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Fiscal policy, interest rate and the manufacturing sector performance in Nigeria

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Abstract

In this paper, the influence of fiscal policy (government expenditure and taxation) and interest rate on the manufacturing sector of the Nigerian economy was explored for the period 1981 to 2021. The study utilized the autoregressive distributed lag (ARDL) model approach since some of our variables were integrated at level and others at first difference, and the bounds test reporting the existence of long run relationship in the model. Findings of the study indicated that in the short run, government expenditure and its one-period lag exerted a negative and significant influence on manufacturing sector performance; value added tax exerted a positive and significant effect on manufacturing sector performance while its one-period lag exerted a negative and significant effect; and interest rate exerted a positive and significant effect on manufacturing sector performance. In the long run, government expenditure put forth a negative but insignificant effect on manufacturing sector performance; while value added tax and interest rate exert positive and significant effect. In the disaggregated model, recurrent expenditure exerts a negative and significant effect; capital expenditure exerted a positive and significant effect; value added tax exerted a negative and significant effect; and interest rate put forth a positive and significant influence on manufacturing sector performance. The study recommended that there is need for a reduction in the cost of governance as a huge proportion of public spending is used in running the government other than being utilized in stirring critical sectors that could stir manufacturing sector performance.

Keywords: Government Expenditure; Tax; Interest Rate; Industrialization; Manufacturing

1. Introduction

The role of fiscal policy in influencing macroeconomic variables has been explored in diverse studies like Ekong, Okon & Effiong (2019), Effiong, Arinze & Okon (2022), and Atan & Effiong (2021). The relationship between fiscal policy and manufacturing sector performance is a prominent topic in academic circles, particularly for emerging countries like Nigeria which has attracted attention from scholars like Effiong & Essien (2020). As a result, the government's fiscal policy has a significant impact on the manufacturing sector's performance. Government spending, taxation, and the fiscal deficit all have an impact on a country's economic activity. For example, government capital expenditures on power and the road network would considerably benefit the industrial sector by lowering operating costs. A rise in recurrent expenditure will result in an increase in residents' consumer expenditures, resulting in increased demand for products and services and increased manufacturing output. High tax rate has an impact on industrial production, especially when corporations realize that a significant amount of their profits will be paid to the government in the form of taxes. Savings and investments will be affected in the same way, as people and corporations will have less money to spend. Without a doubt, the fiscal imbalance tends to crowd out private sector investments, resulting in a decrease in economic growth.

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It has been suggested that the amount of industrialization in an economy is a factor in achieving economic growth and development. Industrialization (manufacturing) is viewed to be a key driver of employment (Atan & Effiong, 2020; Effiong & Udonwa, 2024) and economic growth (Effiong & Udofia, 2022). Industrialization serves as a catalyst for structural transformation and diversification of the economy, allowing a nation to fully use its factor endowment and become less reliant on imported raw materials and finished products for economic growth, development, and sustainability. A thriving manufacturing sector has been proposed as the ideal industry to drive Africa's development because it provides opportunities for increased availability of manufactured goods, a vehicle for increased production of goods and services, increased employment, increased efficiency, increased incomes, and improved balance of payments (Emerenini & Ajudua, 2014).

Manufacturing, which is viewed as a planned combination and continuous application of suitable technology, infrastructure, managerial experience, and other key resources, has piqued attention in recent years in the growth of economies (Ajudua & Imoisi, 2018). The importance of the manufacturing sector cannot be overstated, as demonstrated by the level of industrialization in advanced nations, which is led by the manufacturing sector. Thus, there is no doubt that industrialization has propelled advanced countries to their current enviable position, and that developing countries desire to follow in their footsteps to economic success.

Governments have used a variety of sound and effective policies, including fiscal policy, to achieve long-term economic growth and development through industrialization. Fiscal policy is the purposeful manipulation of key economic variables such as government taxes, borrowing and government spending, to affect economic activity. Okafor (2012) predicted that the performance of Nigerian manufacturing industry will continue to worsen owing to poor government budget implementation and issues in evaluating raw inputs. To say confidently that the Nigerian manufacturing sector is performing to expectations based on environmental reality, which everyone can attest to, is to imply our concerns are unfounded. The manufacturing sector's poor performance may be linked in great part to the quality of basic infrastructure, particularly electricity supply and good road networks. Volatility in macroeconomic variables, such as inflationary tendencies and exchange rate volatility, is also taken into account. The government has interfered in the past through different measures to boost manufacturing capacity, generate employment, and distribute income, yet this sector continues to perform horribly below expectations (Echekoba & Ananwude, 2016).

Two contentious issues raised in theoretical and empirical literature piqued our interest in doing this study. At first, no one can agree on the potential link between fiscal policy and manufacturing sector performance (Ubesie, *et al.,* 2020). Government involvement in the market, according to Keynesian theory, is necessary to solve market failures. The Ricardian Equivalence theory, on the other hand, is based on the idea that government involvement through fiscal policy instruments cannot encourage manufacturing activities. They believe that the benefits of greater government spending would be offset by the tax that the government would levy in order to combat inflationary tendencies. Second, the empirical results on the subject matter are mixed. Government fiscal policy is positively related to manufacturing sector performance, according to Falade (2020), Uffie & Aghanenu (2019), Ajudua & Imoisi (2018), Okpala (2018), Osinowo (2015), Falade and Oladiran (2015), Nwanne (2015), Njoku, Okezie, and Idika (2014), Ademola (2012), and Eze & Ogiji (2013). In contrast, despite the government's many fiscal policy instruments, Jeff-Anyeneh, Ezu, & Ananwude (2019), Okpe (2018), Kanu (2017), Arikpo, Ogar, and Ojong (2017) concluded that the manufacturing sector has not performed as expected. The lack of consensus on the relationship between fiscal policy and manufacturing sector performance in Nigeria necessitates a re-evaluation of whether fiscal policy instruments can stimulate manufacturing sector performance in Nigeria from 1981 to 2021.

Given the importance of the manufacturing sector to economic growth and development, Nigeria has implemented several initiatives targeted at increasing the productivity of this critical sector as a way of attaining long-term growth (Effiong, 2022). For example, under the First National Development Plan (1962-1968), the government implemented an import substitution industrialization strategy aimed at decreasing the importation of finished products and boosting foreign exchange savings by manufacturing part of the imported consumer items domestically (Ademola, 2012). During the second development plan phase (1970-1974) and the third development plan period (1976-1980), which coincided with the oil boom, the nation solidified its import substitution industrialization approach. Because of the economy's inadequate technical foundation at the time, manufacturing operations were so structured that they had to rely on foreign inputs.

Nigeria's manufacturing industry, on the other hand, remains dormant. Low technology, the manufacture of light consumer items, and high labor intensity characterize this industry. The data suggests that the industry has not performed well. Apart from 1981, when it contributed 29.87% to GDP, the sector's contribution to GDP has been in a decline. In 2000, the sector contributed 11.44% to GDP, this value declined to 6.55% in 2010. In 2017 and 2018, the manufacturing sector contributed 9.18% and 9.20% to GDP respectively; while it contributed only 8.98% to GDP in

2021 (CBN, 2021). The origins of the problem may be traced back to the country's transition from a diversified to a mono-product economy, with oil serving as practically the sole source of foreign exchange earnings, accounting for almost 90% of total earnings. This declining trend over the years is presented in Figure 1 below.

