Impact of Bank Credit on Nigeria's Manufacturing Sector

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Abstract: This study examines the Impact of Bank Credit on Nigeria's Manufacturing Sector. The study was carried out using regression technique of the Ordinary Least Square. The OLS techniques was applied after determining stationarity of our variables using the ADF Statistic, as well as the cointegration of variables using the Johansen approach and discovered that the variables are stationary and have a long term relationship among the variables in the model. From the result of the OLS, it is observed bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, exchange rate, workers incentives and employment generation have a positive impact on manufacturing subsectors in Nigeria, although, exchange rate was expected to be either positive or negative. From the regression analysis, the result show that bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation are statistically significant in explaining inflation in Nigeria Based on the finding from the study, the researcher makes the following recommendations: The government should adequately finance the manufacturing subsector through Loans and advances to help businesspersons finance, expand and produce new goods thereby increasing rate of employment and enhancing economic growth. The government should ensure that depositors fund is safe in the banks so that banks can mobilize resources through demand deposit and channel same to the manufacturing subsector to enhance production and distribution f goods and services. The government should ensure that bank reduce their lending rate. This will ensure increase in investment and consequently enhancing economic growth.

Key words: Manufacturing Sector, Bank credits, Bank demand deposit, Bank lending rate, Interest rate Exchange rate, Workers incentives, Employment generation.

1. INTRODUCTION

There is no gain saying the fact that industrialization is in the forefront of bringing about economic development of nations especially the third world countries which are in dire need of development. Nations with industrial capacities have continued to experience rapid and improved economic growth and development occasioned by mass production of goods and services (Malik, Teal & Baptist, 2006; Adediran, & Obasan, 2010).). The critical role played by the industrial subsector particularly the manufacturing sector in advancing the economies of the so called developed nations makes it imperative that less developing countries should seek out ways to quickly industrialize if any meaningful progress is to be made in terms of growth and development. Besides promoting growth and development, industrialization will play a crucial role in the restructuring of the economies of developing nations (Abayomi, 2010; Ogunsakin, 2014),

The manufacturing sector is the engine room of advanced nations and has helped in transforming their economies. It is the sure means to mass production of goods and services to reduce import dependency, path to export expansion and generation of foreign exchange, creation of mass employment, raising standard of living of citizenry and increasing per capita income. It is also the path to opening up the economy to numerous investments and dynamic opportunities as a result of effective linkages among various sectors of the economy (Igbinedion & Ogbeide, 2016)). The origin of manufacturing dates back to the post-independence era when only moderate manufacturing activities took place owing to low capital investment. Up till early 70s, most trading companies in Nigeria engaged in import substitution whereby agro-based light industries such as textile companies, tobacco processing units, palm kernel processing plants etc, and assembly companies were set up (Adolphus & Deborah, 2014). Most of these light plants were privately owned. However, between the mid-70s and early 80s, when Nigeria experienced oil boom, government set up major industrial plants to handle importations arising from the downstream activities at the time. The nation has had to face a lot of woes due to the neglect of the manufacturing sector and her over reliance on oil. The manufacturing sector in Nigeria has been unable to impact significantly on the economy due to numerous problems it faces (Toby, 2013). Lack of adequate investment capital has hampered the sectors ability to invest in new methods of production, acquire modern equipment and technology, and qualified personnel (Tomola, Adebisi & Olawale, 2012, Tomola, 2013).

John & Terhemba (2016) note that the effectiveness of the manufacturing sector is influenced by the availability of funds to meet the demands of the sector. This brings to fore the need to have a financial sector that is strategically developed to provide ready credit facilities to the manufacturing sector to enable the sector develop and contribute to economic growth and development in Nigeria (Bassey, Asinya & Amba, 2011). The impact of bank credits in the overall performance of the manufacturing sector cannot be overemphasized. Bank credits come in handy to augment the scarce financial resources of industries in the manufacturing sector, to expand their operations and grow their businesses (Gbadebo et al, 2017). Bada, (2017) cited in Bello, Anfofum and Farouk (2021) state that manufacturing firms perform effectively when raw material resources and financial credits are readily available to enable them to satisfy consumers' demands; which was the motivation in setting up the financial sector. It is also believed that the financial sector was set up to mop-up excess credit from the surplus sectors of the economy and release same to service the deficit sectors of the economy (Bello, Anfofum and Farouk, 2021). Thus, government, over the years through the Central Bank of Nigeria (CBN), has come up with numerous programmes aimed at getting financial credits to be extended to manufacturers for better and quick financing of business expansion and growth (Okafor, 2016). This is in realization of the fact that money deposit banks play critical roles in mobilizing and advancing idle funds and credits to the manufacturing sector. The ability of the deposit banks to extend a variety of financial services to the manufacturing sector is a reflection of a healthy financial sector which can go a long way to stimulate the

