified. Thirdly, a VECM (equation (16)) is estimated and the entire range of diagnostic tests is performed.

3.1 Data analysis

The data used in this study were obtained from the Central Bank of Nigeria, the World Bank Databank, African Development Indicators, and the International Monetary Fund International Financial Statistics covering the period between 1974 and 2012. All data were measured in real terms (2005 prices) and local currency (Naira). The governance index was sourced from the Worldwide Governance Indicators. The methodology adopted in deriving index for governance for this study follows the line of thought in Akanbi (2012) when measuring governance. Given this, the worldwide governance indicators developed by Kaufmann, Kraay and Zoido-Lobaton (1999a) were utilised. The indices cover a broad range of policy and institutional outcomes for a large number of countries, and include the rule of law, corruption control, government effectiveness, regulatory quality, voice and accountability, and political instability. To capture governance in a broader context, the average value of the six elements in the governance indicators is used. See Akanbi (2012) for detailed analysis on derivation of governance series.

4. Empirical Analysis

4.1 Reduced-Form VAR Diagnostic Tests

The reduced-form VAR is estimated. All the roots have modulus less than one and lie inside the unit circle. Table 1 shows other diagnostics tests for the VAR. The VAR passed all the diagnostic tests, revealing a well-specified model.

Table 1: Diagnostic Test on the Reduced-Form VAR

H_1	H_0	Test	DF	Statistic	P-value
Serial correlation	No serial correlation	LM-Test-χ^2 (lag 2)	81	62.96	0.93
Normality	Normally distributed Error term	JB-Joint	18	17.37	0.50
		Kurtosis-Joint	9	6.24	0.71
		Skewness-Joint	9	11.13	0.26
Heteroscedasticity	No heteroscedasticity	χ^2	252	272.02	0.18

Source: Author's calculations from Eviews 8

4.2 Cointegration test results

Based on the above theoretical framework and the nature of the data-generating process of all the variables included, an appropriate model for the government expenditure in Nigeria was selected, and the results of the trace and maximum eigenvalue tests are presented in Table 2.[3] To critically evaluate government expenditure pattern in Nigeria, four crucial periods[4] as laid out in Akanbi (2011) need to be captured. These periods, however, constitute major structural breaks. In other to capture the structural breaks that arise from these crucial periods, a dummy variable was included as an exogenous variable in a VAR model. Four breaks were identified, with the beginning of each period (1975, 1985, 1994 and 1999) denoted as 1, and 0 for the rest of the periods.

To detect which version of the deterministic component should be used, the Pantula principle was adopted. The trace test identified four (4) cointegrating vectors, while the maximum eigenvalue test identified three (3) cointegrating vectors for a model with no constant or trend in the cointegrating equation (CE). In a conflicting cointegrating scenario

[3] The appropriate model does not allow for a linear deterministic trend in the data and estimate with no constant or trend in the cointegrating equation and VAR.

[4] The pre-Structural Adjustment Programme (SAP) [1975–1984], the SAP era [1985–1993], the period of deregulation [1994–1998], and the return to a democratic dispensation [1999–2012].

such as this, the maximum eigenvalue test is adopted when estimating the error correction model, as it has a sharper alternative hypothesis that pins down the number of cointegrating vectors (Enders, 2004:354).

