

Impact of the Structure of Federal Government Domestic Debt on Manufacturing Sector in Nigeria (1981-2024)

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Abstract

The persistent rise in Nigeria's domestic debt structure and its implications for industrial development provide strong motivation for this study. Concerns have grown that excessive government borrowing may crowd out private sector credit and undermine the manufacturing sector, which is central to economic diversification and growth. Against this backdrop, the study investigates the impact of the structure of Federal Government domestic debt on manufacturing sector output (MFS) in Nigeria between 1981 and 2024. The analysis focuses on three components of domestic debt: Amount of Debt held by the Central Bank (ADC), Amount of Debt held by Deposit Money Banks (ADD), and Amount of Debt held by the Non-Bank Public (ADN). Using the Dynamic Ordinary Least Squares (DOLS) estimation technique, the study explores the long-run relationship between debt structure and manufacturing performance. The findings reveal that debt held by the Central Bank (ADC) has a negative and statistically significant impact on manufacturing sector output, implying that direct monetary financing of deficits constrains industrial productivity by limiting private sector credit access. Conversely, debt held by Deposit Money Banks (ADD) shows a positive but statistically insignificant impact, suggesting that commercial banks' preference for government securities reduces their support for productive investments in manufacturing. Meanwhile, debt held by the Non-Bank Public (ADN) exhibits a positive and significant impact on manufacturing sector output, indicating that market-based debt participation fosters financial deepening and industrial growth. The study concludes by recommending policies to limit Central Bank deficit financing, incentivize banks to expand credit to manufacturing, and promote broader public participation in government securities tied to industrial development.

Keywords: *Fiscal Policy, Debt, Manufacturing, Economic Growth, Other Depository Institutions*

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Background to the Study

The manufacturing sector plays a pivotal role in driving economic growth and structural transformation in both developed and developing economies, serving as a primary engine for industrialization, employment creation, and technological innovation. Globally, countries such as China, Germany, and South Korea have leveraged manufacturing to achieve rapid industrialization and economic diversification, with manufacturing consistently contributing over 25% of GDP in these economies (World Bank, 2023). In contrast, Nigeria's manufacturing sector has persistently underperformed, contributing an average of less than 10% to GDP despite numerous policy interventions (CBN, 2024). The Central Bank of Nigeria (CBN) statistical bulletin indicated that Nigeria's manufacturing sector output fluctuated significantly between 1981 and 2024, declining to as low as ₦2,898.47 billion in 1995, with marginal recovery to ₦6,754.96 billion in 2023.

The structure of domestic debt plays a crucial role in shaping the performance of the manufacturing sector (Akpansung, 2018). Domestic debt in Nigeria is primarily categorized by the amount of debt held by the Central Bank of Nigeria, Deposit Money Banks, and the Non-Bank Public. Excessive reliance on Central Bank financing often fuels inflationary pressures, which erodes manufacturers' purchasing power, while debt concentrated in Deposit Money Banks tends to crowd out private sector credit, limiting access to affordable financing. Similarly, high levels of debt held by the Non-Bank Public reflect inefficiencies in debt management and insufficient investments channeled into productive manufacturing activities (Andrieu *et al.* 2018; Effiong *et al.* 2024). Over the years, various Nigerian governments have implemented policies such as the Structural Adjustment Programme (SAP) of 1986, the Vision 20:2020 blueprint, the National Industrial Revolution Plan (NIRP) of 2014, the Economic Recovery and Growth Plan (ERGP) 2017–2020, and the Nigeria Industrial Policy and Competitiveness Advisory Council. These interventions were intended to improve manufacturing competitiveness but have yielded minimal results compared to countries like Malaysia and Indonesia, which successfully leveraged industrial policies to achieve export-oriented manufacturing growth.

This study addresses the gap in empirical literature by examining how the structure of federal government domestic debt impact manufacturing sector output in Nigeria. It contributes to knowledge by providing evidence-based recommendations on sustainable debt financing strategies to enhance manufacturing sector growth and economic diversification.

The following hypotheses will be tested to achieve the objective of the paper:

- H₀₁:** Amount of debt held by central Bank has no significant impact on manufacturing sector in Nigeria,
- H₀₂:** Amount of debt held by deposit Money Banks has no significant impact on manufacturing sector in Nigeria.
- H₀₃:** Amount of debt held by non-Bank Public has no significant impact on manufacturing sector in Nigeria.

