

## INFLATION AND MANUFACTURING OUTPUT IN NIGERIA

By

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### Abstract

Over the years, the government of Nigeria has made several efforts to develop the manufacturing sector, yet the sector has continued to perform poorly, becoming increasingly weaker presumably on account of inflationary pressures accompanying the import of manufactured goods. This work is therefore aimed at investigating the impact of inflation on the manufacturing sector output in Nigeria using time series data obtained from Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS), World Bank Development Indicators (WDI) and World Economic Organization (WEO). The Autoregressive Distributed Lag (ARDL) bound test approach was adopted. The result revealed that inflation rate was correctly signed and thus had a negative effect on the manufacturing sector output, although this proved to be statistically insignificant. The paper recommended that government should encourage investors in local raw materials through direct incentives, and overhaul access to credit for the productive sector particularly the manufacturing sector.

**Keywords:** Manufacturing Output, Inflation rate, Exchange rate, Sectoral credit allocation.

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### Introduction

Manufacturing is a deliberate and sustained application and combination of suitable technology, management techniques, and other resources to move an economy from the traditional low level of production to a more automated and efficient system of mass production of goods and services (Ayodele & Falokun, 2003). Manufacturing to many scholars is synonymous with industrialization which is the process of transforming raw material with the aid of human resources and equipment that leads to production of more consumer goods and capital goods. The contribution of the manufacturing output to GDP in Nigeria has fluctuated widely over the years. From 4.8% at independence in 1960, it grew to 17.8% in 1990, reducing 14.61% in 2021 (World Bank, 2022). Similar fluctuating trend is recorded for inflation in Nigeria. In 1990, the inflation rate was 7.36%, reducing to 6.62% in 2000 and ultimately increasing to 16.95% in 2021 (World Bank, 2022).

The manufacturing sector which depends heavily on imported raw materials and capital and intermediate goods has severely been affected in recent time by the sharp decline in the value of naira and the concurrent rise in the exchange rate. In 1990 for instance the naira exchanged for 7.39 per US dollar, and later in 2000 it exchanged for 85.98 per US dollar before rising to over 500 per US dollar in 2022. Comparing the contribution of the manufacturing sector to GDP with other sectors, for instance agricultural sector, a discouraging picture presents itself. The

aggregate contribution of the manufacturing sector to GDP in real terms over the last three years was N19.26 trillion while that of the Agricultural sector was N55.05 trillion (NBS, 2022). This huge gap is a clear indication of the urgent need for improvement in the value addition in the production process of the manufacturing sector.

According to Udeagbala (2022), the low performance of the sector could be attributed to the scarcity of foreign exchange, difficulty in access to credit, rising cost of raw materials, high cost of energy and poor infrastructural facilities. However, in developing economies like Nigeria with a sizeable proportion of the citizenry advancing into poverty, the effect of inflationary pressure which facilitates this negative advancement ought to be seriously considered. Inflation, which is a sustained increase in general price level, creates on its path a heavy toll, affecting the manufacturing sector adversely. It is therefore fitting that the effect of inflation on the fortunes of the nation's manufacturing sector should be carefully examined, especially as it is thought, among other ideas, that it is responsible for the nation's failure to take full advantage of the opportunities offered by AfCFTA.

In addition, most studies have focused, and rightly so, on inflation and the growth of the economy. Scholarly studies on the impact of inflation on economic growth in Nigeria thus abound, for instance Richard (2018), Musa et al (2020), Umar et al (2021), Iyatse (2022) and Shuaib et al (2015). These scholars concentrated on the impact of inflation on the whole economy (aggregated). This overall view of the economy does not permit a closer look at the consequences of our poor inflation management on a key sub-sector such as manufacturing. However, there are some authors that investigated the impact of inflation on manufacturing sector in Nigeria for instance, Modebe and Ezeaku (2016), Medee (2015), Adegbelemi (2018). Empirical studies on inflation and manufacturing sector performance outside the country include those of Oduor et al (2021). Of all these studies both within and outside the country, their variables ranged from inflation, manufacturing output, consumer price index, interest rate, manufacturing sector productivity and exchange rate. None of the studies to the best of my knowledge included sectoral allocation (SA) of credit as one of the variables in determining the impact of inflation on manufacturing output in Nigeria (as is modeled in this study). This is important because one of the principal strategies of development is by mobilization of domestic and foreign savings in order to generate sufficient capital for investment. The domestic and foreign savings are abysmally small in most developing countries. Adequate capital is the fulcrum on which any sector including the manufacturing sector can achieve accelerated growth. Therefore, sectoral allocation of credit to manufacturing sector especially in a developing country like Nigeria by specialized financial

