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INTEREST RATE DYNAMICS AND ITS IMPACT ON THE PERFORMANCE OF THE MANUFACTURING SUB-SECTOR IN NIGERIA

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ABSTRACT: *The major focus of the research is to empirically investigate the impact of interest rate dynamics on performance of manufacturing- sub sector in Nigeria. The research covers the period between 1980 and 2019.This period is important since it includes the pre-structural adjustment programme (SAP) era where interest rate was not liberalized and the structural adjustment programme period where interest rate is liberalized. The cointegration technique with its implied error correction mechanism was used for the study. The result shows that the high interest rate in Nigeria has hindered the performance of the manufacturing sub sector. The GARCH and ARCH results indicates that interest rate dynamics has influenced the performance of the manufacturing sub- sector. The result also confirms a long run relationship among the variables. It was therefore recommended amongst others, that there should be a drastic reduction in the interest rate coupled with the adoption of liberalized interest rate regime with some caution; this will increase the performance of the manufacturing sub- sector in Nigeria.*
KEYWORDS: manufacturing sub-sector, minimum rediscount rate, monetary policy rate, treasury bills, and inflationary spiral**.**

INTRODUCTION

Although Nigeria had embarked on financial sector reforms in 1987, the economy continued to move on the brink of collapse with volatility in virtually all major macroeconomic aggregates. The economy is still characterized by infrastructural decay, widespread corruption, inefficiency in private and public sector as well as low level of private sector participation in economic activities. The net result is a near collapse in investment level leading to decline of real output and falling per capita income from 1980 to the present day.

Experts have posited that structural reforms good as it may seems must transcend mere macroeconomic stabilization. It must logically involve increase in productive investment so that increased national income and eventually full employment can be achieved (Fitzherid et al 1992). This is supported by the Economic Commission for Africa ECA (1999) when it posited that economic growth as an expansion of macro capacity of an economy is a function of the distribution of current resources between consumption and investment needs to achieve sustainable growth and development.

The introduction of SAP led to the financial sector reform like; deregulation of interest rate, exchange rate and other deregulations according to (Ogwuma, 1993; Ojo, 1993). However as a reversal policy the government in January 1994 expressly introduced some measures of regulation into interest rate management owing to wide variations and unnecessary high rate under the complete deregulation of interest rates.

In light of the above, the deposit rates were once again set at 12.45% per annum while a ceiling of 21% per annum was fixed for lending rate. The ceiling on interest rates introduced in 1994 was retained in 1995 with a little modification for flexibility but was lifted in October 1996 to pursue a flexible interest rate regime as observed by Omole and Falokun (1999). In line with the adoption of the market-based technique of monetary management, interest rates policy remained flexible and responsive to changes in market conditions. However, as an instrument of monetary policy the Central Bank of Nigeria CBN in 2000 indirectly influenced the level and direction of change in interest rate movement through its intervention rate on various money market instruments especially the Minimum Rediscount Rate (MRR) as well as the stop rate of weekly tender for treasury bills. The MRR as the nominal anchor of CBN's interest rate policy continued to be used proactively in line with prevailing economic conditions while the rate of treasury bills was made competitive with comparable money market instruments CBN (2006). Further, the MRR has undergone some fluctuations since 1987 to date as a result of the changes in the CBN policies which in turn have changed the overall economic conditions. In August 1987, it was 15.0% and was reduced to 12.75% in December of 1987 with the objective of stimulating investment and growth in the economy. In 1989, the MRR was raised to 13.25% in order to contain inflation. To further liberalize interest rate management, the ceiling on interest rate was lifted in 1992 and re-imposed in 1994 when inflationary spiral could not be contained. However, in October 1996, interest rates were fully deregulated with the banks given freedom to determine the structure of interest rates in consultation with their customers. The CBN however, retained its discretionary power to intervene in the money market to ensure tolerable movement in interest rates. The policy of interest rate deregulation has been retained since 1997 while the MRR was replaced with the Monetary Policy Rate (MPR). Again, the MPR was brought down to 10% from 14% with a lending rate of 13% and a deposit rate of 7% which stood as a standing policy intended to stem volatility in interest rates especially that of the interbank rates.