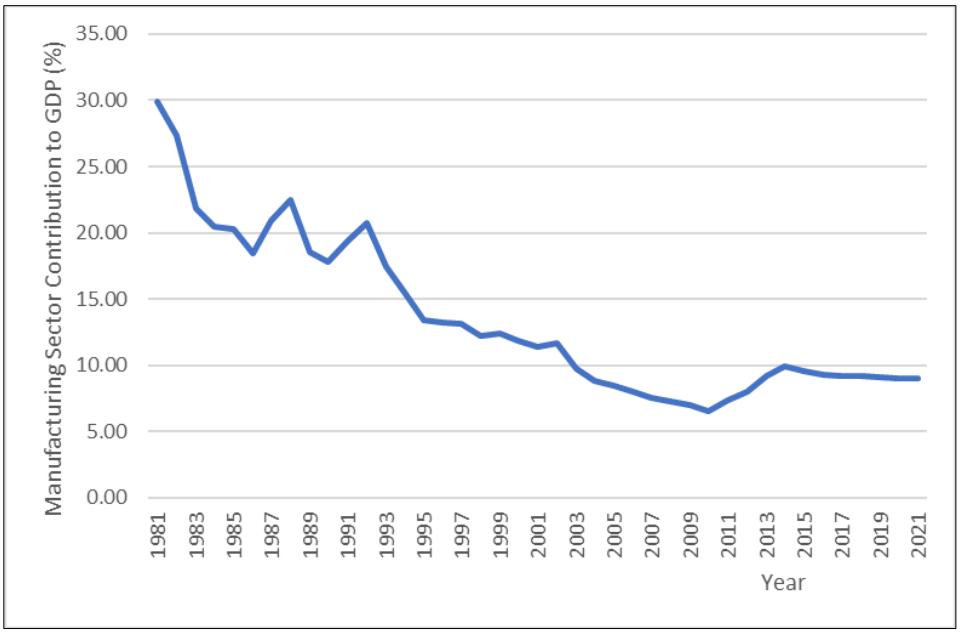

Figure 1 Trend of manufacturing sector's contribution to GDP

It has also been suggested that Nigeria's manufacturing industry's ongoing poor performance is mostly due to huge importation of finished goods, insufficient financial assistance, and other factors that have resulted in a decline in manufacturing sector output. (Ajudua & Imoisi, 2018). Other challenges facing the growth of Nigerian manufacturing industry as identified by various scholars include corruption and ineffective economic policies, lack of integration of macroeconomic plans, the absence of harmonization and coordination of fiscal policies, inappropriate and ineffective policies, lack of economic potential for rapid economic growth and development, gross mismanagement/misappropriations of public funds (Ajudua & Imoisi, 2018), and weak financial system that does not support industrial initiatives (Effiong & Ekong, 2021; Udofia, Onwioduokit & Effiong, 2022). Interest rate could also be seen as one of the important variables that could affect the real sector of the economy (Effiong, 2020) and thus, could have a significant influence on the manufacturing sector of the economy.

In Nigeria, the goal of increased manufacturing output was not reached although the country embarked on devaluation to promote export and stabilize the rate of exchange. Following the introduction of the Structural Adjustment Programme in 1986 to achieve an export led growth economy to 1993 when it was terminated, Nigeria's debt service payment continued to increase while the country's capital expenditure was less than 30 percent of the total budgetary expenditure. The meagre capital expenditure in the country compounded by the poor budgetary performance was responsible for the inadequate performance of the infrastructures such as electricity generation and inadequate road network. This non-availability or deterioration of the infrastructure due to forced reduction in public investment has imposed heavy costs and shifted resources away from productive private investment in Nigeria. Hence, the manufacturing sector in Nigeria has been facing challenges such as inadequate infrastructure, high energy costs, and limited access to credit, which have hindered its growth and productivity.

In response, the Nigerian government has implemented various fiscal policy measures to stimulate the sector's growth. However, despite these measures, the manufacturing sector's output in Nigeria has remained relatively low compared to other African countries. Therefore, the problem this research aims to address is to investigate the impact of fiscal policy measures on the manufacturing sector output in Nigeria and identify the factors that contribute to the sector's low output despite the implementation of fiscal policy measures. The broad objective of the study is to ascertain the influence of fiscal policy measures on manufacturing sector output in Nigeria from 1981 to 2021. The specific objectives are to determine the impact of government expenditure on manufacturing sector output in Nigeria; to examine the effect of value added tax (VAT) on manufacturing sector output in Nigeria; to examine the causal relationship among manufacturing sector output, government expenditure and value added tax in Nigeria; and to explore the influence of interest rate on the manufacturing sector performance in Nigeria.

2. Literature Review

2.1. Theoretical Framework

Some of the theories explored in this study are the managerial theory of the firm, The Savers-Spenders Theory, and the Keynesian Aggregate Demand Theory. Managerial theory of the firm was propounded by Bumole (1967) as cited in Eze & Ogiji, (2013). The theory believes that for any economy to grow faster through industrialization, the country needs to increase its public expenditure so as to facilitate the developmental processes of the economy. It emphasizes that a firm's decisions whether to grow or not depends on the level of fiscal policy because the firm grows through government expenditure on industrialization. In other words, government expenditure triggers industrial productivity. Furthermore, the theory states that the reason why managers are hired is for revenue maximization and not for profit maximization.

Savers-Spender's theory of fiscal policy was propounded by Mankiw (2000). It has three propositions that cover government revenue, expenditure and debt. The first proposition states that temporary tax changes have large effects on the demand for goods and services, meaning that alterations in tax rate charged on taxpayers reduces or increases their income and consumption. In other words, higher tax rates reduce spenders' take-home pay (income) while lower tax rate or refunds increases spenders' incomes. This in effect implies that the purchasing power of spenders is affected by the rate of tax imposed on their income at any particular point in time (Eze & Ogiji, 2013). The second proposition believes that government expenditure crowds out capital in the long run. By this, the theory implies that extra consumption reduces investment, which in turn raises marginal product of capital and as well decrease the level of employment and output. It is also of the opinion that higher interest rate margin, induces savers to save more. The implication of this proposition is that extra consumption and higher interest rate margin reduce investment which in turn reduces the level of output and employment (Eze & Ogiji, 2013). The third proposition states that government debt increases steady-state inequality. This means that a higher level of debt means a higher level of taxation to pay interest on debt. The tax will fall on both the savers and the spenders, but the interest will only fall on savers (Eze & Ogiji, 2013). The implication of this is that a higher level of debt raises the income and consumption of the savers and lowers the abet income and consumption of the spenders.

The Keynesian approach to aggregate demand management asserts that the market mechanism could not be relied upon for an economy in recession or below full employment to recover or rebound quickly. In other words, a basic premise of the Keynesian approach is that the private sector is inherently unstable and therefore recommends activist fiscal and monetary policies. An activist macroeconomic policy involves setting fiscal and monetary variables in each time period at the values which are thought necessary to achieve government objectives (Levacic & Rebmann, 1982). The Keynesian theory essentially advocates public spending, preferably involving deficit in government fiscal budget to stimulate aggregate demand which will in turn stimulate manufacturing activities. In other words, it presents a framework that could be used to calculate the effects of government spending on economic activity and imposing taxes and consequently estimating the size of the required intervention. Activist stabilization policy can take two forms: either as a discretionary or as a feedback rule which relates policy to current and lagged output.

A discretionary policy involves the government or other authorities such as the central bank deciding in each period what the appropriate policy response should be given current circumstances. On the other hand, a feedback policy rule establishes some fixed formula for deciding what values the policy variables should take and this formula would remain unchanged over a considerable time span. In practice, a feedback policy rule has been limited to the operation of automatic stabilizers. These are changes in government spending and taxation which occur automatically as national income changes and which act in a stabilizing manner, e.g., government spending on unemployment rises in a depression while the tax revenue fall (Levacic & Rebmann, 1982). Government expenditure is a missing variable within the Solow-Swan neoclassical model. Alternative growth theories have also been developed in response to policy needs to accommodate the missing variables in the neoclassical model (Bogunjoko, 2004). The Keynesian framework views government expenditure as an input in the aggregate production function which the neoclassical model assumed to depend only on labor and capital as factor inputs. The Keynesian theory view fiscal expansion as having a multiplier effect on aggregate demand and hence the manufacturing sector. This is the theory on which this study is based.

2.2. Empirical literature review

Some empirical studies have been conducted to ascertain the influence of fiscal policy on the manufacturing sector of the economy.

Nwanne (2015) examined the influence of government capital spending on the manufacturing sector's output in Nigeria using quantitative time-series data and multiple regression approaches. The co-integration test revealed that the explained and explanatory variables had a long-run connection. It also revealed that government capital expenditure on the road network and communication has a significant impact on manufacturing sector output, but government capital spending on power has a minimal impact on manufacturing sector output. In Nigeria again, Falade & Oladiran (2015) investigated the connection between government consumption and manufacturing output. The government's spending was split into two categories: capital and recurring. Time-series data from 1970 to 2013 was used in the study. The researchers looked at manufacturing sector output, capital and recurring spending, and the interest rate. The findings indicated that while government capital investment has a positive connection with manufacturing sector output, recurrent spending has a negative link with manufacturing sector output.

