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Domestic Debt and Service Sector Output in Nigeria: An Empirical Analysis

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Abstract: *This study investigated the impact of domestic debt on service sector output in Nigeria from 1985 to 2023 using the Dynamic OLS model. The dependent variable was service sector output, while the explanatory variables were domestic debt stock, interest rate, government capital expenditure, and inflation rate and efficiency ratio. Data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin and the National Bureau of Statistics (NBS). The series were subjected to Unit root and cointegration tests. The results of the Augmented Dickey Fuller showed that all the series were stationary at first difference 1(1). The cointegration test confirmed the existence of a long-run relationship among the variables. The findings of the study showed that domestic debt stock exerted positive significant impact on the service sector output. Interest rate and inflation negatively influence the service sector, while government capital expenditure and efficiency ratio exhibited negative significant effects. The study concluded that domestic borrowing, if prudently managed, could support service sector growth. The author recommended effective debt management and fiscal discipline to boost the service sector's contribution to Nigeria's economy.*

Keywords: domestic debt, service sector output, government capital expenditure, interest rate Nigeria

INTRODUCTION

Service sector has grown greatly in the developed and developing countries including Nigeria. The contribution of the service sector can be felt in employment generation, income generation and economic diversification and innovation (Hada & Suri, 2019; Phiri et al., 2022, Hassan & Hoque, 2024; Kundu & Bandyopadhyay, 2025). It is gradually becoming the mainstay of some economies because of its enormous contribution to the GDP. In Nigeria alone, the service sector contributes over 57 percent of the GDP in 2025. The rise in the contribution of the service sector to the economy has shown that it may serve as impetus to enhance the growth of other sectors, especially in the developing countries where many sectors are experiencing stunted growth. Service sector has been identified as the driver of innovation, which enhance

productivity across industries, including manufacturing (Lagrand & LeJoie, 2013; Lee & Miyazaki, 2011; Rewatkar & Mansuri, 2024).

The ability of the service sector to stimulate the growth needed in the economy depends on easiness of sourcing fund in the financial market. Attracting fund in the financial market is subjected to factors, which include quantity of financial instruments, prevailing interest rate in the financial markets, and quantity needed by each participant. The seekers of fund in the domestic financial market include the government that needs funds to carry out its various obligations in the country. The demand for fund by the government in the domestic markets has implication on the potent of the private sector to secure fund at moderate interest rate; because government has the tendency to accept any rate offered by the financial institutions. As such, the entrant of the government can crowd- out the private investment (Udeh, 2018; Adegboye et al. 2020). As at 2023, the total debt of the obligations of the government in the domestic financial market stood at ₦22 trillion from ₦500 million in the mid- 1980s (National Bureau of Statistics, 2023). This obligation shows that the rising debts have the potential to crowd – out investment in the service sector.

The fact above showed that there exists a relationship between the domestic debt and the service sectors, and the existing empirical literature has not yet provided clear or sector-specific evidence on how domestic debt affects the services industry. Most studies such as Kijambu et al. (2025), Hassan et al. (2025), Sekarani et al. (2024), Ahmed et al. (2023), El- Yaqub et al. (2024), Hadji (2023), Abdullahi et al. (2021), Ramakrishina (2020) focus mainly on the relevance of domestic to economic growth, credit to the private sector and financial development. One of the attempts to examine the relationship between domestic debt and service sector was by Abdullahi et al. (2021) in Pakistan; and the results showed that debt has impact on the service sector in the long run.

The need for empirical investigation of the relationship between domestic debt and service sector arises from the fact that the government is in dilemma between the appetite to borrow internally and the desire to ensure that the service sector continue to grow. The Nigerian domestic debt has already risen to ₦80.5 trillion and the service sector is contributing at least 57% of the GDP at present. This dilemma calls for the need to investigate whether the growth of domestic debt hinders the contribution of the service sector in Nigeria. Since the domestic debt is mainly used for recurrent expenditure rather than the infrastructure that supports the service sectors. This can make the debt to be a drag rather than a stimulant. As such, this study will determine if the current debt profile is supporting or stifling the growth of the service sector.

LITERATURE REVIEW

Conceptual definitions

Domestic debt is the borrowed funds obtained locally by the government from institutions such as commercial banks, non – financial institutions, and private individuals. According to Ozurumba and Kanu (2014), these are borrowed funds from the internal sources and within the confines of the country. Treasury bills, bonds and promissory notes are some of the instruments used to make the funds available to the government.

Service Sector is the sector of the economy that render intangible goods and services. It is the sector characterises by intangible nature, non- transferability, employment generation, diversity of activities and driving force of the economy in the term of contributions to the GDP (Hada & Suri, 2019; Harini & Indira, 2014).

