Economic Performance and Government Size

In ECOWAS Countries

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Abstract

This study investigated the impact of government size on economic growth and welfare in a non-linear model framework and subsequently determined the optimal size of government that promotes economic development in ECOWAS countries. Data covering the period 1986 to 2018 were employed and estimated using pooled ordinary least squares estimation techniques with heteroskedasticity consistent standard errors (HCSE). The study found that non-monotonic relationship exists between government size and economic development. The results also show that optimal level of government size for ECOWAS countries is about 22 percent and government size beyond this level is detrimental to economic growth and development. The study thus recommends that all ECOWAS countries, except Burkina Faso, may increase their government size since they are on the left side of the Armey curve.

Keywords: Government size, economic development, HDI, ECOWAS

JEL Code: H21, H53, O47

1. INTRODUCTION

The issue of relationship between government size and economic development is currently of burning importance to most economies across the world since the global financial crisis of 2007 which has resulted to increase in public debt and drop in rate of economic growth. Faced with this crisis, countries like United State of America, chose to support economic activity with reflationary policies that is 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.

Over the past few decades, the size of government recorded in most countries in ECOWAS sub region has been on increase. On average, between 2013 and 2018, the government size recorded for all Member States except Nigeria (that was 12.19%) in relative term varying from 16.17% to 33.96% (Africa Economic Outlook, AEO, 2019). The fiscal policy of the ECOWAS countries is geared toward ensuring macroeconomic stability.

Statistics shows that between 2013 and 2016, the governments of Burkina Faso, Guinea, Guinea-Bissau, Sierra Leone, Gambia and Liberia have increased expenditure and adopted a fiscal deficit, ranging from 1.1% to 8.7% of GDP, to combat Ebola (EVD) outbreak and recovery plans. Other countries operated fiscal deficit between 1.1% and 10.4% in response to the macroeconomic challenges facing their countries including security challenges facing countries such as Nigeria and Cameroon (AEO, 2017). Following expansionary fiscal policies, the stock of public debt has seen an appreciable increase in most countries of the region. Expressed as a percentage of GDP, the public debt is about 46.89 percent for the ECOWAS region over the period 2013-2019; varying between 22.1 percent (Nigeria) and 121.04 percent (Cabo Verde), with the ratio falling below the 70 percent regional threshold in 13 countries (WEO, 2019).

However, economic growth and development recorded in the Sub-region do not match the huge budgetary spending of the governments. With a large public sector, many ECOWAS Member States are still characterized by low economic growth, poor social indicators and economic welfare index. According to the World Development Indicators (WDI, 2018), Nigeria, which contributes about 70 percent of ECOWAS's GDP, for instance recorded a decrease in the net primary school enrolment (a social indicator) from a figure of sixty seven percent (67%) in 2004 to sixty-four (64.1%) in 2017. This poses a puzzle to the theoretical stance that in the long-term, growth rate depends on governmental actions, such as government spending on maintenance of law and order, provision of infrastructure services, protection of intellectual property rights, and regulations of international trade, financial markets, and other aspects of the economy (Barro, 2013).

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 an opinion that government size promotes economic development (Komain & Brahmasrene, 2007; Alexiou, 2009) while other studies establish that the effect of government size on economic development is deleterious (Vu Le & Suruga, 2005; Romero-Avila & Strauch (2008); Taban, 2010).

There is still an on-going debate on the sign of the relationship between government size and economic development and research effort at resolving these disagreeing views have led to the consideration of a non-linear nexus between the size of government and economic

growth (Barro, 1990). There are plethora of evidences which indicate that linear relationship exists between government size and economic growth and development in ECOWAS countries. Ansari, Gordon and Akuamoach (1997), Enang (2010) and Mudaki & Masaviru (2012) reported in their studies that large government is a drag on economic growth and development whereas Yasin (2003), Oriakhi & Arodoye (2013) and Gisore, Kiprop, Kalio, Ochieng & Kibet (2014) asserted that government spending 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 (Alimi, 2018).

There are studies on the optimal government size in relation to growth in ECOWAS countries such as Heerden and Schoeman (2008), Pollard, Shackman and Piffaut (2011), Ekeocha and Oduh (2012), Olaleye, Edun, Bello and Taiwo (2014). However, Ekeocha and Oduh (2012) employed data that end in 2006 while Heerden and Schoeman (2008) based their study on strong assumptions of balanced budget and assume away the other drivers of economic growth and developement. Levine and Renelt (1992) and Sala-i-Martin (1997) has well pointed out in growth and development literature that control variables are significant in growth regression; however, studies of Heerden and Schoeman (2008) and Olaleye, *et al* (2014) which adopted bivariate relationship, they did not avail their studies of robust information in their models.