Table 2: Cointegration test results

Trace tests				Maximum eigenvalue tests			
H_o	H_1	λ-Trace Stat.	5% CV	H_o	H_1	λ-Max Stat	5% CV
r=0	r $\geq$ 1	291.8845*	179.5098	r=0	r=1	87.14510*	54.96577
r $\leq$ 1	r $\geq$ 2	204.7394*	143.6691	r=1	r=2	61.90749*	48.87720
r $\leq$ 2	r $\geq$ 3	142.8319*	111.7805	r=2	r=3	48.04288*	42.77219
r $\leq$ 3	r $\geq$ 4	94.78898*	83.93712	r=3	r=4	34.77004	36.63019
r $\leq$ 4	r $\geq$ 5	60.01894	60.06141	r=4	r=5	25.35072	30.43961
r $\leq$ 5	r $\geq$ 6	34.66822	40.17493	r=5	r=6	16.51859	24.15921
r $\leq$ 6	r $\geq$ 7	18.14963	24.27596	r=6	r=7	10.69747	17.79730
r $\leq$ 7	r $\geq$ 8	7.452162	12.32090	r=7	r=8	7.144139	11.22480
r $\leq$ 8	r $\geq$ 9	0.308024	4.129906	r=8	r=9	0.308024	4.129906

*denotes rejection of the null hypothesis at the 0.05 level

Source: Author's calculations from Eviews 8

4.3 Long-run VECM results

Using the maximum eigenvalue cointegrating test results, the long-run part of the VECM is presented in equation (17). After imposing the necessary restrictions, the long-run cointegrating vector identified the overall government expenditure, government capital expenditure and recurrent expenditure, which are the equations of interest in this study. In order to fully identify all cointegrating vectors, and be in line with equations (11), (12) and (13), nine restrictions were applied to the long-run part of the VECM. The first, second and third CEs represent total government expenditure, capital expenditure and recurrent expenditure equations respectively. These three variables were restricted to one in the long-run part of the VECM. In addition to this, six restrictions were applied to the long-run CEs. Urbanisation and labour force participation rate were restricted to zero in CE1, labour force participation rate and total population were restricted to zero in CE2, and urbanisation and total population were restricted to zero in CE3. In the short-run, however, urbanisation, labour force participation rate and total population were all restricted to zero in the three CEs. The restrictions on the short-run adjustment coefficients were based on the insignificant role that these variables are expected to play in the adjustment towards the long-run.

$$\phi X_{t-1} = \chi \delta' X_{t-1} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ \chi_{41} & \chi_{42} & \chi_{43} \\ \chi_{51} & \chi_{52} & \chi_{53} \\ \chi_{61} & \chi_{62} & \chi_{63} \\ \chi_{71} & \chi_{72} & \chi_{73} \\ \chi_{81} & \chi_{82} & \chi_{83} \\ \chi_{91} & \chi_{92} & \chi_{93} \end{bmatrix} \begin{bmatrix} \delta_{11} & 0 & 0 & \delta_{41} & \delta_{51} & \delta_{61} & \delta_{71} & \delta_{81} & 1 \\ 0 & 0 & \delta_{32} & \delta_{42} & \delta_{52} & \delta_{62} & \delta_{72} & 1 & \delta_{92} \\ 0 & \delta_{23} & 0 & \delta_{43} & \delta_{53} & \delta_{63} & 1 & \delta_{83} & \delta_{93} \end{bmatrix} \begin{bmatrix} \ln\_pop_{t-1} \\ \ln\_lfpr_{t-1} \\ \ln\_ur_{t-1} \\ gov_{t-1} \\ \ln\_ypc_{t-1} \\ \ln\_rev_{t-1} \\ \ln\_R_{t-1} \\ \ln\_C_{t-1} \\ \ln\_G_{t-1} \end{bmatrix} \quad (17)$$

where χ' and δ' represent the short-run and long-run coefficients of the VECMs respectively. The estimated long-run government expenditure equations, after normalisation, are presented in Table 3, with the t-values in parentheses.