Theoretical review

Crowding-Out Effect Theory

This theory could be traced to the classical economics and was later refined by Blinder and Solow (1973). The main argument of this theory is that interest rate rises when government borrowed from the financial markets; and thereby discourage private investment. This theory explains that there is competition between the government and the private sector in a market characterises by limited financial instruments. This theory has been employed by Udeh (2018) and Adegboye et al. (2020). Udeh (2018) found out that crowding out effects took place in a credit- constrained Nigerian environment. This finding emerges from analysis of debt-investment relationship in Nigeria, one side hand. On the other side, Adegboye et al. (2020) revealed a robust evidence of financial crowding – out in Nigeria. Empirical evidence from Adegboye et al. showed that domestic debt crowded out private investment in Nigeria.

Keynesian Theory of Public Debt

In the Keynesian theory, John Maynard Keynes (1936) held the view that public debt is important in stimulating economic activity. He argued that this is particularly needed during periods of economic slack. Such borrowing can be used to finance productive investments. Aggregate demand, employment and output can be stimulated. One such area, where such fund is directed to is infrastructural development, which supports the growth of the service sector. The theory further argued that excessive borrowing can lead to inflationary pressure. The inflationary pressure can exert negative impact on the private investment. This theory showed that domestic debt can trigger growth in the service sector, if borrowed fund is used productively and within sustainable limits. This theory posited that the infrastructure deficits can be enhanced through productive public investment. In addition, the service sector is consumption- driven, which makes it to be of demand- side economics. Lastly, the current state

of Nigerian environment can lead to the situation where debt-financed spending can lead to positive growth, especially in the service sector.

Empirical review

Kijambu et al. (2025) investigate the relationship between domestic and credit to the private sector in Uganda. The results from Granger causality and ARDL showed that the relationship between domestic debt and credit to the private sector was negative in the short run and long run. Hassan et al. (2025) investigated the relationship between public debt and economic growth in Nigeria. Using data from 1986 to 2024 and ARDL, their findings revealed that domestic and external debts exerted significant positive long- run effects on growth. The focus of the study by Sekarani et al. (2024) in Indonesia was on how the domestic debt affected the financial development. Drawing from data from 2010Q1 to 2020Q3 and with the employment of Principal Component Analysis and Ordinary Least Squares (OLS), their findings showed that domestic debt exerted positive significant impact on financial activity and financial size only; and not on financial efficiency.

Using time series data from 1960 to 2022 in Bangladesh, Ahmed et al. (2023) revealed that domestic debt and credit to the private sector exerted significant impact on economic development. Another study in Nigeria, which addressed the impact of domestic debt on the economy is by El- Yaqub et al. (2024). Their results showed that interest on domestic debt exerted negative influence on the economy. Hadji (2023) examines the relationship between domestic debt and economic growth in Sierra Leone. His study covered the period 1973 to 2021 and the results from the ARDL showed that debt service exerted negative impact on economic growth in both short- run and long – run.

Abdullahi et al. (2021) explore the nexus between concessional debt and the growth service sector in Pakistan. Using annual time series data from 1972 to 2019, they found that the concessional debt has impact on the growth of the service sector in the long run. In the addition, they found that the lag of concessional debt exerted positive impact on the growth of the service sector in the short run. Study by Ramakrishina (2020) showed that the sources of service sector growth in India could be said to be income elasticity of demand; and the performance of the service sector was quite higher than that from agriculture and industry.

Akpansung (2018) took a look at the impact of the domestic debts on private sector credit, lending rate and real output. Using Multivariate Vector autoregression approach and data sourced from 1981 to 2016, he found that domestic debts exerted statistically insignificant positive impacts on both the private sector credit and prime lending rate. One more study from India was done by Behera (2018). Behera investigated employment dynamics in service sectors from 1972 – 1973 to 2011 – 2012; and found that employment in organised services exerted positive impact on non- services output. Salam et al. (2018) examined the determinants of service sector growth in some selected developed and developing economies. The results of their panel data estimation showed that GDP per capita, FDI net inflow, trade openness and innovations were common determinants of the growth of the service sector.

Using data from 1980 to 2015 in Nigeria, Okwu et al. (2016) discovered that domestic debt influenced the economy positively both in the short- run and the long – run. Similar study in Nigeria is that of Bakare et al. (2016), which examine the relationship between domestic debt and economic growth. Their findings showed that domestic debt exerted significant positive impact on economic growth. . In the study by Ramakrishna (2015) in Ethiopia, the ARDL result showed that service sector contributed significantly to economic growth while public debt did not have significant influence on economic growth. In the study conducted by Darma (2014), it was found that internal debt exerted positive impact on social services provision. This result by Darma was from the data from 1980 to 2010 in Nigeria on causality between debt service payments and provision of social services in Nigeria. Mbate (2013) investigates the relationship between domestic debt and economic growth in Nigeria. His findings showed that domestic debt has positive influenced on economic growth.