This study, therefore, investigated the relationship between government size and economic growth and welfare in a non-linear model framework and subsequently determined the optimal size of government that promotes economic growth and development in ECOWAS countries using pooled ordinary least squares estimation techniques with heteroskedasticity consistent standard errors (HCSE). The rest of the study is structured as follows: Section 2 provide stylized facts about the economies of ECOWAS countries while section 3 presents the conceptual and theoretical framework for the study. Section 4 covers data and method, section 5 presents results and discussions while section 6 concludes.

2. Background Of Economic Community Of West African States (ECOWAS)

The Economic Community of West African States (ECOWAS) is a regional group of fifteen West African countries, namely: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. It was founded on 28 May 1975, with the signing of the Treaty of Lagos, and has as its

mission the promotion of economic integration across the region. ECOWAS is considered as one of the pillars of the African Economic Community. The organization was founded in order to achieve "collective self-sufficiency" for its member states by creating a single large trading bloc through an economic and trading union.

The ECOWAS Commission in collaboration with its monetary institutions, West Africa Monetary Institute (WAMI) and West Africa Monetary Agency (WAMA), had set out six convergence criteria for member States to comply with for the single currency to be implemented. Studies on “optimum currency area” state four main conditions that must be satisfied for a successful launch of single currency (Asongu, 2019). The first is a large and integrated labor market that allows workers to move easily throughout the currency union to fill employment gaps. Price and wage flexibility together with capital mobilityare also necessary to eliminate regional trade imbalances. These two conditions imply the need for a third: a centralized mechanism for fiscal transfers to countries that suffer as a result of labor and capital mobility. Lastly, participating countries should have similar business cycles, to avoid a shock in any one area (Amadou & Kebalo, 2019). These conditions guided the currency’s (ECO) six convergence criteria. These criteria are; a budget deficit below 3% of GDP; public debt of no more than 70% of GDP; inflation of 5% or less; and a stable exchange rate. Moreover, gross foreign-currency reserves must be large enough to provide at least three months of import cover, and the central-bank financing deficit must not exceed 10% of the previous year’s tax revenue.

Analysis Of Trends And Patterns Of Economic Growth And Development Indicators in ECOWAS Countries

Table 1 show that the population of Nigeria is more than the entire population of the other 14 ECOWAS member countries. Ghana and Cote d’Ivoire that are next to Nigeria have about 25 million and 30 million people respectively. In 2018, Nigeria and Cote d’Ivoire recorded the high real GDP growth rate of 8.6% and 7.4% respectively while Liberia, Sierra Leone, Togo, Mali, Niger and Guinea Bissau performed below ECOWAS average of 5.4%. in term of GDP per capita (US dollar), only 5 countries pass beyond the sub-region average of $1,200 with Cape Verde and Ghana as countries that have high income per head.

A cursory look at stylized facts about the economies of ECOWAS Countries presented in Table 1 in terms of meeting the ECO’s convergence criteria show that only Cape Verde, Guinea Bissau and Cote d’Ivoire have a budget deficit below 3% of GDP bench mark,

although Senegal is close with her deficit of 3.5%. Table .1 captures only the external debt of member countries and it shows that 5 countries (Sierra Leone, Niger, Senegal, Cote d'Ivoire and Cape Verde) have external debt above 50% of their GDP and Cape Verde recorded the highest value of 103.4 % of her GDP as external debt. A closer look at the debt service of the debt as a share of exports reveals that Senegal, Nigeria and Gambia spend more than 20% of their export earnings to service external debt alone.

Inflation rate is expected to be kept under 5% as part of plan towards adoption of single currency regime (Nwatosh, 2018). Statistics on rate of inflation shows that all 8 member countries of West African Economic and Monetary Union (WAEMU) have inflation rate that is below the 5% criteria. These countries are; Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo. On the other hand, the 6 West African Monetary Zone (WAMZ) countries have inflation rate that ranges between 7.2% and 23.6%. On stable exchange rate criteria, WAEMU countries also exhibited the expected pattern of stable exchange rate over the period 2016 and 2018. It can thus be adduced that the reason these countries met the two criteria of low inflation rate and stable exchange is the fact that WAEMU is an existing monetary union with a common stabilization policy.

