Evaluation of factors influencing industrial production in Nigeria

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Abstract

Despite the relevance of the industrial sector in shaping the progress of an economy, there still existed factors that impede its growth. In order to evaluate this factors the study used inflation (FLATION), exchange rate (CHANGE) and (VATAX) as the explanatory variable while manufacturing production was used as proxy to the explained variable (industrial production). Longitudinal research design was employed to evaluate the influence of inflation, exchange rate and value added tax on manufacturing production in Nigeria. Time series data that spanned 1989 through 2022 from online database. Probability sampling techniques was employed. Quantitative data analysis (descriptive statistic & inferential statistics) was used since it involves numerical data and often includes statistical techniques to identify patterns, relationships, and trends. Results from analysis showed that FLATION and VATAX had insignificant influence on manufacturing production but CHANGE had a positive significant influence on MAPROD. Conclusively, the R-square statistics showed that the study variables has 55% influence on industrial production in Nigeria. Hence, it is recommended that economic regulators should embark on policies aimed at controlling inflation, as lower and stable inflation is generally favorable for economic stability and growth. Also, maintaining exchange rate stability is recommended, as volatility might impact manufacturing sectors indirectly through investor confidence and import/export costs. Although VAT shows an insignificant effect, it might still impose burdens on manufacturing firms. So government should re-evaluate and potentially reform VAT policies to alleviate any burdens on the industrial (manufacturing) sector, possibly through targeted tax incentives or rebates for industrial firms.

Keywords: Inflation, Exchange Rate, Value Added Tax, Manufacturing Production

1. Introduction

Industrial production is a crucial element of Nigeria's economic landscape, significantly contributing to the nation's GDP, employment, and technological progress. However, the sector's growth and sustainability are influenced by various internal and external factors. These are economic policies, level of infrastructure, energy supply, human capital, market conditions, exchange rate, inflation and technological advancements. Economic policies play a pivotal role in shaping the industrial sector. Policies related to taxation, trade, and investment directly impact the operating environment for industrial firms. High corporate taxes can reduce profitability and deter investment, while favorable tax incentives can stimulate growth and expansion in the sector. Trade policies that include tariffs and import restrictions can protect local industries but may also lead to higher input costs if essential raw materials are imported

(Federal Ministry of Industry, Trade, and Investment, 2023).

Industrial production refers to the output of the industrial sector of an economy, which includes mining, manufacturing, and utilities. It is a measure of the real output of businesses engaged in these activities and is typically reported as an index to reflect changes over time. This index helps in understanding the level of industrial activity within an economy and its contribution to overall economic performance (Erhijakpor & Aroghene, 2023). Manufacturing entails process of converting raw materials into finished goods through the use of labor, machines, tools, and chemical or biological processing. Examples: Production of automobiles, electronics, textiles, machinery, and chemicals. Mining on the other hand involves extraction of minerals and other geological materials from the earth, which are used as raw materials in various industries. Examples: Coal mining, crude oil extraction, natural gas production, and metal ore mining. Meanwhile, utilities is the provision of essential services such as electricity, water, and natural gas to businesses and households. Examples: electric power generation, water supply, and gas distribution.

Moreover, government policies on subsidies and financial incentives can encourage industrial development by reducing operational costs and promoting innovation (Aroghene & Ikeora, 2022). Whereas, infrastructure is a critical determinant of industrial production, efficiency and effectiveness. In Nigeria, inadequate infrastructure, particularly in transportation, electricity, and telecommunications, poses significant challenges to the industrial sector. Poor road networks and insufficient rail transport increase logistics costs and delays, affecting the timely delivery of raw materials and finished products. Reliable electricity supply is essential for continuous

production processes however, frequent power outages and reliance on expensive diesel generators increase operational costs and reduce competitiveness. Investment in modern infrastructure is therefore crucial for enhancing industrial productivity and growth. Poor infrastructure increases logistics costs and disrupts production schedules, which negatively impacts industrial output (Central Bank of Nigeria, 2023).

