



The Nexus between Interest Rate and the Growth of Manufacturing Sector in Nigeria

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Abstract

The work examined the effect of interest rate on the growth of manufacturing sector in Nigeria. Time series data were unruffled from CBN statistical bulletin for the period of forty one (41) years. The researchers employed ex post facto design for the study. To stationarized the data, unit root test was used. Ordinary least square multiple regression was applied for the analysis. The findings showed that saving rate and maximum rate had no significant effect on the growth of the manufacturing sector where as prime rate had negative significant effect on the growth of the manufacturing sector at 5 percent level of significance within the period considered. The researchers based on the findings, recommend that government should reduce the maximum rate to a single digit so as to increase the growth of the manufacturing sector in Nigeria, government should sustain the prime rate because of its contribution to the growth of the manufacturing sector in Nigeria etc.

Keywords: Growth of manufacturing sector, Interest rate, Prime rate, Maximum rate, saving rate etc.

INTRODUCTION

According to Nzotta (2004), interest rate is the amount of money charged for obtaining funds. It is amount sacrifice to get money. Interest rate is the cost paid for borrowing and expresses what the person borrowing pays to the lender for using the money. Interest rate helps the money flow in the economy and aids corporate organizations such as manufacturing sector etc carry out their businesses with ease (Ihenetu 2021). Interest rate influences the demand and allocation of accessible loanable funds. It also influences the rate of consumption and the rate and form of investments. When the interest rate is high, it discourages borrowing and slows down the economic activities where as low interest rate encourages borrowing and stimulate economic growth and hence high profit expectation (other factors remains constant) since the business owners are expected to pay small fraction of their money as interest for the fund borrowed. In other hand, the more the interest rate increases, the more the profit margins reduced (CBN 2010).

Interest rates in any economy are majorly influenced by the policy of the country's monetary authorities which is the central banks (CB). Central banks (CB) applied Monetary Policy Rate (MPR) or Discount Rate (DR) to direct the movement of other financial rates in the country which ultimately affect the level of inflation, output and employment. When the central bank changes the monetary policy rate, it affects the market and commercial banks' rates such as deposit money banks' interest rates and people's prospects about future growths in the economy. The modifications of interest rates by central bank directly affect market interest rates such as mortgages, consumer loan, deposits at financial institutions etc. While the decrease in the rate of borrowing is likely to encourage borrowing, spending and investment, increase in the rate of borrowing discourages saving (CBN 2010). Ultimately, the reduction of interest rate will boost the overall demand for goods and services where as the later is the opposite. A rise in the interest rates of central bank can inhibit the prices of assets, and thereby reducing the wealth of household and possibly reduce the appetite for customers' borrowing and spending. Interest rates also have the capacity of influencing exchange rates. When the country's interest rate rises, it makes the countries domestic currency denominated assets better than the foreign (and domestic) investors.

This will ultimately lead to a high demand of the currency of countries in relation to other country's currencies. Since the domestic currency is now strengthens, the imported goods and services of the country would become cheaper where as the product of the domestic country would become more and more costly in the foreign market which will eventually result to the reduction in demand for goods and services for them. Aside the possible stifling effect on inflation, there may be a decrease in foreign exchange earnings with possibly, balance of payments disequilibrium if it continuous. Interest rate of central banks can also influence people's prospects of future interest rates, economic growth and inflation (Ihenetu 2021).

Interest rates act as a bridge between the financial sector and the real sector of the economy (Ihenetu and Iwo 2021). Real sector as enunciated by Wikipedia is seen as real economic dealings of the economy. It is the major part of the economy because its activities influence economic outputs (Aliyu and Yusuf 2013). It is the key segments of the economy of Nigeria because of the impact it has on gross domestic product (GDP), National income (NI) and product account (Nwafor 2020). The real sector comprises of manufacturing sector especially and also service industries and as well includes housing, agriculture, mining, infrastructures and services sectors (Nwafor 2020).