Table 1. Macroeconomic Variables of ECOWAS Countries (2018)

Country/Variables of Interest	Benin	Burkina Faso	Cape Verde	Cote D'Ivoire	Gambia	Ghana	Guinea	Guinea Bissau
Population (Millions)	11.48	19.75	0.55	24.90	2.16	29.46	13.05	1.90
Real GDP Growth rate (%)	6.1	6.8	5.5	7.4	5.4	6.3	5.8	5.3
GDP per capita (US Dollars)	916	716	3.593	1,921	496	2,224	732	771
Government Expenditure (% of GDP)	23.1	27.6	30.6	10.2	36.0	19.8	20.7	21.1
Budget Deficit (% of GDP)	-4.6	-4.7	-2.7	0.2	-3.9	-5.4	-4.4	-2.5
External Debt outstanding (% of GDP)	23.8	23.7	103.4	67.4	47.5	38.5	26.5	19.9
Debt service (% of Exports)	3.8	4.3	6.4	4.7	35.4	14.0	2.6	1.8
Inflation rate	0.9	1.5	1.3	2.9	7.2	9.8	9.8	0.4

Average Exchange rate 2016 (local to USD)	593.1	593.1	99.7	1464.4	46.0	4.4	9117.6	582.1
Average Exchange rate 2018 (local to USD)	558.1	558.1	95.6	1839.4	48.1	4.8	9682.0	558.1
Country/Variables of Interest	**Liberia**	**Mali**	**Niger**	**Nigeria**	**Senegal**	**Sierra Leone**	**Togo**	**Africa**
Population (Millions)	4.85	19.10	22.31	195.87	16.29	7.72	7.99	1,286.29
Real GDP Growth rate (%)	0.0	4.9	5.2	8.6	6.7	3.5	4.7	-
GDP per capita (US Dollars)	490	901	453	2,085	1,482	496	721	1,817
Government Expenditure (% of GDP)	45.2	20.1	25.5	11.8*	22.9	21.9	30.7	-
Budget Deficit (% of GDP)	-3.9	-4.7	-5.9	-5.2*	-3.5	-6.8	-6.7	-3.3
External Debt outstanding (% of GDP)	29.6	24.1	59.2	15.2	62.9	56.8	23.6	37.2
Debt service (% of Exports)	7.7	7.7	10.5	24.6	23.2	7.3	4.3	23.8
Inflation rate	23.6	1.9	2.7	12.1	0.5	16.9	0.9	10.9
Average Exchange rate 2016	1.0	582.1	593.1	305.3	582.1	7353.3	582.1	
Average Exchange rate 2018	1.0	558.1	558.1	305.5	558.1	7993.3	558.1	

Source: **Author's calculation based on Africa Statistical Yearbook 2019**

Figure 1 shows the ECOWAS GDP growth rate presented some variations marked by production cycles. During the period 1986 to 1991, the GDP growth was as low as -1.3 percent. This was as a result of external shock to oil price increases, declining terms of trade and increased real rates of interest, debt crisis and subdued growth with poor economic performance. The debt crisis gave World Bank and IMF the leverage they needed to implement their newly adopted policies of deregulation and privatisation through what were called structural adjustment programmes (SAPs) in the mid-1980s. These almost invariably included the following elements of what is now called neoliberalism: reduced government

spending and greater fiscal discipline to control inflation, removing import controls and restrictions on foreign investment, privatisation of state enterprises, devaluation of the currency among others. These economic restructuring and attempts at stable economic growth improved growth in the second phase.

Another phase of low average growth of 1.26% was reported for the period 1992 – 1995. Leonce and James (2011) opined that continued declining terms of trade, made worse by capital flight, the brain drain and the devastating effect of HIV/AIDs were possibly explanation for low growth during the period especially in 1992. They showed that the people benefiting from capital flight are the local elites who, in cooperation with the multinational companies, engage in mispricing of imports and exports to get round any local regulations on the export of capital that had not been removed as a part of the neoliberal reforms. Hence, the economic restructuring of the late 1980s did not sustain growth in most of the sample countries during these periods.

A closer look at the trend chart in Figure 1 also shows there were many troughs/slump of growth between 1996 and 2016. The cycle of relatively high growth that occurred in 1996-2014 with average growth rate of 4.39% was largely as a result of the significant increase in the prices received for primary products and oil prices. Moreso, the debt relief that both IMF and World Bank made available to some governments reduced the share of tax revenues that went into debt servicing; this gesture aided growth in the period.

