Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.9, No.2, 2018

A Re-Examination of Trade Policy and Industrial Sector Performance in Nigeria

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Abstract
In this paper, the purpose was to investigate the extent to which trade policy impact on industrial sector performance in Nigeria within the period of 1970 to 2014. Particularly, the study was carried out using ARDL bounds testing approach. It was observed that the trade policy variables of exchange rate, trade openness and tariff significantly impact on industrial sector performance. Specifically, exchange rate and tariff have negative and significant impact on manufacturing sub-sector and industrial sector performance in Nigeria. On the other hand, trade openness has a significantly positive effect on industrial sector growth. On the basis of these findings, the study suggested the implementation of appropriate exchange rate and tariff policies that will promote industrial activities as well as protect domestic firms from external competition. Emphatically, moderate tariff on importation of raw materials and machineries should be adopted and enforced.

1. Introduction

Industrialization of any economy has been the desire of most governments. This is because of the catalytic potentials embedded in industrialization to create employment opportunities, raise per capita income, raise economic growth and development etc. Without generating greater output and income, a country cannot make a sustained attack on poverty, unemployment, and other social and economic problems. Industrialization is viewed as an essential stage in reaching the goal of rapid economic growth. But industrialization cannot be a policy objective in its own right.

It is based on these potentials that successive governments in Nigeria, since independence have been quite consistent, at least in theory, through an expression in annual budgets, in pursuance of an industrial policy that aims at ensuring economic growth and development. Over the years, Nigerian governments have been confronted with the implementation of a growth-oriented economic policy to boost industrialization through trade. Policymakers in the developing countries including Nigeria have long agreed on the role of government in providing infrastructure, promoting market efficiency, and maintaining stable macroeconomic policies. But they are yet to come out with a realistic policy toward trade and industry. The form of government intervention in this area is the distinguishing feature of alternative development strategies. For analytical convenience, trade strategies can be broadly divided into two groups, namely, outward oriented and inward oriented trade strategies. An outward-oriented strategy is one in which trade and industrial policies do not discriminate between production for the domestic market and exports, nor between purchases of domestic goods and foreign goods. Because it does not discourage international trade, this nondiscriminatory strategy is often referred to as an export promotion strategy. By contrast, an inward oriented strategy is one in which trade and industrial incentives are biased in favor of production for the domestic over the export market. This approach is well known as the import substitution strategy.

The policy challenge has often been a decision between protectionist and liberalized policies. Nigeria adopted the former as shown in various development plans from 1964 to 1986. That is; Import Substitution Strategy, Export promotion, indigenization policies etc. Inability of the protectionist policy to drive sustainable growth led to a policy change, in 1986 to economic openness or liberalization. Following the adoption of liberalization policy in 1986 under the structural adjustment programme, there have been conflicting opinions on whether or not it has supported the growth of the Nigerian economy (Ndebbio, 1991).

The structure of the Nigerian economy is typical of an underdeveloped country. Over half of the gross domestic product is accounted for by the primary sector with agriculture continuing to play an important role. The oil and gas sector, in particular, continues to be a major driver of the economy, accounting for over 95 per cent of export earnings and about 85 per cent of government revenue between 1970 and 2014. In contrast, the industrial sector in Nigeria accounts for an average smaller proportion of economic activity (6 per cent) while the manufacturing subsector contributed barely an average of 4 per cent to GDP within the period of study (Chete, Adeoti, Adeyinka and Ogundele, 2014). This is despite policy efforts over the last 50 years to facilitate the industrialization process. The increasing domination of oil and gas sector over all other sectors including the industrial sector does not in any way depict Nigeria's desire to industrialize immediately. The poor performance of the industrial sector as evidenced in the dismal performance of the manufacturing, building and construction, solid minerals and utility sub-sectors can be attributed to so many factors, including ineffective macroeconomic policies brought about by policy inconsistency, non-implementation and frequent reversals.

Meanwhile, it must be stressed that Nigeria has never lacked or been in short supply of policies but the

problem is what can be done for the public sector to come out with realistic policies which could be implemented and sustained (Okonjo-Iweala, 2012). Although, Nigeria has developed several trade policies alongside industrial polices as embedded in 1962-1967; 1970-75; 1975-80; and 1980-85 development plans and various sectoral policies, but is still lacking behind as witnessed in industrial share to GDP.

