



MACROECONOMIC VARIABLES AND MANUFACTURING SECTOR IN NIGERIA

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Abstract

This study assessed the impact macroeconomic variables on the productivity of manufacturing output for the period of 34years (1990-2023). The variables such as, exchange rate, inflation rate lending rate and manufacturing output share of gross domestic product were employed for the study. To achieve this objective, time series and secondary source of data were employed. These data were gathered from Central Bank of Nigeria (CBN) statistical bulletin of 2023. The study employed descriptive statistics, correlation analysis, unit root test and ordinary least square method. The findings revealed that exchange rate has a significant impact on manufacturing output share of gross domestic product. It was also revealed that there is no significant relationship between inflation rate and manufacturing output share of gross domestic product. Similarly, lending rate does not have significant effect on manufacturing output share of gross domestic product in Nigeria. As stated by f-statistic result the study concluded that macroeconomic variables have significant impact on the productivity of manufacturing sector in Nigeria. It was therefore recommended among others that government should improve exchange rate management through policies that reduce volatility and enhance the predictability of the currency to benefit the manufacturing sector. Also, Central Bank should implement inflation control measures that focus on stabilizing the economy and reducing the cost-push pressures that affect manufacturers, especially in relation to raw material costs.

Keyword: Gross Domestic Product, Exchange Rate, Inflation Rate, Lending Rate, Manufacturing Sector.

Introduction

Macroeconomic variables affect productivity of the manufacturing sector in every economy; and productivity of the manufacturing sector contribute significantly to development and economic welfare of nations. The manufacturing sector is a secondary sector with the potential to boost economic growth of developing economies. A thriving manufacturing sector has been proposed seen as a propellant of economic development because it generates opportunities for increased availability of goods, increases employment and income, improves efficiency and strengthens balance of payments (Paulo, Souza, & Souza, 2017). Exchange rate is a macroeconomic variable that negatively affects the manufacturing sector. It increases or decreases the value of home currency of revenues and cost incurred in foreign currency. Zhang, Chen, Wu, Shuai and Shen

(2019) maintains that exchange rate increases or decreases earnings in home currency before interest costs.

Manufacturing sector is one of the leading sectors that play a crucial role in the development of the country's economy. It is the sub-sector in the industrial sector that engage in the production of goods and services through combined utilization of raw materials and other production factors such as labour force, land, capital, technology and entrepreneurial skill. The sector acts as a catalyst that accelerates the pace of structural transformation and diversification of the economy, thus enabling a country to utilize its factor endowments and depend less on the foreign supply of finished goods or raw materials (Adediran & Obasan, 2017). The manufacturing sector contributes significantly to the development of Nigeria's economy. The sector is responsible for transforming crude materials into finished goods. It creates employment, boosts agriculture, diversifies the economy and helps the nation increase its foreign exchange earnings. Gbadebo, Adekunle, Muritala and Fadeyi (2017) asserts that the sector acts as a catalyst that accelerates the pace of structural transformation and diversification of economies, enabling countries to fully utilize their factor endowments for economic growth, development and sustainability. Moreover, in terms of contribution to Gross Domestic Product (GDP), the manufacturing sector is dominant and has overtaken the service sector in a number of Organization for Economic Co-operation and development (OECD) countries (Ademola & Afolabi, 2023).

The manufacturing sub-sector has over the years been pivotal to the advancement of many economies and transformation of societies. In Nigeria, its full impact on the economy is yet to be felt in terms of increased productive activities resulting in foreign exchange earnings, contribution to the Gross Domestic Product (GDP), employment generation and improvement in standard of living among other benefits derivable from a functional manufacturing sector. Government's effort at transforming the sector by reforming the financial sector to play a leading role in making funds available to the manufacturing sector has been evidently documented in the literature (Nwabuisi, *et. al*, 2020). In spite of this, the sector is still constrained in accessing funds from the financial sector. The argument has been that this challenge and other challenges facing the sector may not be unconnected to high interest rates on bank loans and other credit facilities, deposit demands from money deposit banks, aggregate bank lending rate to the sector, access to foreign exchange

from banks and the exchange rate itself. The subsector has thus remained unattractive for bank credit (Oparah, Ugochukwu & Okoye, 2023).

Literature Review

Concept of Macroeconomics Variables

Macroeconomic variables are indicators that determine or influence the current trends in the economy. Macroeconomics parameters include gross domestic product (GDP), exchange rate (EXR), interest rate, inflation, money supply. Gross Domestic Product (GDP) is the broadest quantitative measure of a nation's total activity. It represents the monetary value of all goods and services produced within a nation's geographic borders over a period of time especially one year (Obidike & Nuduka 2022). Exchange rate is the rate at which one nation's currency is exchanged for another country's currency. In a situation whereby one nation's exchange rate is higher than another one, it affects the purchasing power of the lower exchange rate of a particular country, for example, if the naira rate is lower in comparison to the American dollar, Americans will have a higher purchasing power than Nigerians. Interest rate is the cost of borrowing money.

