Public Debt, Tax and Economic Growth in Economic Community of West Africa

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Abstract

This study examined the effect of public debt and tax on economic growth in Economic Community of West Africa covering the period 2010-2022. The regression analysis used was based on a two-step system Generalized Method of Moment and threshold regression. The finding shows that the coefficients of public debt and interest paid on debt is negative and statistically significant while tax is positive and statistically significant in influencing growth. Furthermore, the countries with threshold above 77% are Benin, Burkina Faso, Congo Democratic, Mali, Niger, Nigeria, Senegal, and Togo. Those with threshold below 77% are Cabo Verdi, Congo Republic, Cote d'Ivoire, and Gabon are above the 77% threshold. The estimated threshold less than and greater 77% threshold has the threshold value of 0.009 and 0.026 respectively with probability value less than 0.05. Based on the findings, the study suggests that West African economies should as a matter of necessity diversify their economies away from dependence on primary products. Take advantage of Africa Continental Free Trade Are (ACFTA) initiative to boost their productive capacity and raise tax potential. Deepen the provision of basic infrastructure to boost industrial productivity.

Keywords: Public debt, tax, economic growth, Nigeria
JEL Codes: H20; H63; O52

1, Introduction

The issues of limited tax and debt capacity for growth are pertinent for developing economies, where structural factors imply that capacity constraints are tighter than in developed economies. In developing economies limited infrastructure imposes bottlenecks that inhibit growth, and where fiscal adjustment falls disproportionately on public investment (Wei, Thomas, Neng and Jinqiang, 2024). Quality public expenditure promote private investment in capital and improve techniques of production through proper maintenance of the rule of law, enforcing contracts and regulating financial markets. Public investment which is either the stock of physical infrastructure or human capital can increase the productivity of both capital and labor. The tax system can distort resource allocation thereby reducing both growth and welfare (Pratibha and Krishna, 2022). The economic, institutional and political environment influences the effectiveness

of public spending for promoting growth and the capacity of the government to raise tax revenue or borrow to finance public goods while minimizing the cost to economic growth.

West African economies governments face constraints on borrowing on both international and domestic capital markets due to sovereign risk. The debt limits imposed by creditors facing sovereign immunity are tighter than the traditional solvency constraint that relies on a debtor's commitment to repay up to the point of exhausting all its resources. The effects of debt limits on economic growth depend on the nature of the externality associated with public goods spending (Celikay, 2020; Otaki, 2015). If public spending is restricted to current flows of services, then higher levels of public debt are associated with lower permanent growth rates. If public spending finances investment in the stock of public infrastructure, then relaxation of a debt limit can raise welfare by increasing growth rates in transition to the steady state (Afonso and Ibraimo, 2020; Reinhart and Rogoff, 2010a,b). However, this is associated with the view that higher debt is associated with lower long-run growth rates which are reached in finite time in the model economy.

The environment imposes constraints on fiscal policy that can be reflected in cross-country differences in rates of economic growth. The essence of Ricardian equivalence is that "optimal public debt" is only a meaningful concept when the fiscal capacity of the government is constrained (Ostry, Ghosh and Espinoza, 2015; Reinhart and Rogoff, 2010a). The implications of fiscal constraints for optimal public borrowing are particularly important for developing countries where distortions associated with tax collection are greater than in advanced industrialized countries. The incentive effects of taxes are reflected in varying rates of successful tax collection with the type of tax, definition of the tax base and means of payment (Robbins and Simonse, 2012). Tax evasion tends to be higher with lower enforcement expenditures and weaker penalties for non-compliance. A constrained optimal fiscal weighs the costs of increasing tax compliance against the benefits of collecting more revenue (Tanzi and Lutz, 1991). The choice of tax bases and rates should reflect the impact of these on overall revenues net of collection and enforcement costs.