Literature Review

Conceptual Review

Structure of Federal Government Domestic Debt

The structure of federal government domestic debt referred to the composition and institutional arrangements through which a government borrows internally to finance expenditures when revenues fall short. Domestic debt is primarily denominated in local currency and held by residents or domestic institutions, making it less vulnerable to exchange rate risks than external debt (Chinemerem *et al.*, 2021). In Nigeria, domestic debt instruments include treasury bills, Federal Government bonds, treasury certificates, and promissory notes, managed mainly by the Central Bank of Nigeria (CBN) and the Debt Management Office (DMO) (CBN, 2022; DMO, 2023). Debt is held by three primary groups—CBN, Deposit Money Banks, and the Non-Bank Public—each with distinct implications for monetary and fiscal policies. Emmanuel and Puke (2022) argued that debt composition influences interest rates, private sector investment, and credit supply to key industries such as manufacturing. Slepov *et al.* (2017) noted that heavy CBN holdings may signal debt monetization, raising inflationary risks, while Deposit Money Bank holdings are associated with a crowding-out effect, discouraging private-sector lending Murni *et al.* 2019). Non-Bank Public holdings, which include pension funds and insurance companies, can enhance financial market participation and capital market depth (Kimani & Olweny, 2018). Globally, Reinhart and Rogoff (2011) emphasized that domestic debt structure must be assessed alongside financial sector health and monetary policy stance. The IMF (2021) categorized debt markets as shallow or deep based on investor diversity, affecting debt sustainability, while Obiano (2022) highlighted that structure is as critical as size in determining economic outcomes. For Nigeria, rising debt servicing costs and stagnant manufacturing output underscore the need to understand how domestic debt structure shapes real sector productivity.

Amount of Debt Held by the Central Bank

The level of federal government debt held by the Central Bank of Nigeria (CBN) represents securities such as treasury bills and bonds recorded on the apex bank's balance sheet. Such financing is typically executed through Ways and Means advances or open market operations to support government liquidity (CBN, 2022). While this role positions the CBN as both a monetary authority and a lender of last resort, it also creates policy conflicts, particularly when fiscal pressures are high. The Debt Management Office (DMO, 2023) reported that CBN-held debt has increased substantially during revenue shortfalls, raising macroeconomic concerns. Studies indicate that monetizing fiscal deficits through central bank financing undermines monetary policy autonomy and contributes to inflationary pressures (Akpansung, 2018; Anyanwu *et al.*, 2017).

The International Monetary Fund (IMF, 2020) cautions emerging economies against excessive central bank financing, warning of risks to price stability. Historical evidence by Sargent and Wallace's "unpleasant monetarist arithmetic" underscored how fiscal dominance leads to inflation and volatile interest rates, discouraging private-sector investment. In Nigeria, Ways and Means advances have multiplied significantly, intensifying money supply

growth and weakening credit development for private enterprises, particularly in manufacturing (Chukwuka *et al.*, 2023). Rising inflation and interest rate volatility are further identified as barriers to long-term capital flows into productive sectors (Felix *et al.*, 2017).

Amount of Debt Held by Deposit Money Banks

The volume of domestic debt held by Deposit Money Banks (DMBs) reflects their significant investment in treasury bills, bonds, and other government securities. These instruments are considered safe and liquid, making them attractive to banks, particularly during economic uncertainty (Akpanung, 2018). However, this preference often leads to crowding out, as banks allocate fewer resources to private sector credit, especially for manufacturing investment (Chinemerem *et al.*, 2021). According to the Debt Management Office, Nigerian DMBs are key holders of domestic debt securities, with commercial banks dominating short- and medium-term government borrowing (Chukwuka *et al.*, 2023). Research shows that banks' concentration on government securities limits credit access to capital-intensive sectors, raising borrowing costs and hindering economic growth (Ajudua & Imoisi, 2018). The manufacturing sector, in particular, requires long-term financing, yet high interest rates and tighter credit conditions reduce its productive capacity (Ebelebe & Amaefule, 2020). Similarly, Iorember and John (2016) highlighted how the competition between government and private sector borrowing discourages investment in real-sector activities. International evidence also indicated that governments in emerging markets rely heavily on domestic banks to absorb debt, but this strategy can stifle private-sector development and financial deepening (Hayati *et al.*, 2022). Regulatory frameworks further incentivize banks to invest in risk-free securities, strengthening balance sheets but discouraging lending to economically strategic industries such as manufacturing (Imeokparia *et al.*, 2021).

Amount of Domestic Debt Held by the Non-Bank Public

The amount of domestic debt held by the Non-Bank Public represents the share of government securities owned by entities outside the formal banking system, including pension funds, insurance companies, mutual funds, and private investors (Chukwuka *et al.*, 2023). This group plays a crucial role in financing government deficits and supporting capital market development by investing in treasury bills, bonds, and other securities. In Nigeria, the Debt Management Office (DMO) reports that non-bank participation in the debt market has gradually increased, reflecting investor confidence and improved access to capital markets (Abraham & Adama, 2021). Scholars highlight the importance of non-bank investors in mobilizing long-term capital. For instance, pension funds' investments in government securities have provided a steady source of financing for infrastructure and industrial growth, which indirectly benefits the manufacturing sector (Ebelebe & Amaefule, 2020). This form of patient capital helps bridge financing gaps for large-scale projects while minimizing liquidity risks in the banking sector (Imeokparia *et al.*, 2021). However, excessive reliance on non-bank financing can create crowding-out effects, limiting funds for private investment and slowing industrialization efforts (Felix *et al.*, 2017). Globally, diversified investor participation in domestic debt markets is viewed as a sign of financial depth and resilience. Hayati *et al.* (2022) emphasize that a broad investor base spreads risks and stabilizes debt sustainability. Yet, in Nigeria, barriers such as limited financial literacy, shallow secondary markets, and high

transaction costs have concentrated debt ownership among large institutions (Chinemerem *et al.*, 2021). As such, ADN remains a double-edged component of debt structure, with potential to either stimulate or hinder manufacturing performance, depending on market inclusivity and fiscal management.

