

PUBLIC FINANCE AND ECONOMIC GROWTH IN WEST AFRICAN MONETARY ZONE COUNTRIES: A PANEL DATA ANALYSIS

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Abstract

The relationship between economic growth and public finance in West African Monetary Zone Countries was examined in this study. The study used Gross Domestic Product per Capita as the dependent variable; and public expenditure, public revenue and public debt as the independent variables in the model specified. Using the Pooled Mean Group/ Autoregressive Distributed Lag technique to analyze panel data collected from the countries, the study revealed that public finance and economic growth have a positive relationship but the impact of public finance on economic growth was found to be non-significant. The study recommended sound fiscal governance and an efficient implementation of the National budget so that the operations of public finance would have a positive and significant effect on economic growth.

Introduction

Overtime, various writers have advanced their own definition of the subject public finance, with their presentations revolving mainly around public expenditures and revenues; however Anyanwu (1997) regards public finance as “that branch of economics that is concerned with the revenue, expenditure and debt operations of government and the impact of these measures”. In his observation the public finance identifies and looks into the effects of governmental financial policies. That is, it tries to analyze the effects of government taxation (and other sources of revenue) and expenditure on the economic situation of individuals, institutions and the economy as a whole.

The main content of public finance is the use of public funds for social welfare, economic growth and development (Aladejare, 2020). Public finance basically seeks to fulfil public requirements that facilitate economic growth and development and also to understand how policies affect results across all sections of society. Another fundamental goal of public finance is the optimum allocation of resources which when done efficiently will reduce inequality and poverty within the economy.

Government financial activities are very much prevalent in developing countries but the bother here are the effects of these activities on economic growth and development; the present situation in the developing countries under review show that bad governance, displace priorities, mismanagement of funds, lack of accountability and transparency in the tiers of government, unethical behaviours within institutions, the dwindling state of

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infrastructures, unimplemented budgets, high debt profile and corruption take the centre stage thus hindering the effectiveness of the operations of public finance in economic growth and development (Nyamadi, 2023).

It is therefore the objective of this study to examine the impact of public finance on economic growth and development in developing countries using the countries within the West African Monetary Zone (Ghana, Guinea, The Gambia, Liberia, Sierra Leone and Nigeria) as case study.

Review of related Literature

Public finance is the division of economics that is made up of two words as public and finance. The term public refers to the state that is the government and finance means knowledge of management of money (Olaoye and Orimogunje, 2022). Thus, public finance is the study of how government raises finance and how she spends it keeping in view the management and allocation of resources for achieving the goals of public organization.

Economic growth represents an increase in the ability and productive capacity of an economy to produce goods and services, compared from one period of time to another. Economic growth refers only to the quantity of goods and services produced. Economic growth can also be described as a process of transformation; it encompasses the analysis of various variables that give rise to sustained extension of the production capacity of a country (Aluthge, Jibir, and Abdu, 2021).

Gross domestic product per capita is a measurement based in gauging the prosperity of an economy based on economic growth and development. The basic interpretation is it shows that production within an economy can be accredited to each person. Gross domestic product per capita is an important economic performance indicator and it is useful in ascertaining the average living standards and economic wellbeing in economies.

The major role of public finance in all its dimensions (public expenditure, public debt and public revenue) is to bring about economic growth and development and also increasing living standards and economic wellbeing within countries (Mudiaga and Onyia, 2022).

Empirical Review

Odogu, Obalokumo, Odoko and Dadowei (2021) using Nigeria as their case study investigated the effects of tax revenue on gross domestic product and human development index. The Ex-post facto research design was used for the study and relevant econometric tests were carried out. The study revealed that tax revenues have effects on gross domestic product and human development index. Thus the study concluded that for the stimulation of economic development; tax revenue is a necessary component of fiscal policy that should be used.

Chimezie, Omakhanlen and Eraibie (2020) examined the relationship between government spending and economic development in Nigeria. The study utilized Peacock's idea, which claims that social disruptions would likely lead to increase in government spending, resulting in increased national GDP. Secondary data sourced from the CBN and World Development Indicators for the period 1981 to 2017 was analyzed using the Unit Root test, Auto-Regressive Distributed Lag (ARDL), and the Granger causality approach. The study's findings show that government revenue (GREV) has a significant influence on the development of Nigeria's economy, government expenditure (GEXP) has not significantly impacted economic growth through the outcomes of recurrent expenditure (REXP) and capital expenditure (CEXP), and gross domestic savings (GDS) has not influenced Nigeria's economic growth.

