SELECTED TAXES AND MANUFACTURING SECTOR OUTPUT IN NIGERIA

Abstract

This paper examined the impact of selected taxes on manufacturing output in Nigeria using quarterly time series data from 2011Q1 to 2022Q4. Real manufacturing gross domestic product (RMGDP) was used as proxy for manufacturing sector output and the dependent variable while petroleum profit tax (PPT), company income tax (CIT), import value added tax (IMVAT) and domestic value added tax (DVAT) were the explanatory variables. The Lindahl theory of taxation was used as the theoretical foundation for the tax and manufacturing output model. After subjecting the series to stationarity test using the Phillips Perron test, the autoregressive distributed lag (ARDL) regression technique was used to evaluate the model. The results revealed that in the long run both company income tax (CIT) and import value added tax had significant negative impact on Manufacturing output, while domestic value added tax (DVAT) impacted positively on manufacturing output. On the other hand, in the short run, while petroleum profit tax (PPT) and domestic value added tax (DVAT) impacted negatively on manufacturing output, import value added tax (IMVAT) impacted positively on manufacturing output. Based on these findings, the study recommended among other things that the government should balance its company income tax (CIT) with the provision of basic social goods such as security, electricity and good road networks in the country to reduce the negative impact of company income tax on manufacturing output in the long run.

Keywords: *Taxation, Manufacturing Output, Lindahl Theory, ARDL, Nigeria.*

1. Introduction

Modern tax policies are aimed at achieving a wide range of policy goals. The goals of taxation include generating revenue for public expenditure, redistributing income, stabilising the economy, mitigating externalities, and influencing resource allocation in a way that promotes economic progress. All levels of government in Nigeria are faced with the challenge of increasing their income base due to the rising cost of operating the government and the continuously decreasing revenue, thus taxation remains one of such viable means of raising funds, (Kiabel & Nwokah, 2009). Taxation is one approach. Thus, what exactly is taxation? Taxation is the imposition of levies often by the government on the incomes and possessions of individuals and businesses. The concept of taxation is better understood when it is explained on the basis of the elements of taxation which comprises of the tax base, the tax rate and the tax yield. The tax base is the object on which tax is collected, the rate refers to the percentage of the base that is collected in tax while the yield is the amount of income generated from tax for the government. The task of public policy particularly in developing countries like Nigeria is therefore, the creation of the nexus between tax yields and the provision of social goods that improve the wellbeing of tax payers. While the expected wellbeing of an individual tax payer from the government may cut across an array of public projects, that of a corporate or business

entity fundamentally lies around the growth and profitability of the business engendered by an enabling environment from the government Given the potential correlation between taxes paid and benefits received, payroll taxes are often denoted as "contributions" (as observed in the United States). However, these payments are invariably obligatory, and the nexus between contributions and benefits can sometimes be tenuous. (Gale, Krupkin, & Rueben, 2015)

The sustenance of government expenditure and the enhancement of wealth redistribution underline the basis of taxation with the broad objective of fostering socioeconomic growth within the nation, (Jhingan, 2004; Ogbonna & Ebimobow Musgrave and Musgrave, 2004; Ola, 2007; Burges & Sterm, 1993; Bhartia, 2009). In Nigeria, however, this pivotal role of taxation remains largely unfulfilled within the existing system. Odusola (2006) contends that the nation's fiscal framework is imbalanced, heavily reliant on oil revenues, which have consistently accounted for at least 70% of total revenue over the past decades. Consequently, traditional tax sources have played a marginal role in Nigeria's fiscal policy administration. Contrary to Jhingan's (2004) argument that taxes effectively curtail conspicuous consumption and excessive spending among the affluent classes, such a notion does not hold true in the Nigerian context. In practice, the administration and collection of taxes in Nigeria seem to be in favour of regressive taxation as the rich tend to pay less in tax compared to proportional tax common with personal income and progressive taxation associated company income tax and capital gain tax or tax on interest earned. (Adebayo, 1998) . According to the 2020 World Bank Ease of Doing Business Report, Nigeria ranked 131 out of 190 countries in terms of the ease of doing business and 171st for the convenience of tax payment.

Manufacturing in Nigeria has changed through the years, with a boom in the decades after independence in the 1960s and 1970s. Those industrialization programmes that the government started in an effort to wean the economy off of its dependence on oil. A large number of jobs, increased gross domestic product, and new industrial developments may be traced back to Nigeria's thriving manufacturing industry. It is vital to the nation's efforts to diversify its economy and become self-sufficient. Many different types of goods and services are produced in Nigeria's factories, including food and drink, clothing and textiles, medicines, chemicals, building supplies, automobiles, and electronics. In addition to bigger industrial companies, the manufacturing landscape is populated by small and medium-sized enterprises (SMEs). But here is where you can see the connection between taxes and industrial output in Nigeria: (i) Revenue from taxes: The Nigerian government receives a substantial portion of its budget from taxes placed on manufacturing operations. These taxes include corporate income tax, value-added tax (VAT), excise charges, and custom duties. Manufacturing companies' capacity to turn a profit and remain competitive is very sensitive to the nature and level of these levies. (ii) Effect on production cost: Manufacturing companies' profitability and investment choices might be influenced by the impact of high tax rates or complicated tax structures on production costs. This can lead to reduced production capacity, diminished competitiveness in home and international markets, and potentially lower levels of output and employment in the industry. (iii) Investment and Innovation: Tax policies, such as investment incentives or tax exemptions for particular industries or locations, can impact investment decisions in the manufacturing sector. Favorable tax policies may encourage firms to expand their operations, invest in new technologies, and enhance productivity, leading to increased output and economic growth. Conversely, unfavorable tax policies may deter investment and innovation, constraining the sector's growth potential. (iv) Compliance and Informality: The complexity of the tax system and high tax rates may