Manufacturing Sector Output

Manufacturing sector output refers to the total value of goods produced by industries transforming raw materials into finished or semi-finished products, often measured through GDP contribution, growth rates, or capacity utilization (Uzodinma & Russell, 2024). In Nigeria, despite its potential to drive diversification, job creation, and technology transfer, the sector has consistently underperformed, contributing only about 8.5% to GDP in recent years (Obiano, 2022). Studies attribute this weakness to structural barriers, including inadequate financing, high production costs, poor infrastructure, and policy inconsistency (Joshua-Gyang, 2024; Ubesie *et al.*, 2020). Comparative evidence from Asian economies demonstrates that strategic manufacturing investment is central to industrialization, as seen in Malaysia and South Korea, where supportive financing structures and industrial policies spurred rapid growth (Murni *et al.*, 2019). Macroeconomic variables such as interest rates, inflation, exchange rates, and public debt structure strongly influence manufacturing performance (Oguejiofor *et al.*, 2024). Heavy domestic borrowing by the government often crowds out private sector financing, raising borrowing costs and restricting capital access for manufacturers (Matthew & Mordecai, 2016; Kimani & Olweny, 2018). Poorly structured debt portfolios, particularly when concentrated within the banking sector, distort credit allocation and undermine long-term industrial investment (Slepov *et al.*, 2017). Conversely, debt channeled towards infrastructure and industrial development has the potential to enhance output (Tiwary & Paul, 2023).

Empirical Review

Joshua-Gyang (2024) examined the impact of fiscal policy on manufacturing industrial sector in Nigeria from 1987 to 2022, the study applied the Auto-regressive Distributed Lag (ARDL) approach and found that government capital expenditures, oil taxation, and public external debt have a negative effect on manufacturing industrial output, while government recurrent expenditures, non-oil taxation, and public domestic debt exert a positive effect; however, the model's probability values revealed that government recurrent expenditures, oil taxation, and public domestic debt have a significant effect, while government capital expenditures, non-oil taxation, and public external debt have an insignificant effect on the manufacturing industrial output in Nigeria; the study recommended that the government through the Federal Ministry of Finance and other related agencies should design mechanisms to track fiscal policy indicators to ensure that projects—especially infrastructural ones are industrially driven to enhance manufacturing industrial output in Nigeria.

In another study, Oguejiofor *et al.* (2024) examined the relationship between fiscal policy measures and output growth of manufacturing industries in Nigeria between 1981 and 2021 using Autoregressive Distributed Lag (ARDL) estimation method the result indicated that the relationship between company income tax and tariff on the one hand, and manufacturing

output growth rate on the other hand was negative and significant in the long run. Abiola (2024) discussed the association between the government capital investment and the manufacturing industry in Nigeria using regression analysis, and according to the Johansen co-integration, which was tested on the long-run equilibrium relationship, it was established that the measures of value of manufacturing output, government capital expenditure, value added tax, and customs and excise duty were interrelated; regarding the results, the values indicated that there existed a significant. While, Effiong *et al.* (2024) investigated the influence of fiscal policy (government expenditure and taxation) and interest rate on the manufacturing sector of the Nigerian economy from 1981 to 2021, using the Autoregressive Distributed Lag (ARDL) model approach, the results showed that government expenditure and its one-period lag exerted a negative and significant influence on manufacturing sector performance, value added tax exerted a positive and significant effect while its one-period lag exerted a negative and significant effect, and interest rate had a positive and significant effect; in the long run, government expenditure had a negative but insignificant effect, while value added tax and interest rate maintained positive and significant impacts; the study recommended reducing the cost of governance as excessive public spending is diverted from productive sectors, and instead reallocating resources toward stimulating manufacturing sector performance.

Also, Uzodinma and Russell (2024) investigated the effects of the fiscal policy on the output of manufacturing sector in Nigeria between 1981 and 2021, they employed the Ordinary Least Squares (OLS) estimator method and discovered that government expenditure had a positive and significant influence on the manufacturing sector. Ademola (2023) investigated the determinants of Deposit Money Banks' (DMBs) credit to the manufacturing sector in Nigeria, specifically evaluating the effects of macroeconomic factors, the study employed the Autoregressive Distributed Lag (ARDL) model for estimation, revealing that INF and PLR had positive but insignificant effects on DMBs' credit in the long run, LTD had a positive and significant effect in the short run, and LQD negatively affected bank credit in both the short and long run, while short-run causality was also established from the explanatory variables to DMBs' credit; the study concluded that INF, LTD, LQD, and PLR are critical determinants of bank credit to the manufacturing sector, and recommended that the Central Bank of Nigeria implement favorable macroeconomic and monetary policies to stimulate commercial bank lending to Nigerian manufacturing firms and foster economic growth.