Osinowo (2015) examined the influence of fiscal policy on real-economy production in Nigeria for the period 1970-2013. An Autoregressive Distributive Lag (ARDL) and Error Correction Model were used in the research. The data revealed that, with the exception of the agriculture sector, the government's overall expenditure has made a significant contribution to the output of the various sectors of the real economy. The findings revealed that the manufacturing sector has a positive association with all determining elements, but the inflation rate, with the exception of the industrial sector, has had a negative impact on real economy sectorial growth.

Using annual time series data spanning from 1980 to 2013, Mensah, Ofori-Abebrese, & Pickson (2016) investigated the impact of macroeconomic factors on manufacturing activity in Ghana. To examine the long-run and short-run flow of macroeconomic components and industrial activity, the Autoregressive Distributive Lag Model was used. Manufacturing activities and macroeconomic components have a co-integration connection, according to the study. The lending rate, inflation rate, employment rate, and government consumption are the key macroeconomic variables that impact industrial activity in Ghana, according to the research.

Arikpo, Ogar, & Ojong (2017) investigated the impact of fiscal policy on the performance of Nigeria's manufacturing sector. For the research, an ex-pose facto investigation approach was used. From 1982 to 2014, data from the Central Bank of Nigeria's time series database was used. The data was analysed using the standard ordinary least square multiple regression method. The research discovered that increases in government revenue decreased the manufacturing sector's output. Olawale *et al.* (2017) investigated the impact of government financial development on manufacturing sector output from 1970 to 2014. The data was analysed using the Auto-Regressive Distributive Lag (ARDL) method. The study discovered that government expenditure had a favourable but little influence on manufacturing sector output.

Olatunde & Temitope (2017) investigated the influence of budget deficits on the performance of several sectors of the Nigerian economy from 1981 to 2015. Agricultural, manufacturing, building and construction, wholesale and retail commerce, and service industries were among the sectors studied. The analysis technique adopted in the study was the autoregressive distributive lag. The budget deficit appears to have a negative impact on the agricultural, building and construction, manufacturing and wholesale, and trade sectors in the short run, but a positive influence on the agricultural, building and construction, service and wholesale, and trade sectors in the long run.

Ehinomen, Akindola, & Adeleye (2017) examined the impact of government tax collection and expenditure on Nigeria's manufacturing sector performance between 1980 and 2014. In order to get numerical estimates of the coefficients in the model, the Ordinary Least Square (OLS) estimation technique was used. According to the OLS results, there appears to be a significant and positive relationship between government spending and manufacturing sector performance. Furthermore, tax revenue and manufacturing sector performance had a significant relationship.

Okoro *et al.* (2017) analysed the effects of fiscal and monetary policies on Nigerian manufacturing output. The article used empirical evidence to examine the suitability of monetary policies used to promote dynamic industrial performance. The evidence suggests that Nigerian manufacturers are not utilizing the benefits of the government's different fiscal and monetary policies.

Okpala (2018) used time-series data from 1981 to 2016 to examine the impact of government capital investment on manufacturing output in Nigeria. Capital investment on road networks has a positive critical connection with manufacturing production in the short term but has a negative and insignificant influence on manufacturing output in the long run, according to the research. In the long term, capital consumption has a positive substantial influence on manufacturing output, but in the short run, it has a negative yet significant impact on manufacturing production. Both in the long and short term, capital consumption on electricity has a negative and insignificant influence on industrial output.

Yoke & Chan (2018) examined the influence of value added tax (VAT) on manufacturing sector performance using imbalanced panel data from ASEAN nations from 1985 to 2014. The findings were that VAT has a negative impact on manufacturing performance. Manufacturing businesses performed better in countries with VAT than in countries without VAT, according to the findings. Okpe (2018) investigated the effects of fiscal policies on the manufacturing of Nigeria using annual time series data from 1971-2016. The data collected was analysed using error correction model (ECM). Results from their analysis showed that recurrent consumption, subsidies, and petroleum tax appear to have a negative and significant influence on the development of the manufacturing sector, whereas government capital investment appears to have a significant and positive impact on the development of the manufacturing sector.

In Nigeria, Ajudua and Imoisi (2018) investigated the relationship between fiscal policy and manufacturing sector output. Time-series data from 1986 to 2016 were used to try to discover a link between manufacturing sector output and government consumption using the Error Correction Model (ECM) approach. The study's findings revealed that government consumption in Nigeria was notable and strongly connected to manufacturing segment output, but tax revenue was not. Uffie & Aghanenu (2019) investigated the influence of fiscal variables such as total government consumption and corporate income tax on manufacturing output in Nigeria. the study made use of time-series data extracted from several sources spanning the years 1981 to 2016. Co-integration was tested using the Autoregressive Distributive Lag (ARDL) bounds test method. The study discovered that the regressors' short- and long-run effects on the target variable are extremely important. It was shown that government consumption boosted manufacturing output, as seen by increased government spending on capital infrastructure, but corporate income taxes hindered output due to a variety of taxes.

Ewubare & Ozo-Eson (2019) examined the effect of taxation on manufacturing sector output in Nigeria for the period between 1980-2017. the secondary data collected for the study was analysed using parsimonious error correction model and the result showed that corporate income tax, excise duty tax and petroleum profit tax has a significant positive effect on manufacturing sector output, while value added tax was found to have a negative effect on manufacturing sector output. Imide (2019) examined the impact of fiscal policy on the manufacturing sector of the Nigerian economy from 1980 to 2017. Government consumption, company income tax rate, and government domestic debt obligation were used as exogenous variables while manufacturing index was used as exogenous variable. The ordinary least square approach was used to conduct the research. The findings revealed that the government's consumer and corporate income tax rates have a positive link with the manufacturing sector index, while the government's domestic debt obligation has a negative direct relationship with the index.

Oladipo *et al.* (2019) used Auto-Regressive Distributive Lags to examine the effects of corporate taxes and value-added taxes on manufacturing output in Nigeria. The long-run finding revealed that corporation tax has a positive relationship with manufacturing output, but value-added tax has a negative link with manufacturing output. In the short run, it appeared that at a 5% significant level, corporation tax is not statistically significant. Using ordinary least squares regression analysis, Andabai (2019) investigated the causation between government tax revenue and manufacturing sector development in Nigeria from 1990 to 2018. The output of the manufacturing sector was the dependent variable, whereas the inflation rate, value-added tax, and tax on petroleum products were utilized as explanatory variables. The study's findings revealed that there is a long run relationship between government tax revenue and manufacturing sector output in Nigeria.

Jeff-Anyeneh, Ezu, and Ananwude (2019) assessed the long and short-run relationship between government consumption and manufacturing development in Nigeria from 1981 to 2016. The Autoregressive Distributive Lag (ARDL) was employed to analysis the secondary data collected for the study. The found that government consumption has not emphatically influenced manufacturing development in Nigeria both in the long and short run despite the persistent rise in government consumption and different approaches of the government towards making strides manufacturing activities in Nigeria.

Ogu & Kem (2020) evaluated the effect of tax collection on Nigeria’s manufacturing sector performance from 1981 to 2018 using ordinary least square regression analysis. From the result, together tax paid by companies, taxes from petroleum products, customs, and excise duty, and capacity utilization of the manufacturing sector showed a significant and noteworthy relationship with manufacturing sector performance but independently evaluated, it appears that tax paid by companies, taxes from petroleum products divulged a positive effect and no significant relationship on manufacturing sector performance, whereas taxes impose on importation and exportation of certain goods and services and capacity utilization of the manufacturing sector encompassed a positive effect and noteworthy relationship on the output of the industrial sector.

Using time series data between 1970 and 2018, Falade (2020) used an Autoregressive Distributive Lag (ARDL) and Error Correction Model (ECM) to investigate the differential impacts of fiscal policy variables on the performance of the major sectors of the economy, namely the manufacturing, agricultural, and service sectors. While both domestic and international debts had no substantial influence on the three sectors studied in the short run, foreign debt and government consumption spending have incremental effects on the industrial sector's production, according to the findings.

Ubesie *et al.* (2020) investigated how fiscal policy may help Nigeria's manufacturing sector operate better. The time series data gathered from the Central Bank of Nigeria (CBN) and the Federal Inland Revenue Service (FIRS) for the period 1986 to 2019 were analysed using the Ordinary Least Square (OLS) estimation technique and the Granger causality test. The research found that recurrent expenditure had no significant impact on the manufacturing sector's performance. Capital spending, the fiscal deficit, and the company's income tax all have a significant impact on the manufacturing sector's performance.