This study contributes to the debate on public debt, tax and growth nexus with focus on how fiscal capacity constraints impact on optimal path of growth and the public debt. Particularly, the study examines the constraint on government capacity to tax or public debt finance public expenditures effects on economic growth. To achieve this, the study is organized in 5 sections. Section 1 is introduction. Section 2 is literature review. Section 3 is methodology. Section 4 is empirical analysis and discussion of results. Section 5 conclusion and recommendations.

2. Literature Review

2.1 Conceptual Clarification

Public debt refers to the total amount of money that a government owes to various creditors, which may include individuals, institutions, and foreign governments. It is the accumulation of borrowing by the government over time to finance its expenses when its revenue falls short. The components of public debt can vary depending on the specific context but generally include bonds, bills, notes, loans and others (Butkus, Mohaddes, Pesaran and Raisi, 2021a; Ewaida, 2017). There seems to be a consensus among public opinion leaders that huge external debt was adversely affecting economic growth and development in developing countries (Mitchel, 2011). This was affirmed by Hansen and Imrohoroglu, (2016) who observed that the relationship between government debt and real GDP growth is weak for debt/GDP ratios below a threshold of 90% of GDP. The concern is that excessive domestic borrowing could crowd out private-sector investment as the government competes with the private sector for available funds.

Tax is a prime source of income for economies. Governments perform their fundamental roles of providing; non-exclusive goods, upholding of rule of law, protecting life and properties against external aggressors, and regulating economic and social activities through tax (Indre, Lithuania, Kristina, and Dovile, 2023; Adam, Kamas and Lapatinas, 2015). Furthermore, Fannoun and Hassounch, 2019) opined that taxation is a process established by the government to exert control over tax and tax collection. The redistribution of wealth from the private to the public sectors of the economy is to help the nation in achieving some of its economic and social objectives which include providing essential facilities and services like proficient health care services, and quality roads, among others (Butkus, Mohaddes, Pesaran and Raisi, 2021b; Kallas, Todorovic, and Dordevic, 2020).

Tax revenue refers to the aggregate amount of revenue collected by the government through various types of taxes imposed on individuals, businesses, and other entities within a specific period (Ntekpere and Olayinka, 2020; Kong and van der Hoek, 2008). It represents the sum of all tax receipts received by the government from different sources which include income taxes, sales taxes, value added taxes, corporate taxes, property taxes, excise taxes, custom duties, payroll taxes, etc. Taxes affect individual households' and firms' behavior, investment decisions, consumption patterns, and overall economic activity (Mulia and Yasin, 2018). Tax policies can

influence incentives, income distribution, economic growth, and the overall functioning of the economy (Fotaimi and Anthonia, 2023; Nautel and van Meensel, 2011; Barro, 1996).

Tax-to-GDP Ratio is a commonly used indicator that compares total tax revenue to the country's gross domestic product (GDP). It reflects the size of the tax burden on the economy and provides insights into the level of government involvement in economic activities (Puonti, 2022). The tax-to-GDP ratio vary significantly among countries, influenced by factors such as tax policies, economic structure, and government priorities (Oyewobi and Falolu, 2023).

Economic growth is defined as the increase in a country's overall output (Romer, 1986). It is a steady increase in a country's per capita output or income, accompanied by increases in the labour force, consumption, capital, and trade volume. Technological innovation and positive external forces are usually the driving causes behind economic progress. It is the most widely used metric for assessing an economy's performance, as well as the most essential aspect in determining a country's success (Todaro and Smith, 2012). Typically, changes in the Gross Domestic Product (GDP) are used as proxy for economic growth (GDP). GDP is a comprehensive measure of a country's overall economic activity, encompassing all private and public consumption, government spending, investments, and exports (Jhingan, 2004).

