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IMPACT OF FISCAL POLICY ON MANUFACTURING OUTPUT AND CAPACITY UTILIZATION IN NIGERIA FROM 1984 TO 2021

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Abstract:
The importance of fiscal policy in stimulating, stabilizing and repositioning the manufacturing sector cannot be over-emphasized. This paper aims at evaluating the impact of fiscal policy on the Nigeria's manufacturing output and capacity utilization rate from 1984 to 2025, with a view to determining the best fiscal options for repositioning the Nigeria's manufacturing sector. The paper expresses capacity utilization rate and manufacturing output as the target-dependent variables, represented by models I and II respectively, while the fiscal policy instruments namely: government capital expenditure (GCAPEX), government recurrent expenditure (GREPEX), government non-oil tax revenue (GNTAX) and government budget deficit (GBDEF) are the explanatory variables. The study adopted the autoregressive distributed lag (ARDL) regression technique and the E-views version 10 application software to carry out various tests and analysis including, the pre-estimation tests, the parameters estimation and the post-estimation tests. To ensure that the data series was stationary overtime, the study conducted a unit root test, which confirmed that the data series were stationarity at 1(0) and 1(1) differencing and at 5% level of significance. The study also conducted the ARDL bound test, which confirmed that there was a long-run cointegration among the variables as revealed by the F-stats of 4.82 and 3.39 for model 1 and model II respectively, which were greater than both the lower and the upper bounds. The error correction model (ECM) revealed that the coefficients of the short-run speed of adjustment for model 1 and

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model II were 83% and 77% respectively, which were both negative, implying that the relationship among the variables was statistically significant at 5% level of significance. The t-stat of the individual variables revealed that the systematic components of each variable were statistically significant at 5% level of significance. Accordingly, the result revealed that apart from the GREPEX that made positive impact on both the capacity utilization and output in both the short-run and the long- run, the GCAPEX, GNTAX, GBDEF made negative impact on the target-dependent variables in the long-run. The result corroborated with the hypotheses, which states that despite the implementation of fiscal policy in Nigeria over the years, the aggregate manufacturing output and capacity utilization rate did not increase significantly. The study recommends among other solutions that the Nigeria's fiscal policy needs to be restructured and finetuned in line with the Keynesian-Structuralist integrated framework, to boost capacity utilization rate and output of the manufacturing sector and the economy.

JEL: C32; E62; L60

Keywords: fiscal variables: capital expenditure; recurrent expenditure; non-oil tax revenue and budget deficit, performance indicators: manufacturing output and capacity utilization rate

1. Introduction

1.1 Background Statement

The importance of fiscal policy for stimulating and influencing the growth and development of the manufacturing sector cannot be over-emphasized. Fiscal policy is one of the macroeconomic policy measures employed by the government to stimulate economic growth and development as well as the growth and development of the manufacturing sector. Like any other macroeconomic policy, fiscal policy is aimed at achieving various socio-economic and developmental goals among which are the generation of employment and income; expansion of capacity and output, equitable distribution of income; reasonable price stability; equilibrium balance of external trade and balance of payment; and economic growth and development. Fiscal policy is undoubtedly one of the most important and effective tools used by government to achieve macroeconomic stability in the economy and the sectors therein (Omedero, Ihendinihu and Ekwe, 2016). The main objective of this paper is to evaluate the impact of fiscal policy on Nigeria's manufacturing sector, using manufacturing output and capacity utilization rate as the key performance indicators (KPIs) and as the target-dependent variables.

1.2 Statement of the Problem

Prior to 1984 (the base year of the study), fiscal policy in Nigeria was among the major macroeconomic policies in the national development plans for promoting the country's

economic growth and development. This was the position right from the time of independence in 1960 to the late 1970s. The problems of Nigeria's manufacturing sector started with the world oil glut and the associated 'Dutch Disease' of the early 1980s that resulted from the decline in the price and revenue from crude oil and the resultant austerity measures. The implication of the oil glut and Dutch Disease on Nigeria's economy was the emergence of economic recession and depression, which impacted negatively on the manufacturing sector, resulting in the decline of the performance and contributions of Nigeria's manufacturing sector to the gross domestic product of the country.

From the available data series, Nigeria's manufacturing sector, which grew in the early 1970s at an average growth rate of 7.2%, started to decline from that point to 5.6% in 1980 and to 5.4% in 1981. The annual average capacity utilization rate of the manufacturing sector, which was between 75% and 85% in the 1970s till the early 1980s, started declining from 43% in 1984 to 38.3% in 1985 and to 38.8% in 1986. It increased marginally from 40.4% in 1987 to 42.4% in 1988, to 43.8 in 1989 and in 1990, when it declined to 40.3% and fluctuated from 42% in 1991 to 38.1% in 1992. In 2002, the capacity utilization rate increased from 42.7% in 2001 to 54.9% in 2002, to 56.5% in 2003, to 55.7% in 2004, to 54.8% in 2005 and declined again to 53.3% in 2006 (Banjoko, Iwuji & Bagshaw, 2012). The declining trend in Nigeria's capacity utilization rate continued from 2006, when it averaged at an annual rate of 25%, up to 2021 and continues to date.

Similarly, Nigeria's manufacturing output growth rate declined consistently from 6.8% in 1995 to 6.5%, 6.3% and 6.2% in 1996, 1997 and 1998, respectively (MAN, 2000) (Uffie & Aghanenu, 2019). The growth rate rose sharply from 6.99% in 2001 to 10.07% in 2002 and declined to 5.66% in 2004 and rose again to 9.12% in 2005, to 9. 39% in 2006, to 9.57% in 2007, and declined to 8.89% in 2008, to 7.85% in 2009 and to 7.64% in 2010 (Chikelu & Okoro, 2016). From 2010 to 2021, the Nigerian manufacturing sector's output has continued to decline at an annual average rate of 3.4% to date.

The declining trend continued during the COVID-19 era even at a higher rate. The nominal GDP growth of the manufacturing output in the first quarter of 2020 was recorded at 28.47% (year-on-year) or -7.97% points lower than the figures recorded in the corresponding period of 2019 (36.45%) but 2.18% points higher than the preceding quarter of 26.29%. The quarter-by-quarter growth of the sector during COVID-19 was recorded at 2.84% (NBS, 2020). Also, the manufacturing sector's contribution to the real GDP growth in the first quarter of 2020 was 0.43% (year-on-year), lower than the same quarter of 2019 as well as the preceding quarter by –0.38% points and –0.81% points, respectively. The growth rate of the sector on a quarter-on-quarter basis, stood at –5.38%, lower than that recorded in the preceding quarter of 2019. The contribution to GDP in the 2020 first quarter was 9.65%, lower than the 9.79% recorded in the first quarter of 2019 but higher than the 8.74% recorded in Q4 2019 (Adedokun & Fasoye, 2021).

It was observed that while the CU and MQ were consistently declining over the period, the fiscal policy instruments were on the increase. For example, the CAPEX increased over the period from 4.1 in 1984 to 70.92 in 2994, to 357.25 in 2004, to 783.12 in

2014 and to 2522.47 in 2021. Similarly, the REPEX increased from 5.83 in 1984 to 89.92 in 1994, to 1110.80 in 2004, to 3426.94 in 2014 and to 9145.16 in 2021. Likewise, the BDEF also grew from 1.37 in 1984, to 41.01 in 1994, 2458.45 in 2004, to 5858.84 in 2014 and thereafter declined to 2262.2 in 2015, 802.68 in 2016 and to minus 527.6 in 2020 and minus 912 in 2021. In a similar manner, the non-oil tax revenue grew from 3 in 1984 to 51.7 in 1994, to 565.7 in 2004, to 3275 in 2014 and to 6397.10 in 2021.

The reasons attributed to the declining trend of Nigeria's manufacturing sector were the sharp and persistent increase in the cost of production caused by high cost of power and energy, high interest and foreign exchange rates, high tax and tariff rates, multiplicity of taxes and tariffs, and inconsistent, ineffective and inefficient government policies (Tomola, Adebisi & Olawale, 2012). Similar reasons were identified by (Njoku, Okezie and Ngozi, 2014), to include inadequate and epileptic electricity/power supply, lack of critical raw materials, lack of foreign exchange to procure critical raw materials and technologies, and high interest rate, which limited investment and operations in the manufacturing industry. Other reasons attributed to the declining trend were the massive importation of finished manufactured goods, smuggling and dumping of foreign products into the country, inadequate access to financial facilities, lack of advanced manufacturing technologies, and inadequate and deficient basic manufacturing infrastructure.

According to the Manufacturers Association of Nigeria (2015), "*about 40% of the manufacturing firms in Nigeria had closed down, while about 40% were ailing, only about 20% operated at a sustainable level*". It was reported that due to the incidence of high and multiplicity of taxation, most of the manufacturing firms in Nigeria, who could not cope with the high incidence of taxes, had to relocate to other West Africa Countries. Other reasons attributed to the relocation trend were the harsh manufacturing environment caused by lack of manufacturing infrastructure and policy inconsistency.

The regressive trend between fiscal policy instruments and manufacturing performance indicators suggests that the performance of the Nigeria's manufacturing sector depends not only on the fiscal policy instruments but also on other macroeconomic policy instruments such as the interest rate, foreign exchange rate, inflation rate, and factors such as access to raw materials and basic inputs, market accessibility, availability of infrastructural facilities and the enabling business environment, as well as other development policies including the financial development policy, the commercial and services policies, the technological policy and last but not the least, the legal and regulatory framework under which the manufacturers have to operate. It was of great concern that despite the increases in the fiscal policy instruments over the years, the manufacturing sector's capacity utilization rate and output continued to decline consistently (Adebayo, 2010; Peter & Simeon, 2011).

It was against the backdrop of consistent decline in the performance of Nigeria's manufacturing sector as reflected in the capacity utilization rate, output and contribution of the manufacturing sector to the GDP, despite the implementation of various fiscal

policy measures by the government that prompted and spurred the curiosity to conduct the research on the impact of fiscal policy on Nigeria's manufacturing sector.

1.3 Objectives of the Study

The main objective of this study is to investigate and evaluate the impact of fiscal policy on Nigeria's manufacturing capacity utilization rate and the output over time, with the aim of identifying the challenges faced by Nigeria's manufacturing sector and to determine the most appropriate fiscal policy strategic options for resolving the challenges and repositioning the sector on the path of growth and expansion.

The whole essence of this paper, therefore, is to assess the impact of fiscal policy on Nigeria's manufacturing sector as it affects the growth of output and capacity utilization of the sector, with a view to determining the appropriate combination of fiscal policy instruments that would address the challenges of Nigeria's manufacturing sector and reposition the sector.

1.4 Research Questions

From the statement of the problems and the objectives of the study, the following research questions were asked:

1) What impact has the government capital expenditure made on Nigeria's manufacturing output and capacity utilization rate over the period starting from 1984?
2) What impact did government recurrent expenditures such as wages and salaries, overheads and maintenance have on Nigeria's manufacturing sector's output and the capacity utilization rate over the same period?
3) What impact has the government non-oil tax revenue, generated through PIC, CIT, CED, VAT and Import and Export duties (MXD), made on the output and the capacity utilization of Nigeria's manufacturing sector over the same period?
4) What impact did the government fiscal deficit financed through public borrowing/debt make on the output and capacity utilization of Nigeria's manufacturing sector over the period covered?

1.5 Statement of Hypotheses

Based on the objectives and the research questions, the following null hypotheses were formulated:

H_{01}: Government capital expenditure made no significant impact on the output and capacity utilization of Nigeria's manufacturing sector.

H_{02}: Government recurrent expenditures made no significant impact on the output and capacity utilization of Nigeria's manufacturing sector.

H_{03}: Government non-oil tax revenue made no significant impact on the output and capacity utilization of Nigeria's manufacturing sector.

H_{04}: Government fiscal deficit made no significant impact on the output and capacity utilization rate of Nigeria's manufacturing sector.

1.6 Scope of the Study

The focus of the study is the fiscal policy as it impacted Nigeria's manufacturing sector over the period under investigation. The reason for the inter-temporal analysis was because of the continuous declining trend of the manufacturing sector, which has persisted over a long time, despite the implementation of various macroeconomic policies. It was believed that the long-run time-series data (though aggregate data) would provide enough evidence to analyze the impact of fiscal policy on Nigeria's manufacturing sector output and capacity utilization over the period in question.

1.7 Significance of the Study

The uniqueness of the study is the empirical findings and recommendations thereof, which were explicitly presented for the purpose of making effective and efficient fiscal policies that are necessary and capable of growing and developing Nigeria's manufacturing sector and the economy. It is therefore beneficial to the policy and decision makers, the academia and researchers, and all those who rely on evidence-based research results, to make policies and to conduct further research, in line with the school of thought that believes in the resurgence of fiscal policy as an instrument for managing the economy. The study essentially provides the theoretical basis, the analytical framework and the application techniques that are required for macroeconomic/fiscal policy formulation and implementation.

1.8 Limitations to the Study

The study is limited to the time-lag of information obtained from the secondary data series, which was collected from the published bulletins of the relevant agencies and the empirical literature provided on the subject matter. The implication is that both policy research and policy formulations may lag two to three years behind the data series.