incentivize some manufacturing firms to operate informally or engage in tax evasion practices to reduce their tax burden. This informal sector activity can distort competition, undermine government revenue collection efforts, and hinder the development of a competitive and sustainable manufacturing sector. (v) Government Spending and Infrastructural Development: The manner in which tax revenue is allocated and spent by the government can also impact the manufacturing sector. Investments in infrastructure, such as transportation networks, power supply, and telecommunications, financed through tax revenue, can improve the business environment for manufacturing firms, reduce production costs, and enhance overall sector performance. (vi) Price Stability and Predictability: Consistency, stability, and predictability in tax policies are crucial for fostering a conducive business environment and promoting long-term investment in the manufacturing sector. In the light of the foregoing, this study is aimed at achieving the following objectives: (a) interrogate the impact of petroleum profit tax on the manufacturing output. (b) Examine the impact of corporate income tax on the manufacturing output. (c) Evaluate the impact of import value-added tax on the manufacturing output, and (iv) Assess the impact of domestic value-added tax on the manufacturing output. The study covered the period between 2011 and 2022 utilizing quarterly data in Nigeria. The rest of the paper is presented as follows: section two presents the literature review. The methodology is presented in section three. Data analysis and results presentation are covered in section four, and conclusion and recommendations are unveiled in section five.

2. Literature Review

This section covers the conceptual clarification, theoretical framework of the study as well as empirical findings from previous studies on taxation and manufacturing output both internationally and locally.

2.1 Conceptual Clarification

2.1.1 Petroleum Profit Tax

This tax is collected from the profit of firms involved in petroleum activities within Nigeria. It is backed by the Act establishing it, Cap. FIRS LFN 2004 (as amended by the Finance Act, 2019 and 2020), which governs this tax system in the country. Notably, firms who pay this tax are exempted from corporate income tax on the same income. The various taxes include: (i) For joint venture and sole-risk firms during their initial five years of operation, the applicable tax rate stands at 65.75% of the chargeable profit. (ii) For joint venture and sole-risk enterprises operating for more than five years, the tax rate increases to 85% of the chargeable profit. (iii) In the case of businesses operating under a production sharing arrangement, the tax rate amounts to 50% of the chargeable profits. (iv) Deductions for education taxes are factored in when computing assessable earnings for petroleum enterprises. (v) Estimated tax returns for each accounting period must be submitted within two months from the commencement of the respective period. (vi) Final returns for each accounting period are required to be filed within five months following the conclusion of the said period. (vii) Late submission of returns incurs a penalty of N10,000 plus an additional N2,000 for each day of non-compliance. (viii) Failure to settle any installment of tax by the due date attracts a penalty of ten percent (10%) alongside interest calculated at the Central Bank of Nigeria's prevailing minimum rediscount rate. Failure to remit payment within one month may lead to enforcement actions, (FIRS, 2022).

2.1.2. Company Income Tax

The administration of this tax is such that for resident companies, the tax applies to their worldwide income while for non-resident companies the tax only applies to their Nigeria-source income. This tax was also established in 2004 by CIT Act, Cap C21, LFN (as amended by the Finance Act, 2019 and 2020). A standard tax rate of 30% is applied to a company whose gross turnover in her accounting year is greater than ₦100 million. This may not apply to a company when earnings do not stem from trade or commercial activities, such as those generated by cooperative organizations. Furthermore, the CITA mandates that every business must remit provisional tax payments within three (3) months of the commencement of each assessment year, equivalent to the tax paid in the previous year, as a prepayment toward the forthcoming annual income tax assessment.

According to the Nigeria Fiscal Guide of 2023, all profits earned by companies, except those expressly exempted and revenues from the sale or disposal of crude oil by upstream petroleum companies not transitioning under the provisions of the Petroleum Industry Act, are subject to corporate income tax (CIT). Nigerian corporations are taxed on their worldwide income, whereas non-resident companies (NRCs) are taxed solely on profits derived from or earned within Nigeria, to the extent that such profits are connected to activities within the country. CIT is levied solely on the portion of profit attributable to Nigerian activities for NRCs with a significant economic presence (SEP). Entities engaged in trade or commerce within Nigeria, or those with an SEP, are obligated to prepare audited financial statements and submit CIT returns within six months following the close of their fiscal year. However, for NRCs providing technical, management, consultancy, or professional services to Nigerian residents without a fixed base or engaging in other trade or business as defined by the CIT Act, withholding tax (WHT) serves as the final tax.

