IMPACT OF BANK CREDIT ON MANUFACTURING SECTOR OUTPUT IN NIGERIA

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ABSTRACT
This study examines impact of bank credit on manufacturing sector output in Nigeria. The study sourced secondary data from CBN statistical bulletin for the period of 1986-2017. Manufacturing sector output serves as explained variable, while bank credit and inflation rate serve as explanatory variables. The study adopts ADF and PP tests of stationarity to determine the order of integration of the variables; ARDL model and ganger causality to test the hypotheses that bank credit does not have significant impact on manufacturing sector output; there is no significant long-run relationship between bank credit and manufacturing sector output; and there is no causality between bank credit and manufacturing sector output. Post-estimation tests were also conducted. The findings suggest that manufacturing sector output and bank credit at first difference, and inflation rate at level were stationary; unidirectional causality from manufacturing sector output to bank credit; bank credit exerts significant positive impact on manufacturing sector output; and significant long run relationship among variables. The model is, not serially correlated, homoscedastic, normally distributed, and stable. Based on the findings, the study recommends that existing functional policies such as credit rationing should be strengthened to attract potential investors in the manufacturing sector. Regulatory authorities should encourage the manufacturing sector through accessible and affordable bank credit that will encourage investors in the manufacturing sector to access adequate loan facility to enhance productivity in the sector; and specialized institutions should be licensed by CBN that will be solely responsible for allocating soft credit for manufacturing investment in Nigeria.

Keywords: Bank credit; Manufacturing sector; Nigeria
JEL Classification: C32, G21, L16

1. INTRODUCTION
Financial institutions play important role in the provision of the financial support to the real sector in an economy of any nation. The Nigerian financial system is broadly categorized into two major sub-sectors, which are the informal and formal sectors (Mike, 2010; Abubakar & Audu, 2011). While the core path of industrialization all over the world is dominated, shaped and defined by the manufacturing

sector (Mike, 2010). Manufacturing sector is a vital requirement for real sector growth, source of employment and wealth, and the verge for sustainable development (Mike, 2010).

Informed by the mono-economy system of Nigeria that has been threatened by crude oil price fluctuation in the international market, the Nigerian government has come to terms with the need for economic diversification. It is a common knowledge that the manufacturing activities have potential to influence the economy of any nation (Mike, 2010). In developing economies like Nigeria, manufacturing sector accounts for a very low proportion of the total economic activities when compared to advanced economy, where manufacturing sector is a leading sector, and serves as an avenue of increasing the productivity, source of foreign exchange earnings and per capital income. Arguably, the diversification of the Nigerian economy depends to a considerable extent on the development of the manufacturing sector, and as such, its financing requires a considerable attention from all stakeholders. However, despite the various government interventions and policies, and research investigations aimed at revamping and developing the manufacturing sector, the sector output has not been able to meet domestic demand to guarantee economic diversification despite the increasing credit to private sectors over the years. This situation has raised serious concern as to the impact of bank credit on manufacturing sector output in Nigeria.

The volume of bank credit to the private sector of the economy has continued to increase in Nigeria as indicated by CBN (2017). The volume of credit to the private sector has witnessed continuous increase within 1986 through 2017. In 1986 the credit to the private sector stood at 15.25 billion naira, but increased to 180 billion naira in 1995. The amount increased further to 530.37 billion naira in 2010; and it increased further to 21. 8 trillion naira in 2016. Surprisingly, the share of credit to the private sector that goes to the manufacturing sector is characterized with fluctuations. The credit to manufacturing sector as percentage of credit to private sector increased from 38% in 1986 to 67% in 1995 before falling to 22% in 2000; it marginally increased to 27% but falls to 1% in 2012 and later falls further in 2017 (CBN, 2017). Similar trend was observed in the manufacturing output in Nigeria. In 1987 the manufacturing sector output increased by 11%, and increased further to 38% in 1994 before falling to 14% in 2000. The manufacturing sector output fluctuates throughout the study period by increasing to 15% in 2000; and 21% in 2011 before falling to 3% in 2017. This is an indication that the manufacturing sector of Nigeria is starved of financial resources which can intuitive argue for the current state of the sector. This is because, increasing credit to private sector (manufacturing sector) in general term is expected to enhance the manufacturing sector output (CBN, 2017).