Besides the low performances of industrial sector, the relative effectiveness of the trade policies has not been re-examined in the context of Autoregressive Distributed Lag (ARDL) model. Therefore, the basic aim of this study is to re-examine quantitatively, the impact of trade policy on industrial sector performance in Nigeria. In carrying out this study, the industrial sector is examined holistically in conjunction with the manufacturing subsector in order to ascertain if trade policy indicators significantly impacts on any of the dependent variables. The manufacturing subsector is chosen because it is usually seen as the engine room of the industrial sector.

2. Empirical and Theoretical Issues on Trade Policy and industrialization

Numerous studies with different time frames and methodologies have been conducted on the impact of trade policy on industrialization. In their study, Aluko, Akinola & Fatokun (2004) examined the impact of globalization on the Nigerian manufacturing sector with particular reference to selected textile firms from Lagos, Asaba and Kano. This study employed both qualitative and quantitative techniques in the collection of the relevant data while parametric and non-parametric methods were adopted for the analysis of data. The study sampled 630 respondents in total, which also formed the sample size for this study. The result from this study shows that globalization has had an inverse effect on the manufacturing sector. In essence, the result shows that globalization had strong adverse effects on capacity utilization in the manufacturing sector. The study thus submits that Nigeria and her manufacturing firms are not fully prepared for the challenges of globalization.

Adebiyi & Dauda (2004) conducted an empirical investigation on Trade Liberalization Policy and Industrial Growth Performance in Nigeria, using an error correction mechanism. The work studied the relationship between trade policies and industrial growth in Nigeria, using quarterly time series data spanning 1973 and 2001. The model developed by Lucas (1988) is taken as the theoretical framework for undertaking empirical work on the relation between trade liberalization and industrial growth in Nigeria. After the estimation, it was confirmed that trade openness and real export were significant determinants of industrial production in Nigeria.

Mesike, et al (2008) using data for the period 1960-2004 showed that the liberalization of trade has exposed Nigerian rubber industry to the fluctuations in global rubber prices and the instability in the natural rubber prices has been a disincentive for rubber production and exports. Saibu (2011) investigated the relative effectiveness of trade and policy shocks on sectoral output growth in a small open Nigerian economy employing A CVAR model. The effects of monetary policy shocks were positive and significant on manufacturing, service and industrial sector while fiscal policy shock was only significant and positive on agricultural output growth. The result further showed that international oil price shock and trade openness had pronounced negative effects on both sectoral and aggregate outputs. In addition, oil and trade openness' negative effects overwhelmed the positive effects of fiscal and monetary policy shocks in investigating the relationship between trade liberalization and the market structure and productivity performance of the Nigerian manufacturing sector.

Bakare and Fawehinmi (2011) analyzed the impact of trade openness on non-oil industrial sector in Nigeria from 1979-2009 using the error correction technique. The analysis revealed that trade openness has a significant positive impact on non-oil industrial output in Nigeria. on the basis of this result, the study recommended that the government should consolidate and maintain the current trade policies so as to enhance sustainable growth and development in the industrial sector

Adenikinuju & Olofin (2007) examined the quantitative effects of the role of economic policy in the growth performance of the manufacturing sector in Africa. The study used panel data for seventeen countries over the period, 1976 to 1993. The result also found that the improvement in terms of trade was found to have a beneficial impact on manufacturing output in Nigeria. The result also found that level of human capital, proxied by primary and secondary school enrollment rates have positive impact on growth in manufacturing sector output in Africa. The competitiveness index, that is the unit of labour cost, has a negative impact on the growth performance of the manufacturing sector in African countries. The trade liberalization policy, proxied by index of openness, has an insignificant effect on the growth in the manufacturing.

Umoru & Eborieme (2013) empirically examined the relationship between trade liberalization and industrial growth in Nigeria utilizing annual time series data covering the period 1970-2010.The study also employed the error correction model under the framework of the ordinary least square estimation technique to determine the short-run dynamics around the equilibrium relationship. Results obtained from the study showed that a 10 per cent rise in trade liberalization lagged one, two and three periods stimulate industrial production by 1.55, 1.09 and 1.23 percent respectively implying that the process of trade liberalization is cumulative and self-sustaining. The study concluded that there is a positive and significant correlation between trade liberalization and industrial growth in Nigeria and recommended that the government embark on comprehensive implementation of trade liberalization policies in order to accelerate and sustain industrial growth in Nigeria.

In a similar but slightly different manner, Asongo, Jamala, Joel & Waindu (2013) also examine the impact of trade liberalization on industrial growth taking a cursory look at the performance of the industrial sector in Nigeria. The study employed the Ordinary Least Square estimation technique while annual data spanning from 1989 -2006 was utilized. The results of the study showed the existence of a positive relationship between domestic credit to private sector and foreign private investment on the manufacturing output. Also the result indicates the existence of a positive relationship between the manufacturing output and the Gross Domestic Product. The study therefore concludes that the manufacturing sector plays a pivotal role in the economic development of the country.