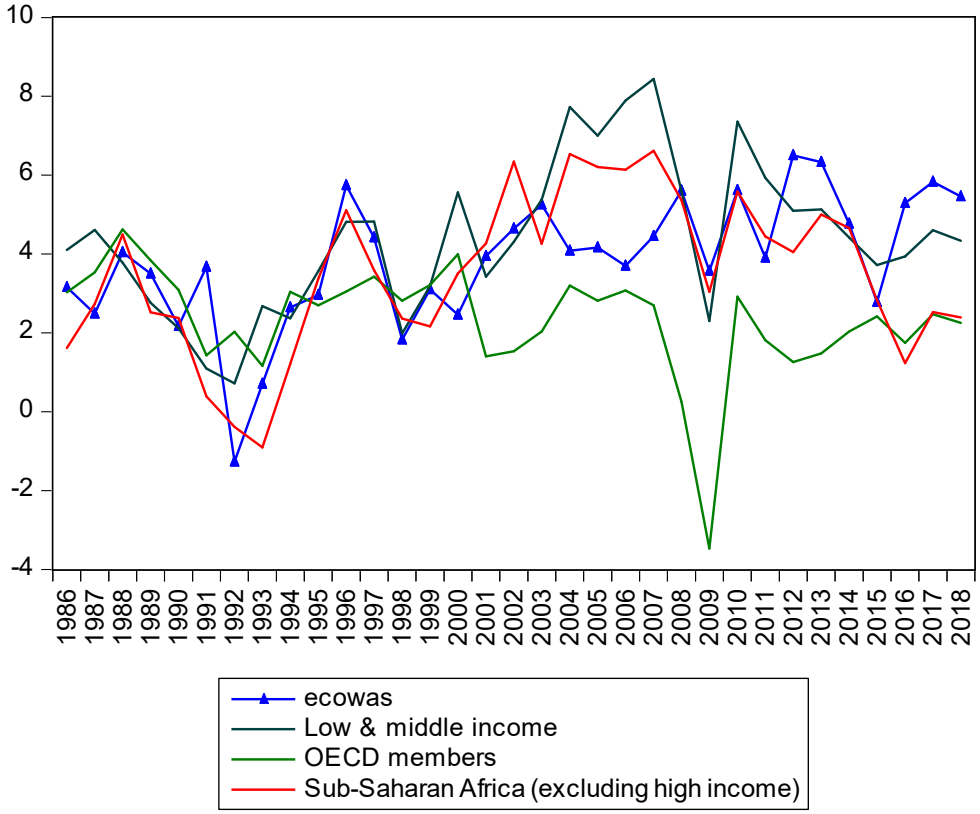

Figure 1: Trend of GDP Growth in ECOWAS Countries (%), 1986-2018

Source: **Author's Calculation Based On Wdi Database**

Output growth in ECOWAS countries is lower than average recorded in Low and Middle Income countries (LMY) and Sub-Saharan African (SSA) countries between year 2000 and 2009 as Table 2 depicts. During the same time frame, Organization of Economic Cooperation and Development (OECD) has low average growth rate of 1.75 percent but it has exhibited consistent growth in the next two cycles, contrary to decreasing pattern exhibited by ECOWAS countries (similarly LMY, SSA countries) in 2015-2018 phase.

Table 2: Output growth Cycles in ECOWAS Countries (2000-2018)

	2000 - 2004	**2005 - 2009**	**2010 - 2014**	**2015 - 2018**
ECOWAS	4.08	4.30	5.42	4.84
Low & Middle Income	5.28	6.25	5.59	4.15
SSA	4.98	5.47	4.75	2.24
OECD	2.43	1.07	1.90	2.22

Source: **Author's calculation based on WDI database**

3. Theoretical Framework

Following Barro (1990), the representative individual in a closed economy seeks to maximize overall utility, as given by

$$U = \int_0^x \mathrm{u}(c)e^{-\rho t}\mathrm{dt}, \quad \rho > 0 \tag{1}$$

where c is consumption per person and ρ is the constant rate of time preference. Population, which corresponds to the number of workers and consumers, is constant. Using an inter-temporal utility function with a constant elasticity of substation (σ):

$$u(c) = \frac{c^{1-\sigma} - 1}{1-\sigma}, \tag{2}$$

equation (1) becomes

$$U = \int_0^x \frac{c^{1-\sigma} - 1}{1-\sigma} \cdot e^{-\rho t}\mathrm{dt}, \tag{3}$$

where $\sigma > 0$, so that marginal utility has the constant elasticity – σ.

Each household-producer has access to the production function

$$\mathrm{y} = f(k) \tag{4}$$

where y is output per worker and k is capital per worker. Each person works for a given amount of time; that is there is no labour-leisure choice. The maximization of the representative household's overall utility in equation (1) implies that the growth rate of consumption at each point in time is given by

$$\frac{\dot{c}}{c} = \frac{1}{\sigma} \cdot (f' - \rho) \tag{5}$$

where f' is the marginal product of capital. Instead of assuming diminishing returns ($f'' < 0$), by assuming constant return to a broad concept of capital; that is

$$y = \mathrm{A}k, \tag{6}$$

where A > 0 is the constant net marginal product of capital.

