EFFECTS OF TAXATION ON INDUSTRIAL SECTOR OUTPUT IN NIGERIA

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Abstract

This paper studies the connection between taxation and industrial output in Nigeria using time series data from the Central Bank of Nigeria (CBN) Statistical Bulletin (2022). The research employs the Augmented Dickey-Fuller (ADF) test to confirm stationarity, followed by the ARDL bounds test to assess cointegration among variables. A Non-Linear Autoregressive Distributed Lag (NARDL) model is then used to reflect the asymmetric effects of corporate income tax (CIT), value-added tax (VAT), and institutional quality (INSQ) on industrial output. The results reveal that in the long run, increased CIT negatively affects industrial output, while improved VAT and institutional quality positively impact output. In the short run, VAT and institutional quality are statistically significant in enhancing industrial performance. The error correction model (ECM) displays a 36% swiftness of change towards equilibrium. Based on these findings, the study recommends reforming corporate tax policies to reduce the burden on industries, which could include reducing the CIT rate for key sectors, offering tax incentives for industries with high growth potential, and simplifying tax administration to improve compliance. In addition, strengthening VAT collection and improving institutional quality are crucial steps to stimulate Nigeria's industrial sector.

Keywords: Taxation, Industrial Output, Corporate Income Tax, Value-Added Tax, Institutional Quality

Jel Classification Codes: H25, L60, O14.

1. Introduction

Taxation plays a crucial role in developing the manufacturing sector globally, providing governments with the necessary revenue for infrastructure, human capital investment, and fostering industrial growth (Onoshole, 2024). In developed economies, well-structured tax regimes have led to improved productivity and innovation within the industrial sector. In contrast, in African economies, the relationship between taxation and manufacturing output is more nuanced. High tax burdens can discourage industrial growth, particularly in less developed economies (World Bank, 2022). However, appropriate tax incentives can significantly boost industrial performance by lowering production costs and attracting investment. In Nigeria, the industrial sector is a vital promoter of economic expansion, and taxation plans significantly impact its output. When structured to encourage investment and expansion, taxation can positively influence manufacturing, but burdensome taxes may stifle growth, reducing productivity and global competitiveness (Eniekezimene et al., 2024).

Globally, industrial performance is strongly linked to tax policies. For instance, in the European Union, corporate tax incentives have contributed to steady growth in manufacturing output. Similarly, the United States has experienced robust industrial performance due to tax cuts and credits that favour manufacturing (Nigerian Federal Ministry of Industry, Trade, and Investments, 2014). In 2021, industrial sectors contributed significantly to GDP in various countries: the USA (17.88%), China (39%), South Africa (24.44%), and Brazil (20.15%) (Aaron, 2023). In Africa, South Africa's industrial sector has experienced an average growth rate of 3.1% over the last decade, partly due to a competitive tax system (Kaplan, 2019).

However, Nigeria's industrial output has fluctuated significantly over the years (Adejumo, 2020). Despite being the second largest economy close behind South Africa with an estimated GDP of nearly $400 billion, Nigeria’s economic output in 2024 is estimated at $395 billion and is among the world's least industrialized countries, with the share of manufacturing value-added in relation to GDP typically falling below 5% over the last decade. This figure is smaller than the 8.6% recorded at independence in 1960. Nigeria's industrialization peaked during the oil boom (1973-1981) when manufacturing accounted for 11% of GDP. By 2022, this figure had fallen to less than 6%. Additionally, manufacturing exports made up just 0.5% of total exports, while imports of manufactured goods accounted for about 15% of GDP, representing over 60% of total imports (Joshua Gyang, 2024).

To improve Nigeria's manufacturing output, various government and non-governmental initiatives have been introduced. Policies such as the Pioneer Status Incentive (PSI), granting levy holidays to industries, and the Finance Act of 2020, which reduced corporate tax rates for small and medium enterprises, aim to lower the tax burden on manufacturers and stimulate industrial output (Nwankwo et al., 2023; Oladipo et al., 2024). Additionally, the Nigeria Industrial Revolution Plan (NIRP) was launched to create an enabling environment for industrial growth through tax reliefs, subsidies, and infrastructural development. Other approaches include the National Economic Empowerment Development Strategy (NEEDS), Vision 20:2020, and the Nigerian Industrial Revolution Plan, all of which emphasize various reforms across sectors,

including public sector reform, tax reform, and trade policy (Onyejiuwa & Fagboyo, 2019).

