

Effect of Government Capital Expenditure on Manufacturing Sector Output in Nigeria

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Abstract

The study investigates the relationship between government expenditure and manufacturing sector output in Nigeria. Government expenditure is disaggregated into capital and recurrent with a view to analyse the relative effect of these categories of government expenditure with emphasis on the capital component. The study employed time series data from 1970 to 2013. Data on manufacturing sector output, capital and recurrent expenditure, nominal and real Gross Domestic Product (GDP), exchange rate and interest rate were collected from Statistical Bulletin and Annual Report and Statement of Accounts published by the Central Bank of Nigeria (CBN). Econometric evidence revealed stationarity of the variables of interest at their first difference while the Johansen cointegration approach also confirms the existence of one cointegrating relationship at 5 percent level of significance. In addition, error correction estimates revealed that while government capital expenditure has positive relationship with manufacturing sector output in Nigeria, recurrent expenditure exerts negative effect on manufacturing sector output. The results showed that one per cent increase in government capital expenditure resulted in an increase of 11.2 per cent in manufacturing sector output while recurrent expenditure decreases it by 26.9 per cent. This reveals that

government capital expenditure has positive impact on manufacturing sector output. The study therefore suggests that larger percentage of government expenditure in the annual budget should be on capital component coupled with improved implementation of expenditure policies rather than recurrent expenditure which does not really have a significant impact on the manufacturing sector.

Keywords: Government capital expenditure, Manufacturing sector output, Cointegration

1. Introduction

The contribution of the manufacturing sector of the economy cannot be over emphasized when considering its role in the process of economic growth and development (Loto, 2012). It is hard, if not impossible for any country to witness significant growth in its economy without a well-developed and dynamic manufacturing sector. In the development literature, manufacturing sector serves as the vehicle for the production of goods and services, the generation of employment and the enhancement of incomes, (Olorunfemi, *et.al.*, 2013). Also, Kayode (1989) and Libanio (2006) described industry and in particular the manufacturing sector, as the heart and engine of growth of the economy. This fact is supported by evidences from the developed countries of the world as virtually all of them are industrialised with the manufacturing sector leading the process (World Development Indicators, 2014).

Manufacturing sector refers to those industries and activities which are involved in the manufacturing and processing of items and indulge in either the creation of new commodities or in value addition (Adebayo, 2010). Indeed, Mbelede (2012) opined that manufacturing sector is involved in the process of adding value to raw materials by turning them into products. The final products can either serve as finished goods for sale to consumers for final use or as intermediate goods used in the production process. Activities in the manufacturing sector cover a broad spectrum which includes; agro processing, metal/plastic, ICT/electrical, textile, clothing, footwear, cement and building.

These activities contribute to the economy as a whole in terms of output of goods and services; provide a means of reducing income disparities; develop a pool of skilled and semi-skilled labour for the future industrial growth; improve forward and backward linkages within the value chain and between socially and geographically diverse sectors of the country; offer an excellent breeding ground for entrepreneurial and managerial talent and serve as a source of foreign exchange for the economy (Imoughele and Ismaila, 2014). Apart from laying solid foundation for the economy, it also serves as the import substituting industry, provides ready market for intermediate goods and contributes significantly to government revenue generation through tax (Aderibigbe, 2004).

In the Nigerian experience, the downturn of the global oil market as frequently observed with its attendant and the sharp decline in foreign exchange earnings have adversely affected macroeconomic performance in the economy coupled with the global financial crisis that occurred within the past decade. Nigeria's economy has consistently faced the problems of balance of payment deficit as a result of excessive dependence on imports for consumption and capital goods, dysfunctional social and economic infrastructure, unprecedented fall in

capacity utilization rate in industry and neglect of the agricultural sector, among others. These have resulted in fallen incomes and devalued standards of living (Anyanwu, 2004).