A similar studies conducted by Muhammad *et al.* (2023), examined the impact of debt financing on firm profitability in the manufacturing sector of Selangor State, Malaysia, the study found that manufacturing companies in the region rely heavily on debt as a key source of capital for expansion and innovation, and that prudent debt management enhances profitability, while excessive debt leads to declining profits due to high interest costs; the study emphasized the influence of economic conditions and government policies on profitability and concluded that balancing debt leverage with effective risk management is essential for sustainable profitability in the manufacturing sector; based on these findings, the study recommended that firms should prioritize prudent debt management, monitor debt-to-equity ratios, manage costs to minimize interest expenses, diversify funding sources, and

explore alternative financing to reduce over-reliance on traditional debt. Tiwary and Paul (2023) estimated the effect of bank credit and foreign currency borrowing on working capital financing (WCF) in Indian manufacturing firms using three distinct models, examining the role of short-term foreign currency borrowings, internal capital market structures (including business group affiliations), and bank dependency and financial distress; the study found that while the debt-equity ratio is a significant factor, firm-specific characteristics such as age, size, and asset tangibility were irrelevant; findings also revealed that financial distress adversely affects WCF, independent of macroeconomic fundamentals, and that bank-dependent smaller firms with no dividend payouts experience inefficient WCF; notably, the study discovered that short-term foreign currency borrowings play a significant role in supporting WCF in less-developed credit markets, contributing uniquely to the literature on emerging market financing.

Chukwuka *et al.* (2023) examined the implications of fiscal policy responses on manufacturing sector growth in Nigeria from 1980 to 2021 using Autoregressive Distributed Lag (ARDL) model and found that government expenditure, used as a proxy for fiscal policy, had a positive but weakly significant impact on manufacturing sector growth; the study concluded that Nigeria's fiscal policy has not effectively supported manufacturing sector development and recommended increased budgetary allocations, access to raw materials through foreign exchange waivers, and stronger fiscal policy instruments including interest-free loans, infrastructure development, and protection against exchange rate exploitation. Emmanuel and Puke (2022) assessed the impact of debt on the profitability of small manufacturing firms in Kogi State, Nigeria, measuring profitability through return on assets (ROA) and return on equity (ROE), using regression analysis on a sample of 20 randomly selected firms; the analysis, based on a two-variable regression model and a 95% confidence level, found no significant relationship between debt usage and firm value/profitability, thereby accepting the null hypothesis; the study recommended the implementation of tax incentives, concessional interest rate loans, and increased equity funding to support small-scale manufacturing firms.

Hayati *et al.* (2022) investigated the effect of debt financing and firm performance on 21 Indonesian manufacturing companies listed on the stock exchange between 2016 and 2020, using purposive sampling and panel data regression; the findings indicated that short-term debt ratio (STDA) had no effect on return on assets (ROA) or net profit margin (NPM), while long-term debt ratio (LTDA) negatively and significantly affected both ROA and NPM; in contrast, sales growth (GROWTH) had a positive and significant impact on both profitability measures, suggesting that growth-driven strategies yield better outcomes than reliance on long-term debt. Obiano (2022) analyzed the effect of disaggregated fiscal policy components on manufacturing capacity utilization in Nigeria using time series data from 1981 to 2019, the study employed descriptive statistics, ADF unit root tests, Johansen co-integration, and an Error Correction Model (ECM); the results showed that capital expenditure, domestic and external debt had significant negative effects, while recurrent expenditure, non-oil revenue, and budget deficit had significant positive effects; oil revenue and allocative efficiency were found to be insignificant and negative, while debt sustainability

had a positive but insignificant effect; concluding that fiscal policy significantly influences manufacturing capacity utilization, the study recommended channeling government spending toward capital projects and providing tax incentives to stimulate the productive sector.

Chinemerem *et al.* (2021) examined the effect of deficit financing on Sectorial Output in Nigeria from 1986 to 2020, employing two models under the ARDL methodology due to mixed integration order, the study found that domestic debt had a positive significant effect on sectoral output, while foreign debt negatively and insignificantly affected manufacturing output but had a significant impact on services output; budget deficit exerted a positive significant effect on manufacturing output but a negative insignificant effect on services output, and foreign reserves showed a negative insignificant effect on manufacturing output but a statistically significant short-run effect on services output; additionally, both inflation rate and interest rate had mixed effects on sectoral output. While, Obi (2021) examined the effects of treasury bill rate, cash reserve ratio, and money supply on manufacturing sector output in Nigeria, using an ex-post facto research found that manufacturing subsector output is endogenous in explaining monetary policy's impact in the short run, where monetary policy rate and money supply had positive and significant effects on manufacturing output, while treasury bill rate was not significant; the study recommended the Central Bank adopt expansionary monetary policy to boost the money supply to real sectors, reduce MPR to lower interest rates and encourage credit access, and tailor sector-specific monetary directives under guided deregulation to avoid CRR-related constraints that could hinder economic growth.

Abraham and Adama (2021) investigated the influence of capital formation through bank and non-bank domestic savings on economic growth in Nigeria, applying trend analysis and advanced econometric techniques to evaluate data from 2006 to 2018; the analysis involved unit root testing, Johansen co-integration to determine long-run relationships, and Granger causality tests covering 2008 to 2016, revealing that none of the variables were stationary at level but all became stationary after first differencing, with evidence of long-run significance and a causal relationship between capital formation and economic growth; the study further found a negative, non-significant relationship between domestic savings and capital formation, and recommended that investor-friendly policies and enabling environments be created to attract capital inflows and channel investments into real sectors.