The effect of public finance on economic growth from the period of 2011-2020 was examined by Mudiaga and Onyia (2022). They employed Ordinary least square estimation technique and found out that government recurrent expenditure had a significant impact on economic growth while on the other hand there was an insignificant effect of capital expenditure on economic growth. They recommended the provision of social infrastructure so as to boost private investments and economic growth

Methods and Model Specification

Using secondary data sourced from Central Bank of Nigeria statistical Bulletin, World Bank data base; the study employed the Panel Pooled Mean Group/Autoregressive Distributive Lag (PMG/ARDL). The PMG/ARDL model is to basically ascertain the long and short run connection between public finance and unemployment rate of the WAMZ countries.

The model is thus specified

$$GDP_{pc} = f(TGR, TGE, TGD, INFL, EXCHR)$$

Estimated as

$$GDPpc = b_0 + b_1 \log TGR + b_2 \log TGE + b_3 \log TGD + b_4 \log INFL + b_5 \log EXCHR + e_t \quad (1)$$

Where: GDPpc = Gross domestic product per capita, TGR = Total government revenue, TGE = Total government expenditure, TGD = Total government debt, INFL = Inflation rate, EXCHR = Exchange rate
ARDL Equation specified as

$$\Delta GDPpc_t = \alpha_0 + \sum_{k=1}^n \alpha_1 \Delta \log TGR_t + \sum_{k=1}^n \alpha_2 \Delta \log TGE_t + \sum_{k=1}^n \alpha_3 \Delta \log TGD_t + \sum_{k=1}^n \alpha_4 \Delta \log INFL_t + \sum_{k=1}^n \alpha_5 \Delta \log EXCHR_t + \rho_1 \Delta \log TGR_{t-k} + \rho_2 \Delta \log TGE_{t-k} + \rho_3 \Delta \log TGD_{t-k} + \rho_4 \Delta \log INFL_{t-k} + \rho_5 \Delta \log EXCHR_{t-k} + e_t \quad (2)$$

Data analysis

Descriptive statistics analysis

Table 1 Result of descriptive statistics analysis

	GDPPC	TGR	TGE	TGD	EXCHR	INFL
Mean	1013.217	12.45250	19.00908	62.39292	1158.759	12.18292
Median	707.4500	12.32000	17.79000	38.00000	54.91500	11.30000
Maximum	3201.000	27.09000	37.12000	600.1000	9840.590	34.70000
Minimum	242.4000	5.110000	8.670000	7.300000	0.870000	2.100000
Std. Dev.	715.0578	3.555406	6.317270	96.05635	2631.741	6.198812
Skewness	1.173992	1.122995	0.939376	4.116100	2.241627	1.250273
Kurtosis	3.201438	5.364508	3.390340	20.16672	6.524127	4.785737
Jarque-Bera	27.76801	53.17684	18.41037	1812.327	162.5952	47.20796
Probability	0.000001	0.000000	0.000101	0.000000	0.000000	0.000000
Sum	121586.0	1494.300	2281.090	7487.150	139051.1	1461.950
Sum Sq. Dev.	60845605	1504.269	4749.039	1097992.	8.24E+08	4572.607
Observations	120	120	120	120	120	120

Source: Researcher's presentation from E-views 10.0 statistical software

The study began this section by comprehensively comparing the descriptive statistics of the data set employed in this study. Table 1 showed the result of the descriptive or summary statistics for both dependent, independent and control variables. It is important to states that for the summary statistics, the raw data in their untransformed state were used to enable an appraisal of the structure of the raw data used for the regression analysis. The summary statistics were used to compare the measures of central tendency, the measures of dispersion and the measures of normality of the data set. The measures of central tendency compared the mean and median values of the data set. While the mean considered the average values of the variables the median looked at the middle distribution of the data set.

