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FISCAL POLICY AND MANUFACTURING SECTOR OUTPUT: THE NIGERIAN EVIDENCE

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Abstract

This work investigated the effect fiscal variables-Total Government Expenditure and Company Income Tax) on manufacturing sector output in Nigeria. It utilized time-series data extracted from various sources spanning the period of 1981 to 2016. It employed the Augmented Dickey-Fuller unit root test for stationarity cum the Autoregressive Distributed Lag (ARDL) Bounds test approach to Cointegration. Stability of the model was also diagnosed using CUSUM and CUSUMSQ. The ADF unit root result showed that manufacturing output was integrated of order I(1) while government expenditure and tax on company income were integrated of order zero I(0). The ARDL approach to bound test exhibited long run equilibrium relationship among the variables. The study found that both short-run and long-run impacts of the regressors are quite significant on the target variable. It established that government expenditure upwardly drove manufacturing output which can be underscored by increased government expenditure on capital infrastructure while company income tax dampened output owing to multiplicity of taxes. The Error Correction Model showed that disequilibrium in the short-run are adjusted for each period in the long-run. Also, the CUSUM test showed that the model was stable while CUSUMSQ test somewhat exhibited instability in the residual variance. Based on the findings, the study suggests that government expenditure on capital infrastructures should be encouraged to further enhance the sector's productive and utilisation capacity and the need for tax-cut on company income to motivate both actual and potential investors.

Keywords: Manufacturing output, Fiscal Variables, Bounds testing, ECM, Stability testing

1.1 Introduction

In any economy, the hub for the production of goods and services, the generation of employment and incomes is the manufacturing sector (Olorunfemi, et al.,2013). It is crucial in diversifying the economy and boost to foreign exchange earnings. However, the achievement of these goals is undeniably hinged on policy guidance by the government in the form of fiscal policy. The government employs fiscal policy for management and stabilization of the economy. The government has embarked on various macroeconomic policy options over the years to grow the economy in terms of growth and development and the policy option employed is that of fiscal policy (Peter and Simeon, 2011). Afam (2012) maintained that fiscal policy is the aspect of government policy dealing with the raising of revenue through taxation and other sources and deciding on the level and pattern of expenditure for the aim of influencing economic activities.

Fiscal policy is the use of two main instruments (tax and expenditure) to influence the economy for the purpose of stability and growth. Public expenditure is mainly used for allocation, stabilization and distribution (Musgrave and Musgrave, 1989) while tax policy is used to promote objectives such as redistribution, industrialization, promotion of employment and resources allocation (Anyanwu, 1997).

Like many other African countries, Nigeria's early independence years had seen an industrial strategy that relied heavily on import substitution. At first this had appeared to work relatively well, with the share of manufacturing to GDP increasing from 2 per cent in 1957 to 7 per cent in 1967 (Utomi, 1998). The massive oil revenues meant that this strategy could be intensified, consequently the 1970s witnessed huge investments in state-owned enterprises. While this implied rapid expansion of the industrial sector, subsequent returns on investment projects were typically much below expectations and highly erratic. The import substitution strategy turned out to be unsuccessful in generating growth in incomes and jobs.