Theoretical Framework

This paper is anchored on the Loanable Funds Theory, originating from classical economic thought and refined by later neoclassical theorists such as Wicksell (1898) and Ohlin (1937), the Loanable Funds Theory posited that the market interest rate is determined by the interaction between the supply of loanable funds (savings) and the demand for those funds (investment). It emphasizes the role of financial intermediaries—such as commercial banks and other institutional investors—in channeling available funds either to the government through debt instruments or to the private sector for investment purposes.

The theoretical relationship is formally represented as:

$$S + (T - G) = I + (X - M), \quad (1)$$

Where: S = Private savings, T = Tax revenues, G = Government expenditure, I = Private investment, $X - M$ = Net exports. In this framework, when the government runs a fiscal deficit ($G > T$), it must borrow from the pool of available loanable funds. This borrowing competes with private investment (I), leading to a rise in interest rates and a potential decline in private sector borrowing—an effect commonly referred to as financial crowding out. The greater the share of financial system resources committed to government debt, the less remains available for the manufacturing sector, which heavily relies on affordable long-term credit for operations and expansion. In the Nigerian context, the Amount of Debt held by the Central Bank, Deposit Money Banks, and Non-Bank Public represents the institutional distribution of government domestic debt. These institutions are the primary holders of government securities and the key intermediaries in the financial system. When commercial banks hold a significant portion of government debt, their ability and willingness to lend to manufacturers may be constrained. Similarly, when pension funds, insurance firms, and other non-bank investors commit large proportions of their portfolios to government securities, the supply of long-term financing to the industrial sector may become limited.

The theory, therefore, supports the study's hypothesis that the structure of domestic debt not just its aggregate size matters for real sector performance. Specifically, if government borrowing from these institutions disproportionately absorbs available loanable funds, manufacturing sector output (MFS) may suffer due to reduced investment, higher interest costs, and credit rationing. Conversely, if the debt structure allows for diversified and non-disruptive financing, it could coexist with robust private sector growth. By applying the Loanable Funds Theory as the guiding framework, this study captures the dynamic interaction between public borrowing and sectoral investment outcomes, particularly the effect of domestic debt distribution on manufacturing sector performance over the period 1981–2024. The theory also justifies the study's econometric approach (DOLS), which is designed to assess long-run equilibrium relationships among cointegrated macroeconomic variables such as public debt structure and manufacturing output.

Methodology

Sources and Nature of Data

This paper employs an ex post facto research design, analysing secondary annual time series data from 1981 to 2024. Data used is secondary type and is obtained by using the Central Bank of Nigeria Statistical Bulletin (CBN, 2025) and comprises Manufacturing Sector Output, three components of the structure of federal government domestic debt: the amount held by the Central Bank of Nigeria (ADC), the amount held by Deposit Money Banks (ADD), and the amount held by the Non-Bank Public (ADN in the period of 1981-2024).

Model Specification

The study adopted and used Dynamic Ordinary Least Squares (DOLS). The foundation of the model was based on the theoretical framework of the study. Also, the initial model was

adapted from the work of and the study adapted Ajudua and Imoisi (2018) who examined the Fiscal policy and manufacturing sector output nexus in Nigeria. The functional form of the model is expressed as:

$$MDS=f(CEX, REX, NTX, OTX, EXD, DMD) \quad (2)$$

Where;

MDS = manufacturing industrial sector in Nigeria

CEX = government capital expenditures

REX = government recurrent expenditures

NTX = non-oil taxation in Nigeria

OTX = oil taxation in Nigeria

EXD = public external debt

DMD = public domestic debt in Nigeria.

Equation 2 is modified based on the research objectives and to establish the functional relationship of structure of federal government domestic debt and manufacturing sector in Nigeria while focusing on road and rail hence are captured in the implicit model as:

$$MFS=f(ADC, ADD, ADN) \quad (3)$$

Where:

MFS = Manufacturing Sector Output

ADC = Amount of Debt held by the Central Bank

ADD = Amount of Debt held by Deposit Money Banks

ADN = Amount of Debt held by the Non-Bank Public

The study further specify equation 3.2 in a stochastic (linear regression) form to gives:

$$MFS_i = \beta_0 + \beta_1 ADC_i + \beta_2 ADD_i + \beta_3 ADN_i + \varepsilon_i \quad (4)$$

Where:

β_0 : Intercept term.

$\beta_1, \beta_2, \beta_3, \beta_4$: Coefficients of the independent variables.

ε_i : Error term capturing unobserved factors at time t.

Based on economic theory and empirical literature, the expected signs of the coefficients for the explanatory variables in this study are as follows:

β_1 (ADC) — $\beta_1 > 0$: The coefficient of the Amount of Debt held by the Central Bank (ADC) is expected to have positive impact on Manufacturing Sector Output (MFS)

β_2 (ADD) — $\beta_2 < 0$: The coefficient of the Amount of Debt held by Deposit Money Banks (ADD) is expected to have a negative effect on manufacturing sector output.