Effiong & Ekong (2021) looked at how Nigerian industry was impacted by the banking sector between 1981 and 2019. The study made use of the Error Correction Model, the Autoregressive Distributed Lag (ARDL) Bounds test for cointegration, and the Augmented Dickey-Fuller unit root test. According to the results of the unit root test, the variables were stationary at first difference mixture of levels and first difference. For this, the ARDL Bounds test for levels relationship had to be used. The findings showed that the rise of Nigeria's financial sector had a negative and substantial impact on industrialization, and that deindustrialization had a negative and significant impact on economic growth.

Kaldor's law, which states that "manufacturing is the engine for growth," was examined by Effiong & Udofia (2022). The research, which introduced the idea of globalization, was carried out from 1982 to 2020 in the setting of Nigeria. The impact of growing manufacturing production on growing non-manufacturing output was carefully examined in the study using the Dynamic Ordinary Least Squares (DOLS) approach. Growth in the manufacturing sector has a significant and favourable impact on the growth of the non-manufacturing sector, according to DOLS findings. According to the coefficient, there is an average 0.3416% growth in the non-manufacturing sector for every 1% rise in production in the manufacturing sector.

In recent times, emphasis has been on impact of fiscal policy on the growth of Nigerian economy as a whole, while little attention has been given to the impact of fiscal policy on the growth of manufacturing sector in Nigeria. This study attempts to examine fiscal policy and its attendant impact on the manufacturing sector in Nigeria since the issue of economic diversification in the country cannot be possible without giving due credence to the manufacturing sector.

3. Methodology

3.1. Research Design

This study is designed to investigate empirically, the effect of fiscal policy and interest rate on the manufacturing sector in Nigeria. The research is necessitated by the dwindling performance of the manufacturing sector over the years, and the recent agitation to make the manufacturing sector one of the key driving sectors of the economy as a result of the call to diversify the economy. The study will adopt both the historical and ex-post facto research design. While the former will be used to study and appraise the chronological level of manufacturing output in Nigeria, the latter will be used to establish a cause-and-effect relationship among the variables. The study will make use of information from the Central Bank of Nigeria (CBN) Statistical Bulletin for data collection.

3.2. Model Specifications

The model below is derived from the Keynesian theory. This theory presents a framework that could be used to calculate the effects of fiscal policy on economic activity such as manufacturing sector output and imposing taxes and consequently estimating the size of the required intervention. The model is also similar to the model adopted by Ubesie *et al*. (2020). In order to achieve our research objectives, the following model is specified.

The functional form of our model is given as

$$MSO = f(GEXP, VAT, FDI, GFCF, CPS, LEMP, INFL, INTR, EXR) \quad (3.1)$$

The econometrics form of equation one can thus be written as

$$MSO_t = \alpha_0 + \alpha_1 GEXP_t + \alpha_2 VAT_t + \alpha_3 FDI_t + \alpha_4 GFCF_t + \alpha_5 CPS_t + \alpha_6 LEMP_t + \alpha_7 INFL_t + \alpha_8 INTR_t + \alpha_9 EXR_t + \varepsilon_t \quad (3.2)$$

Where MSO= Manufacturing sector output; GEXP = Government total expenditure; VAT = Value added tax; FDI = Foreign direct investment; GFCF = Gross fixed capital formation; CPS = Credit to private sector; LEMP= Labour employment in the manufacturing sector; INFL= Inflation rate; INTR= interest rate; EXR= Exchange rate; and Ɛ= Error term.

The logarithm transformation for equation (2) becomes:

$$In MSO_t = \alpha_0 + \alpha_1 In GEXP_t + \alpha_2 In VAT_t + \alpha_3 InFDI_t + \alpha_4 InGFCF_t + \alpha_5 InCPS_t + \alpha_6 In LF_t + \alpha_7 INFL_t + \alpha_8 INTR_t + \alpha_9 EXR_t + \varepsilon_t \quad (3.3)$$

Where ln represents the natural logarithm of the variables. It is worth noting that in Equation (3.3), rates are not being expressed in log form.

3.3. Method of Data Analysis

Apart from using table for data presentation and illustration, the following econometrics techniques will be used in analysing the data.

3.3.1. Unit Root Test

Unit Root Test of Stationarity is aimed at determining whether the variables have dependable means and variances. The Augmented Dickey-Fuller unit-root test will be used to test whether the variables are stationary or non-stationary at levels, first or second differencing. Damodar (2005) stated that the essence of unit-root test is to allow both the levels and first difference of the relevant variables to enter growth regression and as well as to avoid spurious regression and give accurate results.

3.3.2. Autoregressive Distributed Lag (ARDL)

This study will make use of the Autoregressive distributed lag and bound test of co-integration to determine the long run relationship between the variables. This test for co-integration was developed by Pesaran *et al.* (2001). ARDL co-integration technique does not require pretests for unit roots unlike other techniques. Consequently, ARDL co-integration technique is preferable when dealing with variables that are integrated of different order, I(0), I(1) or mixture of both and, robust when there is a single long run relationship between the underlying variables in a small sample. The Autoregressive distributed lag (ARDL) method does not require the unit root test of stationarity, but to avoid ARDL model crash in the presence of variables that are stationary at second difference, the unit root test will be carried out to determine the number of unit root in series of co-integration. The long run relationship of the underlying variables is detected through the F-statistic (Wald test). In this approach, long run relationship of the series is said to be established when the F-statistic exceeds the critical value bond (Nkoro & Uko,2016).

To ascertain the co-integration between the variables, equation (3.2) can therefore be expressed as an ARDL model developed by Peasran *et al*. (2001):

$$\ln MSO_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \ln MSO_{t-i} + \sum_{i=0}^{n} \delta_i \ln GEXP_{t-i} + \sum_{i=0}^{n} \varphi_i \ln VAT_{t-i} + \sum_{i=0}^{n} \lambda_i \ln FDI_{t-i} + \sum_{i=0}^{n} \xi_i \ln GFCF_{t-i} + \sum_{i=0}^{n} \xi_i \ln CPS_{t-i} + \sum_{i=0}^{n} \gamma_i \ln LEMP_{t-i} + \sum_{i=0}^{n} \Psi_i INFL_{t-i} + \sum_{i=0}^{n} \eth_i INTR_{t-i} + \sum_{i=0}^{n} \emptyset_i EXR_{t-i} + \mu_t \quad (3.4)$$

Following the bound testing approach proposed by Pesaran *et al*. (2001), the bound test for equation (3.4) can be examined to be the following model:

$$\Delta \ln MSO_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta \ln MSO_{t-i} + \sum_{i=0}^{n} \delta_i \Delta \ln GEXP_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta \ln VAT_{t-i} + \sum_{i=0}^{n} \lambda_i \Delta \ln FDI_{t-i} + \sum_{i=0}^{n} \xi_i \Delta \ln GFCF_{t-i} + \sum_{i=0}^{n} \xi_i \Delta \ln CPS_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta \ln LEMP_{t-i} + \sum_{i=0}^{n} \Psi_i \Delta INFL_{t-i} + \sum_{i=0}^{n} \eth_i \Delta INTR_{t-i} + \sum_{i=0}^{n} \emptyset_i \Delta EXR_{t-i} + \lambda_1 \ln GEXP_{t-i} + \lambda_2 \ln VAT_{t-i} + \lambda_3 \ln FDI_{t-i} + \lambda_4 \ln GFCF_{t-i} + \lambda_5 \ln CPS_{t-i} + \lambda_6 \ln LEMP_{t-i} + \lambda_7 INFL_{t-i} + \lambda_8 \ln INTR_{t-i} + \lambda_9 EXR_{t-i} + \omega_t \quad (3.5)$$

The null hypothesis of no long run relationship is tested using the F-test on (H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$) against ($H_a$: $\alpha_1 \neq 0$, $\alpha_2 \neq 0$, $\alpha_3 \neq 0$, $\alpha_4 \neq 0$). If the computed F-test exceeds the upper critical bounds value, then H_0 is rejected signaling co-integration amongst the different variables. If the computed F-value is below the critical bound, we fail to reject H_0. But if the computed F-value falls within the critical value bound, the result is inconclusive (Moslares & Ekanyake, 2015). If these series are found to be co-integrated, an unrestricted error correction version of the corresponding ARDL model can be estimated to trace the short-term dynamics of the model (Wool & Baharumshah, 2010). The reparametrized result gives the short-run dynamics and long run relationship of the underlying variables. Consequently, the error correction model is therefore presented as follows:

$$\Delta lnMSO_t = \emptyset_0 + \sum_{i=1}^{m} \beta_i \Delta lnMSO_{t-i} + \sum_{j=1}^{n} \gamma_j \Delta X_{t-j} + \varphi ECM_{t-1} + \varepsilon_t \quad (3.6)$$

Where X is a vector of the explanatory variables in the model, i and j are the optimal lags of the dependent and explanatory variables respectively, φ is the error correction mechanism which is expected to be negative and statistically significant for adjustment to long run equilibrium to be feasible, and ε is the error term.

