Determinants of the Size of Public Expenditure in Nigeria

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Abstract

Analysis of public expenditure constitutes a central issue in public sector economics and public finance literature. Understanding the reasons for government spending growth has been a central concern of public sector economists. This is due to the fact that most economies of the world have consistently had increased government expenditures. Nigeria is not an exception. There is need to ascertain the determinants of size of government expenditure in Nigeria. Short-Run Error Correction Model and long-run static equation were used for comparing the influence of those variables on the size of government spending. The long-run static equation served as a test to compare short-run dynamics with the long-run relationships. Ordinary least squares (OLS estimation technique was used. The stationarity tests showed that none of the variables was stationary at level form, but only after their first difference. The results of this study show that the size of revenue and growth rate of national income (output) and private investment significantly influence the size of public expenditure both in the short run and long run. External and domestic debts significantly influence the size of government expenditure only in the short run. It is recommended that the revenue base should be expanded; conducive environment should be created for private investment to thrive, and debt accumulation should be reduced and used for stabilization only in the short run. The conclusion to draw from this study is that revenue, private investment, and income boost public spending while public debts might be counterproductive.

Keywords

stationarity, revenue size, public expenditure, Phillips–Peron, Wagner's law

Introduction

Analysis of public expenditure constitutes a central issue in public sector economics and public finance literature. Looking at the public expenditure in the form of publicly supplied goods and services, and other public spending, a series of issues has been addressed. According to Bergstrom and Goodman (1973), the costs of providing these goods and services are borne by the community and the demand for them is decided collectively. Many developing countries are currently undergoing substantial macroeconomic and structural adjustment. Whether or not such programs are affecting government expenditure and hence longer term economic growth and poverty reduction is still not clear. Fiscal operations of governments, especially of developing countries, are crucial because public expenditures provide channels for their growth.

The link between public expenditure and economic growth has attracted considerable interest on the part of economic researchers both at the theoretical and empirical levels. Roughly speaking, one may distinguish between two opposing views: On one hand, there is the Keynesian approach according to which government spending is an important policy tool to be used to ensure a reasonable level of economic activity, correct short-term cyclical fluctuations in aggregate expenditure (Singh & Sahni, 1984), and secure an increase in productive investment, thus providing a socially optimal direction for growth and development (Ram, 1986). The opposite view is that excessive state intervention in economic life affects growth performance in a negative way for two reasons: First, because government operations are often conducted less efficiently, they reduce the overall productivity of the economic system; second, because excessive government expenditure (usually accompanied by high taxation levels) distorts economic incentives and results in sub-optimal economic decisions (Barro, 1990; King & Rebelo, 1990).

Understanding the reasons for government spending growth has been a central concern of public sector

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economists going back at least as far as Wagner (1893) and beginning in more recent times with Downs (1957). An "excessive" size of government is often alleged to be the cause of many economic ills in both developed and developing countries, including slow economic growth, large government deficits, internal imbalances, and external imbalances. Studies have given many factors that necessitate the rise in government expenditure as foreign aid (Heller, 1975; Njeru, 2003; Quattara, 2006; Remmer, 2004; Swaroop, Shikha, & Rajkumar, 2000), external debt servicing burden (Mahdavi, 2004; Shonchoy, 2010), rising populations and urbanization (Shelton, 2007), political regimes and institutions (Milesi-Ferretti, Perotti, & Rostagno, 2002; Persson & Tabellini, 1999; Shelton, 2007; Shonchoy, 2010), income (Akpan, 2011; Aregbeyen, 2006; Henrekson, 1993; Hong, 2015; Hong & Nadler, 2015; Sideris, 2007), and so on.