Non-governmental organizations (NGOs), like the Manufacturers Association of Nigeria (MAN), have also advocated for more favourable tax policies to support the manufacturing sector. They urge the government to reduce tax-related bottlenecks that limit production capacity (MAN, 2015). Despite these policies, the sector continues to face significant challenges. Many manufacturers have either relocated to other countries or closed down permanently. These challenges are reflected in the weak performance of some industrial subsectors. In the first quarter of 2023, the oil sector experienced a negative performance of -4.2%, although this was an improvement from -18.9% in the same quarter of 2022. The manufacturing subsector grew by 4.5% in 2022 but slowed to 1.9% in 2023 (National Bureau of Statistics [NBS], 2023). Additionally, the contribution of solid minerals to GDP decreased from 0.4% in 2022 to 0.1% in 2023. Overall, the Nigerian industrial sector contracted by -6.4% in the first quarter of 2023 (NBS, 2023).

Considering the crucial role of the industrial sector in driving economic transformation, many researchers have explored the relationship between taxation and industrial sector development. However, findings have been mixed. While Onwuka and Akoma (2022) found an insignificant relationship between taxation and industrial sector growth, Ogu and Kem (2020) reported a significant impact. Moreover, no studies have incorporated institutional quality as a variable in explaining this relationship. Institutional quality is critical in determining how effectively tax systems can positively impact the industrial sector. Thus, this study incorporates institutional quality to discover the connection between taxation and the development of Nigeria's industrial sector.

2.0 Literature Review

2.1 Theoretical Review

This paper is anchored on Adam Smith's Benefit Theory of Taxation (1776), which assumes a direct relationship between taxpayers and government services. The theory suggests that individuals should contribute taxes in fraction to the advantages they derive from government services. It suggests that those who derive greater benefits from government programs should bear a larger tax burden. In theory, if a sector benefits more from government interventions, it should contribute more in taxes than sectors receiving less attention.

However, this theory faces several criticisms. First, measuring the exact benefits individuals receive from public services is challenging, especially since many government expenditures provide collective benefits. Second, the theory does not offer a comprehensive solution to tax structure design, focusing only on financing public services and not addressing the redistribution of wealth through tax transfers. Finally, applying this principle might result in the poor, who rely more on public services, bearing a heavier tax burden than the rich. Despite these limitations, the theory remains relevant for this study by highlighting that tax burdens should reflect the direct benefits received from public services, which could apply to Nigeria’s industrial sectors.

Taxation and Industrial Sector Output

Taxation and industrial output are intertwined, both playing crucial roles in economic development. Taxation is a vital tool for governments to raise revenue, which is used to fund essential infrastructure and services that industrial sectors rely on, such as roads, electricity, and education (Onwuka & Uturu, 2022). An efficient tax system can create an environment conducive to business growth by improving operational efficiency and enhancing profitability. As infrastructure improves, industrial sectors benefit from reduced production costs and increased output (Olaoye et al., 2019).

The industrial sector is central to economic growth, generating employment, fostering technological advancements, and contributing to export growth (Ekong & Ekong, 2022). It acts as a catalyst for national economic transformation, making effective taxation critical for boosting industrial performance and overall economic stability. As industrial sectors grow, they contribute more to government revenue, creating a cycle of mutual benefit.

2.2 Empirical Review

On empirical review, Omolade et al. (2023) used an ARDL model covering 1980–2022 in Nigeria the study found that value-added tax (VAT), inflation, and human capital positively affect industrial output. However, customs and excise duties (CED) and trade openness negatively impact industrial growth.

Joshua-Gyang et al. (2023) carried out research covering the period from 1999 to 2022 in Nigeria, utilizing the Fully Modified Ordinary Least Square (OLS) model to evaluate the influence of various tax components on industrial output. The discoveries revealed a progressive but insignificant connection between company income tax (CIT) and industrial output. Conversely, customs and excise duties (CED) had an adverse effect on industrial output, whereas value-added tax (VAT) showed a progressive stimulus.

Onwuka and Akoma (2022) investigated the link between taxation and manufacturing efficiency in Nigeria from 2005–2021 using Ordinary Least Square OLS, this study identified no substantial correlation between taxation and manufacturing sector output.

