A Co-Integration Analysis of Growth in Government Consumption Expenditure in Ghana

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1 author:

Grace Ofori-Abebrese
Kwame Nkrumah University Of Science and Technology
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GRACE OFORI-ABEBRESE[1]

ABSTRACT

Growth in government consumption expenditure in Ghana has been a concern to policy makers since independence. This paper uses the co-integration technique to determine how inflation, real GDP, trade openness, population growth and relative price influence government consumption expenditure. The study revealed that increases in real GDP, trade openness and inflation cause a fall in government consumption expenditure as a share of GDP. Higher relative price levels and larger population size increase government consumption expenditure for the period 1977-2007. The study recommend measures to curb population growth, reduce the price of public goods, manage the over liberalization of the economy, among others.

[1] Department of Economics, Kwame Nkrumah University of Science and Technology; Kumasi, Ghana. Email: ofori35@yahoo.com

INTRODUCTION

Governments all over the world engage in the provision of goods and services that arise not only from ideological reasons but also from governments' attempt to deal with failures of a market economy. Market failure exists when there is the tendency for the market to produce too much of some goods and services and insufficient quantity of others or in the extreme case, none at all (Brown and Jackson, 1994 and Musgrave, 1989). It is notable that public consumption expenditure both in nominal terms and relative to the economy has expanded in most countries regardless of their levels of economic development over the twentieth century. In Ghana, since independence, public expenditures have followed an upward trend due to the increasing involvement of the public sector in the economy. Data for total public expenditure in Ghana (Bank of Ghana's Annual Bulletins for various years) indicate that total public expenditures in nominal terms, increased tremendously from ¢457.65m in 1970 to ¢8,048.526 billion in 2000. In the 1970s public expenditures as a ratio to GDP went up as high as almost 30 percent. The ratio however, fell in the 1980s and regained an upward trend after 1992.

Growth in public consumption expenditure has raised national concern considering the fact that modern economies stress on greater involvement of the private sector for economic growth. Recent developments in the country have portrayed that budget deficits have been one of the causes of instabilities of the macroeconomic variables. The studies of Islam and Wetzel (1991) and Duodu (2002) on Ghana depicted that budget deficits adversely affect economic growth of the country and this confirms the concerns raised by most Ghanaians. A study to delve into the theoretical and empirical reasons for growth in public expenditure is therefore relevant and of national interest. The findings of the study can inform all stakeholders in public sector in their spending endeavors. The recommendations will throw light on how the government can manage its consumption expenditure to curb the budget deficit syndrome to place the economy on a better plate.

A number of empirical studies including that of Ansari et al, (1997) and Addison and Osei, (2001) on Ghana indicate that public consumption expenditure has continued to grow both in nominal terms and as a percentage of

the gross domestic product (GDP) since independence but did not spell out what actually are the factors that drive the expansion in public consumption expenditures in Ghana. This study therefore aims at finding out the factors that influence growth in public consumption expenditures in Ghana.

LITERATURE REVIEW

Total public expenditure has been variously defined but that of Hyman, (2002) considers it as those expenditures which government makes in order to fulfill its obligations or duties. Total government expenditure is made of consumption and investment expenditures. Government consumption expenditure is made up of interest payments, transfer payments, wages and salaries, consumables and other recurrent expenditures. Investment expenditure comprises governments spending on roads, schools, hospitals etc. In examining the growth of public expenditure, it is imperative that these two categories are separated since their impacts on the economy are not the same.

Wagner (1890) explained in his "Law of Expanding State Activity" that the expansion of government activity responds positively to changes in economic development. Thus as a country's per capita income rises, peoples' demand for publicly provided goods and services rises faster and this makes the public sector grows faster both nominally and relative to the gross domestic product (GDP) expanding public expenditure. Baumol (1967) looked at it from the cost of producing public goods and services. He concluded that the high cost of producing public goods and services resulting from high cost of production would, other things being equal, raise the cost of government output thereby leading to the growth of public expenditure if demand is price inelastic or income elastic. Peacock and Wiseman, (1961) used the theory of "social disturbance" to conclude that public expenditure grows faster in crisis periods than in normal or settled periods in an economy. Buchanan and Tullock (1977) used the theory of public choice to explain the growth of public expenditure. The theory seeks to explain how voters, politicians, bureaucrats and lobbyists behave in different incentive rules. They concluded that the self-interest and bureaucracy usually associated with the provision of public goods affect the efficiency of production and thus increase public expenditure. Musgrave and Peacock, (1994) and Rostow, (1971) explain the long-run growth of public expenditure in terms of the levels of development. They argued that the private