In the study of Ahmad et al. (2012) in Pakistan, they found that domestic debt and domestic debt servicing exerted positive and significant impact on inflation. Using quarterly data between 1994 and 2008, Onyeiwu (2012) provided an explanation on the impact on domestic debt on economic growth. The results of his Ordinary Least Squares (OLS) showed that the level of domestic debts has negative effect on economic growth in the period under study. In the study by Pattanaik and Nayak (2011), it was found that achieving higher employment elasticity in the service sector could be enhanced through investment friendly environment, better public expenditure management, effective labour policies and proper structural transformation. These results emerged from the empirical analysis of the data from 1960-61 to 2005-05. Sanidas and Park (2011) examined the role of the service sector and other factors in Korea's economic growth of industries. Their findings showed that the service sector has increased efficiency in the economy of Korea both in the output and input.

Another study in India on service sector was that of Banga and Goldar (2007). In the study, Banga and Goldar engaged panel data of 143 three-digit level industries for 18 years and found that service sector contributed significantly to output and productivity growth in the manufacturing sector. A study, which examined the role of services was that of Sasaki (2007), and it showed that service sectors caused shifts in the employment from manufacturing sectors and affected the rate of economic growth. Banga (2005)'s study on service sector showed that the service sector experienced low productivity in comparison to other sectors in the developing economies. Banga also found that service sector was highly labour intensive; and as such, the sector lacked attributes such as capital accumulation, innovation, or economies of scale.

RESEARCH METHODOLOGY

Crowding out theory appeared to provide a more robust explanation of the dynamics of domestic debt and output, especially in the context of acquiring domestic debt and its impact on service sector output among the developing countries such as Nigeria. This theory has shown that domestic debt can trigger the growth needed in the service sector, if properly allocated and utilised. The crowding out theory is well applicable to Nigeria because of the

specific characteristics of Nigerian financial market, which is shallow and possesses limited instruments. As such, government borrowing could put pressure on the interest rates. The pressure on interest rates can weaken the ability of the service sector to pull fund from the financial markets. Since the majority of the participants in the service sector are in the private sector, government borrowing from the domestic financial market is rather a burden than a blessing. In addition, borrowed fund from the domestic financial market by the government can hinder the growth of the service sector; when such funds do not go infrastructural development, where they can be of benefits to the service sector. This theory showed that domestic debts exert negative influence on the service when government borrows from the domestic financial market because liquidity is squeezed from the private investors.

From the explanation of the crowding- out hypothesis about Nigeria, we derived the various explanatory variables employed in the study and the function form was given as Equation (1).

$$lnSCO = f(lnDDT, lnCEX, INT, INF) \quad (1)$$

Where, SCO = service sector output, DDT = domestic debt, CEX = capital expenditure, INT = interest rate, INF = inflation rate, and *ln* = natural logarithm

We rewrote the Equation (1) in econometric form and this gave use Equation (2).

$$lnSCO_t = \beta_0 + \beta_1 lnDDT_t + \beta_2 lnCEX_t + \beta_3 INT_t + \beta_4 INF_t + \mu_t \quad (2)$$

In Equation, t = time (years), $\beta_0 - \beta_4$= coefficients to be estimated and μ = stochastic term. We further transformed Equation (2) into Dynamic Ordinary Least Square (DOLS) model and we had Equation (3).

$$lnSCO_t = X_t M/ + \sum_{l=-m}^{i=m} \beta_1 \Delta lnDDT_t + \sum_{i=-n}^{i=n} \beta_2 \Delta lnCEX_t + \sum_{i=-q}^{i=q} \beta_3 \Delta INT_t + \sum_{i=-w}^{i=w} \beta_4 \Delta INF_t + \mu_t \quad (3)$$

We estimated Equation (3) and the result was presented in Table 4. We conducted Variance Inflation Factors and the result showed that the values of Centred VIF were all very high. They were higher than 10. This is an evidence of severe multicollinearity, which called for omission of those variables suffocating other variables. These variables were log of domestic debt and log of government expenditure. This is expected, since significant portion of the domestic debt goes into finance of government activities. The two variable are expected to move in the same direction and proportion. We decided to employed ratio approach. This approach enabled us to express government expenditure as a ratio of domestic debt; thereby creating a new variable,

we called efficiency ratio. Efficiency ratio helps to investigate how much the quality/efficiency of debt-funded spending affect service sector.

