INTEREST RATE AND MANUFACTURING SECTOR OUTPUT IN NIGERIA
(1998-2018)

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Abstract: The study examines the impact of interest rate on manufacturing sector output in Nigeria between 1988 and 2018. Annual data on manufacturing sector, inflation rate, commercial banks total loan volume and interest rate from the Central Bank of Nigeria statistical bulletin and Index Mundi were collected. A model to represent manufacturing sector output as dependent variable, and commercial banks total loan volume, inflation rate and interest rate as the independent variables and tested using the unit root test, error correction mode, Auto regressive distributed lag (ARDL) and ARDL Bond test. The unit root test was first of the series to be carried out, manufacturing sector output (MSO), commercial banks total loan volume (CBTL) and interest rate were all integrated of order zero while exchange rate and inflation rate were integrated of order one, hence ARDL test. The result showed that commercial banks total loan volume and inflation rate had positive impacts on manufacturing sector output in Nigeria during the period covered while interest rate had negative impact on manufacturing sector output of Nigeria. The study recommends that the Central Bank of Nigeria and other monetary authorities should reduce the interest rate being charged on loans through the reduction of bank rate and other deposit requirements of the commercial banks in order to make funds available to the manufacturing sector, hence an increase its output.

Keywords: interest rate, manufacturing sector output, exchange rate

1.0 Introduction

The impact of the manufacturing sector output on growth and development of any Nation cannot be overemphasized. Only few nations have been able to grow their wealth without investing in the manufacturing sector, since a very viable and vibrant manufacturing sector normally precipitates industrialization, countries of the world normally strives to achieve this. On the other hand, one major ingredient in achieving this macroeconomic objective of a vibrant and efficient manufacturing sector is the interest rate. It has been recognized as an essential tool for the sustainability of real sectors across many countries. In all countries across the globe, interest rate is determined by the interaction of the amount of money in the circulation that is available for lending and borrowing. Interest rate is an important economic price; this is because whether seen from the point of view of cost of capital or from the perspective of opportunity cost of funds, interest rate has fundamental implications for the economy. By either impacting on the cost of capital or influencing the availability of credit, by increasing savings, it is known to be the main determinant of investment in an economy. The Central Bank of Nigeria (CBN) introduced the indirect monetary instruments in order to control interest and inflation rate since their primary objective is price stability and this can be achieve by regulating money supply in the economy (Uchendu, 1993).

Early efforts in manufacturing sector in Nigeria were oriented towards the adoption of an import substitution strategy in which light industry and assembly related manufacturing firms were embarked upon by the formal trading companies up to about 1970, the prime mover in manufacturing activities was the private sector which established some agro-based light manufacturing units such as vegetable oil extraction plants, textiles, beverages and petroleum products. A thorough examination of the growth of the sector over the years in Nigeria shows that the share of the manufacturing sector in gross domestic product (GDP) has not been impressive. According to the CBN (2018), in 1994 the manufacturing sector contributed above 20 percent to the Nigeria's GDP but have been on the decline since then. By 2002, the manufacturing sector contributed less than 10 percent to GDP and reduced
to 9 percent between 2013 and 2015. The highest growth rate of the Nigerian manufacturing sector of 60.3 percent growth rate was recorded in 1994. In 2017 the manufacturing sector contributed 9.18 percent, 13.25 percent points higher than growth recorded in the corresponding period of 2016, the manufacturing sector contributions to the nation’s gross domestic product (GDP) during the period did not change from 2017 share (8.86 percent), as well as in annual contribution, which rose only slightly from 9.18 percent in 2017 to 9.20 percent in 2018. (CBN, 2019)