In Nigeria, companies are subject to three different income tax rates based on their turnover: 30% for large companies with turnover exceeding ₦100 million, 20% for medium-sized companies with turnover ranging from ₦25 million to ₦100 million, and a 0% rate for companies with turnover below ₦25 million.

2.1.3. Import Value Added Tax

Import value added tax is a consumption tax on economic activity involving imports, which in this case comprise products and services imported from other countries into Nigeria. Imported products can be physical (such as raw materials, industrial inputs, and finished goods) or intangible. Imported articles are subject to VAT at the appropriate port or border station. Where the commodities are imported by post at the post office or the point of receipt in Nigeria. For intangible assets, the VAT point of import is the location in Nigeria where payment is required. Nigeria's value added tax was 5% until February 2020, when it was increased to 7.5%.

2.1.4. Domestic Value Added Tax

Domestic value-added tax (VAT) constitutes a consumption tax imposed on the provision of all goods and services within the domestic soil of Nigeria minus any of such item the law earmarked not to charged accordingly.

The VAT was applied at a fixed rate of 5% up to February 2020 when it rose to 7.5%. For transactions involving goods and services provided by specific entities, VAT must be deducted at the source by the recipient and remitted to the Federal Inland Revenue Service (FIRS). These entities include: (i) non-resident companies neglecting to apply value-added tax on their invoices; (ii) individuals supplying goods and services to oil and gas companies; and (iii) individuals providing goods and services to government ministries and parastatals.

2.2 Theoretical Framework

2.2.1 The Lindahl Theory of Taxation

The Lindahl tax, conceptualized by Swedish economist Erik Lindahl in 1919, represents a distinctive approach to taxation aimed at financing public goods. Under this framework, individuals are required to contribute towards the provision of public goods based on their respective marginal benefits, thereby determining the optimal level of provision for each public item. In an equilibrium state, all individuals consume equal quantities of public goods, yet the implementation of Lindahl tax leads to varying prices as individuals' value certain commodities differently. According to this concept, each individual's proportional contribution to total tax revenue corresponds to the level of personal benefit derived from a public commodity. In essence, the Lindahl tax reflects an individual's share of the overall tax burden within a specific economy. The actual tax payment made by each individual is computed by multiplying this proportion by the total cost of the public good.

The equilibrium quantity is determined by balancing the marginal cost of the product with the aggregate marginal benefits to consumers, expressed in monetary terms. The Lindahl price for each individual signifies the payment made by that individual for their share of public goods. These individual Lindahl prices collectively represent components of a society's collective tax burden, with the sum of these prices equating to the cost of supplying public goods, such as national security and other communal programs and services beneficial to society as a whole. This study employs the Lindahl tax theory to investigate the impact of taxes on industrial production in Nigeria. The manufacturing sector, akin to individuals, is concerned with the marginal benefit derived from government taxation, which is anticipated to influence production and output levels.

2.3 Empirical Literature

Becker and Holmes (2018) conducted a study assessing the impact of taxes on both profitable and unprofitable businesses in Germany. Their analysis focused on key determinants including investment, taxation, liquidity, and corporate expansion. They observed instances where tax payments experienced a three-percentage-point change and compared the ensuing five-year tax change effects with those of the subsequent two years. Findings indicated that adjustments in

dividend tax had a notable adverse effect on investment allocation and profitability, albeit showing no correlation with business development.

Gatsi, Gadzo, and Kportorgbi (2013) employed panel data methodologies to examine the impact of corporate income tax on the financial performance of ten listed manufacturing firms in Ghana between 205 and 2012. The outcome of the investigation showed that corporate income tax impacted inversely on financial growth of firms. However, the study revealed a positive relationship between the size, age, and growth of the firms with financial performance.

Otwani, Simiyu, and Makokha (2017) utilized a mixed technique of correlation and regression to evaluate the impact of corporate income tax on the financial performance of listed companies on the Nairobi Securities Exchange. The findings revealed that there is a direct correlation between corporate income tax and the financial performance of Kenyan companies listed on the Nairobi Stock Exchange.

Yoke and Chan (2018) utilized unbalanced panel data from ASEAN countries to scrutinize the effect of value-added tax (VAT) on industrial performance from 1985 to 2014. Their study revealed a negative relationship between VAT and manufacturing performance, while also exploring the association between VAT and export intensity. The study found VAT to have a positive impact on export intensity, with manufacturing enterprises performing better in VAT-implementing nations, while export intensity fared better in countries without VAT.

From 1985 to 2018, Etim, Mbobo, Joel, and Ekenam (2020) investigated how taxes affected industrial output in Nigeria. As a dependent variable, their study used manufacturing production, while as independent variables, they used petroleum profit tax, value-added tax, personal income tax, and corporation income tax. Their investigation, which used the ordinary least squares approach, showed that VAT and CIT were not statistically significant. In contrast, industrial output was positively correlated with personal income tax (PIT) and petroleum profit tax (PPT), lending credence to the theoretical claim that CIT discourages entrepreneurship.