Energy supply is another vital factor influencing industrial production in Nigeria. The country's industrial sector is heavily reliant on energy, with electricity and fuel being major inputs. Despite Nigeria's abundant natural resources, including oil and gas, the sector suffers from chronic energy shortages and high energy costs. Frequent power outages and reliance on expensive diesel generators are major challenges for Nigerian manufacturers (Nigerian Bureau of Statistics, 2023). Sustainable energy policies that ensure reliable and affordable energy supply are essential for boosting industrial output. Also, the availability and quality of human capital are significant determinants of industrial productivity. Nigeria has a large and youthful population, offering a potential workforce for the industrial sector. However, challenges such as inadequate education and vocational training, brain drain, and poor working conditions hinder the development of a skilled labor force (Imene & Udjo-onovughakpo, 2023). Enhancing educational and training programs to align with industry needs, improving working conditions, and retaining talent are critical for building a competent and motivated workforce that can drive industrial innovation and efficiency (International Monetary Fund, 2023).

Market conditions, including demand dynamics, competition, and consumer behavior, significantly impact industrial production. Domestic market size and

purchasing power influence the scale and scope of industrial activities. For instance, high inflation rates erode consumer purchasing power, reducing demand for manufactured goods (World Bank, 2022). Over the past few years, Nigeria's inflation rate has been growing steadily. The inflation rate reached its greatest level since 1996, which was 33.7%, as of April 2024. Compared to the previous month, January 2024, this represents an increase from 29.9% to 31.7%. Forty-five percent was the level of food inflation in April 2024, which had a substantial impact on consumer prices as well as cost structures for companies that are dependent on agricultural inputs. Additionally, competition from imported goods can challenge local industries, particularly if imported products are cheaper or of higher quality. Understanding market trends and consumer preferences is crucial for industrial firms to tailor their products and strategies to meet demand and stay competitive. Similarly, exchange rate fluctuations and inflation are macroeconomic factors that have substantial effects on industrial production. A stable exchange rate is essential for planning and budgeting, especially for industries reliant on imported raw materials and machinery.

Depreciation of the Naira increases the cost of imports, affecting production costs and profitability (Central Bank of Nigeria, 2023). The Nigerian naira has been under depreciation pressures, with the exchange rate moving dramatically. According to recent reports, the exchange rate has fluctuated, influencing import costs for raw materials and machinery required for industrial output. This depreciation raises the cost of imported items, which might reduce producers' profit margins and lead to increased consumer pricing. As of mid-2024, the naira had depreciated significantly, owing to prolonged economic woes and external pressures. The Central Bank of Nigeria (CBN) introduced naira stabilization measures in 2023, but swings continue to harm the economy, particularly the industrial sector. In the previous six months, the highest exchange rate was 1 USD to 1,680.50 NGN in February 2024, and the lowest was 1 USD to 1,076.86 NGN. In the last 30 days, the exchange rate fluctuated from a high of 1 USD to 1,534.84 NGN to a low of 1 USD to 1,5459.86 NGN, with an average rate of roughly 1 USD to 1,504.91. As part of the government's efforts to increase revenue, increased VAT rates and collections have been taking place. The demand for manufactured items may decrease as a result of this increase, which can have an impact on industrial output by increasing costs for both businesses and consumers. As a result of these modifications, the National Bureau of Statistics observes periodic rises in the amount of VAT obtained. Revenue from value-added tax (VAT) in Nigeria has seen a considerable growth ever since the VAT rate was raised from 5% to 7.5% in the year 2020. In 2022, the country generated ₦2.51 trillion from VAT, representing a 21.2% increase from ₦2.17 trillion in 2021.

In the first half of 2023, VAT income was ₦1.49 trillion, with a 10% increase in the second half of the year. Effective monetary and fiscal policies are necessary to manage inflation and stabilize the exchange rate, thereby supporting industrial growth (Aroghene & Imene, (2023). While adoption of new technologies and innovation is vital for enhancing industrial productivity and competitiveness. However, Nigeria's industrial sector faces challenges in technology adoption due to limited access to modern machinery, insufficient research and development (R&D), and a lack of technical expertise. Encouraging investment in R&D, facilitating access to modern technologies, and fostering partnerships between industry and academia can drive technological advancements and improve industrial

output (Federal Ministry of Industry, Trade, and Investment, 2023).