$$Efficeincy\ (EFF) = \frac{CEX}{DDT} \tag{4}$$

With the introduction of efficiency (EFF), we were able to measure scale (debt), and productivity (efficiency). We re – specified Equation (3), and this gave us Equation (5) as followed:

$$lnSCO_t = X_t M' + \sum_{l=-m}^{i=m} \beta_1 \Delta lnDDT_t + \sum_{i=-n}^{i=n} \beta_2 \Delta lnEFF_t + \sum_{i=-q}^{i=q} \beta_3 \Delta INT_t + \sum_{i=-w}^{i=w} \beta_4 \Delta INF_t + \mu_t \tag{5}$$

Before we estimated Equation (5) and further carried out the Variance Inflation Factors to be certain that the result is statistically trusted. The results showed that the values Centred VIF were moderate. They were between the values of 2 and 5, which showed that the model is healthy. We proceed with the result (See Appendix for results of Variance Inflation Factors).

In Table 1, we described each variable in Equation (5) and their expected contributions.

Table 1: Description, Measurement and Expected Sign

S/No	Variable	Description	Measurement	Expected sign
1	lnSCO	It captured the contribution of the service sector in the economy	Log of the output of the service sector	
2	lnDDT	It captured the dual impact of debt. The dual impact, in the sense that, debt may provide liquidity for service sector or "crowd out" the private sector	Log of the total domestic debt stock	-/+
3	lnCEX	It captured the contribution of the infrastructure to the service sector	Log of the capital government expenditure	+
4	lnEFF	It is used to show how the borrowed funds are being used for growth- enhancing assets rather than consumption	Log of the total capital government expenditure over log of total domestic debt stock	+
5	INF		Rate	-
6	INT		Rate	-

Source: Authors' survey

The Augmented Dickey-Fuller (ADF) test was adopted to test the time-series properties of data and determine the order of integration to stationarity. Thus, to avoid spurious regression due to the problem of non-stationarity of data, the Augmented Dickey Fuller test was used to check for the presence of a unit root in the variables i.e. whether the variables were stationary or not and to what degree. After testing for the stationarity of the variables, the test for co-integration followed. This test was used to check if long- run relationship existed among the variables in the model and was carried out using the Johansen System Cointegration Test. The presence of long- run relationship allows the use of Dynamic OLS for the estimation.

The Dynamic OLS helps to account for the problem of endogenity and serial correlation in Equation (5). In Equation (5), following Craigwell and Wright (2012), X_t as a vector of all explanatory variables. As such, $I, lnDDS, lnEFF, INT\ and\ INF$ are $X's$. In the same Equation (5), $M/$ can be described as the subset of 1(1) variables of $X; while\ \beta_1, \beta_2, \beta_3, and\ \beta_4$ are the vectors of long- run coefficients. In addition, μ_t is a well- behaved error term. The leads of the first difference of explanatory variables are $m, n, q, and\ w$, on one hand. On the other hand, $-m, -n, -q\ and\ -w$ are the lags of the first difference of same explanatory variables. And, Δ is the first difference of explanatory variables. Leads and lags are included to deal with the issues of endogenity and autocorrelation.

Data were sourced from the annual time-series data for all variables from 1985 to 2023; Central Bank of Nigeria (CBN) Statistical Bulletin (various publications), National Bureau of Statistics (NBS), and World Bank, World Bank's World Development Indicators (WDI)

DATA ANALYSIS AND DISCUSSION OF FINDINGS

In this section the author presented and explained the results obtained from the estimation of the data used for the study on the impact of domestic debt on service sector output in Nigeria from 1985 to 2023. The estimation began by presenting the descriptive statistics, in order to have clear pictures of the characters of the series.

Descriptive statistics

Table 2: Descriptive statistics

	SSC	DDT	CEX	INF	INT
Mean	19495.63	5712.36	774.89	19.53	23.73
Median	13786.30	1370.32	498.03	12.20	22.88
Maximum	43079.98	53258.01	4486.21	76.76	36.09
Minimum	5498.16	27.95	5.46	0.22	11.75
Std. Dev.	13151.94	9804.40	957.89	17.78	5.13
Skewness	0.45	3.22	2.10	1.78	-0.09
Kurtosis	1.54	15.36	7.71	5.26	3.11
Jarque-Bera	4.78	315.90	64.64	28.87	0.07
Probability	0.09	0.00	0.00	0.00	0.96
Sum	760329.40	222782.2	30220.72	761.50	925.34
Sum Sq. Dev.	6.57E+09	3.65E+09	34867119	12007.02	998.57
Observations	39	39	39	39	39

Source: Authors' survey

Going through the statistics in Table 2, it is clear that the values of the mean, median and standard deviation of the following series: real service sector output (SSC), domestic debt (DDT), government capital expenditure (CEX), interest rate (INT) and inflation rate (INF) were far from each other. For instance, the value of the mean for real service sector output (SSC) was ₦5,709.33 billion larger than its value of median; same was the mean value for domestic debt (DDT), which was ₦4,342.04 billion greater than the value of the median. This showed that these series – real service sector output (SSC), domestic debt (DDT), government capital expenditure (CEX), interest rate (INT) and inflation rate (INF) could not be said to relatively balanced and the data points lacked consistency. The large gaps between the values of the maximum and minimum further showed that these series suffered from the problems of the outliers; which suggested likelihood of volatility in the series.