Given the importance of manufacturing sector as the bedrock of economic growth and development, Nigeria, over the years, has employed several strategies which were aimed at enhancing the productivity of this vital sector as a means of achieving sustainable growth. For instance, the country adopted the import substitution industrialization strategy during the First National Development Plan (1962-1968) which was targeted at reducing the volume of imports of finished goods and encouraging foreign exchange savings by producing locally some of the imported consumer goods (Ishola, 2012). The country consolidated her import substitution industrialization strategy during the Second National Development Plan period (1970-1974 and 1976-1980) which actually fell within the oil boom era. During this time, manufacturing activities were so organized to depend on imported inputs because of the weak technological base of the economy. However, as a result of the collapse of the world oil market in the early 1980s, there was a severe reduction in the earnings from oil exports. Consequently, the import-dependent industrial structure that had emerged became unsustainable owing to the fact that earnings from oil exports could not adequately pay for the huge import bills.

The government had recently launched the National Industrial Revolution Plan (NIRP). The goal of the plan is to increase the contribution of the manufacturing sector to GDP from the present 4 per cent to more than 10 per cent in the next five years. This is expected to boost the annual revenue earnings of the Nigerian manufacturers by up to N5 trillion per annum and lead to massive employment generation. To achieve this therefore, there is need for a sound and effective policy making and implementation from the government. One of such policies which could be employed is fiscal policy. Fiscal policy is the use of government revenue (taxation) and expenditure (spending) to influence the level of economic activities.

Government expenditure which are majorly financed through government revenue, public borrowing, grants and aids refer to the expenses which the government incurs for its own maintenance, for the society and the economy as a whole. It is an important instrument which the government can influence to achieve its macroeconomic objectives. Components of government expenditure include; capital expenditure and recurrent expenditure. Capital expenditure refers to government spending on building, road construction, land, and housing among others. The benefits of expenditures on capital projects are more durable and impactful as compared to those of recurrent expenditure which basically refers to expenses on the day to day activities of the government, wages and salaries, maintenance of social services, rent and rates, etc. (Mansouri, 2008).

Some studies have argued that increase in government spending can be an effective tool to stimulate aggregate demand for a stagnant economy and to bring about crowd-in effects on the private sector. According to this view, government could reverse economic downturns by borrowing from the private sector and then returning the funds to the private sector through various spending programs. High levels of government consumption are also likely to increase employment, profitability and investment via multiplier effects on aggregate demand

(Chude and Chude, 2013). Thus, government expenditure, even of a recurrent nature, can contribute positively to economic growth. On the other hand, endogenous growth models such as Barro (1990), predict that only productive government expenditures will positively affect the long run growth rate.

There are several ways through which public expenditure contribute to the achievement of macroeconomic objectives, especially the manufacturing sector's contribution to the real Gross Domestic Product (GDP). There are both direct and indirect impacts. The direct impacts include the establishment of state-owned financial and banking institutions to provide cheap credit such as the Nigerian Industrial Development Bank established in 1964. It can also encourage the performance of the manufacturing sector by means of grants and subsidies to the sector. The indirect impact come through the provision of infrastructural facilities like construction of roads, rail way, power projects etc., such projects create enabling environment for operators in the manufacturing sector thereby enhancing their productivity.

Evidence from the past budgets of the country has shown significant increase in the expenditure of government. The Nigerian budget is now evaluated in trillions of naira as against the region of millions and billions which it used to be in recent past. This is supposed to have led to a surplus or equilibrium on the records of balance of payment through its positive effect on manufacturing productivity. However, despite the increasing public expenditure, it is observed that the major challenges of the country still remain poor infrastructure, underdeveloped human capital, poor health services and other imbalances in the economy, all of which portend negative implications for economic growth.

In general, the growth rates of government capital expenditure and manufacturing output have declined over the period 1970-2013, as indicated in figure 1 below. Between 1970 and 1975, government capital expenditure had increased on average by 91 percent while manufacturing output had an average increase of 37 percent. Over the next 5-year period, that is, 1976-1980, government capital expenditure grew by 35% on average while that of manufacturing output was 36 percent, indicating a decline in their growth rates, although the growth patterns are positive. Over the subsequent 5-year period (i.e., by 1980-85), government capital expenditure experienced an average fall of 9 percent and this was accompanied by a low positive growth rate of about 6 percent in manufacturing output. One would recall that in the early 80s, developing countries experienced a downturn in credit flows and the period also marked a general decline in economic performance in the developing world, which may have translated to the sharp decline in the Nigerian government's expenditure on capital projects. This appears to have contributed to the significant fall in the growth of manufacturing output, although it remained positive on average.