economy (Ndebbio, 2004). Despite all government's effort and policies towards attracting credits to the real sector, it is rather appalling that the manufacturing sector in Nigeria is still grappling with the challenge of accessing adequate funds to undertake manufacturing and productive activities. Owing to the importance of the sector to national growth and development, it requires urgent attention to position it to achieve its lofty objectives.

Statement of the Problem

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). 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 credits.

According to a release by the Central Bank of Nigeria (CBN), bank credits over the years to the sector fell short of what it prescribed and even with CBN's regulation of the financial sector, financial credits to the manufacturing sector remained abysmally low standing at 21.7% in 2001, with a marginal increase of 11.1% by 2012 (CBN, 2013). This has narrowed the sector's operational funds to what she can generate internally which may be responsible for reduced productive capacities and lack of business expansions in the sector. A review of the literature on the subject matter showed that there is a dearth of studies on the impact of bank credits on the manufacturing subsector in Nigeria with most studies looking critically at financial credits to the agricultural and private sectors. A gap thus exist and in order to fill this gap, this study focuses on the impact of bank credits on the manufacturing subsectors in Nigeria

Objectives of the Study

The broad objective of this study is to examine the impact of bank credit on the manufacturing sector in Nigeria. Specifically, the study seeks to:

1. Examine the effect of bank credits on manufacturing sector
2. Determine the effect of bank demand deposit on manufacturing sector.
3. Ascertain the effect of bank lending rate on manufacturing sector.
4. Examine the effect of interest rate on manufacturing sector.
5. Determine the effect of exchange rate on manufacturing sector.
6. Examine the effect of workers incentives on manufacturing sector.
7. Ascertain the effect of employment generation on manufacturing sector

Research Hypotheses

Ho_1: Examine the effect of bank credits on manufacturing sector

Ho_2: Determine the effect of bank demand deposit on manufacturing sector.

Ho_3: Ascertain the effect of bank lending rate on manufacturing sector.

Ho₄: Examine the effect of interest rate on manufacturing sector.

Ho₅: Determine the effect of exchange rate on manufacturing sector.

Ho₆: Examine the effect of workers incentives on manufacturing sector.

Ho₇: Ascertain the effect of employment generation on manufacturing sector

2. METHODOLOGY

Model Specification

Using the knowledge gained from the above theoretical framework, the study examined the impact of bank credit on the manufacturing subsectors in Nigeria by adopting Ogar, Nkamare & Charles' type model and modified it to incorporate variables of the study as bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation. But with this little modification, bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation are the explanatory variables, while manufacturing subsector is used as the dependent variable. Thus, the model for the study is specified as:

The functional form of the model is:

$$MASS = (BNC, BD3, BLR, INT, EXR, WIN, EMG) \qquad . \qquad . \qquad . \qquad (1)$$

The mathematical form of the model is:

$$MASS = \beta_0 + \beta_1 BNC + \beta_2 BD3 + \beta_3 BLR + \beta_4 INT + \beta_5 EXR + \beta_6 WIN + \beta_7 EMG \qquad (2)$$

The econometric form of the model is:

$$MASS = \beta_0 + \beta_1 BNC + \beta_2 BD3 + \beta_3 BLR + \beta_4 INT + \beta_5 EXR + \beta_6 WIN + \beta_7 EMG + \mu_i \quad (3)$$

Where MASS = Manufacturing subsectors proxied by MASS output (aggregate)

BNC = Bank credits to Manufacturing subsectors (aggregate)

BD3 = Bank demand deposit

BLR = Bank lending rate to MASS (aggregate)