Understanding the factors influencing industrial production in Nigeria is crucial for policymakers, industry stakeholders, and investors. Insights from this evaluation will help in designing and implementing policies and strategies that address the challenges faced by the industrial sector. In order to evaluate factors that influence industrial production in Nigeria, the study made used of inflation, exchange rate and value added tax as explanatory variables while manufacturing production was used as the proxy for industrial production in Nigeria.

2 Literature Review

2.1 Conceptual /Empirical review

The section provide empirical evidence from various countries on how inflation, exchange rate fluctuations, and VATAX affect industrial output and manufacturing production, offering a comprehensive understanding of these dynamics with and beyond Nigeria.

Industrial Production

Industrial production refers to the output of the industrial sector of an economy. The industrial sector in Nigeria is classified into manufacturing, Mining and utilities. Industrial production is typically measured by an index that tracks the volume of production over time. This index is often seasonally adjusted to account for regular fluctuations in production activity, such as holidays and changes in weather. The importance of industrial production in an economy cannot be downplayed. Its relevance can be seen in the role it plays as a key economic indicator that provides insights into the health and direction of an economy (Aroghene & Akpoyibo, 2023). An increase in industrial production typically signals economic growth, while a decline may indicate economic contraction (Imene, 2023). Also, industrial sector is a significant source of employment, providing jobs in manufacturing plants, mines, and utility companies. Likewise Industrial production contributes substantially to a country's Gross Domestic Product (GDP), reflecting the sector's importance in economic activities (Aroghene, 2022). Similarly, output from the industrial sector affects various other sectors through supply chain linkages, influencing everything from raw material supply to the availability of finished goods. For this study industrial production is proxy with manufacturing production

Influence of Inflation on Manufacturing Production

Inflation, defined as the general rise in the prices of goods and services over time, has significant implications for manufacturing production. In Nigeria, inflationary pressures can severely impact the cost structure, profitability, and overall productivity of manufacturing firms. One of the direct effects of inflation on manufacturing production is the increase in the cost of raw materials and other inputs. As prices rise, manufacturers face higher costs for the materials required to produce goods, leading to increased production costs. For instance, during periods of high inflation, the prices of essential commodities like steel, chemicals, and other industrial inputs escalate, squeezing profit margins and making it difficult for manufacturers to maintain competitive pricing (Nigerian Bureau of Statistics, 2023). Inflation also erodes consumer purchasing power, reducing the overall demand for manufactured goods (Aroghene & Imene, 2023). When prices rise, consumers tend to cut back on discretionary spending, affecting sales volumes for manufacturers. This reduced demand can lead to lower production levels as firms adjust their output to match the diminished market appetite (Central Bank of Nigeria, 2023). High inflation creates economic uncertainty, complicating long-term

planning and investment for manufacturing firms. Manufacturers may be hesitant to invest in new technologies or expand their operations due to unpredictable costs and revenue streams. This hesitation can stifle innovation and growth within the sector (International Monetary Fund, 2023). Inflation often leads to higher interest rates as central banks attempt to control rising prices. Higher borrowing costs can deter manufacturers from taking loans for capital investments, further impacting their ability to expand and modernize their operations. Consequently, the overall productivity and efficiency of the manufacturing sector may suffer (World Bank, 2022).

A study by Domaç and Yücel (2005) explored the relationship between inflation and industrial output in Turkey from 1980 to 2000. Using an Autoregressive Distributed Lag (ARDL) approach, the study found that inflation had a significant adverse effect on industrial production. The research highlighted the importance of macroeconomic stability in fostering industrial growth. Akinlo (2006) examined the relationship between inflation and industrial output in Nigeria from 1980 to 2003. Using the Ordinary Least Squares (OLS) regression technique, the study found a significant negative relationship between inflation and industrial output. High inflation rates were found to increase production costs, reduce profit margins, and ultimately decrease industrial productivity. The study highlighted the need for stable macroeconomic policies to control inflation and support industrial growth. Folawewo and Osinubi (2006) conducted an empirical analysis of the impact of inflation on industrial output in Nigeria. The study utilized Vector Autoregression (VAR) models to analyze data from 1980 to 2002. The results indicated that inflation has a long-term adverse effect on industrial output, primarily through the cost-push inflation mechanism, where rising input costs reduce