The assumption of constant return becomes more plausible when capital is viewed broadly to encompass human and nonhuman capital. The Ak production function can be modified to distinguish between two types of capital and the model can be extended along the lines of Lucas (1988) and Rebelo (1991) to allow for sectors that produce physical and human capital.

Hence, this simple model is modified to incorporate a public sector. Let g be the quantity of public services provided to each household-producer. It is assumed that these

services are provided without user charges and are not subject to congestion effects (which might arise for highways or some other public services). That is the model abstracts from externalities associated with the use of public services.

Barro (1990) consider the role of public services as an input to private production. It is this productive role of public services that creates a potentially positive linkage between government and economic development (measure as growth rate of consumption). Production now exhibits constant returns to scale in k and g together but diminishing returns in k separately. That is, even with a broad concept of capital, production involves decreasing returns to private inputs if the (complimentary) government inputs do not expand in a parallel manner.

Given constant returns to scale, the production function can be written as

$$y = \phi(k,g) = k \cdot \phi\left(\frac{g}{k}\right), \qquad (7)$$

where ϕ satisfies the usual conditions for positive and diminishing marginal products, so that $\phi' > 0$ and $\phi'' < 0$. Hence the model allows government services such as education, training and public infrastructures to enter as a separate input to private production.

The general idea of including g as a separate argument of the production function is that private inputs represented by k, are not a close substitute for public inputs. Private good would not readily replace public good if user charges were difficult to implement, as in the case of non-excludable services as national defence and maintenance of law and order. In other cases, us er charges would be undesirable, either because the service is non-rival or because external effects cause private production to be too low (as is sometimes argued for basic education).

The model assume that government expenditure is financed contemporaneously by a flat-rate income tax

$$g = T = \tau y = \tau \cdot k \cdot \phi\left(\frac{g}{k}\right), \qquad (8)$$

where T is government revenue and τ is the tax rate. The equation (9) constrains the government to run a balanced budget. That is, the government can neither finance deficits by issuing debt nor run surpluses by accumulating assets.

The production function in equation (7) implies that the marginal product of capital is

$$\frac{\partial y}{\partial k} = \phi\left(\frac{g}{k}\right) \cdot \left(1 - \phi' \cdot \frac{g}{y}\right) = \phi\left(\frac{g}{k}\right) \cdot (1 - \eta), \qquad (9)$$

where η is the elasticity of y with respect to g (for a given value of k), so that $0 < \eta < 1$. Note that the marginal product of, $\partial y/\partial k$, is calculated by varying k in equation (7), while holding g fixed.

The private optimization still leads to a path of consumption that satisfies equation (5), except that f' is replaced by the private marginal return to capital. With the presence of a flat-rate income tax rate at rate τ, return to capital is $(1 - \tau) \cdot \partial y/\partial k$, where $\partial y/\partial k$ is given from equation (10). Therefore, the growth rate of consumption is now

$$\gamma = \frac{\dot{c}}{c} = \left[\left(1 - \frac{g}{y}\right)(1 - \eta)\phi\left(\frac{g}{k}\right) - \rho\right]/\sigma \qquad (10)$$

A change in g/y can therefore affect γ in two counteracting ways. An increase in g/y reduces $(1-g/y)$, crowds out private investment and hence lowers the growth rate. On the other hand, a higher g/y makes private capital more productive, raises $\delta y/\delta k$ and thereby leads to a higher γ. The net effect is given by the following derivative

$$\frac{\partial \gamma}{\partial\left(\frac{g}{y}\right)} = \frac{1}{\sigma} \cdot \phi\left(\frac{g}{k}\right) \cdot (\phi' - 1) \qquad (11)$$

the sign of which depends on the level of government spending. If government spending is too large then $\phi' < 1$, and consequently $\delta\gamma/\delta(g/y) < 0$, implying that a further expansion of government spending will depress the growth rate. If government spending is too low such that $\phi' > 1$, then $\frac{\partial \gamma}{\partial\left(\frac{g}{y}\right)} > 0$ suggesting that an increase in government spending can increase the growth rate. If government spending is at the optimal level then $\phi' = 1$, however $\delta\gamma/\delta(g/y) = 0$ and a growth maximizing share of government spending can be determined. At the optimum, and further marginal change in government spending will not affect the growth rate, implying little correlation between g/y and γ.