It is pertinent to know that under a deregulated interest rate system, the market plays a vital role in determining the rate of interest. This implies that both banks and their customers are free to be on the round tables to negotiate and arrive at a suitable interest rate on deposits and loans respectively.

Only recently with the outbreak of the coronavirus, the Central Bank of Nigeria (CBN) in carrying out its Financial System Stability mandate, released measures to battle the economic impact of COVID-19.One of such interventions is the reduction of interest rate on its intervention loans from 9% to5%.It also extended the moratorium on such loans from one to two years.

The apex bank also came up with a regulatory forbearance to enable Deposit Money Banks restructure their customers' loans with a view to reducing the burden on businesses and households. These measures have become necessary due to unprecedented disruption in global supply chains, sharp reduction in demand for crude oil, turmoil in global stock and financial markets ,wide spread cancellation of sporting activities and restrictions in travelling among others.

However, ,it must be emphasized that the reduction in interest rate relates only to CBN intervention loans, implying that all other loans outside this coverage are not affected by the new directive.

Empirical evidence abounds that the financial sector reform with objective of low interest rate did not achieve the desired level of interest rate regime (Usman 2001). This observation among others has necessitated the researcher to investigate the impact of interest rate dynamics (changed) on the performance of the manufacturing sub sector of the Nigerian economy.

OBJECTIVES OF THE RESEARCH

The major objective of the research is to empirically investigate the impact of interest rate dynamics on the performance of manufacturing sub sector of the Nigerian economy. The specific objectives include, To:

- establish the impact of interest rate variation on the performance of the manufacturing sub-sector.
- examine the impact of inflation on the performance of the manufacturing sub- sector.
- evaluate the relationship between exchange rate and manufacturing sub-sector performance.
- ascertain the relationship between economic growth on manufacturing-sub sector performance.

RESEARCH HYPOTHESES

The following hypotheses will be tested. They are stated in the null form.

$HO_{(1)}$ There is no significant relationship between interest rate variation and the level of manufacturing output in Nigeria.

$HO_{(2)}$ There is no significant relationship between inflation rate and manufacturing output in Nigeria.

$HO_{(3)}$ There is no significant relationship between exchange rate and manufacturing output in Nigeria.

$HO_{(4)}$ There is no significant relationship between the level of economic growth and manufacturing output.

THEORETICAL UNDER PINNINGS

The real sector encompasses key productive sectors which include manufacturing sub-sector of which private investment and foreign direct investment are components. A theoretical model of

the form outlined below will be used i.e. Chingande et al (2012) theoretical framework will be adopted.

According to the theory, the drivers of the real sector i.e. manufacturing, foreign direct investment, private investment fall into two categories which are the rate of return (A) and risky factors (B) for which there is a positive response of the manufacturing output to interest rate and a negative response to the risk factors:

$$MQ = f(A,B)$$

where: MQ is manufacturing output,

A Is a collection of factors affecting the rate of return on manufacturing that includes interest rate (IR), inflation (INFL), rate of economic growth (GDP), exchange rate (ER), Corporate taxes (CT), labour cost (LC) etc.

B Which stands for the risk factors (RF) associated with real sector and manufacturing output. Such risk include: political instability, war, and failure to observe democratic tenets etc.

The result is a theoretical model of the form:

$$MQ = f(IR, INFL, GDP, ER, CT, LC, RF)$$

One of the assumptions of the classical linear Regression model (CLRM) is that there should be variability (dynamics) in the x – variable (independent variables) including interest rate hence the econometric model as given below:

$$MQ = \propto + \propto_1 IR + \propto_2 INFL + \propto_3 ER + \propto_4 RGDP + Vt$$
$$\propto_1 < 0,\ \propto_2 < 0,\ + \propto_3 > 0,\ \propto_4 > 0$$

Where MQ is manufacturing output, IR is interest rate, INFL is inflation rate, ER is the exchange rate, RGDP is the Real Gross Domestic product. $\propto_1$, $\propto_2$, $+ \propto_3$, $\propto_4$ are parameters to be estimated and they measure the slope of the regression equation. Where in natural logarithm form, they represent the various elasticities. Vt is the random variable which accounts for other factors not included in the model.