sector's participation in capital formation is minimal at the early stage of development and thus compel the public sector to increase its provision of total capital formation. Programs such as the "critical minimum effort", "the big push" and "balanced growth" suggested more government involvement in the economy (Arndt and Richardson, 1987). Population growth and inflation have often been considered to increase government expenditure (Brown and Jackson 1994).

Henrekson, (1993) using co-integration tested for the growth of public expenditure in Sweden for the period 1861-1991. He found no support for Wagner's Law. Ashsan et al, (1996) however found support for Wagner's law in a similar study for Canada (1952-1988). Nomura, (1995) also in his study on Japan (1960-1991) revealed that growth in real GDP per capita actually causes growth in public expenditure confirming Wagner's hypothesis. Sanz and Vala'zquez, (2002) analyzed the determinants of the composition of government expenditure in 23 OECD countries over the period 1970-1997. They concluded that besides income and prices, other issues like institutional factors, population, population density and its age structure have significant influence on the composition of government expenditure on the economies under study. Ansari et al, (1997) in their study on three African States – Ghana (1963-1988), Kenya (1964-1989) and South Africa (1957-1990) used real gross national income per capita, population growth, trade openness and inflationary level in the economies to test for the growth in public expenditure. Their findings did not show any clear relationship between the variables under consideration.

A MODEL OF GOVERNMENT EXPENDITURE

In this study, I hypothesized that population growth, trade openness, inflation, prices and GDP growth can cause increases in government consumption expenditure in Ghana. I utilize secondary data collected from International Monetary Fund (IMF), Bank of Ghana Quarterly Bulletins, Ministry of Finance and Economic Planning (MOFEP), World Bank Reports, various issues of the State of the Ghanaian Economy published by the Institute of Statistical, Social and Economic Research; and reports from the Ghana Statistical Service for the period 1977 to 2007.

I first test for co-integration of the variables (Johansen and Jesulius, 1990) and used the error-correction model to determine the short-run dynamics of the variables. Results of the test are obtained using Eviews 5.0.

The model specified for the study is expressed as;

$$DEGDP = f(RGDP, MW_t POPGR, OPEN, INFL) \dots \dots \dots (1)$$

where GEGDP denotes government consumption expenditure as a share of GDP; MW denotes minimum wage, the variable for relative price; POPGR stands for population growth; OPEN denotes trade openness, and INFL denotes the inflationary level in the economy.

The relationship between these variables is not straightforward or linear so a Cobb Douglas form is assumed. To linearized the equation, the natural logarithm is taken of the series. Using the natural logarithm form of the variables also establishes that all the series are integrated to the first order which makes it more suitable for the use of the co-integration procedure. The operational model in the log-linear form is given as:

$$\ln GEGDP = \beta_0 + \beta_1 \ln RGDP + \beta_2 \ln MW + \beta_3 \ln POPGR + \beta_4 \ln OPEN + \beta_5 \ln INFL + \mu \dots (2)$$

where β_i ($i = 1,2,3,4,5$) are elasticity coefficients to be estimated; and μ is the disturbance term.

DEFINITION OF VARIABLES AND EXPECTED SIGNS OF THE COEFFICIENTS

Government consumption expenditure (GEGDP), the dependent variable, is expressed as a ratio of gross domestic product to drive away the problem of simultaneity in the variables. Real gross domestic product (RGDP) is one of the independent variables. GDP is the total purchaser's value of all final goods and services produced by either citizen-supplied or foreign-supplied resources employed within the economy in a given period of time, usually a year. It is calculated without taking account of the wear and tear (depreciation) of capital and equipment and any natural resources involved in the production. The coefficient of the income variable (RGDP) β_1, is expected to be positive and

