

The Effect of Population Distribution on Government Expenditure in West Africa

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Abstract

This study examined the relationship between government expenditure and population distribution in West African countries between 1980 and 2013. In this study, panel estimation method was used to examine the effect of demographic variables, proxied by aged dependent population, young dependent population and urbanization rate, on government expenditure. Other regressors used in this study are domestic income and inflation rate. The result of the panel estimation shows that the determinants of public expenditure growth in West Africa are domestic income, inflation rate, urbanization rate and aged dependency population. Therefore, population control policies which target growing aged dependency rate and urbanization should be considered in the determination and management of public expenditure.

Keywords: population, dependency rate, expenditure, fixed effect, West Africa

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1. INTRODUCTION

It is widely acknowledged that sound and sustainable management of an economy relies significantly on its demand management policies. The demand management policies consist of fiscal and monetary policies. Fiscal policy is that part of government policies concerning the raising of revenue through taxation and other means and deciding on the level and pattern of expenditure for the purpose of influencing economic activities. Monetary policy, on the other hand, is defined as government deliberate effort to influence the volume of money, as well as the cost and direction of credits in the economy with the aim of achieving specific objectives (Anyanwu, 1993). Government expenditure, a fiscal tool, is one of the major demand management tools used in stimulating the economy. Public expenditure involves all the expenses which public sector incurs for its maintenance for the benefit of the economy (Anyanwu, 1997). Okoh (2008) sees government expenditure as the expenses the government in carrying out its programmes. Thus, government expenditures are the expenses which government incur for the maintenance of the government and the society.

The relationship between economic growth and government expenditure, or more generally the size of the public sector, has been a major subject of analysis and debate among scholars (Aschauer 1989; Tanzi and Zee 1997; Okafor and Eiya, 2009; Shonchoy, 2010; Gaurav, 2011). A central theme raised and examined is whether or not government expenditure promotes the economic growth rate of an economy. The general view is that public expenditure, notably on physical infrastructure and human capital, can be growth-enhancing although the financing of such expenditures can be growth-retarding because of disincentive effects associated with taxation (Gaurav, 2011). Several studies have also investigated the determinants of growth of government expenditure. Specifically, some of the reasons adduced for the growth in public expenditure overtime are increase in income (Wagner 1883), rising inflation (Peacock and Wiseman, 1961), growing public debt and tax revenue (Okafor and Eiya, 2009) and increasing population (Abeng, 2005; Alexiou, 2009; Shonchoy, 2010; and Abu Tayeh and Mustafa, 2011).

While most of these studies focus on public expenditure growth and its determinants, little interest is given to effect of population age distribution and urbanization on public expenditure. Population size and age distribution might be a major and dominant contributory factor to the growth of expenditure as government policies are geared towards narrowing, as much as possible, the gap between social amenities and change in population distribution. The provision of schools, hospital and other social amenities necessary has to grow with population size, trend of urbanisation and age distribution. Changes in population growth, according to Musgrave and Musgrave (1989), generate changes in age distribution and this trend is reflected in expenditure for education as well as care for the aged. Abeng (2005) also indicates that in Nigeria, demographic factor (population age distribution) is an important determinant of public expenditure growth exerting a direct, strong positive and significant relationship with the level of government expenditure. In addition, government spending, especially health care, education and social security, tends to be related to the demographic structure of the country. Similarly, a high degree of urbanization leads to a greater demand for services like education, roads and transportation which invariably exerts pressure on public expenditure (Sanz and Velzquez, 2002; Remmer, 2004).

Furthermore, government spending, especially health care and social security, tends to be related to the demographic structure of any economy, the variations of the dependency ratio of the population is also important (Sanz and Velzquez 2002; Remmer 2004). Similarly, a high degree of urbanization leads to a greater demand for services like education, roads and transportation and, greater urbanization will promote more government expenditure on infrastructure and public utilities. Thus, the overall objective of this study is to investigate the effect of demographic factors on government expenditure in West Africa. The rest of this paper is organized as follow: Section 2 discusses the related empirical literatures. Section 3 explains the methodology of the study. Section 4 presents and analyses the result while section five concludes and recommends.

2. POPULATION AND PUBLIC EXPENDITURE

Much of the existing literature on the optimal allocation of public expenditure in a growth context has ignored demographic considerations. At the same time, there is robust evidence suggesting that the composition of public spending depends on the demographic structure of the population. For instance, using data for a large group of industrial and developing countries, Shelton (2007) found that a greater fraction of the population above 65 tends to be accompanied by higher levels of government expenditure on health care, public order and safety— possibly a reflection of the ability of the “old” to exploit the political process to their advantage. But such bias, to the extent that it is systematic, may result in large adverse effects on infrastructure investment and growth—and eventually the welfare of old and young generations alike. Thus, an important avenue for future research could be to extend our growth regression framework to a multi-equation setting, so as to account for the endogeneity of government spending choices.