LITERATURE REVIEW

Jhingan (2005) defined interest rates as the rental payment for the use of credit by borrowers and return for parting with liquidity by lenders. Like other prices, interest rates perform a rationing function by allocating limited supply of credit among the many competing demands. Interest rate may also be seen as the price of credit which might be subject to distortions due to inflation. According to Wikipedia (2005) an interest rate is the rate at which interest is paid by a borrower for the use of money that they borrow from a lender. It can also be seen as a rate which is charged or paid for the use of money and is usually expressed on an annual basis.

Mckinnon and Shaw (1973) argued in favour of financial liberalization as medium of promoting saving, investment, and growth. Their argument was based on the fact that real interest rates are frequently negative in developing countries due to administrative controls on the nominal interest rates and heavy regulation in the financial market. This is supported by Udude(2015) and Fatoumata(2017). They contended that in those countries where self financing is very important and interest rate is negative or very low, an upward increase in real deposit rates encourages savings (the substitution effect dominates the income effect) and the substitution from goods to bank deposits. Both have positive effects on private investment because self financing investment rises and because there is a rise in the availability of funds to finance any profitable investment project. However, at higher rates, economic agents would prefer to hold deposits that yield a higher return than investment in physical capital. Therefore, at high rates, investment and real bank rates are expected to be negatively related. Hence, Mckinnon's arguments imply a nonlinear relationship between real interest rates and private (real sector) investments.

Further private investment can be nonlinear in credit availability (Guncavdi et al 2008). That is, if we expect that credit constraints are present at all levels of interest rates, then when the effect of an increase in the real interest rates in the loan supply is higher than the cost brought about by higher rates due to asymmetric information problems, a decrease in the sensitivity of private investment on credit availability at higher rates should be expected as well.

The effect of real interest rates on private (real sector) investment spending was also formalized in an investment equation by Jorhenson 2013) who derived the desired stock of capital as a function of real output and the opportunity cost of capital. In this a representative firm maximizes the present value of its future cash flows. The desired capital stock is directly related to output and inversely related to cost of capital. A decrease in real interest rate lowers the opportunity cost of capital and therefore raises the desired capital stock and investment spending. Fry (1988) also posited that an increase in real interest rates has a positive effect on the volume and on quality of investment in financially repressive economies. The former effect is seen because self financing is important and investment is lumpy. Then the economic agents accumulate resources before any investment project is executed. Increases in real interest rates thus stimulate both total and financial savings and consequently, investment. The latter effect, via improvement in the quality of investment occurs because a higher, interest rate will rule out investment projects with low productivity. At the same time, higher rates move resources form less efficient (e.g. goods facing depreciation) to more efficient form of accumulation (e.g. bank deposits with a more favourable return).

Luintel (2001) posited that data on interest rates is only available since the eighties or early nineties for most of developing countries; therefore there is not an abundance of empirical work testing the effect of interest rates or cost of capital on private (real sector) investment for developing countries. He noted that previous work for developing countries is not only sparse but also shows mixed results for the effect of interest rates on real sector investment. For instance, Warman and Thirwall (1994) showed a negative and significant relationship using data for Mexico. Demelo and Tybout (2006) report a negative but statistically insignificant effect using data for Uraguay. Laumas (2000) and Athukorala (1998) found a positive relationship between real interest rate on deposits

and private (real sector) investment in India. With respect to the relationship between the cost of capital and investment, the relation is found to be negative in Athukorala (1998) but positive in Guncavid et al (2008) for Turkey.

MATERIAL AND METHOD

All computations in this study were carried out using an econometrics software known as e-views 7.1 version. The cointegration and vector error correction modeling was adopted for this study. But before proceeding to test for cointegration and estimation of parameters, the augmented Dickey – Fuller unit root test was carried out to test the stationarity of the time series data. In addition, the following diagnostic checks was also carried out:

1. Autocorrlation LM Test
2. White Heteroskedacity Test
3. Residual Normally Test
4. Variance decomposition

One interesting issues that remain is how manufacturing sub- sector reacts to shocks in any of those monetary variables. Which shock is relatively the most important and how long, on average, it will take for the manufacturing sub sector to restore its equilibrium following such shock. The usual block F-tests and an examination of causality in a VAR will show which of the variables in the model have statistical influence on the future values on each of the variables in the system. However, these tests will not reveal whether changes in a value of a given variable have a negative or positive influence on the other variables in the system, or how long it would take for the effect to work through the system (Brooks, 2002) To provide such information, Lutkepohl and Reimers (1992) developed impulse response and forecast error variance decomposition analyses for a VAR process with cointegrated variables.

