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Interest Rate Spread, Exchange Rate and Manufacturing Output in Nigeria

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Abstract
This study examines the impact of interest rate spread and exchange rate volatility on manufacturing output in Nigeria between the periods of 1981-2020. Secondary data were collected from the CBN statistical bulletin, 2020 and World Bank. In the regression model estimated, the dependent variable was manufacturing output (MQ) while the explanatory variables used include exchange rate (EXCHT), interest rate spread (IRS), inflation (INF), foreign direct investment (FDI), credit to private sector (CPS) and government capital expenditure (GCAP). In order to reduce the problem of stationarity and structural breaks associated with the time series data, the model was logged. The work adopted the Ordinary Least Squares (OLS) method of estimation and employed Newey-West-HAC to correct heteroskedasticity and autocorrelation problems intrinsically. Unit root test was carried out to check if the variables were stationary and the ADF test showed that there exists a cointegrating or long run relationship between the dependent and explanatory variables. Ramsey RESET tests was also carried out. The result revealed that, despite being significant, a negative relationship exists between foreign direct investment and manufacturing output. Consequently, the work recommends that government should adopt policies that prevents crowding out effect in the economy as well as encourage the consumption of locally made products. Also, the government must embark on a massive overhaul of our morbid physical infrastructure (power, road, rail and ports) if we are to achieve a sustainable economy and a virile manufacturing sector. The findings also show that government capital expenditure is significant but negatively related to capital formation. In view of this, the study recommends that government should adopt effective measures, policies and programs that foster accountability and transparency in the method of spending public funds in Nigeria.

Background to the Study

It is without doubt that the manufacturing sector of any economy worldwide is very key and recognized to be an engine of growth and a catalyst for positive transformation and sustainable national development. This is so due to its enormous potentials as a tool for wealth generation, employment creation and ultimately, contribution to the country's Gross Domestic Product (GDP) including ameliorating hardship and alleviating poverty among the populace of a particular country. The overall performance of the manufacturing sector since independence has not been very impressive as the scenario has been a mixture of initial mild growth and subsequent decline and retrogression. At independence, the colonial masters handed over to us a manufacturing sector that is wobbly and weak both in structure and content. The Nigerian industrial sector was predominantly dominated by large European companies like UAC, CFAO and John Holt. These companies were basically engaged in trade and commerce and in the trading of manufactured goods imported from their home countries. "Our economy was structured and organized mainly as a source

of raw materials and market for industrial products of the mother country. Manufacturing was discouraged with anti-industrialization legislations and policies made as though to ensure that there is no significant industrial development" (Anowor & Okorie, 2016; Egwaihude et al, 2001). There was no deliberate effort to reinvest financial resources generated within the country for the purpose of development nor was there any concrete attempt made to encourage indigenous entrepreneurship.

Prior to the oil boom of the 1970s, the manufacturing sector contributed approximately 10% to the total economic output of Nigeria. But thereafter, increased revenue from oil caused the sector's relative contribution to the GDP to reduce drastically, growth persisted though, at a slower rate (Anowor et al, 2013). The recession caused by the fall in oil prices in the early 1980s triggered policy attention back to the manufacturing sector, with the steel production gaining a remarkable focus. Before this period, the Nigerian Enterprises Promotion Decrees of 1972 and 1977 had changed majority firms' ownership from foreign to Nigerian, restricting capital inflows. The high prices of imported products coupled with the lack of foreign capital and technology stimulated domestic production of some essential commodities like soap and salt. In the year 1987, the bans on import of raw materials were imposed under the World Bank Structural Adjustment Programmes (SAPS) leading to import substitution. Intermediary input manufacturers were able to produce competitively once again and there were fewer factory and plant closures. This, alongside the Privatisation and Commercialization Act of the year 1988 encouraged an achievement of a higher degree of efficiency.