3.4. Data Sources

The data used for this study were obtained from secondary sources constituting the Central Bank of Nigeria statistical bulletin and the World Development Indicators. The data which are time series in nature covers the period of 1981 through 2021. Data on labour employment in the manufacturing sector was derived from the World Development Indicators while for all other variables, they were obtained from the Central Bank of Nigeria statistical bulletin.

4. Empirical Findings

4.1. Descriptive Statistics

The descriptive statistics are reported to see how the variables concentrates within or deviate from the central value (the mean). Consequently, the descriptive statistics captures the measures of central tendency and the measures of dispersion. Table 1 captures the result where emphasis will be laid on manufacturing sector output, value added tax, and government expenditure.

Table 1 Descriptive properties of the variables

	MSO	VAT	GEXP	EXR	CPS	FDI	GFCF	INFL	INTR	LEMP
Mean	8.295	5.868	6.378	3.875	6.635	0.357	9.025	2.680	2.832	2.508
Median	8.181	5.694	6.925	4.745	6.737	0.462	9.012	2.542	2.863	2.510
Maximum	8.807	6.896	9.406	6.031	10.400	2.179	9.464	4.288	3.394	2.596
Minimum	7.971	5.094	2.265	-0.400	2.367	-1.665	8.642	1.684	2.224	2.317
Std. Dev.	0.285	0.588	2.281	1.884	2.753	1.133	0.191	0.683	0.262	0.083
Skewness	0.729	0.298	-0.493	-1.060	-0.138	0.003	0.037	0.872	-0.440	-0.740
Kurtosis	2.025	1.543	1.893	2.894	1.594	1.837	2.463	2.930	3.226	2.526
Jarque-Bera	5.133	4.129	3.665	7.514	3.417	2.251	0.489	5.081	1.380	4.027
Probability	0.076	0.126	0.160	0.023*	0.181	0.324	0.782	0.078	0.501	0.133
Observations	40	40	40	40	40	40	40	40	40	40

Note: * denotes significance at the 5% level.; Source: Researcher Computation, 2024.

In accordance with Table 1, changes in manufacturing output (MSO) averaged 8.295% with a standard deviation of 0.285%, thus giving a coefficient of variation of 3.44%. The maximum and minimum value of the variable is 8.807% and 7.971% respectively, which gives a very small range in the observations. The distribution is positively skewed as indicated by the skewness coefficient of +0.729, and platykurtic given that the coefficient of kurtosis less than 3 (2.025<3.0). The distribution is normally distributed given that the Jarque-Bera statistic of 5.133 is not significant at the 5% level (p>.05). For Value added tax (VAT), changes in its value averaged 5.868% with a standard deviation of 0.588% giving a coefficient of variation of 10.02%. The distribution has a minimum value of 5.094% and a maximum value of 6.896, thus giving a smaller range in the distribution. Changes in government expenditure (GEXP) averaged 6.378% with a standard deviation of 2.281% thus giving a coefficient of variation of 35.76%. The variable has a maximum value of 9.406% and a minimum value of 2.265%, making the distribution to have a large range. In both VAT and GEXP, the variables are platykurtic given that their respective coefficient of kurtosis being 1.543 and 1.893 are less than 3. While VAT is positively skewed, GEXP is negatively skewed. Meanwhile, the two variables are normally distributed given that their respective Jarque-Bera statistic are not significant.

4.2. Correlation Analysis

The correlation analysis is conducted to reflect on how the variables moves with each other. Table 2 captures the result where the coefficient with negative signs implies negative (inverse) correlation, that is, the variables move in the opposite direction; while those with positive sign imply positive (direct) correlation, that is, the variables move in the same direction.

Table 2 Correlation matrix

	MSO	**VAT**	**GEXP**	**EXR**	**CPS**	**FDI**	**GFCF**	**INFL**	**INTR**	**LEMP**
MSO	1									
VAT	0.671	1								
GEXP	0.450	0.923	1							
EXR	0.310	0.807	0.961	1						
CPS	0.545	0.967	0.985	0.911	1					
FDI	0.364	0.813	0.763	0.672	0.795	1				
GFCF	0.578	0.623	0.555	0.418	0.592	0.472	1			
INFL	-0.177	-0.280	-0.226	-0.141	-0.268	-0.176	-0.140	1		
INTR	-0.145	-0.011	0.169	0.333	0.073	0.134	-0.215	0.268	1	
LEMP	-0.238	-0.808	-0.780	-0.659	-0.806	-0.863	-0.406	0.348	-0.01	1

Source: Researcher Computation, 2024.

It can be seen from Table 2 that there is a fairly high positive correlation between MSO and VAT (+0.671), MSO and GEXP (+0.450), MSO and CPS (+0.545), and MSO and GFCF (+0.578). Also, a weak positive correlation is observed between MSO and EXR (+0.310), and MSO and FDI (+0.364). These means that the variables move in the same direction with MSO. On the contrary, weak correlation is observed between MSO and INFL (-0.177), MSO and INTR (-0.145), and MSO and LEMP (-0.238). The implication here is that MSO moves in an opposite direction with these variables, though such movements are very weak. It is worth to note that correlation does not imply causation. Hence, further analysis will be conducted to ascertain how the independent variables influences manufacturing sector output.

4.3. Granger Causality Test

In examining the nature of the causal relationship among manufacturing sector output, government expenditure and value added tax in Nigeria, the Granger causality test is utilized. The test reports F-statistic and their probabilities. The significance of the F-statistic implies that there is causality between the variables which are considered pairwise. Table 3 reflects on the result of the test so obtained.

Table 3 Pairwise Granger causality test result

Null Hypothesis:	**Observation**	**F-Statistic**	**Probability**
VAT does not Granger Cause MSO	40	13.9257	0.0006*
MSO does not Granger Cause VAT		2.6300	0.1134
GEXP does not Granger Cause MSO	40	8.0541	0.0073*
MSO does not Granger Cause GEXP		0.9104	0.3462

Note: * denotes significance at the 5% level.; Source: Researcher Computation, 2024.

It can be observed from the result in Table 3 that VAT Granger causes MSO. This is because the F-statistic (13.9257) is statistically significant. On the contrary, MSO does not Granger cause VAT since the F-statistic of 2.6300 is not significant at the 5% level. This follows that there is a unidirectional causality flowing from VAT to MSO. Thus, value added tax causes manufacturing sector output during the study period. Also, GEXP causes MSO since the F-statistic of 8.0541 is significant at the 5% ($p<.05$). However, MSO does not cause GEXP as the F-statistic of 0.9104 is not significant at the 5%

level (p>.05). Therefore, there is a unidirectional causality flowing from GEXP and MSO. That is, government expenditure causes manufacturing sector output within the study period.

4.4. Unit Root Test

Since this study is utilizing time series variables, it becomes pertinent to ascertain whether the variables are influenced by time. In this regard, it is pertinent to ascertain the stationarity of the time series variables before they could be used for analysis. This leads to the test for the existence of unit root among the variables. The test for unit root is conducted based on the constant and trend assumption under the Augmented Dickey-Fuller (ADF) and the Philip-Peron (PP) test. The use of the PP test is to confirm the result generated by the ADF test. In cases where the ADF test reports different order of integration from the PP test, the result from the PP test will be upheld as it is considered to be more powerful than the ADF test. Table 4 captures the result of the test which is conducted based on the 5% level of significance. For the variable to be regarded as being stationary, the ADF/PP statistic must be negative and significant at the 5%.