Further information on the linkages between the manufacturing sector and interest rate can be obtained from variance decomposition, which measure the proportion of forecast error variance in a variable that is explained by innovations (impulses) in itself and the other variables. Variance decompositions performed on the VECM may provide some information on the relative importance of shocks in our model. In other words, variance decompositions give the proportion of the movements in the dependent variables that are due to their 'own' shocks (innovation), versus shocks to the other variables (Brooks, 2002). Brooks also observed that own series shocks explain most of the forecast error variance of the series in a VAR. the same factorization technique and information used in estimating impulse responses is applied in the variance decompositions.

FINDINGS AND DISCUSSION

The first step in analyzing the results is the unit root test. This is followed by the cointegration test and the error corrections. The variance decomposition is the last in the session.

UNIT ROOT TEST

The Augemented Dickey fuller (ADF) unit root test was used to assess the data. The result of the ADF unit root test is shown in table I below:

Summary of ADF Unit Root Test Result

Variable	Level Data	First difference	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
MQ	-1.64	-6.22*	-3.67	-2.96	-2.62	1(1)
RGDP	1.96	-3.87*	-3.67	-2.96	-2.62	1(1)
ER	-0.06	-3.56**	-3.67	-2.96	-2.62	1(1)
INFL	-3.09	-5.38*	-3.67	-2.76	-2.62	1(0)
IR	-2.18	-5.15*	-3.67	-2.76	-2.62	1(1)

Source: Author's Computation

NB:* Indicates statistical significance at the 1% le
** indicates statistical significance at the 5 percent level.

The result shows that all the variables except inflation were originally non-stationary. They however became stationary after the first difference was taken. That is they are 1(1). Inflation was stationary at the levels because it is in percentages. This thus leads us to the test for cointegration.

COINTEGRATION TEST

The Johansen cointegration test was used to test for the existence of a long run relationship among the variables.

The result of the cointegration test is shown in table2

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.913180	152.0865	68.52	76.07
At most 1 **	0.742536	78.76888	47.21	54.46
At most 2 **	0.537871	38.06260	29.68	35.65
At most 3	0.326978	14.90524	15.41 3.76	20.04
At most 4	0.095945	3.025941		6.65
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.913180	73.31759	33.46	38.77
At most 1 **	0.742536	40.70628	27.07	32.24
At most 2 *	0.537871	23.15736	20.97	25.52
At most 3	0.326978	11.87930	14.07	18.63
At most 4	0.095945	3.025941	3.76	6.65

Table 2: Summary of Johansen cointegration test.
Author's Computation

The result of the Johansen cointegration in both the trace statistic and the Max-Eigen statistic indicates three cointegrating equation in each case. This is an indication of the existence of a long run relationship among the variables. The existence of a long run relationship enables us to test for what constitutes the true cointegrating equation. The vector Error correction (VEC) was used for this purpose.

VECTOR ERROR CORRECTION (VEC)

The VEC result is used in this case to identity the true cointegrating equation. The relevant section of the VEC result is shown below:

Cointegrating Eq:	CointEq1				
LMQ(-1)	1.000000				
LIR(-1)	0.690405 (0.23155) [2.98166]				
LER(-1)	0.319936 (0.07528) [4.24967]				
LRGDP(-1)	-2.748007 (0.25061) [-10.9651]				
INFL(-1)	-0.065381 (0.00434) [-15.0681]				
C	23.75996				
Error Correction:	D(LMQ)	D(LIR)	D(LER)	D(LRGDP)	D(INFL)
CointEq1	-0.831401 (0.33612) [-2.47350]	0.065435 (0.09125) [0.71707]	0.225631 (0.13903) [1.62290]	-0.039128 (0.01629) [-2.40220]	6.481444 (6.42921) [1.00812]

Table 3: Summary of VEC result:

VEC result indicate that the manufacturing output and the Real Gross Domestic Product equation constitutes the true cointegrating equations.