statistically significant because Wagner's Law (1890) concluded that, higher income levels leads to increases in the demand for public goods. Relative price (which is also seen as the supply price of government output) relates to the differential rates of growth in the costs of output in the public and private sectors of the economy. According to Berry and Lowery, (1984) the ratio of costs in the public sector to costs in the private sector is assumed to be determined by the average public sector wage. Minimum wage (MW) is therefore used as a proxy for the relative price variable. β_2, the coefficient of the relative price variable (MW) is expected to be positive and significant (Baumol, 1967). Population growth (POPGR) is the annual percentage change in population. According to Ferris and West, (1996) population coefficient, β_3 has no a priori sign because the influence of increases in the population variable on government expenditure is not clear from a theoretical point of view. Trade openness (OPEN) is defined as the degree to which a country is opened to international trade. It is calculated as the sum of exports and imports of goods and services measured as a percentage/ratio of gross domestic product. The compensation hypothesis by Rodrik, (1998) predicts a positive relationship between openness and government expenditure and thus $\beta_4 > 0$. Inflation (INFL) is the continuous increase in the general price level of goods and services. The "Inflation Increases Public Outlay" (IPO) hypothesis developed by Opler (1988) predicts that $\beta_5 > 0$ because inflation causes an increase in the growth rate of the public share of real GDP.

DATA ANALYSIS AND DISCUSSIONS

To establish a stable long-run equilibrium relationship between the variables, the multivariate co-integration technique Johansen (1990) is applied to the model. The Max-Eigen/Trace test is conducted to determine the number of co-integration vectors for the expenditure model. The test result is displayed in Table 1.

Table 1 Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.929090	195.3732	95.75366	0.0000
At most 1 *	0.853414	118.6293	69.81889	0.0000
At most 2 *	0.701379	62.94519	47.85613	0.0011
At most 3	0.488574	27.89633	29.79707	0.0815
At most 4	0.252740	8.450304	15.49471	0.4186
At most 5	4.75E-05	0.001378	3.841466	0.9691

Trace test indicates 3 co-integrating eqn(s) at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values.

From Table 1, the trace statistic for the unrestricted co-integration rank trace test for Ho: r=0, is 195.3732. This value is greater than the 5% critical value of 95.75366 and this suggest the rejection of the null hypothesis. The trace statistic for the null hypothesis (Ho: r=1) is 118.6293 and is also greater than the 5% critical value of 69.81889.

The unrestricted Max-Eigen Test is used to confirm or otherwise of the results in Table 1. From Table 2, the Max-Eigen statistics for the two null hypothesis (Ho: r=0, Ho: r=1) are 76.74396 and 55.68407 respectively. These values are greater than their respective 5% critical values of 40.07757 and 33.87687. The results of the Trace and the Maximum Eigen value tests above confirm the existence of more than one co-integrating vector at 5% significance level.

This confirmation establishes the presence of an underlying long-run equilibrium relationship between the dependent variable (lnGEGDP) and all the explanatory variables (lnRGDP, lnMW, lnMW, lnPOPGR, lnOPEN and lnINFL).

Table 2
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.929090	76.74396	40.07757	0.0000
At most 1 *	0.853414	55.68407	33.87687	0.0000
At most 2 *	0.701379	35.04886	27.58434	0.0046
At most 3	0.488574	19.44603	21.13162	0.0846
At most 4	0.252740	8.448925	14.26460	0.3349
At most 5	4.75E-05	0.001378	3.841466	0.9691

Max-eigenvalue test indicates 3 co-integrating equations at the 0.05 level. (*) denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values.

RESULTS OF THE LONG-RUN GOVERNMENT EXPENDITURE MODEL

Based on the operational expenditure model:

$$\left(\ln \text{GEGDP}_T = \beta_0 + \beta_1 \ln \text{RGDP}_T + \beta_2 \ln \text{MW}_T + \beta_3 \ln \text{POPGR}_T + \beta_4 \ln \text{OPEN}_T + \beta_5 \ln \text{INFL}_T + \mu_T \right),$$
(3)

Table 3 presents the normalized long-run expenditure model of the study. Column 4 presents the t-statistics of the results which indicate whether the coefficients of the independent variables are significant or not. The results of the t-statistics indicate that the coefficients of the various independent variables are statistically significant at 5% level of significance or even lower.