the profitability and output of industrial firms. Ogunleye and Ayeni (2012) investigated the effects of inflation on industrial sector performance in Nigeria from 1970 to 2008. Employing co-integration and error correction modeling techniques, the study found that inflation negatively impacted industrial output. The research suggested that inflation volatility introduces uncertainty, which discourages investment in the industrial sector and hampers production efficiency. Olusola (2018) analyzed the impact of inflation on industrial growth in Nigeria using time series data from 1981 to 2016. The study used Autoregressive Distributed Lag (ARDL) bounds testing approach and discovered a negative relationship between inflation and industrial growth. The findings underscored the importance of maintaining low and stable inflation rates to foster industrial development.

Influence of Exchange Rate on Manufacturing Production

The exchange rate, which determines the value of the Nigerian Naira relative to other currencies, is a crucial factor influencing manufacturing production. Exchange rate fluctuations can affect the cost of imported inputs, export competitiveness, and overall financial stability of manufacturing firms. A depreciating Naira makes imported raw materials and machinery more expensive. Since many Nigerian manufacturers rely on imported inputs, an unfavorable exchange rate increases production costs, reducing profit margins and potentially leading to higher prices for finished goods (Central Bank of Nigeria, 2023). For example, if the Naira weakens against the US dollar, the cost of importing essential components like electronics, machinery, and chemicals rises, impacting the overall cost structure of manufacturing firms. Conversely, a weaker Naira can enhance the competitiveness of Nigerian manufactured goods in international markets by making them cheaper for foreign buyers. This can boost

export volumes and revenue, contributing positively to the manufacturing sector. However, the benefits of increased export competitiveness can be offset by the higher costs of imported inputs (International Monetary Fund, 2023). Exchange rate volatility creates financial instability for manufacturers. Firms may face difficulties in managing foreign currency-denominated debts and in predicting future costs and revenues, which complicates financial planning and risk management. This uncertainty can discourage investment and expansion in the manufacturing sector (World Bank, 2022).

Choi and Baek (2007) investigated the effects of exchange rate fluctuations on manufacturing output in South Korea from 1980 to 2005. Using a Structural Vector Autoregression (SVAR) model, the study found that exchange rate volatility negatively impacted manufacturing production. The study emphasized the need for exchange rate stabilization policies to support the manufacturing sector. Carrera and Restout (2008) examined the influence of exchange rate fluctuations on the manufacturing sector in Mexico from 1980 to 2006. Utilizing an Error Correction Model (ECM), the study found that exchange rate volatility had a negative impact on manufacturing output. The depreciation of the Peso increased the cost of imported raw materials, adversely affecting production. A study by Zhang and Zhang (2011) analyzed the impact of exchange rate volatility on manufacturing exports in China from 1994 to 2008. Using a Generalized Method of Moments (GMM) approach, the study found that exchange rate volatility negatively affected manufacturing exports and production. The depreciation of the Renminbi increased the cost of imported inputs, reducing output. Tandrayen-Ragoobur and Kasseeah (2017) explored the impact of exchange rate volatility on manufacturing exports in Malaysia from 1990 to 2014. The study

used an ARDL model and found that exchange rate fluctuations adversely affected manufacturing exports and production. The research highlighted the importance of maintaining a stable exchange rate to enhance manufacturing sector performance . Aliyu (2010) examined the impact of exchange rate fluctuations on the manufacturing sector in Nigeria from 1986 to 2008. Using a Generalized Method of Moments (GMM) estimation technique, the research found that exchange rate volatility negatively affects manufacturing output. The depreciation of the Naira increased the cost of imported inputs, leading to higher production costs and reduced output (Aliyu, 2010). Eme and Johnson (2012) conducted an empirical analysis of the effects of exchange rate movements on the manufacturing sector in Nigeria. Utilizing an Error Correction Model (ECM), the study analyzed data from 1980 to 2010 and found a significant negative impact of exchange rate volatility on manufacturing production. The study recommended policies aimed at stabilizing the exchange rate to enhance manufacturing sector performance. Olaniyan and Lucas (2014) investigated the influence of exchange rate volatility on manufacturing output in Nigeria using quarterly data from 1986 to 2012. The study employed a Structural Vector Autoregression (SVAR) model and found that exchange rate instability adversely affected manufacturing output by increasing the cost of imported raw materials and machinery. Uche and Uche (2020) assessed the effect of exchange rate fluctuations on the manufacturing sector's performance in Nigeria from 1990 to 2018. Using an Autoregressive Distributed Lag (ARDL) model, the study found that exchange rate depreciation had a negative impact on manufacturing output. The findings emphasized the need for policies that promote exchange rate stability to support the manufacturing industry.