Table 3: Estimated long-run results

Independent Variables	**Dependent Variables**		
	CE1: Overall government expenditure	***CE2: Capital expenditure***	***CE3: Recurrent expenditure***
Overall government expenditure		**2.0** [23.98]***	**2.2** [395.66]***
Capital expenditure	**0.43** [40.52]***		**-0.97** [-40.60]***
Recurrent expenditure	**0.44** [332.02]***	**-1.59** [-19.97]***	
Overall government revenue	**0.02** [1.82]*	**0.22** [3.50]***	**-0.1** [-1.85]*
Real per capita GDP	**0.14** [7.99]***	**0.52** [4.17]***	**-0.32** [-7.98]***
Governance	**-0.49** [-10.43]***	**-0.24** [-1.37]	**1.11** [10.54]***
Urbanisation Ratio		**3.22** [6.10]***	
Labour force participation rate			**0.13** [6.15]***
Total population	**0.10** [6.34]***		
Note: *** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level			

Source: Author's Calculation from Eviews 8

Note: Dependent variables indicate that they have been normalised to one (1) and the independent variables suggest that the signs of all other coefficient variables have been reverted so as to correspond to the theoretical specifications of equations 11, 12 and 13.

The estimates presented in Table 3 are the average long-run coefficient estimates of the VECM. Estimates of the overall government expenditure equation (CE1) correspond to a priori expectations, except for governance variable, which shows the opposite effect. The effects of capital and recurrent expenditure on overall government spending are similar, indicating that both components of government expenditure have been growing almost at the same rate on average over the years. An increase in capital and recurrent expenditure by 1 percent will lead to about a 0.44 percent increase in overall government expenditure. On the other hand, the significance of the coefficients of the overall government expenditure (CE2 and CE3) shows that an increase by 1 percent in total government spending will lead to an increase of about 2 percent and 2.2 percent in capital and recurrent expenditure respectively. This also indicates that both expenditure components will have to reflect twice the changes in overall government expenditure.

The decision to increase capital spending in a particular period will directly translate into a reduction in recurrent expenditure, and vice-versa. This is revealed in the dual-causality effects of capital and recurrent expenditure in CE2 and CE3. An increase in recurrent expenditure by 1 percent will lead to about a 1.6 percent decrease in capital expenditure, and when capital expenditure increases by 1 percent, recurrent expenditure will also fall by about 1 percent (Table 3). The direction from changes in recurrent expenditure to changes in capital expenditure is found to be more elastic than from changes in capital expenditure to recurrent expenditure. However, this revealed that expenditure reallocations will be balanced by changes in capital expenditure rather than recurrent expenditure.

Changes in overall government revenue will have a positive effect on overall government spending and capital expenditure, but the effect will be negative on the recurrent expenditure component. From the result in Table 3, a 1 percent increase in government revenue will lead to about a 0.02 percent and 0.22 percent increase in overall government expenditure and capital expenditure respectively. On the other hand, government recurrent expenditure declines by about 0.1 percent when overall government revenue rises by 1 percent. The small magnitude found for the coefficient of overall government expenditure can be attributed to the net effects of the coefficients of both capital and recurrent expenditure. The negative effect of the changes in government revenue on recurrent expenditure could be associated with reallocation of resources to areas that are susceptible to corrupt practices (i.e. capital expenditure projects) and thereby not able to meet up with the increasing rate of recurrent expenditure. However, one of the consequential effects of this will be a shrinking and ineffective public service delivery.

The significance of real per capita GDP in the overall government expenditure and capital expenditure equations (CE1 and CE2) shows that the higher the welfare level of a country, the more that country spends on capital projects. The coefficients show that a 1 percent increase in real per capita income will lead to about 0.14 percent and 0.52 percent increases in overall and capital spending. However, in the case of the recurrent expenditure equation (CE3), an increase in the per capita income by 1 percent results in the recurrent government spending falling by about 0.32 percent.

The response of recurrent spending to the governance index shows that as the government pursues good governance, its spending on operations, wages and salaries, purchases of goods and services, and current grants and subsidies, rises. An improvement in the governance index by 1 unit, results in an increase in recurrent expenditure of about 1.1 percentage points. This is not surprising, since this expenditure component is not very attractive to politicians and/or bureaucrats attempting to promote their own personal interests. Similar results were found in Mauro (1997), who nevertheless cautions readers not to interpret such expenditure as being free of corruption. However, the results seem to indicate that the level of corrupt practices in the education sector is much lower than in other sectors.