An examination of the values obtained for the Skewness showed that all of the series except interest rate (INT) were positively skewed. The evidences to suggest the existence high spikes in the Skewness of domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF) could be seen in their values, which were 3.22, 2.10 and 1.78 respectively. These series- domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF) have long tails to the right. Furthermore, the values of Kurtosis for domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF), which were 15.36, 7.71, and 5.26 respectively showed that these distributions were 'leptokurtic' but that of interest rate was 'mesokurtic'. As such, it has a perfectly bell shape. The value of Kurtosis for real service sector output (SSC) was 1.54. The distribution for the real service sector output (SSC) was 'platykurtic', which means the distribution was flatter at the peak and thinner at the tail. The

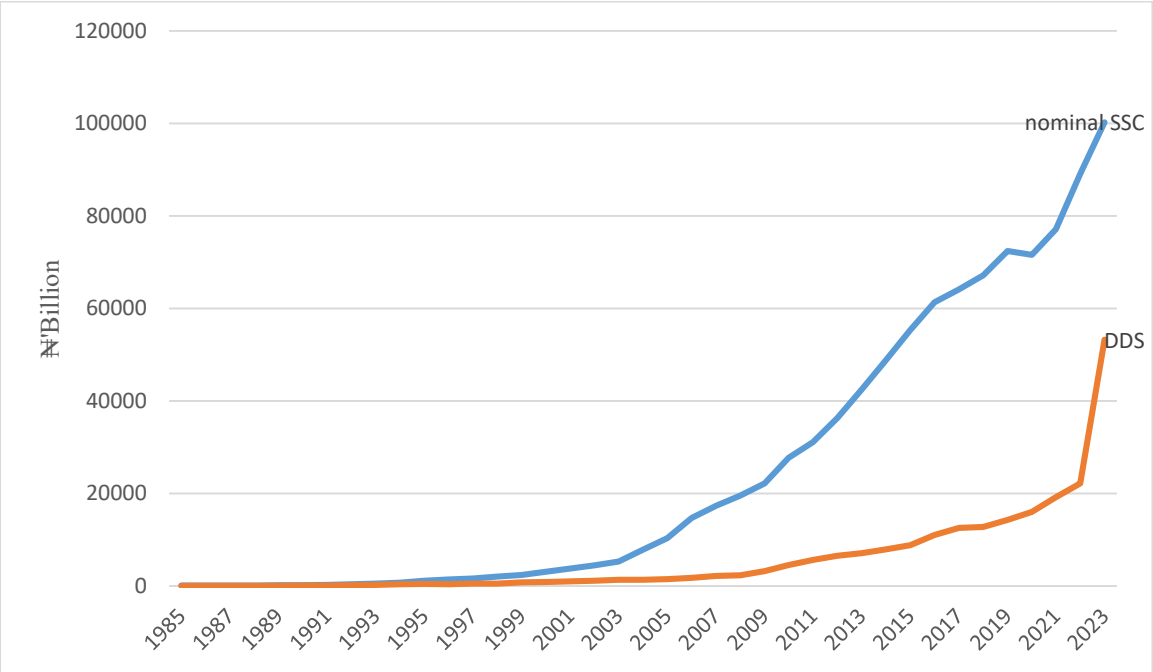
values of Kurtosis for domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF), which were higher than 3 showed that these series have extreme values.

Lastly, the pro- values of the Jarque Bera for service sector output (SSC) and interest rate (INT) were 0.09 and 0.96 respectively, which showed that these series were normally distributed. But same pro- values of the Jarque- Bera for domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF) were 0.00, 0.00 and 0.00 respectively. These pro- values showed that these series - domestic debt (DDT), government capital expenditure (CEX), and inflation rate (INF) were not normally distributed. As such, there is need for log transformation of all the series except for inflation rate (INF) and interest rate (INT), which were already in rate.

Trend Analysis

Prior to formal econometric testing, a visual inspection of the historical trends of the core variables provided crucial context and revealed structural patterns.