It is important to note that the effectiveness of manufacturing sector is tied to the availability of financial resources to meet the sector demands. This therefore necessitates the needs for a well-developed financial sector that will adequately mobilize and allocate substantial amount of credits to the manufacturing sector in Nigeria. Because manufacturing sector if properly and adequately develop, plays an important role as a source of employment and wealth, and a canal for sustainable development, capable of promoting industrialization in an economy (Adegbite, 2006; Mike, 2010; Raphael & Gabriel, 2015).

The existing empirical studies have however focused on addressing the effect of credit to the private sector on manufacturing sector output (Udoh & Ogbuagu, 2012; Odior, 2013; Imoughele & Ismaila, 2014; Ogunsakin, 2014; Akinlo & Lawal, 2015; Orji, Anthony – Orji, Nchege & Okafor, 2015; Olanrewaju, Aremo & Okorie, 2015; John & Terhemba, 2016; Igbinedion & Ogbeide, 2016; Okoye, Nwakoby & Okorie, 2016; Omini, Ogbeba & Okoi, 2017; Onakoya, Ogundajo & Johnson, 2017). Unfortunately, bank credit proxied by credit to the private sector is not an accurate share of bank credit to the manufacturing sector, and therefore, cannot be accurate investigation of the impact of

bank credit on manufacturing sector output. It is against this background that this study uses Auto Regressive Distributed Lagged (ARDL) model to examine the impact of bank credit (bank credit to the manufacturing sector) on manufacturing sector output in Nigeria over the period of 1986 to 2017.

2. LITERATURE REVIEW

2.1 Theoretical Literature

Although different theoretical underpinnings advanced different propositions that explain the interaction between bank credit and manufacturing sector output, these theories can be looked at from either the traditional perspective or modern perspective. The traditional school of thought includes Classical, Keynesian and Monetarist theories, while the modern school of thought includes McKinnon – Shaw, and Stiglitz – Weiss Information Asymmetry. From the traditional school of thought, the classical theory is of the view that money has no effect on real wealth but it facilitates trade as a means of exchange. It further opines that the forces of demand and supply (the invisible hands), will continuously guarantee the attainment of equilibrium of the market (Eschenback, 2004; Levine, 2005). Keynesian theory refuted the classical theory of invisible hands self-propelling equilibrium state and the neutrality of money, and advocated that government should increase aggregate demand through deficit financing for economic prosperity (Eschenback, 2004; Levine, 2005). Unlike classical and Keynesian theories, the monetarists support the regulation of money supply and inflation targeting to keep the economy in shape, and canvass for Central Bank credibility, independence and transparency to ensure price stability and economic prosperity (Eschenback, 2004; Levine, 2005; Obafemi & Udah, 2012). While from the modern school of thought, the McKinnon – Shaw model posits that a liberalized financial system where the interplay of demand and supply determine the interest rate, in such a way that the manufacturers, entrepreneurs and SMEs will have access to credit and other financial services (Fry, 1980: Asmah, Acquah & Amonoo, 2003). In contrast to McKinnon – Shaw model, Stiglitz – Weiss information asymmetric theory opines that banks resort to non-price mechanism such as credit rationing even in situation where interest rates are liberalized because of information asymmetric problem (Obafemi & Udah, 2012).

2.2 Empirical Literature

The role of bank credit in manufacturing sector development has attracted and received increased attention from both researchers and policy makers with divergent views. On one side, are those who suggested that bank credit retards manufacturing sector output (Udoh & Ogbuagu, 2012; Ogunsakin, 2014; Akinlo & Lawal, 2015; Orji et al. 2015; Olanrewaju et al. 2015). On the other side, are those who suggested that bank credit promotes manufacturing sector output (Odior, 2013; Imoughele & Ismaila, 2014; John & Terhemba, 2016; Igbinedion & Ogbeide, 2016; Okoye et al. 2016; Omini et al. 2017; Onakoya et al. 2017). Some previous studies used credit to private sector as proxy for bank credit, and suggested that it has significant impact on manufacturing sector output (Obafemi & Udah, 2012; Udoh & Ogbuagu, 2012; Odior, 2013). For instant, Obafemi and Udah (2012), Odior (2013), Edeme and Karimo (2014), Oleka and Maduagwu (2015) suggested that credit to private sector has significant positive impact on manufacturing sector output; Udoh and Ogbuagu (2012), Ogunsakin (2014), Okonkwo, Godslove and Mmaduabuchhi (2015), Raphael and Gabriel (2015), Orji et al. (2015) revealed that credit to private sector has significant negative impact on manufacturing sector output; while Imoughele and Ismaila (2014), CBN Real Sector Division (2014) found insignificant impact on manufacturing sector output.

