Public Spending and Economic Welfare in ECOWAS Countries: Does Level of Development Matter?

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Abstract

Conflicting views on the sign of the relationship between government size and economic development have resulted into the testing of non-monotonic relationship in the literature. Therefore, the total effect of growing public spending on economic development is ambiguous. This study investigated how government size affect economic development and determine the optimal government size that promotes economic development in ECOWAS countries. The study employed secondary data covering the period 1986 to 2018. Data on Gross Domestic Product per capita, government size, population growth rate, inflation rate, gross fixed capital formation and financial development variables were sourced from World Development indicator database. The study constructed social welfare function as development indicator. Data were analysed using Least Absolute Deviation (LAD) regression and quantile regression (QR). The findings showed that quantile regression estimates are negative and significant ($p < 0.05$) in low quantiles, thus suggesting that deleterious effect of government size is more pronounced among countries with low level of economic development.

INTRODUCTION

The issue of relationship between government size and economic development is currently of burning importance to most economies across the world, especially in the United States and European Union because most countries have been confronted with an increasing public debt and a drop in their economic growth since global financial crisis of 2007. Faced with this crisis, countries like United State of America, chose to support economic activity with reflationary policies *i.e.* public spending, thus increasing public deficit and public debt. This choice seems to have been justified by the Keynesian paradigm, based on a vicious cycle of public spending through the multiplier effect.

This observation appears to hold across most countries regardless of the level of development. For the last 20 years, expansion in the share of government as a percentage of GDP appears to have been the norm in both developing and developed countries. In comparing developing and developed nations, the current levels, growth rates, composition, and determinants of government expenditures exhibit significant differences. Therefore, the total effect of growing public spending on economic welfare and development is ambiguous, especially with the realities of exposure to international trade and domestic factor such as institutions (Thorbecke, 2013).

In West Africa, most of the countries are members of Economic Community of West African States (ECOWAS) economic group. Out of this group, countries such as Burkina Faso, Cote d'Ivoire, Guinea-Bissau and Togo experienced political turmoil during the period of analysis, while Mali, Niger and Nigeria remain vulnerable to security issues, which have contributed to the fragility of the group (AEO, 2017). From the fiscal revenue viewpoint, none are considered predominantly natural resource-rich, perhaps except Nigeria; however many generate fiscal revenues from natural resources (mining, oil) with increasing economic and fiscal potential. ECOWAS countries have among the lowest GDP per capita levels in the

world and exhibit relatively low and irregular GDP per capita growth rates, mainly because their economies are not well diversified and they have relatively high population growth rates.

Findings from the empirical literature on government size and economic development relationship are mixed (Folster & Henrekson, 2001). In recent years, there is some convergence in term of the importance of public expenditure on economic development. But, the result still changes across countries, economic regions or from one data sample to another. For instance, some studies are of opinion that government size promotes economic development (Komain & Brahmasrene, 2007; Alexiou, 2009). Other studies posit that the effect of government size on economic development is deleterious (Martins & Velga, 2013; Churchill, Yew & Ugur, 2015)

The debate on sign of the relationship between government size and economic development is still on. Attempt to resolve these conflicting views have led to the consideration of a non-linear relationship between the government size and economic development (Barro, 1990). Ample evidence indicates that linear or monotonic relationship exist between government size and economic development in ECOWAS countries. For example, Ansari, Gordon and Akuamoach (1997), Enang (2010) and Mudaki & Masaviru, (2012) reported in their studies that large government is a drag on economic development, whereas Yasin (2003), Oriakhi & Arodoye (2013) and Gisore, Kiprop, Kalio, Ochieng & Kibet (2014) asserted that government is a spur to growth and economic development. Given that empirical literature supply conflicting views on the impact of government size on economic development, it indeed becomes plausible to consider the possibility of a non-linear relationship for ECOWAS countries.