2. Literature Review and Theoretical Framework

2.1 Conceptual Review for the Study

2.1.1 Fiscal Policy Instruments

Fiscal policy is defined in this paper as the use of various fiscal policy instruments to stimulate and grow the economy and the sectors therein, and to promote economic growth and development. The fiscal instruments/variables of interest for this study are the government capital expenditure (CAPEX), government recurrent expenditure (REPEX), government non-oil tax revenue (NTAX) and government fiscal budget deficit (BDEF) are the independent or policy variables, while the key performance indicator of the manufacturing sector adopted for the study are the capacity utilization rate (CU) and the manufacturing output (MQ) as the dependent or target variables.

2.1.1.1 Government Capital Expenditure (CAPEX)

Government Capital Expenditure (CAPEX) refers to expenditures by the Federal Government of Nigeria (FGN) on investment for infrastructure and long-term projects that have long-term benefits, such as roads, rails, ports, energy and power, research and development and other infrastructure that aid the manufacturing sector. The figures for the variable were collated by the Budget Office of the Federation and contained in the annual budgets as well as published in the statistical bulletins of the Nigeria Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN).

2.1.1.2 Government Recurrent Expenditures (REPEX)

These are the short-term expenditures on salaries, administrative overheads and maintenance costs for running the government and its ministries, departments and agencies (MDAs). The figures on recurrent expenditure, like the capital expenditure, were collated by the Budget Office of the Federation and reported in the annual budget of the federation and published in the annual reports and statistical bulletins of the Central Bank of Nigeria (CBN) and the Nigeria Bureau of Statistics (NBS).

2.1.1.3 Government Non-oil Tax Revenue

This refers to the tax revenue generated from various sources, including taxes and tariffs of various kinds such as the Personal Income Tax (PIT), the Company Income Tax (CIT), Import Duty (MD), Export Duty (XD), Excise Duty (ED) and Value Added Tax (VAT). It is important to note that while taxes and tariffs are similar sources of government non-oil tax income/revenue, their effects/impacts on the taxpayers vary differently from taxpayer to taxpayer depending on the tax structure/base and the rate of tax. For instance, various kinds of taxes have the potential to affect the income and consumption of the taxpayer, while tariff has the potential of increasing the cost and volume of production. PIT reduces the payer's disposable income and the propensity to consume, which eventually reduces the aggregate demand and subsequently the national income/output. CIT, on the other hand, reduces the profits/returns on investment of the payer and eventually the national income. Import duty increases the costs/prices of imports and reduces the quantity imported, while export duty increases the costs/prices of exports and eventually the quantity exported. Excise duty also increases the cost of production and subsequently the price of the product. Imposition of taxes and tariffs in whichever form reduces the national income/output.

2.1.1.4 Budget Deficit

Budget deficit is an excess of government expenditure over its revenue, which are usually financed through borrowing either from domestic sources or foreign sources or both (Public Debt). This refers to deficit financing, which is the process of borrowing money by the government to finance its budget deficit. Budget deficit can occur due to various reasons such as, the expected revenue collection being lower than the expected government expenditure on infrastructural development, defense, and other expenses.

The domestic sources include issuance of government bonds and treasury bills, while foreign sources are the bilateral loans (London Club) and the multilateral loans (Paris Club).

2.1.2 Manufacturing Sector

The manufacturing sector, according to Njoku (1997), "*is the sector of the economy that is concerned with the conversion of raw materials and semi-finished products into finished and final products. The sector is identified with the transformation of the economy from natural-resources-based to modern-production-based economy*".

The manufacturing sector plays a prominent role in the economic transformation of nations, whether developed or an underdeveloped economy. The sector is regarded as the main contributor to employment and income generation, wealth creation, poverty reduction, economic diversification, foreign exchange generation, as well as investment and capital formation for economic growth and development of an economy (Haraguchi, Cheng & Smeets, 2016).

According to Arikpo, Ogar and Ojong (2017), "*the manufacturing sector occupies a leading position in promoting productivity, investment, import substitution, export expansion, employment and per capita income at a faster rate than any other sector*". Loto (2012) highlighted the contributions of the manufacturing sector to include an increase in productivity and competitiveness of the domestic economy, to replace imports (import substitution) and expand exports (export expansion), create and build capacity for foreign exchange earnings, generating employment and income, which are the determinants of economic growth and development. Oburota and Okoi (2017) noted that the manufacturing sector plays a vital role in providing intermediate inputs, semi-finished and finished products.

This study sums up the role of the manufacturing sector 'as the catalyst for transforming the economic structure of the country from a simple, slow-growing and low-value economic activities to a more complex, fast-growing and more advanced economies that are driven by industry, technology, innovation and mass production'.

2.1.3 Manufacturing Output

Manufacturing output is essentially one of the key performance indicators (KPIs) of the manufacturing sector. It refers to the total quantity of goods produced by the entire manufacturing firms/facilities located in Nigeria as recorded by the firms and aggregated by the collating agency.

Theoretically, manufacturing output is usually expressed as a function of inputs (factors of production), as captured in the Cobb-Douglas production function. The relationship between manufacturing output and input is usually represented with a Cobb-Douglas function as follows:

$$Yt = f(AtKt^{\alpha}, Lt^{1-\alpha}) \qquad (2.1)$$

Where:
Yt = represents the manufacturing output (Y) at time (*t),*
A = refers to the 'efficiency factor' or total factor productivity (TFP),
L = the amount of labour/man hours used in the production,
K = the physical and financial capital employed.
α and 1- α = the elasticities of output with respect to inputs (L and K) – the rate of change of output to input.

The *A*-input refers to the 'efficiency factor' or total factor productivity (TFP), which represents any factor that relates to technology. TFP measures the productivity and efficiency of the manufacturing process, given the combination of various inputs/factors of production. The parameters α and 1- α are the elasticities of output with respect to the included inputs, which are the rate at which output changes as a result of a given change in labour (L) and capital (K), respectively. In the long run, they are assumed not to be subject to the law of diminishing returns. In other words, the elasticities are assumed to be constant.

In practice, manufacturing output is measured as the actual quantity of goods produced by various manufacturing firms, sub-sectors and sectors. It includes both the finished and semi-finished (intermediate) products that are produced from manufacturing plants and facilities located in the country, measured in volumes and values. The data on manufacturing output were primarily generated by the firms in their sectors and sub-sectors and collated by agencies that aggregate them for policy advocacy. For this study, manufacturing output data were collated and published periodically by the Manufacturers Association of Nigeria (MAN) and the National Bureau of Statistics (NBS).

2.1.4 Capacity Utilization Rate

Capacity utilization rate is another important key performance indicator (KPI) of the manufacturing sector that helps to determine the efficiency and productivity of the sector. Okunade (2018) defines effective capacity utilization rate as "*the rate at which a firm utilizes its resources/facilities to produce a certain quantity of output at a minimum average total cost, given the existing production technology and factors' prices*". In their book, "*industrial capacity and employment promotion*", Phan-Thuy, Betancourt, Winston and Kabaj (1981) described capacity utilization rate as "*the percentage of total output produced from the installed capacity at any point in time, given the available facility and the existing technology*". These definitions suggest that capacity utilization rate of the manufacturing sector/firms is the volume of output produced from a given installed capacity.

This indicator explains how efficient input can be utilized to produce a given output out of the installed capacity, and it shows the ability of a firm to produce more output with the same number of inputs or produce the same quantity of output with fewer inputs. Given the volume of installed output capacity, capacity utilization rate may or may not increase. For an efficient firm, output increases at a higher proportion than the capacity utilization rate, while for an inefficient firm, output increases at a lesser

proportion than the capacity utilization rate. The rate depends not only on the stock of plants, machines and equipment that were installed but also on other constraints prevalent in the business and economic environment including the availability of other inputs (raw materials, operating capital and labour) and the inputs prices, availability of infrastructure and energy as well as their costs, competition of local products against imported substitutes and lastly but not the least, the nature of demand for locally manufactured product. It also depends on the productivity and efficiency of inputs/factors, including electricity and power, manufacturing infrastructure, research, innovation and development (RID).

In practice, capacity utilization rate relates to the proportionality between capacity installed and quantity of output, such that a percentage change in capacity utilization would result in a percentage change in output. In this sense, capacity utilization refers to the proportion of the manufacturing capacity installed that is being utilized to produce a given quantity of output over a given period. In other words, a 1% change in capacity utilization rate would result in a 1% change in output.

2.2 Empirical Review

From available literature, it was empirically revealed that government expenditure made a positive impact on manufacturing output (Peter & Simeon, 2011; Mwafaq, 2011; Muritala & Taiwo, 2011; and Sikiru & Umaru, 2011). Other empirical literature revealed that government expenditure made a negative impact on the growth of Nigeria's manufacturing sector and the economy (Nurudeen & Usman, 2010; Ighodaro & Okiakhia, 2010; Omitogun & Ayinla, 2007). These literatures considered one single fiscal instrument in their papers – it is either the government tax revenue, government expenditure or the budget deficit.

Meanwhile, some studies like those of Okafor and Kenneth (2016); Onakoya and Somoye (2013) and Ighodaro and Okiakhia (2010) studied the impact of government expenditure on growth, while Abomaye, William, Eyo and Friday (2018); Adudu and Ojonye (2015), Umoru and Anyiwe (2013) examined the impact of tax revenue on economic growth. These studies considered aggregate economic growth (represented by the GDP) rather than sectoral performance of any of the sectors.

2.2.1 Gaps in Literature

The major gap in the literature reviewed was the fact that they were not specific on the quantitative impact of fiscal policy on economic growth and the growth of the manufacturing sector. In other words, they could not determine the exact quantity of the GDP or the manufacturing output or the capacity utilization rate that would be generated from a given percentage change in the government tax revenue or government expenditure or other fiscal instruments.

Another gap in the literature on the subject matter was the fact that most of the existing literature concentrated on the impact of fiscal policy on economic growth/GDP. For example, Chukwuemeka (2020); Davids and Alao (2018); Ighodaro and Okiakhia

(2010); Falade and Olagbaju (2015) considered the impact of fiscal policy on Nigeria's economic growth. The GDP may not be a perfect representation of sectoral performance. In a multi-sectoral economy like Nigeria, using economic growth as a proxy target variable for sectoral performance may not be a good representation of all the sectors. As a mono-cultural oil-dependent economy, there is a tendency for the GDP to grow while the manufacturing sector or any other sector in the economy does not grow.

To resolve the gaps, this study adapted an analytical framework that captures all the basic instruments of fiscal policy as they impacted Nigeria's manufacturing sector's performance, using aggregate capacity utilization rate and output as key performance indicators. By combining the major fiscal instruments and some monetary policy instruments adopted as control variables, this study addresses the issues of policy inconsistency and ineffectiveness that had been constraining Nigeria's manufacturing sector and the small and medium enterprises (SMEs) over the years.

2.3 Theoretical Framework

The theoretical framework adapted for this study is the Keynesian-Structuralists integrated framework, which seeks to combine the insights of Keynesian economics with those of structuralists economics, particularly for analyzing economic challenges faced by developing economies and the sectors therein. The framework integrates the short-run demand-focused perspective of Keynesian economics with the long-run supply-side-focused perspectives of Structuralist economics. The aim was to provide a more comprehensive and robust framework that recognizes both the demand-side fiscal policy and the supply-side fiscal policy, as well as the structural and institutional constraints in the economy that affect the manufacturing sector's performance. It acknowledges the importance of aggregate demand and aggregate supply in determining manufacturing output, capacity utilization and employment, as well as highlighting the presence of long-term structural rigidities and institutional constraints that hinder economic growth and development, such as research and development gaps, innovation and technological gaps, income and resources distribution gaps, sectoral imbalances and external dependency gaps.

2.3.1 Keynesian Framework

The Keynesian framework usually begins with a standard aggregate demand identity equation as follows:

$$Y = AD = C + I + G + (X - M) \quad (2.1)$$

Where:
Y = National Output,
AD = Aggregate Demand,
C = Consumption Expenditures,
I = Investment Expenditures,

G = Government Expenditures,
X-M = Net Exports = Total Exports less Total Imports.

In the Keynesian framework, aggregate demand (AD) consists of the aggregate private consumption expenditures, aggregate firms' investment expenditures, government expenditures, as well as aggregate imports and exports (net exports).

By summing these components together and solving Y (national output), the national income equilibrium (equilibrium in the product sector of the economy) was determined as follows:

$$Y = \frac{a - bto + Io + Go + (Xo - Mo)}{1 - b1(1 - t1)} \quad (2.2)$$

Where:
Y = National income/output (represented by the GDP),
a = Autonomous consumption by the households (does not depend on income),
b = Marginal propensity to consume (mpc) (which is a function of additional income),
1-b = Marginal propensity to save (mps) (fraction of additional income saved),
t_o = Autonomous or lump sum tax revenue,
I = i0 +i1r (Investment function).

Where:
I = the investment function by the firms, and r is the interest rate,
G_o = Government expenditure,
(X-M) = Net export (export less import),
M = m0 + m1Y + m2REER,
M is import and REER is the real effective exchange rate,
X = x0 +x1Y∗ + x2REER,
X is exports, and Y∗ is world income.