The manufacturing sector seems to be the driver and facilitator of growth and sustain the change for growth and development (Ihenetu and Isoboye 2022). This could be as an upshot of its great capacities and a real tool for wealth creation, employment generation, poverty alleviation, high contribution to the nation's gross domestic product etc (Sambo, Iwuji and Bagshaw 2012). Manufacturing sector could be seen as the main remedy for economic progress and a fundamental base for economic revolution (Dogara 2018). Manufacturing sector converts unfinished materials to finished materials which are parceled and sold to the people and thereby creates treasure for the economy. It breaks out a country away from being dependent economy to a becoming a productive economy. For example, Countries like China, India, North Korea, Malaysia and Singapore that were viewed as the third world before, were able to breakout from being a third world countries through manufacturing sector. Therefore, one can rightly say without crumbling that there is a connection between manufacturing sector and economic growth and development (Simbo, Iwaji and Bagshaw 2012).

To encourage and promote increased level of investment in priority sectors such as the manufacturing and agricultural sector, prime rate and maximum rate have to be reduced to the bearest minimum where as saving rate increased (Taiga and Adofu 2021). If these policies are invoked by the government, it is obvious that the manufacturers and industrialists will realize the full potential of output in production and effectively stimulate the growth of the Nigerian manufacturing sector.

The study conducted by researchers in this area used capacity utilization to proxy the growth of the manufacturing sector, this study shall look at the manufacturing sector's growth in relation to economic growth. This is the central problem of the study.

The purpose of the study is to determine the effect of interest rate on the growth of the manufacturing sector's in Nigeria. The rest of the paper shall be segmented into literature review, methodology, presentation and analysis and finally, conclusion and recommendations.

Literature Review

a. Conceptual Framework

i. Interest Rate and Transmission Mechanism

According to Nzotta (2004), interest rate is the amount of money charged for obtaining funds. It is amount sacrifice to get money. Interest rate is the cost paid for borrowing and expresses what the person borrowing pays to the lender for using the money. Interest rate helps the money flow in the economy and aids corporate organizations such as manufacturing sector etc carry out their businesses with ease (Ihenetu 2021). Interest rate influences the demand and allocation of accessible loanable funds. It also influences the rate of consumption and the rate and form of investments. When the interest rate is high, it discourages borrowing and slows down the economic activities where as low interest rate encourages borrowing and stimulate economic growth and hence high profit expectation (other factors remains constant) since the business owners are expected to pay small fraction of their money as interest for the fund borrowed. In other hand, the more the interest rate increases, the more the profit margins reduced (CBN 2010).

Interest rate acts as a conduit for monetary policy diffusion mechanism. As a result of this, the central bank engages its policy rate such as anchor rate, rediscount rate or monetar y policy rate in some countries, to change the path of other rates in the economy and the expenditure and savings behaviour of financial agents, and also, influence other macroeconomic variables in the economy which are exchange rate, Inflation and aggregate demand.

The main channel of monetary policy transmission is interest rate. Monetary policy generally influences some of the macroeconomic aggregates such as output, prices, expenditure, etc by varying the price and the credit available in the economy.

The central bank can decide to change the rate at which it gives to the deposit money bank and other banks (monetary policy rate); this may have a great effect on other rates in the economy. Normally, when the banks are having cash problem, they exchange some of their assets to central bank for cash, also when the central bank want to mop-up excess liquidity, it sells some of these financial assets to banks in exchange for cash with the purpose of bringing down the money supply in the system. These financial instruments that bank sell are government bonds, bills, and other government securities. With this, the CBN changes the direction of interest rates.