According to the Nigeria Bureau of Statistics (NBS, 2019) Nigeria manufacturing sector grew by 3.4 percent in 2018, with oil refining recording the highest growth of 7.1 percent. cement grew by 5.3 percent, food, beverages and tobacco recorded 5.5 percent, textile, apparel and footwear recorded 1.9 percent, wood and wood products 1.5 percent, pulp, paper and paper products 3.4 percent, chemical and pharmaceutical products 1.4 percent, Non-metallic products -4.9 percent, Electrical and Electronics 10.1 percent, basic metal and Iron steel 0.9 percent, Motor vehicle and assembly 2.3 percent, other manufacturing -0.6 percent. Nigeria manufacturing sector has been performing below expectation over the years for a number of reasons, ranging from high level of importation of finished goods, poor and inconsistent government policies to support the sector, inadequate or epileptic power supply, lack of innovation and technology, poor infrastructures just to mention a few, which has resulted in the reduction in optimal capacity utilization of the manufacturing sector in Nigeria. Furthermore, the level of growth in manufacturing sector has been affected negatively because of high interest rate of lending and these two are responsible for high cost of production in country’s manufacturing sector (Adelbiyi, 2001; Adelbiyi and Babatope, 2004, Rasheed, 2010). Hence, Okafor (2012) observed that the level of Nigeria manufacturing Industries performance will continue to decline because of low implementation of government budget and difficulties in assessing raw materials and stiff competition with foreign firms.

To further worsen the situation, the manufacturing sector has been faced with the difficulty of not having easy access to long term loans because of so many stringent conditions attached to it, uneasy access to international finance, the problem of smuggling and restrictive credit guidelines to the sector as well as high interest rates. All these have continuously led to decrease in Nigerian GDP, creating foreign exchange earning problem, rising unemployment and decreased per capital income, which causes unique consumption pattern. To solve the problem of accessibility of funds, the Federal Government of Nigeria prioritized the manufacturing sector by directing commercial banks, through the Central Bank of Nigeria (CBN), to make loans available to manufacturers at lower interest rate, privatization of the power sector, establishment of power stations across the Country since industrialization has been noted as the major sector in the provision of good and services, employment generation and sustainable growth of the economy. Again, the establishment of Nigeria Industrial Development Bank which later metamorphosis into the current Bank of Industry [BOI] with the mandate of providing finance and technical assistance for the growth of the manufacturing sector. Other government initiatives includes; provision of incentives to support the industrial hubs; rationalize tariff and waivers on the equipment and machinery imports required for agric-industry. Review of local, fiscal and regulatory incentives to support the development of industrial cities, parks and clusters.

According to the Nigeria Bureau of Statistics (NBS, 2019), the Nigeria manufacturing sector is dominated by the production of food, beverages and tobacco, with sugar and bread products generating the greatest value of output (NBS, 2017). Government efforts at tackling the problems of the manufacturing sector include making it cheaper for consumers to purchase local products through prohibition and putting an end to smuggling. More recently, CBN announced plans to facilitate the issuance of single-digit interest rate loans to the agriculture and manufacturing sectors respectively. Other efforts include Port reforms and ease of doing business reforms. These efforts have started yielding results since Nigeria ranking moved to 145th in 2017 from 169th in 2016 (NBS, 2019).

Economist believed that investment can either be financed through savings or borrowing. An economy with high level of income will be able to save and thereafter invest and vice-versa. Borrowing often from financial institutions (Commercial Banks or Bank of Industry (BOI) attracts interest rate, since those banks are profit oriented, though with the mandate of financial intermediation. When interest rate is low, like what is applicable in most developed countries, the rate of investment will be high. Interest rate in Nigeria has remained two digits in the past 2/3 decades whereas in the developed countries e.g. USA, Japan and Germany, the interest rate is as low as a digit (CBN 2018). But over the last 2 decades, bringing down the interest rate has been a mirage despite the enormous advantages accruing from it, one wonder why it has practically been impossible for interest rate to come down.
Favorable exchange rate remains one of the major macroeconomic objectives of any nation. The Nigerian manufacturing sector is highly capital-intensive and depends solely on the importation of capital goods for production. Once exchange rate is favorable, it will enhance their net investment and thereafter boost their productivity/output. But over the years in Nigeria, experiences have shown that Nigeria currency is weak at the international foreign exchange market, hence unfavorable exchange rate for the country. Taking a keen look at the impact of exchange rate on manufacturing sector output will not be out of place because of the important roles manufacturing sector play in output growth. Again, the continuous increase in the price of goods and services often known as inflation has constitute serious challenge to the attainment of price stability in the country. Though, increase in price serves as incentives to manufacturers when disposing their goods and services but as impediment in the areas of when purchasing capital goods and raw materials needed for production.