The framework represents the so-called Keynesian equilibrium condition whereby the national income/output (Y) is determined by the aggregate demand (AD) components. In the Keynes framework, consumption (C) is said to be a function of disposable income:

$$C = a + bYd \quad (2.3)$$

Where:
a = The autonomous/constant component of consumption,
b = The marginal propensity to consume while,
Yd = Disposable income after tax.

$$Yd = (Y - T) \quad (2.4)$$

Y = Total national income,
T = The government tax revenue,
T = $t_o + \tau Y$ (It is an implicit function of income and profit),
t_o = The autonomous or lump-sum tax, and
t = The average tax rate and is positively related to income.

From the Keynesian equilibrium (equation 2.2) and given the definitions of the components therein, we can analyze how changes in any of the fiscal instruments, e.g. government expenditures (G) and tax revenues (T), can affect the national output/income by deriving the multipliers. This can be expressed as follows:

$$Y = 1/1 - (1 - \tau)\ [a_o + bt_o + Io - di + Go] \quad (2.7)$$

$$dY = 1/1 - (1 - \tau)\ [dG - d*\partial i\partial GdG] \quad (2.8)$$

Government expenditure multiplier (dG) is derived as follows:

$$1/(1 - b1(1 - t1)) \quad (2.9)$$

While the tax multiplier (dt_o) is derived as follows:

$$- b1\Delta to/(1 - b1(1 - t1)) \quad (2.10)$$

Where:

dY =Change in the national output/income,
dG = Change in government spending,
Δto = Change in tax revenue,
b = Marginal propensity to save,
1-b = Marginal propensity to consume,
t_o = Autonomous tax,
t_1 = Marginal tax rate.

By applying the multiplier coefficient on the changes in government expenditure, it shows that an increase in government expenditure (ΔG) would cause an increase in income/output, other things being equal, while a decrease in government expenditure would cause a decrease in income/output. On the other hand, by applying the coefficient of the tax multiplier to changes in tax revenue, an increase in tax (Δto) would cause a decrease in income/output, while a decrease in tax would have an opposite effect, other things being equal.

The above analysis describes the concepts of Keynesian equilibrium national income/output and the effect of the multiplier on the national income. The multiplier is defined as the ratio or the number of times a given change in government tax revenue or government expenditure can return to affect the national output/income (Mencinger,

2016). In the Keynesian tradition, a change in government expenditure or tax is usually amplified by the multiplier, which itself is a function of the combined marginal propensity to save (mps) and the marginal tax rate (mtr) (Obi: 1988).

2.3.2 The Structuralists Framework

The Structuralists' framework incorporates the production function of the manufacturing sector into the model as follows:

Manufacturing output = Ym = *f*(Km, Lm, Tm)

Where:
K = capital,
L = labor, and
T = technology.

From the Keynesian framework, exports less imports represent the net export, which the Structuralists recognize as the **external sector constraints.** Other factors that are implicitly considered by the structuralists are the **institutional constraints** and **tax efficiency** - a parameter in the tax that measures the government's ability to collect revenue. Also considered by the structuralists is the **infrastructure quality** - a parameter that affects the productivity of capital in the production functions. The core concern of structuralist economics is the process of structural and institutional transformation, which often involves allocation and administration of resources from less productive sectors to more productive sectors.

2.3.3 Fiscal Instruments Transmission

The fiscal policy theoretical framework shows that capital expenditure is transmitted into the manufacturing output and capacity utilization through investment in infrastructure such as roads, railways, ports, electricity and power, research, innovation and development, oil and gas, iron and steel, and information and communication technology. Recurrent expenditure is transmitted into the manufacturing output and capacity utilization through the national income streams in the forms of wages and salaries, and governance overheads, which are translated into consumption of locally manufactured products.

Non-oil tax, on the other hand, is a leakage from the income streams, transmitted into the manufacturing output and capacity utilization through deductions on earnings, incomes and profits. Though a source of revenue to the government, non-oil taxes and tariffs are captured as withdrawals from the income streams and a reduction in aggregate demand. Lastly, budget/fiscal deficit (increase in capital expenditure over recurrent expenditure) is transmitted into the manufacturing output and capacity utilization through investments in and development of infrastructures that support manufacturing and production.

It is indicative that changes in the fiscal policy instruments would directly or indirectly affect the key performance indicators in the economy, including the manufacturing sector's capacity utilization rate, output, employment, productivity, profitability and competitiveness, as well as the aggregate demand and supply in the economy (David, 2005; Mark & Asmaa, 2009 and Chirag, 2010). For example, an increase in non-oil taxes, other things being equal, would reduce the aggregate disposable income (Yd), which would in turn reduce the aggregate demand (AD) for locally manufactured products and the gross domestic product (GDP), while a decrease in tax will induce the demand and supply of locally manufactured products. On the other hand, increases in government expenditure and budget deficit, other things being equal, would cause increases in the AD and the manufacturing output and capacity utilization rate via the multiplier, while a decrease in fiscal variables would have an opposite effect on the AD and the GDP, other things being equal.

2.4 Effectiveness of Fiscal Policy

The question therefore is, at what point is fiscal policy most effective? The answer is provided by Dernburg and McDougall (1980), who posited that fiscal policy is most effective when a given change in fiscal instruments, such as a reduction in taxes and tariffs or an increase in government expenditure or budget deficit, would yield the highest level of GDP, given the level of interest rate. This is theoretically the point where the interest rate (cost of capital/investment) in the economy is said to be very low. At this level of interest rate, the 'dynamic multiplier' is said to be very high, such that any expansionary fiscal policy, which results from an increase in government expenditure or a decrease in government tax revenue, would increase the national output (Y) and the manufacturing output. In other words, fiscal policy is said to have a full positive impact on the national output and the output of the manufacturing sector.

On the contrary, Westaway and Waymann-Jones (1981) posited that ineffective fiscal policy is caused by a high interest rate, which causes low investment in the real sector and subsequently, low employment and output of the economy and the manufacturing sector. In other words, fiscal policy is said to be most ineffective when an expansionary fiscal policy would make a negative or zero impact on the national output as well as the output of the manufacturing sector.

It therefore implies that monetary policy targets are crucial for the attainment of fiscal policy effectiveness. The question again is, at what level of monetary targets will fiscal policy be most effective and how would this be realized in reality? This is the dilemma referred to as the 'crowding out effect'. The crowding out effect asserts that rising government spending often negatively influences private sector investment. Mainly, this occurs because as the government increases taxes or borrows more funds, it raises interest rates, making borrowing more costly for businesses and individuals. Consequently, this has negatively impacted the manufacturing sector over the years. Thus, the introduction of some monetary policy variables like interest rate and foreign

exchange rate into the models (as control variables), would help to determine the effective impact of fiscal policy on the manufacturing output and capacity utilization rate.

3. Research Methodology and Model Specification

3.1 Research Methodology

To carry out an analysis of the impact of fiscal policy on the manufacturing output and capacity utilization rate, the relevant secondary data on both the fiscal variables and the manufacturing output and capacity utilization rate were collated. The relevant fiscal policy variables used for this study are the government capital expenditure (GCAPEX), government recurrent expenditure (GREPEX), government non-oil tax revenue (GNTAX) and government budget deficit (GBDEF), while the manufacturing sector's performance indicators are the capacity utilization rate (CU) and the manufacturing output (MQ). These variables were specified in two models with the capacity utilization rate as model I and the manufacturing output as model II, both represent the target/dependent variables, while the fiscal policy instruments represent the policy/independent variables.

3.2 Models Specification

This paper adapted the model used by Ubesie, Ananwude, Cyracus and Emmanuel (2020) for their study titled "*The use of fiscal policy tools to stimulate the performance of manufacturing sector in Nigeria*". This is the demand-oriented Keynesian macroeconomic framework to explain the impact of recurrent expenditure, capital expenditure, fiscal deficit, and company income tax on manufacturing contribution to the GDP specified as follows:

$$MS_{GDP} = f(REXP, CEXP, FSD, CIT, INTR, INFL) \quad (3.1)$$

Where:
MS_{GDP} = Manufacturing contribution to Real GDP,
$REXP$ = Recurrent expenditure,
$CEXP$ = Capital expenditure,
FSD = Fiscal deficit,
CIT = Corporate income tax,
$INTR$ = Interest rate,
$INFL$ = Inflation.

To carry out the regression analysis, the model was transformed into the following functional form:

$$LogMS_{GDPt} = a_0 + a_1 LogREXP + a_2 LogCEXPt + a_3 LogFSDt + a_4 LogCIT + a_5 LogINTR + a_6 LogINFL + u_t \quad (3.2)$$

Where:
a_0 = constant parameter
$a_1 - a_6$ = coefficients of independent variables which they estimated
u = error term
t = time trend

Adapting from the above model, this study specified two models to capture the two dependent variables as follows:

$CU_t = f$(CAPEX, REPEX, NTAX, BDEF, INR, EXCR, INFR): Model 1 (3.3)

$MQ_t = f$(CAPEX, REPEX, NTAX, DEF, INR, EXCR, INFR): Model 2 (3.4)

Where:
CU_t = Capacity Utilization Rate (Model I),
MQ_t = Manufacturing Output (Model II),
CAPEX = Government Capital Expenditure,
REPEX = Government Recurrent Expenditure,
NTAX = Government Non-oil Tax Revenue,
BDEF = Government Budget Deficit.

Control Variables
INR = Interest rate,
EXCR = Exchange rate,
INFR = Exchange rate,
u_t = Error Term,
t = Time Trend.

The choice of control variables for the study was based on their relevance to influence and stabilize the impact of fiscal variables in the models. The control variables help to hold other variables constant while determining the impact of each of the fiscal variables included in the models. For instance, the interest rate is fundamental in determining the cost of capital and investment funds; the foreign exchange rate is fundamental in determining the cost and volume of imports and exports, and their impact on manufacturing CU and MQ, while the inflation rate is fundamental in determining the changes in the relevant price levels as well as their impact on the aggregate demand (AD).

3.3 Regression Analysis Technique

This study adapted the auto-regressive distributed lag (ARDL) regression technique and utilized the platform of the E-views version 10 application software for the analysis of the time series data.

The generalized ARDL function is specified as follows:

$$Y_t = C + \sum \alpha k y_{t-k} + \sum \beta x_t + \sum \beta_2 x_{t-j} + \varepsilon \quad (3.5)$$

Where:
Yt = the dependent variable at time t,
C = constant term,
$\sum$ = summation of data,
α = the coefficient of the lagged Y at the previous period,
β = the coefficient of the independent variable(s) at time t,
X = the independent variable(s) at time t and the past periods,
ε = the error term.

The ARDL regression technique expresses the relationship between the dependent variables as functions of their past values (Autoregressive) and the current and the past values of the independent variables (Distributed Lags).

The ARDL models for this study, to capture both the short- and the long-run impact of the fiscal variables on the CU and MQ, were specified as follows:

$$\Delta CU_t = \alpha_0 + \sum \alpha_1 \Delta CU_{t-j} + \sum \alpha_{2j} \Delta Gcapex_{t-j} + \sum \alpha_{3j} \Delta Grepex_{t-j} + \sum \alpha_{4j} \Delta Ntax_{t-j} + \sum \alpha_5 \Delta Bdef_{t-j} + \sum \alpha_6 \Delta Inr_{t-j} + \sum \alpha_7 \Delta Ecxr_{t-j} + \sum \alpha_8 \Delta Ifnr_{t-j} + \beta_1 CU_{t-1} + \beta_2 Gcapex_{t-1} + \beta_3 Grepex_{t-1} + \beta_4 Ntax_{t-1} + \beta_5 Bdef_{t-1} + \beta_6 Inr_{t-1} + \beta_7 Ecxr_{t-1} + \beta_8 Ifnr_{t-1} + \beta_9 ECM_{t-1} + U_t \quad \mathbf{3.7}$$

$$\Delta MQ_t = \alpha_0 + \sum \alpha_1 \Delta MQ_{t-j} + \sum \alpha_{2j} \Delta Gcapex_{t-j} + \sum \alpha_{3j} \Delta Grepex_{t-j} + \sum \alpha_{4j} \Delta Ntax_{t-j} + \sum \alpha_5 \Delta Bdef_{t-j} + \sum \alpha_{6j} \Delta Inr_{t-j} + \sum \alpha_7 \Delta Ifnr_{t-j} + \beta_1 MQ_{t-1} + \beta_2 Gcapex_{t-1} + \beta_3 Grepex_{t-1} + \beta_4 Ntax_{t-1} + \beta_5 Bdef_{t-1} + \beta_6 Inr_{t-1} + \beta_7 Ifnr_{t-1} + \beta_8 ECM_{t-1} + U_t. \quad 3.8$$

Where:
CU = Capacity Utilization of the Manufacturing Sector,
MQ = Manufacturing Sector's Output,
$Capex$ = Government Capital Expenditure,
$Repex$ = Government Recurrent Expenditure,
$Ntax$ = Government Non-oil Tax Revenue,
$Bdef$ = Government Fiscal Budget Deficit.