Omodero and Eriabie (2022) examined the causal impact of VAT on manufacturing output in Nigeria using data from 2010 to 2021. Pairwise Granger Causality Tests indicated that both local VAT returns and aggregate VAT collections had a positive effect on manufacturing output.

Idoko et al. (2022) investigated tax reforms in Nigeria from 1990 to 2021 and discovered a confirmatory and substantial correlation between tax reforms and industrial output. Their study revealed that company income tax, petroleum profit tax, and customs and excise duties (CED) had varying impacts on industrial output.

Olawumi and Adesanmi (2020) employed an ARDL model to assess the interplay between corporate tax revenue and manufacturing output in Nigeria over the period from 1981 to 2018. Their findings indicated that company income tax (CIT), government investment expenditure, interest rates, and money supply negatively affected industrial

productivity, whereas manufacturing capacity utilization demonstrated a positive but insignificant impact.

Ogu and Kem (2020) analyzed the influence of taxation on industrial sector efficiency in Nigeria from 1981 to 2018 using an error correction model. The findings revealed that CED and manufacturing capacity utilization positively impacted industrial output, while CIT and petroleum profit tax had a positive but insignificant impact.

Etim et al. (2020) utilized an Ordinary Least Square OLS approach to analyze data in Nigeria from 1985 to 2018, revealing that company income tax (CIT) and value-added tax (VAT) had an adverse influence on manufacturing output. In contrast, personal income tax and petroleum profit tax demonstrated a progressive effect on industrial output.

Ewubare and Ozo-Eson (2019) analyzed data in Nigeria from 1980 to 2017 using an error correction model, which indicated that company income tax (CIT) and petroleum profit tax absolutely influenced manufacturing output. However, value-added tax (VAT) had an adverse but significant influence, while excise duties demonstrated a positive but insignificant impact.

Oladipo et al. (2019) utilized an ARDL model to analyze data in Nigeria from 2000 to 2016, finding that company income tax (CIT) positively affected manufacturing output in the long run, while having an adverse impact in the short run. Conversely, value-added tax (VAT) exhibited an adverse consequence in the long term but a positive result in the short span.

Ogudu et al. (2018) studied the impact of corporate income tax on industrial sector performance in Nigeria between 2013 and 2017 using fixed and random effect regression techniques. The result shows that company income tax and net assets have a positive and significant impact on manufacturing sector performance in Nigeria, while earnings per share have a negative and insignificant impact on the industrial sector in Nigeria.

Akindola and Adeleye (2017) examined the impact of government taxation and expenditure on the performance of the manufacturing sector in Nigeria from 1980 to 2014. The Ordinary Least Square (OLS) estimation method was employed in obtaining the numerical estimates of the coefficients, and from the findings, the results showed that there was a positive and significant relationship between Government Expenditure and the manufacturing sector and also there was a positive relationship between Government Tax Revenue and the manufacturing sector. The reviewed literature underscores the importance of taxation in driving industrial output but identifies gaps, particularly in incorporating institutional quality as a moderating factor. High institutional quality can ensure an effective tax system that fosters industrial growth while maximizing government revenue for development projects. This study aims to fill that gap by including institutional quality as a control variable, offering a more comprehensive understanding of how taxation influences industrial sector performance in Nigeria.

This literature review demonstrates the multifaceted relationship between taxation and industrial output in Nigeria, incorporating both theoretical perspectives and empirical evidence from various studies. By including institutional quality, this study adds a crucial

dimension to understanding how tax policies can optimize industrial growth while ensuring sustainable economic development.

3.0 Methodology

This research employed time series data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin 2022 to estimate the interplay between taxation and the industrial sector in Nigeria. Initially, a unit root test was performed using the Augmented Dickey-Fuller (ADF) test to determine the stationarity level of the data before proceeding to cointegration testing. For the cointegration analysis, the study adopted the ARDL bounds test as suggested byPaseran et al. (2001). Subsequently, the Non-Linear Auto-Regressive Distributed Lag (NARDL) technique was applied to derive the numerical estimates of the coefficients. The NARDL method was selected due to its advantages over the linear ARDL, as it is capable of modelling cointegrating relationships in small or finite samples. It employs positive and negative partial sum decompositions, allowing for the discovery of asymmetric influence in both the long and short term. Importantly, the NARDL model, like its linear counterpart, is flexible with variables being a mix of I(0) and I(1), making it suitable for analyzing time series data with different integration orders. However, if any variable is integrated of order two (I(2)) or higher, it invalidates the assumptions underlying the bounds testing approach for cointegration. This limitation arises because the ARDL and NARDL frameworks are designed for series that are at most I(1), and the presence of I(2) variables would lead to spurious results.