Figure 1: Trend Analysis for nominal Service Sector Output and domestic debt



Source: Authors' survey

Figure 1 presented the trend of nominal Service Sector Contribution to GDP (nominal SSC) in Nigeria over the period 1985 to 2023. The graphical evidence showed a consistent long-run upward trajectory, indicating the growing importance of services to Nigeria's aggregate

economic performance. From 1985 to the mid-1990s, nominal service sector output increased gradually from less than ₦100 billion to around ₦1,146.44 billion. The growth during this period reflects modest expansions in financial services, public administration, trade, and telecommunications before full deregulation and modernization of the sector. Between 2000 and 2005, the service sector experienced a more pronounced upward shift, rising from about ₦3,093.38 billion to roughly ₦10,331.83 billion. This acceleration corresponded with Nigeria's banking sector reforms, increased private-sector activity, and the early effects of telecommunications liberalization, which led to rising service-oriented output.

A sharper and more sustained increase were observed between 2006 and 2014, and by 2014, it went close to ₦50,000 billion. This period aligned with structural reforms, expansion in ICT, increased financial inclusion, urbanization, and growth in professional and administrative services. The graph showed a steep slope upward, indicating strong sectoral dynamism and rising domestic demand for services. Also, between 2015 and 2020, the growth trend remained generally positive but became less steep, reflecting the macroeconomic shocks associated with the 2016 recession, declining oil prices, and exchange rate instability. Though the slope flattened, nominal service output did not decline significantly which demonstrated the sector's relative resilience compared to agriculture and manufacturing.

The period 2021 to 2023 showed another noticeable rise, with nominal service sector output reached over ₦100,000 billion. The rebound corresponded with post-COVID-19 recovery, increased digital services, financial technology expansion, and renewed government reforms targeting non-oil sectors. This indicated that the nominal service sector had become increasingly central to Nigeria's GDP structure in the new decade.

Above all, the trend suggested that the Nigerian service sector has experienced strong, sustained long-run growth, despite short-term macroeconomic disturbances. The rising output trend highlighted: increasing reliance on service-driven economic activities; declining dominance of oil as the economy diversifies; strong performance of ICT, finance, trade, and professional services; and structural transformation consistent with global development patterns.

Similar trend could be observed of the growth of the domestic debt in Nigeria. Before 1990, the domestic debt was less than ₦100 billion. Gradually, it went from ₦116.20 billion in 1991 to over ₦400 billion in 1994. This means that within three years the domestic debt has tripled itself. The rise in this era has shown that government has begun to rely on domestic debt for support. This rise continued throughout the period under study and it could be seen that by 2023 the domestic debt has reached ₦53,258.01 billion. The trend has shown that from the sluggish rise of the domestic debt in early 1990s, there has been substantial contribution of it

to the economy. It could be seen that the period of sharp rise in both nominal service sector and domestic debt coincided. These trends showed that the growth of both exhibited similar trends, and this showed the likelihood of domestic debt contributing to the growth of the service sector positively during the period under study.

Unit root test and cointegration test

Table 3 showed the result of the Unit root test for the series in the model.

Table 3: Unit Root Test

Variable		ADF Statistics	ADF Critical	Order
lnSSC	Level	-1.93	-3.54	
	First difference	-6.36	-3.58	1(1)
lnDDS	Level	-0.52	-2.94	
	First difference	-3.78	-2.94	1(1)
lnCEX	Level	-1.70	-2.94	
	First difference	-7.07	-2.94	1(1)
lnEFF	Level	-1.69	-2.94	
	First difference	-6.84	-2.94	1(1)
INF	Level	-3.05	-2.94	
	First difference	-5.55	-2.95	1(1)
INT	Level	-3.60	-2.94	
	First difference	-8.00	-2.94	1(1)

Note: 5% level of significance

Source: Authors' survey

The result above showed that all of the series were stationary at First Difference, including the new variable introduced as a result of problem of multicollinearity. We decided to conduct the cointegration test and the result was presented in Table 4.

Table 4: Trace test results for cointegration

Null hypothesis	Alternative hypothesis	Statistics	Critical values	P - values
Model including government capital expenditure (CEX)				
Series: lnSSC, lnDDS, lnCEX, INF, INT				
$r = 0$	$r \geq 1$	96.16	69.82	0.00
$r \leq 1$	$r \geq 2$	52.03	47.86	0.02
$r \leq 2$	$r \geq 3$	27.12	29.80	0.10
Model including efficiency ratio (EFF)				
Series: lnSSC, lnDDS, lnEFF, INF, INT				
$r = 0$	$r \geq 1$	96.16	69.82	0.00
$r \leq 1$	$r \geq 2$	52.03	47.86	0.02
$r \leq 2$	$r \geq 3$	27.12	29.80	0.10

Note: 5% level of significance

Source: Authors' survey

Table 4 showed the results obtained for the Johansen System equation cointegration test. We reported the trace test and the results showed that there were two (2) cointegration equations in the model including government capital expenditure (CEX) and the model including efficiency ratio (EFF). With this result, we proceed to estimate the Equation (3) and Equation (5) using Dynamic OLS.