However, many factors have been noted as being responsible for the decline in manufacturing output in Nigeria. Some of these factors include: insufficient finance, poor maximization of productions, lack of skilled employees, high exchange rate, high government bureaucracy, infrastructural challenges, poor perception of local goods, poor distribution channels, over dependence on foreign machines, high interest rate (Anowor, Ukwueni & Ezekwem, 2013). Over the years, interest rates have remained a subject for critical assessment with diverse implications for savings mobilization and investment promotion. Generally, interest rates are the rental payments for the use of credit by borrowers and return for parting with liquidity by lenders (CBN, 1997). In the Nigerian economy, the minimum rediscount rate (MRR) now monetary policy rate (MPR) is the official interest rate of the Central Bank of Nigeria (CBN), which anchors all other interest rates in the money market and the economy (Ogunbiyi and Ihejirika, 2014).

Prior to financial sector deregulation in Nigeria under the Structural Adjustment Programme (SAP) adopted in 1986, the monetary policy of the government was development-oriented as banks were required to lend at concessionary rates to priority sectors like agriculture and manufacturing (Onodugo et al, 2014). The policy thrust of the government was to promote real sector development by offering low rates of interest on loans to the sectors (Nwonye et al, 2020). Interest rate regulation during the period ensured that the spread between deposit and lending rates was maintained within the specified limits. Interest rates were largely managed or fixed below the rate of inflation in the economy.

However, the policy regime which fixed interest rates below inflation rate (interest rate repression) failed to deliver on government's economic objective of real sector growth. With the introduction of SAP in 1986, the mechanism for interest rate management was liberalized thereby setting the stage for a transition from fixed to market-determined interest rate regime. Under SAP, the banking sub-sector witnessed wider spreads between deposit rates and lending rates. Interest rates became positive in real terms, as they rose above inflation rates for most part of the period. Towards an effective management of interest rate in Nigeria, the monetary authorities have adopted two major policies on interest rate. First, in the post-independence period, the policy thrust was to keep interest rates as low as possible, often below the rate of inflation (interest rate repression), to enable the government and private sector operators borrow cheaply to fast-track the process of economic growth and development. Basic features of the regime (which lasted until the mid-1980s) include the use of administrative controls such as the introduction of ceilings on interest rates and prioritization of certain sectors of the economy so as to control the volume and direction of credit flow in the economy. Owing to the rising trend in interest rate (particularly lending or loan rate) since the introduction of SAP, real sector operators like manufacturers have continued to cry aloud over the negative impact of lending rate on their operations.

In a regulated economy, interest rate is always benchmarked by the government to foster economic prosperity through fiscal and monetary policy measures. Monetary regulators often pursue policies that ensure that economic productions are financed by the banks to grow the economy, create jobs, increase income and GDP (Ettah, 2004). The manufacturing sector acts as a catalyst that expedite the pace of structural transformation and diversification of the economy, thus allowing a country to make use of its factor endowments and to rely less on the import of finished goods or raw materials (Akinyomi, 2014). This sector also creates investment capital at a faster rate than any other sector of the economy while promoting wider and effective linkages among different sector (Toby and Peterside, 2014).

Notwithstanding the essential roles played by the manufacturing sector in development and growth process, scholars have recognized that the sector is bedeviled by many problems. Some of the problems confronting the sector are: negligence and maladministration on the part of successive military and civilian government, corruptions, indiscriminate policy reversals, inadequate funding, high cost of borrowing from financial institutions, poor management, lack of basic infrastructure and unguided competition from foreign manufacturing firms (Okafor, 2012). To tackle these problems, the Federal Republic of Nigeria has prioritized the manufacturing sector by directing commercial banks, thorough the Central Bank of Nigeria (CBN), to devote a certain percentage of their loanable fund to the sector at a much lower rate since industrialization has been recognized as the propelling force acting as the pivot for the production of commodities and services, employment generation and sustainable national income both in

developing and developed economies, thus, borrowing for investment purposes are highly discouraged when lending rate is high and vice versa.