3.1 Model Specification

The theoretical framework of this research is based on the model developed by Adam Smith's Benefit Theory of Taxation (1776), which has been adapted for use in this study and presented in Equation 3.1.

$$INDO = f(CIT, PPT, CED, MCU) \quad 3.1$$

Where INDO is industrial output; CIT = corporate income tax; PPT= petroleum profit tax; CED = customs and excise duties; MCU = manufacturing capacity utilization. This current study therefore included variables such as industrial output; value-added tax and institutional quality in its model. The model is thus specified in its functional form as

$$INO = f(CIT, VAT, INSQ) \quad 3.2$$

Where, INO = industrial output; CIT = corporate income tax; VAT = value-added tax; INSQ = institutional quality. The parametric and stochastic form of the model can be expressed as:

$$INOt = \beta o + \beta 1 CITt + \beta 2 VATt + \beta 3 INSQt + £t \quad 3.3$$

Where, £ = stochastic error term which identifies other variables that are not added in the model; β_0 = intercept; β_1, β_2 and β_3 are the slope of the coefficients. Equation 3.3 can be transferred into a logarithm so as to enable the coefficients of the variables to be inferred as elasticities. Therefore, the transformed model is given as:

$$\Delta lnINO = ln\beta 0 + \beta 1lnINOt-1 + \beta 2lnCITt-1 + \beta 3lnVATt-1 + \beta 4lnINSQt-1 + £t \quad 3.4$$

Where Δ is the first difference operator; ln = Natural logarithms.

The Non-Linear ARDL specification is expressed as;

$$\Delta lnINO = \beta 0 + \beta 1lnINOt-1 + \beta 2-lnNEG\ (CIT)t-1 + \beta 3-lnNEG(VAT)t-1 + \beta 4-lnNEG(INSQ)t-1 + \beta 5+lnPOS(CIT)t-1 + \beta 6+lnPOS(VAT)t-1 + \beta 7+lnPOS(INSQ)t-1 + \sum_{i=1}^{p}\alpha 1i\Delta lnINOt-1 + \sum_{i=1}^{p}\alpha 2-lnNEG(CIT)t-1 + \sum_{i=1}^{p}\alpha 3-lnNEG(VAT)t-1 + \sum_{i=1}^{p}\alpha 4-lnNEG(INSQ)t-1 + \sum_{i=1}^{p}\alpha 5+lnPOS(CIT)t-1 + \sum_{i=1}^{p}\alpha 6+lnPOS(VAT)t-1 + \sum_{i=1}^{p}\alpha 7+lnPOS(INSQ)t-1 + \mu t \ldots\ldots 3.5$$

4.0 Presentation of Results and Discussion of Finding

4.1 Stationarity Test

Table 1: Summary of the Augmented Dickey-Fuller Unit Root Test

Variables	ADF Stats	CriticalValue @5%	Order of Integration	Remarks
INFO	-5.4549	-2.9484	I(1)	Stationary
CIT	-5.6753	-2.9484	I(1)	Stationary
VAT	-3.8264	-2.9719	I(0)	Stationary
INSQ	-4.6167	-2.9484	I(1)	Stationary

Source: Authors' Computation, 2024

The ADF unit root test for stationarity is presented in Table 1. From the result, industrial output (INO), company income tax (CIT), value-added tax (VAT) and institutional quality (INSQ) were all found to be stationary at 5 per cent. This is because the absolute values of the ADF statistics surpass the critical values at the 5 per cent significance level for all variables. Consequently, the null hypothesis is accepted, indicating that the model is stationary.

Table 2: Summary of ARDL Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	37.49433	NA	0.005822	-2.30995	-2.12136	-2.25088
1	57.92318	33.813*	0.0015*	-3.6498*	-3.4141*	-3.5760*
2	58.17015	0.391746	0.001613	-3.59794	-3.31505	-3.50934
3	58.17420	0.006155	0.001734	-3.52925	-3.19921	-3.42589

Source: Authors' Computation, 2024

Table 2 shows that a lag length of one is ideal for this study. Therefore, the Akaike Information Criterion (AIC) was selected as the method for determining this lag length, given that it possesses the lowest value in comparison to the Schwarz Information

Criterion (SC) and the Hannan-Quinn Information Criterion (HQ). According to the verdict rule, the method with the lowest value is preferred.