Having established that a co-integrating relationship exists among the variables, a Vector Error-Correction Model (VECM) is estimated to determine the short-run dynamics among the variables. The results are based on the assumption of one year adjustment to equilibrium period.

Table 3: Long -run government expenditure model

Regressor	Coefficient	Standard Error	T-statistic
lnRGDP	-3.149482	0.39375	-7.99859***
lnMW	0.000567	0.00048	-0.14356***
lnOPENNESS	-0.016872	0.04264	-1.18255***
lnPOPGR	6.695676	1.90344	3.51767**
lnINFL	-0.274476	0.04415	-6.21734***

Note: **, *** implies statistical significance at the 5% and 1% levels respectively.

Table 4: Short -run government expenditure model (VECM)
Dependent Variable: $\Delta lnGEGDP_t$

Regressor	Coefficient	Standard Error	T-statistic
Constant	-4.508995	-	-
$\Delta lnGEGDP_{t-1}$	-3.149482	0.39375	-7.99859**
$\Delta lnRGDP_{t-1}$	-0.083581	0.58222	-0.14356
$\Delta lnMW_{t-1}$	-0.000567	0.00048	-1.18255
$\Delta lnPOPGR_{t-1}$	6.695676	1.90344	3.51767**
$\Delta lnOPEN_{t-1}$	-0.016872	0.04264	-0.39568
$\Delta lnINFL_{t-1}$	-0.274476	0.04415	-6.21734***
ECT_{t-1}	0.022574	0.03706	0.60903

Note: **, *** implies statistical significance at the 5% and 1% levels respectively. Δ denote first difference operator.

The results indicate that the coefficients of the lags of GEGDP, POPGR and INFL are statistically significant while those of the remaining variables OPEN, RGDP, MW and the Error Correction Term (ECT), and are not statistically significant.

The results for the short-run analysis do not deviate from the long-run analysis. The co-integration test indicates a negative relationship between government expenditure (GEGDP) and gross domestic product (RGDP). The negative sign of the co-efficient (-3.149482) implies that, as real GDP rises, government expenditure as a share of GDP falls. This result contradicts Wagner's Law that government expenditure increases with increases in real GDP. However this result is consistent with that of the study on Ghana by Ansari et al, (1997). They, however, used real gross national income per capita (RGNI/P) as the explanatory variable instead of real gross domestic product (RGDP) used in this study. The negative relationship between government expenditure as a share of GDP and real GDP could be explained from heavy interest payments of the government over the period of study especially in the late 1990s. Payment of interest on government debt is likely to reduce funds available to the government for spending. It could also be explained from a possible reduction in government consumption expenditure and increase in investment expenditure as real GDP increases. The implication of this finding is that if increases in real GDP cause increases in government investment expenditure, it will enhance economic growth in the Ghanaian economy. If it rather leads to increases in government consumption expenditure, it will not promote economic growth.

The co-efficient of minimum wage (MW) is 0.000567 and this implies that the relative price variable, though very small, positively affect government expenditure in the long-run. This suggests that high cost of output in the public sector positively influence the growth in public consumption expenditure. It is significant at 1% level of significance. The coefficient shows that a one percent increase in the cost of output of public goods results in a 0.000567 percent increase in GEGDP, holding the other variables constant. The outcome of this study confirms the theoretical development made by Baumol in 1967 which indicates that growth in public expenditure is determined by a high cost of output in the public sector due to rising wages. This result is not surprising because in Ghana, productivity in the public sector has been perceived to be low and relative higher wages augment government consumption expenditure. The value of the coefficient for the vector correction error is statistically insignificant both at the 5 percent and 1 percent levels and this indicates that, relative price has little influence on government expenditure in the short-run.

The coefficient for the population growth variable, POPGR is positive and significant at 5% level of significance both in the short-run and long-run analysis. This means that population growth expands government expenditure GEGDP both in the short-run and long-run. This result confirms economic theory because large size of population lays an extra burden and hence cost on the government in terms of the provision of social amenities, health facilities, educational facilities and other public goods. The hypothesis that population growth can cause increases in government expenditure is accepted at 5% level of significance in both instances.