Barro (1990) laid the theoretical foundations for non-linear relationship between government size and economic growth, which could be extended to economic development variables. The marginal effect of government size on economic growth and development is conditioned upon the initial level of government spending or a given threshold. Therefore, effect of government size on economic development is expected to be positive in the countries where the government spending is below a certain threshold. When the government is increased beyond the threshold, the relationship is expected to be negative.

In order to test the relationship between government size and economic growth in a non-monotonic framework as theoretically characterized, this study employed a simple

quadratic equation following Vedder and Gallaway (1998), Pevcin (2004) ,Davies (2009) and modifying equation (1);

$$DEV_t = \alpha + \beta_1 GOV_t + \beta_2 GOV^2_t + \mu Z_t + v_t \quad (12)$$

where DEV_t, defined as indicator of economic growth and development; GOV_t is a measure of government size; α, is an unobserved country specific effect and v_t is the error term. t = 1,…,31 is the period under study. Z represents a matrix of control variables as suggested in literature on the growth-expenditure relationship (Bairam, 1990; Dalamagas, 2000; Asselain & Blancheton, 2005). These explanatory variables are; investment share of GDP (inv), population growth rate (pop), inflation rate (inf) and financial development (fid).

The positive coefficient of the linear GOV term is related to the constructive effects of government spending on output, and the expected negative coefficient of the squared GOV term (GOV^2) is related to the negative effects of increased government size. B_1 and β_2 are coefficients of government size and the square of government size over time.

In order to determine the threshold value of government size that optimised growth and subsequently development, the study applies partial differentiation. Taking the first partial derivative of development indicators (DEV) with respect to government size (GOV), using equation 12, produces

$$\frac{\partial DEV}{\partial GOV} = \beta_1 - 2(\beta_2 GOV) \quad (13)$$

$$\beta_1 - 2(\beta_2 GOV) = 0 \quad (14)$$

$$\hat{G}OV_t = \frac{\beta 1}{2(\beta 2)} \quad (15)$$

The procedure that equalizes the values of the first partial differentiation to zero produces the optimal government size ($\hat{G}OV$). Assuming the first order condition is met, the study took the second-order derivative test in order to ascertain that equation (15) will produce a relative maximum or minimum;

$$\partial^2 DEV/\partial GOV^2 = -2\beta_2 \quad (16)$$

Since equation (16) is negative i.e. $\partial^2 DEV/\partial GOV^2 < 0$, therefore government size relative maximum.

In this way, the "Barro Rule" from theoretical formulation is upheld, that public services are provided at an optimal level when their marginal product is unitary ($\phi' = 1$),

which correspond with $\partial grw/\partial gov = 0$ (i.e. $\frac{\partial \gamma}{\partial\left(\frac{g}{y}\right)} = 0$), the point at which marginal change in government spending will not affect the growth rate. Therefore equation (16) will produce the threshold value of government size that maximizes growth and development.

4. Data And Methods

Estimation Techniques

The study employed pooled ordinary least squares (POLS) estimation techniques with heteroskedasticity consistent standard errors (HCSE) to investigate the relationship between the size of government and economic development in non-linear model framework and subsequently determine the optimal size of government that promotes economic development in ECOWAS countries. The regression equation specified in equation (12) is a second-degree polynomial function, because it includes both the linear term and the squared term of GOV in the estimation equation. Since the second-degree polynomial function is linear in the parameters, i.e., β_2, it does not present any special estimation problems and can be estimated using the Pool Ordinary Least Squares (POLS) estimation technique. Incorporating the control variables into equation (12), the model to be estimated becomes;

$$DEV_{it} = \phi_0 + \phi_1 GOV_{it} + \phi_2 GOV^2_{it} + \phi_3 INF_{it} + \phi_4 INV_{it} + \phi_5 POP_{it} + \phi_6 FID_{it} + v_{it} \quad (17)$$

Data and Measurements of Variables

The dependent variables in the model to be estimated in this study is economic development, which was measured by three (3) proxies - per-capita RGDP (*rgdpc* - Income based variable), Human development Index (*hdi*) and Social Welfare Function (*swf*). The main explanatory variable is government size (GOV). The study used the share of general government spending to GDP (GOV) – this consists of central, state and local governments, and social security funds – as a measure of government size. The study includes four control variables in the models are; Inflation rate (inf) measure as the percentage change of consumer price index, population growth rate (pop), 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.