4.1 Bounds Test for Cointegration

Table 3: Summary of ARDL Bounds Test

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.812168	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Authors' Computation, 2024

According to Table 3, the F-statistic value is 3.812168, which surpasses the upper critical value bounds at the 5 per cent level of significance. This finding leads to the conclusion that a long-run relationship exists amid the variables. Consequently, the null hypothesis of no cointegration is rejected. Thus, the study advances to estimate both the short-run and long-run NARDL models.

4.2 Results of Non-linear Autoregressive Distributed Lag (NARDL) Model

Table 4: Summary of Long Run NARDL Result

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCIT_POS	-0.350139	0.320383	-1.092879	0.2917
LCIT_NEG	0.059372	0.068237	0.870088	0.3980
LVAT_POS	0.533476	0.366524	1.455501	0.1661
LVAT_NEG	0.081641	0.049449	1.650992	0.1195
INSQ	0.105571	0.047052	2.243699	0.0408
C	9.780903	0.391755	24.96687	0.0000

Source: Authors' Computation, 2024

Table 4 reveals that the regression line for the long-run estimates has positive intercepts, as indicated by the constant (c), which is cherished at 9.7809. This suggests that if all variables are held constant (set to zero), industrial output would be estimated at 9.7809. The a priori expectation for the intercept can theoretically be either positive or negative, reflecting the nature of the underlying relationship between the dependent and independent variables. In this analysis, the observed intercept is consistent with theoretical expectations, indicating that the model effectively captures the inherent dynamics of the relationship under investigation.

The coefficients for both the positive and negative components of company income tax (CIT) and value-added tax (VAT) are not statistically significant. This lack of statistical significance indicates that the estimated relationships between these tax variables and industrial output cannot be reliably interpreted. As such, the results do not provide sufficient evidence to conclude any meaningful long-term effect of CIT or VAT on industrial output. Future research with a more extensive dataset or alternative

methodologies may be necessary to establish robust relationships. The coefficient for institutional quality is 0.1056, suggesting that, on average, a 1% rise in institutional quality is expected to raise industrial output by 0.11%. Notably, institutional quality is statistically significant, as its p-value is below the 5% threshold.

Table 5: Summary of Short-Run NARDL Result

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCIT_POS)	-0.246958	0.047840	-5.162115	0.0001
D(LCIT_NEG)	-0.003321	0.014339	-0.231603	0.8200
D(LVAT_POS)	0.084054	0.030004	2.801451	0.0134
D(LVAT_NEG)	0.013971	0.018966	0.736654	0.4727
D(INSQ)	0.114713	0.048920	2.344897	0.0332
CointEq(-1)*	-0.366964	0.060038	-6.112221	0.0000
R-squared	0.767243	Mean dependent var		0.013551
Adjusted R-squared	0.711824	S.D. dependent var		0.045908
S.E. of regression	0.024644	Akaike info criterion		-4.375402
Sum squared resid	0.012754	Schwarz criterion		-4.087438
Log-likelihood	65.06793	Hannan-Quinn criteria.		-4.289775
Durbin-Watson stat	2.120492			

Source: Authors' Computation, 2024.

The results in Table 5 provide valuable insights into the short-run effects of corporate income tax (CIT), value-added tax (VAT), and institutional quality (INSQ) on industrial output in Nigeria. Positive changes in CIT exhibit a coefficient of -0.246958 and a p-value of 0.0001, indicating statistical significance at the 1% level. This suggests that a 1% increase in CIT leads to a 0.25% decrease in industrial output in the short run, highlighting the negative impact of higher CIT on industrial productivity. In contrast, the coefficient for negative changes in CIT is -0.003321, with a p-value of 0.8200, which is not statistically significant. Therefore, the effect of a decrease in CIT on industrial output cannot be reliably concluded. Regarding VAT, positive changes show a coefficient of 0.084054 with a p-value of 0.0134, demonstrating statistical significance at the 5% level. This implies that a 1% increase in VAT results in a 0.08% increase in industrial output in the short run. On the other hand, the coefficient for negative changes in VAT is 0.013971, with a p-value of 0.4727, indicating no statistical significance. Thus, a reduction in VAT does not have a statistically significant effect on industrial output.