Regressional output

Table 4 showed the result of the Dynamic OLS of estimation of Equation (3).

Table 4: Regression output
Method: Dynamic OLS
Sample: 1985 – 2023
Dependent variable: *ln*SSC

	Column I DOLS	**Column II FMOLS**	**Column III CCR**
Constant	7.44[a]	7.37[a]	7.36[a]
	(47.85)	(33.42)	(36.73)
*ln*DDS	0.77	0.63	0.64
	(15.53)[a]	(8.09)[a]	(7.98)[a]
INT	-0.04	-0.01	-0.02
	(-5.91)[a]	(-1.45)	(-1.35)
INF	-0.01	-0.01	-0.01
	(-1.77)	(-1.99)	(-1.47)
*ln*CEX	-0.43[a]	-0.33[a]	-0.33[a]
	(-6.91)	(-3.62)	(-3.70)
R- squared	0.99	0.95	0.95
Adjusted R- square	0.98	0.94	0.94
Long – run variance	0.01	0.06	0.06
Jarque Bera Statistic	0.62		
	0.73[b]		

Note: [a]5% level of significance; [b]Pro - value

Source: Authors' computation

The result obtained from the table above showed that the Long- run variance was 0.01. This value is statistically low; and it was indication that the model was statistically stable for establishing relationship among the variables and, in addition, the deviation from the trend could be easily corrected. The coefficient of determination (R- squared) was very high. It was around 99%.

The coefficient of log of domestic debts (*ln*DDS) was positive and significant at the 0.05 level of significance. It was not like this sign was not expected, since we have already specified in a prior that it could be positive or negative. We proceed to do a robust checking of this sign by carrying out Fully Modified OLS and Canonical Cointegration Regression (CCR). As observed in Column II and Column III, same signs occurred in the estimation using methods – Fully

Modified OLS and Canonical Cointegration Regression (CCR). All of the signs for log of domestic debt (*ln*DDS) was positive and significant. The coefficient of log of domestic debt (*ln*DDS) was 0.77, which means 0.77 elasticity between log of domestic debt (lnDDS) and the log of real service sector output (*ln*SSC) was economically and statistically significant. As such, it was economically plausible and it was neither weak nor suspicious. It could be said that in the period under study. The occurrence of this positive coefficient could be attributed to the possibility of the borrowing benefiting trade, telecommunication, financial services and public services. Domestic debts, therefore leads to crowd in effect on the private sector; as a result of improving infrastructure. This finding contradicted such studies as Ogunjimi and Igwe (2024), Okonkwo and Chukwu (2023), Iyoha and Okoro (2023) and Nwankwo (2021) while the finding toiled in with Nwamah and Umeh (2019) and Adofu and Abula (2019).

The coefficient of the log of government capital expenditure (*ln*CEX) was negative but significant. This sign was contrary to the expectations but it should be expected because the economic environment in Nigeria characterised by structural issues, inflationary effects, inefficiency and leakages, and the current composition of government expenditure could produce this type of results. For instance, the majority of government spending goes into recurrent activities rather than capital projects, which are needed for upliftment of the service sector. This result pointed out one fact, which is the elasticity of log government capital expenditure and this stood at 0.44. This value was statistically and economically significant. As such, it could be concluded that government capital expenditure is a must for growth of service sector in Nigeria.

Both inflation rate (INF) and interest rate (INT) exerted negative impact on the log of real service sector output (*ln*SER). These conformed to the a priori. The interest rate was significant at 5% level of significance. This showed the relevance of the interest rate on the growth of the service sector, though it is economically negligible. This could be attributed to the low patronage of financial institutions by the owners of service sector industries due to high interest rate. This result showed that when government borrows, there is increase in the demand for money, which pushes up the interest rate. In addition, inflation rate, though not statistically significant, eroded the purchasing power of the service consumers in the period under study.

Having explained the economic implication of the above results, we proceed to post- diagnostic test. The Jarque Bera test showed that the residual was normally distributed (See Table but the Variance Inflation Factors (VIF) reported evidence of multicollinearity between log of domestic debt (*ln*DDS) and the log of government capital expenditure (*ln*CEX). The Centred Variance Inflation Factors were 18.97 and 19.49 respectively for log of domestic debt (*ln*DDS) and the log of government capital expenditure (*ln*CEX).