2.2 Theoretical Review

Public borrowing is often associated with financing accumulated budget deficits (Adedeji, Oyinlola and Adeniyi, 2023; Slavyuk and Slaviuk, 2018; Tanzi and Lutz, 1991). Furthermore, Olonite, Gurowa, Ibrahim and Ajewole (2021) observed that the causal relationship between the tax burden and public borrowing runs in both directions: high public debt creates the need for changes in economic activity (labor, capital) to cover the public debt, which is limited by increasing tax rates and/or by reducing productive government spending. Pouzo and Presno (2022) argued that, at constant economic conditions, persistent budget deficit and borrowing means that citizens use public services today in exchange for a combination of higher taxes and reduced spending later. Hence, budget deficit and increasing public debt maintain or improve the current financial situation of consumers but worsen it in the future.

Uchida and Ono (2022) and Romer (1956) observed that high public debt burden leads to higher future taxes or lower government spending in the future when the government is expected to repay its debts. In both cases, consumption is adversely affected. Tax increase and government

spending decrease directly or indirectly reduce consumers' disposable income, so fewer goods and services are purchased, demand decreases, and therefore production volumes decrease, the country's GDP shrinks (Mittong and Tamaselli, 2019; Solow, 1956). Similarly, Ogawa and Ono (2010) argued that the longer the government delays raising taxes to stem debt growth, the higher the interest burden will be, making the process of economic stabilization increasingly difficult. Woo and Kumar (2015) showed that in periods of economic downturn, the tax burden decreases when debt to GDP ratio increases.

The effectiveness of tax policies for raising revenue varies widely across developing countries. The divergence of statutory tax rates from effective tax rates is much higher for most developing countries than for advanced industrialized countries as is the variation in statutory rates across activities within economies (Ugwuanyi, Ugwuanyi, Efanga and Abgbaeze, 2021). The strength of institutions is an important determinant of the degree of tax compliance and of the adverse effect of the tax system on output, income and growth (Oyewobi, 2019). The analysis in this paper first highlights how constraints on effective tax rates motivated by tax distortions and enforcement costs affect optimal fiscal policies in an endogenously growing economy.

Governments tend to borrow instead of raising taxes when faced with economic threats to mitigate the consequences of economic recession in developing economies (Cassau and Shadmani, 2018). However, when indebtedness reaches an unsafe level, the risk of state insolvency is faced, costs increase and there is a risk of negative consequences for the country's economic condition in the future, which the government may have to make decisions to increase the tax burden to improve (Alesina and Passalacqua, 2016). An increasing tax burden can reduce consumption in the country, so production volumes would also decrease, and companies would face a decrease in sales revenue, which would directly affect the country's GDP (Alawneh, 2017; Adam and Kammas, 2007).

2.3 Empirical Review

There are studies on the nexus among public debt, taxes and growth. Adedeji, Oyinlola, and Adeniyi (2023) examined the effect of public debt on the relation between tax and growth in sub-Saharan African countries. The study employed a dynamic fixed-effects model to explore both linear and nonlinear relationships. The findings from the linear analysis shows that tax measures impact positively on growth regardless of public debt, while public debt has a negative effect on

growth. Its interaction with total taxes exhibits a positive influence. The nonlinear approach shows a negative association between public debt and growth. Moreover, the interaction term indicates that public debt weakly supports the impact of indirect taxes on economic growth while undermining the effectiveness of taxes on goods and services. However, the interactions between public debt and other tax measures are not statistically significant. Overall, public debt undermines the effectiveness of most tax measures in middle-income countries.

Oyewobi and Falolu (2023) examined the effect of public debts as well as increased consumption expenditure raised from tax. The study used time series covering 1992-2022. Data was a analyzed using ordinary least squares. The result revealed a positive relationship between total tax revenue, consumption expenditure, and public debt. Similarly, Indre, Lithuania, Kristina. & Dovile (2023) examined the impact of public debt on tax burden within the member countries of the European Union covering during the period 1995-2021. The study used multiple regression models. The findings suggest a dual impact of public debt on tax burden where a reduction in the current period is followed by an increase in future periods. The influence of public debt on the tax burden is contingent upon the specific level of public debt. When public debt reaches a critical threshold of 55.88 percent of the GDP, any further government borrowing is associated with a consequent augmentation of the tax burden.