The history of exchange rate systems in Nigeria date back to early 1960s (Bakare, 2011), according to Bakare (2011), before the establishment of the Central Bank of Nigeria in 1958 and the enactment of the Exchange Control Act of 1962, foreign exchange was earned by the private sector and held in balances abroad by commercial banks that acted as agents for local exporters. The oil boom experienced in the 1970s made it necessary to manage foreign exchange rate in order to avoid shortage. However, shortages in the late 1970s and the early 1980s compelled the government to introduce some ad hoc measures to control excessive demand for foreign exchange. However, it was not until 1982 that comprehensive exchange controls were applied. Then a fixed exchange rate system was in practice. The increasing demand for foreign exchange and the inability of the exchange control system to evolve an appropriate mechanism for foreign exchange allocation in consonance with the goal of internal balance made it to be discarded in September 26, 1986 while a new mechanism was evolved under the Structural Adjustment Programmes (SAP). The main objectives of exchange rate policy under the Structural Adjustment Programmes were to preserve the value of the domestic currency, maintain a favourable external balance and the overall goal of macroeconomic stability and to determine a realistic exchange rate for the Naira (Bakare, 2011).

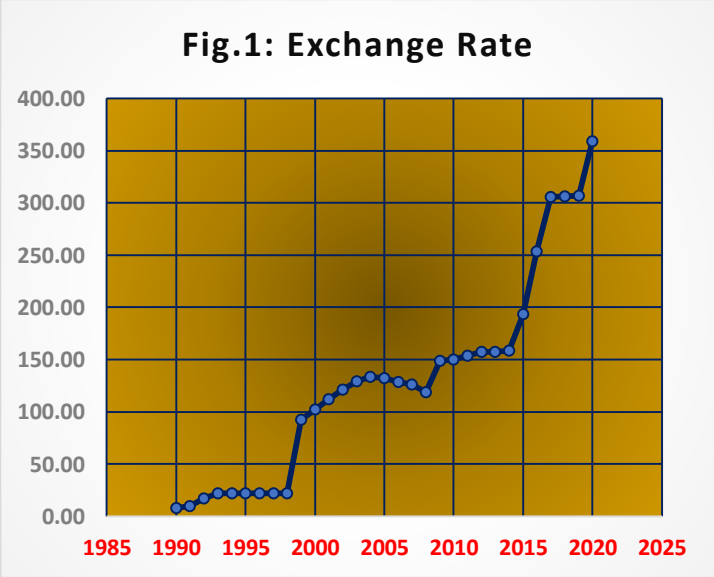
Statement of the Problem

At independence in 1960, an unprecedented euphoria of excitement and greater desire for industrialization become prevalent. The first National Development Plan (1962-1968) was aimed at kick-starting massive industrialization throughout the country. To this end, well-articulated development projects and policies were designed to trigger off the establishment and growth of a potent and virile manufacturing sector. For instance, the building of an Iron and Steel project believed to be vital for a virile industrial growth was set in motion in 1963. The establishment of the Nigerian industrial Bank; a developmental credit institution in partnership with International Finance Corporation took effect in 1963. Government also initiated the building of the petroleum refinery at Alese-Eleme in Port Harcourt to supply all the refined petroleum needs of the country.

Aside the above, local and foreign investors were attracted with incentives such as pioneer certificates which would allow investors to enjoy numerous tax reliefs, custom duty relief on imported industrial machineries, spare parts and components brought into the country. Local investors were also given protection via expatriate quota restrictions and excise duty reliefs. With the support and encouragement provided by the government and the aforementioned inducements to foreign and local investors, many industries began to emerge in different parts of the country. In a bold attempt made by the government to boost electricity in the industrial sector and other sectors of the economy, a contract for the construction of the Kanji Dam was awarded in 1944. The country seemed

prepared for a massive industrialization and increased output. As a follow up, other robust policies and programmes were designed and unveiled by the government to increase productivity and manufacturing output some of which are: Structural Adjustment Programme (SAP), import substitution, second national development plan, The Indigenization Policy (1972), etc. However, towards the end of 1980s till date, many problems were discovered that were responsible for the slow growth and development in the manufacturing sector as well as its output. Some of these problems were: heavy dependency on income from oil, weak infrastructure, shortage of skilled labour, lack of sufficient financial resources, lack of proper management and planning, high interest rate, exchange rate volatility and so on.