Peacock and Wiseman (1961) examined the relationship between population and government expenditure since 1890. They also considered how these things are affected by changes in population, prices, and the level of employment. The analysis leads to the conclusions that there has been a considerable growth in government expenditure in real terms per head of population, that the rate of growth over the period as a whole was considerably faster than the rate of growth of gross national product in real terms per head of population, and (what is in some ways more important for our general thesis) that when we have taken account of population growth, price changes and changes in the level of employment, we are left with an important phenomenon to explain—the irregular time pattern of expenditure growth.

Kuehnelt (2010) studied how population aging endogenously changes the composition of government spending and economic growth. He incorporated heterogeneity and a demographic structure into an infinitely-lived agent endogenous growth model by assuming that households differ in their composition between working young and retired old. The households determine by majority voting the public policy mix between productive expenditure and spending that satisfies the elderly's preferences. Population aging is predicted to increase public spending that benefits the old and to lower the economy's growth rate. However, it does not affect public productive expenditure. Bassetto and McGranahan (2011) investigated the relationship between public capital spending and population dynamics at the state level. Empirically, they documented two robust facts. First, states with faster population growth do not spend more (per capita) to accommodate the needs of their growing population. Second, states whose population is more likely to leave do tend to spend more per capita than states with low gross emigration rates.

To interpret these facts, we introduce an explicit, quantitative political-economy model of government spending determination, where mobility and population growth generate departures from Ricardian equivalence by shifting some of the costs and benefits of public projects to future residents. The magnitude of the empirical response of capital spending to mobility is at the upper end of what can be explained by the theory with a plausible calibration. In the model, more mobile voters favor more spending because the maturity of states' debt is very long term and costs are shifted into the future more than benefits. Buettner *et al.*, (2006) examined the extent to which population size and density affect the cost of providing public services at the subnational level. Empirical estimates of cost functions are obtained from an analysis of the expenditures of German states disaggregated into about 40 functions of government. The empirical results indicate that generally there is no significant relationship between population density and the cost of public goods. At the same time, cost are almost proportionately related to population size indicating that goods and services provided by the German states display only a limited degree of publicness.

Poterba (1998) pointed out the possibility of a positive correlation between the size of public expenditure on compulsory education and population aging. The elderly support the increase in government expenditure on compulsory education if they are altruistic toward the younger generation or if they are indirectly benefitted by the appreciation of land prices, reduction in the crime rate, and increase in future productivity owing to an increase in the expenditure on compulsory education. He analyzed the impact of population aging on government expenditure on compulsory education using state-level panel data from 1961 to 1991 in the United States. According to his estimation results, a 1 percent increase in the ratio of the elderly—aged at least sixty-five years—reduces the per-student public expenditure on education by about 0.26 percent.

Okafor and Eiya (2009) ascertained the growth in government expenditure and determined the factors responsible for this growth. They examine 4 determinants of growth in public expenditure: Inflation, Public debt, tax revenue and population. The data collected for these variables were subjected to the ordinary least square regression analysis. The results indicate that: inflation has a negative relationship with total government expenditure, while population, public debt and tax revenue have a positive relationship with total government expenditure. These findings show that demographic factors are some of the major determinants of government expenditure growth. Summarily, the effect of population on public expenditure growth is mixed. It depends on the structure and components of population and on the types of expenditure considered. Most of the literatures on public expenditure in developing countries mainly relate expenditure to economic growth, education and health. These studies did not consider demographic components like dependency rate, urbanisation etc. in their analyses.

3. METHODOLOGY

This paper employed panel regression model. This involves estimation of the relationship between population distribution and government spending robust ordinary least square and fixed effect panel estimation techniques. The panel approach is preferred over other approaches since our focus is on dynamic variations of public spending across West Africa countries accounted for by population changes. Hausman test was used to ascertain the necessity of random effect. Other test such as normality test was conducted to verify the robustness of the specified model.

3.1 Model Specification

The theoretical model for this study is presented in equation 1. In this model, public spending is regressed on domestic income, demographic factor (proxied by young dependence rate, age dependence rate and urbanization) and inflation rate.

$$TGEX = f(GDP, DPOP, APOP, URB, INF) \dots \dots \dots 1$$

Equation 1 is restated in a regression form as

$$TGEX = \beta_0 + \beta_1 GDP + \beta_2 POP + \beta_3 APOP + \beta_4 URB + \beta_5 INF + E \dots \dots \dots 2$$

Where:

TGEX= Government expenditure

INF= Inflation rate

DPOP= dependent population ; **APOP** = aged population; **GDP**= income; **URB**= urbanization

4. DATA AND SAMPLE

Dataset for this work are secondary annual data spanning from 1980 to 2013. Countries of interest are the sixteen West Africa countries. Of these countries, four countries were removed due to lack of data. These countries are Cape Verde, Guinea, Guinea Bissau and Liberia. Data for the study were sourced from the World Bank development indicator (2014). Government spending was captured by government recurrent expenditure as percentage of GDP. Inflation which represents the effect of macroeconomic instability on government spending was captured by percentage change in GDP deflator. Income was proxied by per capita GDP. The demographic variables used in this study are dependent population measured as percentage of population between 0-15 years to total population, aged population which is the percentage of population between 65 years and above to total, and urbanization rate represented by percentage of population in urban areas.