Furthermore, the studies that have investigated the link between government size and economic development for developing economies, have discussed economic development from income based perspective of development (studies such as, Iyare, Lorde & Francis, 2005; Oteng-Abayie, & Frimpong, 2009; Moreno-Dodson & Bayraktar, 2015). Recent development in macroeconomics has showed that income-based indicator (GDP growth) is not a good measure of economic development and well-being (Stiglitz, Sen & Fitoussi, 2009; Stiglitz, 2016). This study, therefore, looked beyond GDP measure by constructing social welfare function (SWF) as development indicator. This development indicator considers the spread of benefit that economic growth brings among the citizenry in terms of access to health care, education, infrastructures, improved quality of life e.t.c.

Upon the foregoing, this study tested the relationship between government size and economic development in ECOWAS countries in a non-monotonic framework as theoretically characterized by Pevcin (2004) and Davies (2009) using quantile regression.

DATA AND METHODS

Beyond the standard linear regression model framework, the study applied quartile regression model. Quantile regression as introduced in Koenker and Bassett (1978) is an extension of classical least squares estimation of conditional mean models to the estimation of the whole conditional distribution of response variable (see Koenker, 2005).

Given the data (y_t, x_t¿′ for $t = 1, \ldots, T$, where x_t is $k \times 1$, consider the following linear specification for the conditional quantiles of y:

$$y_t = x_t'\beta + e_t \qquad \text{equation (1)}$$

where y_t is the dependent variable – development indicator and x_t is a vector of explanatory variables – government spending and control variables. The primary objective is to estimate β for different conditional generic quantile functions given in equation (1).

As described by Koenker and Bassett (1978), the estimation of β is done by minimizing equation (2);

$$\hat{\beta}_\tau = min_{\beta \epsilon R} k [\tau \sum_{yt \geq xt\beta} ¿ y_t - x_t' \beta \vee ¿ + (1-\tau) \sum_{yt < xt\beta} ¿ y_t - x_t' \beta \vee ¿$$

equation (2)

With equation (2) specification, the study was able to depict the conditional distribution in detail when more quantile regressions are estimated. Moreover, the conditional distribution would be skewed to the left if the upper quantile lines are close to each other, relative to the lower quantile lines. It has been found in many applications that the estimated quantile regressions are quite different across quantiles (Katrin, 2009). This suggests that regressors may have distinct impacts on the dependent variable at different locations of the conditional distribution (Kuan, 2007).

While the formulation of the quantile regression model is analogous to the conventional mean regression model, important differences arise in model estimation. The essential feature of a regression analysis is to examine the manner in which a set of explanatory variables affects the conditional distribution of a dependent variable. In the classical econometric techniques (Ordinary Least Squares, Instrumental Variable and Generalized Least Squares), the component around which the dependent variable randomly fluctuates is the conditional mean $E[y/x, \beta]$. However, unlike the classical approach, which amounts to estimating the conditional mean of the conditional distribution of y, the quantile estimator is employed on different quantiles of the conditional distribution.

The quantile function is a weighted sum of the absolute values of the residuals. Where the weights are symmetric for the median regression case in $\tau = ½$, the minimization problem stated in equation (2) reduces to $min_{\beta \epsilon R} k \sum_{t=1}^{T} ¿ (y_t - x_t' \beta ¿ \vee ¿$ and asymmetric otherwise. It thus can be observed that varying the parameter τ on the [0,1] interval will generate the entire conditional distribution of economic development and government size series. The coefficient $\beta_i(\tau)$ can then be interpreted as the marginal impact on the τ^{th} conditional quantile due to a marginal change in the i^{th} policy variable.

The quantile regression approach makes it possible to identify the effects of the covariates at different points on the conditional distribution of the dependent variable. With economic development as dependent variable, suppose τ =0.05, i.e countries that are in the left tail of the conditional distribution of economic development (less developed countries) and τ =.95, that is, countries that are in the upper tail of the conditional distribution (most developed countries). Under traditional mean regression methods the slope coefficient is constrained to be the same for all quantiles, as such there is insufficient information on how policy variables affect countries differently. Mello and Novo (2002) construed that the ability to distinguish the effects of policy variables among different quantiles is important empirically.