INT = Interest rate

EXR = Exchange rate

WIN = Workers incentives proxied by government expenditure on motivating MASS workers (aggregate)

EMG = Employment generation proxied by employment growth rate

β_0 =   Constant term

$\beta_1 – \beta_7$ = Coefficient of parameters

μ_i = Stochastic error term

Method of Data Analysis

The economic technique employed in the study is the ordinary least square (OLS). This is because the OLS computational procedure is fairly simple and it is the best linear estimator among all unbiased estimation. It is efficient and has shown to have the smallest minimum variance thus, it is the best linear unbiased estimator (BLUE) in the classical linear regression (CLR) model. Basic assumptions of the OLS are related to the forms of the relationship among the distribution of the random variance (μ_i).

OLS is a very popular method and in fact, one of the most powerful methods of regression analysis. It is used exclusively to estimate the unknown parameters of a linear regression model. The Economic views (E-views) software will be adopted for regression analysis.

Evaluation based on economic a priori criteria

This could be carried out to show whether each regressor in the model is comparable with the postulations of economic theory; i.e., if the sign and size of the parameters of the economic relationships follow with the expectation of the economic theory. The a priori expectations, in tandem with the manufacturing sector growth and its determinants are presented in Table 3.1 below, thus:

Table 1: Economic a priori expectations for the model

Parameters	Variables		Expected Relationships	Expected Coefficients
	Regressand	Regressor		
β_0	MASS	Intercept	+/-	$0< \beta_0 >0$
β_1	MASS	BNC	+	$\beta_1 > 0$
β_2	MASS	BD3	+	$\beta_2 > 0$
β_3	MASS	BLR	+	$\beta_3 > 0$
β_4	MASS	INT	-	$\beta_4 < 0$
β_5	MASS	EXR	+/-	$0< \beta_5 > 0$
β_6	MASS	WIN	+	$\beta_6 > 0$
β_7	MASS	EMG	+	$\beta_7 > 0$

Source: Researchers compilation

A positive '+' sign indicates that the relationship between the regressor and regressand is direct and move in the same direction i.e. increase or decrease together. On the other hand, a '-' shows that there is an indirect (inverse) relationship between the regressor and regressand i.e. they move in opposite or different direction.

Evaluation based on statistical criteria: First Order Test

This aims at the evaluation of the statistical reliability of the estimated parameters of the model. In this case, the F-statistic, standard error, t-statistic, Co-efficient of determination (R^2) and the Adjusted R^2 are used.

The Coefficient of Determination (R^2)/Adjusted R^2

The square of the coefficient of determination R^2 or the measure of goodness of fit is used to judge the explanatory power of the explanatory variables on the dependent variables. The R^2 denotes the percentage of variations in the dependent variable accounted for by the variations in the independent variables. Thus, the higher the R^2, the more the model is able to explain the changes in the dependent variable. Hence, the better the regression based on OLS technique, and this is why the R^2 is called the co-efficient of determination as it shows the amount of variation in the dependent variable explained by explanatory variables.

However, if R^2 equals one, it implies that there is 100% explanation of the variation in the dependent variable by the independent variable and this indicates a perfect fit of regression line. While where R^2 equals zero. It indicates that the explanatory variables could not explain any of the changes in the dependent variable. Therefore, the higher and closer the R^2 is to 1, the better the model fits the data. Note that the above explanation goes for the adjusted R^2.

The F-test: The F-statistics is used to test whether or not, there is a significant impact between the dependent and the independent variables. In the regression equation, if calculated F is greater than the F

table value, then there is a significant impact between the dependent and the independent variables in the regression equation. While if the calculated F is smaller or less than the table F, there is no significant impact between the dependent and the independent variable.

Evaluation based on econometric criteria: Second Order Test

This aims at investigating whether the assumption of the econometric method employed are satisfied or not. It determines the reliability of the statistical criteria and establishes whether the estimates have the desirable properties of unbiasedness and consistency. It also tests the validity of non-autocorrelation disturbances. In the model, Durbin-Watson (DW), unit root test, co-integration test are used to test for: autocorrelation, multicolinearity and heteroskedasticity.

