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Debt-Economic Growth Nexus: Empirical Evidence from South-South States of Nigeria

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Abstract: The purpose of this study is to investigate the debt-economic growth nexus among states domiciled in South-South region of Nigeria. Using data from 2014-2019, the study employed the dynamic panel ordinary least squares (DOLS) to correct for simultaneity bias among the regressors and small sample bias, which are all associated with OLS estimator. It also adopted the Pedroni (1999, 2004) and Larsson, Lyhagen and Lothgreen (2001) techniques to establish the presence of a long-run relationship. The results affirmed that the South-South States are bedevilled by huge debt burden through the years, restraining and inhibiting their economic performance, since both domestic and external debts have impacted negatively on economic growth. The findings of this study showed that South-South states, and by extension other sub-national governments are faced with numerous macro- and micro-level challenges orchestrated by external and domestic debts and requires responses from relevant stakeholders to stabilize the narrative. The novelty of this study is twofold. This systematic analysis of the impact of domestic and external debt is the first of its kind focusing solely on South-South geopolitical zone of Nigeria. Unlike previous studies, the study carried out a state-by-state as well as panel cointegration test to establish longrun relationship.

Keywords: external; domestic; growth; debt

JEL Classification: F43, E51, C32

1. Introduction

Economies globally rely on debt to carry out several macroeconomic activities at different points in time. This include advanced economies such as the United States of America, France, Germany, Spain and others. Borrowing is a traditional means of financing projects in an economy when generated revenue falls short of intended

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expenditure. The residual resulting from matching the revenue with expenditure is the deficit. Over the years, the growing fiscal deficit in Nigeria has negatively affected macroeconomic stability resulting in accumulation of huge debt burden which has crippled economic performance. One reason for this is the rising debt stock and the accompanying debt service stock. Tactlessly, the economy continues to borrow to finance its budgets from year to year. A case in point is the debt arrangements by government during the COVID-19 pandemic.

Unfortunately, debt issues are not limited to federal government in Nigeria, as state governments are also seriously indebted externally and domestically. With huge allocations from the central government, state governments have continued to promote ambitious and unviable projects, further straining the viability of their economies. The states in the South-South geo-political zones are a good reference point. A reason for examining these states is that they contribute the largest proportion of the country's oil earnings and the geographical location of this sub-region has endowed it with huge agricultural potentials by virtue of its arable land mass and water bodies that can transform this sub-region if properly harnessed. However, the budget books and economic activities of the South-South states show that they are highly indebted internally and externally. A cursory look at Table 1 and Table 2 show a horrifying scenario of their debt situation. For instance, Table 1 clearly shows that Akwa Ibom (AKS), Bayelsa (BAY), Cross River (CRS), Delta (DT), Edo (ED) and Rivers (RS) accrued ₦1,281.23 billion, ₦1,197.1 billion, ₦1,109.26 billion, ₦1,741.44 billion, ₦531.95 billion and ₦1,347.83 billion, respectively between 2011 and 2019; accumulating a total debt stock of ₦7,207.11 billion in nine years.

Table 1. Domestic Debt of South-South States (₦' Billion)

Year	Akwa Ibom	Bayelsa	Cross-River	Delta	Edo	Rivers
2011	41.25	162.82	90.75	90.84	39.04	83.98
2012	108.89	222.40	90.87	83.68	62.27	81.46
2013	125.04	69.51	116.06	102.10	48.19	129.55
2104	81.76	91.68	107.34	211.95	40.05	91.76
2015	145.58	103.37	115.52	320.61	46.29	134.97
2016	155.43	140.18	128.14	241.23	45.09	142.42
2017	187.28	129.47	125.65	228.33	68.51	191.16
2018	198.66	130.04	167.98	228.81	86.82	225.59
2019	237.34	147.93	166.95	233.89	95.69	266.94

Source: Central Bank Statistical Bulletin; Office of the Auditor General

Table 2 showed the external indebtedness of the South-South states. Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers accrued $733.02, $459.23, $1,707.62, $425.21, $1,537.11 and $609.15 respectively between 2007 and 2019, resulting in a total of $5,471.34. Cross River state has the highest external debt stock, while Delta