institutions such as Bank of Industry (BOI), Nigerian Export and Import (NEXIM) bank, Nigerian Bank for Commerce and Industry (NBCI) is very imperative for the growth of the sector; hence the inclusion of the variable in this study. The rest of the paper presents a review of theoretical and empirical literature; the research method adopted for the study, followed by results, discussion of findings and finally, conclusion and recommendations.

### **Review of Related Literature**

Kaldor's model of economic growth is very apt for this study. Kaldor in his theory attempts to provide a framework for relating the genesis of technological progress to capital accumulation which is in total contrast to other neoclassical models that treat the causation of technical progress as completely exogenous. The technical progress under the Kaldor's model replaces the usual production function. According to Kaldor, the basic functional relationship is not the production factor with respect to output per man as an increasing function of capital but a technical progress that relates to increase in output per man as an increasing function of rate of increase of investment. Kaldor's model though based on the Keynesian concepts and Harrodian dynamic approach differs from them. To Kaldor for instance, economic growth and its process are based on the interdependence of the fundamental variables like investment, productivity etc. and that the dynamic process cannot be understood simply with the help of saving/capital output ratio as contained in the Harrod's Model. Kaldor's model is however not without some criticisms one of which includes that the model does not take into consideration the vast unproductive expenditure of modern capitalist society for example government military spending. Also, the model does not explain how the distribution of income in a functional sense will be affected by changes in real income below the full employment level.

The highlights of this theory include the beneficial impact of positive spill over externalities of a knowledge based, innovative real sector which endangers economic growth. This is achieved through the persistent development of the economy which also promotes productivity in the manufacturing sector (Adegbemi, 2018).

Another theory that is very relevant to this study is the endogenous growth model. The endogenous growth model argues that a persistent rate of prosperity is influenced by internal processes such as human capital, innovation, and investment in capital rather than external uncontrollable forces hence challenging the view of neoclassical economists. That if the firms including the manufacturing sector want to achieve sustainable growth, they should invest in endogenous inputs such as human capital, research, innovative technologies and other

endogenous factors. This can be undertaken by the government and private sector. For example, government spending can inspire entrepreneurship by creating a conducive environment, and encouraging competitive markets e.g. reduction in interest rates or introduction of grants as well as sectoral credit allocation to the manufacturing sector at very low interest rate.