Test for Autocorrelation

This test is carried out to see if the error or disturbance term (μ_t) is temporarily independent. That is, the values of μ_t at every different period are not the same. It tests the validity of non autocorrelation disturbance. The Durbin-Watson (DW) test is appropriate for the test of First-order autocorrelation and it has the following criteria.

1. If d* is approximately equal to 2 (d* =2), we accept that there is no autocorrelation in the function.

2. If d*= 0, there exist perfect positive auto-correlation. In this case, if 0<d*< 2, that is, if d* is less than two but greater than zero, it denotes that there is some degree of positive autocorrelation, which is stronger the closer d* is to zero.

3. If d* is equal to 4 (d*=4), there exist a perfect negative autocorrelation, while if d* is less than four but greater than two (2<d*< 4), it means that there exist some degree of negative autocorrelation, which is stronger the higher the value of d*.

Test for Multicolinearity

This means the existence of an exact linear relationship among the explanatory variable of a regression model. It is use to determine whether there is a correlation among variables.

Decision Rule: From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity. Also, reject the null hypothesis (H_0), if any two variables in the model are in excess of 0.8 or even up to 0.8. Otherwise we reject.

Test for Heteroscedasticity

The essence of this test is to see whether the error variance of each observation is constant or not. Non-constant variance can cause the estimated model to yield a biased result. White's General Heteroscedasticity test would be adopted for this purpose.

Decision Rule: We reject H_0 if $F_{cal} > F_{tab}$ at 5% critical value. Or alternatively, we reject H_0 (of constant variance i.e., homoskedasticity) if computed F-statistics is significant. Otherwise accept at 5% level of significance.

Test for Research Hypotheses

This study will test the research hypothesis using t-test. The t-statistics test tells us if there is an existence of any significance relationship between the dependent variable and the explanatory variables. The t-test will be conducted at 0.05 or 5% level of significance.

Decision rule: Reject H_0 if $t_{cal} > t_{\alpha/2}$, (n-k). Otherwise, we accept.

Nature and Source of Data

The study attempted to explain the impact of bank credit on Nigeria's manufacturing subsector from 1999-2022 using Ordinary least Square (OLS) technique method. All data used are secondary data obtained from the Statistical Bulletin of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) annual reports and publications.

3. DATA PRESENTATION AND ANALYSIS

Summary of Stationary Unit Root Test

Establishing stationarity is essential because if there is no stationarity, the processing of the data may produce biased result. The consequences are unreliable interpretation and conclusions. We test for stationarity using Augmented Dickey-Fuller (ADF) tests on the data. The ADF tests are done on level series, first and second order differenced series. The decision rule is to reject stationarity if ADF statistics is less than 5% critical value, otherwise, accept stationarity when ADF statistics is greater than 5% criteria value. The result of regression is presented in table 2 below.

Table 2: Summary of ADF test results

Variables	ADF Statistics	Lagged Difference	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
MASS	-6.379781	1	-3.653730	-2.957110	-2.617434	$I(1)$
BNC	-3.989956	1	-3.653730	-2.957110	-2.617434	$I(1)$
BD3	-6.155715	1	-3.653730	-2.957110	-2.617434	$I(1)$
BLR	-6.853553	1	-3.653730	-2.957110	-2.617434	$I(1)$
INT	-10.23662	1	-3.653730	-2.957110	-2.617434	$I(1)$
EXR	-5.163307	1	-3.653730	-2.957110	-2.617434	$I(1)$
WIN	-5.526057	1	-3.653730	-2.957110	-2.617434	$I(1)$
EMG	-7.790108	1	-3.653730	-2.957110	-2.617434	$I(1)$

Source: Researchers computation

Evidence from unit root table above shows that none of the variables are stationary at level difference, that is, $I(0)$. All the variables are stationary at their first difference, that is $I(1)$. Since the ADF absolute value of each of these variables is greater than the 5% critical value, they are all stationary at their different integrated differences. They are also significant at 1% and 10% respectively. Since one of the variables is integrated at level form and some at first difference, we go further to carry out the cointegration test. The essence is to show that although all the variables are stationary, whether the variables have a long term relationship or equilibrium among them. That is, the variables are cointegrated and will not produce a spurious regression.