State reported the least. A disturbing feature of this phenomenon is that this huge debt stock is not inclusive of servicing obligations. The states in the South-South region continue to wallow in deep economic crisis including high inflation rate, poor social infrastructure or amenities, disturbing unemployment crisis, heightened insecurity as well as high cost of governance. Regardless of the huge local and foreign borrowing, the deficit gap continues to widen. The proportion of deficit financed with external loans continued to peak from year to year, growing at an alarming rate. All these have attendant effects on the growth trajectory of the states in both the short and long-run periods and the citizenry are directly affected by such fiscal activities and posing huge threats to the states' economic sustainability.

Table 2. External Debt Stock ($) million

Year	AKS	BAY	CRS	DT	ED	RS
2007	60.06	22.29	94.45	24.17	33.31	30.99
2008	60.36	25.79	99.39	21.57	31.68	32.34
2009	58.74	25.05	101.83	19.48	42.05	33.73
2010	61.38	26.37	110.91	16.38	41.19	35.51
2011	62.65	27.45	107.53	15.4	42.51	33.86
2012	61.66	28.00	113.03	18.99	42.74	36.64
2013	61.84	28.66	121.97	19.67	44.29	42.69
2014	58.89	34.83	141.47	24.23	123.13	44.73
2015	52.72	37.6	136.40	38.79	168.19	46.92
2016	50.56	39.25	114.99	42.32	183.64	48.26
2017	50.52	47.77	167.92	58.39	232.20	66.77
2018	45.66	56.62	188.77	63.29	276.25	78.28
2019	47.98	59.55	208.96	62.53	275.93	78.43

Source: Central Bank Statistical Bulletin; Office of the Auditor General

This paper will thus investigate the debt-growth nexus of the South-South states in Nigeria. Specifically, the study will examine the following hypotheses:

H_1: Domestic debts do not significantly impact economic growth in South-South states in Nigeria.

H_2: External debts do not significantly impact economic growth in South-South states in Nigeria.

Following this introductory section, the remaining sections are structured into 4 parts. Section 2 considered a review of empirical literature with a view to finding established relationships in previous studies. The methodology and the discussion of results were presented in sections 3 and 4 respectively, while section 5 drew conclusions developed on the basis of the findings and proffered recommendations aimed at stimulating productive and sustainable debt policies and maintaining economic stability.

2. Literature Review

Generally, literature abound on debt and its impact on the performance of the Nigerian economy. These empirical studies have employed different methods in evaluating such relationship. For instance, Festus and Saibu (2019) in a study using autoregressive distributed lag (ARDL) model, showed that external debt adversely impacts economic performance in Nigeria. Their study spanned 1981-2016 and the study recommended a need for accountability in governance and proper utilization of debt instruments. Similarly, in the study of Onakoya and Ogunade (2017), efforts were focused on the examination of the debt-growth relationship using an ARDL model on data spanning 1984-2014. A negative relationship was found leading to a conclusion which suggests transparency in acquiring and expending financial resources on capital project rather than recurrent obligations in Nigeria. Data obtained between 1984 and 2012 was employed in an ARDL model by Olasode and Babatunde (2016). The study established a negative relationship in the debt-growth nexus as in previous studies and suggested that government should adequately manage external debts and fully utilize them for economically viable projects. Still within the ARDL framework, Lawal, Babalola, Otekunri and Adeoti (2016) utilized data from 1981-2014 to prove that external debt adversely affect growth in Nigeria. The study affirmed this in both the short- and long-run. Among other economic options, the study suggested a close monitoring of secured debts by monetary authorities in order not to move beyond recommended thresholds.

Utilizing 1980-2016 data, Dal and Ayokunle (2020) also proved that domestic debt has adversely affected growth in Nigeria both in the short- and long-run. The study recommended that government should select a target on the acquisition and utilization of debts. Udeh, Ugwu and Onwuka (2016) evaluated the effect of foreign debt on economic growth in Nigeria from 1980-2013. Whereas debt had a positive effect on growth in the short-run, in the long-run however, there was a reversal and the study upheld that government should check the rate of accumulating debts using well-defined criteria.