4.1 Empirical Result

The summary of the descriptive statistics used in this empirical study is presented in Table 1. It shows that average government expenditure had a mean of US\$3.61. The mean of the population between the age 0-15 years and 65 years above are 3.18% and 44.36% respectively while the urbanization rate average stood at 37%. In addition, the gross domestic product and inflation had a mean of US\$1065 and 11.20% respectively. Also, the standard deviation of all variable ranges between 0.86 and 1782.7 as presented in table 1.

Table 1: Descriptive Analysis

	GEX	APOP	DPOP	URB	GDP	INF
Mean	13.61364	3.182030	44.36973	37.00498	1064.781	11.19715
Median	12.97727	2.951428	44.62368	36.49200	486.1327	5.286129
Maximum	38.77047	6.090054	50.09347	86.65800	8107.357	165.6766
Minimum	4.833249	2.009545	38.45566	9.428000	247.1207	-20.80981
Std. Dev.	4.868210	0.859511	2.435934	15.66265	1782.710	20.00098

4.2 Interpretation of the Result

The regression results for government expenditure from the robust OLS and fixed effects equation are presented in table 2.

Table 2: Panel regression result

Dependent Variable: GEX		
	Robust OLS	Fixed Effect
Constant	6.557457* (1.753512)	-10.25686 (-1.388003)
Log(GDP)	-0.042337 (-0.125729)	2.258207** (2.979161)
APOP	0.378098* (1.809270)	0.559393 (1.257134)
DPOP	0.081390 (1.010526)	0.040752 (0.386982)
URB	-0.037243* (-1.859375)	-0.091362** (-3.216679)
INF	-0.025930** (-4.918422)	-0.030673** (-5.123197)
GEX(-1)	0.832071** (37.33552)	0.695731** (22.48827)
R-squared	0.826410	0.846343
Adjusted R-squared	0.823648	0.839206
F-Statistics	299.1312	118.5841

Notes: * and ** denote significance at 10 and 5 percent critical level respectively
t- ratio in bracket

The coefficients obtained in the fixed effect result show that gross domestic product is statistically significant at 5 per cent significance level and has significant positive impact on government expenditure. A 1 per cent increase in gross domestic product leads to 2.25 per cent increase in government expenditure. Aged dependency rate is significant at 10 percent critical level in the pooled OLS but it is insignificant in the fixed effect estimation. However, young dependency rate is statistically insignificant. This implies that aged dependency rate is a significant determinant of government expenditure in the selected countries based on pooled OLS result, while, young dependency rate is insignificant determinant of public spending in West African Countries. This simply means that the spending of the government is not geared towards these age groups (0-15) in the selected countries. This findings contrast with that of Poterba (1998) and Shelton (2007) who found that a greater proportion of the population above 65 tends to be accompanied by higher levels of government expenditure on health care, public order and safety.

In addition, urbanisation and Inflation rate have significant negative impact on government expenditure. One percent increase in inflation rate leads to about 0.09 per cent and 0.03 percent decrease in government expenditure at 1 percent level confidence level each. The lag value of government expenditure is also significantly different from zero at 1 per cent confidence level. The result shows that the major determinants of public expenditure are gross domestic product, urbanization, inflation and lag of public expenditure. The coefficient of determination (R^2) is 0.85. This indicates that about 85 percent of the total variations in government expenditure are explained by the variations in all the explanatory variables used in the model. The F- statistic is significant at 1 percent critical value (prob. 0.000). The implication is that all the explanatory variables introduced in the model are jointly significant in explaining the variations in government expenditure.

Moreover, Hausman (1978) test was applied to buttress the application of the balanced panel fixed effects model instead of random effect. From the result, p-value of the test is 0.0000, (shown in table 3), therefore, the null hypothesis of presence of random effects is rejected and the fixed effect model is selected.

Table 3: Hausman Test

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	44.154291	6	0.0000

5. CONCLUSION

This study examined the relationship between public expenditure and demographic factors in West Africa countries between the year 1980 and 2013. The result of the study shows that public expenditure growth responses significantly to changes in urbanization, age population, inflation rate and domestic income in West Africa. The findings that aged dependency rate has significant effect on public spending concurred with that Poterba (1998) and Shelton (2008) who found out the possibility of a positive correlation between the size of public expenditure in the United States. The findings also show that inflation rate reduce the amount of real government spending in the economy.

The major findings of this paper lend support to the assertion that population distribution is one of the major driving forces behind increasing government expenditure in West African countries over the years. Thus, the government in these countries should take into consideration the rising trend of population, especially, aged dependence population and urbanisation. Population control policies which target growing aged dependency rate and urbanization should be considered in the determination and management of public expenditure. This study shows that aged and dependent population do not account for significant variations in government expenditure in West Africa even when the proportion of dependent population is on the rise in this region. This calls for further study to unravel the reasons for poor funding for these groups of population.

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