The variation of the CBN rates influences money-market interest rates directly and lending and saving rates indirectly which banks set to their customers. These could also influence the prices of other parts of the economy (CBN 2010).

ii. Manufacturing Sector

Manufacturing is the transformation of unfinished materials into finished consumable goods or producers goods. Obioma, et al (2015), asserts that manufacturing is the use of modern technology, equipment and machineries to produce goods and services, alleviate human suffering and ensuring unbroken advancement in their welfare. The manufacturing sector of any given economy in the world is presumed to be the engine of growth and a promoter for sustainable revolution and national development. This is as a result of its huge capacities as a tool for generating wealth, creating employment, helping to contribute to the national Gross Domestic Product including poverty alleviation among the citizenry. The skills of the advanced countries of the world and the growing economies of these countries like China, India, North Korea, Malaysia and Singapore revealed that there is a direct relationship between the advancement of the manufacturing sector and the growth and development their economies. Therefore, for there to be national growth and development for up- coming countries like Nigeria, the growth of the manufacturing sector is very crucial. Kaldor asserted that manufacturing sector has greater and higher productivity and potentials for capital buildup than agricultural sector. This is called “engine of growth hypothesis”. The efficiency of manufacturing sector is positively correlated to the development of the manufacturing sector, this is called “Verdoorn's Law” and the output of the non-manufacturing sector is directly related to the growth of the manufacturing sector.

Manufacturing sector consists of the producing and manufacturing of items which is either the production of new things or adding values to the existing ones. Manufacturing sector contributes a significant portion of the industrial segment in the developed countries. The end products can either becomes finished products for sale to consumers or as intermediary goods which is used in further production process. Manufacturing sector creates an avenue for growing productivity vis-a-vis import replacement and export enlargement, creation of foreign exchange earning capacity, rising of employment and per capita income which might cause unrepeatable consumption behaviour. Manufacturing sector helps in adding value to raw materials and semi-finished goods by changing them into final output (Opusunju, Akyüz and Santeli 2019).

b. Theoretical Framework

Classical Theory of Interest Rate

The work is anchored on classical theory. This theory is linked with David Ricardo, Marshall, A.C. Pigou, Cassels, Walras, Taussing and Knight. This theory is known as the real theory of interest rate. The reason is that, in the determination of interest rate, the monetary factors are not very much considered. Only real factors such as productivity and thrift are given much consideration. Base on the theory, the interest rate is determined by the interaction of demand and supply of investment or capital. Rate of interest is the price paid for borrowing money for investment. Firms and individual borrow money for investment; therefore, one can say that investment depends solely on interest rate. Low interest rate leads to high borrowing and high investment where as high interest rate discourages borrowing which eventually leads to low investment. Therefore, investment is negatively related to interest rate. Household and other surplus economic unit save their money so as to earn interest rate. The reason is that high interest rate encourages high saving and low interest rate discourages low saving. Therefore, saving has a positive relationship with interest rate. Firms and corporations can acquire funds through the savings of households and other surplus economic units. The saving is supply to financial intermediary and firms and corporations borrow them for investment in the market especially good market. Therefore, interest rate in the market is determined at the point of intersection between supply of saving and demand for investment. Interest rate can also adjust and re-adjust to equilibrium when the goods market crosses the saving and investment.

Manufacturing sector borrow money from banks and pay interest and invest the money borrowed to make profit. The cost of borrowing will determine the amount to borrow and the profit to make from the investments. The higher the rate of interest, the lower the amount borrowed and the lower the profit and vice versa.

Methodology

Ihenetu (2008) define research design as a blue print, framework for collecting and analyzing data. The researchers applied ex post facto design for the work. This is because the data was original and was collected without adulteration from CBN statistical bulletin and used for the study. The fact that these data were original without adulteration informed the choice of the design. The data were purely time series data sourced from CBN statistical bulletin 2021

The researchers used ordinary least square multiple regression to analyze the data. This tool tests the effect of interest rate on the growth of manufacturing sector in Nigeria.

The model is given as:

$$MG = f(SR, PR, MR).$$

This model was transformed into the mathematical formula by adding the constant α , β and error term μ as:

$$MG = \alpha + \beta_1 SR + \beta_2 PR + \beta_3 MR + \mu$$

Where MG = Manufacturing sector's Growth

SR = Saving Rate

PR = Prime Rate

MR = Maximum Rate

α = constant variable

$\beta_1 \beta_2 \beta_3$ = Coefficient of independent variables (slope)

μ = error term.