Summary of Cointegration Test

Cointegration means that there is a correlationship among the variables. Cointegration test is done on the residual of the model. Since the unit root test shows that none of the variable is stationary at level $I(0)$ rather all the variables are at first difference $I(1)$, we therefore test for cointegration among these variables. The result is presented in the tables 3 below for Trace and Maximum Eigenvalue cointegration rank test respectively.

Table 3: Summary of Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None *	0.930032	285.6241	159.5297	0.0000
At most 1 *	0.837419	197.8536	125.6154	0.0000
At most 2 *	0.780507	137.9065	95.75366	0.0000
At most 3 *	0.707391	87.86419	69.81889	0.0009
At most 4	0.454874	47.30985	47.85613	0.0562
At most 5	0.433594	27.28747	29.79707	0.0948
At most 6	0.227752	8.528835	15.49471	0.4107
At most 7	4.23E-09	1.40E-07	3.841466	0.9997

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.930032	87.77049	52.36261	0.0000
At most 1 *	0.837419	59.94710	46.23142	0.0010
At most 2 *	0.780507	50.04235	40.07757	0.0028
At most 3 *	0.707391	40.55434	33.87687	0.0069
At most 4	0.454874	20.02239	27.58434	0.3396
At most 5	0.433594	18.75863	21.13162	0.1040
At most 6	0.227752	8.528835	14.26460	0.3275
At most 7	4.23E-09	1.40E-07	3.841466	0.9997

Source: Researchers computation

Table 3 indicates that trace have 4 cointegrating variables in the model while Maximum Eigenvalue indicated also 4 cointegrating variables. Both the trace statistics and Eigen value statistics reveal that there is a long run relationship between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result is a long run relationship between MASS and other variables used in the model.

Presentation of Result

Having verified the existence of long-run relationships among the variables in our model, we therefore, subject the model to ordinary least square (OLS) to generate the coefficients of the parameters of our regression model. The result of the regression test is presented in table 4 below.

Table 4: Summary of regression results

Dependent Variable: MASS
Method: Least Squares
Sample: 1999 2023
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.39482	9.097329	12.51769	0.0000
BNC	0.605847	0.008945	5.653702	0.0000
BD3	0.348385	0.421148	3.827227	0.0034
BLR	0.178778	0.563559	2.917230	0.0105
INT	-0.225220	0.457988	-4.491760	0.0001
EXC	0.173304	0.054769	3.164269	0.0038
WIN	0.573428	0.109624	5.230879	0.0000

EMG	0.902406	0.578999	2.558564	0.0107
R-squared	0.954408	F-statistic		80.74344
Adjusted R-squared	0.942587	Prob(F-statistic)		0.000000
S.E. of regression	6.861700	Durbin-Watson stat		1.820478

Source: Researchers computation

Evaluation of Findings

To discuss the regression results as presented in table 4, we employ economic a priori criteria, *statistical criteria and econometric criteria.*

Evaluation based on economic a priori criteria

This subsection is concerned with evaluating the regression results based on a priori (i.e., theoretical) expectations. The sign and magnitude of each variable coefficient is evaluated against theoretical expectations.

From table 4, it is observed that the regression line has a positive intercept as presented by the constant (c) = 21.39482. This means that if all the variables are held constant or fixed (zero), MASS will be valued at 21.39482. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

It is observed in table 4 that bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, exchange rate, workers incentives and employment generation have a positive impact on manufacturing subsectors in Nigeria, although, exchange rate was expected to be either positive or negative. This implies that a unit increase in bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, exchange rate, workers incentives and employment generation will lead to an increase in the MASS in Nigeria. On the other hand, bank interest rate has a negative impact on manufacturing subsectors in Nigeria. This means that as bank interest rate is increasing MASS will be decreasing in Nigeria.

From table 4, it is observed that all the variables conform to the a priori expectation of the study. Thus, table 5 summarizes the a priori test.