Influence of Tax (Value Added Tax) on Manufacturing Production

Value Added Tax (VAT) is a consumption tax levied on the value added to goods and services at each stage of production and distribution. In Nigeria, VAT can significantly impact manufacturing production through its effects on costs, pricing, and competitiveness. VAT increases the cost of production as manufacturers must pay tax on raw materials and intermediate goods. Although businesses can reclaim VAT paid on inputs, the process can be complex and time-consuming, affecting cash flow and operational efficiency. The administrative burden of VAT compliance also adds to operational costs (Federal Ministry of Industry, Trade, and Investment, 2023). To maintain profit margins, manufacturers may pass the additional VAT costs onto consumers in the form of higher prices. This can reduce the competitiveness of Nigerian manufactured goods both domestically and internationally, particularly if competing products from countries with lower or no VAT are available. Higher prices can also lead to reduced consumer demand, negatively impacting sales and production volumes (Nigerian Bureau of Statistics, 2023). The overall tax environment, including VAT, influences investment decisions within the manufacturing sector. High VAT rates can discourage investment by increasing the overall tax burden on businesses. Conversely, lower VAT rates or tax incentives can attract investment by reducing the cost of doing business, encouraging firms to expand their operations and invest in new technologies (Central Bank of Nigeria, 2023).

Smart and Bird (2009) conducted an empirical study on the effect of VAT on manufacturing performance in Canada. Using panel data analysis from 1981 to 2008, the study found that VAT compliance costs negatively impacted manufacturing output. The research suggested that simplifying VAT procedures could mitigate its adverse effects on the industrial sector. Ogbonna and Ebimobowei (2012) analyzed the impact of Value Added Tax (VAT) on the performance of the manufacturing sector in Nigeria from 1994 to 2010. Using a descriptive research design and regression analysis, the study found that VAT has a significant negative effect on manufacturing output. The additional tax burden increased production costs and reduced competitiveness. Gemmell and Ratto (2012) analyzed the impact of Value Added Tax (VAT) on industrial production in the United Kingdom from 1970 to 2010. Using regression analysis, the study found that VAT had a significant negative effect on industrial output. The additional tax burden increased production costs and reduced competitiveness. Okoli and Afolayan (2015) examined the effect of VAT on industrial output in Nigeria using time series data from 1994 to 2012. The study applied the Ordinary Least Squares (OLS) regression technique and found that VAT had an adverse impact on industrial production. The research suggested that VAT compliance costs and administrative burdens negatively affected industrial performance. Ojo and Oladipo (2017) conducted an empirical study on the effect of VAT on the manufacturing sector in Nigeria. Using data from 1994 to 2014 and employing the Autoregressive Distributed Lag (ARDL) model, the study found that VAT significantly reduced manufacturing output. The findings highlighted the need for a review of the VAT rate to mitigate its adverse effects on the manufacturing sector. Adewuyi and Akpokodje (2018) investigated the relationship between VAT and industrial sector growth in Nigeria from 1994 to 2016. Using co-integration and error correction modeling techniques, the study found that VAT had a long-term negative impact on industrial output. The research recommended improving VAT administration and reducing the tax rate to