Secondary data covering the period 1986 to 2018 are sourced from World Development indicator (WDI) database for these variables; Gross domestic product per capita, government size (government expenditure to GDP), population growth rate, inflation rate, gross fixed capital formation and financial development while Social Welfare Function was derived following Sen (1973) by the author.

5. Results And Discussions

The estimated results of the quadratic models were reported in Tables 3, covering the two indicators of economic development and the baseline measure. These results are consistent with the suggested hypothesis by Barro (1990) that higher government size is detrimental to economic growth and development after a certain point. This is evident by the negative and significant coefficient of the square term of government size, in all the models.

The total effect of government size on development, as reported in Tables 3 shows that government size have a positive impact on economic activity in ECOWAS countries. It suggest that a 1% increase in government size bring about, on average, 0.034% point increase in human development index, 41.38% in social welfare function indicator and 31.46% in GDP per capita. Nonetheless, if we look into the marginal effect of government activity, the conclusion is more contrasted. Consequences of change of government size on economic development in ECOWAS countries can be demonstrated from the estimated regression by expressing economic development as a function of government size. So, in order to derive the marginal impact of government size on development when it changes by one unit, we differentiate it with respect to government size as in equation (14) for *hdi* model, for example, to produce;

$$\frac{\partial DEV}{\partial gov} = 0.0351 - 0.0008gov \qquad (19)$$

Equation (19) posits that a given change in government size has different effects on economic development depending on the value of government size. This contrast with linear model, for which any specific change in government size always changes growth by a precisely predictable amount no matter what government size, is. For instance, in *hdi* model, the

marginal effect of increasing government size by one percentage point on economic development in a linear model specification reported in Table 3 is 0.01489 unit point. Thus, the marginal impact of government size on economic development in a non – monotonic relationship diminishes as government size gets larger, that is the ability of government spending to induce growth and development reduces. This submission is in line with the findings of Munene (2015) and Moreno-Dodson and Bayraktar (2015) whose inferences indicate that there are diminishing returns to scale for government size.

Table 3: POL Results (Dependent variables are *hdi*, *swf and rgdpc*)

Variable	*hdi* model		*swf* model		*rgdpc* model	
	1 - Linear	2 - Quadratic	3 - Linear	4 - Quadratic	7 - Linear	8 - Quadratic
Govexp	0.01489*** (0.0000)	0.0351*** (0.0000)	12.1768*** (0.0000)	42.5597*** (0.0000)	13.8004** (0.0159)	32.1777** (0.0351)
Govexp2	-----	-0.0008*** (0.0001)	-----	-1.1706*** (0.0002)	-----	-0.7080 (0.1909)
Infl	-0.0007 (0.5614)	-0.0022* (0.0530)	5.9385*** (0.0012)	3.6557** (0.0375)	-5.7246* (0.0535)	-7.1054** (0.0241)
Invt	0.0070*** (0.0001)	0.0049** (0.0044)	-0.7958 (0.7673)	-4.0554 (0.1235)	3.5543 (0.4250)	1.5828 (0.7349)
Pop	3.30E-09*** (0.0000)	2.95E-09*** (0.0000)	7.09E-07*** (0.0000)	6.57E-06*** (0.0000)	6.48E-06*** (0.0000)	6.17E-06*** (0.0000)
Findev	0.0040** (0.0304)	0.0032** (0.0577)	8.8713*** (0.0022)	7.6973*** (0.0041)	10.0608** (0.0334)	9.3507** (0.0481)
R-squared	0.3281	0.4440	0.6184	0.6807	0.3684	0.3822
Schwarz criterion	-0.9935	-1.1299	13.688	13.5621	14.6942	14.7248
D-W stat.	0.6366	0.7235	0.3934	0.3900	0.6078	0.6399

Note: p-value in bracket; *** (1%), ** (5%), * (10%)

Source: Author's Computation

The properties of the estimated parameters of the quadratic equation provide evidence to prove the existence of the Armey (1995) curve. The results obtained from the estimation of the models thus provide a framework to approximately compute the specific point where output and welfare is maximised. Using the estimates from POLS estimation technique reported in Tables 3. Table 4 presented the optimal government size (as percentage of GDP).

The study revealed that optimal government size that maximises economic growth and development exist and it ranges from 18 percent to about 23 percent for ECOWAS countries.