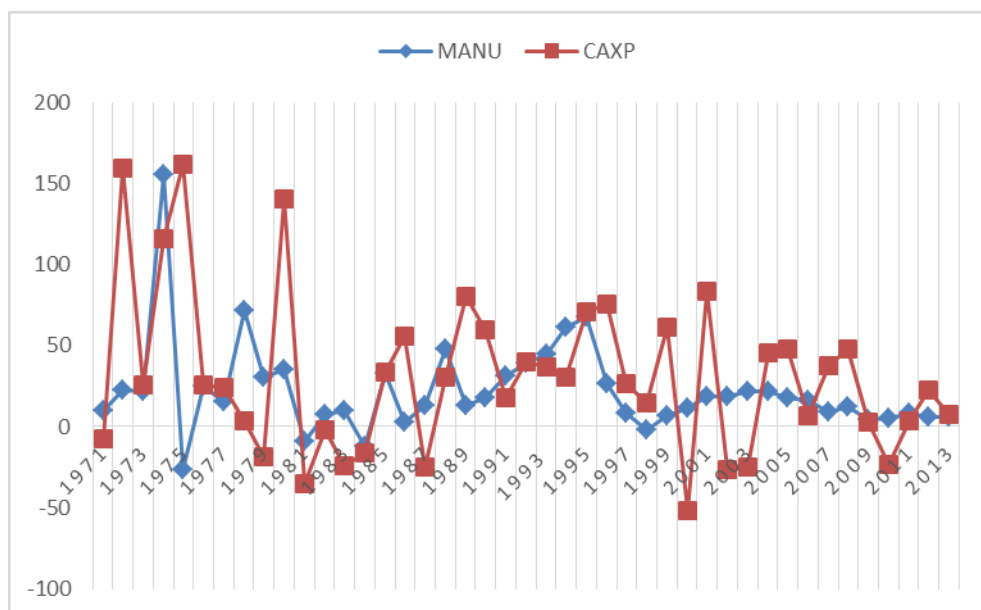


Figure 1. Growth Rates of Manufacturing Output and Government Capital Expenditure in Nigeria: 1970-2013

The trends however, improved over the next interval as capital expenditure surged upward by 40 percent on average by 1990 while the corresponding growth rate in manufacturing output was 19 percent. The average growth rates of the two economic variables have remained positive over the remaining periods of the sample. However, these rates have declined over time with government capital expenditure increasing by about 12 percent over the period 2011 and 2013 while manufacturing output only increased correspondingly by about 7 percent. The above trends ultimately suggest a close relationship between government capital expenditure and manufacturing output and therefore, will be a subject of our empirical exercise involving cointegration analysis.

Some studies have suggested that increase in government expenditure on socio-economic and physical infrastructures impact on long run growth rate. For instance, government expenditure on health and education raises the productivity of labour and increase the growth of national output. Similarly, expenditure on infrastructure such as road, power etc. reduces production costs, increase private sector investment and profitability of firms (Barro, 1990; Barro and Sala-i-Martin, 1992; Neill, 1996). On the other hand, Tullock (1980) observed that growth in government spending causes deadweight loss of output, gives rise to additional inefficiencies by encouraging rent seeking by various interest groups, unhealthy competition with the private sector over resources and investment opportunities.

The persistence of these problems in the Nigerian economy therefore makes it necessary to study the performance of the expenditure policy of the government, particularly the capital component, and not just its size as this could have great impact on the manufacturing sector as a component of the growth. This work is expedient as the Central Bank of Nigeria's statistical bulletin (CBN, 2008) reveals that the contribution of manufacturing sector to the Nigerian economy is insignificant as compared to the oil and the agricultural sectors despite

several strategies embarked upon by government which were aimed at improving industrial production and capacity utilization of the sector.