The researchers used stationarity test and ordinary least square multiple regression for the analysis.

(i) Unit root test

Unit root was employed to ensure the stationarity of the time series data. The purpose is to certify that the data employment will not lead to false estimates. In this standpoint, Brooks (2009) employed Augmented Dickey Fuller (ADF) test. The decision rule is to accept alternate hypothesis if the ADF test statistic is more than the corresponding Mackinnon's Critical Values at 5% levels of significance.

(ii) Ordinary least square multiple regression test

This is employed to address the short-run estimations of the regressive equation. If the researcher must reject null hypothesis, the associated t-statistic of the variables must be less than 0.05 level of significance.

(iii) Johanson Co-integration Test

Johanson co-integration test was employed to test whether there exists a long run relationship in. Since the ordinary least square captured only the short run estimate, the need to check their long run relationship is necessary.

(iv) Error Correction Model

The model was developed to correct the error of the short run. If there is co-integration among the variables, the need to correct the error in the short run and check the long run relationship is indispensable.

Data Presentation and Analysis

The data used for the work are presented below:

Table-1(a): Gross Domestic Product (GDP), Manufacturing Sector (MS), Saving Rate (SR), Prime Rate (PR) and Maximum Rate (MR) in billions and percentages (1981 – 2021).

Period	GDP	MS	SR	PR	MR
1981	139.31	28.23	6.00	7.75	10.00
1982	149.05	30.31	7.50	10.25	11.75
1983	158.75	33.49	7.50	10.00	11.50
1984	165.85	29.42	9.50	12.50	13.00
1985	187.83	39.55	9.50	9.25	11.75
1986	198.12	41.63	9.50	10.50	12.00
1987	244.68	45.96	14.00	17.50	19.20
1988	315.62	66.34	14.50	16.50	17.60
1989	414.86	76.14	16.40	26.80	24.60

1990	494.64	87.96	18.80	25.50	27.70
1991	590.06	115.03	14.29	20.01	20.80
1992	906.03	159.95	16.10	29.80	31.20
1993	1,257.17	231.02	16.66	18.32	36.09
1994	1,768.79	370.16	13.50	21.00	21.00
1995	3,100.24	619.85	12.61	20.18	20.79
1996	4,086.07	780.48	11.69	19.74	20.86
1997	4,418.71	848.33	4.80	13.54	23.32
1998	4,805.16	838.53	5.49	18.29	21.34
1999	5,482.35	891.29	5.33	21.32	27.19
2000	7,062.75	984.08	5.29	17.98	21.55
2001	8,234.49	1,146.68	5.49	18.29	21.34
2002	11,501.45	1,358.53	4.15	24.85	30.19
2003	13,556.97	1,635.05	4.11	20.71	22.88
2004	18,124.06	1,968.56	4.19	19.18	20.82
2005	23,121.88	2,326.31	3.83	17.95	19.49
2006	30,375.18	2,689.08	3.14	17.26	18.70
2007	34,675.94	2,913.26	3.55	16.94	18.36
2008	39,954.21	3,263.82	2.84	15.14	18.70
2009	43,461.46	3,406.69	2.68	18.99	22.62
2010	55,469.35	3,578.64	2.21	17.59	22.51
2011	63,713.36	4,527.45	1.41	16.02	22.42
2012	72,599.63	5,588.82	1.70	16.79	23.79
2013	81,009.96	7,233.32	2.17	16.72	24.69
2014	90,136.98	8,685.43	3.38	16.55	25.74
2015	95,177.74	8,973.77	3.58	16.85	26.71
2016	102,575.42	8,903.24	3.75	16.87	27.29
2017	114,899.25	10,044.48	4.13	17.56	30.60
2018	129,086.91	12,455.53	4.07	19.33	28.16
2019	145,639.14	16,781.06	3.95	15.53	30.57
2020	154,252.32	19,539.55	3.22	12.32	28.64
2021	176,075.50	25,725.87	1.55	11.55	28.12

Source: CBN Statistical bulletin 2021

To get the growth of the manufacturing sector, we divide MS by GDP and multiply by 100. The result now becomes:

Table-1(b): Manufacturing Sector Growth (MG), Saving Rate (SR), Prime Rate (PR) and Maximum Rate (MR) in percentages (1981 – 2021).