Table 4 Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) unit root test result

Variable	ADF test Statistic at Level	ADF test Statistic at First Difference	Order of Integration	PP test Statistic at Level	PP test Statistic at First Difference	Order of Integration
MSO	-2.4201	-4.9063*	I(1)	-2.5686	-4.8788*	I(1)
GEXP	-0.4032	-7.9700*	I(1)	-0.8287	-7.8482*	I(1)
VAT	-2.9083	-7.5433*	I(1)	-2.8577	-7.5433*	I(1)
FDI	-2.9152	-9.9208*	I(1)	-2.9741	-9.9208*	I(1)
GFCF	-7.0417*	-------	I(0)	-5.1605*	--------	I(0)
CPS	-0.7422	-4.5309*	I(1)	-0.7422	-4.4202*	I(1)
LEMP	-2.1253	-3.6877*	I(1)	-1.3697	-9.8336*	I(1)
INFL	-4.0574	--------	I(0)	-3.4260	-13.3735*	I(1)
INTR	-3.0334	-9.1532*	I(1)	-2.9136	-9.5617*	I(1)
EXR	-1.4426	-6.9571*	I(1)	-1.3493	-6.9571*	I(1)

Note: * denotes significance at the 5% level.; Source: Researcher Computation, 2024.

The result of the unit root test as portrayed in Table 4 reflects that the variables are stationary in mixed order in both the ADF and PP technique. However, there is a case where there is variant in the conclusion of the ADF and PP result. For instance, the ADF unit root test reported that INFL is stationary at level while the PP technique reported that it is stationary at first difference. Since the PP technique is regarded to be more powerful, then INFL is stationary at first difference. For every other variable, the result of the ADF is in line with that of PP result. Given the result, we can say that only GFCF is stationary at level, I(0), while every other variables are stationary at first difference, I(1). The stationarity of the variables in mixed order of levels, I(0), and first difference, I(1), requires the use of the autoregressive distributed lag (ARDL) bound test for cointegration to ascertain whether the variables have any relationship in the long-run.

4.5. Test for Cointegration

Given that some of our variables are stationary at first difference while others are stationary a level, it becomes pertinent to ascertain whether their linear combinations could yield some long-run relationship. Given the mixed order of integration so observed, the appropriate test for cointegration to utilize is the autoregressive distributes lag (ARDL) bounds test. The test is conducted using the F-statistic, and it is required that the F-statistic must lie outside the 5% upper and lower bounds for cointegration to exist. The result of the test is captured in Table 5 where the F-statistic is reported to be 7.6338 and the 5% lower and upper bounds critical bounds values are 2.04 and 2.08 respectively.

Table 5 Autoregressive distributed lag (ARDL) bound test for cointegration result.

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.6338	10%	1.80	2.80
k	9	5%	2.04	2.08
		2.5%	2.24	3.35
		1%	2.50	3.68

Source: Researcher Computation, 2024.

Given that the F-statistic (7.6338) lies outside the 5% critical bound (2.04) and upper bound (2.08), it is clear that the null hypothesis of 'no levels relationship is rejected'. Therefore, cointegration exists and there is a long-run relationship among the variables in the model. The existence of the long-run relationship in the model is a pointer for the estimation of both the short-run and the long-run models to see how the independent variables will interact to affect manufacturing sector output in both the short-run and in the long-run.

4.6. Autoregressive Distributed Lag (ARDL) Error Correction Model Estimation

The fact that there exists a levels relationship among the variables in the model signals the need for the estimation of the ARDL model for the study to check how short-run distortions could be corrected in the long-run; and then to see the nature of the long-run behaviours of the variables in influencing the dependent variable. Table 6 presents the short-run error correction model result.

Table 6 Autoregressive distributed lag (ARDL) short-run error correction model result

Variable	Coefficient	Standard Error	t-Statistic	Probability
Δ(GEXP)	-0.2436	0.0415	-5.8691	0.0000*
Δ(GEXP(-1))	-0.1591	0.0439	-3.6277	0.0021*
Δ(VAT)	0.4273	0.0687	6.2195	0.0000*
Δ(VAT(-1))	-0.3377	0.1010	-3.3417	0.0039*
Δ(FDI)	-0.0666	0.0119	-5.5853	0.0000*
Δ(GFCF)	-0.0308	0.0595	-0.5176	0.6114
Δ(CPS)	0.2034	0.0513	3.9677	0.0010*
Δ(CPS(-1))	0.1507	0.0593	2.5431	0.0210*
Δ(LEMP)	3.5366	0.4345	8.1401	0.0000*
Δ(LEMP(-1))	-1.4283	0.4259	-3.3534	0.0038*
Δ(INTR)	0.1934	0.0356	5.4322	0.0000*
ECM(-1)	-1.0701	0.0927	-11.5485	0.0000*
R-squared	0.8968	S.D. dependent var		0.1105
Adjusted R-squared	0.8548	Akaike info criterion		-3.2501
S.E. of regression	0.0421	Durbin-Watson stat		2.1983

Note: * means that the variable is significant at least at the 5% level.; Source: Researcher Computation, 2024.

From the short-run error correction model, it can be observed that the dynamic estimates have different pattern of influence on manufacturing sector output in Nigeria. Changes in government expenditure (GEXP) and its one-period lag is observed to have a negative and significant effect on changes in manufacturing sector output. Such is an indication that an increase in government expenditure could lead to a substantial decrease in manufacturing sector output in the short run. A 1% increase in government expenditure is associated with a 0.2436% decrease in manufacturing sector output. Meanwhile, the one-period lag in government spending reduces manufacturing sector output by 0.1591% on

the average. Though it could be expected that government spending should generate positive effect on manufacturing sector performance, the negative effect so established in this study can be attributable to the fact that a greater percentage of government expenditure is allocated to administration and not on sectors that could drive manufacturing activities. This high cost of governance associated with widespread corruption and inefficiency could not allow public spending to influence manufacturing output positively.

For changes in VAT, the result revealed that the variable has a positive and significant effect on manufacturing sector output, however, its one-period lag exerts a negative and significant effect. It follows that VAT could be used in improving the performance of the manufacturing sector output in Nigeria. From the coefficient, a 1% increase in VAT leads to a 0.4273% increase in manufacturing sector output, while the one-period lag of VAT reduces manufacturing output by 0.3377% on the average. It is a common idea that taxes could cause a reallocation of resources away from sectors with high tax burden to the sector with a lower tax burden. Thus, it could be expected that VAT should have a negative effect on manufacturing sector output. The proceeds from VAT could be utilized in building infrastructure and providing the economic overheads for manufacturing activities to thrive. Consequently, VAT could have a positive effect on the manufacturing performance.

Changes in foreign direct investment (FDI) and gross fixed capital formation (GFCF) are observed to have a negative effect on manufacturing sector performance. While the effect of FDI is significant, GFCF wielded an insignificant effect. Thus, a 1% increase in FDI leads to a 0.0666% decrease in manufacturing sector output. Though FDI should be having a positive influence on manufacturing sector output, the negative effect so observed can be linked to the high level of repatriation of profits by multinational corporations of which such could have been reinvested in the Nigerian economy to boost overall performance.

Worthy of note is that credit to the private sector (CPS) and its one-period lag put forth a positive and significant effect on manufacturing sector output within the study period. It therefore implies that increasing credit to the private sector will help to boost manufacturing sector output in Nigeria. based on the coefficient, manufacturing sector output will increase by 0.2034% if credit to the private sector is increased by 1%; while the past period's credit to the private sector aided in increasing manufacturing sector output by 0.1507% on the average. Credit to the private sector serves as an investment fund that could be utilized in boosting manufacturing activities in the country.

Changes in the labour employment in the manufacturing sector is observed to exert a positive and significant influence on manufacturing sector output while its one-period lag exerted a negative and significant effect. It therefore implies that an increase in labour employment in the sector will increase output substantially, which is an indicator that the marginal product of labour in the manufacturing sector is not yet zero or negative. A 1% increase in labour employment in the sector will lead to a 3.5366% increase in manufacturing sector output on the average; however, the past period's employment reduces manufacturing sector output by 1.4283% on the average. Labour is therefore crucial in manufacturing activities as they aid in facilitating the effective operation of other inputs in the manufacturing production process.

The short-run model indicates that changes in interest rate (INTR) exerted a positive and significant effect on manufacturing sector output. Thus, a 1% increase in the rate of interest will lead to a 0.1934% increase in manufacturing sector output. The traditional expectation is that interest rate should have a negative effect on manufacturing sector output. Meanwhile, the positive effect recorded in this study could be explained in terms of long-term and short-term investments. Higher interest rate could discourage investors who requires funds for short-term investments. Given that manufacturing is a long-term venture, investors could still take high interest rate loans with expectations to be better off in the long run. The need for manufacturing plants could be interest inelastic in the situation of little or no equity contribution as it will be required before production could take place.