Control Variables
Inr = Interest rate,
$Excr$ = Exchange rate,
$Infr$ = Inflation rate,
Δ = Rate of change,
a_0 = Constant coefficient,
$a_1 - a_8$ = Coefficients of independent variables to be estimated,
β_1-β_8= Coefficients of independent variables in ARDL-ECM model,
β_9 and β_8 = Coefficient of ECM of model one and two respectively.
u = Error term,
t = Time trend.

3.4 A Priori Expectations

In line with the Keynesian-Structuralists integrated theoretical framework, which was adapted for this study, it was expected that government capital expenditure (CAPEX), recurrent expenditure (REPEX), non-oil tax revenue (NTAX) and the budget deficit (BDEF) would stimulate the aggregate demand (AD) and supply (AS), which would eventually induce manufacturing capacity utilization rate and output.

Accordingly, it was expected that the parameters' estimates would be: α_1, α_2, α_3, $\alpha_5 > 0$ while α_4, α_6, α_7, $\alpha_8 < 0$ for model I (equation 3.5), which implies that the government capital expenditure (CAPEX), recurrent expenditure (REPEX) and fiscal deficit (BDEF) were expected to make positive impact on the capacity utilization, while government non-oil tax (NTAX), interest rate (INR), foreign exchange rate (EXCR) and inflation rate (INFR) were expected to make negative impact on the capacity utilization and manufacturing output, depending on the direction of changes.

Similarly, it was expected that β_1, β_2, β_3, and $\beta_5 > 0$ while β_4, β_6, β_7, and $\beta_8 < 0$ for the model II (equation 3.6), where $\beta_1 =$ MQ. This implies that MQ, CAPEX, REPEX and BDEF were expected to have a positive relationship with the dependent variable (MQ) while NTAX, INR, EXCR and INFR were expected to have a negative on the manufacturing output. This implies that increases in the CU, MQ, CAPEX, REPEX and BDEF would result in increases in the capacity utilization rate and output of the manufacturing sector and vice versa, while increases in NTAX, INR, EXCR and INFR would result in decreases in the capacity utilization rate and the output of the manufacturing industry.

4. Data Presentation and Descriptive Statistics

4.1 Descriptive Statistics

The descriptive statistics for the variables: MQ, CU, REPEX, CAPEX & BDEF as derived from the data series over the period are as follows:

Table 4.1a: Descriptive Statistics for the Variables: MQ, CU, REPEX, CAPEX and BDEF

	MQ	CU	REPEX	CAPEX	GBDEF
Mean	4183.444	45.14534	1934.133	594.8637	1548.608
Median	1496.792	44.05000	840.5500	394.9750	758.1500
Maximum	2572.87	57.75000	9145.160	2522.470	6883.740
Minimum	2941.50	29.30000	5.830000	4.100000	-912.2300
Std. Dev.	5986.82	86.54151	2440.573	634.4030	2083.532
Skewness	1.999846	-0.211986	1.409325	1.362461	1.157933
Kurtosis	6.649001	1.817814	4.235643	4.493121	3.240925
Jarque-Bera	46.41185	2.497416	14.99671	15.28647	8.583691
Probability	0.000000	0.286875	0.000554	0.000479	0.013680
CUSUM	158970.9	1715.523	73497.06	22604.82	58847.12
CUSUM Sqr	1.33E+09	2771.090	2.20E+08	14891284	1.61E+08
Observations	38	38	38	38	38

Source: E-views Output, Version 10.

Table 4.1b: Descriptive Statistics for the variables: NTAX, EXCR, INFR and INR from the data series over the period are as follows

	NTAX	EXCR	INFR	INR
Mean	1344.692	116.6545	0.190842	17.93960
Median	512.5500	119.7700	0.127150	17.57032
Maximum	6397.100	399.9600	0.728400	29.80000
Minimum	3000.000	0.760000	0.053900	9.250000
Std. Dev.	1675.820	109.7676	0.172054	4.193385
Skewness	1.237584	0.898619	1.805134	0.534364
Kurtosis	3.659137	3.059302	4.990553	4.006932
Jarque-Bera	10.38812	5.119839	26.91086	3.413808
Probability	0.005549	0.077311	0.000001	0.181427
CUSUM	51098.30	4432.870	7.252000	681.7048
Sum Sq. Dev.	1.04E+08	445810.2	1.095297	650.6257
Observations	38	38	38	38

Source: E-views Output, Version 10

Table 4.1a shows that the variables MQ, CU, REPEX, CAPEX and BDEF have mean values of 4183.444, 45.14534, 1934.133, 594.8637 and 1548.608, respectively, over the period under consideration. It also shows the minimum probability values of the variables as 29.41650, 29.30000, 5.830000, 4.100000 and -912.2300 respectively and the maximum probability values of the variables as 25725.87, 57.75000, 9145.160, 2522.470 and 6883.740 respectively. The ranges between the minimum and maximum probability values depict the fact that the data series for the variables have been on the increase over the period under consideration. The Jarque-Bera (J-B) statistics show that the CU is normally distributed, while the J-B statistics for MQ, CAPEX, REPEX and BDEF show that the variables are non-normally distributed over time.

Table 4.1b displays the mean, median, minimum, maximum, standard deviation, skewness, kurtosis and the Jarque-Bera for each of the variables. The result shows that the mean probability values for government tax revenue (NTAX), exchange rate (EXCR), inflation rate (IFNR) and interest rate (INR) are 1344.692, 116.6545, 0.190842 and17.93960 respectively, while the minimum values for NTAX, EXCR, INFR and INR are 3.000000, 0.760000, 0.053900 and 9.250000 respectively and the maximum values for NTAX, EXCR, INFR and INR are 6397.100, 399.9600, 0.728400 and 29.80000 respectively. The ranges between the minimum and the maximum values are so high, depicting the increases in the values of the variables over the years under consideration. Table 4.1b shows that the Jarque-Bera probability of NTAX and INFR are non- normally distributed, while that for EXCR and INR are normally distributed. The non-normality of the individual variable does not hold, due to the central limit theorem, which implies that the variable is either normally distributed or non-normally distributed.

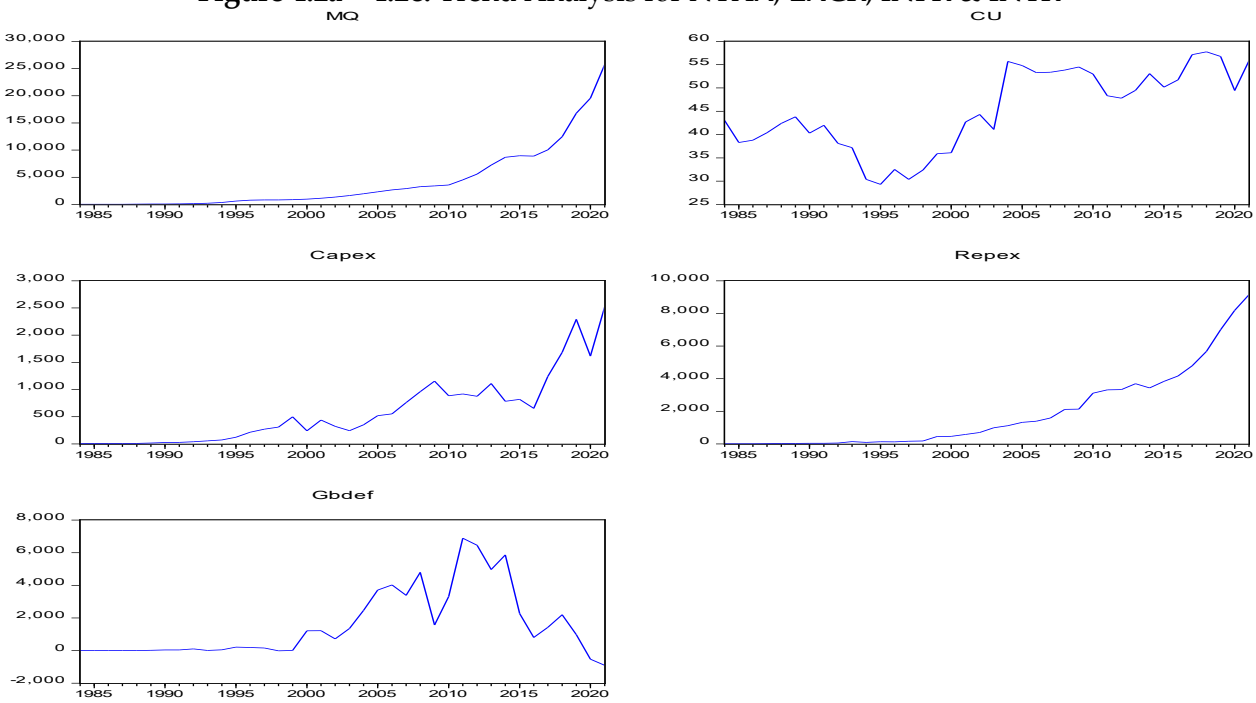
4.2 Trend Analysis

The trend analysis shows the movement and/or fluctuation of the variables over the period covered. The trend lines generated by the E-views version 10 were the

manufacturing output (MQ); capacity utilization rate (CU); government capital expenditure (CAPEX); government recurrent expenditure (REPEX); non-oil tax revenue of the FGN (NTAX); government budget deficit (BDEF); foreign exchange rate (EXCR); inflation rate (INFR), and lastly, the interest rate (INR).

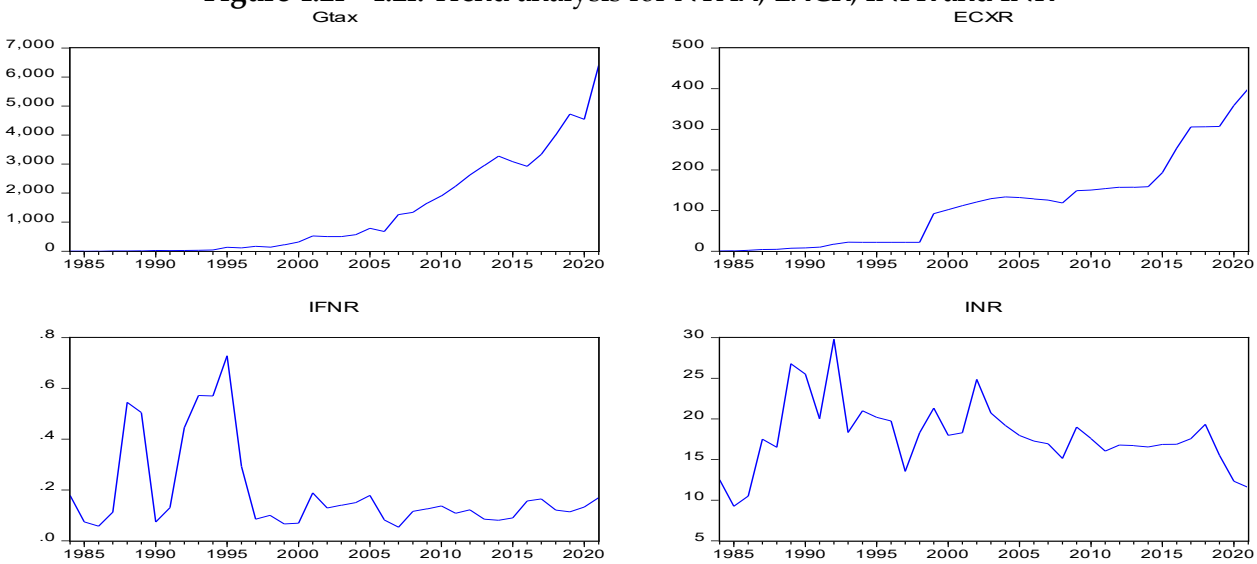
The trend lines of the variables are presented on graphs 4.2a – 4.1e and 4.2f – 4.2i as follows:

Figure 4.2a – 4.2e: Trend Analysis for NTAX, EXCR, INFR & INTR



Source: E-views Output, Version 10

Figure 4.2f - 4.2i: Trend analysis for NTAX, EXCR, INFR and INR



Source: E-views Output, Version 10

The trend lines on fig 4.2a-4.2e show that there were upward and downward trends in the fiscal policy variables plotted against the CU and the MQ. In other words, there were fluctuations in the CAPEX, REPEX and BDEF against the MQ & CU over the period under consideration. The graphs of the MQ and REPEX moved almost in the same direction with positive and continuous increases over the years. In other words, the values of MQ and REPEX continue to rise steadily from 2015 to 2017, respectively, with positive values up to 2021. The graph for CAPEX rises continuously, but fluctuations occurred from time to time.

The trend lines for CU and BDEF on figures 4.2a – 4.2e show that there was clear upward and downward movement in the CU. It first got to its peak in 1995 and then declined in 1996, then picked up again in 1997 and continuously declined till 2003. However, the trend line for BDEF shows that the BDEF was almost flat from 1984 up to 2000 before it rose astronomically in the year 2000 and got to the peak in 2012 before it started declining steadily up to 2021.