From the result, it could be observed that the mean values were: \$1013.21 for gross domestic product per capita (GDPPC) of WAMZ countries; 12.45percent for total government revenue (TGR) of WAMZ countries; 19.00

percent for total government expenditure (TGE) of WAMZ countries; 62.39 percent for total government debt (TGD) of WAMZ countries; 1158.75 for exchange rate (EXCHR) of WAMZ countries; and 12.18 percent for inflation rate (INFL) of WAMZ countries. The median values of the variables were: \$707.45 for gross domestic product per capita (GDPPC) of WAMZ countries; 12.32 percent for total government revenue (TGR) of WAMZ countries; 17.79 percent for total government expenditure (TGE) of WAMZ countries; 38.00 percent for total government debt (TGD) of WAMZ countries; 54.91 for exchange rate (EXCHR) of WAMZ countries; and 11.30 percent for inflation rate (INFL) of WAMZ countries.

The measures of dispersion considered how widely spread the dataset was from their mean values. The measures of dispersion considered in this study were the minimum value, the maximum values and the standard deviation. From the E-view output, the maximum values were: \$3201.00 for gross domestic product per capita (GDPPC) of WAMZ countries; 27.09 percent for total government revenue (TGR) of WAMZ countries; 37.12 percent for total government expenditure (TGE) of WAMZ countries; 600.10 percent for total government debt (TGD) of WAMZ countries; 9840.59 for exchange rate (EXCHR) of WAMZ countries; and 34.70 percent for inflation rate (INFL) of WAMZ countries.

Table 2 PMG/ARDL long run and short run estimates (joint countries' analysis): Gross domestic product per capita (GDPPC)

Dependent Variable: D(LGDPPC)

Method: ARDL

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (1 lag, automatic): LTGR LTGE LTGD LEXCHR LINFL

Fixed regressors: C

Number of models evaluated: 1

Selected Model: ARDL(1, 1, 1, 1, 1, 1)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
LTGR	0.543906	0.273057	1.991912	0.0501
LTGE	-0.343579	0.223500	-1.537268	0.1286
LTGD	-0.253457	0.046828	-5.412462	0.0000
LEXCHR	0.101701	0.159829	0.636309	0.5266
LINFL	0.238583	0.131434	1.815225	0.0736
Short Run Equation				
COINTEQ01	-0.203189	0.084960	-2.391602	0.0194
D(LTGR)	-0.329592	0.137953	-2.389156	0.0195
D(LTGE)	-0.020012	0.051373	-0.389538	0.6980
D(LTGD)	-0.119354	0.072142	-1.654435	0.1023
D(LEXCHR)	-0.595674	0.140775	-4.231387	0.0001
D(LINFL)	-0.017937	0.022868	-0.784392	0.4353
C	1.373022	0.527372	2.603516	0.0112
Mean dependent var	0.060577	S.D. dependent var		0.142896
S.E. of regression	0.084970	Akaike info criterion		-1.962410
Sum squared resid	0.527051	Schwarz criterion		-0.870642
Log likelihood	164.7446	Hannan-Quinn criter.		-1.519038

*Note: p-values and any subsequent tests do not account for model selection.

Source: Researcher's presentation from E-views 10.0 statistical software

Given the result in Table 2, the long run coefficient measures the long run effect of individual independent variables controlled by exchange rate and inflation rate on the dependent variable. The PMG/ARDL long run estimates revealed that, all things being equal, a percentage increase in total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) will lead to a corresponding 0.54 percent increase in the gross domestic product per capita (GDPPC) of the WAMZ countries and was found to be statistically significant at five percent in the long run. On the other hand, the analysis of the PMG/ARDL long run estimates revealed that, all things being equal, a percentage increase in total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) will lead to a corresponding 0.34 percent decrease in the gross domestic product per capita (GDPPC) of the WAMZ countries and was found to be statistically non-significant at five percent in the long run. Lastly, the PMG/ARDL long run estimates revealed that, all things being equal, a percentage increase in total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) will lead to a corresponding 0.25 percent decrease in the gross domestic product per capita (GDPPC) of the WAMZ countries and was found to be statistically significant at five percent in the long run.