Folajimi and Anthonia (2023) evaluated the effect of tax revenue on economic growth in Nigeria covering the 1997-2017. Using inferential statistics, the findings revealed that tax revenue, petroleum profit tax, value added tax, customs and excise duties and company income tax have significant positive effect on economic growth. The study concluded that tax revenue influences economic growth and determines long-run economic growth. Furthermore, Uchida and Ono (2022) analyzed the effect of voting on policies, including labor, capital income taxes and public debt using an overlapping-generations model with physical and human capital accumulation. The results show that the debt ceiling induces the government to shift the tax burdens from the older to younger generations, but stimulates physical capital accumulation and may increase public education expenditure, resulting in a higher growth rate.

Ntekpere and Olayinka (2020) examined the effect of tax revenue on public debt and capital expenditure in Nigeria covering the period 1999-2018. The study employed ordinary least square regression method. The findings revealed that tax revenue had a statistically significant, positive

and negative effect on public debt and capital expenditure. Similarly, Agunbiade and Idebi (2020) examined the relation between tax revenue and economic growth in Nigeria covering the period 1981– 2019. The study employed the Vector Error Correction Modelfor data analysis. Granger causality test found a causal relationship between Real GDP and the different tax components. The impulse response functions and the variance decomposition analysis show that impact of the shock in the indirect and direct taxes on GDP growth. Variance decomposition found that the effect of the shock to the direct tax on GDP growth tends to be low.

Aizenman and Kletzer (2017) examined the relation between optimal public investment and fiscal policy for countries characterized by limited tax and debt capacities using a non-stochastic CRS endogenous growth model. The results show that persistent differences in growth rates across countries could stem from differential public finance constraints, and differentiate between the case where the public expenditure finances the flow of recurring spending (such as law enforcement), versus the stock of tangible public infrastructure. With investment in the stock of public infrastructure, public sector borrowing to finance the accumulation of public capital goods may allow the economy to reach a long-run optimal growth path faster.

3. Methodology

3.1 Model Specification

The model draws from Reinhart and Rogoff (2010b) assertion that high public debt burden leads to higher future taxes or lower government spending in the future when the government is expected to repay its debts which affect public investment in basic infrastructure. Public borrowing is often associated with financing accumulated budget deficits (Afonso and Ibraimo, 2018). High public debt creates the need for changes in economic activity (labor, capital) to cover the public debt, which is limited by increasing tax rates and/or by reducing productive government spending and by implication growth. Furthermore, Robbins and Simonsen (2012) argued that, at constant economic conditions, persistent budget deficit and borrowing means that citizens use public services today in exchange for a combination of higher taxes and reduced spending later.

Following the literature and modelling approach, this study adopted and modified the modelling approach of Folajimi and Anthonia (2023), specified as follows:

$$LogRgdp_{it} = \alpha_0 + \beta_0 Rgdp_{jit-1} + \beta_1 Pub/gdp_{it} + \beta_2 Tax/gdp_{it} +$$

$\beta_3 Topen_{jit} + \beta_4 Ioutp_{jit} + \beta_5 Fex_{jit} + \beta_6 Inr_{jit} + \beta_7 Uemp_{jit} + \theta_i + \varepsilon_{it}1$

Where Rgdp is real GDP; Pub is public debt as ratio of GDP; Tax is tax as ratio of GDP; Topen is trade openness; Ioutp is industry output; Fex as foreign exchange; Inr is interest paid on public debt; Uemp is unemployment rate. (apart from tax and public debt other variables are control variables).