Omodero and Alpheaus (2019) utilized the OLS method to analyze data spanning 1997 - 2017 to establish that while external debt negatively impacts growth, its servicing burden positively affect economic growth, prompting the study to suggest stringent measures on the part of government to check excess foreign borrowing. Bolanle, Fapetu and Olufemi (2015) found a negative external debt-economic nexus in Nigeria from 1990 - 2013 using an error correction model while conversely, Ndubuisi (2017) found that the relationship was positive between 1985 and 2015 asserting that such positive impact was due to government investing the debts on infrastructural development. Thus, there is need for improved debt management practices in Nigeria.

Obisesan, Akosile, and Ogunsanwo (2019) empirically establish that external debt and its service payments has negative impact on growth, thus prompting the study to suggest that loans should be closely supervised to ensure it maximal utilization. This was corroborated by the study of Essien, Agboegbulem, Mba, and Onumonu (2016) which utilized data between 1970 and 2014 and focus on debt in the public sector.

Olugbenga and Oluwole (2019) employed a structural VAR on economic data between 1970 and 2014 and confirmed that the debt overhang hypothesis is true in Nigeria. The study thus proffered economic policy recommendation such as contractionary fiscal budget and accountability in spending among other economic options.

It is clearly seen from the literature reviewed that there is a dearth of empirical studies on debt and economic growth at the state level in Nigeria. This is especially important given the debt burden of the various states in Nigeria. Other than the conventional allocation from the central government, states in the country has continued to wallow in debt quagmire. Unexpectedly, is the enormous debt burden of states in the South-South zone of Nigeria; a region responsible for the bulk of the internally generated revenue of the country through its natural resource, crude oil. It thus became imperative to examine the impact of debt on the economic growth of the region. This study is thus poised to fill this gap. At the time of this research, there were no evidence of empirical studies that examined debt and economic growth at a disaggregated state-level in Nigeria.

3. Methodology

This section covers the theoretical framework and the various econometric techniques adopted to accomplish the objective of the study. The study adapts the Cunningham (1993) and Romer (1994) growth and debt model as expressed in Akram (2013). Debt burden was first introduced into the production function by Cunningham (1993) owing to its huge implication on capital and labour productivity. Often times, economies are severely affected since they utilized a sizable chunk of resources to sustain the debt burden through the period. Thus, debt was introduced by Cunningham (1993) into the production function as follow:

$$Y = A(A, L, DEBT) \tag{1}$$

An essential element missing in equation (1) is human capital. This element was subsequently introduced by Romer (1994) in the debt-growth model as seen below:

$$Y = A(K, L, DEBT, H) \tag{2}$$

In the expression 2, output (Y), capital stock (K), labour (L), human capital (H) and debt stock (DEBT) are fully captured. To arrive at a steady state, three dramatis personae were considered. These are the firms, government, and individual.

- *Firms*

The model assumes an economy with *i* firms with a production function given as:

$$y_i = A_i G k_i^\alpha l_i^{1-\alpha} \tag{3}$$

Where A_i denotes the level of technology in the economy. The firm also utilizes capital stock (k_i), labour (l_i) and public goods (*G*). Given these resources, the firm maximizes profits given the condition in equations 4 and 5:

$$\frac{\partial y_i}{\partial k_i} = \alpha \left(\frac{y_i}{k_i}\right) = r \tag{4}$$

$$\frac{\partial y_i}{\partial l_i} = (1 - \alpha)\left(\frac{y_i}{l_i}\right) = w \tag{5}$$

Where wage (*w*) and interest rate (*r*) are the underlying factors.