Nigeria has consistently had deficit spending over the years without equivalent rate of economic growth. Data show that output of Nigeria has been fluctuating for some years and the sources of these shocks may not be clear. In 2010, the aggregate expenditure of general government increased by 15.3% from the level in 2009. As a proportion of GDP, it represented 28.4% as compared with 28.8% in 2009, while the growth rate of GDP was 7.9%, which exceeded the 7.0% recorded in 2009 and the average annual growth rate of 6.7% but lower than the target growth rate of 10% for the year (Central Bank of Nigeria [CBN], 2010). In 2014, Edame studied the determinants of public infrastructure spending in Nigeria, using error correction mechanism (ECM). He found that rate of urbanization, government revenue, population density, external reserves, and type of government jointly or individually influence public expenditure on infrastructure in Nigeria. Adebayo, Adebusuyi, and Ishola (2014) investigated the impact of public expenditure on industrial growth of Nigeria and found that government expenditure on administration, economic services, and transfers maintained a negative long-run relationship with industrial growth in Nigeria while government expenditure on social services maintained a positive long-run relationship. They concluded therefore that there is no crowding-out effect.

It is then necessary to investigate the determinants of the size of public expenditure in Nigeria. This article is poised to investigate the determinants of the rising tide in public expenditure in Nigeria. The section "Literature Review" is a review of relevant literature, the section "Data and Method of Analysis" dwells on data and discussion of findings, while the section "Conclusion" concludes the article.

Literature Review

The earliest theory of public expenditure could be traced to Adolph Wagner (one of the leading German economists of his time) who in 1883 propounded an interesting development thesis, which loosely held that as a nation develops its public sector and consequently public spending will grow in importance.

The theory of public expenditure is the theory of the costs of providing goods and services through the public sector budget and/or the theory regulations and laws introduced that will result in private sector expenditure. There are two approaches to the question of growth of public sector, namely, the growth in absolute size of public expenditure and the growth in public sector in relation to economic magnitudes. According to Brown and Jackson (1994), public expenditures are represented in two broad categories, namely, exhaustive public expenditures and transfer public expenditures. Exhaustive public expenditures are government's purchases of labor, consumables, and capital goods and services. For them, exhaustive public expenditures are purchases of inputs by the public sector and are calculated by multiplying the volume of inputs by the input prices. Economists have argued that the larger the size of exhaustive public expenditure, the higher the size of the opportunity cost—crowding-out effect—of private sector investment.

Following Wagner's Law, as the national income rises, the public expenditure also rises to meet the demands of the people. As the economy grows and income rises, the demand for goods, including public goods will rise, which as a consequence pushes the public expenditure up. With rise in per capita income, public provision of consumer goods also rises.

Relative rise in prices of goods and services, inflation, is another factor responsible for increase in public expenditure. Public services will become more costly, but it does not follow that the share of public expenditure for Gross National Product (GNP) must rise. Population change may also be a major determinant of the public expenditure share. Changes in the rate of population growth generate changes in age distribution, and this trend is reflected in expenditures for education as well as care for the aged. Changes in the general population might affect some services, such as defense, police protection, or fire protection, whereas, in other cases, it is a specific section of the population that is of importance for the provision of the service, for example, the school-age population in the case of education.

Peden and Bradley (1989) examined the effect of the size of government on economic output and productivity using U.S. data for 1949 to 1985. They concluded that the "level of government activity in the economy has a negative effect on both the economic base (GDP) and the economic growth rate (GDP growth)" (p. 239). Peden and Bradley concluded that the size of government, "beyond the optimal point" (p. 243), resulted in lower GDP, lower rates of GDP growth, and significant deterioration in productivity.

Fölster and Henrekson (2001) examined the growth effects of government spending and taxation in "rich" countries. Fölster and Henrekson limit their study to rich countries due to differences in the composition of government

spending between rich and poor countries. Covering the period from 1970 to 1995, Fölster and Henrekson find a robust negative relationship between government expenditure and economic growth. Dar and AmirKhalkhali (2002) studied the impact of government size on productivity in 19 Organisation for Economic Co-oOperation and Development (OECD) countries between 1971 and 1999. They found that total factor productivity growth and the productivity of capital are weaker in countries where the size of government is larger. They also found that those countries with smaller governments enjoyed efficiencies resulting from fewer policy-induced distortions (e.g., burden of taxation), greater market discipline, which fosters more efficient use of resources, and the absence of crowding-out effects that weaken incentives for capital investment.