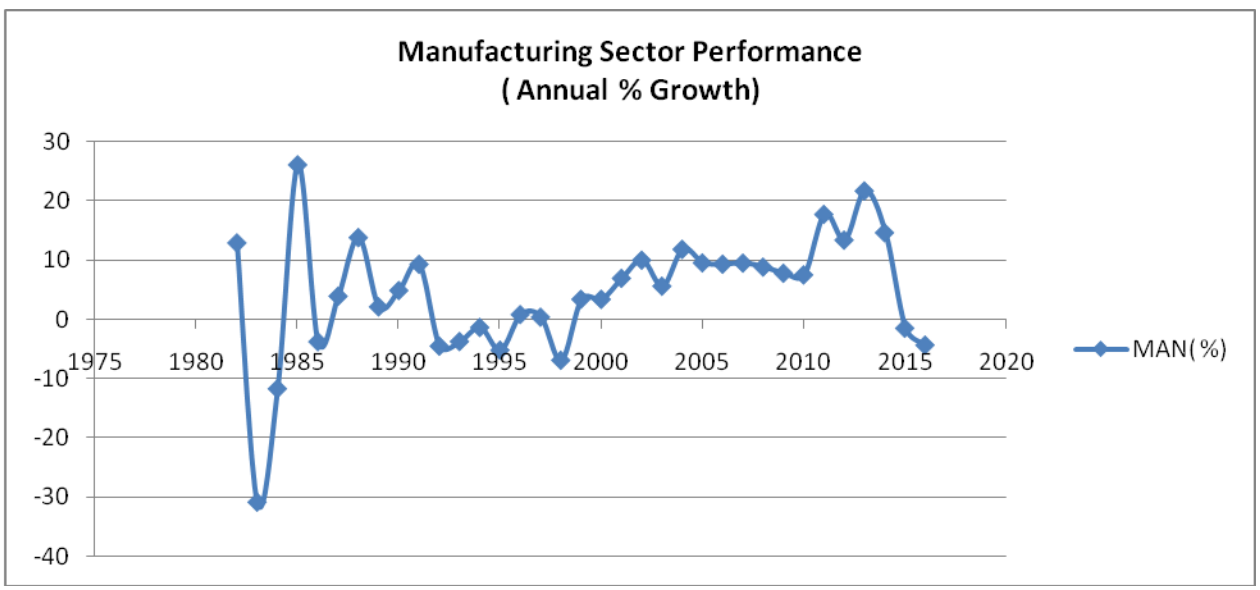
In Nigeria, manufacturing sector share of the GDP and capacity utilisation has not been relatively stable over time. In 1981 it was 9.87%, peaked to 10.44% in 1983, dropped from 5.45% to 3.67% from 1995-2000. It became lowest in 2008 with 2.41% while it increased from 6.55% to 9.75% from 2010-2014 before it slightly dropped from 9.53% to 8.77% from 2015-

2016 while the overall manufacturing capacity utilization was all time high in 1981 with 73.3% then fell sharply to 38.8% in 1985. It was minimum in 1995. Utilisation capacity increased from 30.4% in 1997 to 56.22% in 2010 (CBN, 2017). These manufacturing shares of the GDP and capacity utilization shows that the sector can contribute to job creation, technology promotion and as well ensure equitable distribution of economic opportunities and the macroeconomic stability of the country

Inspite of various policy measures of the government to boost the performance of the manufacturing industry, the effect of fiscal policy on output and capacity utilization of the industry is a growing concern (Adebayo, 2010; Peter and Simeon, 2011). It has been observed that the manufacturing outfits are characterized with high lending rate which significantly contributes to high cost of production in the sector (Adebiyi and Babatope, 2004; Rasheed, 2010). According to Okafor (2012), Nigerian manufacturing industries' performance will continue to decline because of low implementation of government budget and assessing raw materials. Also, Olugenro (2014) cited multiplicity of taxes as the bane of the manufacturing industries in Nigeria. In view of these problems, the researcher hereby investigates the relationship between fiscal policy variables and manufacturing output in Nigeria.

1.2. Trend of Manufacturing Sector Annual Growth

Figure 1: Manufacturing Sector Performance (Annual % Growth), 1982-2016.



Source: Author's Computation (2018) from World Bank Data

The manufacturing sector (annual % growth) in Nigeria has been characterized with fluctuations. It downturned to -4.32% in 2016 perhaps due to the recession experienced in the country. The graph shows that for over 36 years, the indicator reached maximum of 26.22% in 1985 consequent upon inward-looking industrial oriented policy of the government and nose-dived to -30.93% in 1983 as the Nigeria's industrial sector became characterized by high importation.

2.0 Literature Review

2.1 Theoretical Literature

The theoretical framework employed is the William Baumol's Revenue Maximization Model of 1958 which is the most realistic under the Managerial Theories of Firms. The model states that managers dominate in the entire decision making process in modern corporate world. It emphasized that modern firms have separate managerial functions away from ownership, and that managers are hired to maximize revenue than profit to ensure future growth of the firm. The theory holds that for a country to grow faster through competition and industrialization, it has to increase and exogenously determine its public expenditure to facilitate expansion and development. The theory further emphasized that firm's growth decision is hinged on the size of government fiscal policy.