From 1981 to 2018, Ogu and Kem (2020) examined the effect of taxes on industrial performance in Nigeria using the ordinary least squares approach. Collectively, their results showed that manufacturing capacity utilisation, customs and excise duty taxes, petroleum profit taxes, and corporate income taxes all had a significant impact on industrial production. When looking at each factor separately, however, industrial output was positively and significantly affected by customs and excise duties and manufacturing capacity utilisation, but positively and insignificantly by corporate income tax and petroleum profit tax.

To examine the impact of tax components on industrial production in Nigeria from 1999 to 2022, Joshua-Gyang, Awujola, and Aiyedogbon (2023) used the completely modified ordinary least squares method. Their findings indicated that, compared to customs and excise charges, which had a negative effect on industrial production, value-added tax (VAT) had a beneficial influence,

albeit a minor one.

Using ordinary least squares, Ewubare and Ozo-Eson (2019) examined the effect of taxes on production in Nigeria's manufacturing sector from 1980 to 2017. Their findings demonstrated considerable beneficial benefits of corporate income tax, petroleum profit tax, and excise duty tax on manufacturing sector production, however value-added tax was shown to have a negative influence.

Ogudu, Kingsley, and Akinlosotu (2018) used fixed and random effect regression techniques to analyze the impact of corporate income tax on manufacturing output in Nigeria between 2013 to 2017. They sampled five firms out of all 23 firms dealing on consumables representing 35%. The findings revealed that corporate income tax impacted positively on the net income and return on equity those firms.

Ologbenla (2022) investigated the impact of taxes on Nigerian production performance spanning from 1994 to 2020, with GDP as the dependent variable and PPT, CIT, and VAT as the independent variables. Utilizing the auto-regressive distributed lag (ARDL) approach, the data showcased a notable and favorable influence of petroleum profit tax and value-added tax on economic activity. Conversely, corporate income tax was found to impede the production performance of the economy.

Onwuka and Akoma (2022) evaluated the influence of taxes on the performance of Nigerian manufacturing enterprises between 2015 and 2021. Their study attempted to discover if taxes impacted return on assets (ROA) and profits per share (EPS), employing Flour Mills plc as the case study. Ordinary least squares regression was applied for the inquiry. Findings demonstrated a modest negative impact of taxes on ROA and an insignificant positive impact on EPS, suggesting no meaningful influence on the manufacturing sector.

Ighoroje and Akpokerere (2021) examined fiscal policy and industrial sector output in Nigeria from 1987 to 2019. Fiscal policy was classified into three categories: government spending, tax revenue, and budget deficits, while industrial sector production was measured as the industrial sector's GDP contribution. The model was tested using multiple regression techniques based on Johansson cointegration error correction modelling. The findings showed that fiscal policy has both long-run and short-run effects on industrial sector output. The detailed results showed that government spending and the budget deficit had a significant positive influence on industrial sector production in Nigeria, whereas tax revenue had a positive but moderate effect on industrial sector output.

Uwuigbe, Uwuigbe, Adeyemo, and Anowai (2016) investigated the impact of tax incentives on the overall performance of Nigeria's manufacturing industry. A total of 100 structured copies of the questionnaire were distributed to employees from the relevant industrial industries. The hypotheses were tested by regression analysis. According to the research, businesses that are eligible for government tax breaks are more likely to pay their taxes on time, and tax breaks would significantly increase the number of manufacturing sectors in Nigeria.

Ajelabi (2023) investigated how business income tax affected the corporate performance of selected Nigerian industrial businesses. This study's population included all 44 registered manufacturing businesses in Nigeria that produced consumable items. Purposive sampling techniques were used to identify just five listed industrial businesses. The research revealed that corporate income tax (CIT) exerted a noteworthy and positive influence on profit after tax (PAT) in Nigerian-listed industrial enterprises. Additionally, the study identified a positive and significant relationship between CIT and returns on equity (ROE). Conversely, the change in shareholders' fund (CSF) was found to have a negative and significant impact on ROE.

3. Material and Methodology

This study employed an ex post facto research approach, utilizing quarterly time series data on real manufacturing gross domestic product (RMGDP) as a proxy for manufacturing output, which served as the dependent variable with a vector of explanatory variables including petroleum profit tax (PPT), corporate income tax (CIT), import value-added tax (IMVAT), and domestic value-added tax (DVAT). The series were obtained from the Federal Inland Revenue Service (2022) and the Central Bank of Nigeria (CBN) Statistical Bulletin of 2022, covering the period from 2011 to 2022.

3.1. Model Specification

Following the Lindahl Theory of Taxation, the model specification for this study comprised the identification of the explained and explanatory variables. Thus, the model is described based on the information relevant to the phenomena being examined and the behavior of the time series data with regard to the order of integration of the series. Consequently, the functional specification of the tax model is articulated as follows:

$$y_t = f(X_t) \quad 3.1$$

where:

yt represents manufacturing output at time *t*, assessed by real manufacturing gross domestic product. *Xt* denotes a vector of explanatory factors, encompassing petroleum profit tax, corporate income tax, import value-added tax, and domestic value-added tax, which interact within the manufacturing sector and exert influence on the sector. The selection of these factors was informed by both theoretical considerations and practical observations in Nigeria.