Furthermore, Obayumi, Edun and Kayode (2012) showed that bank lending rate significantly affects manufacturing sector output; Ogar, Nkamare and Effiong (2014) suggested that commercial bank loan has significant impact on manufacturing sector output; Adegboye, Ojo and Ogunrinola (2016) found that credit to private sector has significant impact on manufacturing sector output; Okoye et al. (2016)

reported that lending rate exerts significant negative impact, while credit to private sector exerts significant positive impact on manufacturing sector output in line with the findings of Omolara and John (2016), Ahad, Dar and Imran (2017), Onakoya et al. (2017) and Bada (2017). Interestingly, Omini et al. (2017) examined the impact of bank credit to manufacturing sector on manufacturing sector output, and suggested that bank credit to manufacturing sector has significant positive impact on manufacturing sector output. Conversely, Topcu and Coban (2017) showed that banking sector development does not cause manufacturing sector growth.

Most studies on the impact of inflation rate on manufacturing sector output have shown that inflation rate has significant impact on manufacturing sector output, while few studies showed that it has an insignificant impact on manufacturing sector output. These outcomes could be largely related to the differences in sample periods and/or methodology employed by these studies. For instant, Loto (2012), Umer and Alam (2013), Ariwa, Ani, Onyele, Ekele and Okwuchukwu (2017) and Sokunle and Harper (2018) reported an insignificant impact of inflation rate on manufacturing sector output; while Odior (2013), Chaudhry, Ayyoub and Imran (2013), Siyakiya (2014), Oni, Akinlo and Oladapo (2014), Ailemen, Akhanolu and Chibuzor (2016), John and Terhemba (2016), Modebe and Ezeaku (2016) and Onakoya et al. (2017) showed that inflation rate has significant negative impact on manufacturing sector output. More so, Okwo, Mbajiaku and Okelue (2012) used OLS to examine the effect of deposit money banks credit on Nigerian economic growth. However, Ikeobi (2020) showed that the fund allocation of the capital market had insignificant negative impact on manufacturing output, while Peter, Okere and Ugonma (2020) revealed that bank credits have significant positive impact on the economy as well as manufacturing sector output in Nigeria.

3. METHODOLOGY

This study sourced annual secondary data covering the periods of 1986 – 2017. The data on manufacturing sector output, bank credit to manufacturing sector, and inflation rate were sourced from the 2017 edition of Statistical Bulletin of the Central Bank of Nigeria for thirty-two (32) years from 1986 through 2017. The authors specified a functional model in line with the work of Toby and Peterside (2014) with modification to capture the relationship between manufacturing sector output, bank credit to manufacturing sector and inflation rate as follows: MSO = F (BC & CPI). However, economic variables do not exhibit exact relationship as depicted by the functional model, but rather an inexact relationship due to stochastic error term as contained in the econometric model below: $MSO_t = \beta_0+\beta_1 BC_t +\beta_2 CPI_t + \mu_t$. where MSO stands for manufacturing sector output; BC for bank credit to manufacturing sector; CPI for inflation rate; β_0 for constant parameter; β_{1-2} for partial slopes; and μ_t for error term.

3.1 Theoretical Framework

Studies like Obafemi and Udah (2012), Odior (2013), Edeme and Karimo (2014), Oleka and Maduagwu (2015) suggested that credit to private sector has significant positive impact on manufacturing sector output. In same vain, Stiglitz-Weiss information asymmetric theory is employed as the theoretical underpinning to examine the impact of bank credit on manufacturing sector output in Nigeria because the theory opines that market failure is the fundamental cause of lack of adequate capital and finance to manufacturing sector as a result of market imperfection, asymmetric information and the high fixed cost of manufacturing.