Hence, the study estimated equation (3) specify as;

$$dev_i = \rho_\tau + \delta_\tau govexp_i + \epsilon_\tau Z_i + \varepsilon_{\tau i} \qquad \text{equation (3)}$$

Where *dev* represents economic development, *govexp* represents government size and Z captures the control variables, ρ_τ, δ_τ, and ϵ_τ are parameters to be estimated for different values

of τ and, $\varepsilon_{\tau i}$ is the random error term. By varying τ from 0 to 1, the study can trace the entire distribution of economic development variable conditional on government size variable.

Definitions and Measurements of Variables

The dependent variables in Social Welfare Function (SWF). Looking beyond GDP, the measure of economic development employed in this study is the Social Welfare Function (SWF) developed by Sen (1973), using an individual's average income for a country, allowing it to be weighted by the inequality of distribution of income within a country and is calculated as:

$$SWF_{it} = GDP\ per\ capita_{it} * (1 - GINI_{it}) \qquad \text{equation (4)}$$

GDP per capita is the average level of income in a given country *i* at time *t*. GINI is the most commonly used measurement of income inequality for country *i* at time *t*. The higher the value of *swf* index, the higher the level of social welfare. Using equation (4), the study constructed social welfare function for the sampled countries.

Four control variables in the models are; Inflation rate (*inf*) measure as the percentage change of consumer price index, population growth rate (*pop*) in percentage, domestic investment (*inv*), proxy by gross fixed capital formation as percentage of GDP captured the share of investment to output and financial deepening (*findev*) measure as ratio of credit to private sector to GDP .

As widely used in the growth literature (Islam, 1995; Caselli, et at., 1996; Levine et at., 2000; Hung, 2011) averaging data over fixed intervals has the potential for eliminating business cycle fluctuations. Thus, allowing the focus to be on the medium – and long – term trend in the data. Therefore, all values of variables are five-year averages in order to eliminate short – term fluctuations and reduces potential impacts of single year abnormalities.

Thus, with inclusion of the control variables described above, equation (4) begets the estimated model as;

$$dev_{it} = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1 govexp_{it} + \boldsymbol{\beta}_2 inf_{it} + \boldsymbol{\beta}_3 inv_{it} + \boldsymbol{\beta}_4 pop_{it} + \boldsymbol{\beta}_5 fid_{it} + v_{it} \qquad \text{equation (5)}$$

Secondary data was the major source of data for this study. Data covering the period 1986 to 2018 are sourced as discussed below: government size (government expenditure to GDP), population growth rate, inflation rate, gross fixed capital formation and financial development, were sourced from World Development indicator (WDI) database.

RESULTS

Table 1: Development Indicators for ECOWAS Countries, 1986-2018 Averages

Country	*rgdpc*	*swf*	*Remark*
Burkina Faso	411 [L]	417	low
Cote d'Ivoire	1016 [H]	906 [H]	very high
Gambia	495	300 [L]	low
Ghana	712 [H]	884 [H]	very high
Guinea	487	507	medium
Guinea Bissau	374 [L]	321 [L]	very low
Mali	482	536	medium
Niger	279 [L]	251 [L]	very low

Nigeria	992 [H]	1388 [H]	Very high
Senegal	767 [H]	592 [H]	very high
Sierra Leone	287 [L]	370	low
Togo	412	336 [L]	low

[L] – low, [H] – high

Table 1 presents averages of two development Indicators for ECOWAS Countries for the period 1986 to 2018 and it suggest relative close correlation between real gross domestic product per capital and social welfare function. For examples, 8 out of 12 sampled countries show similar development status using the two indicators. This correlation is more explicit in figure 1, where the patterns of real gross domestic product per capital (*rgdpc*) and social welfare function (*swf*) are similar, although swf is lower throughout all the sample period.