Further analysis of the PMG/ARDL in Table 2 revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.2031 or 20.31 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 7 revealed that the value of the intercept which is 1.37 revealed that gross domestic product per capita (GDPPC) of the WAMZ countries increased by 1.37 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of the WAMZ countries in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.32 percent decrease in gross domestic product per capita (GDPPC) of the WAMZ countries in the short run. On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant negative effect on the gross domestic product per capita (GDPPC) of the WAMZ countries in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.02 percent decrease in gross domestic product per capita (GDPPC) of the WAMZ countries in the short run. Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant negative effect on the gross domestic product per capita (GDPPC) of the WAMZ countries in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.11 percent decrease in gross domestic product per capita (GDPPC) of the WAMZ countries in the short run.

Table 3 PMG/ARDL short run dynamics (Gambia): With respect to gross domestic product per capita (GDPPC)

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.584598	0.010674	-54.76722	0.0000
D(LTGR)	-0.469260	0.037705	-12.44557	0.0011
D(LTGE)	0.047911	0.026949	1.777847	0.1735
D(LTGD)	-0.096447	0.011759	-8.201931	0.0038
D(LEXCHR)	-0.268859	0.079692	-3.373701	0.0433
D(LINFL)	-0.098689	0.002967	-33.26330	0.0001
C	3.817468	0.483213	7.900181	0.0042

Source: Researcher's presentation from E-views 10.0 statistical software

GAMBIA

The analysis of the PMG/ARDL in Table 3 about Gambia revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.5845 or 58.45 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 3 revealed that the value of the intercept which is 3.81 revealed that gross domestic product per capita (GDPPC) of Gambia increased by 3.81 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Gambia in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.46 percent decrease in gross domestic product per capita (GDPPC) of Gambia in the short run. On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant positive effect on the gross domestic product per capita (GDPPC) of Gambia in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.04 percent increase in gross domestic product per capita (GDPPC) of Gambia in the short run. Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Gambia in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.09 percent decrease in gross domestic product per capita (GDPPC) of Gambia in the short run.

GHANA

The analysis of the PMG/ARDL in Table 4 about Ghana revealed that the error term adjustment coefficient (COINTEQ01) is negative and non-significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.0101 or 1.01 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically non-significant. Further analysis of the PMG/ARDL result in Table 4 revealed that the value of the intercept which is

0.30 revealed that gross domestic product per capita (GDPPC) of Ghana increased by 0.30 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically non-significant at five percent level of significance.

Table 4 PMG/ARDL short run dynamics (Ghana): With respect to gross domestic product per capita (GDPPC) as a dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.010159	0.003816	-2.661816	0.0762
D(LTGR)	-0.349018	0.336534	-1.037095	0.3759
D(LTGE)	0.011457	0.061266	0.187006	0.8636
D(LTGD)	-0.360446	0.030882	-11.67161	0.0014
D(LEXCHR)	-1.022593	0.114117	-8.960932	0.0029
D(LINFL)	0.043864	0.010740	4.084109	0.0265
C	0.308009	0.183307	1.680289	0.1915

Source: Researcher's presentation from E-views 10.0 statistical software

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant negative effect on the gross domestic product per capita (GDPPC) of Ghana in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.34 percent decrease in gross domestic product per capita (GDPPC) of Ghana in the short run.

On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant positive effect on the gross domestic product per capita (GDPPC) of Ghana in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.01 percent increase in gross domestic product per capita (GDPPC) of Ghana in the short run.

Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Ghana in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.36 percent decrease in gross domestic product per capita (GDPPC) of Ghana in the short run.