The long-run coefficient for trade openness variable (OPEN), which is measured as the sum of exports and imports as a ratio of GDP, is negative but statistically significant at 1% level of significance. This implies that more trade openness has a contractionary effect on public consumption expenditure in the long-run. This result does not support the theoretical conclusion of the compensation hypothesis (Rodrik, 1998) that openness increases government expenditure. The outcome could have resulted from trade restriction policies adopted at the early part of the period under consideration (1977-1983) in the country. This period was characterized by trade restrictive measures, import licenses and foreign exchange control mechanism which indicate that the economy was not actually opened. From the data used for the study, trade openness was 22 in 1997 and government expenditure as a percentage of GDP was 12.6. In 1979 trade openness increased to 22.4 and GEGDP fell to 10.3. Trade openness in 1986, which was the year for the structural adjustment program, increased to 36.7 and GEGDP fell further to 11.1. After 1986, the economy embarked on export promotion measures to reduce the balance of payments problems which could possibly have reduced the effects of openness on government expenditure. The result however supports the efficiency hypothesis (Rodrik, 1997) which expects widespread retrenchment in countries whose industries are less competitive in the face of increased economic integration in order to control government's social spending. Hence, the hypothesis that trade openness can cause increases in government expenditure is rejected at 1% level of significance. An important policy implication for the results on trade openness is that Ghana cannot, in the long-run, sustain the social costs involved in 'real' liberalization of the economy and that there is the need to

employ trade-restrictive measures alongside liberalization to regulate government consumption expenditure.

The long-run regression indicates a negative, significant relationship between the inflation variable, INFL and GEGDP. This shows that in the long-run a rise in the inflationary level in the economy will contract government consumption expenditure. This could have resulted from various fiscal disciplinary measures put in place to control inflation especially the period immediately after the structural adjustment program in 1986 and early 2000. Thus, the hypothesis that inflation can cause increases in government expenditure is rejected.

In the dynamic expenditure equation, the estimated coefficient of the Error Correction Term (ECT_{t-1}) is positive but statistically insignificant. This is an indication of the validity of a long-run equilibrium relationship among the variables in the expenditure equation. In absolute terms, the coefficient of the ECT_{t-1} is less than one (0.022574) suggesting that the system corrects its previous period's disequilibrium in more than one year to its equilibrium level following a shock. Given this coefficient, it implies that the model is explosive and will hardly revert to long-run equilibrium.

CONCLUDING REMARKS AND POLICY RECOMMENDATIONS

This study has employed the multivariate co-integration test to examine the long run and short run relationships between real GDP, inflation, population growth, trade openness and minimum wage and growth in public expenditure in Ghana. The results of the study indicates that public expenditure growth has been positively influenced by increases in the cost of providing public goods, giving evidence for the validity of the Baumol hypothesis over the period of study. This is confirmed by the positive coefficient (0.000567) of the MW variable in the long-run government expenditure equation.

Trade openness effects on government expenditure imply that trade liberalization of the economy and export promotion has not had significant influence on government expenditure growth. The inflationary level variable indicates a significant effect in the short-run. Increases in population have a positive effects on public expenditure measured as a ratio of GDP, both in the short and long periods.

These results have some important implications for how the government of a small open-economy, such as Ghana, can effectively bring budgetary problems under control.

1. Trade openness theoretically increases government expenditure but this study has revealed that if policy makers can embark on export drive measures and manage over-liberalization of the economy, then trade openness in Ghana can reduce government expenditure. It is therefore recommended that, though Ghana is doing everything possible to abide by the regulations of the Eco-Zone and the international trade agreements, policy makers should manage the over-liberalization of the economy.

2. Family planning measures should be taken more seriously in the country especially among the youth and in the rural communities. A social campaign targeting the enrolment of more women in tertiary education may help to prolong the age of first-child birth and, consequently, check population growth.

3. Civil service reform was one of the packages of the structural adjustment program in 1986. The objective here was to increase efficiency in the production of public goods. So many years after this reform, policy makers can consider easy means of processing document, reduce bureaucracy and encourage the use of computers in capturing data, filing and other assessments to increase efficiency and productivity in the public sector. There is no profit test in the provision of public goods, but efficient service delivery will make wages commensurate to productivity and thus reduce the relative price of public goods to reduce growth in especially government consumption expenditure.

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