enhance industrial growth. A study by Warren (2006) examined the influence of VAT on the industrial sector in Australia from 1980 to 2005. Using a co-integration and error correction approach, the study found that VAT had a long-term negative impact on industrial production. The findings emphasized the need for a balanced tax policy to support industrial growth. Chigome et al (2020) investigated the effects of VAT on the manufacturing sector in South Africa from 1994 to 2018. Using an ARDL model, the study found that VAT significantly reduced manufacturing output. The research highlighted the importance of reducing VAT rates or providing exemptions for industrial inputs to promote industrial growth. Oboro & Agbamu (2024) explored fuel subsidy removal on the economic welfare of Nigerians within the period 1990 to 2022. Using a price pass-through model, the study employed the use of unit root test, cointegration, Pairwise Granger Causality Tests, and VECM. The study examines both the short and long run effect of fuel subsidy removal on the economic welfare of Nigerian. The result revealed that the Price of Petroleum Motor Spirit, Inflation rate, Unemployment, Population increase will lead to decline on economic welfare of most Nigerians due to the negative impact of this variables on economic welfare.

2.1 Theoritical Framework

Classical Economic Theory

Classical economic theory forms the bedrock of many modern economic concepts developed in the late 18th and early 19th centuries. It was primarily formulated by prominent economists such as Adam Smith, David Ricardo, and John Stuart Mill. This theory emphasizes the self-regulating nature of markets, where the forces of supply and demand naturally adjust to achieve equilibrium without government intervention. Classical economics theory provides a reasonable framework for understanding how different factors contribute to manufacturing output. This theory posits that production output is a function of various inputs such as labor, capital, and technology. The influence of macroeconomic variables like inflation, exchange rate, and taxes can be analyzed within this context. Hence the theory of the classical economics was used to underpin the study.

3. Methodology

The study embarked on longitudinal research design to explore the influence of inflation, exchange rate and value added tax on manufacturing production in Nigeria. This is because longitudinal research design is useful for studying changes and developments over time. Longitudinal investigations are a form of correlational research in which researchers watch and gather data on multiple variables without attempting to affect them. The industrial sector in Nigeria serves as the study population while the manufacturing sector production serve as the sample. Time series data that spanned 1989 through 2022 from online database and repositories was used. The study period reflects correct trend in the Nigeria economy. Inflation (FLATION) is measured by actual inflation (%) while exchange rate was measured by real effective exchange rate (%). Manufacturing production was measured by average manufacturing capacity utilization. Data for FLATION were obtain from financial statistical bulletin, CHANGE from external sector statistical bulletin. Valued added tax (VATAX) data were obtained from public finance statistical bulletin. While manufacturing production data were obtained from domestic production, consumption and prices statistical bulletin. Non probability sampling techniques was employed. Quantitative data analysis (descriptive statistic & inferential statistics) was used since it involves numerical data and often includes statistical techniques to identify patterns, relationships, and trends.

Adewuyi and Akpokodje (2018) model was modified for this study. The study is stated in its functional form as:
MAPROD = f(FLATION, CHANGE, VATAX)
eqn (1)

The model is further specified in its econometric form as:
MAPROD = β_0+ β_1 FLATION + β_2 CHANGE +β_3 VATAX + ε
eqn(2)

Where:
MAPROD = Manufacturing production
β_0 = Intercept
FLATION = Inflation
CHANGE = Exchange rate
VATAX = Value added tax
ε = Error Term
β_1–β_3 = Coefficient of the Independent Variables.
The a priori expectations are β_1, β_2, β_3, should be lesser or greater than 0.

4 Results and Discussion

Table 1: Descriptive Statistics

	MAPROD	FLATION	CHANGE	VATAX
Mean	44.04879	19.02858	142.5554	238.0568
Median	44.42056	12.10000	129.0041	103.3812
Maximum	62.04167	76.75887	425.9811	1171.360
Minimum	30.40000	0.223606	7.391558	5.026000
Std. Dev.	8.498974	17.14443	117.2433	288.6471
Skewness	0.031446	1.973588	0.852568	1.558775
Kurtosis	2.126117	6.117606	2.951185	5.135474
Jarque-Bera	1.087472	35.84118	4.122315	20.22910
Probability	0.580575	0.000000	0.127307	0.000040
Sum	1497.659	646.9716	4846.883	8093.932
Sum Sq. Dev.	2383.675	9699.741	453617.5	2749466.
Observations	34	34	34	34

Source: Author's Compilation Using Econometric Views Version 9.0., (2024).