Period	MSG	SR	PR	MR
1981	20.26371	6.00	7.75	10.00
1982	20.33225	7.50	10.25	11.75
1983	21.09825	7.50	10.00	11.50
1984	17.73636	9.50	12.50	13.00
1985	21.0545	9.50	9.25	11.75
1986	21.01	9.50	10.50	12.00
1987	18.78351	14.00	17.50	19.20

1988	21.01964	14.50	16.50	17.60
1989	18.35403	16.40	26.80	24.60
1990	17.7826	18.80	25.50	27.70
1991	19.49459	14.29	20.01	20.80
1992	17.65449	16.10	29.80	31.20
1993	18.37625	16.66	18.32	36.09
1994	20.92708	13.50	21.00	21.00
1995	19.99372	12.61	20.18	20.79
1996	19.10108	11.69	19.74	20.86
1997	19.19853	4.80	13.54	23.32
1998	17.45057	5.49	18.29	21.34
1999	16.25737	5.33	21.32	27.19
2000	13.9334	5.29	17.98	21.55
2001	13.92536	5.49	18.29	21.34
2002	11.81181	4.15	24.85	30.19
2003	12.06061	4.11	20.71	22.88
2004	10.86157	4.19	19.18	20.82
2005	10.06108	3.83	17.95	19.49
2006	8.852873	3.14	17.26	18.70
2007	8.40138	3.55	16.94	18.36
2008	8.168913	2.84	15.14	18.70
2009	7.838412	2.68	18.99	22.62
2010	6.451566	2.21	17.59	22.51
2011	7.105959	1.41	16.02	22.42
2012	7.698141	1.70	16.79	23.79
2013	8.928929	2.17	16.72	24.69
2014	9.635812	3.38	16.55	25.74
2015	9.428437	3.58	16.85	26.71
2016	8.679698	3.75	16.87	27.29
2017	8.741993	4.13	17.56	30.60
2018	9.648947	4.07	19.33	28.16
2019	11.52236	3.95	15.53	30.57
2020	12.66727	3.22	12.32	28.64
2021	14.6107	1.55	11.55	28.12

Source: Computed by the authors 2021

Aprior expectation: A negative significant effect is expected between prime rate, maximum rate and manufacturing sector growth (MG), where as a positive significant effect is expected between saving rate and manufacturing sector growth (MG).

Table-2: Stationarity (Unit Root) Test Results

Variab les	Level	1 st difference	Order of Integration	Remark
DMG	-0.556100	-7.361492	I(1)	Stationary
DSR	-2.317597	-6.367641	I(1)	Stationary
DPR	-3.259464	-6.367417	I(1)	Stationary
DMR	-3.322806	-6.986161	I(1)	Stationary

Significant at 5% level, ADF test > Critical Value, then the variable is stationary

Source: Extracts from E-Views 10 Output

Table 2 showed the results of unit root stationarity test for the data employed. In general, the absolute values of the ADF test statistic for all the variables employed for study were higher in comparison to all their corresponding Mackinnon's critical values at 5%. All these variables were stationary at the integration of order I(1). Since these variables were stationary at 5% level of significant, they are therefore suitable for utilization and estimations.