In the Lindahl model, the Lindahl price attributed to each individual represents the comprehensive payment made by that individual for their portion of public goods. Consequently, Lindahl prices can be interpreted as individual contributions to the overall tax burden within an economy, where the aggregate of these prices reflects the expenditure required to furnish public goods. This model incorporates enhancements to the Lindahl model. Firstly, it is acknowledged that assessing the benefit of taxation in the Nigerian manufacturing sector is challenging due to

the absence of essential characteristics such as security, power, and other basic infrastructure, which are largely lacking and are typically provided by businesses at their own expense. As a result, the expected tax advantage to the individual firm paying tax is combined with the sector's production, which represents actual manufacturing output. As a result, our new functional model is described as:

$$y_t = f\,(ppt, cit, imvat, dvat) \qquad 3.2$$

Based on the behavior of the time series data regarding stationarity properties, wherein the series exhibited both integrated of order zero I(0) and order one I(1), the autoregressive distributed lag (ARDL) technique was deemed appropriate for estimating the impact of the set of explanatory variables on the dependent variable in this study. Consequently, the ARDL specification of the model is presented as follows:

$$RMGDP_t = \alpha + \sum_{i=0}^{n} \beta_{1i}\Delta RMGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta PPT_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta LCIT_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta IMVAT_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta DVAT_{t-I} + \beta_6 RMGDP_{t-1} + \beta_7 PPT_{t-1} + \beta_8 CIT_{t-1} + \beta_9 IMVAT_{t-1} + \beta_{10} DVAT_{t-1} \quad \varepsilon_{1t} \quad (3.3)$$

Where: Δ is the first difference operator, β_{1i},……, β_{5i} , indicate the short-run dynamics of the model, β_6,……. β_{10}, denote the long-run association and ε_{1t} is the random term in equation 3.3. The specific form of error correction mechanism (ECM) estimated for RMGDP as a measure of manufacturing output in this study is expressed as:

$$RMGDP_t = \beta_0 + \sum_{i=0}^{n} \beta_1 RMGDP_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta X_{t-1} + \beta_3 ECM_{t-1} + \varepsilon_{3t} \qquad (3.4)$$

Where: X_t is the vector of explanatory variables, ECM_{t-1} is the error correction term and it captures the speed of adjustment back to the long run after a short run shock and ε_{3t} is the stochastic error term.

3.2 Estimation Technique and Procedure

Empirical Results and Discussion

4.1 Descriptive Statistics

Data for 48 quarters from 2011 to 2022, were included in Table 1, which summarized the descriptive statistics for the tax and manufacturing output in this study. In terms of average measured by the mean values, the average value of real manufacturing gross domestic product (RMGDP) is approximately ₦6147.8 billion for the period under study while the average value of petroleum profit tax was approximately ₦576.81 billion for the same period. Over the time, the average company income tax was around ₦326.19 billion, import value added tax was ₦63.8 billion, and the average domestic value added tax was approximately ₦221.59 billion. The maximum and minimum values for theses series are clearly seen as presented in table 1. The standard deviations of the series from their respective means showed that RMGDP was the most

volatile (approximately ₦652.92) billion, while import value added was the least volatile at ₦30.91 billion approximately.

Table .1: Summary of Descriptive Statistics

Variable	No. of Obs.	Mean	Maximum	Minimum	Std. Dev	Prob
RMGDP	48	6147.848	6684.220	4216.190	652.9160	0.0000
PPT	48	576.8079	1476.440	176.7500	261.8918	0.0026
CIT	48	326.1898	778.3000	112.3600	158.9054	0.0452
IMVAT	48	63.80479	136.6100	35.54000	30.91098	0.0023
DVAT	48	221.5877	567.9500	0.250000	119.2109	0.0014

Source: Author's computation using Eviews 13

4.2 Unit Root Test Result

The unit root test for series stationarity using the Phillips Perron approach is based on the null hypothesis that a variable's series has a unit root. The PP test critical value at 5% was compared to the PP test statistic. According to the results, real manufacturing gross domestic product (RMGDP), company income tax (CIT), and domestic value added tax (DVAT) were integrated of order zero I(0), while petroleum profit tax (PPT) and import value added tax (IMVAT) were integrated of order one I(1), as shown in table 2.

Table 2 : Results of Phillips Perron Test Statistics

Variable	Phillips Perron Test Statistics			Probability		I(d)
	5% Crit. Value	Levels	First Difference	Levels	First Difference	
RMGDP	-2.925169	-3.747851	Ψ……	0.0063	Ψ…….	I(0)
PPT	-2.925169	-2.308416	-8.867455	0.1736	0.0000	I(1)
CIT	-2.925169	-3.298655	Ψ…….	0.0205	Ψ…….	I(0)
IMVAT	-2.925169	0.086189	-8.002270	0.9613	0.0000	I(1)
DVAT	-2.926622	-10.11307	Ψ…….	0.0000	Ψ…….	I(0)

Source: Author's computation using Eviews 13

4.3 The ARDL Bound Test for Cointegration Result

This section looked at the long-term relationship between the variables using cointegration and the autoregressive distributed lag (ARDL) bound test. The ideal lag length of (2,4,0,2,3) was found for the ARDL bound test by applying the Akaike Information Criteria (AIC), as recommended by Pesaran et al. (2001), through the vector autoregression (VAR) lag length selection criteria. Thus, table 3 displays the bound test result. At the traditional 5% threshold of significance, the F-statistic (6.702954) was found to be more than the upper critical bound value (3.905) and, consequently, bigger than the upper bound value of 5.173 at the 1% level of significance. Consequently, the results affirmed a long run nexus amongst the variables in the model.