A number of studies with different economic techniques examined the impact of inflation on manufacturing sector output both within and outside the country. Umar, et al (2021) investigated the impact of inflation on economic growth in Nigeria from 1999 to 2017 using ordinary least square (OLS) technique. The result obtained showed that inflation has positive but non-significant impact on economic growth in Nigeria. The study recommended that policies which will enhance improvement in the economy should be embraced such as implementation of the minimum wage, ease of doing business and efficient interest rate regime. Olugbenga and Oluwabunmi (2020) investigated the impact of inflation on economic growth, evidence from Nigeria, using auto regressive distributed lag (ARDL). The findings from the study indicate that inflation and real exchange rate exert significant negative impact on economic growth while interest rate and money supply generate a positive and significant impact on economic growth. The causality result shows that unidirectional relationship exists between interest rate, exchange rate, government consumption expenditures and gross domestic product. Based on the findings, the study recommended for the need of the monetary authorities to tackle inflation vigorously to prevent its adverse effect on the economy. Adegbelemi (2018) carried out a study on the Macroeconomic Dynamics and the manufacturing output in Nigeria. Findings from the study revealed that there exist a negative relationship between inflation rate, interest rate, exchange rate, broad money supply and manufacturing output. The author recommended that there should be a harmonization of both monetary and fiscal policies to achieve remarkable improvement and formidable growth in the manufacturing sector. Bans – Akutey et al (2016) examined the effect of inflation on manufacturing sector productivity in Ghana. Using manufacturing sector productivity (MSP) as the dependent variable they found that there exists a stable and significant long-run relationship between inflation and manufacturing sector productivity. However, their result revealed that in the short-run, there was an insignificant relationship between inflation and manufacturing sector productivity. Oduor et al (2021) investigated the effect of inflation on growth of manufacturing sector in Kenya from 2008-2017. Some of the variables include inflation, manufacturing value added and consumer price index. The result of their study revealed that inflation has a statistical and significant negative effect on the growth of the manufacturing sector in Kenya. Chukwuani and Ezeudo (2018) investigated the impact of commercial bank sectoral allocation in stimulating real sector output growth in Nigeria.

Specifically, Agricultural and manufacturing sectors were their area of concentration. From the result they found that bank credit sectoral allocation to the manufacturing sector has no impact on the manufacturing sector output in the short-run but became significant and positive in the long-run. Also from their result, inflation rate and interest rate have significant impact on manufacturing sector output both in the short-run and long-run. They recommended that adequate allocation of credits to the sector will positively increase the sectoral output which will in turn promote economic growth and development. Nwabuisi et al (2020) examined the effect of bank credit on the performance of manufacturing sector in Nigeria. The result of their studies revealed that bank credit and interest rate have significant positive effects on manufacturing sector performance while exchange rate showed a significant negative impact on manufacturing sector performance in Nigeria. The study recommended that monetary authorities should introduce policies that will bring down lending rate to stimulate borrowers.

**Research Method**

This study adopted a modified linear Cobb-Douglas production function in line with similar studies carried out by Modebe and Ezeaku (2016) and Asuquo et al (2021) as follows:

$$MANOP = F(INF, EXR, INT, SA) \text{ -----(1)}$$

Where MANOP = Manufacturing output

- INF = Inflation rate
- EXR = Exchange rate
- INT = Interest rate
- SA = Sectoral allocation of bank credit to manufacturing sector.

With the natural log of manufacturing output as the dependent variable, the functional form of the model becomes:

$$\ln manop = \alpha_1 \ln inf + \alpha_2 \ln exr + \alpha_3 \ln int + \alpha_4 \ln sa + \epsilon \text{ .....(2)}$$

Where  $\alpha_s$  are the parameters and  $\epsilon$  is the error term

To establish the time series property of all time series employed in the model, Stationarity tests were conducted using augmented Dickey Fuller (ADF) and Philip Perron (PP) procedures. The results revealed a mixed order of integration with a maximum of first difference. On account of

this outcome the ARDL modeling technique was selected and utilised to test the long run relationship of the variables.

Table I: ARDL Bound co-integration test Result  
Null Hypothesis: No Levels Relationship

Test Statistics	Value	Significant	1(0)	1(1)
F – Statistics	253.60874	10%	2.525	3.56
		5%	3.058	4.223
K	4	1%	4.28	5.84

Source: Author's computation with E-views 10

From Table I, the F-statistics for the model is 253.60874 and is greater than the upper 1(1) bound of 4.223 at 5% level of significance. The null hypothesis is rejected; the conclusion is that there is presence of co-integration in the model. This implies that there is a long-run relationship between manufacturing output and inflation in Nigeria. This necessitates the estimation of both the short run and long-run ARDL regression.