Since the collapse of the Bretton Woods system (and the adoption of the floating exchange rate regime) in 1973, the exchange rates have been highly volatile in both developed and developing countries. In Nigeria, exchange rate management has undergone significant changes over the past five decades. During the 1960s, Nigeria operated a fixed dollar in addition to restrictions on imports through strict administrative controls on foreign exchange. In 1978, the Nigerian monetary authorities pegged the naira to a basket of 12 currencies of her exchange rate regime fixed at par with the British pound and later the American major trading partners. The sudden fall in international oil price and consequent decline in foreign exchange receipts in the early 1980s were such that the economy could not meet up with its international financial commitments, and to mitigate the challenges, the stabilization act of 1982 was implemented resulting to a rapid fall in the value of the naira. This depreciation affected manufacturing output adversely as imports of factory machines became very expensive. On the other hand, the fall in exchange also led to the decline of capital formation since the pace investment in key sectors was retarded owing to the high cost of factor inputs. The failure of the Stabilization Act to tackle the economic problems (unpaid trade bills and accumulation of payment arrears consequent on the sharp fall in oil price) led to the adoption of the Structural Adjustment Programme (SAP) in 1986 targeted amongst others at the realization of a viable and realistic exchange rate, through a flexible arrangement.



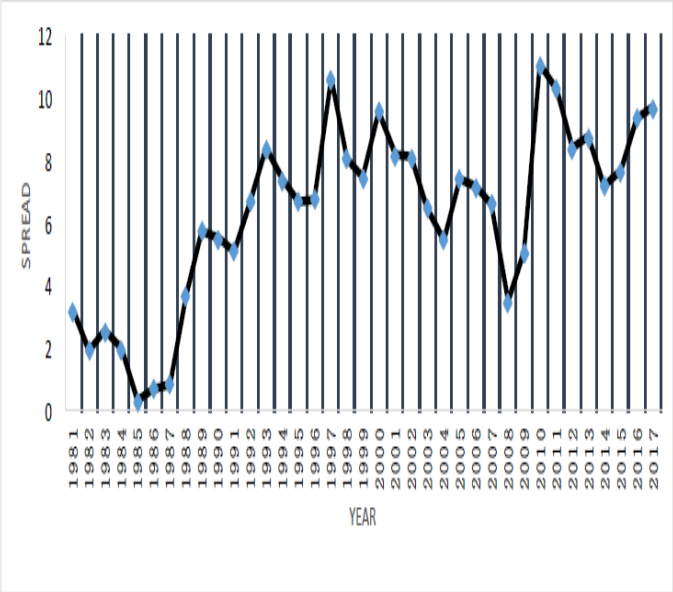
Source: Authors' construct using CBN dataset.

It can be noted that just as previously highlighted, volatility increased in Nigeria

exchange rate especially in the wake of the IMF liberalization. Also, the exchange rate was pegged at 8.04 in 1990 and maintained a slow upward trend over the years. It however rose to 22.05, hitting a double-digit by 1993. From 1995, the exchange rate became pegged at 21.89 and remained the same till 1998. The years between 2000 and 2007 represented the period of relative stability in Nigeria. Volatility increased again in 2009 but this was short term. The relative stability was restored in 2011 and 2012 with Sanusi Lamido Sanusi exchange rate management policy which succeeded in keeping the exchange rate within a reasonable band. However, by the year 2015, the exchange has skyrocketed to 193.28 and has maintained a steady upward movement thus far, so that in the year 2020, the exchange rate reached a peak 358.81 (naira/dollar).

Prequel to 1990, the interest rate spreads was low in 1986 but increased in 1987 following governments' liberalization of the entering requirements into the banking business and the total removal of interest rate control. It significantly rose to 5.77 in 1989. This was the period when banks were permitted to pay interest on demand deposits. It however a bit dropped to 5.52 in 1990 when embargo was placed on bank licensing. The Central Bank was to regulate and supervise all financial institutions and interest rate re-administered. Interest rate spreads maintained a wave-like pattern going forward and became double-digit from 2010 and 2011 standing at 11.06 and 10.02 respectively. Over the study period (especially in recent years), interest rate spread has on the average, maintained an upward movement.