Most studies in Nigeria had focused on the effect of total public expenditure on the manufacturing sector and economic growth with conflicting findings. For instance, while some conclude that government expenditure has a positive effect on manufacturing output (Mwafaq, 2011; Muritala and Taiwo, 2011; Sikiru and Umaru, 2011; and Peter and Simeon, 2012), others found that government expenditure has not been effective in the area of promoting manufacturing sector development and sustainable economic growth in Nigeria (Nurudeen and Usman, 2010; Ighodaro and Okiakhi, 2010; Omitogun and Ayinla, 2007). The controversy might stem from non-disaggregation of government expenditure to know the component that contributes more significantly to economic growth through its contribution to manufacturing sector development. Only a few had examined the effect of capital component of that expenditure on manufacturing output in Nigeria.

This paper aims to contribute to the debate on the effect of government expenditure particularly the capital component on economic growth through its effect on manufacturing sector's output. The paper will therefore investigate the effect of the capital component of public expenditure on the manufacturing sector by looking at the Short and Long run effects in order to provide better insight on prudent and efficient allocation of public funds so as to bring about economic growth and development via manufacturing sector development. Accordingly, the paper is divided into five sections. The next section is theoretical perspective/literature review. Section three is the methodology of the study while the results and discussion is the focus of section four. The last section presents conclusion and recommendations.

2. Review of Literature

The nature of the relationship between public expenditure and economic growth via manufacturing sector performance has stimulated series of theoretical and empirical studies. The major theoretical works were done by Barro (1988), Barro and Sala i-martin (1995), and Devarajan (1996). Barro, (1990) developed a simple endogenous growth model of government spending. In this model, he finds a non-linear relationship between public expenditures which are complementary inputs to private production and a negative relationship between government consumption and growth of the economy.

Prior to the endogenous growth theory as proposed by Barro (1990), no significant relationship was predicted to exist between economic growth and public expenditure. In fact, in Solow growth model (1956) public expenditure is only related to the equilibrium factor ratios and it is assumed that public investment is not related to long run economic growth in the neoclassical perspective. However, the recent argument in favour of the significant relationship between long run economic growth and public expenditure rests on the inclusion of fiscal policies into the endogenous growth model with the conclusion that public spending can affect long run economic growth (Barro and Sala-i-Martin, 1995).

Government consumption expenditure is assumed to be negatively related to long run

economic growth while public investment expenditure is predicted to be positively related to long run growth. Barro (1990) further argued that government consumption expenditure connotes leakages in the production process due to its non-entrance into the private production functions as well as its negative relationship with returns on private investment which invariably poses discouragement to investors. However, public policies can be used to enhance efficient allocation of resources by correcting market failures and thus encourage higher human and physical capital productivity.

The theory of public expenditure may be discussed in the context of increasing public expenditure, the range of public expenditure and/or in terms of the division of a given amount of public expenditure into different items like recurrent and capital expenditure. The latter of the two parts may be conceived in terms of allocation of the economy's resources between providing public goods on one hand and private goods on the other. The theories are as follows:

On empirical ground, there are mixed findings on the impact of government expenditure on growth. Several empirical studies are country-specific using time series data across several years while others are cross-country utilizing panel or cross sectional data. Chih-Hung Liu, et al. (2008) investigated the causal relationship between GDP and public expenditures for US federal government covering the time series data 1974-2002, they found in this study that total expenditure does cause the growth of GDP, which is consistent with the Keynesian theory. However, the growth of GDP does not cause the increase in total public expenditure which is inconsistent with Wagner's law. Mwafaq (2011) investigated the impact of public expenditures on economic growth using time series data on Jordan for the period 1990-2006 and found that government expenditure at the aggregate level has positive impact on the growth of GDP which is attuned with the Keynesian theory.

The review of the relationship between fiscal policy and economic growth in three North African countries of Egypt, Morocco and Tunisia by Mansouri (2008) shows positive correlation between the two variables, and also that 1 percent rise in public expenditure increases the real GDP by 1.26 percent in Morocco, 1.15 percent in Tunisia and 0.56 percent in Egypt. The results also affirmed existence of long-run relationships for all the three countries.