3.2 Pre-Estimation Diagnostic Tests

The Auto Regressive Distributed Lagged (ARDL) model does not necessarily require pre-estimation diagnostic tests of the variables, but since we are dealing with time series data we started by determining the order of integration of the data before implementing the ARDL model. To accomplish

this task, this study used two distinct tests of stationarity, namely, Augmented Dickey – Fuller and Phillips Perron (PP) unit root tests to determine the order of integration of the variables under review.

3.3 Estimation Tests

a. ARDL Model

To empirically analyze the above econometric model, the Auto Regressive Distributed Lagged (ARDL) model specification was adopted with modification to show both short run and long run relationships between manufacturing output, bank credit to manufacturing sector and inflation rate in Nigeria (Udoh & Ogbuagu, 2012; Victor, 2013; Osmond & Godslove, 2016; Lawal, 2016; Ariwa et al., 2017). The ARDL (p, q1, q2 …qk) model following Pasaran, Shin and Smith (2001) can be written as:

$$\Omega L, Pyt = \alpha_0 + \beta i\ (L, qi)\ ki{=}1\ xi, + \delta\ 'wt + \mu t$$

Where yt is the dependent variable; α_0 is a constant; L is a lag operator; and wt is a $s \times 1$ vector of deterministic variables such as seasonal dummies, time trends or exogenous variables with fixed lags. This study adopts Pesaran et al. (2001) model with modification to suit variables used as follows:

$$\Delta lnMSO_t = \alpha_0 + \sum_{i=0}^{m} \beta_{1i} \Delta lnMSO_{t-i} + \sum_{i=0}^{m} \beta_{2i} \Delta lnBC_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta\, CPI_{t-i} + \gamma_1 MSO_{t-1} + \gamma_2 BC_{t-1} + \gamma_3 CPI_{t-1} + \in_t$$

To investigate the presence of long-run relationships among the variables, bound testing under Pesaran et al. (2001) procedure was adopted. The bound testing procedure is based on the F-test which is actually a test of the hypothesis of no co-integration among the variables against the existence or presence of co-integration among the variables.

b. Pairwise Granger Causality Test

$$LnMSO_t = \sum_{i=1}^{m} \alpha_i lnMSO_{t-i} + \sum_{j=1}^{m} \beta_j LnBC_{t-j} + \lambda_1 t + \mu_{1t}$$

$$LnBC_t = \sum_{i=1}^{m} \alpha_i LnBC_{t-i} + \sum_{j=1}^{m} \beta_j LnMSO_{t-j} + \lambda_2 t + \mu_{2t}$$

Note that the two equations represent a bivariate model; it also applies to all the variables under the systems formulated in linear model. Each equation contains the lags of both variables in the system which was determined automatically by statistical software used in estimation. Test of hypothesis of unidirectional, bidirectional or independence follows the F statistics with its corresponding critical value or probability value.

$$F = \frac{RSS_r - RSS_{ur}/m}{RSS_{ur}/n - k}$$

If the computed F value exceeds the critical F value at choosing level of t-1significant, we reject the null hypothesis. That is to say, bank credit to manufacturing sector causes manufacturing sector output.

3.4 Post Estimation Diagnostic Tests

To determine the robustness of the model estimated, avoid interpreting spurious regression and making policy recommendations based on weak model, a considerable number of post estimation diagnostic tests were conducted. Firstly, test for serial correlation was carried out using the popular Breusch – Godfrey test; secondly, test for heteroscedasticity was also estimated using Breusch – Pagan - Godfrey test; thirdly, Jarque – Bera test statistic to check if the series are normally distributed was conducted; and finally, the CUSUM test for stability was also carried out.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Pre-Estimation Results

To investigate the long-run and short-run relationships among manufacturing output, bank credit to manufacturing sector and inflation rate, the study employed the Augmented Dickey Fuller (ADF) and Phillips-Perron (P-P) tests to detect the level of stationarity.

Table 1: ***Augmented Dickey-Fuller and Philips Perron Unit Root Tests***

Variables	**ADF**		**PP**		**Integration order**
	Level	**1st difference**	**Level**	**1st difference**	
LnMSO	-1.765702	-3.726772**	-0.624835	-3.828970**	I(1)
LnBC	-1.840533	-8.794321**	-0.321873	-8.330355**	I(1)
CPI	-4.44200**		-4.442845**		I(0)

Notes: ** denotes significant at 5%. **Source:** computation using E-views 9.