Table 4: Estimated Optimal Government Size (% of GDP)

Development Models	Coefficient of gov	Coefficient of gov^2	Optimal Government Size (% of GDP)
***hdi* model**	**0.035**	**-0.0008**	**21.94**
swf model	42.55	-1.171	18.17
rgdpc model	32.17	-0.708	22.72

Source: Author's Computation

The finding suggests that Armey curve peaks where government spending is approximately equal to 22% of GDP in *hdi* model. The results from *swf* and *rgdp* baseline models do not significantly deviate from previous findings, the optimum size ranges from 18% to about 23% of GDP. The study assessed empirically the validity of Armey curve by determining the non-linear impact of government size on economic growth when it is above and below the optimum level. The study found strong evidence of the existence of an inverted "U-shaped" relationship between government size and economic growth. In particular, when the government size of the average country in ECOWAS is below the optimal size, a 10% increase in government size, will enhance economic development by 0.35%. However, if the average country is above the optimal size, then a 10% increase in government size will decrease growth by 0.008%. Therefore, the impact of government size on economic development is larger quantitatively when it is below the estimated threshold. This position is consistent with finding in Romero de Avila and Strauch (2008) and Asimakopoulos and Karavias (2015).

The study thus posited that the optimal level of government size is in the range of 18 - 23%. This falls within the range reported in the related literature. For example, Afonso *et al*, (2003), in sample of 23 OECD countries, finds that the optimal level of government spending is equal to 35%, whereas Chobanov and Mladenova (2009), in a sample of 28 OECD, reports a threshold of 25%. In different studies on European Union, Pevicin (2004) finds optimal government size of 36-42% for a sample of 12 countries while Forte & Magazzino, (2010) in sample of 27 countries, finds that the optimal size of government is between 35.39% and 43.5%. In studies of eight ASEAN countries, Hok et al. (2014) obtained optimal size of government 28.5 percent.

For low income countries (i.e. those with per-capita RGDP's below the median), Davis (2009) finds the optimal size of government to be 30% while Ekeocha and Oduh (2012) and Olaleye *et al* (2014) found 23% and 11% for Nigeria respectively, Heerden and Schoeman (2008) found 21.94% for South Africa, Keho (2010) for Cote d'Ivoire found 21.1 to 22.3% of GDP and Munene (2015) found 23 per cent optimum government size for Kenya. The optimum of government spending was different from a research to another due to methods, observations, or/and the situation of covered countries in their studies. The optimal government size in most studies, either by economic group or country specific, ranges from 17.5% to 45% of GDP (Chobanov and Mladenova, 2009; Facchini and Melki, 2011). This range is contained in threshold proposed by Professor Friedman (Schaefer, 2006).

In order to situate the individual sample country into the optimal government size obtained for ECOWAS group, the study depicts in Appendix I, the mean government size for three periods (full sample period, 10-year and 5-year). The study shows that government size in the three periods for all sample countries has been lower than the optimal size except for Burkina Faso and Togo. Burkina Faso recorded government size of between 22% and 25% in the three periods while Togo recorded about 70% share of her GDP as government expenditure on average in the last five year (2014-2018). Ten of the sampled countries have government size that is lower than the estimated optimal size of 18% and ECOWAS average of 18.25% for the period (2014-2018).

6. Conclusion

The study therefore concludes that ECOWAS economic group is still on the upward sloping portion of the Armey curve. Hence, increasing government size towards the optimal size is desirable. However, the policy of increasing the share of public expenditures in ECOWAS countries should be implemented with caution and selectiveness. Even though the government size of most of the countries has been lower than the optimum level, increasing government size might not boost economic growth and development unless there is improved efficiency in public sectors such as education and health, improving the quality of institutions to curb rent-seeking activities and corruption as noted by Wu *et al*, 2010. The study conclude that the relationship between government size and economic development is not linear rather ambiguous, thus suggesting that harmful effect of increasing government spending will be more pronounced among countries with low level of economic development than advanced economies.

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APPENDIX I

Government Size in ECOWAS countries, 1986-2018

Country	1986-2018 (Full Sample Average)	2009-2018 (10-year Average)	2014-2018 (5-year Average)
Burkina Faso	22.04	22.79	24.58
Cote d'Ivoire	13.91	12.58	13.04
Ghana	10.63	9.79	9.35
Guinea	10.56	15.66	17.15
Gambia	11.59	10.54	11.72
Guinea Bissau	10.61	9.75	10.79
Mali	15.29	16.40	16.56
Niger	14.92	15.66	16.11
Nigeria	3.95	7.00	5.71
Senegal	14.78	14.14	14.14
Sierra Leone	9.90	9.94	9.90
Togo	20.92	40.53	69.92
ECOWAS	**13.26**	**15.40**	**18.25**
LDC	11.81	11.93	12.18
LMY	13.78	14.28	14.49
OECD	17.48	18.29	17.85
SSA	13.19	14.26	14.02