The response of total government expenditure and capital expenditure to better governance is also in line with expectations. The significance of the governance index shows that as the governance index declines (poor governance) by 1 unit, total government expenditures and capital expenditure tend to rise by about 0.49 and 0.24 percentage points, respectively. In other words, a more corrupt and/or inefficient government will tend to increase its expenditure by either inflating its projects or choosing those that will be easier to levy bribes on. This is contrary to what is found in the case of recurrent spending, and could reflect the self-interest of politicians and bureaucrats.

The population structure and density included in the estimations are in line with a priori expectations as far as the two expenditure components are concerned. The results reveal that a 1 percent increase in the total population size will increase total government spending by about 0.1 percent. The urbanisation ratios have a positive impact on capital spending. The results show that an increase in the urbanisation ratio by 1 percent will lead to an increase of about 3.2 percent in capital expenditure. In the same way, when the labour force participation rate increases by 1 percent, recurrent expenditure by government also increases by about 0.13 percent.

Table 4 presents the short-run adjustment coefficients (χ values or loading matrices), which show the dynamic adjustment towards the long-run equilibrium path. As expected, the χ values of the error-correction estimates are all greater than 0 in absolute values, except for the restricted coefficient. This implies that all the cointegrating vectors enter into the short-run determination of the Nigerian current account function and, therefore, they can be regarded as not being weakly exogenous (Enders, 2004:328).

Table 4: Estimated loading matrices and weak exogeneity tests

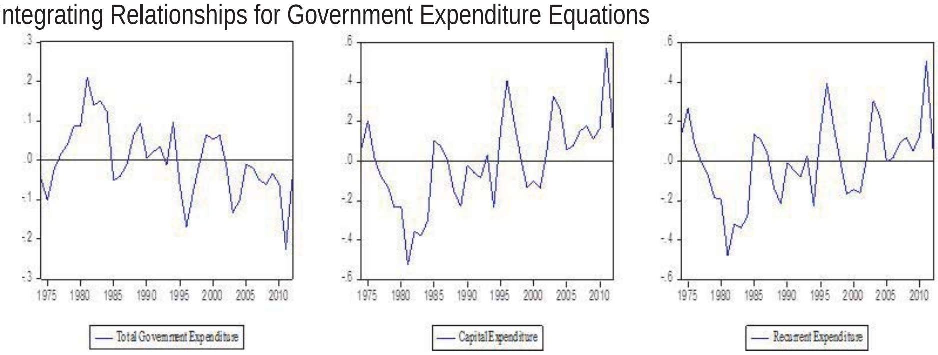
Variables	ΔG_t	ΔC_t	ΔR_t	Δrev_t	Δypc_t	Δgov_t	Δur_t	$\Delta lfpr_t$	Δpop_t
CE1	-247.5 (-2.86)	-581.18 (-6.26)	-26.04 (-0.20)	-266.14 (-1.80)	-79.44 (-1.17)	-26.38 (-0.97)	0.00	0.00	0.00
CE2	-0.34 (-0.94)	-0.24 (-0.62)	-0.57 (-1.05)	0.44 (0.71)	0.44 (1.56)	-0.45 (-3.96)	0.00	0.00	0.00
CE3	-109.3 (-2.86)	-256.89 (-6.24)	-11.97 (-0.21)	-118.58 (-1.81)	-35.03 (-1.16)	-11.43 (-0.95)	0.00	0.00	0.00

Source: Author's calculations from Eviews 8

Notes: t-statistics are given in brackets

The likelihood ratio for binding restrictions is LR = 45.59 (0.00). The p-value is given in parentheses. This test pertains to both long-run and the above loading matrix restrictions. The negative signs of the loading factors indicate that the variables tend to bring the system back to its long-run equilibrium path, while the positive signs of the loading factors indicate that the variables tend to push the system away from its long-run equilibrium path. Almost all the variables played an important role in bringing the system back to its long-run equilibrium path, except for the government revenue and per capita GDP in CE2, which had positive signs.