Table 1 depicts the estimated result of stationarity test using two different approaches. The ADF estimate -4.44200 for inflation rate only at level value is significant at 5%, while the ADF estimates of -3.726772 and -8.79421 for manufacturing sector output and bank credit to manufacturing sector at first difference are significant at 5% level respectively. More so, the PP estimate of -4.442845 for inflation rate only at level value is significant at 5% for only inflation rate, while, the PP estimates of -3.828970 and -8.330355 for manufacturing sector output and bank credit to manufacturing sector at first difference are significant at 5% level respectively.

From the above result, manufacturing sector output, and bank credit to manufacturing sector series revealed stationarity after first difference in both cases of ADF and PP, while inflation rate series showed stationarity at level in both cases of ADF and PP. However, a mixture of I(0) and I(1) provide evidence for the use of ARDL as proposed by Pesaran et al. (2001).

4.2 Estimation Results

a. Bound Testing Approach to ARDL

Table 2: ***Co-Integration Results among the Variables (F-Bound Testing with Intercept)***

Models	**F-statistics**	**Decision**
F_{lnMSO}(LnMSO/LnBC, CPI)	4.537428**	Co-integrated
F_{lnBC}(LnBC/LnMSO, CPI)	3.536101	No co-integration
F_{lnCPI}(CPI/LnBC, LnMSO)	7.011617*	Co-integrated
Critical values for F-bound testing		
10%	3.17 – 4.14	
5%	3.79 – 4.05	
2.5%	4.41 – 5.52	
1%	5.15 – 6.36	

Notes: *, ** denote significant at 1% & 5% respectively. **Source:** computation using E-views 9.

Table 2 presents the result of bound test. When considering manufacturing sector output as dependent variable, it revealed evidence of co-integration among variables under investigation at 5% level of significant. This is because F statistics of 4.537428 is more than the Pesaran critical value 3.79 – 4.05 at 5% leading to the rejection of null hypothesis. The model considering bank credit as dependent variable found no evidence of long run relationship at 5% level. Model for inflation rate shows empiric signal of long run relationship among the variables at 1% level of significant. The findings show that manufacturing sector output, bank credit to manufacturing sector and inflation rate move together in the long run. Such long run relationship is consistent with economic theory and previous research findings (Obamuyi et al., 2012; Mayende, 2013; Okonkwo et al., 2015; Ibi et al., 2015; Akinlo & Lawal, 2015).

b. ARDL Results

Table 3: ARDL Short-run Result

Short-run	**Coefficients**	**T statistics**
ΔlnBC	0.033102	2.043004***
ΔCPI	0.034660	2.248515**
Ecm	-0.052539	-3.204039*

Notes: *, **, *** denote significant at 1%, 5% & 10% respectively. **Source:** computation using E-views 9.

Table 3 shows short run coefficients of the Auto Regressive Distributed Lagged estimate. In the short-run, the coefficients of 0.033102 and 0.034660 for bank credit to manufacturing sector and inflation rate exert significant positive impact on manufacturing sector output at 10% and 5% level of significant respectively. In same vain, Ogar et al., (2014); Bans –Akiotey et al., (2016); Omolade and Ngalawa (2016); Ahad et al. (2017); Onakoya et al., (2017); Ariwa et al., (2017) showed that bank credit exerts significant positive impact on manufacturing sector output, but Udoh and Ogbugu (2012) and Ogunsakin (2014) and Orji et al., (2015) revealed contrary findings. In addition, the error correction term or the speed of adjustment to long run equilibrium is negative and statistically significant at 1% level. The speed of adjustment to the long run equilibrium is very slow at 5.3% annually. Meaning that it will take a considerable long period of time for equilibrium to be reinstalled.

Table 4: ARDL Long-run Result

Long-run	**Coefficients**	**T statistics**
LnBC	0.630038	3.313767*
CPI	0.659705	1.793972***

Notes: *, *** denote significant at 1% & 10% respectively. **Source:** computation using E-views 9.