Overparameterize Error Correction mechanism (ECM) Model

The Overparameterize ECM result involves two lags each of the independent variables. The result of the overparameterize ECM result is shown below:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLIR	-2.348888	0.725388	-3.238112	0.0051
DLIR(-1)	0.298140	0.714619	0.417202	0.6821
DLIR(-2)	1.290363	0.608272	2.121359	0.0499
DLRGDP	-15.38886	4.509800	-3.412317	0.0036
DLRGDP(-1)	3.658601	3.402371	1.075309	0.2982
DLRGDP(-2)	-0.255177	0.458867	-0.556102	0.5858
INFL	-0.036882	0.012117	-3.043727	0.0077
INFL(-1)	0.046344	0.014851	3.120597	0.0066
INFL(-2)	-0.039531	0.011561	-3.419282	0.0035
DLER	-0.542089	0.479803	-1.129816	0.2752
DLER(-1)	0.667347	0.178440	3.739888	0.0000
DLER(-2)	-0.250345	0.498093	-0.502608	0.6221
ECM(-1)	-0.331315	0.145534	-2.276540	0.0310
C	1.361841	0.455694	2.988498	0.0087

Table 4: Summary of Overparameterize ECM Result
R_2 = 0.72, DW = 2.18, AIC = 2.14, SC = 2.79
Author's Computation

The parsimonious (Preferred) ECM result was gotten by deleting insignificant variables from the overparameterize ECM result. The Aikaike information criterion are used in selecting the appropriate lag length.

Parsimonious ECM Result and Test of Hypotheses.

The parsimonious ECM result was used in testing the various hypotheses. The result of the parsimonious ECM result is shown below:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLIR	-0.694378	0.057300	-12.11823	0.0000
DLIR(-2)	-0.278391	0.107894	-2.580236	0.0139
DLRGDP	0.250679	0.063116	3.971709	0.0005
INFL	-0.036346	0.010045	-3.618386	0.0016
INFL(-1)	-0.042171	0.011776	-3.581004	0.0018
INFL(-2)	-0.032745	0.009448	-3.465871	0.0023
DLER(-1)	0.833970	0.389805	2.139453	0.0443
ECM(-1)	-0.383472	0.178956	-2.142827	0.0413
C	1.109727	0.311584	3.561564	0.0018

Table 5: Parsimonious ECM Result:

R_2 = 0.67, AIC = 1.96, SC = 2.38, DW = 2.14,t critical 1.96 ,

The t test in the parsimonious ECM result was used to test the various hypothesis. The decision rule is to validate the alternative hypothesis if the t calculated is greater than t critical and the reverse is true if the t calculated < t critical

TEST OF HYPOTHESIS I

The first hypothesis is restated below. There is no significant relationship between interest rate and the output of the manufacturing sector.

The t calculated in this regard with a value of -12.11 is > t critical of 1.96. this is an indication of the validation of the alternative hypothesis that there is a significant relationship between interest rate and manufacturing output. This provides an indication that variations in the interest rates has influenced the real sector performance in Nigeria.

TEST OF HYPOTHESIS TWO

The second hypothesis is restated below:

There is no significant relationship between the level of Economic growth and manufacturing output.

The t calculated (3.97) > t critical (1.96). This is an indication of the validation of the alternative hypothesis.

That there is a significant relationship between the level of economic growth and manufacturing output in Nigeria. The result insinuates that the level of economic growth matters for the performance of the manufacturing sector in Nigeria.

TEST OF HYPOTHESIS THREE

There is no significant relationship between the inflation rate and the output of the manufacturing sector.

The t calculated (-3.58) > t critical (1.96) an indication of the validation of the alternative hypothesis that there is a significant relationship between inflation rate and the output of the manufacturing sector in Nigeria. An indication that he real sector is influenced by the general price level.

TEST OF HYPOHESIS FOUR

There is no significant relationship between the exchange rate and the level of manufacturing output in Nigeria.

The t calculated (-3.47) > t critical (1.96). An indication of the validation of the alternative hypothesis that there is a significant relationship between exchange rate and the output of the manufacturing sector in Nigeria. An indication that the operators of the real sector in Nigeria are concerned about the exchange rate.