Ayinde (2014) investigated the impact of exchange rate volatility on the performance of manufacturing firms in Nigeria using quarterly data for the period spanning from 1986 to 2012. The study employed Generalized Autoregressive Conditional Heteroscedasticity (GARCH) estimation technique. The results of the study indicated that exchange rate negatively and significantly impacts on manufacturing output in Nigeria. On the basis of this result, it was recommended that properly managed exchange rate strategy be put in place to specifically protect infant industries.

Using annual time series data covering the period 1970-2012 Edeme & Karimo (2014) examined the impact of economic liberalization on industrial sector performance in Nigeria specifically looking at manufacturing, mining and quarrying and power, and the aggregate industrial sector. The study employed the ordinary least square regression technique in estimating the relevant equations. The results obtained from the study showed that economic liberalization has a significant impact on performance of the Nigerian manufacturing, mining, quarrying, and power subsectors respectively and the aggregate industrial sector. The study therefore recommended that that trade openness should be encouraged but its implementation should be handled in line with the peculiarities of the country concerned while efforts toward

Further economic liberalization should be one that encourages development and utilization of the abundant energy resources in the economy.

Arogundade, Obalade & Ogumakin (2015) investigation to establish whether infant industries argument in favour of Nigerian manufacturing sector still holds used annual time series data spanning from 1988-2010. Ordinary least squares estimation technique was employed in its analyses. Manufacturing contribution to gross domestic product was the dependent variable while the independent variables were consumer price index, import, interest rate and tariff. Results obtained from the study showed that inflation, interest rate and import impact negatively on manufacturing output while tariffs impacted positively on the growth of manufacturing sector within the period under evaluation. The study recommended that rather than protection, government should shift attention to improving physical infrastructure notably in the area of power supply while implementing sound and effective trade policies as well as good management of the monetary sector.

Theoretically, Adam Smith's theory of Absolute Advantage (1976), Heckscher-Ohlin Theory of international trade (1933) and The Cobb-Douglas Production Function are the reviewed theories/functions that are relevant to this study

Adam Smith's theory of Absolute Advantage (1976) considers it safe to leave the economy to be propelled by an 'invisible hand'. That is, the forces of competition, motivated by individual self-interest. This theory is built on the role which division of labour plays in economic progress. The crux of this theory is that expansion of international trade is an important method of widening the market and promoting the division of labour. Restrictions on international trade limit the size of the market. Trade restrictions diminish the scope for international specialization and thereby lower domestic productivity.

The Heckscher–Ohlin model (H–O model) is a general equilibrium mathematical model of international trade, developed by Eli Heckscher (1919) and Bertil Ohlin (1933). This theory is an improvement on David Ricardo's theory of comparative advantage by predicting patterns of commerce and production based on the factor endowments of a trading region. The model essentially says that countries will export products that use their abundant and cheap factor(s) of production and import products that use the countries' scarce factor(s). The H–O model removed technology variations but introduced variable capital endowments, recreating endogenously the inter-country variation of labour productivity that Ricardo had imposed exogenously. With international variations in the capital endowment like infrastructure and goods requiring different factor "proportions", Ricardo's comparative advantage emerges as a profit-maximizing solution of capitalist's choices from within the model's equations. The decision that capital owners are faced with is between investments in differing production technologies; the H–O model assumes capital is privately held. This theory is criticized by Leontief Paradox, that factor endowments can be impacted by government policy – minimum wage.

The Cobb-Douglas Production Function is a Neo Classical growth theory which accounts for growth in output as a function of growth in inputs, particularly capital and labour. The Cobb-Douglas form was developed and tested against statistical evidence by Charles Cobb and Paul Douglas during 1927-1947. The production function provides a quantitative technology link between inputs and outputs. As a simplification, it is assumed that labour (N) and capital (K) are the only important inputs. In its most standard form for production of a single good with two factors, the function is

$Y = AL^{\beta}K^{\alpha}$

Where α and β are the output elasticities of capital (k) and labor (L), respectively. These values are constants determined by available technology. Output elasticity measures the responsiveness of output to a change in levels of either labor or capital used in production, ceteris paribus.

$\alpha + \beta = 1$,the production function has constant returns to scale, meaning that doubling the usage of capital K and labor L will also double output Y. If $\alpha + \beta < 1$ returns to scale are decreasing, and if

$\alpha + \beta > 1$, returns to scale are increasing. Assuming perfect competition and $\alpha + \beta = 1$, α and β can be shown to be capital's and labor's shares of output.