Table 4 shows long run coefficients of the Auto Regressive Distributed Lagged estimate. The long-run coefficients of 0.630038 and 0.659705 for bank credit to manufacturing sector and inflation rate exert significant positive impact on manufacturing sector output at 1% and 10% level of significant respectively. From the results, the model points to positive and significant relationship between bank credit to manufacturing sector and manufacturing sector output in short run and long run. These reflect the importance and impact of the bank credit to manufacturing sector on manufacturing sector output in Nigerian economy. However, such relationship is consistent with the findings of Ahad et al. (2017), Onakoya et al., (2017), Ariwa et al., (2017) and Peter et al. (2020) who showed that bank credit exerts significant positive impact on manufacturing sector output, but Udoh and Ogbugu (2012) and Ogunsakin (2014), Orji et al., (2015) and Ikeobi (2020) revealed contrary findings. In the same vein, inflation is positively and statistically significant related to manufacturing output both in the short run and long run. This implies that a percentage point rise in inflation rate will lead to 3.5% and 66% points increase in manufacturing sector output in the short and in the long run respectively (Mayende, 2013; John & Terhemba, 2016; Omini et al., 2017; Bada, 2017) but contrary to the findings of Chaudhry et al. (2013), Odior (2013), Siyakiya (2014), and Oni et al., (2014). The finding is also in consonance with Keynes Paradox of Thrift.

c. Pairwise Granger Causality Test

Table 5: Pairwise Granger Causality Test

Null hypothesis	**F-stat.**	**Prob.**	**Direction of causality**
CPI does not granger cause LnMSO	0.28288	0.7560	No causality
LnMSO does not granger cause CPI	2.59966***	0.0943	LnMSO⟶ CPI
LnBC does not granger cause LnMSO	1.61324	0.2193	No causality
LnMSO does not granger cause LnBC	2.93029**	0.0197	LnMSO⟶LnBC
LnBC does not granger cause CPI	1.83417	0.1806	No causality
CPI does not granger cause LnBC	0.05832	0.9435	No causality

Notes: **, *** denote significant at 5% & 10% respectively. **Source:** computation using E-views 9.

Table 5 shows the result of pairwise granger causality test to further consolidate earlier findings in this study. It revealed no causality running from inflation to manufacturing sector output because we fail to reject the null hypothesis. However, manufacturing output does granger cause inflation rate at 10% level of significant. There is unidirectional causality running from manufacturing sector output to bank credit to manufacturing sector and statistically significant at 5% level (Bada, 2017). No causality whatsoever was examined between bank credit to manufacturing sector and inflation rate.

4.3 Post Estimation Results

To avoid interpreting spurious regression and making policy recommendations based on weak model, a considerable number of diagnostic tests were carried out. The diagnostic tests conducted are as follows:

Table 6: ***Serial Correlation Test***

Breusch - Godfrey Serial Correlation LM Test			
F-statistics	0.528588	Prob. F(2, 25)	0.5959
Obs R-squared	1.257713	Prob. Chi-square (2)	0.5332

Source: computation using E-views 9.

Table 6 provides estimated coefficients of Breusch-Godfrey serial correlation LM test. From the table, the null hypothesis of no serial correlation cannot be rejected, because the probability value (0.5959) is greater than 5% with corresponding F statistics of 0.528588.

Table 7: ***Heteroscedasticity Test***

Breusch-Pagan-Godfrey Heteroscedasticity Test			
F-statistics	1.355288	Prob. F(3, 27)	0.2775
Obs R-squared	4.057243	Prob. Chi-square(3)	0.2553
Scaled explained SS	2.846611	Prob. Chi-square(3)	0.4159

Source: computation using E-views 9.

Table 7 provides estimated coefficients of Breusch-Pagan-Godfrey heteroscedasticity test. The null hypothesis of homoscedasticity cannot be rejected because the probability value (0.2775) is greater than 5% with corresponding F-statistics of 1.355288.

Table 8: ***Normality Test***

Normality Test			
Jarque Bera statistics	3.655731	Probability	0.160756

Source: computation using E-views 9.

Table 8 provides estimated coefficients of Jarque Bera test for normality. The null hypothesis of residues normally distributed cannot be rejected because the probability value is greater than 5%. The Jarque Bera statistics of 3.655731 with corresponding probability value of 0.160756 led us to conclusion that the residuals of the model are normally distributed.