Table 5: Variance Inflation Factors
Sample: 1985 – 2023
Dependent variable: *ln*SSC

	Coefficient Variance	Uncentred VIF	Centred VIF
Constant	0.02	16.82	NA
*ln*DDS	0.003	154.87	18.97
INT	5.17E-05	21.30	2.06
INF	1.02E-05	2.30	2.17
*ln*CEX	0.004	159.07	19.49

Note: [a]5% level of significance; [b]Pro - value

Source: Authors' survey

Other variables – inflation rate (INF) and interest rate (INT) have values less than 5. These values showed that the presence of inflation rate (INF) and interest rate (INT) made the model to be healthy. As explained in the Methodology, we replaced the log of government capital expenditure (*ln*CEX) by the log of the efficiency ratio (*ln*EFF). The result obtained for VIF was reported in Table 5. We re- estimated the model using Equation (5) and the results was presented in Table 6.

Table 6: Regression output
Method: Dynamic OLS
Sample: 1985 – 2023
Dependent variable: *ln*SSC

	Column I DOLS	Column II FMOLS	Column III CCR
Constant	7.44[a]	7.37[a]	7.36[a]
	(47.85)	(33.42)	(36.73)
*ln*DDS	0.34	0.31	0.31
	(14.09)[a]	(10.71)[a]	(10.28)[a]
INT	-0.04	-0.01	-0.02
	(-5.91)[a]	(-1.49)	(-1.36)
INF	-0.01	-0.01	-0.01
	(-1.77)	(-1.99)	(-1.48)
*ln*EFF	-0.43[a]	-0.33[a]	-0.33[a]
	(-6.91)	(-3.62)	(-3.70)
R- squared	0.99	0.95	0.95
Adjusted R- square	0.98	0.94	0.94
Long – run variance	0.01	0.06	0.06
Jarque Bera Statistic	0.62		
	0.73[b]		

Note: [a]5% level of significance; [b]Pro - value

Source: Authors' computation

The results obtained in Table 4 and Table 6 looked similar in terms of signs and significance for log of domestic debt (*ln*DDS), interest rate (INT) and inflation rate (INF) but the magnitudes seemed different for log of domestic debt (*ln*DDS). The replacement of the log of government capital expenditure (*ln*CEX) by the log of efficiency ratio (*ln*EFF) has led to the size of elasticity of log of domestic debt (*ln*DDS) reducing from 0.77 to 0.34. This reduction was less than the half of the previous value when the log of government capital expenditure (*ln*CEX) was in the model. This showed that the presence of the multicollinearity in the model has led to the inflation of the size of the elasticity of the log of domestic debt (*ln*DDS). Like the log of government capital expenditure (*ln*CEX), the coefficient of the log of efficiency ratio (*ln*EFF) was negative but significant at the 0.05 level of significance. This sign showed that debt directed toward capital project in Nigeria failed to stimulate the growth of the service sector due to factors related to 'white elephant projects and so on'.

We estimated another Variance Inflation Factors on the results obtained using Equation (5) and the result was shown in Table 7.

Table 7: Variance Inflation Factors
Sample: 1985 – 2023
Dependent variable: *ln*SSC

	Coefficient Variance	Uncentred VIF	Centred VIF
Constant	0.02	16.82	NA
*ln*DDS	0.0006	36.79	4.51
INT	5.17E-05	21.30	2.06
INF	1.02E-05	2.30	2.17
*ln*CEX	0.004	11.05	3.18

Note: [a]5% level of significance; [b]Pro - value

Source: Authors' survey

Looking at the result in Table 7 about Variance Inflation Factors, the Centred VIF have values, which were less than 5. As such, we concluded that the model was healthy and the estimates could be said to be reliable.

CONCLUSION AND RECOMMENDATIONS

This study has examined the effect of domestic debt in the service sector using time series data from 1985 to 2023. We estimated the model using Dynamic OLS and applied the Fully OLS and Canonical Cointegration Regression (CCR) to confirm the signs obtained for the coefficients. The findings of the model showed that the domestic debt, government capital expenditure and interest rate exerted significant impact on the service sector output. We found the existence of the multicollinearity in the model as a result of domestic debt and government capital expenditure having the centred VIF scores more than 20. We adjusted the model by

introducing efficiency ratio to replace the government capital expenditure. We re-estimated the model and found out that the model became healthy. All variables in the re- specified model had centred VIF less than 5. Domestic debt and interest rate were significant as before. The efficiency ratio was significant but did not have the expected sign. The findings of this study has shown that domestic debt can be an impetus to enhance the growth of service sector but the use of domestic debt to finance of government capital expenditure did not enhance the growth of the service sector. The study therefore recommends that there should be fiscal discipline, which will ensure that funds are properly channeled to what they are meant for. In addition, the interest rate should be moderate enough to stimulate the engagement of private sector in seeking funds in the financial institutions. Lastly, the government should not allow borrowing from the domestic economy to deter the growth of the service sector.

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