ARCH/GRACH

The Autoregressive conditional Heteroskedasticity (ARCH) and the generalized Autoregressive conditional Heteroskedasticity (GARCH) was used to test whether or not interest rate dynamics has influenced the performance of the manufacturing sector in Nigeria. The result is shown below:

Table 6: ARCH/GARCH test Dependent variable: LMQ. Please see Table 6 BELOW:

	Coefficient	Std. Error	z-Statistic	Prob.
LIR	0.193709	0.412276	0.469852	0.6385
C	9.171800	1.236519	7.417438	0.0000
	Variance Equation			
C	0.040281	0.016353	2.463159	0.0138
ARCH(1)	0.108651	0.038276	2.838650	0.0045
GARCH(1)	0.960448	0.078782	12.19127	0.0000

The summation of the ARCH (1) and the GARCH (1) is approximately unity. This provides an indication that the interest rate dynamics has influenced the performance of the manufacturing sector.

DIAGNOSTIC CHECKS:

The various diagnostic checks are shown in table 7 below:
Table 7: Summary of Diagnostic test results. Appendix 9-11

		Jarque-Bera	
Jarque-Bera	3.68	Probability	0.16
		White Heteroskedasticity	
F Statistic	1.12	Probability	0.42
		Brevsch – Godfrey Serial Correlation LM Test	
F Statistic	3.42	Probability	0.05

The Jarque-bere normality test was used to test whether the residuals are normally distributed indicates that the residuals are normally distributed. The white heteroskedasticity test indicate that the residuals are homoskedastic. The Brevsch – Godfrey serial correlation test indicates that there is no serial correlation in the model.

STABILITY TEST

The result of the cumulated sum of Recorsive Residuals (COSUM) and the cumulative sum of squares of Recorsive residuals (C0SOMQ) is shown in the graphs below:
Figure 1: CUSUM Stability test: Appendix12

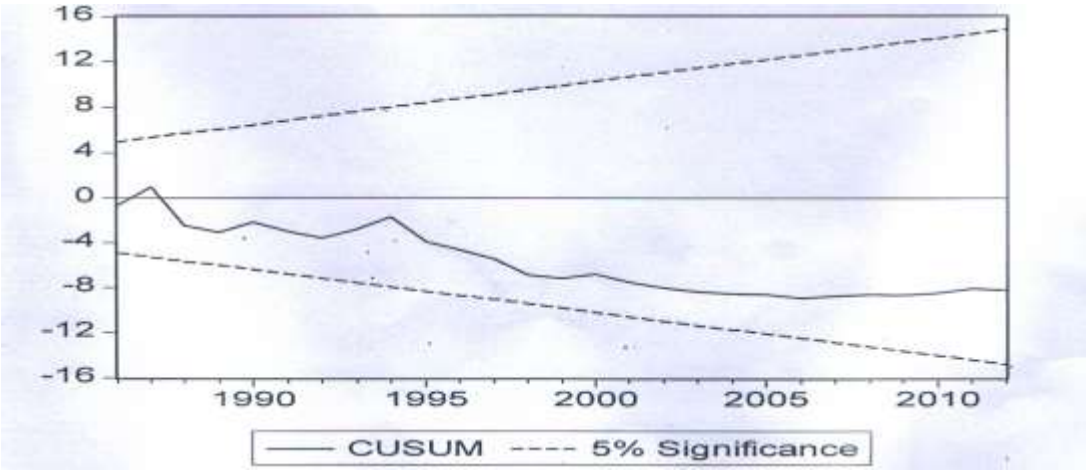
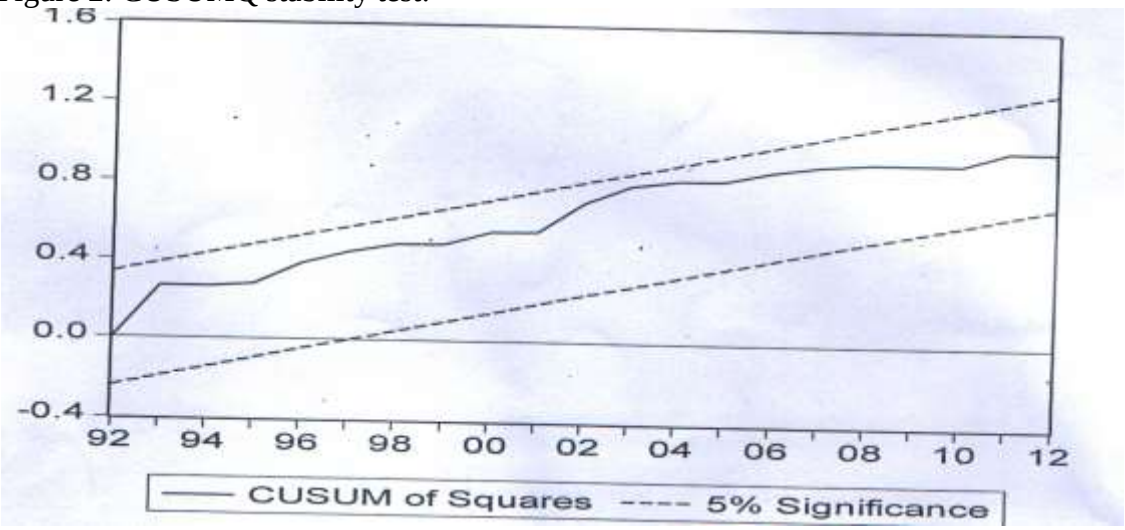