Fig. 2: Interest Rate Spread



Source: Authors' construct

Having gained a considerable understanding of the circumstances surrounding the manufacturing sector in Nigeria, alongside the myriad of challenges bedeviling the sector in Nigeria over the years, this study therefore, tries to determine how the variations in selected macroeconomic variables (interest rate spread and exchange rate) would bring about either a positive or negative (expansion or contraction) impact on the output of the manufacturing sector in Nigeria. Will Nigeria experience an expansion in output if appropriate macroeconomic policy instruments are adopted and properly managed?
This study seeks answer by asking the following research questions:

1. What is the impact of interest rate spread and exchange rate on manufacturing output in Nigeria?
2. What effects does the control variables have on manufacturing output?

Literature Review

Interest Rate and Interest Rate Spread

Interest rate is the price paid for the use of money. It is the opportunity cost of borrowing money from a lender. Interest rate is the reward that accrues to people who provide the fund with which capital goods are bought (Soyibo and Adekanye, 1992). In financial services, "the spread" is the difference between the income from loans and investments the bank or credit union earns and the interest or dividends they pay to their depositors or creditors.

Exchange Rate

Exchange rate refers to the currency rate of one country in terms of currency of another country (Bagh, 2017). It is also regarded as the value of one country's currency in relation to another currency. Thus, an exchange rate has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. Exchange rates are quoted in values against the US dollar. However, exchange rates can also be quoted against another nation's currency, which is known as a cross country, or cross rate.

Manufacturing

Manufacturing is the production of merchandise for use or sale using labour or machines, tools, chemical and biological processing, or formulation. The term may refer to the range of human activity, from handicraft to high tech, but most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale. The manufacturing process, on the other hand, is the steps through which raw materials are transformed into final products. The manufacturing process, therefore, begins with the product design and materials specification from which the product is made. The materials are then modified though manufacturing processes to become the required part (Dabwor, 2015).

Theoretical Literature

Keynes Liquidity Preference Theory of Interest

In his classic work, "The General Theory of Employment, Interest and Money (1936)," Keynes offered his view of how the interest rate is determined in the short run. That is known as the theory of liquidity preference because it posits that the interest rate adjusts to balance the supply and demand for the economy's most liquid asset-money. The theory of liquidity preference posits that the interest rate is one determinant of how much money people choose to hold. The reason is that the interest rates the opportunity cost of holding money: it is what you forgo by holding money in liquid or cash, which does not bear interest rate. When the interest rate rises, people want to hold less of their wealth in the form of money/liquid/cash.

Hicks IS-LM Curve or Modern Theory of Interest

Hick's IS-LM model is also known as neo-Keynesian model. Now, it is widely believed that it is both real or goods market forces and money market forces that determine the rate of interest and real income. The commonly

accepted model for joint determination of rate of interest and the real income is Hick's IS-LM model. The key feature of Hick's (or Keynesian) model is the joint determination of rate of interest and the real income. It also shows the interaction of the goods market and the money market.

Hick's and Learner have synthesized the theory of both classicalists' saving-investment theory, and Keynes' liquidity preference theory into a new theory, which is known as Hicks' IS-LM model. This theory is known as the determinate theory of interest rate (since classical theory of interest; loanable funds theory of interest, and Keynes liquidity preference theory is indeterminate theory of interest because these failed to relate rate of interest with the income). This theory has taken out four important elements viz; (i) saving, and (ii) investment from classical theory of interest, and (iii) liquidity preference or demand for money/cash, and (iv) supply of money from Keynes liquidity theory to determine rate of interest and real income jointly in both commodity market and money market with the help of IS and LM curve. IS curve has been derived from the combination of savings and investment in commodity market.

Law of One Price

The Power Parity (PPP) model or else the "Law of one price" estimates the adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each country's purchasing power. Its assumptions are: that if there are no barriers to free trade, the price of the same commodity must be the same everywhere in the world. Based on that assumption, the exchange rate between two economies must fluctuate towards a long-term value that ensures the equilibrium of commodity pricing.

Law of Variable Proportion

If more and more of a variable factor of production is used in combination with a fixed factor of production, marginal product, then average product will eventually decline. The law of diminishing returns determines the behavior of output in the short run. Think of a pizzeria, with tables, chairs and ovens (fixed factor of production). With no workers, the output is zero, with one worker the output is 'x' units. The worker takes orders, make pizzas, cleans tables and serves the bill. If there are two workers, the second worker can do the same work as the first, and the output will be 2x units. They can specialize and further increase output.