β_3 (ADN) — $\beta_3 > 0$: The coefficient of the Amount of Debt held by the Non-Bank Public (ADN) is expected to exert a positive impact on manufacturing output

However, to establish the relationship structure of federal government domestic debt and manufacturing sector using Dynamic Ordinary Least Squares (DOLS), equation (4) was formulated as:

$$MFS_t = \beta_0 + \beta_1 ADC + \beta_2 ADD + \beta_3 ADN + \sum_{i=1}^m \beta_4^i \Delta ADC_t + \sum_{i=1}^n \beta_5^i \Delta ADD_{t+i} + \sum_{i=1}^o \beta_6^i \Delta ADN_{t-i} + \sum_{i=1}^p \beta_7^i \Delta ADD + \sum_{i=1}^q \beta_8^i \Delta ADD_{t+i} + \sum_{i=1}^r \beta_9^i \Delta ADD_{t-i} + \sum_{i=1}^s \beta_{10}^i \Delta ADN_t + \sum_{i=1}^t \beta_{11}^i \Delta ADN_{t+i} + \sum_{i=1}^u \beta_{12}^i \Delta ADN_{t-i} + \mu_t \quad (5)$$

Where MFS is Manufacturing Sector Output, ADC is Amount of Debt held by the Central Bank, ADD is Amount of Debt held by Deposit Money Banks, ADN is Amount of Debt held by the Non-Bank Public in Nigeria. Also, β_1 to β_4 represent the long-run coefficients for each independent variable, indicating their impact on MFS in the long term. (Σ) represent the summation terms capture the short-run dynamics: ΔADC_{t-j} to ΔADN_{t-j} represent lagged differences of the independent variables ($j = 1$ to n). while μ_t represent the error term remains the same, representing unexplained factors affecting MFS. Equation 5 presents the Dynamic Ordinary Least Square (DOLS) which shows the current and lagged relationship between structure of federal government domestic debt and manufacturing sector in Nigeria.

Variable Description, Measurements and Apriori Expectation

Table 1: Description of the Variables Used for the Model

Variable Code	Description	Measurement	Apriori Expectation	Source
MFS	Total output of the manufacturing sector, representing its contribution to national GDP	Measured in ₦' Billion per annum	Dependent Variable	CBN Statistical Bulletin (2025)
ADC	Debt instruments held by the Central Bank as part of government domestic borrowing	Measured in ₦' Billion	Ambiguous (may affect inflation and monetary stability)	CBN Statistical Bulletin (2025)
ADD	Government domestic debt held by commercial banks for investment and liquidity purposes	Measured in ₦' Billion	Negative (due to crowding-out effect on private sector credit)	CBN Statistical Bulletin, (2025)
ADN	Domestic debt instruments held by non-bank entities such as pension funds and insurance companies	Measured in ₦' Billion	Positive (if investment funds support industrial activity)	CBN Statistical Bulletin, (2025)

Source: Author Compilation, 2025

Method of Analysis

The research employed Dynamic OLS (DOLS) model, proposed by Stock and Watson (1993), which reduces the feedback effects in the co-integrating system by boosting the co-integrating regression with lags and leads of the differenced explanatory variables, such that the error component of the resultant co-integrating equation is orthogonal to the entire history of stochastic regressor innovations (or trends) (Masih et al. 1996). DOLS is a useful approach to the analysis of time series data and predicting the long-term relationships between variables based on its dynamic nature and potential endogeneity.

Presentation and Interpretation of Results

Descriptive Analysis

Table 2: Descriptive Analysis

	MFS	ADC	ADD	ADN
Mean	4385.519	1336.818	2283.287	1968.265
Median	3636.055	373.5550	480.3300	200.7300
Maximum	6754.960	25901.16	14241.42	13115.42
Minimum	2898.470	4.520000	1.840000	4.830000
Std. Dev.	1407.148	3998.811	3437.657	3079.154
Skewness	0.632923	5.517626	1.802998	1.690513
Kurtosis	1.712943	34.00737	5.684461	5.384535
Jarque-Bera	5.974616	1985.928	37.05082	31.38181
Probability	0.050423	0.000000	0.000000	0.000000
Sum	192962.8	58819.97	100464.6	86603.68
Sum Sq. Dev.	85142788	6.88E+08	5.08E+08	4.08E+08
Observations	44	44	44	44

Source: Researcher's Computation Using EViews-12 (2025)

Table 2 provides the description of the output in the manufacturing sector (MFS) and the three types of domestic debt holdings, namely, Central Bank (ADC), Deposit Money Banks (ADD), and the Non-Bank Public (ADN). The average of MFS (4385.52) is marginally large as compared to the median value (3636.06), which indicates a weak rightward skewness in the distribution of manufacturing output. In the case of debt variables, ADC (1336.82), ADD (2283.29), and ADN (1968.27) are greater than ADC (373.56), ADD (480.33), and ADN (200.73), and therefore the presence of outliers is indicated by a small number of very large debt holdings increasing the averages. Regarding dispersion, MFS has a range of 2898.47 to 6754.96 and a standard deviation of 1407.15 which is moderate. On the other hand, ADC has the most dispersion (4.52 to 25,901.16) with a high standard deviation (3998.81), which shows extreme change in central bank debt holdings. On the same note, ADD (1.84 to 14,241.42) and ADN (4.83 to 13,115.42) exhibit high variability, which means that the distribution of debt among banks and the non-bank public is quite unstable, as the standard deviation is 3437.66 and 3079.15 respectively. Jarque-Bra statistic values indicate that all debt variables are not normal ($p = 0.0000$), and MFS is slightly not normal ($p = 0.0504$). In general, the coefficients of skewness reveal that all the variables are positively skewed, and the ADC is

more than asymmetrical. Lastly, the results of the kurtosis show that MFS is platykurtic with a flatter distribution and ADC, ADD, and ADN are leptokurtic with heavy tails and extreme outliers.