Public debt impacts on the allocation of the public budget to the extent that it favors government spending in some sectors and not others. As suggested by Alesina and Tabellini (1990), debt accumulation is very instrumental in the allocation of the public budget. This is supported in the literature by Mahdavi (2004), who found that external debt has an important role to play in the allocation of the public budget. He found that external debt impacts the structure of the public budget by increasing some shares of the public budget while starving other sectors. This relationship, as argued in the literature (Mahdavi, 2004), reflects a greater role for the government as the economy becomes more complex and the demand for public goods and social programs rises. On this basis therefore, we may infer certain changes in the composition of public spending as the role of the public sector changes in the process of development. At the early stages of a nation's development, the government gets involved in almost everything in the economy. But as the economy begins to develop and private sector expands, the government usually divests from some sectors and concentrates on the provision of pure public goods.

The demographics of the population are important in the internal allocation of the public budget. For example, a population structure with a high proportion of 0 to 14 years suggests that the government will be compelled to channel more budget allocation to education to provide the necessary educational resources and health spending to provide for the primary health care. However, a high proportion of the population above 65 years will occasion a shift of the budget to the social services to provide for old age pension and grants. Other aspects such as the population size and density and urban population are also important in the internal distribution of the budget. Because government spending, especially health care and social security, tends to be related with the demographic structure of any economy, we need to take into account the variations of dependency ratio of the population (Remmer, 2004; Sanz & Velzquez, 2002).

Size of government as proxied by the ratio of government expenditure to GDP to measure the burden of government on the economy is also found to influence the direction of public expenditures (Nyamongo & Schoeman, 2007). As observed by Mahdavi (2004), the relative size of government serves to capture the effects of more cyclical factors, such as changes in the tax base and government non-tax revenues. It is also argued that the size of government is also associated with factors that may impact the composition of total spending. These may include the level of corruption, exposure to external risks such as trade shocks, and internal risks such as political instability and social conflicts.

Advocates of aid argue that aid helps developing countries to release binding revenue constraints, strengthen domestic institutions, pay better salaries to public employees, help in poverty-reducing spending, and improve the efficiency and effectiveness of governance (Brautigam & Knack, 2004). On the contrary, higher aid inflows could promote rent-seeking behavior by domestic vested interests that seek tax exemptions or to avoid paying taxes, which lead to revenue decline (Clements, Gupta, Pivovarsky, & Tiongson, 2004). Also, critics argued that aid could lead to increased public and private consumption rather than investment, and could have contributed less to growth (Papanek, 1973; Please, 1967; Weisskopf, 1972).

The relationship between public capital spending and private investment has become an important topic of discussion and study in economic literature. Several researches on this topic have produced ambivalent and controversial results: Some support the idea that public capital spending crowds in private investment, while others support the crowding-out theory. Studies have shown that public investment spending and private investment are complementary rather than substitutable (Lynde & Richmond, 1992). According to them, the categories of public capital spending, which include expenditure on research, roads and transport, water and power projects, education and health, increase productivity of the private sector and automatically spur the growth and development of an economy. A study carried out by Foye (2014) investigating the determinants of public capital spending in Nigeria, using Error Correction Model, found that real GDP, government debt, trade openness, private investment, and foreign direct investment are among the macroeconomic determinants of public capital spending. It is necessary to note that public expenditure on education and health improves the productivity of labor and hence of the economy. Therefore, rising private investment is a signal to policy makers to increase in public expenditure on public development (capital) expenditure.

In similar way, employing data on manufacturing firms over the period 1970 to 1978, Deno (1988) finds evidence of a complementary relationship between public and private capital. While Jenkins (1998) concludes that in the long run, aggregate public investment has either an ambivalent role or plays no role at all in determining private investment expenditure, Ndovorwi (1997), however, concludes that public infrastructural investment is positively related to private investment in the long run. However,

Ndovorwi (1997) used quarterly data, which he interpolated, but Jenkins (1998) used annual data and both studies were for Zimbabwe. Muyambiri, Chiwira, Batuo, and Chiranga (2010) investigated the relationship between public and private investment spending for Zimbabwe, using the Accelerator model and tested Pairwise Granger causality, and found that private investment granger causes public investment.