2.0 Literature Review

Concept of Interest Rate; according to Keynes, interest rate is a reward for parting with liquidity for a specified period. Marshall defines interest rate as the price paid for the use of capital in any market. Carver believed interest is the income that goes to the lender of capital by virtue of its productivity as a reward for its abstinence. According to Cairncross, interest is the price paid for the hire of loan capital. Interest rates can in either be in nominal or real terms depending on whether or not the changes in the price level (inflation) are accounted for in course of determining it. If there is no adjustment for the changes in the price level, then the interest rate is expressed in nominal terms.

Concept of Manufacturing; the manufacturing output of all factories in a country, is a sub-set of industrial output. Manufacturing is the production of merchandise for use or sale using labour and machines, tools, chemical and biological processing, or formulation. The term may also refer to a range of human activities, from handcraft to high technology, 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(intermediate products), more complex products, such as aircraft, household appliances, 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. Modern manufacturing includes all intermediate processes required in the production and integration of a product’s components. Some industries, such as semi-conductor and steel manufacturers use the term fabrication instead.

Interest Rate and Manufacturing Sector

Interest rate is both a cause and effect of the level of production, which makes it very difficult to manage at macroeconomic level. This is because access to finance is both what drives an economy and an effect its ups and downs. When commercial banks offer high interest rates, it discourages people from getting loans to finance new Business, add capital to their businesses and purchase more equipment’s. Charging of high interest rates by Commercial Banks can stifle the general production level, but they do so in response to the amount of demand for debt. When Commercial Banks offer low interest rates, access to capital for new enterprises is increased. While new business can spring up, old ones can equally expand, rents are lower, and there is generally more money flowing in the economy, which means the level of production will be increased. However, commercial banks only do this when the level of production is already increasing, they respond to a demand for loans rather than trying to create it.

Central Bank often gives out loans to commercial banks at low interest rate, when she is trying to increase the levels of production. This is when inflation is rising because of a rise in the price of goods, due to taxes, changes in the dollar's value on international markets, or other factors. The Federal Government does this in order to stimulate production to higher levels, but does it when production is at lower levels. Interest rates can also have catastrophic effects on production levels if they are set at levels that are too low for the levels of production. This means that demand for debt is increased, but the supply of money to pay it is not commensurate with this demand. This can cause massive bank failure, as was evident in late 2008. When banking systems collapse to this magnitude, people lose their jobs, mortgages, and means of income, and wide-scale levels of production are drastically reduced.
Macroeconomists have established the theoretical relationship between real output and monetary policy measures, thus reiterating that the finance led growth advocated that market force induced higher interest rate would enhance more investment by channeling saving to productive investment and stimulate real output growth such as the manufacturing sector. Thus the crucial role of capital in the economic growth and development process had been recognized such that Industrialization is associated with heavy investments financed through capital accumulation. Meanwhile, for growth to occur there is the need for a relatively stable macro-economic environment characterized with low risk and a condition for attracting investment and boosting entrepreneurial activities. There is therefore the need to keep lending interest rate and inflation at a manageable limit in order to propel investments in the manufacturing sector and by implication, economic growth. This can only be achieved through the management of interest rate. Thus, interest rates were adjusted through the “invisible hand” in order to promote increased level of investment in the various preferred sectors (manufacturing) of the economy.

Empirical Literature

Ojo and Ololade (2014) assessed the contribution of manufacturing sector to economic growth in Nigeria in the era of globalization. Ordinary least square (OLS) econometric technique was used on time series data of relevant variables of manufacturing output, trade openness and current account balance. The study found out that though Nigeria manufacturing sector benefited from globalization process, the level of the development in the sector was found to be highly negligible. Thus implying that globalization exerts little impact on economic growth via manufacturing sector of the economy. Imoughele and Ismaila (2014) examine the impact of monetary policy on Nigeria’s manufacturing sector performance between 1986 and 2012. After ensuring data stationarity and cointegration, the result show that the individual variables: external reserve, exchange rate and inflation rate were statistically significant to manufacturing sector output while broad money supply and interest rate were not statistically significant to manufacturing sector output in the previous and current year. However, interest rate, exchange rate and external reserve impacted negatively on the sector output but broad money supply and inflation rate affect the sector positively.