Figures 4.2f - 4.2i show the trend analysis for NTAX, EXCR, INFR and INR with upward and downward movements, which demonstrate continuous fluctuation of the variables from one period to another. The INFR and INR follow the same pattern. It was clearly indicated on the above figures that INFR surged high in 1988 and fell drastically in 1990 and picked up again in 1992 and got to the peak in 1995 before dropping in 1997 and thereafter, continues to fluctuate up to 2021. The trend line for INR shows upward and downward movements, which became very high in 1993 and fell drastically in 1994 before rising and keeps fluctuating between 15% and 25% from 2000 to 2021.

5. Regression Analysis and Test of Results

5.1 Pre-Estimation Tests

The pre-estimation tests conducted are:

1) The Unit Root Test,
2) Lag Length Selection and
3) ARDL Bound Test

5.1.1: Unit Root Test for Stationarity

Unit root defines the value of a variable in terms of its previous values +/- a random error, and it is specified as follows:

$$y_t = y_{t-1} + \varepsilon_t. \quad (4.1)$$

Where:

y_t = the dependent variable at time t,

y_{t-1} = the previous value of the dependent variable,

ε_t = random error term at time t.

The unit root function can be lagged for several periods: $y_{t-1} + y_{t-2} + y_{t-3} + \ldots n$.

The unit root test helps to check the likelihood of data series exhibiting a spurious or nonsensical outcome due to non-stationarity of the data series. A spurious outcome is a situation where two unrelated data series appear to be correlated due to their common trends but are not.

One of the best statistical checks/tests and the most common test for the unit root is the Augmented Dickey-Fuller (ADF), which evolves from the unit root function. The ADF equation as specified above can be expanded to include a higher-order regressive process in the model. The condition for determining stationarity is the difference between the t-statistics, the critical values and the p-values. If the t- statistic < critical value and p-value < 0.05, the null hypothesis (Ho) is accepted. It implies that the time series data does not have a unit root, meaning that the data series is stationary. But if the t-statistic> the critical value and the p-value > 0.05, then the Ho is rejected, meaning that the data series is non-stationary (has a unit root).

However, to ensure that the unit root test was sufficiently consistent with the data series, the study adopted a combined Augmented Dickey-Fuller (ADF) test with the Philip Perron (PP) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The PP condition for determining stationarity is like the ADF conditions. However, the KPSS condition is slightly different in the interpretation of the null hypothesis (Ho). While the ADF and PP reject the Ho when the t-statistic is negative and less than the critical values (data is stationary), the KPSS rejects the Ho when the t-statistic is positive and still less than the critical value (data is stationary). The result of the unit root test using the ADF, the PP and the KPSS is presented on table 4.2.

Table 4.2: Unit Root Test Results: ADF, PP and KPSS Tests

Variable	Test	Test Statistics	Critical Value (5%)	Level of Stationarity
CU	ADF	−5.106373	−2.938987	I(1)
	PP	−5.050500	−2.938987	I(1)
	KPSS	0.282549	0.463000	I(0)
MQ	ADF	− 5.034746	−2.948404	I(0)
	PP	− 9.429915	−2.936942	I(0)
	KPSS	0.611261	0.739000	I(1)
BDEF	ADF	−6.296443	−2.938987	I(1)
	PP	−6.296739	−2.938987	I(1)
	KPSS	0.383726	0.463000	I(0)
NTAX	ADF	−6.101597	−3.529758	I(1)
	PP	−5.105790	−2.938987	I(1)
	KPSS	0.100047	0.146000	I(1)
REPEX	ADF	−3.446388	−3.340328	I(1)
	PP	−4.244784	−3.529758	I(1)
	KPSS	0.133460	0.119000	I(1)
CAPEX	ADF	−6.105279	−3.562882	I(1)
	PP	−8.106581	−2.938987	I(1)
	KPSS	0.351471	0.463000	I(1)
INR	ADF	−3.424185	−2.943427	I(0)
	PP	−3.396737	−2.943427	I(0)
	KPSS	0.191567	0.463000	I(0)
EXCR	ADF	−3.984934	−2.945842	I(1)
	PP	−3.897851	−2.945842	I(1)

	KPSS	0.493535	0.463000	I(1)
INFR	ADF	−4.526013	−2.971853	I(1)
	PP	−7.457070	−2.945842	I(1)
	KPSS	0.348102	0.463000	I(1)

Source: E-views Output, Version 10.

The result of the unit root test, using the combined ADF, PP, and KPSS tests, reveals that among the variables tested, interest rate (INR) was found to be stationary at level I(0) based on both ADF and PP tests, with test statistics of -3.424185 and -3.396737, respectively, which are more negative than the critical value of -2.943427. The KPSS test statistic of 0.191567, which is below the critical value of 0.463000, further confirms the stationarity of INR at level I(0). Similarly, manufacturing output (MQ) appears stationary at level I(0) according to the ADF and PP tests, with statistics of -5.034746 and -9.429915, respectively, exceeding the critical values in absolute terms. However, the KPSS test suggests non-stationarity for MQ, with a statistic of 0.611261 above the critical value of 0.739000, indicating conflicting results but becoming stationary after first difference at I(1).

The remaining variables, including the capacity utilization rate (CU), budget deficit (BDEF), non-oil tax revenue (NTAX), recurrent expenditure (REPEX), capital expenditure (CAPEX), exchange rate (EXCR) and inflation rate (INFR) are stationary at first difference I(1). For instance, CU exhibits ADF and PP test statistics of -5.106373 and -5.050500, respectively, which are more negative than the critical value of -2.938987, suggesting stationarity after first difference. The KPSS test for CU, with a statistic of 0.282549, which is below the critical value of 0.463000, supports stationarity at I(0), but the ADF and PP results take precedence in confirming stationarity after first difference at I(1). Similar patterns are observed for BDEF, NTAX, REPEX, CAPEX, EXCR, and INFR, where the ADF and PP tests indicate stationarity only after first differencing, while the KPSS test either supports or contradicts these findings.

The mixed order of integration across variables, with some being I(0) and others I(1), rules out the use of traditional time series models such as Johansen cointegration that require all variables to be of the same order. Instead, the Autoregressive Distributed Lag (ARDL) model is the most appropriate estimation technique, as it accommodates both I(0) and I(1) variables. Additionally, the ARDL approach is well-suited for small sample sizes and allows for the examination of both short-run and long-run relationships between the variables

5.1.2 Lag length Selection

The selection of the appropriate lag length in an ARDL model is very important. Lag length selection is usually guided by some information criteria, which include the Akaike Information Criterion (AIC), the Schwarz Bayesian Criterion (SBC) and the Hannan-Quinn Information Criterion, among others, as indicated below. However, the most acceptable of them is the Akaike Information Criterion (AIC).

Table 4.3a: Lag length Selection (Model I: CU)

VAR Lag Order Selection Criteria						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-409.3360	NA	1.620004	23.18533	23.53722	23.30815
1	-218.5982	286.1066	0.001546	16.14435	19.31138*	17.24973
2	-107.2827	117.4998*	0.000196*	13.51570*	19.49789	15.60364*

Source: E-views Output, Version 10.

Legend: LR: Sequential modified LR test statistics (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SBC: Schwarz Bayesian information criterion; HQ: Hannan-Quinn information criterion

Table 4.3a above presents the different optimum lags as well as different criteria used for selecting the lag length for the specified equation on capacity utilization (Model I). To get an appropriate lag length, the study compared the following criteria: the Sequential Modified LR test statistic, Final Prediction Error (FPE), the Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information (each test at 5% level). The result shows that lag 2 is most common to all the criteria, as indicated with (*), on which basis the study chose lag 2 to estimate the model. This conforms with the Akaike Selection Criterion (AIC), which was used to select the optimum lag length.

Table 4.3b: Lag length Selection (Model II: MQ)

VAR Lag Order Selection Criteria						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-393.0081	NA	19.93698	22.85761	23.16868	22.96499
1	-249.0420	222.1191	0.092863	17.43097	19.91953	18.29002
2	-161.1258	100.4757*	0.014351*	15.20719*	19.87323*	16.81790*

Source: E-views Output, Version 10

Legend: LR: sequential modified LR test statistics (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SIC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

Similarly, model II (table 4.3b), shows that the Sequential Modified LR test statistic, the Final Prediction Error (FPE), the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SC) and the Hanna-Quinn Information (tested at 5% level of significance) that lag 2 is most common to all the criteria, on which basis the study chose lag 2 to estimate the model.

5.1.3 ARDL Bound Test Results

A key feature of the ARDL approach is the bounds testing procedure for cointegration, which involves testing the significance of the long-run coefficients using F-statistics. This test determines whether there is a long-run relationship among the variables without requiring the variables to be of the same integration order. The result is as follows:

Table 4.4: ARDL Bound Test Results: Model I and Model II

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic (**Model I: CU)**	Value	Signif.	I(0)	I(1)
F-statistic	4.829302	10%	1.92	2.89
K	7	5%	2.17	3.21
Test Statistic **(Model II: MQ)**	Value	Signif.	I(0)	I(1)
F-statistic	3.394181	10%	1.99	2.94
K	6	5%	2.27	3.28

Source: E-views Output, Version 10**.**

The result of the ARDL bound test for cointegration (Table 4.3) shows the existence of a cointegrating relationship. The value of F-statistics for model I and model II are 4.829302 and 3.394181, respectively, and both are greater than the lower and upper bound values at a 5% significance level. Based on this result, the study concluded that there is a long-run relationship between the two target/dependent variables (CU and MQ).

5.2 Data Analysis and Estimation of Coefficients (Model I: CU)

5.2.1 ARDL Short-run Error Correction Regression (Model I: CU)

Table 4.6: ARDL Error Correction Regression

Dependent Variable: (CU)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
DLOG(CAPEX)	0.093926	0.026204	3.584467	0.0020
DLOG(CAPEX(-1))	0.151780	0.042001	3.613745	0.0018
DLOG(REPEX)	0.165593	0.044174	3.748630	0.0014
D(BDEF)	5.51E-06	7.06E-06	0.781368	0.4442
DLOG(EXCR)	-0.195834	0.044794	-4.371886	0.0003
DLOG(EXCR(-1))	-0.110972	0.035733	-3.105609	0.0058
DLOG(INFR)	-0.094346	0.019963	-4.726032	0.0001
DLOG(INFR(-1))	0.119163	0.021630	5.509203	0.0000
CointEq(-1)*	-0.830006	0.105612	-7.859022	0.0000
R-squared = 0.753037 Adjusted R-squared = 0.679863 DW =2.318251				

Source: E-views Output, Version 10**.**

Table 4.6 gives the short-run analysis of ARD. The result shows that government capital expenditure (CAPEX) and recurrent expenditure (REPEX) have a positive and significant impact on capacity utilization (CU), implying that in the short run, a 1% increase in CAPEX and REPEX, on average, led to 9% and 17% increases, respectively, in CU. Similarly, the government budget deficit (BDEF) has a positive and insignificant impact on capacity utilization (CU), implying that in the short run, with a one unit rise in BDEF, CU will increase to 5.51E-06. However, the foreign exchange rate (EXCR) and inflation rate (INFR) have negative coefficients with a significant impact on CU, which implies that in the short run, a 1% rise in EXCR and INFR would result in 20% and 9% reductions in CU, respectively.

The Durbin-Watson (DW) is 2.318251 (approx. 2), which implies that there is no autocorrelation in the model because the value is close to or. The R^2 measures the proportion of variability in the CU that is accounted for by the explanatory variables used in the study. The R^2 of 0.753037 reveals a strong positive relationship between the CU and the independent/explanatory variables. The speed of adjustment coefficient is negative and significant at the 5% level of significance, which implies that about 83% of disequilibrium in the previous period is restored into equilibrium in the current period. Thus, the model is a good fit, since about 75% of changes in the CU were accounted for by the explanatory variables in the model, while 25% of changes in the CU were due to other factors not included in the model.

5.2.2 ARDL Long-Run Estimation Results (Model I: CU)

Table 4.7: Long-Run Estimation Results

Dependent Variable: CU				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LOG(CAPEX)	-0.249122	0.044126	-5.645683	0.0000
LOG(REPEX)	0.295995	0.083273	3.554516	0.0021
LOG(GTAX)	-0.025017	0.063812	-0.392047	0.6994
GBDEF	-1.97E-05	1.14E-05	-1.724240	0.1009
LOG(INR)	0.074123	0.098471	0.752741	0.4608
LOG(ECXR)	-0.027033	0.076313	-0.354238	0.7271
LOG(IFNR)	-0.314671	0.048207	-6.527459	0.0000
C	2.767059	0.362655	7.629996	0.0000

Source: E-views Output, Version 10.

5.2.2.1 Summary of Results (Model I)

CU = 2.8 –0.25Capex +0.30Repex –0.03Ntax –0.19Bdef + 0.07logIntr –0.27logExcr – 0.31logInfr

R^2 = 0.753037 (approx. 75%);

Adjusted **R^2** = 0.679863 (approx. 0.68 = 68%);

DW = 2.318251

The R^2 (R-squared) refers to the coefficient of determination, which measures the goodness of fit of the regression equation, while the adjusted R^2 is the goodness of fit, adjusted to take account of the number of explanatory variables included. The R^2 measures the percentage of variability of the target-dependent variable (MQ) that is explained or accounted for by the fiscal policy-independent variables included in the equation. The result of 0.753037 or 75% indicates that 75% of the MQ was accounted for by the fiscal variables and the control variables included in the model.