Table .3 Bound Test for Cointegration Result
Null Hypothesis: No levels relationship
Number of cointegrating variables: 4

Test Statistic			Value			
F-statistic			6.702954			
	10%		5%		1%	
Sample size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
40	2.427	3.395	2.893	4.000	3.967	5.455
45	2.402	3.345	2.850	3.905	3.892	5.173
Asymptotic	2.200	3.090	2.560	3.490	3.290	4.370

Source: Author's computation using Eviews 13

4.4 Estimation and Discussion of Findings

This sub-section examined the empirical results from the ARDL regression and discusses the findings beginning from the estimates of the long run results and then the short run results.

4.4.1 The ARDL Long Run (Cointegrating coefficients) Result

Following the optimal lag selection criterion and the selected model, ARDL (2,4,0,2,3), the long-run elasticities were computed, and the results are reported in Table 4. As can be seen from the data, petroleum profit tax (PPT) has a positive coefficient of 0.809977, however the probability value is not significant at the 5% or 10% level. Thus, it is obvious that PPT has a minimal beneficial influence on industrial production in the long run. Company income tax (CIT) has a negative coefficient of -2.855252 with a probability value of 0.0203, which is significant at the 2% level, which is lower than the 5% benchmark. This suggests that CIT has a major detrimental influence on industrial production in the long run. More specifically, the conclusion suggests that a 1% rise in business income tax decreases industrial production by around 2.86%. The result on import value added (IMVAT) similarly indicated a negative coefficient, although the probability value was only significant at the 7% level. This means that IMVAT has the propensity to diminish industrial production in the long run. If we picked the 10% level of significance, it would mean that a 1% rise in IMVAT lowered industrial output by 24%. Domestic value added tax (DVAT), on the other hand, revealed a positive coefficient of 12.42305 with a probability value of 0.0112, which is significant at the 1% level. This suggests that DVAT had a large beneficial influence on industrial production in the long run. More specifically, a 1% rise in DVAT boosted RMGDP by 12.4%.

Table .4 ARDL Long Run Results Estimate

Dependent Variable: RMGDP Selected Model: ARDL(2,4,0,2,3)				
Variable	Coefficient	Std. Error	t-Statistic	Prob
PPT	0.809977	0.709694	1.141306	0.2607
CIT	-2.855252	1.179975	-2.419755	0.0203
IMVAT	-24.01401	13.18396	-1.821456	0.0762
DVAT	12.42305	4.667105	2.661832	0.0112

C	5825.242	349.2367	16.67992	0.0000

Source: Author's computation using Eviews 13

4.4.2 The ARDL Short Run Estimates and Error Correction Model (ECM).

This table presents at first, the coefficients of the parameters used in this study, and then the standard errors, followed by the t-statistics, and probability values for the variables in the ECM and ARDL short-run estimate. The ECM's coefficient for CointEq(-1) is statistically significant (-4.086, p-value=0.000) and negative signed, implying that about 8% of the short-run disequilibrium is corrected to long-run equilibrium. Furthermore, the corrected R-squared value of 0.895748 suggests that the explanatory variables account for around 90% of the variance in the dependent variable. In terms of short-term effects, RMGDP(-1) exhibits a positive and statistically significant coefficient (6.822, p-value=0.000), indicating that a 1% growth in RMGDP boosts its increase by nearly 64%. On the other hand, petroleum profit tax (PPT) demonstrates a mixed influence on RMGDP in the short run. While PPT(-1) and PPT(-3) show statistically significant negative coefficients, PPT(-2) does not reach statistical significance at the 5% level. Except for the first delayed year, the reporting year and the second lagged year exhibited significant probability values of 0.0338 and 0.0000, whereas the third lagged year revealed a positive coefficient value of 0.086547 with a probability value of 0.0505. Evidently, PPT displayed a large negative influence on RMGDP in the near run more than its favourable impact on RMGDP. Import value added tax (IMVAT) had positive coefficients of 0.201391 and 1.613996 in the reporting year and was one year late. However, only the prior year was crucial. Thus, IMVAT has a strong beneficial influence on RMGDP in the near run. Domestic value-added tax had a favourable influence on RMGDP in the reporting year but had a considerable negative impact on RMGDP in the first and second lagged years.