From table 1 MAPROD has a mean of 44.05, maximum and minimum of 62.04 and 30.40. Whereas the standard deviation stood at 8.49. FLATION has a mean of 19.03, maximum and minimum of 76.76 and 0.22. Whereas the standard deviation stood at 17.14. In same vein, CHANGE has a mean of 117.24, maximum and minimum of 425.98 and 7.39. Whereas the standard deviation stood at 6.851288. Similarly, VATAX has a mean of 238.06, maximum and minimum of 1171.36 and 5.03. Whereas the standard deviation stood at 288.65. Table 1 similarly revealed that MAPROD, FLATION, CHANGE and VATAX are positively skewed. The Jarque-Bera Probability showed that the data set are normally distributed apart from that of FLATION and VATAX.

Table 2 Correlation Analysis

	MAPROD	FLATION	CHANGE	VATAX
MAPROD	1.000000	-0.222258		
FLATION	-0.222258	1.000000		
CHANGE	0.227431	-0.336682	1.000000	
VATAX	0.200360	-0.235077	0.937905	1.000000

Source: Author's Compilation Using Econometric Views Version 9.0., (2024).
Table 2 displayed the correlation analysis for MAPROD, FLATION, CHANGE and VATAX. From the correlation values: FLATION is negatively correlation with MAPROD weak. CHANGE and VATAX displayed moderate positive correlation with MAPROD. Likewise, FLATION has a negative correlation with CHANGE and VATAX though that of CHANGE and VATAX is positive. The correlation coefficient depicted the absence of perfect correlation among the studied variables which made it suitable for analysis.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.313531	Prob. F(3,30)	0.8154
Obs*R-squared	1.033600	Prob. Chi-Square(3)	0.7931
Scaled explained SS	0.519477	Prob. Chi-Square(3)	0.9146

Source: Author's Compilation Using Econometric Views Version 9.0., (2024).

Table 3 Disclosed Heteroskedasticity Test: Breusch-Pagan-Godfrey for the variables of study. The Prob. Chi-square (3) value of 0.7931 greater than 0.05 indicated that the variables of the study is homoscedastic.
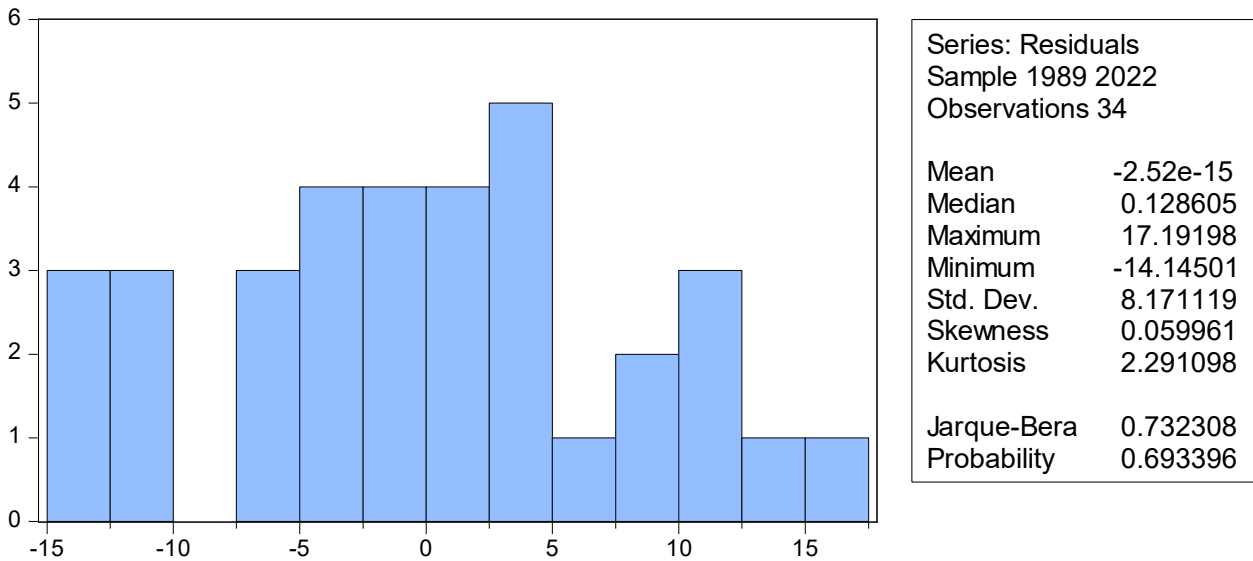