5.2.2.2 Interpretation of Results

The long run regression analysis of fiscal variables for the CU (table 4.7) shows that government capital expenditure (CAPEX) and inflation rate (INFR) have negative significant impact on the capacity utilization rate (CU) in the long run, meaning that with

1% increase in CAPEX and INFR on average, holding other variables constant, will lead to 25% and 31% decline in CU respectively. On the other hand, government recurrent expenditure (REPEX) and interest rate (INR) have positive significant and insignificant impact on the capacity utilization (CU) respectively, implying that in the long run, a 1% rise in REPEX and INR will lead to 30% and 7% rise in CU respectively.

The result shows that the government non-oil tax revenue (NTAX), government budget deficit (BDEF) and foreign exchange rate (EXCR) have negative insignificant impact on the capacity utilization rate (CU), implying that in the long-run, 1% rise in NTAX, BDEF and EXCR will lead to 2.5%, 1.97E-05 and 3% decline respectively on the CU.

5.3 Data Analysis and Estimation of Coefficients (Model II: MQ)

5.3.1 ARDL Short-run Error Correction Regression (Model II: MQ)

Table 4.12: ARDL Error Correction Regression (Model II: MQ)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(MQ, 2)	0.473826	0.128557	3.685720	0.0017
DLOG(CAPEX)	-0.188359	0.040363	-4.666675	0.0002
DLOG(REPEX)	0.427138	0.057550	7.422052	0.0000
DLOG(NTAX)	-0.035489	0.043022	-0.824916	0.4202
DLOG(NTAX(-1))	0.097036	0.039928	2.430261	0.0258
DLOG(INR)	0.101136	0.060563	1.669932	0.1122
DLOG(INR(-1))	-0.397323	0.083326	-4.768302	0.0002
DLOG(INFR)	-0.031425	0.020721	-1.516592	0.1467
DLOG(INFR(-1))	-0.053427	0.020292	-2.632942	0.0169
CointEq(-1)*	-0.768849	0.125197	-6.141101	0.0000
R-squared = 0.756303; Adjusted R-squared = 0.668572; DW stats = 1.980851.				

Source: E-view Output, Version 10**.**

Table 4.12 above shows the ARDL result for model 2 (MQ) in the short-run analysis. The result shows that government capital expenditure (CAPEX) and government recurrent expenditure (REPEX) made negative and positive significant impacts, respectively, on the manufacturing output (MQ) in the short run. This implies that in the short run, a 1% increase in CAPEX and REPEX will lead to a 19% decline and 43% increase, respectively on the MQ.

The table also shows that government non-oil tax revenue (NTAX) and inflation rate (INFR) made a negative and insignificant impact on the MQ such that a 1% rise in NTAX and INFR, holding other variables constant, will lead to 3.5% and 3.1% reduction respectively, in the MQ in the short run. Meanwhile, interest rate (INR) made a positive but insignificant impact on MQ in the short run, which implies that a 1% rise in INR will lead to a 10% rise in the MQ, while government budget deficit (BDEF) had zero effect on the MQ in the short run.

The SR DW is 1.980851 (approx. 2), which implies that there is no autocorrelation in the model. The $R^{2,}$ which measures the proportion of variability in the MQ that was

accounted for by the explanatory variables, and it is 0.756303, which implies that a strong positive relationship exists between the manufacturing output (MQ) and the relevant fiscal policy variables. The speed of adjustment of the coefficient is negative and significant at the 5% level of significance, which implies that about 76% of disequilibrium in the previous period is restored to equilibrium in the current period. Thus, the model is a good fit, since about 76% of changes in the MQ were accounted for by the explanatory variables (fiscal policy instruments), while 24% of changes in the MQ were due to other factors and conditions in the environment.

5.3.2 ARDL Long-Run Estimation Results (Model II: MQ)

Table 4.13: Long-Run Estimation Results (Model II: MQ)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(CAPEX)	-0.160491	0.075024	-2.139214	0.0464
LOG(REPEX)	0.299854	0.141305	2.122033	0.0480
LOG(NTAX)	-0.155016	0.130161	-1.190953	0.2491
BDEF	-1.59E-05	1.35E-05	-1.172939	0.2561
LOG(INR)	0.089160	0.133818	0.666280	0.5137
LOG(INFR)	0.085175	0.059636	1.428245	0.1703
C	-0.053268	0.474658	-0.112224	0.9119

Source: E-views Output, Version 10

5.3.2.1 Summary of Results (Model II)

MQ = -0.05-0.16Capex+0.30Repex-0.16Ntax-02Bdef +0.09logIntr +0.0logExcr +0.09logInfr
R^2 = 0.756303 (approx. 0.76);
Adjusted R^2 = 0.668572 (approx. 0.67);
DW = 1.980851

The R^2 (R-squared) of 0.756303 (approx. 76%) means that 76% of the MQ was accounted for by the fiscal policy instruments and the controlled (monetary variables) included in the model.

5.3.2.2 Interpretation of Results

The long-run regression analysis of fiscal variables for the estimated MQ (Table 4.13) shows that government capital expenditure (CAPEX) and recurrent expenditure (REPEX) have negative and positive significant impacts on the manufacturing output (MQ), respectively, implying that in the long-run, 1% increase in CAPEX and REPEX will lead to 16% and 30% decrease and increase on the MQ, respectively.

The table also shows that the government non-oil tax revenue (NTAX) and government budget deficit (BDEF) made negative and insignificant impacts, respectively, on the manufacturing output (MQ), implying that in the long run, a unit rise in the BDEF will lead to -1.59E-05 decline in the MQ while 1% rise in NTAX will lead to 16% decline in the MQ respectively. Also, the interest rate (INR) and inflation rate (INFR) made positive insignificant impacts, respectively, on MQ, implying that in the long run, a 1%

rise in INR and INFR will lead to 8.9% and 8.5% increases, respectively on the manufacturing output (MQ).

5.4 Post-Estimation Tests for the Study

To ensure that the parameter estimates were consistent with the ARDL results, various post-estimation tests were conducted, amongst which are:

1) Multicollinearity Test,
2) Autocorrelation Test,
3) Heteroscedasticity Test,
4) Normality Test,
5) Stability (CUSUM & CUSUM SQUARE) Test, and
6) Test of Hypotheses.

5.4.1 Multicollinearity Test (Model I: Capacity Utilization)

The multicollinearity result of the variables under consideration and their variance inflation factors (VIF) measures how much the variance of an independent variable is influenced by its interaction with the other independent variables.

Table 4.8: Multicollinearity Result (Model I: CU)

Variance Inflation Factors			
	Coefficient	**Uncentered**	**Centered**
Variable	Variance	VIF	VIF
LOG(CU(-1))	0.023256	3253.847	9.064947
LOG(CAPEX)	0.002318	770.3435	62.94426
LOG(CAPEX(-1))	0.002438	771.9180	72.27935
LOG(CAPEX(-2))	0.003181	961.8718	104.0336
LOG(REPEX)	0.006272	2721.281	249.5473
LOG(REPEX(-1))	0.003599	1484.716	152.7455
LOG(NTAX)	0.002910	1120.426	130.0823
BDEF	8.12E-11	5.528126	3.416086
BDEF(-1)	1.25E-10	8.466970	5.119766
LOG(INR)	0.006917	564.3161	2.943562
LOG(EXCR)	0.007434	1390.675	146.9045
LOG(EXCR(-1))	0.004237	751.5077	99.44975
LOG(EXCR(-2))	0.003254	546.7697	88.14653
LOG(INFR)	0.000848	34.23071	3.904089
LOG(INFR(-1))	0.000814	33.64301	3.840451
LOG(INFR(-2))	0.000999	40.99757	4.724190
C	0.271056	2639.560	NA

Source: E-views Output, Version 10 Output**.**

The multicollinearity test result (Table 4.8) shows that the variables under consideration have no multicollinearity problems because the uncentred variance inflation factor (VIF) for each of the variables was higher than the centered VIF. This means that there is no perfect relationship among the variables under consideration. The individual variables

are not directly correlated with each other, such that they can undermine the statistical significance of each independent variable.

5.4.2 Autocorrelation Test (Model I: CU)

This test belongs to the class of asymptotic (large sample) tests known as Lagrange multipliers (LM) that are used for testing for higher-order ARMA errors and is applicable to check whether there is serial relationship among variables.

Table 4.9: Autocorrelation Test Result

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.922107	**Prob. F(2,17)**	0.4167
Obs*R-squared	3.523188	**Prob. Chi-Square (2)**	0.1718

Source: E-views Output, Version 10 Output**.**

The autocorrelation test (Table 4.9) shows that the p-values of the F-statistic (0.4167) and the p-value of the Obs*R-squared (0.1718) were greater than 0.05, which implies that there is no serial autocorrelation in the residual of the ARDL.

5.4.3 Heteroskedasticity Test (Model I: CU)

This is a test of whether the variance of the disturbance term (μ) of each of the explanatory variables is constant over time, using the Breusch-Pagan-Godfrey p-values. That is, whether the residual error variance of each of the explanatory variables is constant in the long run.

Table 4.10: Heteroskedasticity Test Result

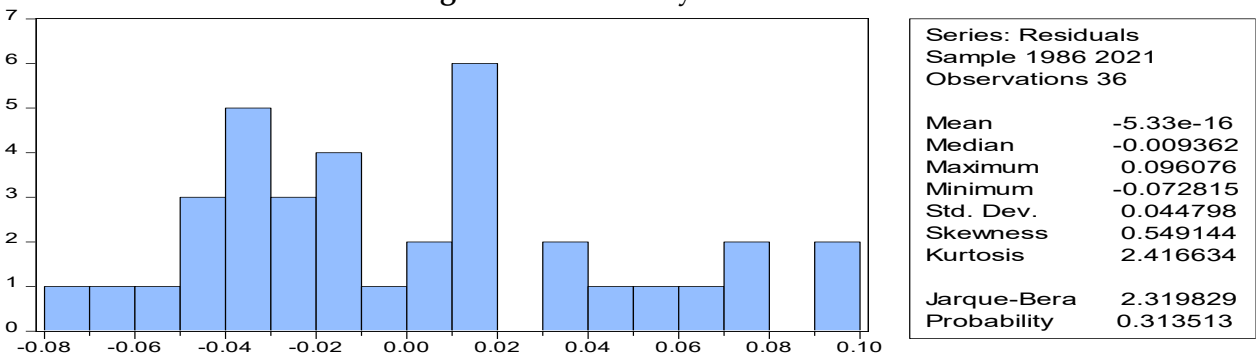
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.679627	**Prob. F(16,19)**	0.7802
Obs*R-squared	13.10387	**Prob. Chi-Square(16)**	0.6651
Scaled explained SS	2.585409	**Prob. Chi-Square(16)**	0.9999

Source: E-views Output, Version 10**.**

The heteroskedasticity test (Table 4.10) result shows that the Breusch-Pagan-Godfrey p-values of the F-statistics (0.7802), Obs*R-squared (0.6651) and Scaled explained chi-square (0.9999) are greater than 0.05, implying that there is no heteroskedasticity or differing variance issues among the variables under consideration. In other words, the variance of residual errors is constant over the period covered; the result of our regression analysis can be reliable.

5.4.4 Normality Test (Model I: CU)

Figure 4.2: Normality Test Result



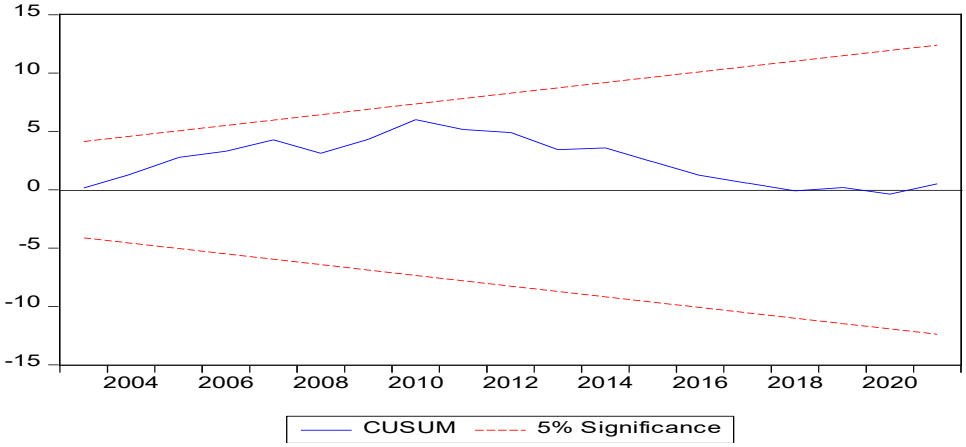
Source: E-views Output, Version 10.

The normality test for residuals shown on the histogram (Figure 4.2) shows that the coefficient of Jarque-Bera is 2.319829 and its p-value of 0.313513 is greater than 0.05, implying that the residual errors of the dependent variable in the model 1 (CU) were normally distributed. Hence, the data can be relied upon for the test of hypotheses and for prediction.