Table 5 ARDL Short Run Estimates Result

Dependent Variable: RMGDP
Selected Model: ARDL(2,4,0,2,3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.075048	0.010901	-6.884726	0.0000
D(RMGDP(-1))	0.636154	0.060467	10.52067	0.0000
D(PPT)	-0.073746	0.033304	-2.214288	0.0338
D(PPT(-1))	-0.040559	0.035314	-1.148513	0.2590
D(PPT(-2))	-0.225687	0.037085	-6.085656	0.0000
D(PPT(-3))	0.086547	0.042636	2.029883	0.0505
D(IMVAT)	0.201391	0.555938	0.362255	0.7195
D(IMVAT(-1))	1.613996	0.592447	2.724285	0.0102
D(DVAT)	0.342033	0.102765	3.328305	0.0022
D(DVAT(-1))	-0.483714	0.123168	-3.927283	0.0004
D(DVAT(-2))	-0.374554	0.105840	-3.538887	0.0012
R-squared			0.919992	
Adjusted R-squared			0.895748	

F-statistic	37.94603 (0.0000)
Serial Correlation LM Test: (Breusch-Godfrey)	0.1592 (0.1550)
Heteroskedasticity Test: (Breusch-Pagan-Godfrey)	0.2154 (0.2211)

Source: Author's computation using Eviews 13

4.5 Diagnostic Test Results

Firstly, the F-statistic reveals that the overall model is well-fitted and statistically significant, as indicated by its probability value in Table .5. Additionally, the findings of both the Breusch-Godfrey Serial Correlation LM test and the Breusch-Pagan-Godfrey Heteroscedasticity test, presented in Table 5, support the absence of serial correlation or heteroscedasticity within the model. The probabilities associated with these tests are greater than 0.05, or the five percent level of significance. Consequently, we accept the null hypotheses that the explanatory variables are not correlated with their lagged values (indicating no serial correlation up to 2 lags) and that the variance of the error term remains constant over time (indicating homoscedasticity)." Similarly, the Jarque-Bera test for residual normality in Figure .1 yielded a P-value larger than 0.05, suggesting that the errors were normally distributed. Hence, the null hypothesis, according to which the errors are normally distributed, is thus accepted.

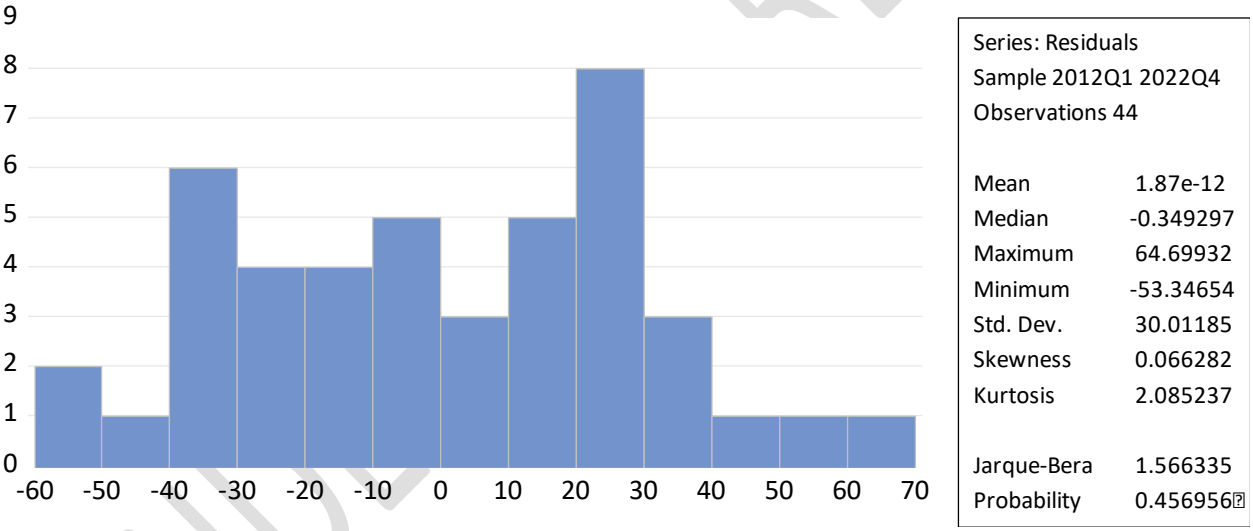

Figure 1 Residual Normality Test Result.

4.5.1 Model Stability Test Results

The cumulative sum (CUSUM) test was used to assess the stability of the model used in the investigation. The results are displayed in Figures .2. The test result demonstrated the stability of the model's regression coefficients. The CUSUM line, which is located between the upper- and lower-5 percent crucial lines, makes this clear. As a result, the null hypothesis that the coefficients are stable is accepted.