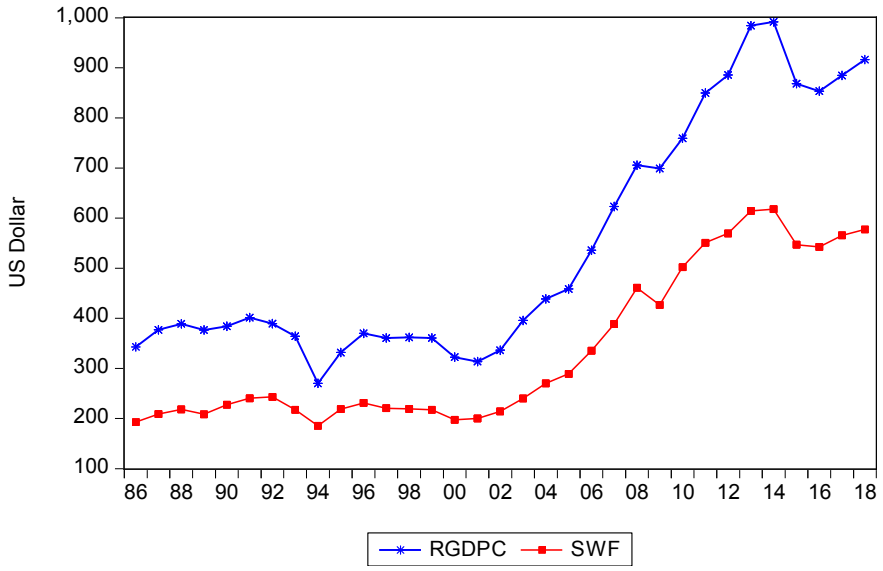

Figure 1: Trend of Real GDP per capita and Social Welfare Function of ECOWAS countries (1986-2018)

Over the sample period, figure 2 shows that the share of government to GDP for ECOWAS countries has been rising since 1988. The growth of government size in the countries might be justified by need of government to finance public investment in building infrastructures, healthcare, education, improvement of labor force, and Research & Development.

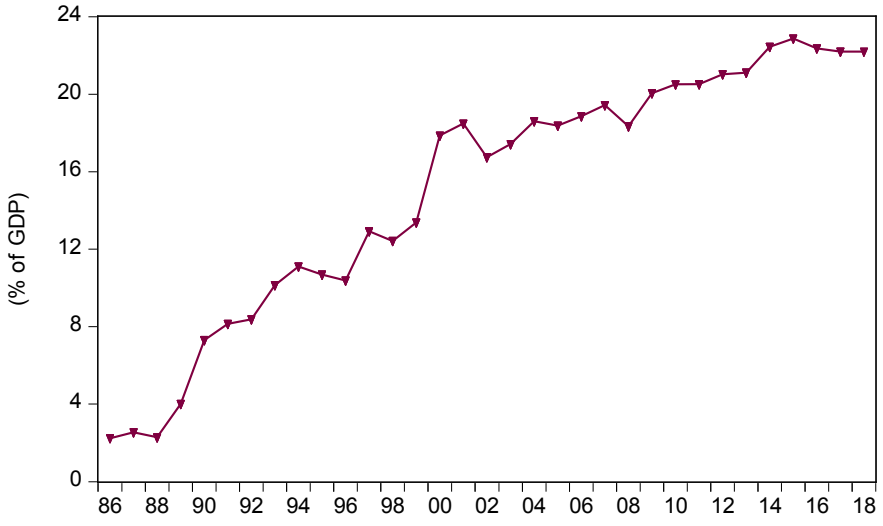

Figure 2: Trend of Government Size of ECOWAS countries (1986-2018)

The panel unit root tests are first applied based on three different panel unit-root tests; Levin, Lin & Chu (LLC), Im, Pesaran and Shin (IPS) and Maddala – Wu (PP-Fisher) tests. The various tests are reported at level in Table 1 and result of tests after first difference in Table 2. As reported in Table 1, the panel unit root tests (at least two of the tests) show that the following series are stationary at levels at least at 5% significance level; economic development (*dev*), inflation (*infl*) and population (*pop*).