2.2 Empirical Studies

A panel study of 22 OECD countries for 1970 – 1995 showed that distortionary taxation hampers growth, while non-distortionary taxes do not; the study further revealed that productive government expenditure increases growth, while non-productive expenditure does not (Kneller et al, 1999). Adenikinju and Olofin (2000) investigated the role of economic policy in the growth performance of the manufacturing sectors in African countries. They utilize panel data for seventeen African countries over the period 1976 to 1993. Their econometric evidence indicates that government policies aimed at encouraging foreign direct investment, enhancing the external competitiveness of the economy, and maintaining macroeconomic balance have significant effects on manufacturing growth performance in Africa. Omitogun and Ayinla (2007) attempt to establish whether there is a link between fiscal policy and economic growth in Nigeria using the Solow growth model estimated with the use of ordinary least square (OLS) method. It was found that fiscal policy has not been effective in the area of promoting sustainable economic growth in

Nigeria. This finding did not believe with Keynesian theory which is anchored on the need for an active policy to sustain economic growth. This is a research gap on the factors capable of hampering the effectiveness of fiscal policy.

Dickson (2007) critically examine the recent trends and patterns in Nigeria's industrial development using descriptive study. The study established that the level of manufacturing industry in Nigeria is concentrated in the southern part of the country and that the spatial pattern could change if industrialists adopt the strategy of industrial linkage. Ajayi (2011) in a study of the collapse of Nigeria's manufacturing sector on economic growth. He used cross-sectional research design and found out that the main cause of collapse in the Nigerian manufacturing sector is low implementation of Nigerian budget especially in area of infrastructure. This means that low implementation of fiscal policy affects the level of growth in Nigerian manufacturing sector. Ogbole, Sonny and Isaac (2011) worked on the comparative analysis of the impact of fiscal policy on economic activities in Nigeria during regulation and deregulation, using the econometric methods of co-integration and error correction model. The study found that there was a difference in the effectiveness of fiscal policy in stimulating economic growth during and after regulation period.

A panel study on firm's growth dynamics in Nigerian manufacturing industry found that the manufacturing firms finance mix, utilization of assets to generate more sales, abundance of funds reserve and government policies are significant determinants of manufacturing industry growth in Nigeria (Sangosanya, 2011).

Rasheed (2010) investigated the productivity in the Nigerian manufacturing subsector using co-integration and an error correction model. The study found a long-run equilibrium relationship index for manufacturing production, determinants of productivity, economic growth, interest rate spread, bank credit to the manufacturing subsector, inflation rates, foreign direct investment, exchange rate and quantity of graduate employment. In all, researchers had not laid emphasis on company income tax as it directly affects the manufacturing sector output and growth.

3. Methodology and Data Sources

Annual time-series data are utilized. The data are obtained from World Bank Development Indicator and Central Bank of Nigeria of Statistical Bulletin, 2017. The data were analysed with E-views 9. The study examines stationarity properties of the time series utilizing the Augmented Dickey-Fuller (ADF) statistic. The reason for augmenting is to obtain white noise errors. If a variable is stationary at levels, it is denoted I(0), at first differencing Δ, it is denoted as I(1).

The study also employs AutoRegressive Distributed Lag (ARDL) bounds test to investigate the short run and long run dynamics of the model. The ARDL model is a form unrestricted Error CorrectionModel (ECM) because all the long run variables are specified and not restricted.