It has been noted in literature that the political environment rather than the economic alone affects the public spending among countries. For example, a study by Nadler and Hong (2011) on how political and institutional factors have affected the U.S. fiscal variables, using standard multiple regression analysis, found that controlling for a range of economic variables, high public sector union membership, strong collective bargaining rights, and a strong democratic orientation in the state legislature were associated with increased yields, reflecting higher default risk. They find that, all things being equal, states with weaker unions, weaker collective bargaining rights, and fewer left-leaning state legislators pay less in borrowing costs at similar levels of debt and similar levels of unexpected budget deficits than do states with stronger unions and more left-leaning legislators.

In 2015, Hong and Nadller carried out a study to determine whether political and institutional factors are germane in determining how the U.S. fiscal variables are affected. One of their findings is that a strong democratic orientation in the state legislature is significantly associated with an increase in the perceived risk of the state. The results further suggest that, controlling for a range of economic variables, high public sector union membership, the absence of right to work laws, and strong collective bargaining rights are significantly associated with an increase in the perceived risk of the state and that the right to strike did not have any meaningful association with state bond yields.

Furthermore, Hong (2015) sought in his study to determine the impact of budget rules on the U.S. fiscal policy outcome and whether the impact depends on political and economic environments. He found that balanced budget rule is an important factor for fiscal policy outcome. He also suggests that the impact of budget rules depends greatly on political environments, especially on the party identity of the executive power, that budget rules are much more binding when the governor is a Republican, but the identity of the party controlling the state legislature did not have a significant impact. He further enunciated that the impact of budget rules also depends on whether the government is divided. Budget rules were less binding in divided branch government, in which one party controls the governorship and another controls the legislature, while the impact of the rules was largely unaffected under divided legislatures, in which different parties control each legislative chamber.

Okafor and Eiya (2011) studied the determinants of growth of government expenditure in Nigeria using ordinary least squares (OLS) and found that population, public debt, total government revenue, and inflation were all statistically significant at 5% level, while inflation was not. Edame (2014) studied the determinants of public infrastructure spending in Nigeria, using ECM. He found that rate of urbanization, government revenue, population density, external reserves, and type of government jointly or individually influence public expenditure on infrastructure in Nigeria. Aregbeyen and Akpan (2013) studied the long-term determinants of government expenditure in Nigeria, using a disaggregated analysis. In their analysis, they found that foreign aid is significantly and positively affecting recurrent expenditure at the expense of capital expenditure; that revenue is also positively affecting government expenditure; that trade openness is negatively influencing government expenditure; that debt service obligation reduces all components of government expenditures in the long run; that the higher the size of the urban population, the higher would be government recurrent expenditure on economic services; strong evidence that Federal government expenditure is biased toward recurrent expenditure, which increases significantly during an election period than would otherwise be the case. Similarly, Adebayo et al. (2014) investigated the impact of public expenditure on industrial growth of Nigeria via co-integration and causality and found that government expenditure on administration, economic services, and transfers maintained a negative long-run relationship with industrial growth in Nigeria while government expenditure on social services maintained a positive long-run relationship. They concluded therefore that there is no crowding-out effect. From these studies reviewed, there is evidence that all the studies combined economic, social, and political determinants of government expenditure in Nigeria.

Data and Method of Analysis

The data for this study were collected from the CBN publications, namely, Statistical Bulletin for 2008 and 2012, and Annual Reports for 2010 and 2012 (Central Bank of Nigeria, 2008, 2012). The data spanned from 1961 to 2012 and the software used was STATA Version 10. The size of revenue was derived by taking the ratio of total government revenue to GDP, while size of the public sector was derived also by taking the ratio of public expenditure to GDP. To capture the determinants of the size of public sector, short-run Error Correction Model and long-run static equation were used for comparing the influence of those variables on the size of government spending. The choice of the model is based on the necessity to understand the link between the size of public expenditure and its determinants in the short run and how this relationship is transmitted into the long run. However, the long-run static equation served as a test to compare the

Table 1. Results of the Stationarity Tests.