Institutional quality (INSQ) presents a coefficient of 0.114713 and a p-value of 0.0332, which is statistically significant at the 5% level. This finding suggests that a 1% improvement in institutional quality leads to a 0.11% increase in industrial output in the short run, emphasizing the critical role of governance and institutional frameworks in enhancing industrial performance. The error correction term (CointEq(-1)) is correctly signed, with a coefficient of -0.366964 and a p-value of 0.0000, signifying statistical significance at the 1% level. This indicates that approximately 36% of any short-run disequilibrium is corrected within the current period, reflecting a moderate adjustment speed toward long-run equilibrium.

The model demonstrates robust explanatory power, as evidenced by the R^2 value of 0.7672, suggesting that CIT, VAT, and INSQ together explain 77% of the variations in industrial output. The remaining 23% is accounted for by factors captured in the error term. Additionally, the Durbin-Watson statistic of 2.1204 supports the absence of autocorrelation, further confirming the reliability and robustness of the model.

4.3 Post-estimation Tests

4.3.1 Normality Test

The normality test was conducted to determine whether the residuals from the model were normally distributed. The result of this test is presented in Figure 1.

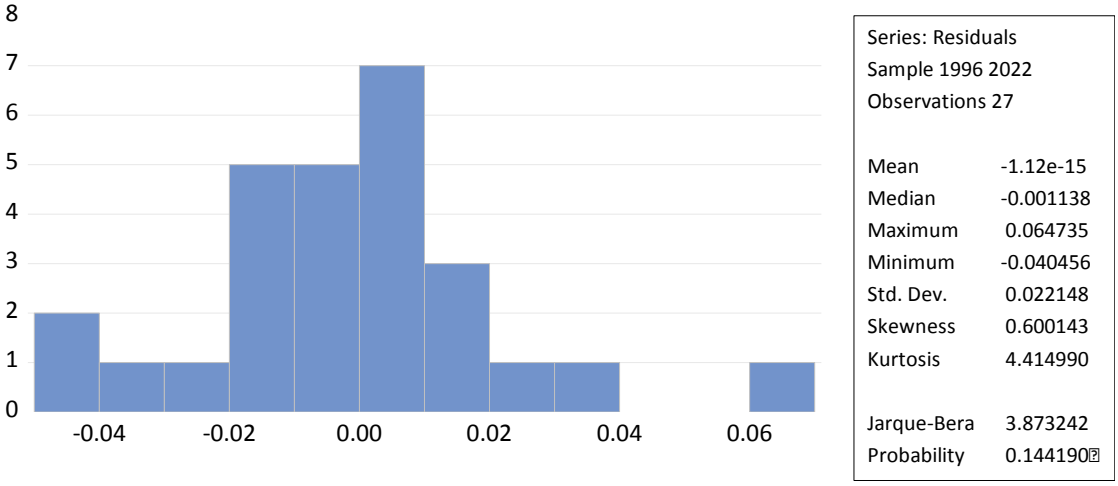

Figure 1: Histogram Normality Test.
Source: Authors' Computation, 2024

The results presented in Figure 1 show a Jarque-Bera probability value of 0.14419, which is greater than the 5% significance level. According to the rule of thumb, this indicates that the residuals of the model are normally distributed. As a result, the null hypothesis, which states that the residuals are normally distributed, is accepted. This finding supports the validity of the model's estimations, confirming that the assumption of normality holds.

4.3.2 Serial Correlation Test

The results of the Breusch-Godfrey serial correlation LM test, presented in Tables 6, indicate no significant evidence of serial correlation in the model.

Table 6: Summary of Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.755362	Prob. F(2,13)	0.2114
Obs*R-squared	5.741089	Prob. Chi-Square(2)	0.0567

Source: Authors' Computation, 2024

Table 6 shows an F-statistic of 1.755362 with a p-value of 0.2114 with a reports of an Obs*R-squared statistic of 5.741089 and a p-value of 0.0567. In both cases, the p-values exceed the 5% significance level, leading to the failure to reject the null hypothesis of no serial correlation. These findings confirm that the model is free from serial correlation, supporting the reliability of the regression results.