5.4.5 Stability Test: CUSUM & CUSUM of Squares (Model I: CU)

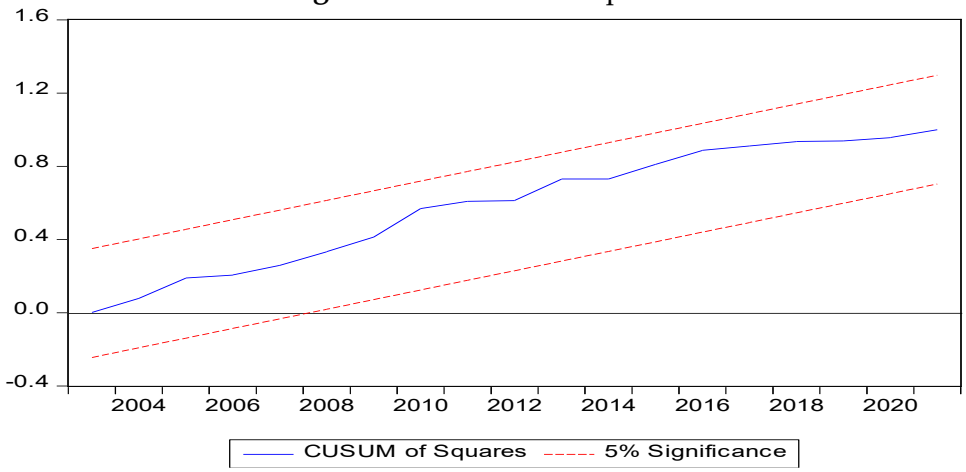
This is to test the existence of parameter instability, whether the cumulative sum and cumulative sum of squares of the residuals go outside the area between the critical (straight bounded upper and lower) lines.

Figure 4.3: CUSUM Test Result



Source: E-views Output, Version 10

Figure 4.4: CUSUM of Squares



Source: E-views Output, Version 10.

The CUSUM and CUSUM of squares statistics (Figures 4.3 & 4.4) were within the critical bound of 5%, with the interpretation that the ARDL model is stable over time and there was no occurrence of a structural break. This implies that the estimated parameters generated from the analysis were good and can be relied upon for policy making.

5.5 Post-Estimation Tests for Model II: Manufacturing Output (MQ)

5.5.1 Multicollinearity Test (Model II: MQ)

Table 4.14: Multicollinearity Result (Model II: MQ)

	Coefficient	Uncentered	Centered
Variable	**Variance**	**VIF**	**VIF**
D(LOG(MQ))	0.046030	12.96427	4.229704
D(LOG(MQ(-1)))	0.042089	12.32228	3.961108
LOG(CAPEX)	0.003796	764.9829	62.42618
LOG(CAPEX(-1))	0.002575	495.9156	46.95227
LOG(REPEX)	0.009680	2541.361	232.7112
LOG(REPEX(-1))	0.011145	2777.891	285.8290
LOG(NTAX)	0.006931	1611.228	187.7254
LOG(NTAX(-1))	0.005523	1218.186	160.4701
LOG(NTAX(-2))	0.004095	853.4625	126.7356
BDEF	8.15E-11	3.528455	2.093814
LOG(INR)	0.012013	613.0261	2.849830
LOG(INR(-1))	0.015298	777.1003	4.427547
LOG(INR(-2))	0.020261	1025.171	6.249087
LOG(INFR)	0.001585	39.98298	4.652846
LOG(INFR(-1))	0.001935	49.69752	5.826617
LOG(INFR(-2))	0.001645	41.73722	4.946802
C	0.130092	785.9944	NA

Source: E-views Output, Version 10.

The multicollinearity result of the variables under consideration and their variance inflation factors (table 4.14) show that there are no multicollinearity or correlations

among the variables, since the uncentred VIF for each of the variables is greater than the centered VIF.

5.5.2 Autocorrelation Test (Model II: MQ)

Table 4.15: Autocorrelation Test Result

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.055834	**Prob. F(2,16)**	0.9459
Obs*R-squared	0.242582	**Prob. Chi-Square(2)**	0.8858

Source: E-views Output, Version 10.

The result of the autocorrelation test of the model 11 (Table 4.15) shows that the P-values of the F-statistics (0.9459) and Obs*R-squared (0.8858) are greater than 0.05, implying that, with the Breusch-Godfrey Serial Correlation LM test, there is no serial autocorrelation in the residuals of the variables used for the ARDL model.

5.5.3 Heteroskedasticity Test (Model II: MQ)

Table 4.16: Heteroskedasticity Test Result (Model II: MQ)

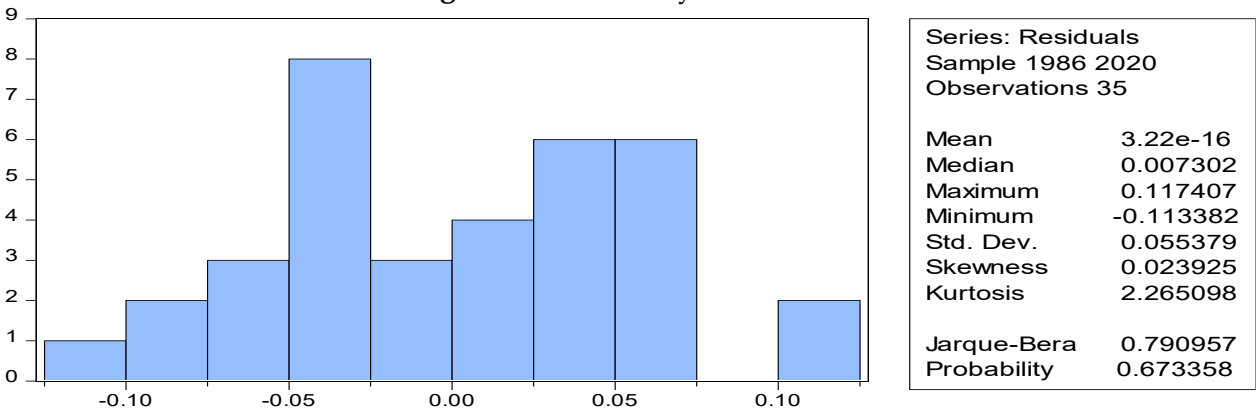
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.665592	**Prob. F(16,18)**	0.7910
Obs*R-squared	13.01006	**Prob. Chi-Square(16)**	0.6720
Scaled explained SS	2.176620	**Prob. Chi-Square(16)**	1.0000

Source: E-views Output, Version 10

The result of the heteroskedasticity test (Table 4.16) shows that the Breusch-Pagan-Godfrey with the p-values for the F-statistic (0.7910); the Obs*R-squared (0.6720) and the Scaled explained SS chi-square (1.0000) are greater than 0.05, implying that there is no issue of heteroskedasticity. In other words, the variance of residual errors is constant over the period covered; the result of our regression analysis can be reliable.

5.5.4 Normality Test (Model II: MQ)

Figure 4.6: Normality Test Result

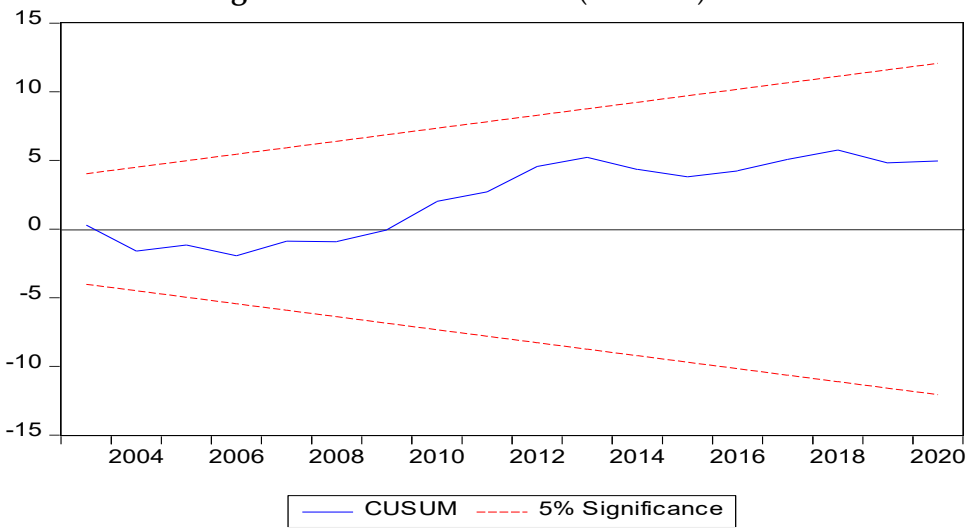


Source: E-views Output, Version 10.

The histogram in Figure 6 above is the normality test for the residuals shows that the coefficient of Jarque-Bera is 0.790957 and its p-value is 0.673358, which are all greater than 0.05, implying that the residuals of the model were normally distributed.

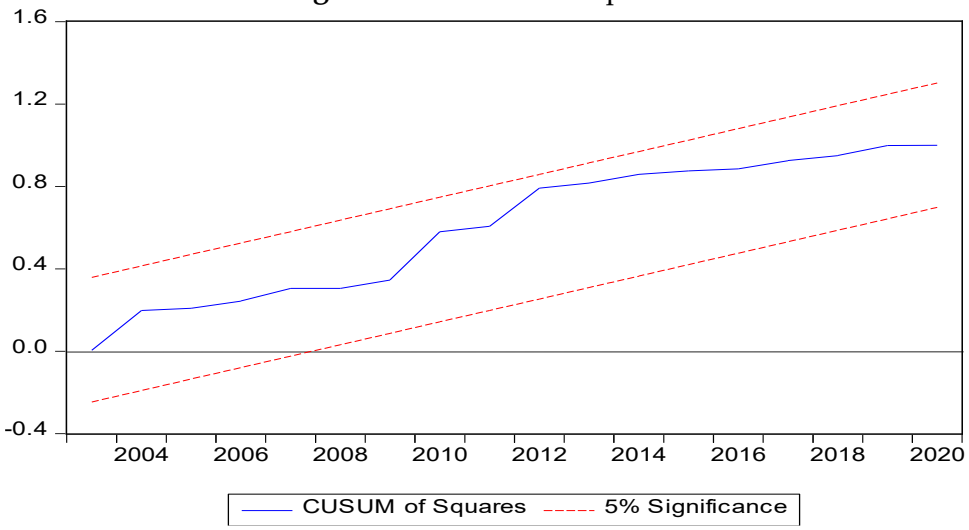
5.5.5 Stability (CUSUM) Test (Model II: MQ)

Figure 4.6: Cumulative Sum (CUSUM) Test



Source: E-views Output, Version 10 Output.

Figure 4.7: CUSUM of Squares



Source: E-views Output, Version 10.

The CUSUM and CUSUM of squares results, respectively (Figures 4.6 and 4.7) show that both the CUSUM test and the CUSUM of squares test are within the critical bound of 5%, meaning that the ARDL for Model II is stable over the time under investigation and there was no case of structural breaks during the period. Therefore, the estimated parameters satisfied the BLUE properties and can be relied upon for policy making.

5.6 Test of Hypotheses

To confirm that fiscal policy in Nigeria did not make a significant impact on the manufacturing capacity utilization rate and output, the following hypotheses were tested using the p-values generated from the long-run regression analysis of both model I and model II.

H_{01}: The null hypothesis that government capital expenditure (CAPEX) made no significant impact on the capacity utilization (CU) and the manufacturing output (MQ) was rejected, and the alternative hypothesis was accepted based on the p-values of 0.0000 and 0.0464 on CU and MQ, respectively, which were less than 0.05. This implies that CAPEX had a significant negative impact on the CU and the MQ, respectively. In other words, government capital expenditure did not have any positive impact on the manufacturing sector's output and capacity utilization rate in the long run.

H_{02}: The null hypothesis that government recurrent expenditure (REPEX) made no significant impact on the capacity utilization (CU) and the manufacturing output (MQ) was rejected, and the alternative hypothesis was accepted based on the p-values of 0.0021 and 0.0480 on CU and MQ, respectively, which were less than 0.05. This implies that REPEX had a positive significant impact on the CU and the MQ, respectively.

H_{03}: The null hypothesis that government non-oil tax (NTAX) made no significant impact on the capacity utilization (CU) and the manufacturing output (MQ) was accepted, and the alternative hypothesis rejected based on the p-values of 0.6994 and

0.2491 on CU and MQ, respectively, which were greater than 0.05. This implies that government non-oil tax (NTAX) made no positive significant impact on the CU and the MQ, respectively. Rather, increases in government non-oil tax resulted in decreases in the manufacturing output and capacity utilization rate.

H_{04}: The null hypothesis that government budget deficit (BDEF) made no significant impact on the capacity utilization (CU) and the manufacturing output (MQ) was accepted and the alternate hypothesis rejected based on the p-values of 0.1009 and 0.2561 on CU and MQ respectively, which were greater than 0.05, implying that the government budget deficit (BDEF) did not make positive impact on the CU and the MQ respectively.