Table 1: Panel Unit Root (At level)

Variables	Levin, Lin & Chu t*	Im, Persaran & Shin W-stat	PP-Fisher Chi-sq	Decision
dev	-6.4276***	-1.5480*	53.8033***	S
govexp	-2.8772***	-0.1776	28.9204	NS
findev	-3.5400***	-0.3277	30.4909	NS
infl	-7.5572***	-3.5036***	75.5070***	S
invt	-4.8193***	0.8476	31.7029	NS
pop	-6.3192***	0.5912	42.0590**	S
*** (1%), ** (5%) & *(10%) level of significance				

Table 2 shows that the series that are non-stationary at levels, achieved stationarity after taking the first difference. Hence, we conclude that these variables are integrated of order one I(1), it therefore necessary to determine whether there is at least one linear combination of the variables that is l(0).

Table 2: Panel Unit Root (At first difference)

Variables	Levin, Lin & Chu t*	Im, Persaran & Shin W-stat	PP-Fisher Chi-sq	Decision
swf	-	-1.2675	-	I(0)
govexp	-24.2001***	-6.9245***	95.5057***	I(1)
findev	-10.2541***	-2.8408***	70.5942***	I(1)
infl	-	-	-	I(0)
Invt	-4.8562***	-0.4798	33.4226*	I(1)
Pop	-	0.9962	-	I(0)
rgdpc	-4.5106***	-0.6037	38.4059**	I(1)
*** (1%), ** (5%) & *(10%) level of significance				

The result of the Kao (1999) cointegration test, which is a residual-based cointegration technique, is presented in Table 3. Based on the results, the null hypothesis of no cointegration was rejected at 5% significance level. Therefore, the Kao cointegration test supports the evidence of long-run equilibrium relationship among the variables.

Table 3: Kao Residual Cointegration Test Result

Test	*swf* model
t-statistic	-10.1846
p-value	0.0000***
Note: *** (1%), ** (5%), * (10%)	

Investigating how government size affect economic development in a non-linear framework, the result of quantile regression estimates are presented in Table 4. The least absolute deviation (LAD) regression generates negative and significant coefficient of government size at the 5% level. This shows that a unit percentage point increase in government size will bring about 3.76 units reduction in economic development and social welfare all things being equal. The results of quantile regression estimates show that out of the five quantile estimates of government size conditional on economic development, three (τ = 0.05, 0.25, 0.50) prove to be negative and significant at the 5% level.

Moreso, the quantile regression results illustrate that the marginal effect of government size on economic development in ECOWAS countries reduces as one moves from 0.05 quantile to 0.25 quantile after which it rises to middle (0.5) quantile of government size variability. For instance, the marginal effect of a unit percentage point rise in government size brings about decrease of 5.17 units at 0.05 quantile, 2.67 units at 0.25 quantile and 3.76 units at 0.5 quantile. This implies that, at lower economic development quantiles, government size exerts a negative effect on economic development and welfare in countries such as Gambia, Guinea Bissau and Sierra Leone. At tau = 0.75, the marginal effect of government spending on economic welfare is positive and significant at 5% level in countries such as Ghana and Cote d'Ivoire while its negative and insignificant at tau = 0.95 (i.e upper quantile).

This evidence suggests that potential information gains associate with the estimation of the entire conditional distribution of level of economic development of sample countries or group, as opposed to the conditional mean only (given in LAD estimates).