	Augmented Dickey–Fuller test for unit root				Phillips–Perron test for unit root			
Variable	Test statistic $Z(t)$	1% critical value	5% critical value	10% critical value	Test statistic	1% critical value	5% critical value	10% critical value
Output growth rate	−5.648	−3.580	−2.930	−2.600	Z(rho) 0.320	−18.918	−13.308	−10.706
					$Z(t)$ 0.646	−3.579	−2.928	−2.600
External debt	−5.458	−3.580	−2.930	−2.600	Z(rho) −1.164	−18.918	−13.308	−10.706
					$Z(t)$ −1.175	−3.579	−2.928	−2.600
Domestic debt	−6.353	−3.580	−2.930	−2.600	Z(rho) −1.352	−18.918	−13.308	−10.706
					$Z(t)$ −2.507	−3.579	−2.928	−2.600
Size of public revenue	−4.575	−3.580	−2.930	−2.600	Z(rho)−24.816	−18.918	−13.308	−10.706
					$Z(t)$ −4.591	−3.579	−2.929	−2.600
Private domestic investment	−5.096	−3.580	−2.930	−2.600	Z(rho) 0.367	−18.918	−13.308	−10.706
					$Z(t)$ 0.431	−3.579	−2.929	−2.600

Source. Stata Software Output.

short-run dynamics with that of the long-run relationships. The estimation technique used is the OLS due to its features of best linear unbiased estimates (BLUE).

Time Series Characteristics

The variables used for the determinants of public expenditure size were tested for stationarity. The Augmented Dickey–Fuller test and Phillips–Peron test were used for all the variables used as determinants of public expenditure, one complementing (confirming) the other. Table 1 shows the stationarity of all the variables.

From Table 1, it could be seen that output growth is not stationary at the level form but became stationary after the first difference. The calculated value for the output growth at first difference is 5.648 in absolute value, and is greater than the absolute values of the critical values for 1% (3.580), 5% (2.930), and 10% (2.600) levels of significance, respectively. The Phillips–Perron test also confirmed that the growth rate of output is not stationary at the level form.

The stationarity test for the external debt (by Augmented Dickey–Fuller) shows that it is not stationary at the level form, while with Phillips–Perron test it is also non-stationary at all level of significance.

A closer look at Table 1 for the domestic debt clearly indicates that the absolute values of the critical values for the 1%, 5%, and 10% levels of significance are all greater than that of the calculated value, which implies that domestic debt is non-stationary at the level form. The Phillips–Perron test also confirms the Augmented Dickey–Fuller test.

The size of the public revenue is stationary at level form for all levels of significance. The Phillips–Perron test also confirms this result at the same levels of significance. The *p* value for the tests show their respective values of .0001 and .0001 for the Augmented Dickey–Fuller test and Phillips–Perron

test, respectively. Finally, investment is stationary at first difference for Augmented Dickey–Fuller test and Phillips–Perron test at all levels of significance.

Results of the Determinants of the Size of the Public Sector

The results of the determinants of public expenditure are stated in Table 2. The results of the Error Correction analysis for the determinants of the size of the public sector show that some variables are significant in the short run while others are significant in the long run. All the variables were non-stationary at level form but became stationary at the first difference; therefore, they entered the model in their first difference (their order of integration). Different models were estimated for this, but the discussion is based on the robust estimation. This is because it produced better and more robust results. The size of revenue (government revenue/GDP ratio) is statistically significant at 5% level of significance and thus shows that a percentage change in the size of revenue will produce a large percentage change in the size of the public sector. This implies that the size of government revenue is positively and contemporaneously affecting the size of the public sector. The nature of the relationship between gross private domestic investment and the public expenditure size is positive in the short run and is statistically significant at 5% level of significance. In similar way, the growth rate of output is positively related with the size of the public sector and is statistically significant at 1% level, implying that increase in national output (income) will automatically raise the size of the public sector in Nigeria.

Domestic borrowing (debts) helps the size of government to expand. This is deciphered from Table 2, which shows that as the domestic debts increase, the size of the public sector also rises. The variable (domestic debts) is statistically significant at 1%.

Table 2. Short-Run Models of Determinants of Government Size in Nigeria.