6. Policy Implications, Conclusion and Recommendations

6.1 Discussion of Results

From the test of hypotheses, it was revealed that apart from the REPEX that made a positive and significant impact on both the capacity utilization rate (CU) and the manufacturing output (MQ) in both the short-run and the long-run, all other fiscal instruments, including the CAPEX and BDEF, made a negative impact on the manufacturing output and capacity utilization rate, against the a priori expectations. The NTAX made an insignificant positive impact only on the CU but a significant negative impact on the MQ in the short run. However, in the long run, the NTAX made a significant negative impact on both the CU and the MQ.

The results show clearly that the following fiscal policy instruments: CAPEX, REPEX, NTAX and BDEF made divergent impacts on the capacity utilization rate (CU) and the manufacturing output (MQ) in the short-run and the long-run – some positive, some negative and some neutral. This goes to confirm the assertion that the two key performance indicators (KPIs): the capacity utilization rate and the output are not the same, though they may be similar.

6.2 Policy Implications of Results

The negative impact of the CAPEX and the BDEF on the CU and MQ in the long run was attributable to insufficient allocation of the CAPEX and the BDEF to manufacturing infrastructure. The CAPEX and BDEF were not sufficiently and effectively allocated and applied to the development of the nation's manufacturing/productive infrastructure such as transport and logistics services; electricity and power; basic metals, iron and steel; modern technology; research, innovation and development; skill acquisition and human capital development. To compound the problem of insufficient allocation of CAPEX and BDEF to manufacturing infrastructure is the fact that the funds were misappropriated and mismanaged, resulting in white elephant projects, which quickly resulted in deteriorated, dilapidated and moribund facilities.

However, the study revealed that government recurrent expenditure (REPEX) over the period made a significant impact on Nigeria's manufacturing output and

capacity utilization rate both in the short-run and in the long-run. This could be attributed to the fact that most of the government REPEX was expended on domestic consumption, which increased aggregate demand for locally manufactured products. This was reinforced by the effective implementation of protective tariffs and the local content development policies of the federal government, to protect the manufacturing sector as well as increase the value-addition of the local manufacturers/producers.

The negative impact of NTAX on the CU and the MQ was also attributable to the fact that NTAX was focused more on revenue generation for the government than on boosting the manufacturing capacity and output. The government at various levels kept introducing new taxes as well as increasing the rates of the old ones, just to generate more revenue at the expense of the local manufacturing sector – the phenomenon known as multiplicity of taxes or multiple taxation.

6.3 Conclusion

From the results of the study, it is evident that fiscal policy has not impacted significantly on Nigeria's manufacturing sector over time due to reasons earlier highlighted. This confirms the statement of problems of the study, which states that despite the application of fiscal policy by various governments, the capacity utilization rate and output of Nigeria's manufacturing sector have not improved significantly. This could mean that fiscal policy has not been well-structured or effectively implemented, or that there are other factors that are affecting the performance of Nigeria's manufacturing sector or both. The good news is that fiscal policy can be used to resolve these challenges and eventually reposition Nigeria's manufacturing sector towards the path of growth and development.

6.4 Recommendations

To address the challenges of Nigeria's manufacturing/productive sector through fiscal policy, the following recommendations need to be considered and adopted:

6.4.1 Resetting and Aligning the Parameter Estimates in Accordance with the Theoretical Expectation

The essence of the research was to test the formulated hypotheses in line with the theoretical a priori expectations. According to fiscal policy theory, it was expected that capital expenditure (CAPEX), recurrent expenditure (REPEX) and the budget deficit (BDEF) would have a positive relationship with the manufacturing output (MQ) and capacity utilization rate (CU), while non-oil tax revenue (NTAX) would have a negative relationship with the MQ and CU. However, the results show that apart from the REPEX that conformed, other fiscal instruments did not conform. Since the parameter estimates were tested through various testing techniques and were confirmed to be the best estimators, there is a need for the Government to fine-tune its fiscal policy to align with theoretical expectations, such that the parameter estimates of CAPEX and BDEF would be made to be positive, while NTAX would be minimized further.

6.4.2 Restructuring and Reallocating Capital Expenditure (CAPEX) and Fiscal Deficit (BDEF) in Favour of Manufacturing Infrastructures

Government capital expenditure (CAPEX) and budget deficit (BDEF) should be restructured to focus more on the manufacturing/productive sector infrastructures such as developing the electricity and power sector, linking manufacturing firms with gas and diesel pipelines; building and developing effective and efficient transport, logistics and haulage system; modernizing the information and communication technology; reactivating and renovating the moribund mines, iron and steel industries (the Ajaokuta Steel, ALSCON, Oshogbo, Katsina and Jos Steel Rolling Mills; and the oil and gas refineries including the Port-Harcourt, Warri and Kaduna Refineries). These are basic infrastructures that are necessary for the development and repositioning of Nigeria's manufacturing sector.

6.4.3 Re-enforcing Domestic Consumption with the Local Content Development Policy

Government should further deepen the local content development policy and program, to improve on the value addition of the local manufacturing industry through utilization of local inputs and consumption of locally manufactured products. Government must be committed to the demand for locally made goods and services in the recurrent expenditures, to increase aggregate demand (AD) of the economy, which would subsequently increase employment, productivity and competitiveness of the local manufacturers and entrepreneurs, thereby increasing manufacturing output and capacity utilization rate. Generally, government recurrent expenditure, if properly structured and implemented, would boost the local content development program and the productive sector of the economy, particularly the manufacturing sector.

6.4.4 Restructuring Non-oil Tax in line with the Keynesian-Structuralist Integrated Framework

The Keynesian framework recognizes tax as a leakage and a deterrent to domestic AD and consumption, while the Structuralist framework recognizes tax as a deterrent to AS. Hence, any tax system that emphasizes generation of government revenue over manufacturing/production and consumption is detrimental to the economy, and particularly the manufacturing/productive sector. Multiplicity of taxes/tariffs as well as increases in tax rates have seriously stunted the growth of Nigeria's manufacturing sector and the small and medium enterprises, with the resultant decline in manufacturing output, capacity utilization rate, employment and income.

There is therefore an urgent need to restructure and reform the Nigerian tax system to minimize the incidence of multiple taxation and multiplicity of taxes, which have hindered the performance and growth of Nigeria's manufacturing sector over the years. This can be achieved by granting concessionary taxes and tariffs on manufacturing inputs and technologies, as well as protective tariffs on imported semi-finished products, particularly competitive imported finished products. Similarly, investment taxes and allowances, as well as accelerated depreciation, should be granted to investors to enable

them to invest more in the manufacturing sector. This can also be achieved by offering investors and manufacturers/producers various forms of tax incentives and reliefs, rebates and allowances, to attract and encourage investment into the country. This will further boost and enhance the local manufacturing productivity, performance and competitiveness as well as attract/encourage foreign investors and multinational corporations (MNCs) to come and invest in the country's manufacturing sector.

6.4.5 Embracing Private Financing Options rather than Deficit Financing

Rather than carrying huge budget deficits, the government can utilize the strategies of Private Financing Initiatives (PFIs) or Public-Private-Partnership (PPP), which require engaging private investors to fund and manage developmental projects. Under this arrangement, the government does not have to lay out a large sum of money at once to fund major projects; rather, it will have to collaborate with private investors, whether local or foreign, for project funding. The private investors would be engaged in specific development projects that would promote development of the manufacturing/productive sector. The PFIs/PPP contracts typically run for about 25 to 30 years (the length of the contract depends on the nature of the projects); to be able to recoup the costs of the projects through long-term refunding plans from either the government or from the revenue generated from the projects.

However, if it becomes very necessary to borrow to finance budget deficit, it must be to bridge infrastructural gap in the Nigeria's manufacturing sector and those that make high impact on the manufacturing/productive sector such as transport, logistics and haulage, information and telecommunication projects, power and energy projects, water supply projects, human capital development projects, research and development (R&D), technology and innovation (T&I) and the local content development projects.

6.4.6 Aligning Fiscal and Monetary Policy Objectives

The Central Bank of Nigeria (CBN) needs to be deliberate in stabilizing the monetary policy stances/instruments such as the interest rate, foreign exchange rate and inflationary rate. CBN should come up with special windows on interest rates for the manufacturers/producers, such that interest rates would be maintained at a single digit. This will go a long way in attracting investment, including foreign direct investment (FDI), as well as motivating the local investors. This would further enhance the capacity utilization rate and output of the manufacturing sector, which would eventually increase employment, income, aggregate demand and consumption. Similarly, CBN needs to create a special foreign exchange window for the manufacturing sector, to enable manufacturers to import their inputs at concessionary foreign exchange rates. These special monetary policy windows would boost Nigeria's manufacturing capacity utilization rate and output expansion.

6.4.7 Combining the Demand-Side and the Supply-Side Fiscal Policies

There is a need to blend the Keynesian demand-side fiscal policy and the Structuralists supply-side fiscal policy to determine the best combination that will boost Nigeria's manufacturing output and capacity utilization. The supply-side fiscal policies are of various types such as, tax reduction to provide incentives to take investment risks and to work; reduction in government regulations, to encourage business formation and expansion; investment in human capital development like industrial training, skill acquisition, vocational education training and industrial health education; investments in research and development (R&D) and raw materials research and development; and investment in new manufacturing infrastructure to further improve productivity. The major benefit of the supply-side fiscal policy is the shift of the aggregate supply (AS) curve outward, which implies that prices would be lowered alongside the expanding manufacturing output. This is in contrast to the demand-side fiscal policy, which tends to shift the aggregate demand (AD) curve upward with the resultant increase in the general price levels/demand-pull inflation.

6.4.8 Effective Institutional Coordination

A major drawback in policy formulation and implementation in Nigeria is the ineffective coordination and cooperation among the policymaking institutions, which underlies policy conflict, inconsistency and somersault. Persistent conflicts have characterized fiscal and monetary policies over time, such that while the Federal Ministry of Finance (FMOF) would list some items as fiscal reliefs for boosting the performance and growth of the manufacturing sector, the Central Bank of Nigeria (CBN) on the hand, would list the same items (regarded as critical inputs and output of the sector) as not qualified for foreign exchange rebate (Aregbeyen, 2018). In other words, while the FMOF would be pursuing an expansionary fiscal policy, the CBN would be pursuing a tight/restrictive monetary policy.

Some policies are not effectively implemented in accordance with the intent and objectives of these policies due to conflict of interest. The bureaucrats attribute the failures of industrial and fiscal policies to the absence of political will by the leadership to implement these policies (due to conflicting political interests). According to the bureaucrats, "*there are good policies on the ground but no political will to achieve intended national development objectives*". The organized private sector (OPS) believes that some industrial policies formulated over time have good intentions, but they only exist on paper and are always reversed by powerful and influential state actors. This is rooted in the conflicting and self-serving interests of the implementers, as they manipulate the instruments of fiscal policy to their advantage. It is therefore instructive to note that the problem is not much of policy formulation but that of effective implementation.

Other areas of policy failures as it relates to industrial policy are that macroeconomic policy is not holistically considered, not critically examining the entire value chain of the policy, lack of continuity in policy direction, improper connection of

industrial/manufacturing policy, and poor coordination of various macroeconomic and sectoral policies among government agencies.

Owing to these factors, policy inconsistencies and instability have become the order of the day as policies are easily jettisoned without critically looking at the underlying rationale and the overriding national interest. The consequences are that despite the huge increases in capital expenditure, recurrent expenditure, non-oil tax revenue and fiscal/budget deficits, Nigeria's manufacturing sector continues to decline as evidenced in the declining manufacturing output and capacity utilization over the years.

In view of these institutional challenges, the study recommends that there is a need to demonstrate necessary political will and commitment to good governance (responsible, responsive, transparent, participatory and accountable), towards providing a structured regime of incentives for the manufacturing sector based on a sector-specifics and allow each sector to run its course under an institutionalized arrangement, as well as maximizing the welfare of the citizenry as a matter of high priority.

The implementing agencies like the customs and excise should ensure effective combating of smuggling, counterfeiting, faking of made-in-Nigeria products, as well as dumping of foreign products and other trade malpractices; promote the patronage on made-in-Nigeria goods by giving locally produced goods preference and entrenching it in the local content development policy and the national procurement process; ensure effective implementation of the ease of doing business in Nigeria; ensure effective coordination and alignment of industrial policy and other macroeconomic policies at both the national and the sub-national levels; and finally, deepen the relationship between government and the organized private sectors (OPS) particularly in the formulation and implementation of macroeconomic policies.

6.6 Suggestions for Further Research

In view of the strategic role played by fiscal policy in the economy, particularly, towards the growth and development of the manufacturing sector in the developed and developing economies, there is a need to conduct further studies on the formulation, implementation and administration of fiscal policy in Nigeria, particularly, as it affects the manufacturing sector and other productive sectors including the agricultural sector. The study therefore suggests that further research be conducted on the impact of various fiscal instruments on a sector-by-sector basis, as well as the subsectors of the economy. This would enable the policymakers to know which fiscal policy instrument(s) would make the most impact on the economy and the sectors therein ceteris paribus and apply it accordingly to achieve the desired objectives and results.

Conflict of Interest Statement

The Authors hereby declare that there are no conflicts of interest among them; that they all approved that the Research Paper written by Dr. Paschal Ogechi Njoku-Harry under the supervision of Professors Sarah O. Anyanwu and S. O. J. Obansa, be published by the European Journal of Economics and Financial Research.

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