Series: Residuals	
Sample 1989 2022	
Observations 34	
Mean	-2.52e-15
Median	0.128605
Maximum	17.19198
Minimum	-14.14501
Std. Dev.	8.171119
Skewness	0.059961
Kurtosis	2.291098
Jarque-Bera	0.732308
Probability	0.693396

Figure 1: Normality Test
Source: Author's Compilation Using Econometric Views Version 9.0., (2024).

Figure 1 showed normality test for the variables of study. Thus, the Jarque-Bera Prob. of 0.6934, is an indication that the data are normally distributed and suitable for regression analysis.

Table 4: Summary of Regression Result

Dependent Variable: MAPROD
Method: Least Squares
Date: 07/06/24   Time: 18:10
Sample: 1989 2022

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	43.83080	3.911899	11.20448	0.0000
FLATION	-0.081578	0.095367	-0.855409	0.3991
CHANGE	1.479567	0.565801	2.614995	0.0256
VATAX	8.12E-05	0.015376	0.005278	0.9958
R-squared	0.550664	Mean dependent var		44.04879
Adjusted R-squared	0.446770	S.D. dependent var		8.498974
S.E. of regression	8.569942	Akaike info criterion		7.244530
Sum squared resid	2203.317	Schwarz criterion		7.424102
Log likelihood	-119.1570	Hannan-Quinn criter.		7.305769
F-statistic	3.818571	Durbin-Watson stat		1.716451
Prob(F-statistic)	0.003836			

Source: Author's Compilation Using Econometric Views Version 9.0., (2024).

In table , FLATION has a coefficient value of -0.0816, t- Statistics value of -0.8554 and associated prob. value of 0.3991. This value illustrated that FLATION has a negative insignificant influence on manufacturing production in Nigeria. This outcome is in line with the opinion of Domaç and Yücel (2005) contrary to that of Olusola (2018).

Also, CHANGE has a coefficient value of 1.479571, t- Statistics value of 2.6149 and associated prob. value of 0.0256. This value explained that CHANGE has a positive significant influence on manufacturing production in Nigeria. This outcome is in line with the opinion of Choi and Baek (2007) and Eme and Johnson (2012) contrary to that of Tandrayen-Ragoobur and Kasseeah (2017).

Moreover, VATAX has a coefficient value of 8.12E-05, t- Statistics value of 0.005278 and associated prob. value of 0.9958. This value indicated that VATAX has a positive insignificant influence on manufacturing production in Nigeria. This outcome is in line with the opinion Ojo and Oladipo (2017) contrary to that of Okoli and

Afolayan (2015) and Adewuyi and Akpokodje (2018).

Equally, the coefficient of determination (R-squared) stood at 0.5507 while the Durbin-Watson stat 1.716451. The R-squared showed that 55% of the study explanatory variables are responsible for variation in manufacturing production in Nigeria. The remainder of 45% is due to the error term.

5. Conclusion and Recommendations

Economic regulators should embark on policies aimed at controlling inflation, as lower and stable inflation is generally favorable for economic stability and growth. Maintaining exchange rate stability is recommended, as volatility might impact manufacturing sectors indirectly through investor confidence and import/export costs. Although VAT shows an insignificant effect, it might still impose burdens on manufacturing firms. Government should re-evaluate and potentially reform VAT policies to alleviate any burdens on the industrial (manufacturing) sector, possibly through targeted tax incentives or rebates for manufacturing firms. Further research should include other potential variables that

might impact industrial (manufacturing) production, such as foreign direct investment (FDI), infrastructure development, and education levels. Conduct surveys and interviews with manufacturing firms to gather qualitative data on how they perceive and are impacted by inflation, exchange rates, and VAT. Develop case studies of specific manufacturing firms or sub-sectors to gain deeper insights into the mechanisms through which these variables affect production.

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