Variables	ECM OLS	ECM robust	ECM Newey
Constant	0.138 (.553)	0.138 (.693)	0.729 (.174)
D.rev ratio	2.699* (.004)	2.699* (.002)	2.199 (.150)
D.log gfcap	1.787* (.011)	1.787* (.042)	2.230 (.098)
D.gdp_grwth	0.186** (.004)	0.186** (.007)	0.122 (.174)
D.log_domdebt	2.563*** (.000)	2.563*** (.007)	3.409 (.067)
D.log_extdebt	0.676* (.047)	0.676* (.013)	0.320 (.438)
L.Residuals	−1.112*** (.000)	−1.112*** (.000)	
L.Fitted values			−0.955 (.251)
Observations	52	52	52
R^2	.758	.758	
Adjusted R^2	.725	.725	
F	22.51	10.50	0.733

Source. Stata Software Output.
Note. p values in parentheses. ECM = error correction mechanism; OLS = ordinary least square.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Long-Run Determinants of the Size of Public Sector.

Variable	Long-run1	Long-run robust	Long-run Newey
Constant	−2.242* (.007)	2.242* (.007)	−2.242* (.301)
rev ratio	1.013* (.137)	1.013* (.137)	1.013 (.301)
log_gfcap	0.790** (.003)	0.790** (.003)	0.790 (.167)
gdp_grwth	0.137 (.157)	0.137* (.157)	0.137 (.257)
log_domdebt	−0.62 (.052)	−0.628 (.052)	−0.628 (.247)
log_extdebt	−0.156 (.395)	−0.156 (.395)	−0.156 (.395)
Observations	52	52	52
R^2	.242	.242	
Adjusted R^2	.158	.158	
F	2.873	2.873	0.724

Source. Stata Software Output.
Note. p values in parentheses.
*$p < .05$. **$p < .01$. ***$p < .001$.

External borrowing is also another factor that gives rise to increase in the size of the public sector, because it has a positive link with the latter and is statistically significant at 5% level. The speed of adjustment of the model from the short run to the long run is statistically significant at 1% level and takes about 112% to adjust from the short run to the long period (equilibrium). This error correction term is statistically significant.

However, the long-run analysis shows that the size of the revenue also affects the public sector. From Table 3, we see that the size of revenue is positively related to the size of the government and is statistically significant at 5% level. Similarly, private investment is also positively related with the size of public sector and is significantly different from zero at 1% level.

The results from Table 3 also show that growth rate of output is a determinant of the size of public sector in Nigeria. It shows that a percentage change in output growth will lead to 13.7 percentage rise in government expenditure, and is also statistically significant at 5% level.

Public debts do not determine the size of the public sector as could be seen in Table 3. It is observed that domestic and external debts are, respectively, negatively and insignificantly affecting the size of public sector. From this, it could be inferred that in the short run, public debts can be growth enhancing by positively influencing the government spending, whereas in the longer periods, public debts undermine economic progress by negatively affecting the public sector.

Conclusion

Because government revenue is a key factor in determining the size of the public sector, the revenue base should be expanded beyond oil sector to include other unexploited solid minerals, agricultural exports, and other avenues that could increase the revenue base. This would boost and/or strengthen the size of revenue and thus public sector expenditure. Private investment and growth rate of output are also determinants of the size of the public sector.

Investment climate should be made favorable for private investment to thrive as it would speed up growth of the economy. It could also be seen that this study supports Wagner's Law that growth of national income raises the size of the public sector.

It is advisable that the governments at all levels be very cautious in the manner they accumulate debts. In the short run, both the external and domestic debts are contemporaneously affecting the size of the public expenditure but have both negative and insignificant links with the size of the public spending. This looks somewhat realistic because in the short run, the government makes these borrowings to offset some imbalances in its expenditure programs and for stabilization policies, but they (debts) become counterproductive as government would be tied to some debt obligations—interest payments, debt servicing, repayments, rescheduling, and so on.

Finally, this study has been able to unravel the puzzle of what determines the size of the public sector in Nigeria as the size of revenue, growth of national income (output growth), private investment, but public debts (external and domestic) negatively affect the government spending signifying that they (debts) can only be used to offset imbalances in the expenditure programs and for short-run stabilization policies and that they become counterproductive later.

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