Table-3: Ordinary Least Square Multiple Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.099416	0.204607	-0.485888	0.6300
DSR	-0.093954	0.132409	-0.709571	0.4825
DPR	-0.122007	0.058500	-2.085592	0.0442
DMR	-0.090002	0.052543	-1.712919	0.0953
R-squared	0.328209	Mean dependent var		-0.141325
Adjusted R-squared	0.272227	S.D. dependent var		1.498521
S.E. of regression	1.278383	Akaike info criterion		3.423708
Sum squared resid	58.83345	Schwarz criterion		3.592596
Log likelihood	-64.47416	Hannan-Quinn criter.		3.484773
F-statistic	5.862703	Durbin-Watson stat		1.849082
Prob(F-statistic)	0.002286			

Source: E-view 10

From table 3, SR, PR, MR are the independent variables where as the MG is the dependent variable. The result of the analysis showed that SR and MR had no significant effect on MG where as PR had negative significant effect on MG at 5 percent level of significance during the period of the study. PR having negative significant effect means that a decrease in prime rate increases the growth of manufacturing sector in Nigeria. All the variables had negative coefficients showing that they confirm to aprior expectation except savings that supposed to be positive. The adjusted r^2 0.27 implies that variation in all the explanatory variables account for 27% of the variation in the growth of manufacturing sector. F – Statistic measures the overall significance of the model. The F-statistic is 5.862703 and the probability of F-statistic is 0.002286 is far less than 0.05 power of test. This means that interest rate had negative significant effect on the growth of manufacturing sector in Nigeria. 1.849082 Durbin Watson shows the absence of serial correlation. The implication here is that it is only prime rate that promoted the growth of manufacturing sector in Nigeria.

Table-4: Johanson Co-integration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.555496	65.50999	29.79707	0.0000
At most 1 *	0.475581	34.69973	15.49471	0.0000
At most 2 *	0.234853	10.17211	3.841466	0.0014

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.555496	30.81026	21.13162	0.0016
At most 1 *	0.475581	24.52762	14.26460	0.0009
At most 2 *	0.234853	10.17211	3.841466	0.0014

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

From the table, both Trace statistic and the Max-Eigen Statistic proved that there is a long run relationship between the variables considered in this study. Since there is a long run relationship, there is need to correct the error of the short run.

Table-5: Result of Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.118743	0.212329	-0.559238	0.5797
DSR	-0.106561	0.136699	-0.779529	0.4411
DPR	-0.124806	0.060033	-2.078952	0.0452
DMR	-0.090022	0.053824	-1.672521	0.1036
ECM(-1)	-0.050839	0.178406	0.284964	0.7774
R-squared	0.336581	Mean dependent var		-0.146706
Adjusted R-squared	0.258532	S.D. dependent var		1.517719
S.E. of regression	1.306886	Akaike info criterion		3.492380
Sum squared resid	58.07030	Schwarz criterion		3.705657
Log likelihood	-63.10141	Hannan-Quinn criter.		3.568902
F-statistic	4.312415	Durbin-Watson stat		1.977337
Prob(F-statistic)	0.006279			

Source: Extracts from E-Views 10 Output

The table showed that the result of Error Correction Model has a negative sign of -0.050839 which is right. It indicates that it will take 5.08% to correct the disequilibrium in growth of the manufacturing sector (MG) in Nigeria.

CONCLUSION AND RECOMMENDATIONS

The researchers therefore concluded that interest rate had negative significant effect on growth of the manufacturing sector in Nigeria. Prime rate has negative significant effect on the growth of the manufacturing sector where as saving and maximum rate has no significant effect on the growth of the manufacturing sector in Nigeria. The coefficients of prime rate and maximum rate are negative which conformed to the apriori expectation where as the coefficient of saving rate did not conformed to the apriori expectation.

Based on the findings of the study, the following recommendations have been made to guide the policy of government:

1. Government should reduce the maximum rate to a single digit so as to increase the growth of the manufacturing sector in Nigeria.
2. Government should sustain the prime rate because of its contribution to the growth of the manufacturing sector in Nigeria.
3. Government should increase the saving rate in order to increase the growth of the manufacturing sector in Nigeria.

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