4.3.3 Heteroscedasticity Test

Breusch-Pagan Test

The results from the Breusch-Pagan-Godfrey heteroscedasticity test, as presented in Table 7, reveal an F-statistic value of 2.463812 with an associated p-value of 0.0983, which is greater than the 5% significance level (0.05). According to the decision rule, if the p-value exceeds 0.05, we fail to reject the null hypothesis that the variance of the residuals is constant.

Table 7: Heteroscedasticity Test Results

Test	F-Statistic	Probability (p-value)
Breusch-Pagan-Godfrey Test	2.463812	0.0983

Source: Authors' Computation, 2024

This result indicates that there is no significant evidence of heteroscedasticity in the model. Hence, the assumption of homoscedasticity holds, supporting the reliability and validity of the regression estimates.

4.3.4 Stability Test

Figure 2 demonstrates that the model is stable, as the baseline remains within the 5% boundary level. This indicates that the model is both stable and properly specified. Since the test results do not exceed the 5% significance boundary, the study confidently concludes that the model maintains structural stability throughout the estimation period.

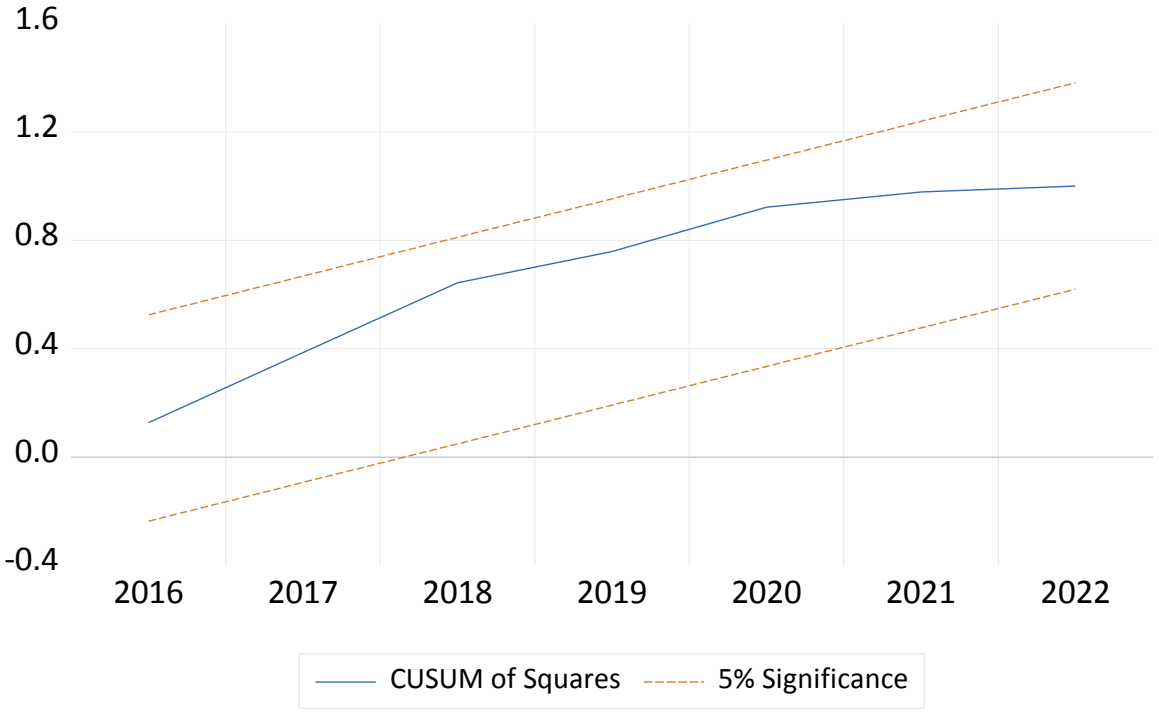

Figure 2: CUSUM of Squares Test
Source:

Source: Authors' Computation, 2024

5. Discussion of Findings

In the long run, increased CIT will result in a negative impact on industrial output, while decreased CIT will result in an increase in industrial output in Nigeria. Also, in the short run, either an upsurge or a decrease in CIT is likely to cause a decrease in industrial output. The positive and negative relationship between CIT and industrial output indicate that a high CIT rate would discourage potential investors from investing in the industrial sector, and also lower the existing investors' ability to reinvest in the sector. This will have an adverse effect on the output of industries as a whole. In a similar vein, a small CIT rate will help boost the output of the industrial sector as investors would be relieved of the increased tax burden, thereby helping them to reinvest in capital, research and development that is crucial for industrial sector growth. The result of decreased CIT failed to conform to the a priori anticipation since it is predictable that a low CIT rate should reduce the tax burden on investors. However, in the case of Nigeria, the low CIT rate which reduced industrial output during the period covered in this analysis was a result of a substantial CIT rate of 30% as well as multiple taxation usually paid by these companies. The positive relationship corroborates the findings of Joshua-Gyang et al. (2023), while the negative impact supports that of Etim et al. (2020).