Correlation Matrix Results

Table 3: Correlation Matrix Results

Probability	MFS	ADC	ADD	ADN
MFS	1.000000			
ADC	0.430072 0.0036	1.000000 -----		
ADD	0.782953 0.0000	0.731160 0.0000	1.000000 -----	
ADN	0.840953 0.0000	0.746903 0.0000	0.967486 0.0000	1.000000 -----

Source: Author's Computation, using E-Views 12, (2025)

Table 3 indicates the correlation outcomes between manufacturing sector output (MFS) and the three types of domestic debt holdings. ADC is positively and statistically significantly correlated with MFS ($r = 0.43$, $p = 0.0036$), which means that central bank debt and manufacturing output are moderately related. There is a far closer correlation between MFS and ADD ($r = 0.78$, $p = 0.0000$) indicating that the debt of Deposit Money Banks is highly associated with the manufacturing performance. MFS and ADN ($r = 0.84$, $p = 0.0000$) have the strongest correlation, which suggests that non-bank public debt holdings can be strongly related to manufacturing output.

Stationary Tests (Unit Root Tests)

This section shows the unit root of the variables using the Augmented Dickey-Fuller (ADF) Test to check the stationary at a 5 per cent level of significance.

Table 4: Unit Root Test Result

Variable	Augmented Dickey-Fuller (ADF) Test		
	ADF	@ 5%	Status
MFS	-4.571091	-2.933158	1(1)
ADC	-4.366421	-2.945842	1(1)
ADD	-5.566510	-2.933158	1(1)
ADN	-6.519918	-2.933158	1(1)

Source: Author's Computation Using EViews-12 (2025)

All of the variables used in this investigation were found to be integrated at order one (1), as shown in Table 4, which displays the findings of the stationary test. They are all stationary at the order 1(1).

Co-integration Test Results

Engle-Granger residual-based co-integration test is a bi-faceted approach utilised to determine whether there is a long-term equilibrium relationship existing between two or more variables which are non-stationary. The notion of co-integration is that two or more series are both independent non-stationaries. A linear combination of the series is said to be co-integrated in case it is stationary. This is shown to mean that even though there may be short-term changes, the variables do tend to unify in the long run meaning that there is some consistent relationship over the long-run.

Table 5: Results of engle and granger (residual based) co-integration test

Variable	ADF Test Statistic	95% Critical ADF Value	Remarks
Residual	-4.743659	-2.931404	Co-integrated

Note: significant at 5%

Source: Author's Computation Using EViews-12 (2025)

Table 5 shows the Engle and Granger residual-based co-integration test. This outcome indicates that the ADF test of the residual is -4.743659, less than the 95% critical ADF, of -2.931404. Because the test value is lower than the critical value at 5 percent level of significance, the null hypothesis of non-co-integration is rejected. This means that the variables are co-integrated meaning that there is a long-run equilibrium relationship between the structure of federal government domestic debt and the manufacturing sector output in Nigeria.

Dynamic OLS (DOLS) Regression Results

This section presented the long-run DOLS regression analysis

Table 6: Dynamic OLS (DOLS) Model Results

Dependent Variable: MFS				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ADC	-1.524126	0.467694	-3.258810	0.0029
ADD	0.721300	0.480303	1.501760	0.1444
ADN	0.624325	0.264134	2.363665	0.0253
C	3692.229	136.2915	27.09069	0.0000
R-squared	0.954351			
Adjusted R-squared	0.934787			
F-statistics	22.50230			
Prob(F-statistic)	0.000025			
Durbin-Watson stat	1.744662			

Source: Author's Computation, using E-views 12, (2025)

Table 6 presents the Dynamic OLS (DOLS) output (Manufacturing Sector Output or MFS) as the dependent variable. ADC coefficient of change of the Central Bank holdings of domestic debt = -1.524126 and is statistically significant ($p = 0.0029$), thus that an increase in Central Bank-held domestic debt correlates with a decrease in MFS. ADD (holdings of Deposit Money Banks) are positive (0.721300) but not statistically significant ($p = 0.1444$), indicating that the holdings of banks do not have reliable effect on MFS in this specification. ADN (Non-Bank Public holdings) is good and statistically significant (0.624325, $p = 0.0253$), which means that the higher the share of domestic debt held by non-bank investors, the higher the MFS. The level of manufacturing output is high, as is denoted by the constant term which is large and significant. The model fit is good ($R^2 = 0.954351$; Adjusted $R^2 = 0.934787$), and joint significance is corroborated by the F statistic = 22.50230 ($p = 0.000025$). This statistic (Durbin-Watson) = 1.744646 indicates that there is no severe problem of autocorrelation.

Post-Estimation Checks (DOLS Diagnostic Test)

The results from the DOLS diagnostic checks captured in Table 7 are crucial for validating the robustness and reliability of the regression model that investigates the impact of the structure of federal government domestic debt on manufacturing sector in Nigeria. These post-estimation tests assess various assumptions underlying the DOLS regression analysis, ensuring that the model's inferences are statistically sound.