Obamuyi, Edun and Kayode (2010), believed that manufacturing capacity utilization and bank lending rate significantly affect manufacturing output in Nigeria. However, the relationship between manufacturing output and economic growth could not be established in the country. Using the ordinary least square multiple regression analytical technique the result of the findings revealed that: there exists an inverse relationship between interest rate and economic growth in Nigeria. In a similar vein, Adeyemi and Olufemi (2016) investigated the determinants of capacity utilization in the Nigerian manufacturing sector between 1975 and 2008. The findings of the study revealed that there is positive relationship between consumer’s price index, fixed capital formation in manufacturing sector and capacity utilization. The study also showed that there is negative relationship between electricity generations, real manufacturing output growth rate and capacity utilization which resulted in low manufacturing productivity growth rate in Nigeria.

Also, Okonkwo, Egbulonu, and Mmaduabuchi (2015) examined the impact of monetary policy variables on manufacturing in Nigeria from 1981 – 2012, using the Johansen cointegration test to establish long run equilibrium relationship between monetary policy and manufacturing sector. The error correction model (ECM) was employed to estimate the model and the study revealed that money supply and credit to private sector exert tremendous influence on manufacturing in Nigeria. Furthermore,

Theoretical Framework;

The Classical Theory of Interest were expounded by eminent economists like Pigou, Marshall, Walras, Knight etc. According to this theory, Interest is the reward for the productivity use of the capital which is equal to the marginal productivity of physical capital. Therefore, those economists who hold classical view have said that “the rate of interest is determined by the supply and demand of capital. The supply of capital is governed by the time preference and the demand for capital by the expected productivity of capital. Both time preference and productivity of capital depend upon waiting or saving. The theory is divided into demand for capital theory and supply of capital theory
1. Demand for capital: implies the Demand for savings, investors agree to pay interest on these savings because the capital projects which will be undertaken with the use of these funds, will be so productive that the returns on investment realized will be in excess of the cost of borrowing, i.e., Interest. In short, capital is demanded because it is productive, that is, it has the power to yield an income even after covering its cost, that is, Interest.

2. Supply of Capital: Supply of capital depends basically on the availability of savings in the economy. Savings emerge out of the people’s desire and capacity to save. To some Classical economists like Senior, abstinence from consumption is essential for the act of saving while economists like Fisher stress that time preference is the basic consideration of the people who save. In both views, interest rate plays an important role in the determination of savings.

Equilibrium of Capital: The rate of interest is determined by the interaction of the force of demand for capital (or investment) and the supply of savings. The rate of interest at which the demand for capital (or demand for savings to invest in capital goods) and the supply of savings are in equilibrium, will be rate determined in the market. The demand for investment and savings are in equilibrium where the two intersect each other. Hence if any change in the demand for investment and/or supply of savings occurs, there will be a proportional shift in the curve, therefore a change in the equilibrium rate of interest.

Marginal Productivity of Capital: The marginal physical product of capital is the price of the product. When, the rate of interest falls, the entrepreneur will be induced to invest more till marginal productivity of capital is equal to the rate of interest. Thus, the investment demand expands when the interest rate falls and it contracts when the interest rate rises. As such, investment demand is regarded as the inverse function of the rate of interest. With respect to the assumption of the Classical theory of interest this study will adopt the model which traces out the effects of interest rate on the manufacturing sector output. Consider that the growth in manufacturing sector output responds to a change in the interest rate, if the interest rate declines investment will increase which will lead to its growth and vice versa.

The Keynesian recognize the possibilities of government crowding-out investment through increasing cost of borrowing, that is, interest rate (Okpanachi 2007).