The results show that changes in VAT, whether an increase or decrease, do not have a statistically significant impact on industrial output in the long run. Therefore, it is inaccurate to assert that changes in VAT directly increase industrial output in both the long and short run. The burden of VAT is ultimately borne by final consumers, making

its influence on industrial growth indirect. While a lower VAT rate could theoretically reduce production costs, increase profits, and lower prices, thereby stimulating demand and industrial output, these effects are not significant in the long run based on the findings of this study. Thus, the impact of VAT on the industrial sector is more nuanced and primarily linked to consumer spending patterns rather than direct production costs. While the findings of this study on VAT agreed with ***the*** results of Omolade et al. (2023) and Joshua-Gyang et al. (2023), it is not consistent with that of Etim et al. (2020) and Ewubare and Ozo-Eson (2019).

Furthermore, institutional quality has a positive impact on industrial output both in the long and short run. The implication of this positive impact is that high institutional quality helps smooth the operations of businesses; ensures accountability and transparency, respect for the rule of law, and lack of corrupt practices among others. However, in Nigeria, this finding is not in tandem with reality, as the country has low institutional quality. The result further revealed that the variables have high explanatory power as suggested by the R^2 of 0.77%. The diagnostic tests carried out revealed that the model is reliable and valid based on the outcomes of different tests conducted that are statistically significant.

6. Conclusion

The research investigates the impact of taxation on industrial output in Nigeria from 1986 to 2022, employing a non-linear Autoregressive Distributed Lag (ARDL) method. The results reveal that, in the short run, increases in corporate income tax (CIT) significantly reduce industrial output, while positive changes in value-added tax (VAT) and improvements in institutional quality (INSQ) contribute to an increase in output. In contrast, decreases in CIT and VAT do not exhibit statistically significant effects on industrial output in the short run. In the long run, the findings indicate that an increase in CIT has a negative effect on industrial output, while reductions in CIT, along with increases in VAT and improvements in institutional quality, positively influence output. However, the effects of decreases in VAT and CIT in the long run are not statistically significant.

The Error Correction Model (ECM) indicates that approximately 36% of any shocks from previous periods are corrected within the current period, suggesting a moderate pace of adjustment towards long-run equilibrium. The model demonstrates strong goodness of fit, highlighting the critical role of CIT, VAT, and INSQ as determinants of industrial output. These results underscore the significance of well-structured tax policies and improved institutional quality in promoting industrial growth in Nigeria. Given the persistent concerns within the industrial sector regarding the detrimental effects of excessive taxation, the study recommends tax policy reforms that strike a balance between revenue generation and the sector's growth needs, thus fostering a more conducive industrial environment for sustainable economic development.

Sustaining VAT at 7.5% can positively influence industrial output if the demand for industrial goods is inelastic. However, the actual distribution of the tax burden will depend on the price sensitivity of both producers and consumers. If demand is relatively

elastic, industries may absorb some of the tax, whereas if demand is inelastic, consumers are likely to bear the majority of the tax burden.

7. Recommendations

i. The government should prioritize sustaining the current Value Added Tax (VAT) rate of 7.5%, as it facilitates increased industrial output while minimizing disruptions to production costs. Given the regressive nature of VAT and the inelastic demand for essential goods, raising the tax rate would disproportionately shift the burden onto low-income households, significantly reducing their purchasing power and potentially deepening poverty levels. By maintaining the existing rate, the government ensures a stable fiscal environment conducive to industrial growth, while simultaneously protecting vulnerable populations who allocate a substantial portion of their income to necessities subject to VAT. The government needs to reduce the CIT rate to between 18 and 20%. This would encourage more investors and the revenue from this tax will increase.

ii. The government should fight corruption, and ensure that all entrusted with public funds are accountable and that people respect the rule of law. This will not only strengthen our weak institutions but also help different tax reforms to stimulate industrial output.

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