Empirical Literature

Simbo, Banjoko, and Bagshaw (2020) examined the performance of the Nigerian manufacturing sector since independence in 1960. The main finding is that despite many policies and developmental initiatives undertaken by successive civilian and military administration since independence, the Nigerian manufacturing sector has grossly underperformed in relation to its potentials. The paper concludes by making recommendations for achieving a verile manufacturing sector.

Jonathan, Emily and Gyang (2016), carried out a study to undertake the empirical analysis of the link between exchange rate

fluctuations and private domestic investment in Nigeria. Thus, simple averages of descriptive statistics, and error correction model (ECM) technique within the Ordinary Least Square estimation were employed to analyze the various trends in data. The findings suggested that, the depreciation of the currency and interest rate does not stimulate private domestic investment activities in Nigeria. On the other hand, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria.

Odior (2020) carried out a study on Macroeconomic variables and the productivity of the manufacturing sector in Nigeria. A static analysis approach, by choosing the time span 1975 to 2011. Before the actual estimation was carried out, the stationarity properties of the variables were explored by using the Augmented Dickey Fuller Test. The error correction mechanism model was also estimated. Manufacturing sector credit and foreign direct investment based on the result have

Ogar et al. (2021) investigated the relationship between bank credit and manufacturing sector performance in Nigeria for the period of 1992-2011. The study employed the Ordinary Least Squares multiple regression techniques and discovered that commercial bank credit had a significant relationship with the manufacturing sector in Nigeria.

In a study conducted by Dabwor and Umejiaku (2021) on the effectiveness of monetary policy transmission routs on manufacturing output in Nigeria, using Error Correction analysis, their findings revealed that the credit channel was not significant in influencing output growth in the manufacturing sector. On the other hand, the exchange rate and the interest rate channels were found to have significantly impacted on Nigeria's manufacturing output.

Methodology and Model Specification

One of the assumptions of the Classical Linear Regression Model (CLRM) is that the model used in analysis should be well specified. Failure to correctly specify the model results in the problem of model specification error or model specification bias. The model is specified with respect to the given study, as well as the available information relevant to the study. The models to be specified in this study are multiple regression model in the sense that they have more than one independent variables.

Model 1: Functional form of the model specification

Modelling the impact of interest rate spread and exchange rate volatility on manufacturing output in Nigeria:

MQ = F (IRS, EXCHT, GCAP, FDI, CPS, INF)

_____ (1)

Model 1: Mathematical form of the specification is given as:

MQ = β0+ β1IRS+β2EXCHT+ β3LOGCAP+β4LOGFDI+ β5LOGCPS +β6INF _____ (2)

Model 1: Econometric form of the model specification

MQ = β0 + β1IRS+β2EXCHT+ β3LOGGCAP+β4LOGFDI+ β5LOGCPS+ β6INF+ *Ut* __ (3)

Where, β0, β1, β2, β3, β4, β5, β6 are parameters.

Where,

MQ` = Manufacturing Output

IRS = Interest Rate Spread

EXCHT = Exchange Rate (Here, we proxy exchange rate volatility by exchange movements)

GCAP= Government Capital Expenditure

FDI = Foreign Direct Investment

CPS = Credit to Private Sector

INF= Inflation

B0 = the intercept term of the regression

Ut = the stochastic Error term

It is noteworthy, that the term "t" is used because we are dealing with time series data.

Empirical Results and Discussion

Table 4.1: Result for Stationary Test

Variables	**ADF Test Statistic @ Levels**	**Mackinnon Critical Value at 5%**	**ADF Test Statistics @ 1st Difference**	**Mackinnon Critical Value at 5%**	**Order of Integration**
MQ	6.662031	-3.557759	-	-	I(0)
IRS	-2.822873	-3.540 38	-6.206493	-3.548490	I(1)
EXCHT	-1.19895 1	-3.544284	-3.836438	-3.544284	I(1)
CPS	0.33 4527	-3.540328	-6.318434	-3.544284	I(1)
GCAP	-3.18 1466	-3.540328	-7.525628	-3.544284	I(1)
FDI	-3.29 6597	-3.557759	-7.305717	-3.544284	I(1)

INF	-3.893258 1	-3.544284	-	-	I(0)

Source: Authors' construct (2022)

The result of the stationary test employing the Augmented Dickey-Fuller Test technique shows that manufacturing output and rate of inflation were stationary at levels. This means that they are integrated of order zero [I(0)]. On another hand, interest rate spread, exchange rate, credit to private sector, government capital expenditure, and foreign direct investment were stationary at first difference which indicate that they are integrated of order one, that is I(1). These eventually suggests cointegration and a dynamic relationship amongst the variables.