Models Table 2: ARDL Regression Result  
ARDL RESULT

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNMANOP(-1)	0.046281	0.028717	1.611638	0.1213
EXR	0.000482	0.000199	2.414549	0.0245
EXR(-1)	-0.000349	0.000189	-1.846329	0.0783
INF	-0.000514	0.000839	-0.612444	0.5465
INT	0.043518	0.00130233	33.42723	0.0000
SA	-2.05E-05	.03E-05	-1.980748	0.0603
C	1.971436	0.078247	25.19513	0.0000

Source: Author's computation with E-views 10

From the result in table 2, exchange rate and interest rate though with trivial coefficient are, statistically significant. This goes to explain the high position in which sources of fund have on manufacturing sector in Nigeria. The lag value of exchange rate is negative and also non significant. Inflation rate with trivial negative value is surprisingly insignificant. The sectoral allocation (SA) is equally trivial and also insignificant. This shows the level of poor response and attention the financial institutions have on the manufacturing sectors. This result calls for urgent and closer look by the government on the compliance of the banking institutions with respect to sectoral allocations to the manufacturing sector. As succinctly noted by Ugwoke (2018) commercial banks in Nigeria are reluctant in extending credits to the real sectors including the

manufacturing sector because they are high risk ventures. Rather, these banks would prefer to engage in contract and trade financing which often guarantee quicker and higher returns.

Table 3: ARDL Error Correction Regression

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR)	0.000482	0.000119	4.052273	0.0005
CointEq(-1)*	-0.953719	0.022069	-43.21437	0.0000

Source: Author's computation with E-views 10

The coefficient of the error correction term count EQ(-1) is statistically significant and carries the expected negative sign at 5% level of significance. The speed of adjustment is 0.953719 that is 95.37% of the adjustment to equilibrium is expected in the next period. It also indicates the proportion of the disequilibrium errors accumulated in the previous period which are corrected in the current period. This result is a pointer to the fact that ignoring error correction in non-stationary time series analysis would lead to misspecification of the underlying process to achieve real price stability as it affects the Nigerian manufacturing sector output.

Table 4: ARDL Long-Run Bounds Test

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	0.000140	0.000101	1.379055	0.1817
INF	-0.000539	0.000878	-0.613387	0.5459
INT	0.045630	0.001333	34.21980	0.0000
SA	-2.15E-05	1.08E-05	-1.998685	0.0581
C	2.067104	0.032126	64.34275	0.0000

EC = LNMANOP - (0.0001\*EXR - 0.0005\*INF + 0.0456\*INT - 0.0000\*SA + 2.0671)

Source: Authors' computation with E-views 10.

The equation of the long-run ARDL result is given by  $LNMANOP = 2.067 + 0.0001*EXR - 0.0005*INF + 0.0456*INT - 0.0000*SA$ . Interest rate is both positive and significant. Other variables are statistically insignificant in the long-run. It should be noted that exchange rate is

positive but with a very trivial coefficient value. This is not surprising because in Nigeria, our traditional export in which the manufacturing sector should take the lead is uncompetitive due to high imports of raw materials and equipment resulting in increased inflationary pressure. Very huge amount of foreign exchange earnings is expended on imports. The finding from this study specifically the non-significant impact of sectoral credit allocation to manufacturing sector is in consonance with similar studies carried out by Andabai and Eze (2018) but negates those of Ndubuisi et al (2020) and Asuquo et al (2021).

### **Conclusion and Recommendations**

The paper investigated the impact of inflation on manufacturing sector output in Nigeria, employing the Auto-Regressive Distributed Lag (ARDL) bound test approach and the E-views 10 software for the data analysis. The empirical results showed that inflation was correctly signed in its effect on manufacturing sector output both in the short and long run. It proved however to be statistically and economically insignificant. Other explanatory variables, apart from interest rate were statistically insignificant in the long-run, a strong indication of the insensitiveness of the policy makers in the growth of the manufacturing sector in Nigeria. The paper recommends that government should encourage investors in local raw materials through direct incentives. Also, a more fundamental overhaul of credit accessibility should be undertaken for the productive sector particularly the manufacturing sector.

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