Table 5 PMG/ARDL short run dynamics (Guinea): With respect to gross domestic product per capita (GDPPC) as a dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.189294	0.010131	-18.68533	0.0003
D(LTGR)	-0.909544	0.179974	-5.053755	0.0149
D(LTGE)	0.101898	0.010370	9.825949	0.0022
D(LTGD)	-0.305318	0.028717	-10.63202	0.0018
D(LEXCHR)	-0.297206	0.102495	-2.899704	0.0625
D(LINFL)	-0.002958	0.001759	-1.682099	0.1911
C	1.157905	0.314518	3.681522	0.0347

Source: Researcher's presentation from E-views 10.0 statistical software

GUINEA

The analysis of the PMG/ARDL in Table 5 about Guinea revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.1892 or 18.92 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 5 revealed that the value of the intercept which is 1.15 revealed that gross domestic product per capita (GDPPC) of Guinea increased by 1.15 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Guinea in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.90 percent decrease in gross domestic product per capita (GDPPC) of Guinea in the short run. On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant positive effect on the gross domestic product per capita (GDPPC) of Guinea in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.10 percent increase in gross domestic product per capita (GDPPC) of Guinea in the short run. Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Guinea in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.30 percent increase in gross domestic product per capita (GDPPC) of Guinea in the short run.

LIBERIA

The analysis of the PMG/ARDL in Table 6 about Liberia revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.2685 or 26.85 percent from the balance in short-term is balanced in long-term, that is, it can be

stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 6 revealed that the value of the intercept which is 1.66 revealed that gross domestic product per capita (GDPPC) of Liberia increased by 1.66 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

Table 6 PMG/ARDL short run dynamics (Liberia): With respect to gross domestic product per capita (GDPPC) as a dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.268579	0.012339	-21.76588	0.0002
D(LTGR)	-0.187987	0.010990	-17.10564	0.0004
D(LTGE)	0.006230	0.010482	0.594378	0.5941
D(LTGD)	-0.016409	0.001571	-10.44336	0.0019
D(LEXCHR)	-0.312160	0.046646	-6.692174	0.0068
D(LINFL)	0.039923	0.002213	18.04102	0.0004
C	1.663442	0.482248	3.449347	0.0410

Source: Researcher's presentation from E-views 10.0 statistical software

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Liberia in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.18 percent decrease in gross domestic product per capita (GDPPC) of Liberia in the short run. On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a non-significant positive effect on the gross domestic product per capita (GDPPC) of Liberia in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.006 percent increase in gross domestic product per capita (GDPPC) of Liberia in the short run.

Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Liberia in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.01 percent decrease in gross domestic product per capita (GDPPC) of Liberia in the short run.

Table 7 PMG/ARDL short run dynamics (Nigeria): With respect to gross domestic product per capita (GDPPC) as a dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.100170	0.000800	-125.1496	0.0000
D(LTGR)	0.059088	0.000909	65.02767	0.0000
D(LTGE)	-0.026775	0.002293	-11.67598	0.0013
D(LTGD)	-0.027659	0.001250	-22.12845	0.0002
D(LEXCHR)	-0.936349	0.010663	-87.81300	0.0000
D(LINFL)	-0.032162	0.000411	-78.29538	0.0000
C	0.796190	0.042870	18.57227	0.0003

Source: Researcher's presentation from E-views 10.0 statistical software

NIGERIA

The analysis of the PMG/ARDL in Table 7 about Nigeria revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.1000 or 10.00 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 7 revealed that the value of the intercept which is 0.79 revealed that gross domestic product per capita (GDPPC) of Nigeria increased by 0.79 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant positive effect on the gross domestic product per capita (GDPPC) of Nigeria in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.05 percent increase in gross domestic product per capita (GDPPC) of Nigeria in the short run. On the other hand, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Nigeria in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.02 percent decrease in gross domestic product per capita (GDPPC) of Nigeria in the short run. Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Nigeria in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.02 percent decrease in gross domestic product per capita (GDPPC) of Nigeria in the short run.

SIERRA LEONE

The analysis of the PMG/ARDL in Table 8 about Sierra Leone revealed that the error term adjustment coefficient (COINTEQ01) is negative and significant on a significance level of 5% as theoretically expected. Thus, a deviation of 0.0663 or 6.63 percent from the balance in short-term is balanced in long-term, that is, it can be stated that there is a long-term cointegration relationship between the variables and was statistically significant. Further analysis of the PMG/ARDL result in Table 8 revealed that the value of the intercept which is 0.49 revealed that gross domestic product per capita (GDPPC) of Sierra Leone increased by 0.49 percent in the short run when all other variables (TGR, TGE and TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) are held constant and was statistically significant at five percent level of significance.