Table 4.2: Result for Cointegration Test

Value of residual term rule	**ADF test statistic**	**Critical value**
	-4.738288	1% = -4.273277
		5% = -3.557759
		10% = -3.212361

Source: Authors' construct (2022)

From the result above, we can observe that the error term is stationary at 1%, 5% and 10% level of significance in absolute term that is /-4.738288/ > /-4.273277/, /-3.557759/ and /-3.212361/. Since the ADF Test statistic is greater than the ADF critical value in absolute term, we reject H0 and conclude that there is a long run relationship between the variables.

Table 4.3: Regression Result

Variable	**Coefficient**	**Std. Error**	**T-statistics**	**Prob. value**
EXCHT	0.001156	0.001037	1.115103	0.2737
IRS	0.034611	0.016864	2.052393	0.0489
LOGFDI	-0.137997	0.067588	-2.041756	0.0501
LOGCPS	0.584205	0.066024	8.848346	0.0000
INF	0.004505	0.001870	2.409737	0.0223
LOGGCAP	0.210022	0.060186	3.489534	0.0015
CONSTANT	4.220635	1.239568	3.404925	0.0019
R-squared = 0.994128 Adjusted R-squared = 0.992953		F-statistic = 846.4351 Durbin-Watson Statistic = 1.293041		

Source: Authors' construct (2022)

Constant (C): The constant coefficient as (4.220635). This implies that when all the explanatory variables are held constant, manufacturing output is increased by 4.22%.

Exchange Rate (EXCHT): The coefficient of exchange rate is 0.001156. This shows a positive relationship between exchange rate and manufacturing output (MQ). Thus, holding other variables constant, a unit increase in exchange rate will, on the average, increase Nigerian manufacturing output by 0.0012%. This implies that a one naira increase in the exchange rate will boost manufacturing output by 0.0012%. This conforms to a priori expectation that exchange could have either a positive or negative relationship with manufacturing output. This also conforms to the work of Jongbo (2014) in Nigeria that exchange rate is has a positive relationship with manufacturing output despite being insignificant. Lower exchange rate discourages import of factor inputs used in the manufacturing sector hence affecting its output negatively. On the other hand, investors tend to gain confidence in the country's currency seeing that the currency competes favourably in the international market. In any case, exchange rate is exogenously determined.

Interest Rate Spread (IRS): The coefficient of interest rate spread is 0.034611. This result reveals that there exists a positive relationship between interest rate spread and manufacturing output (MQ). Thus, holding other variables constant, a unit increase in interest rate spread will, on the average, increase manufacturing output by 0.035%. This conforms to a priori expectation that interest rate spread would have either a positive or negative relationship with manufacturing output. Low interest rate spread encourages saving. This makes funds available for investment purposes. When investments are undertaken in the manufacturing sector, the output of the sector is boosted. This goes against the findings of the study done by Obidike and Ugwuegbe (2015) in Nigeria that interest rate spread is significantly and negatively related to manufacturing output.

Foreign Direct Investment (LOGFDI): Foreign Direct Investment, from the table above, is seen to have a negative relationship with manufacturing output. With a coefficient of -0.137997, a percentage increase in FDI will, on the average, decrease manufacturing output by 0.14%, holding other variables constant. This result did not conform to the work of Odior (2013) in Nigeria, which revealed that FDI is significant and positively related to manufacturing output. This fails to conform to a priori expectation. It is anticipated that foreign direct investment will increase manufacturing output foreign investors who are financially buoyant channel funds into production activities which requires large capital outlays such as oil and gas, textile, aviation, breweries shipping and logistics, real estate etc. when they undertake this kind of investments, there is an expansion in the output of the manufacturing sectors (Anowor

& Nwanji, 2018) However, it is noteworthy that crowding out effect – where increased foreign firms' involvement in a particular sector of the economy substantially affects the local firms negatively on either the demand or supply side. Hence, the existence of a negative relationship between Foreign Direct Investment and manufacturing output in Nigeria.