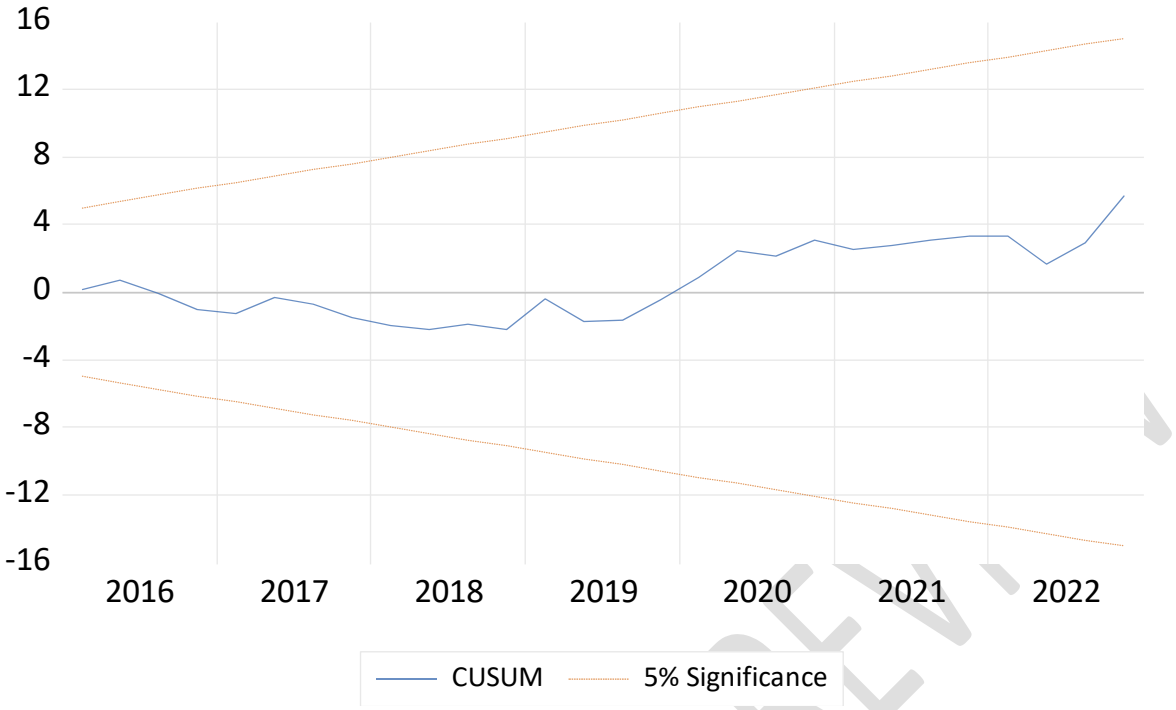

Figure 2 Model Stability Test Result: Cumulative Sum (CUSUM) test.

4. Conclusion

Using quarterly time series data from the Central Bank of Nigeria and the Federal Inland Revenue Service (FIRS), this study investigated how taxes impact industrial production in Nigeria from 2011 to 2022. Real manufacturing GDP (RMGDP) was used as a proxy for Nigerian manufacturing output, with petroleum profit tax (PPT), corporate income tax (CIT), import value added tax (IMVAT), and domestic value added tax (DVAT) serving as explanatory variables. The study's theoretical base was the Lindahl Theory of Taxation. The outcomes of both international and Nigerian research were found to be conflicting following a complete study of the empirical literature. That is to say, while some foreign studies (Gatsi, Gadzo, & Kportorgbi, 2013) found a significant negative impact of corporate income tax on the financial performance of firms in Ghana, others (Otwani, Simiyu, & Makokha, 2017) found a significant positive impact of corporate income tax on financial performance in Nairobi. On the other hand, in Nigeria, while Ajelabi (2023), Ewubare & Ozo-Eson (2019), and Ogudu, Kingsley & Akinlosotu (2018) found positive impact of taxation on manufacturing output in Nigeria, Onwuka & Akoma (2022) and Ogu & Kem (2020) discovered insignificant relationship between taxation and industrial output in Nigeria. Following the issues now encountered by manufacturing enterprises in Nigeria, it is vital to highlight the influence of taxes on the manufacturing industry. Based on the findings, this study investigated the impact of various taxes on Nigerian manufacturing production using both the ARDL technique and the Lindahl tax theory. In the long run, the results indicated that petroleum profit tax (PPT) had an insignificant positive impact on manufacturing output, while corporate income tax (CIT) had a significant negative impact. Import value-added tax (IMVAT) showed an insignificant negative impact, whereas domestic value-added tax (DVAT) exhibited a significant positive impact on

manufacturing output. Conversely, in the short run, PPT had a considerable negative impact on RMGDP across most lags, while IMVAT demonstrated a substantial positive influence. Additionally, DVAT had a significant negative impact on RMGDP. Consequently, based on these findings, the study concluded that taxes had a mixed effect on Nigerian industrial production.

5. Recommendations

As a result of the findings of this study, the following recommendations are made for policy consideration:

(i) The government should balance its company income tax (CIT) with the provision of basic social goods such as security, electricity and good road networks in the country to reduce the negative impact of company income tax on manufacturing output in the long run.

(ii) There is need for the government to adopt selective taxation on the use of import value added tax. For instance, raw materials and industrial inputs can be exempted from import value added tax while the imposing of IMVAT should be on finished goods. This way, the negative impact of IMVAT on manufacturing output can be addressed in the long run.

(iii) The significant positive impact of domestic value added tax (DVAT) on manufacturing output indicates that there exists more score for domestic value added tax in Nigeria. By implementing recommendation (ii) would naturally increase such scope for more DVAT. Also, by further providing the enabling environment as recommended in (i) would engender more scope for DVAT which should further enhance manufacturing output in the country.

(iv) There is need for the government to reduce its petroleum profit tax (PPT) in the short run specifically to encourage local refining manufacturing firm in petroleum operations.

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