Given; \[ Y = C + I \] Equation i

Where \( Y \) is the income, \( C \) is the consumption/Savings, \( I \) is the investment. In line with the Keynesian model, we can incorporate other macroeconomic variables in order to run up the econometric analysis. Therefore, the equation will be:

\[ Y = C + I + Ir \] Equation ii

The interest rate also has a significant effect on manufacturing output; likewise it also influences most macroeconomic indicators. Fortunately, according to liquidity-money model, government has try to put under control most macroeconomic indicators such as exchange rate, inflation rate, commercial bank total loan and also try to vary its policies and policy features of which may affect interest rate and manufacturing output and also the economy at large.

3.0 Methodology

Model Specification

The study specified a multiple linear regression model to analyze how interest rate impact on the manufacturing sector in Nigeria, the model equally adopts the model used by Blessing (2018) who studied the impact of interest rate on Nigeria economic growth. However the model was modified to suit the purpose of the study.

The model is expressed as:

\[ MSO = \beta_0 + \beta_1 INTR + \beta_2 CBTL + \beta_3 INFL + \beta_4 ER + \mu \] Equation iii

\( MSO = \) manufacturing sector output, \( INTR = \) interest rate, \( CBTL = \) commercial banks, total loan volume, \( INFL \)
= inflation rate and EXR = exchange rate

Ordinary least squares (OLS) involving multiple regressions, Augmented Dickey-Fowler (ADF) unit root test and Johansen co-integration techniques will be used to test for the long-run effect in this study. The adoption of this technique was based on the premise that the OLS is assumed to be the best linear unbiased estimator (Uremadu, 2002). The data for this study were sourced from secondary sources and the sample period covers from 1988 to 2018.

Result and Discussion

Table 1; Result of Augmented Dickey-Fuller Unit Root Test

The result of the Augmented Dickey-Fuller (ADF) unit root test conducted on the variables is presented at both level and first difference of the series in the table

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level ADF Test Statistic</th>
<th>Critical Value at Level at 5% level</th>
<th>First Difference ADF Test Statistic</th>
<th>Critical Value at First Difference at 5% level</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSO</td>
<td>-3.033297**</td>
<td>-2.963972</td>
<td>-7.040398</td>
<td>-2.967767</td>
<td>I(0)</td>
</tr>
<tr>
<td>CBTL</td>
<td>-4.733022**</td>
<td>-2.963972</td>
<td>-8.490406</td>
<td>-2.967767</td>
<td>I(0)</td>
</tr>
<tr>
<td>INTR</td>
<td>-4.065187**</td>
<td>-2.963972</td>
<td>-3.334479</td>
<td>-2.991878</td>
<td>I(0)</td>
</tr>
<tr>
<td>ER</td>
<td>1.129063</td>
<td>-2.963972</td>
<td>-3.877309**</td>
<td>-2.967767</td>
<td>I(1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-2.813378</td>
<td>-2.963972</td>
<td>-4.426153**</td>
<td>-2.967767</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

**Significant at 5% level. Source: Author's Computation

From the ADF unit root test results presented in table 1, it shows that MSO, INTR and CBTL are stationary at level since their ADF statistics (absolute values) are greater than the critical values at 5 percent level of significance. Also, INFL and ER are not stationary at level but it is stationary at first difference since its ADF statistics (absolute values) is greater than the critical values at 5% level of significance. MSO, INTR and CBTL are to be integrated at order zero I(0)) while INFL and ER are to be integrated at order one I(1)).

Effect of Interest Rate on Manufacturing Sector Output in Nigeria

The Akaike Information Criteria (AIC) was first used to determine the number of lag to include in the analysis of the ARDL model. The selected optimum lag was 3.