Figure 2: CUSUMQ stability test:



The result of the CUSUM and CUSUM indicates residual stability. Since the CUSUM and CUSUMQ lines falls in-between the two 5% lines.

VARIANCE DECOMPOSITION

What happen to the manufacturing sector performance if for example, there is a sudden change or shock in interest rate? This will be tested using the Cholesky Variance decomposition. The result is shown below:

Variance Decomposition of LMQ:

Period	S.E.	LMQ	LIR	LER	LRGDP	INFL
1	0.745280	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.896356	82.17173	2.286586	1.340945	5.658401	8.542342
3	0.971476	81.99743	3.247318	1.171378	5.705020	7.878851
4	1.118567	74.61222	2.463561	1.185980	10.76642	10.97182
5	1.260082	71.27133	2.528943	0.938852	12.61234	12.64853
6	1.349235	70.24361	2.679521	0.819025	13.03866	13.21918
7	1.430836	69.96581	2.785623	0.772162	13.11489	13.36152
8	1.518603	69.27108	2.857024	0.690412	13.42205	13.75943
9	1.594519	68.81926	2.922993	0.627371	13.62578	14.00460
10	1.666658	68.71720	2.977746	0.585073	13.65344	14.06654

Variance Decomposition of LIR:

Period	S.E.	LMQ	LIR	LER	LRGDP	INFL
1	0.202333	27.42799	72.57201	0.000000	0.000000	0.000000
2	0.264384	16.09168	76.23122	5.852144	1.678863	0.146087
3	0.310939	13.21840	75.53608	9.033313	2.093215	0.118991
4	0.376665	9.106763	75.79884	9.996391	2.860302	2.237699
5	0.434496	7.098316	74.61538	13.63029	2.464349	2.191660
6	0.478119	6.536985	73.13154	15.01274	2.365863	2.952873
7	0.510923	5.748567	73.53202	15.55706	2.101295	3.061054
8	0.548263	5.017760	73.40639	16.95055	1.824819	2.800481
9	0.581698	4.659107	73.04620	17.78508	1.658149	2.851472
10	0.610241	4.295814	73.24072	18.05826	1.522171	2.883039

Variance Decomposition of LER:

Period	S.E.	LMQ	LIR	LER	LRGDP	INFL
1	0.308267	16.81866	27.99367	55.18767	0.000000	0.000000
2	0.482835	13.85361	20.62261	58.51407	2.445558	4.564152
3	0.659143	13.57506	20.24889	50.93944	6.357174	8.879433
4	0.824417	12.40373	19.79733	53.05963	6.221304	8.518009
5	0.938223	10.78286	18.30496	55.95496	5.876581	9.080642
6	1.027985	11.36478	17.37491	56.60857	5.367755	9.283980
7	1.120364	11.91257	16.91036	58.09890	4.621186	8.456980
8	1.201421	11.60397	16.48718	59.53412	4.193525	8.181197
9	1.270259	11.78295	16.16607	60.04435	3.901552	8.105070
10	1.339945	12.07218	15.98831	60.64697	3.562735	7.729797

Variance Decomposition of LRGDP:

Period	S.E.	LMQ	LIR	LER	LRGDP	INFL
1	0.036116	5.051143	3.186121	40.45405	51.30868	0.000000
2	0.061210	2.369770	1.829371	54.11115	41.68186	0.007856
3	0.084356	1.934115	0.967624	63.55698	33.26174	0.279540
4	0.105074	1.254606	1.985471	59.43041	37.09520	0.234315
5	0.126572	1.291905	2.708104	51.26797	43.76755	0.964471
6	0.149955	1.310691	2.860786	44.72540	48.63720	2.465931
7	0.169057	1.185252	3.040375	41.05096	51.54902	3.174392
8	0.185646	1.193546	3.168436	38.22572	53.72350	3.688800
9	0.201481	1.200443	3.150456	36.27459	55.18161	4.192896
10	0.215450	1.159025	3.167731	35.02912	56.19022	4.453905

Variance Decomposition of INFL:

Period	S.E.	LMQ	LIR	LER	LRGDP	INFL
1	14.25537	4.412214	4.500926	0.052799	63.03704	27.99702
2	20.90353	21.68931	2.102836	0.024586	53.38704	22.79623
3	25.13352	29.64961	5.862516	2.525568	42.35300	19.60930
4	26.85500	29.59693	8.465828	6.051002	38.22958	17.65666
5	27.97729	31.47317	8.785583	6.516722	36.77252	16.45201
6	30.29231	34.14378	8.791646	7.097237	34.67511	15.29222
7	32.25805	34.59308	9.161451	8.821209	33.01267	14.41160
8	33.60057	35.51767	9.370814	9.498456	31.98785	13.62520
9	35.28474	36.58079	9.399655	9.839766	31.12562	13.05417
10	36.95488	36.85454	9.433201	10.49834	30.53456	12.67936

Cholesky Ordering: LMQ LIR LER LRGDP INFL

Table 8: Cholesky Variance Decomposition.

Manufacturing output explained 100 percent of shocks to itself in the first period. This declines to 69 percent in the last period. Shocks to interest rate explained 3 percents of changes in manufacturing output in the fifth period. This did not change till the last period. Shocks to manufacturing output explained 27 percent of changes in interest rate in the first period. This decreased to 4 percent in the last period. Shocks to manufacturing output explained 17 percent of changes in exchange rate in the first period. This reduced to 12 percent in the last period. Shocks to interest explained about 28 percent of change in exchange rate in the first period and reduced to 16 percent in the last period shocks to manufacturing output explained 5 percent in economic growth in the first period which reduced to 1 percent in the last period. Shocks to interest rate explained about 3 percent of the changes in economic growth in the first period, which did not change in the last period. Shock, to manufacturing output explained about 4 percent of changes in inflation rate in the first period, which increased to 37 percent in the last period. Shock to interest rate explain about 5 percent of shocks to interest rate in the first period which increased to 9 percent in the last period.

CONCLUSION

Interest rate dynamics has been a major policy focus in almost all countries in the globe. The developed and emerging economies like South Korea, China, etc carefully maintain an interest rate policy that improve the performance of the real sector. This is why, sometimes in the United States, the interest rate is reduced to as low as 1 percent in order to boost the performances of the real sector and create jobs. In Nigeria, however, the result indicates that the high interest rate has hindered the performance of the manufacturing sector. The result shows further that an increase in the interest rate by 1 percent reduced the output of the manufacturing sector by 69 percent. This high elasticity is an indication of the damage that high interest rate policy has caused to the manufacturing and by extension real sector of Nigerian economy.

GARCH(1) and ARCH(1) results indicates that the dynamics in interest rate has influenced the output of the manufacturing sector in Nigeria. The cointegration result shows a long run relationships among the variables. The Error correction mechanism indicates a satisfactory speed of adjustment. It shows that about 38 percent of the errors is corrected each period.

RECOMMENDATIONS

We therefore recommend that the monetary authorities in Nigeria should reduce the interest rate on loans to the manufacturing-sub sector of the economy. This will increase the output of that sector. It is also recommended that concerted efforts should be made to tackle the high inflationary pressure in Nigeria which has hindered the performance of the real sector. Policy makers should learn from the examples of the developed and emerging economics that inspite of adopting the liberalized interest rate policy,authorities sometimes intervene to adopt measures that would push down interest rate with caution and also introducing some internal control measures to encourage real sector performance.

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