Thus the ARDL equation:

$$\Delta MAN_t = ɠ_0 + ɠ_1 \Delta MAN_{t-i} + ɠ_2 \Delta GOVEX_{t-i} + ɠ_3 \Delta CIT_{t-i} + ɠ_4 MAN_{t-1} + ɠ_5 GOVEX_{t-1} + ɠ_6 CIT_{t-1} + nECM_{t-1} + \varepsilon_t \quad \text{.......} 2$$

In equation 2;

MAN= Manufacturing Output, GOVEX = Government Expenditure and CIT = Company Income Tax

Δ represents the first-difference operator,

$ɠ_1$- $ɠ_3$ represents short-run coefficients,

$ɠ_4$- $ɠ_6$ represents long-run coefficients

ε = Stochastic error term

Then the Error Correction Model shows the speed of adjustment of disproportions in the short-run to long-run equilibrium relationship.

4.0 Presentation of Results and Discussion

4.1 The ADF Units Root Test

In order to verify the stationarity status of the variables, the ADF unit root test is employed since most macroeconomic variables are not stationary at levels because of the data generating process.

Table 1: Summary of ADF Unit Root Test

Table 1: ADF Unit Root Test

Variables	ADF Test Statistics	Stationarity
MAN	-3.448453 {0} -2.951125	I(1)
GOVEX	4.122732 {4} -2.957110	I(0)
CIT	4.096264 {4} -2.960411	I(0)

Source: Author's computation (2018) using E-views 9

The result of the unit root test using Augmented Dickey Fuller a showed that government expenditure and company income tax are stationary at levels; integrated of order zero written as I(0) while manufacturing output became stationary after first differencing; integrated of order one written as I(1) The decision is informed by the comparison of the Augmented Dickey Fuller statistics with the Mckinnon critical value obtained at 5% significant level. Since the variables are integrated of different orders, it becomes germane to conduct the ARDL bounds test for Cointegration (Pesaran and Shin, 1999).

Table 2: Lag Length Selection

Lag	LR	FPE	AIC	SC	HQ
0	NA	1.41e+18	44.62646	44.76251	44.67224
1	48.83931	2.78e+17*	43.00296*	43.18435*	43.06399*
2	0.125169	2.74e+17	43.05909	43.28583	43.13538
3	0.027893	3.13e+17	43.11866	43.39076	43.21022

***indicates lag order selected by the criterion**

It establishes that the optimal lag length of one (1) out of a maximum of 3 lag lengths as selected by five different criteria: LR: Sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion and HQ: Hannan-Quinn information Criterion.

Table 3: ARDL Bounds Test for Cointegration

Variables	F-Statistic	Result	
MAN(GOVEX,CIT)	9.294388*	Cointegration	
Critical Bounds	**1%**	**5%**	**10%**
I(0)-Lower	3.17	3.79	5.15
I(1)-Upper	4.14	4.85	6.36

Source: Author's computation (2018) using E-views 9

Note: The critical values for bounds were obtained from Sim, Peasaran and Shin (1999) for number of regressors k=2 at 5% level of significance in case III for unrestricted intercept and no trend. Here, the calculated F-statistic value of 9.294388 outweighs the critical values for both lower I(0) and upper I(1) bounds value of 3.79 and 4.85. Thus the null hypothesis of no Cointegration between target and predicting variables are thus rejected. The conclusion is that there is long-run relationship among variables utilized.

Table 4: Estimated Long Run Coefficients

Regressors	Coefficients	t-statistic	Prob
C	-1.380081	-0.072194	0.9429
GOVEX	10.41517	4.064958	0.0003
CIT	-32.55771	-4.349566	0.0001
AR(1)	0.869569	14.068397	0.0000

R^2=0.961393 F-statistic=19.29905 (0.0000)

Durbin-Watson=1.884909

Source: Author's computation (2018) using E-views 9

This contains the long run equilibrium relationship between the variables utilized including the first-order autoregressive coefficient of error term. The coefficient of determination (R^2) shows that about 96% of the systematic variation in manufacturing sector output is attributable by the fiscal policy variables-government expenditure and company income tax in the long run.