Table 2: Result of ARDL Estimation for the Model

<table>
<thead>
<tr>
<th>Dependent Variable: MSO</th>
<th>Method: Least Squares</th>
<th>Proxy for Interest Rate: INTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>C</td>
<td>0.110804</td>
<td>2.841501</td>
</tr>
<tr>
<td>D(CBTL)</td>
<td>0.021386</td>
<td>1.289295</td>
</tr>
</tbody>
</table>
From the result in table 3, the result of the estimated model shows that Commercial bank total loan (CBTL) when one lag is included has a negative but statistically significant impact on manufacturing sector output in Nigeria in the short run. A one percent increase in Commercial bank total loan (CBTL) when one lag is included, it will lead to decrease in manufacturing sector output by about 6 per cent in the short run. The t-statistic reveals that the variable is significant at 5 per cent level of significance since the probability value is less than 0.05 (p-value < 0.05). In the long run, Commercial bank total loan has negative and insignificant impact on manufacturing sector output though a one percent increase in Commercial bank total loan (CBTL) will lead to decrease in manufacturing sector output by about 11 per cent in the long run. The coefficient of interest rate (INTR) shows that it has a negative impact on manufacturing sector output in Nigeria in the short run. This implies that a 1 per cent increase in interest rate will lead to a decrease in manufacturing sector output by about 0.4 per cent. Using the 5 per cent level of significance, the result shows that interest rate is significant in the short run. In the long run, exchange rate (ER) is found not to be significant to manufacturing sector output but a 1 percent increase in it will result to 19 per cent increase in manufacturing sector output. The result of the estimated model also found exchange rate (ER) to be statistically significant on manufacturing sector output in Nigeria in the short run for the and it has a negative relationship as expected. Precisely, a 1 per cent increase in exchange rate will result to 0.2 percent decrease in manufacturing sector output. But in the long run exchange rate shows a positive relationship with manufacturing sector output though not significant. It shows that a 1 percent increase in exchange rate will result
to 0.02 per cent decrease in manufacturing sector output. The t-statistic confirms that the variable is insignificant at 5 per cent level of significance since the probability value is less than 0.05 (p-value < 0.05).

The result also shows that inflation rate (INFL) has negative and statistically significant impact on manufacturing sector output in Nigeria in the short run. This indicates that an increase in INFL will lead to an increase in manufacturing sector output in Nigeria. Accurately, a one percent increase in inflation rate (INFL) will lead to decrease in manufacturing sector output by about 0.02 per cent in the short run according to the result above. The t-statistic reveals that the variable is significant at 5 per cent level of significance since the probability value is less than 0.05 (p-value < 0.05). In the long run, INFL was still seen to be significant with a negative relationship. The coefficient of determination (R²) and its adjusted R² are 0.89.7 and 0.77.6 respectively implying that there exists goodness of fit in the model. This means that about 89.7 per cent of the total variation in manufacturing sector output is accounted for by Commercial bank total loan, Interest Rate, Exchange rate and Inflation rate. The overall regression (F-Test) is significant at 5 per cent level of significance implying that the joint effects of all the included variables were significant. The Durbin Watson statistic of 2.01 shows that there is no evidence of autocorrelation in the model since the value is within the range of 2.

The implication of the result presented in table 2 and 3 above is that Commercial banks total loan (CBTL) contributes 5.89 percent to the decrease in value of manufacturing sector output which can be attributed to high interest rate on loan. Interest Rate also contributes 0.5 per cent to the decrease in value of manufacturing sector output because interest rate discourage investor from investing which then reduce value of manufacturing sector output. Exchange rate also contributes 0.3 per cent to the increase in value of manufacturing sector output because high exchange rate will result to cheaper goods in the foreign market which will lead to increase export and then increase in value of manufacturing sector output. Inflation rate contributes 0.21 percent to the decrease in value of manufacturing sector output which can be attributed to increase in price of goods that would in turn lead to decline in consumption.

Figure 1: Stability Test of the ARDL estimation

After using the cumulative sum of square of recursive test for the stability test of the ARDL in the model. The result shows that the ARDL estimation model is stable which implies that it’s significant at 5 percent significance level.
Long Run Relationship between Interest rate and Manufacturing Sector Output

The study employed the Auto regressive redistributed Lag (Bounds Testing) approach to test long run relationship between interest rate and manufacturing sector output in Nigeria.