Table 5: Summary of economic a priori test

Parameters	Variables		Expected Relationships	Observed Relationships	Conclusion
	Regressand	Regressor			
β_0	MASS	Intercept	+/-	+	Conform
β_1	MASS	BNC	+	+	Conform
β_2	MASS	BD3	+	+	Conform
β_3	MASS	BLR	+	+	Conform
β_4	MASS	INT	-	-	Conform
β_5	MASS	EXR	+/-	+	Conform
β_6	MASS	WIN	+	+	Conform
β_7	MASS	EMG	+	+	Conform

Source: Researchers compilation

Evaluation based on statistical criteria

This subsection applies the R^2, adjusted R^2, the S.E and the f–test to determine the statistical reliability of the estimated parameters. These tests are performed as follows:

From our regression result, the coefficient of determination (R^2) is given as 0.954408, which shows that the explanatory power of the variables is very high and/or strong. This implies that 95% of the variations

in the growth of the manufacturing subsectors are being accounted for or explained by the variations in bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation in Nigeria. While other determinants of MASS not captured in the model explain just 5% of the variation in manufacturing subsectors in Nigeria.

The adjusted R^2 supports the claim of the R^2 with a value of 0.942587 indicating that 94% of the total variation in the dependent variable (manufacturing subsectors are explained by the independent variables (the regressors)). Thus, this supports the statement that the explanatory power of the variables is very high and strong.

The standard errors as presented in table 4 show that all the explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates.

The **F-statistic:** The F-test is applied to check the overall significance of the model. The F-statistic is instrumental in verifying the overall significance of an estimated model. The hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_\alpha$ (k-1, n-k) at $\alpha = 5\%$, accept if otherwise.

Where; V_1 / V_2 Degree of freedom (d.f)

$V_1 = n-k$, $V_2 = k-1$:

Where; n (number of observation); k (number of parameters)

Where k-1 = 8-1= 7

Thus, n-k = 35-8   = 27

Therefore, $F_{0.05(7,27)} = 2.01$ (From the F table)   … F-table

F-statistic = 80.74344   (From regression result)   … F-calculated

Since the F-calculated > F-table, we reject H_0 and accept H_1 that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables in the model.

Evaluation based on econometric criteria

In this subsection, the following econometric tests are used to evaluate the result obtained from our model: autocorrelation, heteroscedasticity and multicolinearity.

Test for Autocorrelation

Using Durbin-Watson (DW) statistics which we obtain from our regression result in table 4, it is observed that DW statistic is 1.820478 or approximately 2. This implies that there is no autocorrelation since d* is approximately equal to two. 1.820478 tends towards two more than it tends towards zero. Therefore, the variables in the model are not autocorrelated and that the model is reliable for predications.

Test for Heteroscedasticity

This test is conducted using the white's general heteroscedascity test. The hypothesis testing is thus:

H_0: There is a heteroscedasticity in the residuals

H_1: There is no heteroscedasticity in the residuals

Decision rule: Reject H_0 if the computed f-statistics is significant. Otherwise, accept at 5%level of significance. Hence, since the F-calculated is significant, we reject H_0 and accept H_1 that the model has no heteroscedasticity in the residuals and therefore, reliable for predication.

Test for Multicolinearity

This means the existence of an exact linear relationship among the explanatory variable of a regression model. This means the existence of an exact linear relationship among the explanatory variable of a regression model. This will be used to check if collinearity exists among the explanatory variables. The basis for this test is the correlation matrix obtained using the series. The result is presented in in table 6 below.

Table 6: Summary of Multicollinearity test

Variables	Correlation Coefficients	Conclusion
BNC and BD3	-0.355885	No multicollinearity
BNC and BLR	0.107577	No multicollinearity
BNC and INT	0.360529	No multicollinearity
BNC and EXR	0.754336	No multicollinearity
BNC and WIN	0.712719	No multicollinearity
BNC and EMG	-0.059948	No multicollinearity
BD3 and BLR	0.615955	No multicollinearity
BD3 and INT	0.399306	No multicollinearity
BD3 and EXR	-0.301486	No multicollinearity
BD3 and WIN	-0.171593	No multicollinearity
BD3 and EMG	-0.160836	No multicollinearity
BLR and INT	0.727891	No multicollinearity
BLR and EXR	0.323525	No multicollinearity
BLR and WIN	0.449322	No multicollinearity
BLR and EMG	-0.460192	No multicollinearity
INT and EXR	0.500988	No multicollinearity
INT and WIN	0.591169	No multicollinearity
INT and EMG	-0.512462	No multicollinearity
EXR and WIN	0.705568	No multicollinearity
EXR and EMG	-0.137016	No multicollinearity
WIN and EMG	-0.331768	No multicollinearity

Source: Researchers computation

Decision Rule: From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity. We therefore, conclude that the explanatory variables are not perfectly linearly correlated.