Credit to Private Sector (LOGCPS): The variable has a positive sign, indicating a positive or direct relationship between credit to private sector and manufacturing output. With a coefficient of 0.584205, a percentage increase in CPS, holding other variables constant, will on the average, increase manufacturing output by 0.58%. This is in line with the a priori expectation. It is expected that when funds are made available to the private sector in form of credits, the funds will be channeled into productive activities which will boost manufacturing output. It is also in tandem with the findings of Odior (2013) in Nigeria that CPS is significant and has a positive relationship with manufacturing output.

Inflation (INFL): Inflation, from the table above, is seen to have a positive relationship with manufacturing output. With a coefficient of 0.004505, a unit increase in inflation will, on the average, increase manufacturing output by 0.0045%, holding other variables constant. This fails to conform to *a priori* expectation. As inflation rate increases, the cost of investment increases in nominal terms, thereby, reducing the rate or level of investment and depleting manufacturing output. It is envisaged that inflation relates negatively with manufacturing output (MQ). It is also not in line with the findings of Ogar *et al* (2018) in Nigeria, that inflation, though significant, has a negative relationship with manufacturing output. However, it then depends on the type of inflation, that is, whether it is demand-pull or cost-push inflation. While demand-pull inflation relates positively with manufacturing output, cost-push inflation relates negatively. The former spurs production and leads to increased output due to high demand, hence, leading to an expansion in MQ; the latter, on the other hand, is caused by shortage in production due to high cost of inputs which leads to a decline in output.

Government Capital Expenditure (LOGGCAP): Having a coefficient of 0.210022 as seen from the table above, government capital expenditure therefore has a positive relationship with manufacturing output (MQ). This implies that, a percentage increase in GCAP will, on the average, increase manufacturing output by 0.21%, holding other variables constant. This conforms to a priori expectation which states that the higher the amount of government capital expenditure, the greater the output of the manufacturing sector.

Additionally, the R-squared of the model is 0.994128 which shows that 99% of the target variables are explained by the explanatory variables. With the adjusted R-squared with a close value as the R-squared shows that the success of the model is not over-estimated and implies that the general model is a good fit! The F-statistic value being significant

means that the overall model is statistically significantly different from zero. Most importantly, the D.W being greater than the R-squared shows that the model is not spurious and is fit for policy recommendations.

Conclusion and Policy Recommendations

The manufacturing sector remains the backbone of any advanced economy. However, its expansion or contraction depends, to a large extent, on the proper management and application of key macroeconomic variables. From the standpoint of the results obtained in the study, policy recommendations are given below:

1. From the results of this research, we notice that foreign direct investment had a negative relationship with manufacturing output and hence did not conform to *a priori* expectation. Therefore, government should put necessary measures in place to guard against crowding out effect by foreign firms in the economy in order to protect local industries and encourage the consumption of domestic goods.

2. The research findings revealed that government capital expenditure is negatively related to capital formation in Nigeria hence violating our a priori expectation. This could mean that funds earmarked for capital projects are misappropriated such that the intended objectives are not achieved eventually. To this end, it becomes imperative for government to adopt effective measures, policies and programs that foster accountability and transparency in the method of spending public funds in Nigeria.

3. Government should perform its regulatory functions effectively especially with regards to proper management of inflation. Since cost-push inflation affects the economy adversely, the government should use appropriate policy instruments that would not result to inflation be it demand-pull or cost-push.

4. Increased banking sector credit to private sector is very crucial as it accelerates the level of investment in the manufacturing sector hence expanding its output and increasing capital formation. In view of this, the government, through special directives and moral suasion should encourage deposit money banks to increase the level of credit to the private sector.

5. Exchange rate is predominantly exogenously determined. That notwithstanding, the government should use appropriate policy instruments to ensure the relative stability of the exchange rate favourable enough to spur economic activities.

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