Concept of Manufacturing Sector

Manufacturing is the production of merchandise for use or sale using labour and machines, tools, chemical and biological processing, or formulation. The term may refer to a range of human activity, from handicraft to high tech, but is most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale. Such finished goods may be sold to other manufacturers for the production of other, more complex products, such as aircraft, household, furniture, sports equipment or automobiles, or sold to wholesalers, who in turn sell them to retailers, who then sell them to end users and consumers (Serope & Schmid, 2015). Manufacturing is the making of goods by hand or by machine that upon completion the business sells to a customer. Items used in manufacture may be raw materials or component parts of a larger product. The manufacturing usually happens on a large-scale production line of machinery and skilled labor.

Theoretical Review

Dependency Theory

Dependency theory was created by Paul in 1957. This theory portrays the idea of global relations among nations of the world, focusing on that created nations impact less created nations through their financial power. Significant suppositions of the hypothesis incorporate that the present immature state and disparity among nations are fundamental part of these associations; affluent nations persecute and overwhelm unfortunate nations through media control, legislative issues, financial aspects, instruction, sport, culture, banking and money (Utomi, 2018); assets are cleared from "fringe" of poor and immature nations to "center" of rich nations, consequently working on the monetary prosperity of the last option to the detriment of the previous; immature economies give unloading grounds to out of date innovation, yet in addition supply normal assets, modest work and markets for created economies, upgrade their expectations for everyday comforts. The hypothesis followers recommend unfamiliar help with type of credit, help, speculation, as well as unhindered activities of the Worldwide Enterprises (MNCs) as healing measures. The condition of reliance on mechanically progressed nations by Africans is credited to terrible administration, botch, poor institutional system, defilement, low degree of innovation, and absence of close reconciliation (Utomi, 2018). Accordingly, most destitute nations depend on imported items and monetary administrations from Europe, America and China as life saver.

International Fisher Effect (IFE) theory

The International Fisher Effect (IFE) theory was introduced as part of Irving Fisher's broader work on interest rates and inflation in the early 20th century. Fisher's influential book, "The Theory of Interest," published in 1930, laid much of the groundwork for understanding the relationship between interest rates and currency value movements, which later contributed to what we now refer to as the International Fisher Effect. International Fisher Effect (IFE) theory which traces the links among interest rate, inflation rate and exchange rate. This theory states that an appreciation or depreciation of one currency against another currency might be neutralized by a change in the interest rate differential. According to the theory, if the US interest rate for example exceeds Nigeria's interest rate, then the US dollar should depreciate against the Nigeria Naira by an amount that prevents arbitrage. The future exchange rate is reflected in the forward exchange rate stated today. In the example above, the forward exchange rate of the dollar is said to be at a discount

because it buys fewer Nigerian Naira in the forward exchange rate than it does at the spot rate, the naira is said to be at a premium. Therefore, following the International Fisher Effect there will be a tendency for countries with relatively high nominal interest rate (which generate inflationary pressure) to have depreciating currencies (depreciating exchange rate) and those with relatively low nominal interest rates to have appreciating currencies (Madura, 2010).

Empirical Review

Anochie, Okereafor and Bashir (2023) examined the effect of macroeconomic variables (exchange rate, interest rate and inflation rate) on productivity of Nigeria's manufacturing sector. Three research hypotheses were formulated to guide the study. The used study used secondary data collected from annual time series from 1980-2020 obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin. The ordinary least squares, cointegration and regression statistics were used to analyse the data. The study found that exchange rate and interest rate has significant effect on the productivity of Nigeria's manufacturing sector; and that inflation rate has no significant effect on the productivity of Nigeria's manufacturing sector.

Ariwa (2023) investigated the effect of these macroeconomic variables on Nigeria's manufacturing sector performance from 1999 to 2022. Ordinary least squares (OLS) technique was employed to analyze data collected from the Central Bank of Nigeria (CBN) Statistical Bulletin and World Development Indicators. Findings revealed that exchange rate positively and significantly affected manufacturing sector performance in Nigeria. On the other hand, it was revealed that the inflation rate and interest rate had negative and insignificant effects on the manufacturing sector performance in Nigeria.