Test of Research Hypotheses

The test is used to know the statistical significance of the individual parameters. Two-tailed tests at 5% significance level are conducted. The Result is shown on table 6 below. Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

Degree of freedom (df) = n-k = 35-8 = 27

So, we have:

$T_{0.025(27)} = 2.052$　　　…　　Tabulated t-statistic

In testing the working hypotheses, which partly satisfies the objectives of this study, we employ a 0.05 level of significance. In so doing, we are to reject the null hypothesis if the t-value is significant at the chosen level of significance; otherwise, the null hypothesis will be accepted. This is summarized in table 7 below.

Table 7: Summary of t-statistic

Variable	t-tabulated ($t_{\alpha/2}$)	t-calculated (t_{cal})	Conclusion
Constant	±2.052	12.51769	Statistically Significant
BNC	±2.052	5.653702	Statistically Significant
BD3	±2.052	3.827227	Statistically Significant
BLR	±2.052	2.917230	Statistically Significant
INT	±2.052	-4.491760	Statistically Significant
EXR	±2.052	3.164269	Statistically Significant
WIN	±2.052	5.230879	Statistically Significant
EMG	±2.052	2.558564	Statistically Significant

Source: Researchers computation

We begin by bringing our working hypothesis to focus in considering the individual hypothesis. From table 4.6, the t-test result is interpreted below;

For BNC, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that BNC have a significant impact on MASS.

For BD3, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. Thus, BD3 do have a significant impact on MASS.

For BLR, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that BLR do has a significant impact on MASS.

For INT, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that INT has a significant impact on MASS.

For EXR, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that EXR do has a significant impact on MASS.

For WIN, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. Thus, WIN does have a significant impact on MASS.

For EMG, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that EMG do has a significant impact on MASS.

4. CONCLUSIONAND RECOMMENDATIONS

In executing the study, the OLS techniques was applied after determining stationarity of our variables using the ADF Statistic, as well as the cointegration of variables using the Johansen approach and discovered that the variables are stationary and have a long term relationship among the variables in the model. From the result of the OLS, it is observed that bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, exchange rate, workers incentives and employment generation have positive impacts on the manufacturing subsectors in Nigeria, although, exchange rate was expected to be either positive or negative. This implies that a unit increase in bank credits to manufacturing subsectors, bank demand deposit, bank lending rate, exchange rate, workers incentives and employment generation will lead to an increase in the MASS in Nigeria. On the other hand, bank interest rate has a negative impact on manufacturing subsectors in Nigeria. This means that as bank interest rate is increasing MASS will be decreasing in Nigeria.

From the regression analysis, the result showed that all the variables conform to the a priori expectation of the study which indicates that bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation are major determinants of manufacturing subsectors in Nigeria. The F-test conducted in the study shows that the model has a goodness of fit and is statistically different from zero. In other words, there is a significant impact between the dependent and independent variables in the model. The findings of the study also show that bank credits to manufacturing subsectors, Bank demand deposit, bank lending rate, bank interest rate, exchange rate, workers incentives and employment generation are statistically significant in explaining inflation in Nigeria. Finally, the study shows that there is a long run relationship exists among the variables. Both R^2 and adjusted R^2 show that the explanatory power of the variables is very high and/or strong. The standard errors show that all the explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates.

Based on the findings from the study, the researcher makes the following recommendations: The government should adequately finance the manufacturing subsector through loans and advances to help businesspersons finance, expand and produce new goods thereby increasing rate of employment and enhancing economic growth. The government should ensure that depositors fund is safe in the banks so that they can mobilize resources through demand deposit and channel same to the manufacturing subsector to enhance production and distribution of goods and services. The government should ensure that banks reduce their lending rate. This will *ensure increase in investment* and consequently enhance economic growth.

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