The F-statistic value of 19.30 with its corresponding probability value of 0.0000 shows that the overall model is significant; showing that the independent variables are good predictors of the dependent variable in the long run. The coefficient of about of 10.42 shows that government is positive and significant, indicating that a 1 unit increase triggers about 10.42 units increase in manufacturing output in the long run. The t-statistic value of 4.06 confirms it statistical significance. Company income tax (CIT) with the coefficient of about -32.56 shows that is significant but negative. Its t-statistic value of 4.35 shows it is statistically significant. It shows a downward effect on output thus validating the hypothesis that tax on company income erodes profits, savings, investment and growth in the long run. The Durbin-Watson of 1.88 indicates the absence of autocorrelation in the model

Table 5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	**0.532498**	**Prob.F (1,27)**	**0.4718**
Obs*R-squared	**0.657588**	**Prob.Chi-Square(1)**	**0.4174**

The table has the Chi-Square probability of 0.4174 (41.74%) which is far greater than 5%. This implies that the hypothesis of no serial correlation in the model is thus validated.

Table 6: ECM Representation of the ARDL Model

Dependent Variable: D(MAN)

Regressors	**Coefficients**	**Prob***
C	**1.840008**	**(0.1210)**
D(GOVEX)	**-42.15064**	**(0.3829)**
D(CIT)	**-26.31054**	**(0.0817)**
ECT(-1)	**-0.169957**	**(0.1639)**
R^2=0.633834	**F-statistic=13.33166 (0.0000)**	
Durbin-Watson= 2.259668		

Source: Author's computation (2018) using E-views 9

This represents the error correction term for the ARDL model. The coefficient of the ECM is negative and statistically significant at 5% level showing the existence of long-run relationship among variables. The coefficient of the ECM shows speed adjustment towards long run equilibrium. This implies that about 17% of short-run's disproportion is corrected each period in the long-run.

4.2 Stability Diagnostics

This tests the stability of the long-run parameters and residual variance in the model. Here, the Cumulative Sum (CUSUM) and Cumulative Sum Squares (CUSUMSQ) tests proposed by Borensztein et al (1998) are utilized.