Table 7: Results of DOLS Diagnostic Checks

Tests	Outcomes		
	Coefficient	Probability	
Breusch-Godfrey-Serial-Correlation Test	F-stat.	0.266152	0.7680
Heteroscedasticity-Breusch-Pagan-Godfrey Test	F-stat.	1.204335	0.3264
Normality Test	Jarque-Bera	5.479797	0.064577

Source: Author's Computation Using EViews-12 (2025)

The diagnostic tests on the DOLS model, Table 7 indicate that the Breusch-Godfrey Serial Correlation test has an F-statistic of 0.266152 with a probability value of 0.7680, which means that there is no serial correlation in the residuals. The Breusch-Pagan-Godfrey test of heteroscedasticity gives a test value of 1.204335 and probability value 0.3264 indicating that residual values are homoscedastic. Moreover, the Jarque Ber-normality statistic of 5.479797 with probability 0.064577 exceeds the probability of 5% significance, indicating the distribution of the residuals is approximated to be normally distributed. On the whole, these findings show that the DOLS model meets the most important diagnostic criteria of reliability.

Discussion of Findings

The results of the Dynamic Ordinary Least Squares (DOLS) estimation provide important insights into how the structure of domestic debt affects Nigeria's manufacturing sector output (MFS). The coefficient of the amount of debt held by the Central Bank (ADC) is negative and

statistically significant at the 1% level ($\beta = -1.524126$, $p = 0.0029$). This finding suggests that increasing Central Bank absorption of domestic debt exerts a contractionary effect on the manufacturing sector. It indicates that when the Central Bank becomes a major financier of government borrowing, resources are diverted away from productive investment. This outcome aligns with the works of Obiano (2022), Ubesie et al. (2020), and Joshua-Gyang (2024), who emphasize that Central Bank financing of fiscal deficits undermines credit supply to the real economy. However, it contrasts with the argument of Slepov et al. (2017), who suggest that harmonized monetary-fiscal coordination can help avoid such crowding-out effects.

On the other hand, the amount of debt held by Deposit Money Banks (ADD) shows a positive but statistically insignificant coefficient ($\beta = 0.721300$, $p = 0.1444$). Although this suggests a potential link between banks' participation in the government debt market and manufacturing growth, the impact is weak and not conclusive. This finding is consistent with Ademola (2023) and Uzodinma and Russell (2024), who highlight that Deposit Money Banks tend to prioritize short-term, risk-free government securities over longer-term private sector lending, thereby limiting their contribution to industrial growth. In essence, while banks do provide some credit to the sector, the magnitude is not strong enough to register a statistically significant impact.

Interestingly, the amount of debt held by the Non-Bank Public (ADN) has a positive and statistically significant effect on manufacturing output at the 5% level ($\beta = 0.624325$, $p = 0.0253$). This implies that increased participation by institutional and retail investors—such as pension funds, insurance companies, and individuals—in the government securities market enhances the performance of the manufacturing sector. This outcome resonates with the arguments of Iyoha and Eze (2021) and Uche and Ananwude (2020), who contend that long-term institutional investors provide “patient capital” that supports industrialization. It also aligns with Abbas and Christensen (2010), who highlight that broadening the domestic investor base in debt markets improves sustainability while indirectly supporting real-sector growth.

Based on these results, the null hypotheses are addressed as follows: H01, which states that the amount of debt held by the Central Bank has no significant impact on the manufacturing sector, is rejected. H02, which states that the amount of debt held by Deposit Money Banks has no significant impact on the manufacturing sector, is accepted. H03, which states that the amount of debt held by the Non-Bank Public has no significant impact on the manufacturing sector, is rejected.

Conclusion and Recommendations

The paper examined the effect of different categories of domestic debt holdings on manufacturing sector output in Nigeria using the DOLS framework. Results revealed that debt held by the Central Bank had a negative and significant effect on manufacturing, debt held by Deposit Money Banks had a positive but insignificant effect, while debt held by the Non-Bank Public had a positive and significant impact. These findings underscore the

importance of debt structure in shaping industrial growth and credit allocation in Nigeria. The paper therefore recommended that;

- i. Since Central Bank debt holdings had a negative impact on manufacturing sector output, the CBN should reduce its direct involvement in financing government deficits. Instead, it should focus on price stability while promoting policies that channel credit toward productive industries. Specifically, the CBN should tighten limits on overdrafts to the Federal Government and expand targeted intervention funds for manufacturers.
- ii. Debt held by Deposit Money Banks showed a positive but insignificant effect on manufacturing output. Therefore, the Federal Ministry of Finance and the CBN should collaborate to reorient DMB lending patterns by providing tax incentives, interest rate rebates, and risk-sharing mechanisms that encourage long-term credit to the manufacturing sector instead of over-concentration in government securities.
- iii. Since Non-Bank Public holdings had a positive and significant impact on manufacturing, these institutions should expand opportunities for pension funds, insurance firms, and individuals to invest in government securities that are linked to industrial development. For instance, the Dept Management Office can issue special manufacturing sector bonds, while the Security and Exchange commission enhances secondary market liquidity to attract broader investor participation.

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