Stability Test Results

Stability tests under this study are restricted to CUSUM and CUSUM sum of square tests. The tests find parameter instability if the cumulative sum goes outside the area between the two critical lines. Figure 1 revealed the cumulative sum of recursive residual points to stable parameters as the blue line falls inside the critical bound of 5% level of significant. In the same vein, figure 2 shows that model and parameters estimated are stable throughout the period under study. This is because the blue line revolves within the two critical lines and 0.05 critical bound line. This implies that the coefficients of the model estimated are reliable and valid for policy recommendation.

Figure 1: ***Cumulative Sum of Recursive Residuals***

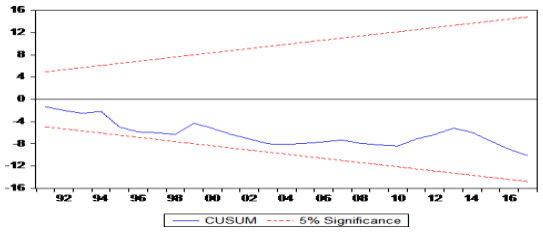
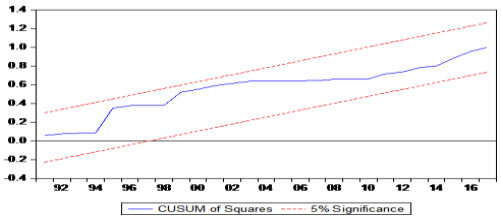


Figure 2: ***Cumulative Sum of Recursive Residuals Square Test***



Source: computation using E-views 9.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study adopts Auto Regressive Distributed Lagged (ARDL) model and granger causality test on secondary data sourced from CBN statistical bulletin to examine impact of bank credit on manufacturing sector output in Nigeria for the period of 1986 to 2017. Emanating from the findings is

the fact that bank credit to manufacturing sector has played a significant role in shaping the output trend in manufacturing sector in Nigeria over the period which reaffirms the findings of Ogar et al. (2015). The study therefore concludes that there is significant long run relationship among manufacturing sector output, bank credit and inflation rate. Bank credit and inflation rate exert significant positive impact on manufacturing sector output in both short-run and long run. However, the long-run estimates far outweigh that of short-run coefficients for the two explanatory variables which are consistent with economic theories and trend in the Nigerian economy right from independent. Although, the result from dynamic short-run error correction depicts slow adjustment to the long-run equilibrium overtime to show that the need for strong financial system and allowing private investors to take the lead are the catching up strategies for the sector. More so, there is significant unidirectional causality running from manufacturing sector output to bank credit which is an indication of the influence of government effort to overhaul the sector through credit rationing. Finally, the post-estimation tests show that the model is free from serial correlation, homoscedastic, normally distributed and the model parameters are stable.

From the aforementioned findings, the following policy recommendations were proffer to enhance the overall performance of the sector as well as overwhelming contribution to the GDP: One, existing functional policies such as credit rationing should be strengthened to attract potential investors in the manufacturing sector. If the exiting functional policy such as credit rationing is strengthened in such that more credits are rationed in favour of manufacturing sector investment, more investors will be attracted to invest in the manufacturing sector of Nigeria which will increase manufacturing sector output in the country. This is because bank credit to manufacturing sector exerts significant positive impact on manufacturing sector output in Nigeria during the period under review. Two, regulatory authorities should encourage the manufacturing sector through accessible and affordable bank credit that will encourage investors in the manufacturing sector to access adequate loan facility to enhance productivity in the sector. For instance, if the Central Bank of Nigeria should direct all commercial banks to avail cheap credits for manufacturing sector investment in Nigeria, this will encourage more investors in the manufacturing sector to access adequate loan facilities to enhance manufacturing sector output in the long run. Three, specialized financial institutions should be licensed by CBN that will be solely responsible for allocating soft credit for manufacturing investment in the economy as any attempt by an economy to improve and achieve high level of manufacturing output calls for specific credit allocation to the manufacturing sector at all time. The CBN can encourage the licensing of more specialized private financial institutions by making the licensing requirements a bid affordable to specialized private financial institutions that will be allocating soft credits for manufacturing sector investment in Nigeria. More specialized private financial institutions against what is obtainable now in the country will complement the effort of Bank of Industry by allocating more soft credits for manufacturing investment.

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