To capture the effect of foreign aid on poverty, the modified model for this study was specified as follows:

$$Rgdp_{it} = \delta Rgdp_{jit-1} + \delta 2 Pub/gdp_{it} + \delta 3 Pub/gdp2_{it} + \delta 4 Tax/gdp_{it} + \delta 5 Tax/gdp_{it} + \delta 6 Topen_{jit} + \delta 7 Ioutp_{jit} + \delta 8 Fex_{jit} + \delta 9 Inr_{jit} + \delta 10 Uemp_{jit} + \varepsilon_{it}2$$

Table 1: **Summary of variables, description and sources**

Variables	Measurement	Source
Dependent		
Real GDP growth rate	Average annual growth of real GDP	WB-WDI
Independent & control variables		
Public debt	Public debt as percentage of GDP	WB-WDI
Tax	Tax as Percentage of GDP	WB-WDI
Trade openness	The ratio of the amount of exports and imports of goods and services to GDP	WB-WDI
Industry output	Ratio of industry output to GDP	WB-WDI
Foreign Exchange	Measure the value of a currency against foreign currency	WB-WDI
Interest rate	Interest paid for public debt as percentage of GDP	WB-WDI
Unemployment	The part of the labor force that does not have a job, but is available and looking for work	WB-WDI

Source: Author's compilation

3.2 Technique of Data Analysis

The regression analysis is based on a two-step system Generalized Method of Moment. The advantage of this approach is that it allows for two equations at different levels, which permits the introduction of more investment for significant and efficient estimation and handles the issues of endogeneity and reverse causality between the dependent and the primary independent variable.

4. Empirical Results and Discussion

4.1 Descriptive Statistics and Correlation Matrix

The descriptive statistics result is shown in Table 2 to explain the variable in terms of their average, standard deviation minimum and maximum values. The analysis is based on 15 countries

in West Africa over the 2010-2022 period. The result revealed that the average real GDP is 3.7. The average public debt for the region is 27.1% with minimum of 18.6% and maximum of 47.3%. The average tax as ratio of GDP is 5.2% with maximum of 21%.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
Rgdp	3.714	3.272	0.949	6.934
Pub/gdp	27.004	0.548	18.644	47.379
Tax/gdp	21.136	4.355	2.897	19.102
Topen	42.60	18.32	9.563	98.235
Ioutp	5.834	0.179	-4.615	10.458
Fex	2.083	1.457	1.423	3.372
Inr	-0.635	3.608	-1.580	1.240
Uemp	-0.523	5.672	-4.722	0.977

Source: Author's computation STATA 13 output

Table 3 shows the correlation analysis for all variables used in this analysis to explain the strength of the relationship between the variables. The results show that all variables positively and negatively correlate with real gross domestic product growth.

Table 3: Correlation matrix

Variable	Rgdp	Pub/gdp	Tax/gdp	Topen	Ioutp	Fex	Inr	Uemp
Rgdp	1.0000							
Pub/gdp	-1.6731	1.0000						
Tax/gdp	0.0368	0.5412	1.0000					
Topen	-4.4526	0.0869	0.0545	1.0000				
Ioutp	-2.0385	0.1073	0.0739	0.0002	1.0000			
Fex	-0.1012	0.2800	0.3896	0.1504	5.0810	1.0000		
Inr	-0.1437	-0.0167	0.0138	0.0226	1.7562	0.2785	1.0000	
Uemp	1.0380	0.1870	0.0938	-0.0076	-0.3579	0.2581	0.6997	1.0000

Source: Author computation STATA 13 output

The strength of the relationship varies between variables with real gross domestic product growth. While tax positively correlate with real growth of gross domestic product, public debt, interest paid on debt and industry output negatively correlate with real growth of gross domestic product in West Africa.

2.2 Estimated results

The Random Effects of Generalized Least Square (GLS) and threshold regression results are presented in Table 4. Empirical studies reviewed have established mixed results on the impact and relationship between public debt and tax on economic growth. On the issue of public debt repaying ability, most of the studies used the debt-to-GDP ratio as a threshold variable on whether West African economies have reached the threshold level of 77% suggested by the World Bank.