In Nigeria, there is controversy as to the role government expenditure on economic growth for instance, 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. Nurudeen and Usman (2010) analysed the impact of government expenditure on economic growth in Nigeria and found that government total capital expenditure has negative effect on economic growth. Also, comparing the relative effectiveness of fiscal versus monetary policies on economic growth in Nigeria, Adefeso and Mobolaji (2010) suggest that the effect of monetary policy is more prominent than fiscal policy on economic growth in Nigeria.

Moreover, Ighodaro and Okiakhi (2010) disaggregated government expenditure into general

administration, and community and social services in examining the effect of government expenditure on economic growth in Nigeria using time series data and found that both components of government expenditure have negative impact on economic growth.

However, Ekpo (1995), found that capital expenditure on transport, communication, agriculture, health and education positively influence private investment in Nigeria, which invariably enhanced the growth of the overall economy. In the same vein Ogbole, Sonny and Isaac (2011) focussed on the comparative analysis of the impact of fiscal policy on economic activities in Nigeria during regulation and deregulation, using the econometric methods of cointegration and error correction model. The study indicates that there is a difference in the effectiveness of fiscal policy in stimulating economic growth during and after regulation period. They recommend that government fiscal policy should refocus and redirect government expenditure towards production of goods and services so as to enhance GDP growth.

On the issue of manufacturing sector development in Nigeria, Ajayi (2011) in a study of the collapse of Nigeria's manufacturing sector in Nigeria 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 the area of infrastructure. This means that low implementation of fiscal policy affects the level of growth in Nigerian manufacturing sector. In the same vein, Rasheed (2010) investigated the productivity in the Nigerian manufacturing subsector using cointegration technique and an error correction model. The study indicates the presence of 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 employment rate.

Sangosanya (2011) used panel regression analysis model and Gibrat's law of proportionate effect in investigating firm growth dynamics in Nigerian manufacturing industry. The study observed that the manufacturing firm's 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.

Sikiru and Umaru (2011) studied the causal link between fiscal policy and economic growth in Nigeria, using Engle-Granger approach and error correction models which was estimated to take care of short-run dynamic. The result indicates that productive expenditure positively impacted on economic growth during the period covered. Charles (2012) investigated the performance of monetary policy on manufacturing sector in Nigeria, the result indicates that money supply positively affects manufacturing index performance while company lending rate, income tax rate, inflation rate and exchange rate negatively affect the performance of manufacturing sector. This means that monetary policy is vital for the growth of the manufacturing sector in Nigeria, which in turn would lead to economic growth.

Loto (2012) examined the relationship between global economic meltdown and the manufacturing sector performance in the Nigerian economy using descriptive analysis and pooled data. The result indicates that the global economic meltdown has insignificant effect

on the manufacturing sector of the Nigerian economy. Tomola, Adebisi and Olawale (2012) employed co-integration and vector error correction model (VECM) techniques to determine the link between bank lending, economic growth and manufacturing sector in Nigeria. The finding of the study revealed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. This means that the growth of manufacturing output has not been enough to generate sizeable growth in the economy.

3. Model Specification and Techniques of Analysis

In most empirical works on the issue of public expenditure, manufacturing sector growth is regarded as an integral part of economic growth and it is viewed as a long run phenomenon. The objective of this paper therefore, is to examine the effect of government capital expenditure on manufacturing output in Nigeria. The paper adapts a modified version of Devarajan, *et al*, (1996) using Manufacturing output as dependent variable, while government capital expenditure and recurrent expenditure and control variables (X) are explanatory variables. Among the control variables are the nominal and real income series (NGDP and RGDP) which are used separately in the equation in order to determine the one with greater effect on manufacturing output. The model specified for the study is thus expressed as:

$$MANU = f(CAXP, REXP, X) \dots\dots\dots (1)$$

in broader terms:

$$MANU = \beta_0 + \beta_1 CAXP + \beta_2 REXP + \beta_3 GDP + \beta_4 EXCH + \beta_5 INTR + \varepsilon \dots (2)$$