Table 4: Result of the ARDL Bound Test

<table>
<thead>
<tr>
<th>Panel A</th>
<th>Test Statistic</th>
<th>Value</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>5.725642</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B

<table>
<thead>
<tr>
<th>Critical Value Bounds</th>
<th>Pesaran et al. (2001) critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(at 5% Significance Level)</td>
<td>2.56</td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2019)

From table 5, it can be seen that there is co-integration or long run relationship among the variable as the value of the F-statistics is more than 5 per cent critical value bound of the Pesaran critical value. This therefore signifies that there is long run impact of the independent variables (Commercial banks total loan, interest rate, exchange rate and inflation rate) on the output of manufacturing sector in Nigeria.

Table 5: Error Correction Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(CBTL, 2)</td>
<td>0.021386</td>
<td>2.222679</td>
<td>0.0462</td>
</tr>
<tr>
<td>D(CBTL(-1), 2)</td>
<td>0.059754</td>
<td>3.560518</td>
<td>0.0039</td>
</tr>
<tr>
<td>D(CBTL(-2), 2)</td>
<td>0.058794</td>
<td>4.811898</td>
<td>0.0004</td>
</tr>
<tr>
<td>D(ER)</td>
<td>-0.002725</td>
<td>-5.366598</td>
<td>0.0002</td>
</tr>
<tr>
<td>D(INFL)</td>
<td>-0.002089</td>
<td>-3.561414</td>
<td>0.0039</td>
</tr>
<tr>
<td>D(INFL(-1))</td>
<td>0.001651</td>
<td>2.797568</td>
<td>0.0161</td>
</tr>
<tr>
<td>D(INFL(-2))</td>
<td>0.258418</td>
<td>1.145935</td>
<td>0.2661</td>
</tr>
<tr>
<td>D(INTR(-1), 2)</td>
<td>-0.006049</td>
<td>-3.984108</td>
<td>0.0018</td>
</tr>
<tr>
<td>ECT(-1)*</td>
<td>-0.829302</td>
<td>-6.976242</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared | 0.869686 | F-statistic | 7.450001 |

Adjusted R-squared | 0.800697 | Prob(F-statistic) | 0.000642 |

Durbin-Watson Stat: | 2.007593 | Serial Correlation LM: F-Stat | 0.521385 | Prob(F-statistic) | 0.6782 |

The error correction coefficient is estimated to be -0.829302 (0.0000), which follows the decision rule that states that the ECT must be negative, less than one and must be statistically significant. The result concludes that 83 per
cent of any disequilibrium between manufacturing sector output.

4.0 Conclusion

Using the ARDL estimation to analyze the short and long run relationship, the study found that Commercial banks total loan is a negative significant determinant of manufacturing sector output in Nigeria. This can be attributed to high interest rate prevalent in Nigeria, which lower the level of investment in the country and which in turn reduces the output of the manufacturing sector. Also the study revealed that interest rate has a negative significant impact on Manufacturing Sector Output in Nigeria, this also should be expected as the cost of capital plays major role in investment decision and the prospect of investment in most economies since increase (decrease) in interest rate result to decline (increment) in investment which then result to decrease the output of manufacturing sector.

In addition to this, the study found out that exchange rate has a negative significant impact on manufacturing sector output in Nigeria; this is as a result of Nigeria being an importing country, which imports most of her capital goods. As exchange rate increase, the cost of importing capital goods such as machinery and equipment’s rises which in turn reduced the efficiency of the firms and the reduces the output of the manufacturing sector. Again, the study find out that inflation rate has a negative significant effect on manufacturing sector output in Nigeria. This is expected, since increase in inflation rate in the country will result to increase in prices of goods and services which tend to reduce the purchasing power and consumption of household and in turn the manufacturing firms (sector) will reduce their production (output).

This study recommends that interest on manufacturing firms’ loan should be reduced so as to facilitate the profitability of the firms which will encourage them to increase production. Central Bank through the monetary policy committee (MPC) should build and create a favourable investment environment (the ease of doing business) by facilitating the emergency of market based interest rate(1 digit rate) that attracts both domestic and foreign investments in order to increase the output of the manufacturing sector. Government should focus more on the manufacturing sector, since the study shows that it has a linkage effect to ensure growth in others sector of the economy and lastly, favourable policies should be implemented to ensure growth of the sector.

REFERENCES