The error correction mechanism so obtained is -1.0701 and it is negative showing that short-run distortions will be corrected in the long-run as well as being statistically significant. This is an indication that any short-run disequilibrium in the model will be corrected before a one full year. This is because 107.01% of the short-run disequilibrium is corrected annually for long-run equilibrium to be established. More precisely, it will take about nine (9) months for the model to completely adjust to attain long-run equilibrium. With the R-squared of 0.8968 so reported, it is clear that the explanatory variables jointly explain 89.68% of the total short-run variations in manufacturing sector output over the study period. After adjusting for degree of freedom, the adjusted R-squared being 0.8548 indicates that the model still exhibits a goodness of fit as the explanatory variables still explain 85.48% of the total short-run variations in manufacturing sector output during the study period.

4.7. Long-Run Model Estimation

The adjusted coefficients in the model in the long-run is given in Table 7 where the long-run effect of the explanatory variables on manufacturing sector output is captured.

Table 7 Long-run result

Variable	Coefficient	Std. Error	t-Statistic	Probability
GEXP	-0.0940	0.0743	-1.2648	0.2230
VAT	1.3838	0.1720	8.0446	0.0000*
FDI	-0.1186	0.0347	-3.4177	0.0033*
GFCF	-0.2449	0.1571	-1.5587	0.1375
CPS	-0.0091	0.0695	-0.1310	0.8973
LEMP	2.2771	0.4542	5.0132	0.0001*
INFL	-0.0277	0.0182	-1.5254	0.1455
INTR	0.3773	0.0740	5.0987	0.0001*
EXR	-0.0581	0.0452	-1.2836	0.2165
C	-3.3753	1.4408	-2.3427	0.0316*

Note: * denotes significance at least at the 5% level.; Source: Researcher Computation, 2024.

In the long-run, some of the results differs from that obtained in the short-run in terms of significance. For instance, government expenditure still exerts a negative effect on manufacturing output, but such effect becomes insignificant in the long run. In the case of VAT, its effect is similar to that of the short-run result as it exerts a positive and significant effect on manufacturing sector output. From the coefficient, a 1% increase in VAT leads to a 1.3838% increase in manufacturing sector output in the long run. Foreign direct investment (FDI) still exerts a negative and significant influence on manufacturing sector output. It follows from the coefficient that a 1% increase in FDI will lead to a 0.1186% decrease in manufacturing sector output in the long run. The effect of gross fixed capital formation remains negative and insignificant as earlier observed in the short-run model. A reverse is the case of credit to the private sector that now exerts a negative but insignificant effect on manufacturing sector output in the long run. One implication of this finding is that as manufacturing firms moves towards the long run, they will not rely on credit from banks to fund their operations rather, they will rely on their retained earnings. Labour employment in the manufacturing sector still exerts a positive and significant influence on manufacturing sector output in the long run. A 1% increase in labour employment results in a 2.2771% increase in the manufacturing sector output. The effect of inflation and exchange rate on manufacturing sector output are both negative and insignificant, while interest rate exerts a positive and significant influence on manufacturing sector output in the long run. Consequently, a 1% increase in interest rate will lead to a 0.3773% increase in manufacturing sector output in the long run.

4.8. Stability Test

In the stability test, the essence is to know whether our estimated parameters are stable. The stability of the parameter estimates is an indication that they are reliable for inferences to be made from them. The test is conducted using the cumulative sum (CUSUM) of squares test shown in Figure 2. For stability to exist, the CUSUM of squares line must lie within the 5% critical upper and lower bound lines.

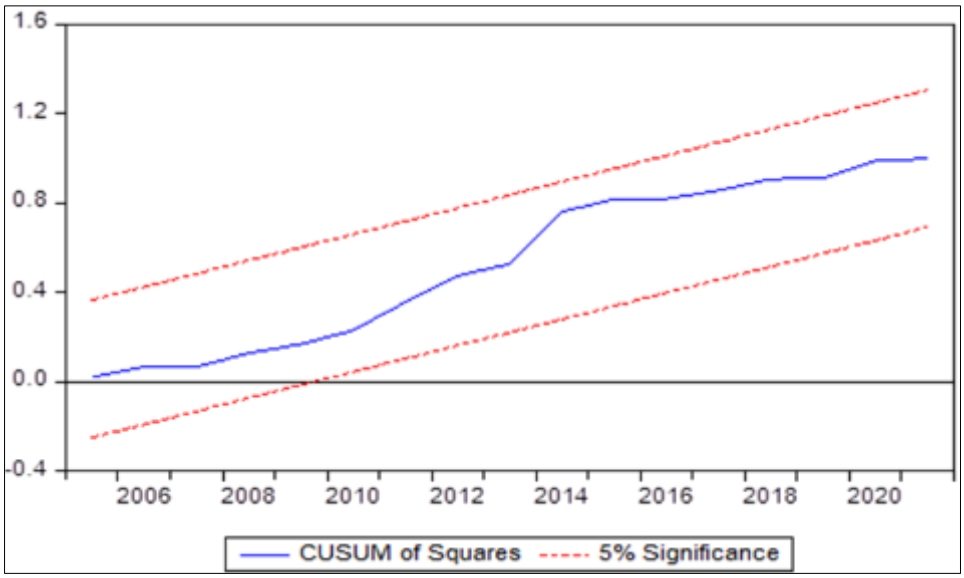

Figure 2 Cumulative sum (CUSUM) of squares test for model's stability

As seen in Figure 2, the CUSUM line lies within the 5% critical upper and lower bounds lines, implying that the parameter estimates (and the overall model) are stable and can be rightly used for inferences without fear of wrong decision.

4.9. Disaggregation of the Model

Our analysis has portrayed the fact that total government expenditure exerts a negative effect on manufacturing sector performance in Nigeria during the study period. Consequently, we proceed to disaggregate total government expenditure into capital and recurrent expenditure components to see which of them could be putting forth the observed negative effect. Table 8 captures the short run model while Table 4.12 captures the long-run model.

Table 8 Short-Run disaggregated Model Result

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(REXP)	-0.1945	0.0148	-13.0984	0.0000
D(REXP(-1))	-0.0386	0.0105	-3.6656	0.0064
D(CEXP)	0.0265	0.0075	3.5443	0.0076
D(CEXP(-1))	-0.1901	0.0115	-16.5260	0.0000
D(VAT)	-0.0096	0.0258	-0.3723	0.7193
D(VAT(-1))	-0.3422	0.0388	-8.8255	0.0000
D(GFCF)	-0.7890	0.0347	-22.7081	0.0000
D(GFCF(-1))	0.4804	0.0267	18.0015	0.0000
D(LEMP)	5.5914	0.1821	30.6968	0.0000
D(LEMP(-1))	-3.9662	0.1670	-23.7482	0.0000
D(CPS)	0.1114	0.0194	5.7565	0.0004
D(CPS(-1))	-0.3866	0.0200	-19.3406	0.0000
D(FDI)	0.0779	0.0061	12.8383	0.0000
D(FDI(-1))	-0.0556	0.0049	-11.4522	0.0000
D(INTR)	0.0851	0.0165	5.1702	0.0009

D(INTR(-1))	0.1032	0.0178	5.7916	0.0004
D(INFL)	0.0416	0.0050	8.3614	0.0000
D(INFL(-1))	-0.0329	0.0052	-6.2708	0.0002
ECM(-1)	-0.6698	0.0238	-28.1225	0.0000
R-squared	0.9903	Mean dependent var		0.0160
Adjusted R-squared	0.9810	S.D. dependent var		0.0956
S.E. of regression	0.0132	Akaike info criterion		-5.5148
Sum squared residual	0.0033	Schwarz criterion		-4.6960
Log likelihood	123.7816	Hannan-Quinn criterion		-5.2235

Source: Researcher Computation, 2023.

The result presented in Table 8 indicates that in the short-run, recurrent government expenditure (REXP) and its one-period lag exerts a negative and significant effect on manufacturing sector performance. It portrays that a % increase in recurrent expenditure will lead to a 0.1945% decrease in manufacturing sector performance, and its one-period lag reduces manufacturing sector performance by 0.0386% on the average. On the contrary, capital expenditure (CEXP) exerts a positive and significant short-run effect on manufacturing sector performance though its one-period lag put forth a negative and significant effect. Thus, a 1% increase in government capital expenditure will lead to a 0.0265% increase in manufacturing sector performance in Nigeria. The effect of total government expenditure earlier observed to be negative in influencing manufacturing sector performance can be explained using this disaggregated model. Since the magnitude of the negative short-run effect of recurrent expenditure (-0.1945) on manufacturing sector performance is greater than that of the capital expenditure (+0.0265), then the net effect will be negative.