Apriori expectation: ? $2_1 > 0$; ? $2_2 > or < 0$; ? $2_3 > 0$; ? $2_4 < or > 0$; ? $2_5 < 0$

And in log form as:

$$\log MANU = \beta_0 + \beta_1 \log CAEX + \beta_2 \log REXP + \beta_3 \log GDP + \beta_4 EXCH + \beta_5 INTR + \varepsilon_t (3)$$

Where MANU = Manufacturing sector output, CAXP = Public capital expenditure,

REXP= Public recurrent capital expenditure, GDP = Gross Domestic Product

EXCH = Exchange rate, INTR = Interest rate and ε_t = white noise or stochastic error term.

The study adopts an error correction modelling approach, and is developed as follows:

The residuals ε from the cointegration model are extracted and used to form an ADF regression

$$\Delta \hat{\varepsilon}_t = a_1 \hat{\varepsilon}_{t-1} + \sum_{i=1}^m \delta_i \Delta \hat{\varepsilon}_{t-i} + v_t \dots\dots\dots (4)$$

We then test the order of integration of the residuals. Rejection of the (unit root) null hypothesis $H_0 : a_1 = 0$ implies that the residuals are stationary i.e. $\hat{\varepsilon}_t$ do not possess unit root and that the variables cointegrate. If the null cannot be rejected, the variables in the

model lack cointegration. If however, we find evidence of cointegration, the residuals will be used to form the estimate of cointegration in the error correction model as follows:

$$\Delta y_t = \lambda \hat{\varepsilon}_{t-1} + \beta_1 \Delta x_t + u_t \dots \dots \dots (5)$$

Where Δy_t and Δx_t represent the first differences of the dependent and explanatory variables, respectively, λ , the coefficient of the lagged residual values, represents the speed of adjustment, which indicates the proportion of any disequilibrium that is corrected within each period.

4. Presentation and Discussion of Results

The results presented in Table 1 clearly indicate that all series exhibit unit root property using both ADF and PP test statistics. They are I(1) series and therefore achieve stationary at first difference using 5 per cent level of significance. The results imply that all series have to be differenced once in our models in order to avoid spurious results. However, first difference only account for short run relationship among series and this problem is addressed by investigating whether cointegration exists among the series. The unit root test is reported in table 1 below.

Table 1. ADF and PP Unit Root Test Results of Nigeria's Annual Series (1970-2013)

Variables	Level		First Difference		Order of Integration
	ADF	PP	ADF	PP	
LRGDP	-2.4288	-6.0396	-5.4732	-6.0488	I(1)
LNGDP	-0.6479	-5.6025	-0.6335	-5.5981	I(1)
LMANU	-1.6597	-6.4572	-1.4576	-6.4573	I(1)
LCAXP	-1.7740	-6.7793	-1.7681	-6.8138	I(1)
LREXP	-0.5927	-7.8044	-0.5597	-8.0577	I(1)
EXCH	0.4052	-6.3060	0.4052	-6.3058	I(1)
INTR	-2.2205	-7.4578	-2.0378	-9.3600	I(1)
1% Critical Value	-3.5925	-3.6010	-3.5925	-3.5966	
5% Critical Value	-2.9314	-2.9350	-2.9314	-2.9332	

Table 2 presents the result of Johansen cointegration showing the long run relationship between indicator of manufacturing output (MANU) and government capital expenditure (CAXP) using nominal national income (NGDP) and real income series (RGDP) together with recurrent expenditure, interest rate and exchange rate as control variables in as reported models 1 and 2 respectively. The evidence of cointegration was further confirmed by the stationarity of the residual terms (ECM) reported in the last row of each model. Both the ADF and PP test conforms to error correction mechanism models where both the short run and long run relationships are examined.