Table 8 PMG/ARDL short run dynamics (Sierra Leone): With respect to gross domestic product per capita (GDPPC) as a dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.066337	0.001863	-35.60329	0.0000
D(LTGR)	-0.120832	0.030016	-4.025625	0.0275
D(LTGE)	-0.260792	0.017216	-15.14842	0.0006
D(LTGD)	0.090156	0.015059	5.986816	0.0093
D(LEXCHR)	-0.736877	0.096643	-7.624718	0.0047
D(LINFL)	-0.057603	0.006179	-9.321964	0.0026
C	0.495118	0.068875	7.188611	0.0055

Source: Researcher's presentation from E-views 10.0 statistical software

In addition, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government revenue (TGR) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Sierra Leone in the short run. The implication is that a percentage increase in TGR controlled by EXCHR and INFL will lead to a corresponding 0.12 percent decrease in gross domestic product per capita (GDPPC) of Sierra Leone in the short run. Similarly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government expenditure (TGE) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant negative effect on the gross domestic product per capita (GDPPC) of Sierra Leone in the short run. The implication is that a percentage increase in TGE controlled by EXCHR and INFL will lead to a corresponding 0.26 percent decrease in gross domestic product per capita (GDPPC) of Sierra Leone in the short run.

Lastly, the examination of the PMG/ARDL short-run estimates revealed that changes in the value of total government debt (TGD) controlled by exchange rate (EXCHR) and inflation rate (INFL) had a significant positive effect on the gross domestic product per capita (GDPPC) of Sierra Leone in the short run. The implication is that a percentage increase in TGD controlled by EXCHR and INFL will lead to a corresponding 0.09 percent increase in gross domestic product per capita (GDPPC) of Sierra Leone in the short run.

Short Run Findings

Relationship between total government revenue and gross domestic product per capita

The PMG/ARDL result revealed that total government revenue was found to have a significant negative effect on gross domestic product per capita of WAMZ countries in the short run. This finding was in consonance with the study by Okeke, Mbonu and Ndubusi (2018) which examined the effect of tax revenue on economic development in Nigeria, and the showed that there existed a significant relationship between public revenue and economic development. On the other hand, this finding was in disagreement with the study by Fineboy, Nwankwo and Akujor (2022) where they did a study on the comparative effect of tax revenue on economic growth of selected African countries; their finding revealed that tax revenues as a whole do not significantly affect the gross domestic product of some African countries which included Nigeria and Ghana.

Relationship between total government expenditure and gross domestic product per capita

The PMG/ARDL result revealed that total government expenditure was found to have a non-significant negative effect on gross domestic product per capita of WAMZ countries in the short run. This finding was not in consonance with the studies by Chandana, Adamu and Abdu (2021) which using data from 1970-2019 disaggregated public expenditure into capital and recurrent expenditures and investigated their impacts on economic growth; amongst their findings expenditure was seen to have positive and significant relationship and impact on economic growth in the long and short runs; and Olayungbo and Olayemi (2018) which using vector error correction model for 1981-2015 Nigerian data recognized that government expenditure has a negative and but significant impact on economic growth in both short and long runs.

Relationship between total government debt and gross domestic product per capita

The PMG/ARDL result revealed that total government debt was found to have a non-significant negative effect on gross domestic product per capita of WAMZ countries in the short run. This finding was not in consonance with the study by Amankwah, Ofori – Asebrese & Kamasa (2018) which did an empirical analysis of the sustainability of public debt in Ghana, using the auto distributive lag tools they discovered that sustainable public debt levels will foster higher and stable economic growth and development.

Conclusion and Recommendation

The gross domestic product per capita of the WAMZ countries provided information on economic growth and income level of the citizens, though the result revealed that public finance operation options (TGR, TGE and

TGD) controlled by EXCHR and INFL have a positive relationship, it also showed that public finance operations have a non significant positive effect on the gross domestic product per capita of WAMZ countries.

The study recommends that for greater significant effects sound fiscal governance can go a long way in facilitating structural reforms which is also beneficial for all dimensions of public finances. In addition, as with the case of mismanagement and misappropriation of public funds, the study recommends efficient implementation of the budget which is a key element in eliminating this challenge both at the macro level and also at the organization level.

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