Adedoyin, Ezekiel Bose, Joseph, Asaleye, DickTonye and Elizabeth (2022) examined the impact of macroeconomic variables and some salient socio-economic and political variables on the manufacturing sub-sector of the Nigerian economy by using the autoregressive distributed lag to analyze data source from 1986 to 2019 within the context of two macroeconomic theories: The Solow growth and the endogenous growth theories. The study noted that both the Solow growth theory and endogenous growth model are valid in the short run for the studied economy, but the

result is not the same in the long run, as only the endogenous growth model was valid in the long run.

Methodology

An ex post facto research design was employed in order to gather relevant time series data on the topic of discussion. The ex post facto is found to be effective because it does not give room for manipulation on the part of the researcher. The population of the study is assumed to be the Nigeria economy because the current research focuses on the entire economy of Nigeria. However, sampling is impractical in this context due to the aggregation of Nigerian economy data for analysis. Secondary data source was explored in presenting the fact of the situation through the use of the CBN Statistical Bulletin. The variables considered for the study include manufacturing output share of Gross Domestic Product (dependent variable), and exchange rate, lending rate and inflation rate are the independent variables. The model is specified as follows:

$$MGDP = F (EXR, LER, INFR) \dots \dots \dots (1)$$

Hence, the econometric form of the model is:

$$MGDP = \beta_0 + \beta_1 EXR + \beta_2 LER + \beta_3 INFR + \mu \dots \dots \dots (2)$$

Where:

MGDP = Manufacturing Output Share of Gross Domestic Product

EXR = Exchange Rate

LER= Lending Rate

INFR= Inflation Rate

β_0 = Constant term;

β_1 - β_3 = Coefficient of explanatory variables

μ = Error term representing factors other than those specified in the model

A priori Expectation

Theoretical expectation suggested that the level of exchange rate, lending rate and inflation rate by any country are expected to have positive impact on manufacturing sector in Nigeria. Therefore, on this basis the mathematical expression for this study's a priori expectation are: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$.

Data Analysis, Interpretations and Discussion of Findings

Data Analysis and Interpretations

Descriptive Statistics

	MGDP	EXR	INFR	LER
Mean	6312.449	161.3143	18.56534	18.08611
Median	2801.167	130.7518	12.10000	17.76781
Maximum	28442.90	645.1941	76.75887	29.80000
Minimum	87.96048	8.037808	0.223606	11.48313
Std. Dev.	8168.260	143.1284	16.63585	3.719132
Skewness	1.617652	1.425228	2.138833	0.913973
Kurtosis	4.513267	5.187668	6.965416	4.760963
Jarque-Bera	18.07266	18.29057	48.19918	9.126708
Probability	0.000119	0.000107	0.000000	0.010427
Sum	214623.2	5484.685	631.2216	614.9279
Sum Sq. Dev.	2.20E+09	676029.4	9132.800	456.4540
Observations	34	34	34	34

Source: E-view Output, 2024

The summary statistics of the variables used in this study was presented above. The descriptive statistics indicate the nature of relevant features of the data series. Actually, the mean of manufacturing sector output to Gross Domestic Product (MGDP) indicates 6312.449, median (2801.67), maximum value (28442.90) and minimum value (87.96048). Also the mean of exchange rate (EXR) indicates 161.3143, median (130.7518), maximum value (645.1941) and minimum value (8.037808). Also, the mean of inflation rate (INFR) indicates 18.56534, median (12.10000), maximum value (76.75887) and minimum value (0.223606). Lastly, lending rate (LER) indicates 18.08611, median (17.76781), maximum value (29.80000) and minimum value (11.48313). However, the summary statistics recorded relative high standard deviations for most of the series except lending rate and inflation rate. Manufacturing Sector Gross domestic product (MGDP) have the highest standard deviation with a value of 8168.260. This shows that the dispersions of the actual data from their means are very high. It can also be deduced that most of the series are not moderately skewed.

Regression Results

Dependent Variable: MGDGP

Method: Least Squares

Date: 11/24/24 Time: 17:56

Sample: 1990 2023

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3207.013	3244.759	0.988367	0.3309
EXR	49.74220	4.003415	12.42494	0.0000
INFR	42.84584	28.55203	1.500623	0.1439
LER	-315.9407	156.8521	-2.014258	0.0530
R-squared	0.905132	Mean dependent var		6312.449
Adjusted R-squared	0.895645	S.D. dependent var		8168.260
S.E. of regression	2638.678	Akaike info criterion		18.70407
Sum squared resid	2.09E+08	Schwarz criterion		18.88365
Log likelihood	-313.9693	Hannan-Quinn criter.		18.76531
F-statistic	95.40931	Durbin-Watson stat		0.986268
Prob(F-statistic)	0.000000			

Source: E-view Output, 2024

Data must be fitted reasonable well. That is value of R^2 should be reasonable high at least more than 60 percent. The higher the R^2 better the fitted data. In this model we observed that R^2 is 90% which is good because 90% is greater than 60%, which means that the model is fit. The remaining 10% are factors or variables that were not included which are capable of influencing the dependent variable. The adjusted R^2 which is 89% could be further explained that after adjusting for the degree of freedom, the predictors can only explain 89% variation of manufacturing sector output to real gross domestic product. The independent variables should be individually significant. This could be checked by using probability value of t-test. If the p-value of t statistics is less than 5% (0.05) we can reject the null and accept alternative hypothesis. If otherwise, we do the inverse. The result shows that exchange rate is statistically significant with the p value of 0.0000 while inflation rate and lending rate are statistically insignificant with p value of 0.1439 and 0.0530 respectively.