Table 2. Cointegration/Long Run Relationship Results in Nigeria (1970-2013)

Series	Model 1 LMANU	Model 2 LMANU
C	-2.3140*** (4.3659)	0.1204 (0.2586)
LNGDP	1.0623*** (7.0698)	
LRGDP		0.2480*** (3.3579)
LCAXP	0.1610** (2.3459)	0.3926*** (5.2185)
LREXP	-0.2712** (2.1222)	0.2279* (1.8559)
INTR	0.0046 (0.6190)	0.0076 (0.7502)
EXCH	-0.0056*** (2.8302)	0.0071** (2.3183)
R ²	0.9945	0.9902
F-Statistic	1375.9***	767.27***
ECM: ADF	-2.9592	-4.0785
PP	-2.9575	-3.9207

Note that figures in parentheses represent absolute t-statistics while ** and *** indicate 5 and 1 per cent levels of significance. The 5 per cent ADF and PP critical value are -2.9592 and -3.9207 respectively

The results of estimated ECM parsimonious models are reported in Table 3. Model 1 reports manufacturing output (MANU) model with nominal income (NGDP) with capital expenditure (CAXP), recurrent expenditure (REXP), interest rate (INTR) and exchange rate (EXCH), while Model 2 reports manufacturing output (MANU) model with real income series (RGDP) with capital expenditure (CAXP), recurrent expenditure (REXP), interest rate (INTR) and exchange rate (EXCH) respectively. The results clearly reveal that the coefficients of past error correction mechanism term [(ECM (-1))], which lie between 0.41 and 0.54 for model 1 and 2 respectively are significantly negative at 1 per cent level of significance. The results clearly show that about 50.0 per cent of the past error is corrected in the current period.

The implication of this result, however, is that all the independent variables cointegrated with manufacturing output series. It then follows that nominal (NGDP) and real income (RGDP) series, capital expenditure (CAXP), recurrent expenditure (REXP), interest rate (INTR) and exchange rate (EXCH) exhibited long run relationship with the manufacturing output (MANU) series in the models 1 and 2 respectively. Manufacturing output with nominal income series model exhibits high F-statistics that are significant at 1 per cent level of significance and high coefficients of determination (R²) of 0.76 with evidence of no first

order autocorrelation as indicated by DW statistics. This indicates that about 76 per cent of variation in the manufacturing output is explained in the model. Similar results are also reported for manufacturing output with real income series model in model 2 with F-statistics that are also significant at 1 per cent level of significance but with lower R^2 of 0.56 implying that only 56 per cent of variation in manufacturing output is explained in the model. This indicate that manufacturing output with nominal income and capital expenditure model perform better than manufacturing output with nominal income and capital expenditure model.

Table 3. ECM Parsimonious Economic Growth Modelling Results for Nigeria (1970-2013)

Variable	Model 1 Δ LMANU	Model 2 Δ LMANU
Constant	0.0934 (1.6221)	0.0596 (0.6513)
Δ LMANU(-1)	-0.2455** (2.1879)	
Δ LMANU(-2)		0.3129** (2.1427)
Δ LCAXP	0.1128* (1.8591)	0.2686*** (3.0174)
Δ LCAXP(-1)	-0.1226** (2.1005)	-0.1537* (1.8956)
Δ LCAXP(-2)		
Δ LREXP	-0.2692*** (3.5448)	-0.1406 (1.3468)
Δ LREXP(-1)	-0.1038 (1.2120)	-0.2352* (1.7506)
Δ LREXP(-2)	-0.1397* (1.8789)	-0.1547 (1.2442)
Δ LNGDP	0.8651*** (7.5319)	
Δ LRGDP		0.1908** (2.0906)
Δ LRGDP(-1)		-0.2106** (2.4461)
Δ INTR		
Δ INTR(-1)	0.0066* (1.7901)	0.0112* (1.9875)
Δ INTR(-2)		
Δ EXCH		0.0059* (1.8872)

Δ EXCH(-1)	-0.0012*** (2.9007)	-0.0073** (2.3289)
Δ EXCH(-2)		
ECM(-1)	-0.4109*** (3.6539)	-0.5402*** (3.5598)
R ²	0.7618	0.5609
F-statistic	9.5967***	2.9810***
DW Statistic	1.9321	1.7532

The figures in parentheses represent absolute t-statistics while *, ** and *** indicate 10, 5 and 1 per cent level of significance respectively. Symbol Δ preceding series represents first difference symbol.