- *Individuals*

It is assumed that an individual that works in a firm has two options in expending his wage. He spends a proportion on consumption, and saves the other proportion. An individual is faced with the lifetime budget constraint given as:

$$(1 - \tau_{t-1})w = c_{t-1} + \frac{c_t}{1 + (1 - \tau_t)r_t} \tag{6}$$

Utility function is given as:

$$U = (1 - \delta)c_{t-1} + \delta c_t \tag{7}$$

The individual saving function is:

$$s = (1 - \tau)w - c_t \tag{8}$$

- *Government*

Debts and taxes are the main sources of government finances as captured below:

$$G_t - G_{t-1} = D_t - D_{t-1} + (1 - \vartheta)T \tag{9}$$

Government finances it budgets through public debt/bond (*D*) and/or taxes (*T*). Note ϑ of total collected taxes services government debts such that $rD = \vartheta T$.

$$T = \tau(w + rs_{t-1})N \tag{10}$$

N represent total individuals while derived income from savings interest is given as rs_{t-1}. A synchronization of equations 9 and 10 results in:

$$(D_t - D_{t-1}) + \tau(w + rs_{t-1})N = G_t - G_{t-1} + rD \qquad (11)$$

It should be noted that

$$(D_t - D_{t-1}) - (G_t - G_{t-1}) = rD - T < 0 \qquad (12)$$

Equation 12 shows that in order to cushion the negative effects of debt on an economy, taxes must exceed interests on debts.

- *Economic Growth Equilibrium*

Assuming linear homogeneity of the production function, equation (2) can be written as:

$$Y_t = A_t K_t^\alpha H_t^\beta L_t^\gamma D_t^{1-\alpha-\beta-\gamma} \qquad (13)$$

A and *L* is assumed to grow at the rate of ρ and η respectively

$$L_t = L_0 e^{\eta t} \qquad (14)$$

$$A_t = A_0 e^{\rho t} \qquad (15)$$

The growth of economy is determined by:

$$
\left.
\begin{aligned}
\dot{k}_t &= s_k y_t - (\eta + \rho + \lambda)k_t \\
\dot{h}_t &= s_h y_t - (\eta + \rho + \lambda)h_t \\
\dot{d}_t &= s_d y_t - (\eta + \rho + \lambda)d_t
\end{aligned}
\right\} \qquad (16)
$$

While the steady state conditions are given as:

$$\dot{k} = \left[\frac{s_k^{1-\beta-\gamma} s_h^\beta s_d^\gamma}{(\eta + \rho + \lambda)} \right]^{\frac{1}{1-\alpha-\beta-\gamma}}$$

$$\dot{h} = \left[\frac{s_k^\alpha s_h^{1-\alpha-\gamma} s_d^\gamma}{(\eta + \rho + \lambda)} \right]^{\frac{1}{1-\alpha-\beta-\gamma}} \qquad (17)$$

$$\dot{d} = \left[\frac{s_k^\alpha s_h^\beta s_d^{1-\alpha-\beta}}{(\eta + \rho + \lambda)} \right]^{\frac{1}{1-\alpha-\beta-\gamma}}$$

Where $(\alpha + \beta + \gamma) < 1$; k = K/L; h = H/L; d = D/L and y = Y/L.

The steady state equation is thus given as:

$$In\left[\frac{Y_t}{L_t}\right] = InA_0 + \rho_t + \frac{\alpha+\beta+\gamma}{1-\alpha-\beta-\gamma}In(\eta+\rho+\lambda) + \frac{\alpha}{1-\alpha-\beta-\gamma}Ins_k +$$
$$\frac{\beta}{1-\alpha-\beta-\gamma}Ins_h + \frac{\gamma}{1-\alpha-\beta-\gamma}s_d \qquad (18)$$

Equation (19) shows that the growth of the economy hinges on capital (human and physical) and debt all other factors assumed constant. The model clearly showed the importance of debt in government economic activities. The study thus, estimates the following econometric model:

$$LGDPG_{it} = \alpha_i + \beta_i DDEBT_{it} + \gamma_i EDEBT_{it} + \varepsilon_{it} \qquad (19)$$

The model above allows for cointegrating vectors between the states as well as state (α_i) fixed effects. GDPG denotes gross domestic product growth rate; DDEBT denotes share of domestic debt to GDP and EDEBT denotes share of external debt to GDP.