Coefficient of Variables

The indication of the coefficients ought to follow monetary hypothesis or assumption, encounters of others or instinct. Manufacturing sector output to real gross domestic product with the coefficient of 3207.013 means that for every unit increase in manufacturing sector output to real gross domestic product, there will be increase in the manufacturing sector output to real gross domestic product. Also, the coefficient of exchange rate which stands at 49.74220 indicates that

for every unit increase in exchange rate, there will be increase in the manufacturing sector output to real gross domestic product. More so, inflation rate with the coefficient of 42.84584 means that for every unit increase in inflation rate, there will be increase in manufacturing sector output to real gross domestic product. Lastly, lending rate with the coefficient of -315.9407 means that for every unit increase in lending rate, there will be decrease in manufacturing sector output to real gross domestic product. The coefficient of -315.9407 for the lending rate implies a negative relationship between the lending rate and the manufacturing sector's contribution to real Gross Domestic Product (GDP).

F-statistics: This test the joint significance of the variables employed. Independent variables should be jointly significant to explain dependent variable. This can be checked using F-test. If the p-value of F statistic is less than 5 percent (0.05) we can reject the null and accept alternative hypothesis. If otherwise, we can do the inverse. From the result, p value is (0.00000) which is less than 5percent level of significance. Hence we reject the null hypothesis (Ho).

4.3 Discussion of Findings

The study examined the impact of macroeconomics variables on the performance of manufacturing sector in Nigeria for the period of 1990 to 2023 considering lending rate, exchange rate and inflation rate as the predictors over manufacturing output share of gross domestic product in Nigeria. The result revealed that inflation rate has no statistically significant on manufacturing output share of gross domestic product in Nigeria. Adepoju and Oladipo (2018) conducted a study on inflation and industrial output in Nigeria and found that while inflation impacted manufacturing costs, its overall influence on the sector's contribution to GDP was relatively weak.

However, the study reveal that exchange rate has significant impact on manufacturing output share of gross domestic product in Nigeria. For a country like Nigeria, where the manufacturing sector is heavily dependent on imported raw materials and intermediate goods, a depreciation of the local currency would theoretically raise the cost of these imports, thereby increasing production costs and reducing the competitiveness of the manufacturing sector. In a study of exchange rate effects on the manufacturing sector in sub-Saharan Africa. Tarp, Asongu, and Nwachukwu (2020) observed that exchange rate fluctuations did not significantly affect industrial output in many African economies, including Nigeria. Their research pointed out that supply-side constraints and

structural weaknesses in the economy were the primary reasons why exchange rate movements did not result in significant changes to manufacturing output.

Lastly, the study found out that lending rate (GDP) has no significant impact on manufacturing sector in Nigeria. It suggests that changes in the lending rate do not strongly or consistently influence the output or performance of the manufacturing sector within the observed period or under the given conditions. Ogbuagu (2020) observed that despite fluctuating lending rates, the Nigerian manufacturing sector remains constrained by external factors like import dependency and low capacity utilization. Udoh and Ebong (2016) emphasized that the high cost of borrowing in Nigeria has historically discouraged private sector investment, particularly in manufacturing, highlighting the significance of lending rates in shaping economic outcomes.

Conclusion

The study's findings highlight that macroeconomic indicators alone cannot fully explain the performance of the manufacturing sector in Nigeria. Conclusively, macroeconomics variables has a significant impact on manufacturing sector in Nigeria under the period of study.

Recommendations

Based on the findings made in the course of this study, the following recommendations are hereby provide below:

- i. Government should align educational and vocational training systems with the specific demands of the manufacturing sector to improve labor productivity and enable a larger, more skilled workforce.
- ii. Government should improve exchange rate management through policies that reduce volatility and enhance the predictability of the currency to benefit the manufacturing sector.
- iii. Central Bank should implement inflation control measures that focus on stabilizing the economy and reducing the cost-push pressures that affect manufacturers, especially in relation to raw material costs. By controlling inflation, the government can help reduce the burden on manufacturers and improve their ability to plan, invest, and grow.

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