Based on the GLS model without the threshold variable for the nexus between public debt, tax and real GDP growth. Overall R square (R^2) value of 0.7516 means that the model captures 75% explained variation within the model. The probability of Wald chi-square test value of 162.53 with a probability value of 0.0000 is significant for the model. The finding shows that the coefficients of public debt and interest paid on debt is negative and statistically significant. The finding is supported by Hoti, Shkurti and Rehman (2022) and Aizenman and Kletzer (2017). However, it did not conform with the findings of Cassou and Shadmani (2018). The coefficient of tax is positive and statistically significant. This finding is supported by Oyewobi and Falolu (2023) and Uchida and Ono (2022).

The data sample was split into two stages according to the degree of threshold to debt level. The findings show that Benin, Burkina Faso, Congo Democratic, Ghana, Guinea, Mali, Niger, Nigeria, Senegal, and Togo are above the 77% threshold while Cabo Verde, Congo Republic, Cote d'Ivoire, The Gambia, Gabon, Guinea Bissau, Liberia and Mauritania are below the 77% threshold. The estimated threshold less than and greater 77% threshold has the threshold value of 0.009 and 0.026 respectively with probability value less than 0.05.

Table 4: Estimated regression results using debt-to-real GDP ratio as a threshold variable

	Linear Model Without Threshold	Threshold Model	Threshold Model Below 77% Ratio	Threshold Model Greater than 77% Ratio
Constant	19.7 (62.94)***	19.3 (68.9)***	18.46 (49.9)***	18.9 (47.8)***
Rgdp	0.13 (5.56)***	0.06 (2.75)***	0.036 (1.74) *	0.082 (2.58)**
Pub/gdp	0.09 (6.89)***	0.075 (7.82)***	0.270 (2.16)**	0.101 (7.13)***
Tax/gdp	-0.01 (-9.55)***	-0.001 (-0.93)	-0.002 (-1.36)	0.002 (0.94)
Topen	-0.07 (-3.97)***	-0.058 (-4.19)***	-0.011 (-0.49)	-0.084 (-4.41)***
Ioutp	0.04 (0.56)	0.067 (1.23)	0.426 (4.62)***	-0.04 (-0.64)
Inr	-0.08 (-0.77)	-0.037 (0.49)	-0.037 (-0.27)	0.024 (0.21)
Uemp	0.07 (0.79)	0.072 (0.81)	-0.402 (-3.41)	0.302 (2.64)
Threshold estimate		25.01		
Bootstrap p-value		0.0000		
(below threshold)			0.026 (15.2) ***	
(above threshold)				0.009 (9.73) ***
Number of Groups		37	16	21
Overall R Square		0.3233	0.2112	0.3176
F-Statistic	0.7516 (186.53)****	(54.38)****	(48.92)****	(33.85)****

Source: Author's computation, STATA 13 output

5. Conclusion and Recommendations

This study examined the effect of public debt and tax on economic growth in West Africa covering the period 2010-2022. The regression analysis used was based on a two-step system Generalized Method of Moment and threshold regression which allows for two equations at different levels and permits the introduction of more investment for significant and efficient estimation and handles the issues of endogeneity and reverse causality between the dependent and the primary independent variable. The finding shows that the coefficients of public debt and interest paid on debt is negative and statistically significant while tax is positive and statistically significant in influencing growth. Furthermore, the countries with threshold above 77% are Benin, Burkina Faso, Congo Democratic, Mali, Niger, Nigeria, Senegal, and Togo. Those with threshold below 77% are Cabo Verdi, Congo Republic, Cote d'Ivoire, and Gabon are above the 77% threshold. The estimated threshold less than and greater 77% threshold has the threshold value of 0.009 and 0.026 respectively with probability value less than 0.05.

Based on the findings, the study suggests that West African economies should as a matter of necessity diversify their economies away from dependence on primary products. Take advantage of Africa Continental Free Trade Are (ACFTA) initiative to boost their productive capacity and raise tax potential. Deepen the provision of basic infrastructure to boost industrial productivity.

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