The study adopts Im, Pesaran and Shin (2003) and Levin, Lin and Chu (2002) to establish the stationarity of the dataset. The null hypothesis states that the series have a unit root. Therefore, rejecting the null hypothesis indicates stationarity. Pedroni (1999, 2004) and Larsson, Lyhagen and Lothgreen (2001) techniques are employed to establish the presence of a long-run relationship; while dynamic panel ordinary least squares (DOLS) establishes the direction and magnitude of impact of the variables in the model. Panel DOLS is able to correct simultaneity bias among the regressors and small sample bias, which are all associated with OLS estimator. The study did not include control variables to minimize omitted bias, since there were no proxies for these variables even at a disaggregated state-level. It is also assumed because of the short period of the time series, the issue of endogeneity will be absent from the estimation. The variables were expressed in their log form and data for the model were drawn from secondary sources which include audited reports from the offices of the Auditor-General in the six states in the South-South zone of Nigeria and the Central Bank of Nigeria (CBN) *Statistical Bulletin* (2019). Due to availability of States GDP, the study employed data of 2014 to 2019 across these states.

4. Results and Discussion of Findings

In order to avoid spurious regression results, the study adopted a panel unit root test. The result is presented in Table 3 below:

Table 3. Panel Unit Root Test

Variable	LLC		IPS	
	No time effects	Time fixed effects	No time effects	Time fixed effects
LGDPG	-1.462	-2.017	3.196$^{\Omega}$	9.372$^{\omega}$
LDDEBT	-0.961	-1.013	-0.048	-1.180
LEDEBT	-0.686	-1.134	-1.710	-1.831
ΔLGDPG	-7.986$^{\omega}$	-13.351$^{\omega}$	-13.925$^{\omega}$	-15.813$^{\omega}$
ΔLDDEBT	-3.447$^{\tau}$	-6.025$^{\omega}$	-6.799$^{\omega}$	-9.418$^{\omega}$
ΔLEDEBT	-8.105$^{\omega}$	-11.427$^{\omega}$	-12.007$^{\omega}$	-18.116$^{\omega}$

Source: Authors' compilation
Note: $^{\omega}$, $^{\tau}$, and $^{\Omega}$ signifies statistical significance at 1%, 5% and 10% respectively.

Stationarity in all variables was achieved at first differences, implying that a cointegration test is needed to estimate long-run relationship. Table 4 shows the cointegration test results:

Table 4. Panel Cointegration Test

Dependent variable: LGDPG	Statistic
Panel variance	-0.937
Panel ρ	-5.061$^{\tau}$
Panel PP	-2.141$^{\tau}$
Panel ADF	-7.416$^{\tau}$
Group ρ	2.416$^{\tau}$
Group PP	-1.908$^{\tau}$
Group ADF	-3.115$^{\tau}$

Source: Authors' Compilation
Note: $^{\omega}$, $^{\tau}$, and $^{\Omega}$ signifies statistical significance at 1%, 5% and 10% respectively.

Table 4 showed that other than the panel variance, all the other cointegration tests significantly rejected the null hypothesis of no cointegration. The implication of this is that the variables move together in the long-run. It is imperative also to ascertain the nature of the relationship between GDPG, DDEBT and EDEBT. Table 5 shows individual state-by-state and panel cointegration results.

Table 5. Panel Cointegration Test*

State	Lag	LM(1)	r = 0	r = 1	r = 2	Rank
AKS	1	7.15	16.05	7.32	1.05	0
BAY	1	10.22	21.73	11.91	4.17	2
CRS	1	5.69	32.19	13.84	0.31	0
DT	1	9.14	15.73	8.79	0.54	1
ED	1	15.11	29.41	14.25	1.21	0
RS	1	5.47	19.58	7.71	1.45	1
Panel test			15.36	6.41	0.21	1

Source: Authors' Compilation

*Note: * Based on Larsson, et al (2001) method; LM(1) denotes the Lagrange-multiplier test for residual autocorrelation of order 1.*

The results above showed that there is at least two cointegrated vectors which implies the presence of panel cointegration. The Larsson, et al (2001) test showed that there is long-run stability among the variables. In a bid to deal with endogeneity bias, we estimated the panel DOLS. The panel DOLS results are presented in Table 6 below:

Table 6. Panel Dols Results

Dependent variable: GDP growth		
State	**Share of domestic debt to GDP**	**Share of external debt to GDP**
AKS	-0.21 (5.93)$^\tau$	-0.48 (3.29)$^\tau$
BAY	-0.19 (3.08)$^\tau$	-0.10 (5.18)$^\tau$
CRS	-1.37 (11.01)$^\omega$	-0.02 (1.83)$^\Omega$
DT	-0.98 (1.58)$^\Omega$	-2.61 (15.31)$^\omega$
ED	-0.07 (2.97)$^\tau$	-0.83 (4.01)$^\tau$
RS	-0.69 (4.01)$^\tau$	-1.27 (3.10)$^\tau$
Panel	0.25 (11.91)$^\omega$	0.97 (17.02)$^\omega$

Source: Authors' compilation

Note: *Values in parenthesis are t-values. $^\omega$, $^\tau$, and $^\Omega$ signifies statistical significance at 1%, 5% and 10% respectively.*

A cursory look at the results in table 6 showed that all coefficients are statistically significant. At the state level, share of domestic debt to GDP and share of external debt to GDP have a significant negative impact on GDP growth in all the states in the south-south region of Nigeria. Specifically, a 1 percent increase in share of domestic debt to GDP decreases GDP growth by around 0.21 percent; 0.19 percent; 1.37 percent; 0.98 percent; 0.07 percent; and 0.69 percent in Akwa Ibom; Bayelsa; Cross River; Delta; Edo; and Rivers States; respectively. This statistic implied that the negative effect of share of domestic debt to GDP on GDP growth is highest in Cross River, followed by Delta State while Edo State recorded the least effect.

Similarly, a 1 percent increase in share of external debt to GDP significantly decreases GDP growth by around 0.48 percent, 0.10 percent, 0.02 percent, 2.61 percent, 0.83 percent and 1.27 percent in Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers States, respectively. The panel parameters of share of domestic debt to GDP and share of external debt to GDP are 0.25 and 0.97, respectively. These statistics suggested that overall, a 1 percent increase in share of domestic debt to GDP and share of external debt to GDP decreases GDP growth by 0.25 percent and 0.97 percent, respectively. These results clearly showed that debts adversely impacted growth in the South-South states of Nigeria. This situation is further worsened by the huge debt servicing obligations. With constraints in revenue from the central government, state governments will continue to grapple with the adverse effect of increasing debt stock.

5. Conclusion

The study examined the debt-economic growth nexus among South-South states in Nigeria. Although economic theory posits that a guided level of debts is necessary to cover the fiscal deficit gaps, this study however revealed that overall, the debt burden of the states in the South-South region of Nigeria is highly unsustainable and detrimental to economic growth. There is thus, need for the various states in the region to develop inward-looking policies aimed at securing and increasing internally generated. The region is so richly blessed with abundant natural resources and arable land for agricultural purposes which the states can take advantage of and look beyond a region with crude oil revenue instead of borrowing locally or externally. It can also be inferred from the study that the policy of fiscal federalism practiced in Nigeria is actually not helping to grow the economy, particularly those of states that contribute significantly to federal revenue such that a decentralization of revenue collection, derivation and allocation formula is inevitable. This conclusion is drawn from the fact that the states in the South-South geo-political zone of Nigeria are known to be blessed with huge crude oil deposits which drive the economy of Nigeria, an oil dependent country. Therefore, fiscal decentralization policies should be vigorously implemented to empower the subnational governments in developing their states rather than overdependence on the central government for financial resources, since the central government in most cases rely on external sources for such activities. There is thus need for financial independence at all levels of governments in Nigeria. Furthermore, there should be transparency in governance at both the central and subnational levels. This will help guide the procedure of acquiring debt stock and utilizing such resources for economic development. Machinery for proper monitoring and management of state projects should be put in place to strengthen transparency and accountability and in helping to curb endemic corrupt practices which constitute the major leeway for siphoning resources meant for economic growth and developmental programmes.

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