The result of the effect of government capital expenditure on manufacturing output is presented in table 3. Nominal and real income series are included separately as one of explanatory variables in models 1 and 2 respectively. The results reported for the effect of government capital expenditure on manufacturing output using nominal income as one of the explanatory variables in model 1 shows that first lagged value [MANU(-1)] of manufacturing output exert significant but negative influence on manufacturing output value, while the second lagged value [MANU(-2)] influences manufacturing output positively at 5 per cent level of significance with the inclusion of real income series as an explanatory variable. The result may indicate that past values of manufacturing output influences its current value. While the first lagged has negative influence with nominal series as one of the explanatory variables, the second lagged value has positive and significant effect on manufacturing output when real income series is used as one of the explanatory variables. The effect of government capital expenditure on manufacturing output reveals that government capital expenditure at level [CAXP] has positive impact on manufacturing output in both models with 10 per cent and 1 per cent levels of significance respectively. This shows that the result has support for theory in terms of sign and support the significant role in the manufacturing output growth process. The first lagged value of the variable [CAXP(-1)] however exerts negative influence on manufacturing output in the two models at 5 and 10 percent levels of significance respectively.

The effect of recurrent expenditure [REXP], nominal income series [NGDP], real income series [RGDP], interest rate [INTR] and exchange rate [EXCH], which are auxiliary variables in the models though mixed, reveal that recurrent expenditure at level [REXP] has negative effect on manufacturing output. However, while the effect is significant at 1 per cent level of significance when nominal income series is used as an explanatory variable, it is insignificant when real income is employed. The first and the second lagged values of recurrent expenditure {[REXP(-1) and [LREXP(-2)]} indicate a negative and significant effect on manufacturing output at 10 per cent level of significance. Also, there is strong indication that both nominal and real income series at level [NGDP, RGDP] when used separately as explanatory have significant positive role to play in manufacturing output in Nigeria as revealed by the positive and significant effect on manufacturing output. The first lagged value of RGDP however presents a negative and significant effect on manufacturing output.

The result also presents a non-significant impact of both interest rate and exchange rate at level as only their first lagged values have significant effect on manufacturing output. While first lagged value of interest rate has positive effect on manufacturing output at 10 per cent level of significant, first lagged value of exchange rate exerts negative effect on manufacturing output at 1 per cent and 5 per cent levels of significance in the two models respectively.

5. Conclusion

The results of the error correction estimates are quite insightful. Empirical results indicate that there is a positive short-run relationship between manufacturing output and government capital expenditure in Nigeria. However, there exists a negative short run relationship between one lag levels of government capital expenditure and manufacturing output. The empirical result of positive relationship between manufacturing output and government capital expenditure is in agreement with the findings of Chih-Hung Liu, et al. (2008), Mwafaq (2011), Muritala and Taiwo (2011), Sikiru and Umaru (2011) and Njoku, Okezie, and Ngozi (2014), which confirms that large public expenditure has positive and significant impact on economic growth which may be brought about through its influence on manufacturing output in the Nigerian economy. Interestingly, the result reveals that recurrent expenditure at level and its lagged value have negative effect on manufacturing output. This may account for the reason why some authors found negative relationship between government spending and manufacturing output as the recurrent component might have surpassed the capital component.

From this study, we confirmed that the reason why public expenditure has not contributed significantly to growth in the manufacturing sector is that the realities in Nigeria deviate from what holds in other industrialized economies. In those economies, public expenditure were rightly channelled toward capital component and judiciously utilized as they were used to lay foundations for sustainable growth, to provide a conducive environment for private business to operate by providing facilities that complement private capitals like stable power supply and good roads. However, in Nigeria, allocations on capital projects are either siphoned, diverted or mismanaged. The study therefore suggests that larger percentage of government expenditure in the annual budget should be on capital component coupled with improved implementation of expenditure policies rather than recurrent expenditure which does not really have a significant impact on the manufacturing sector.

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