Table 4: Quantile Estimates (Dependent variables are *swf*)

Variables	Tau	Coefficient	t-ratio
Constant	LAD	-2.78053	-0.0191
	0.050	-7.7574	-0.7127
	0.250	-103.758	-1.0047
	0.500	-2.7805	-0.0198
	0.750	-572.138***	-3.3313
	0.950	-1578.21***	-3.3584
Govexp	LAD	-3.7614*	-1.473
	0.050	-5.1738***	-3.6973
	0.250	-2.6704*	-1.5471
	0.500	-3.7614*	-1.4647
	0.750	4.6941**	1.9206
	0.950	-0.1418	-0.0188
Infl	LAD	-1.6044**	-2.710
	0.050	-1.0941**	-1.8366
	0.250	-0.5899**	-2.1099
	0.500	-1.6044**	-2.4566
	0.750	-1.3404*	-1.3849
	0.950	1.9404	0.9098
Invt	LAD	-0.5712	-0.3864
	0.050	2.4131***	3.0864
	0.250	3.0521***	3.2893
	0.500	-0.5713	-0.3938
	0.750	-2.9493**	-1.9209
	0.950	-7.8601**	-1.9762
logpop	LAD	40.5232**	1.833

	0.050	22.5751	1.2778
	0.250	30.7814**	2.1661
	0.500	40.5232**	1.8567
	0.750	114.302***	4.2538
	0.950	304.698***	3.6528
findev	LAD	6.9218**	2.644
	0.050	3.4433***	3.7146
	0.250	5.9181***	4.1950
	0.500	6.9218**	2.7792
	0.750	11.7890***	5.5024
	0.950	11.6973**	2.37995

Both the traditional literature on structural barriers to development and in the more recent debate on the proper role of government in a market-oriented development strategy, support exists for the contention that increases in government expenditure may spur growth and economic welfare in less developed countries, such as ECOWAS countries. This position is drawn out of growth-limiting characteristics specific to developing countries among which are structural inflexibilities, instance of market failure, and inability to hedge against risks of doing business. The theoretical supposition that follows is that increasing government size will have more positive (or less negative) impact on economic development in poor countries or developing countries. In testing the hypothesis of this study, the quantile regression results show that the effect of government size on economic welfare is significantly different across level of development.

Countries at the lower development distribution of the sample used such as Gambia, Guinea Bissau and Sierra Leone are expected to increase government spending especially in areas of education, health, the environment and infrastructure where markets alone are insufficient. It suffice to add that the need to increase government expenditures in these areas has not been met in all the ECOWAS countries. For instance, health expenditure remains below the 15% of government spending threshold prescribed under the 2001 Abuja Agreement (AEO, 2017). Statistics shows that Nigeria spend less than 1% of GDP on health (WEO, 2017).

In consonance with some previous studies, this study found the coefficient of the share of government expenditures to be significant, its sign consistently negative (Mudaki & Masaviru, 2012; Martins & Velga, 2013; Churchill, Yew & Ugur, 2015) at low (0.050) to upper-middle (0.750) quantiles. At the upper quantiles of 0.950, the study also found that the coefficient of the share of government expenditures is positive and significant, which is consistent with findings of Komain & Brahmasrene (2007), Alexiou (2009) and Ochieng & Kibet (2014) among others.

This study therefore surmised that the hypothesis that level of economic development does not matter is not supported by these findings, rather it posited that effect of government size on economic development is conditioned on the level of development in ECOWAS countries. Furthermore, the results of the quantiles estimates of the control variables suggest that their relationships with economic development is indeed linear. For instance, financial development and population growth rate have positive effect on economic development across almost all the quantiles of development distributions while inflation rate and domestic investment are consistently negative and statistically significant at 5% level in near all the quantiles.

CONCLUDING REMARKS

This study tested the hypothesis that the effect of government size on economic welfare is not significantly different irrespective of the level of development in ECOWAS countries. Using quantile regression, regression estimates showed that the marginal effect of government size on economic welfare varies across level of development. Therefore suggesting that the relationship between government size and economic development is not linear rather ambiguous, that is it could be positive or/and negative depending on countries' development level. This study concluded that harmful effect (growth benefit) of increasing government spending will be more (less) pronounced among countries with low level of economic development than countries with high level of development. Adopting government spending as policy variable targeted at improving social welfare should be implemented with caution and selectiveness because of efficiency issue arising from weak institutions, especially in developing countries.

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