Figure 3: Cummulative Sum at 5%

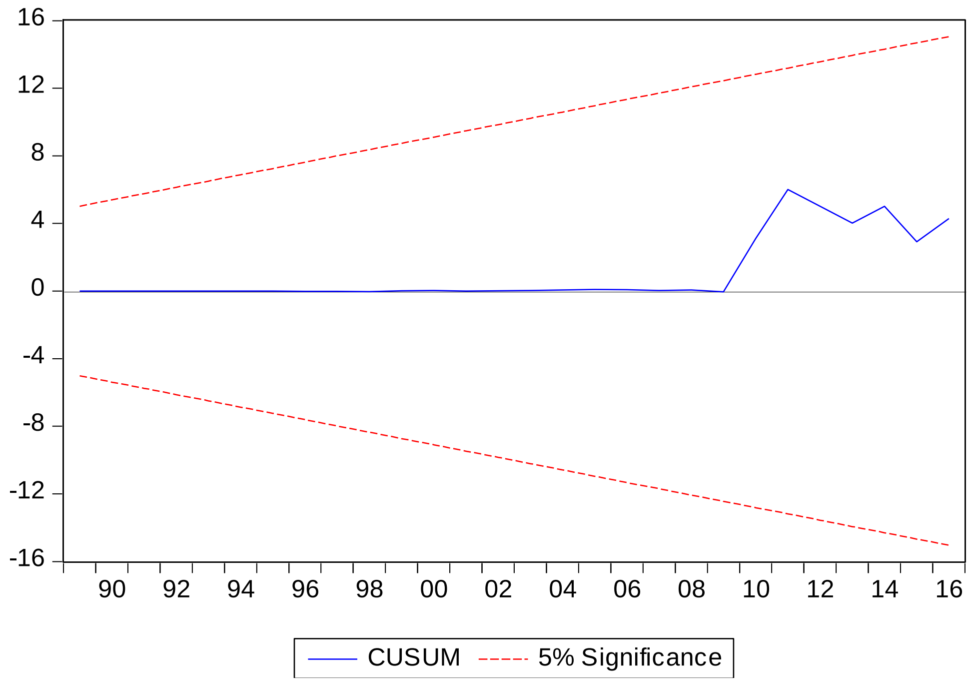
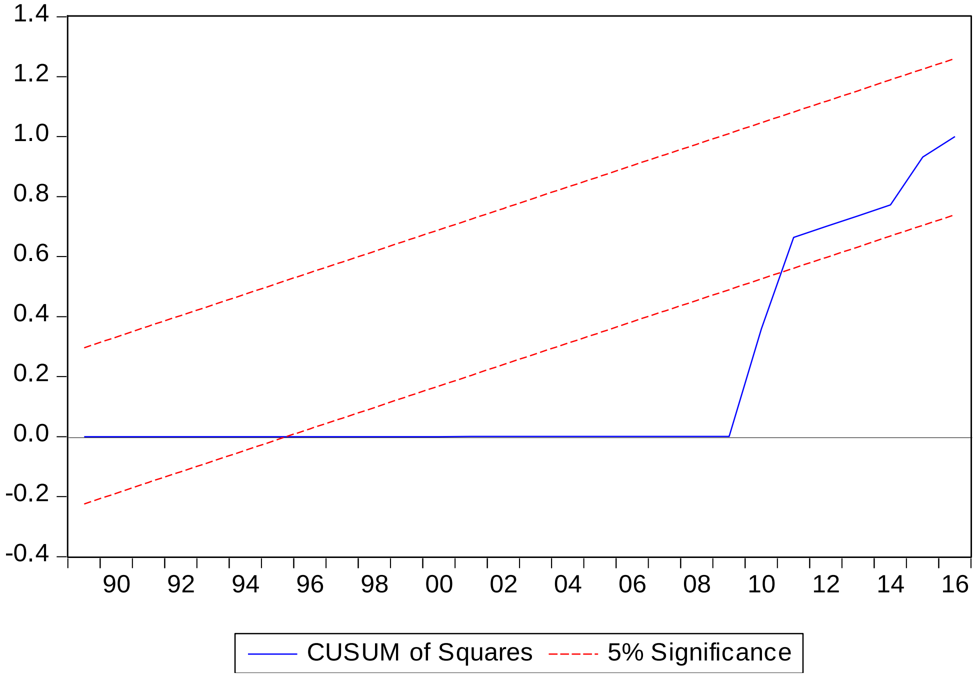


Figure 4: Cummulative Sum Of Square at 5%



In figure 4, the Cummulative Sum (CUSUM) has critical line that fall within the bounds at 5% thus confirming the long-run relationship among variables and stability in the coefficient of the model. While Cummulative Sum of Square(CUSUMSQ) in figure 5 critical line falls outside the bounds at 5% significance level which indicates somewhat instability in the residual variance.

5. Conclusion, Policy Implication of Findings and Recommendation

This work investigated the effect fiscal variables on manufacturing sector output in Nigeria from 1981to 2017. It employed the Autoregressive Distributed Lag (ARDL) bound test approach. It utilized the unit root test to check for stationarity; manufacturing output became stationary after the first differencing while government expenditure and company income tax are stationary at levels. Thus, the need for Sim, Peaseran and Shin Bounds test for Cointegration. The ARDL approach to bound test reveals long run equilibrium relationship among the variables existed. It reveals that both short-run and long-run impacts of the regressors are quite significant on manufacturing sector output. Also, the Error Correction Model shows that disproportions from long-run equilibrium are compensated for each period. The stability of the coefficients of the estimated model and residual variance are diagnosed using CUSUM and CUSUMSQ. CUSUM shows that critical line falls within the bounds thus confirming that the model is stable while CUSUMSQ exhibited instability in residual variance to some extent.

The study finds the government expenditure is a significant driver of manufacturing output in the long-run. By implication, government expenditure promotes output in the long-run which may be attributable to government investment on capital infrastructures while company income tax is found to significant but negative. This study also reveals that company income tax erode manufacturing output due to multiplicity of taxes on firms. Based on the findings, the study suggests that government expenditure put more efforts in providing capital infrastructures to further enhance manufacturing sector's productive and utilisation capacity and there should be tax-cut on company income by the government to encourage both actual and potential investors in the sector.

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