Figure 2: Cointegrating Relationships for Government Expenditure Equations



The graphs of the estimated cointegrating relations of the VECM (in Table 3) are presented in Figure 2. The cointegrating relations were found to be appropriate, since the graphs reverted to the equilibrium (zero).

5. Conclusions

This study investigates the impact of some selected variables on capital and recurrent government expenditure and total government expenditure in Nigeria. In order to fully detect the impact of the selected variables on government expenditure pattern, it was deemed appropriate to disaggregate total expenditure into capital and recurrent expenditure. The estimation performed portrays a robust estimate of the parameters in the models. The estimation was carried out using Johansen estimation technique.

The impact of total government expenditure on capital and recurrent spending shows the expected results, namely, that the shares of both spending components to total government spending increase when fiscal policy is expansionary. This means that capital and recurrent expenditure are resilient to shocks in total government spending, and similarly, total government expenditure is found to be resilient to shocks in capital and recurrent spending. However, although total and capital expenditure tend to be resilient to shocks in government revenue, this is not the case for recurrent expenditure. The latter opposing result could be attributed to the tendency of being able to reallocate resources to areas that are susceptible to corrupt practices, such as capital projects.

The positive, significant and robust relationship found between governance and recurrent spending also shows that this component of expenditure is not affected by any elements of governance (corruption and/or government ineffectiveness) as much as it does for capital expenditure. On the other hand, increased per capita income was found to be in support of the Wagner's law in total and capital expenditure specifications, but this was refuted by the recurrent expenditure specification.

Future research should attempt to correct some of the shortcomings of this study, such as the lack of available long-time series for governance, which resulted in the adoption of a transformation procedure used in an earlier study.

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Appendices

Appendix 1: Forming a Langragian from (4) subject to (2) and (3).

$L = P^{\alpha}C^{\beta}R^{\gamma} + \lambda(Y-P-C-R)$

Since; C+R = Y-P

F.O.C

$L_P = \alpha P^{\alpha-1}C^{\beta}R^{\gamma} - \lambda = 0$ (1)

$L_c = \beta P^{\alpha}C^{\beta-1}R^{\gamma} - \lambda = 0$ (2)

$L_R = \gamma P^{\alpha}C^{\beta}R^{\gamma-1} - \lambda = 0$ (3)

$L_\lambda = Y - P - C - R = 0$ (4)

Equating (2) and (3)

$\beta R = C\gamma$ (5)

$R = \frac{\gamma}{\beta}C$ (6)

$C = \frac{\beta}{\gamma}R$ (7)

Substituting (6) into (4)

$Y - P - C - \frac{\gamma}{\beta}C = 0$

But Y – P = G

$G - (1+\frac{\gamma}{\beta})C = 0$

$C = \frac{\beta}{\beta+\gamma}G$ (8)

Again, substituting (7) into (4)

$Y - P - \frac{\beta}{\gamma}R - R = 0$

$G - (1+\frac{\beta}{\gamma})R = 0$

$R = \frac{\gamma}{\gamma+\beta}G$ (9)

Equating (1) and (2)

$\alpha C = \beta P$

$P = \frac{\alpha}{\beta}C$ (10)

Also, equating (1) and (3)

$\alpha R = \gamma P$ (11)

Substituting (10) into (11)

$R = \frac{\gamma}{\beta}C$ (12)

and

$C = \frac{\beta}{\gamma}R$ (13)

Substituting (12) and (13) into (4)

$Y - P - \frac{\beta}{\gamma}R - \frac{\gamma}{\beta}C = 0$ for Y = P+G

Therefore,

$G = \frac{\beta}{\gamma}R + \frac{\gamma}{\beta}C$ *(14)*