To observe the long-run result, Table 9 reflects the result.

Table 9 Long-Run result of the disaggregated model

Variable	Coefficient	Std. Error	t-Statistic	Probability
REXP	-0.0711	0.0475	-1.4965	0.1729
CEXP	0.7137	0.1541	4.6322	0.0017
VAT	1.3752	0.1910	7.1997	0.0001
GFCF	-3.1261	0.6475	-4.8277	0.0013
LEMP	10.0380	1.6634	6.0347	0.0003
CPS	0.0282	0.0815	0.3462	0.7381
EXR	-0.6572	0.1309	-5.0208	0.0010
FDI	0.2807	0.0934	3.0046	0.0170
INTR	0.2442	0.0883	2.7663	0.0244
INFL	-0.0617	0.0293	-2.1019	0.0687
C	2.0205	1.8655	1.0831	0.3103

Source: Researcher Computation, 2023.

In the long-run, our result in Table 9 still supports the short-run situation. Thus, the effect of recurrent expenditure on manufacturing sector performance is negative but insignificant; while the effect of capital expenditure is positive and significant. Thus, a 1% increase in capital expenditure will lead to a 0.7137% increase in manufacturing sector performance in Nigeria.

4.10. Discussion of Major Findings

One of the major findings of this study is that government expenditure exerts a negative influence effect on manufacturing sector output in Nigeria during the study period. Public spending is expected to boost output in the economy as production is likely to be stimulated through increased public spending in the economy. This is in line with the Keynesian idea where public spending is regarded as one of the chief actions that could facilitate growth. In this study, this seems not to be the case as it is observed that increased public spending will likely lead to a declining output of the manufacturing sector. An introspection into this scenario could be linked to the proportion of public expenditure that goes into influencing real economic activity. As it is the case in Nigeria, greater proportion of public spending goes into recurrent expenditure while smaller proportion goes into the capital components. The negative effect therefore arises from the huge magnitude of the negative recurrent expenditure effect on manufacturing sector performance, although the capital expenditure component put forth a positive effect. This is because a large chunk of public spending in Nigeria is on administration and not on critical area like economic and social services that boost economic activities. This can therefore be the reason for the observed negative effect in the case of Nigeria. Secondly, value added tax (VAT) in its aspect is observed to positively influence the output of the manufacturing sector output. As such, an increased VAT will increase manufacturing sector output. Such positive effect is attributed to the fact that the proceeds from VAT is used to provide economic overheads which are critical for the successful operation of manufacturing firms. Consequently, VAT aids in promoting manufacturing sector output both in the short-run and on the long-run. The result so obtained follows from the fact that both VAT and government expenditure Granger causes manufacturing sector output in Nigeria during the study period. Therefore, fiscal policy indeed affects the performance of manufacturing sector output in Nigeria.

Secondly, this study has revealed that apart from the fiscal policy variables that monetary policy is also crucial in driving the manufacturing sector of the Nigerian economy. This is evident from the fact that credit to private sector put forth a positive and significant effect on manufacturing sector output during the study period. Meanwhile, such positive effect is achievable in the short-run as the effect becomes negative and insignificant in the long-run. It follows that as banks grants more credits, manufacturers could have access to such credit to either start or expand their existing manufacturing enterprises. Consequently, an expansionary monetary policy through credit expansion is desirable in driving manufacturing performance in Nigeria.

5. Discussion

This study explored the influence of fiscal policy on the manufacturing sector of the Nigerian economy from 1981 to 2021. The fiscal policy variable under consideration were government expenditure and value added tax, while the manufacturing sector performance was measured using the manufacturing sector output. The data on the variables utilized for this study were obtained from the Central Bank of Nigeria statistical bulletin and the World Development Indicators. These data were subjected to unit root test which gave the direction on the appropriate estimation approach to deploy. The study also utilized Granger causality test to study the direction of causality between the fiscal policy variables and manufacturing sector output. Then, the autoregressive distributed lag approach was deployed to ascertain the effect of both government expenditure and value added tax on manufacturing sector output in Nigeria both in the short-run and in the long-run. The summary of the study is presented as follows:

- The variables which were tested for stationarity using the augmented Dickey-Fuller unit root test. The result revealed that some of the time series variables were stationary at level while others were stationary at first difference. This led to the test for cointegration using the ARDL bounds testing approach.
- The result from the ARDL bound test indicated that the variables are cointegration hence, a long-run relationship exist among them. Thus, the need to estimate both the short-run and long-run models.
- In the short-run, government expenditure was observed to have a negative and significant effect on manufacturing sector output. This means that if government expenditure increases, manufacturing sector output decreases in the short run. The disaggregated model portrayed that while recurrent expenditure exerted a negative effect on manufacturing sector performance, the capital expenditure exerted a positive effect. This means that capital expenditure improves manufacturing sector performance while recurrent expenditure impedes it.
- Also, VAT was observed to have a positive and significant effect on manufacturing sector output in the long run. This is an indication that as VAT increases, manufacturing sector output also increases in the long run. however, the short-run effect of VAT on manufacturing sector performance is negative indicating that VAT impedes manufacturing sector performance in the short-run.

- Credit to the private sector was also observed to have a positive and significant short-run effect on manufacturing sector output. Upon this, an increase in the credit to the private sector will lead to an increase in manufacturing sector output in the short run.
- Interest rate is observed to exert a positive and significant influence on manufacturing performance, implying that the current rate of interest is favourable for the manufacturing sector to thrive.
- The error correction model indicated that 107.01% of the short-run disequilibrium is corrected annually for long-run equilibrium to be established. More precisely, it will take about nine (9) months for the model to completely adjust to attain long-run equilibrium.
- In the long-run, government expenditure exerted a negative but insignificant effect on manufacturing sector output in Nigeria. This implies that whether the government spends more or less, such spending decision will not influence the manufacturing sector output in the long run.
- Also, the study revealed that VAT still has a positive and significant effect on manufacturing sector output in the long run. Thus, increased VAT will result in increased manufacturing sector output.
- Credit to the private sector exerted a negative and insignificant influence on manufacturing sector output in the long run. The reason here is not over time, credit expansion could even harm manufacturing though such effect will not be substantial.

6. Conclusion

The general performance of an economy is achievable through the proper functioning of different sectors that makes the economy as a whole. Manufacturing sector is one of the critical sectors that could drive economic progress. This made Kaldor in his first law to posit that "manufacturing is the engine for growth". This argument stems from the fact that manufacturing has a greater spillover effect on the rest of the economy as it spurs employment and supports other critical sectors like the agriculture and service sectors. In driving manufacturing activities, economic policies are deployed to achieve some targets. Such policies in the case of this study are the fiscal policy which entails the use of government spending and taxation to influence macroeconomic outcomes. This study observed that fiscal policy influences the performance of the manufacturing sector. Also, monetary policy via credit to the private sector also influences the manufacturing sector performance. Hence, this study concludes that monetary and fiscal policy mix is a prerequisite for the desired outcome to be achieved in the manufacturing sector of the Nigerian economy.

Recommendations

Given the findings of this study, the following recommendations are highlighted to portray how the output of the manufacturing sector could be stimulated.

- There is need for a reduction in the cost of governance as a huge proportion of public spending is used in running the government other than being utilized in stirring critical sectors that could stir manufacturing sector performance. More expenditures should be shifted to the capital expenditure components which are key areas that could spur productivity and growth.
- Fiscal policy alone cannot drive the manufacturing sector growth. This should be matched with monetary policy in a coordinated manner to derive the desired objectives. More efforts should be made towards making credit available to the private sector for manufacturing purposes as this will form the basis for boosting manufacturing activities in Nigeria, thereby ensuring manufacturing sector output growth.
- Since there is a causal relationship between government expenditure and VAT on manufacturing sector output, it is also being recommended that the appropriate level of public spending must be made, and favourable VAT policies should be put in place in order ensure effective and efficient spending of public funds in Nigeria.
- It is of great importance that the interest rate should be kept at a favorable level to promote borrowing and investments within the manufacturing sector.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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