More input means more output. In other words, the marginal product of labour, or MPL (the increase in output generated by increased labour), and the marginal product of capital, or MPK (the increase in output generated by increased capital), are both positive. Labour and capital each contribute an amount equal to their individual growth rates multiplied by the share of that input in income. The rate of improvement of technology, called technical progress, or the growth of total factor productivity, is represented by A.

The growth rate of total factor productivity is the amount by which output would increase as a result of improvements in methods of production, with all inputs unchanged. In other words, there is growth in total factor productivity when we get more output from the same factors of production. Cobb and Douglas were influenced by statistical evidence that appeared to show that labour and capital shares of total output were constant over time in developed countries; they explained this by statistical fitting least-squares regression of their production function.

3. Industrial Performance in pre SAP and post SAP era

An IMF-supported Structural Adjustment Programme (SAP) was adopted in 1986. The introduction of SAP in 1986 laid emphasis on expenditure reducing and expenditure switching policies as well as using the private sector as the engine of growth of the economy via commercialization and privatization of government-owned enterprise (Ogbonna, 2012). It was partly to address the problems of the sector. It was meant to force industrialists to look inward for most of their raw materials, reduce demand for imported goods and encourage private participation in the industrial sector. The major policy thrust of this SAP was redirection from inward-looking import substitution strategy to outward looking export promotion strategy and the final instrument was the exchange rate.

To make the Structural Adjustment Programme (SAP) result oriented, the federal government created certain SAP induced industrial policies such as: interest rate deregulation, Debt-equity swap policy, privatization and commercialization policy, and the new export policy/incentive.

Another notable industrial policy that was put in place in this era was the new industrial policy of Nigeria (1989). This industrial policy was launched on January 14, 1989 by the erstwhile military president, Gen. Ibrahim Babangida. The industrial policy replaced the amended version of the Nigerian Enterprises Promotions Decree of 1977. The main thrust of this industrial policy was to create a new investment climate and mobilize the private sector to take lead to entrepreneurship while the government provides the infrastructure and security (Ndebbio, 1991).

The new industrial policy of 1989 provided a package of incentives and operational guidelines for both local and foreign investors. These incentives included: a 5 years tax holiday on pioneer industries; tax relief up to a maximum of one hundred and twenty and one hundred and forty percent (120 per cent and 140 per cent) on expenses on research and development; capital allowance given without the usual seventy-five percent (75%) of total profit restricted; effective protection for locally made goods as contained in the custom and exercise tariff structure of 1988 (amended in 1989) and an anti-dumping of goods measure; the establishment of an industrial coordination committee (IOCC) to control, co-ordinate and accelerate all approved processes and ensure that all required approvals are given within sixty (60) days; and the establishment of a policy analysis department and an industrial Data Bank (IOB) to gather, store, analyze and retrieve data and provide economic information on industrial ventures (Ndiyo et al, 2004).

The 1989 policy document was geared towards the promotion of small and medium scale industries with a view to reducing the unemployment rate in Nigeria. Government realized that the industrial policy so far pursued, based on Import Substitution Industrialization (ISI), with a with a large-scale structure has yielded the expected results. The Federal Government therefore shifted its attention from the large-scale industrialization which was hoped among others to develop in Nigeria a broader base of entrepreneurial culture (Ovat, 2007).

The introduction of SAP provided the basis for the regulation of the economy as a number of institutional, structural and market reforms were undertaken to liberalize the economy and provided an enabling environment to attract foreign investment. Government decided on gradual divestment of government holdings in non-strategic industrial and commercial enterprises, signaling the initiation of privatization of state-owned enterprises (Roberts and Azubike, 2004).

Unfortunately, the impact of SAP on the industrial sector was a mixture off blessings and woes. While it was desirable for local sourcing of available raw materials, the cost of imported raw materials increased, leading to high price of finished goods. The impact of devaluation, high interest rates. The much intended upsurge foreign

investment due to SAP policies did not materialize at the time (Ekpo, 2004). However, SAP-based policies gradually encouraged increased private sector participation in the industrial sector and reduced the size of public sector direct involvement.

In the post-SAP (1993) era, government maintained the policy of withdrawing from direct participation in manufacturing activity and encouraging private sector investment, as well as encouraging the growth of small and medium-scale industries. From 1995, attention was forced on the design of policy measures to boost capacity utilization, increase output and provide more employment, including granting tax concessions to small companies and exporters and the allocation of funds to capital projects. The legal and institutional framework was revised to attract foreign investments inflow and enhance capacity utilization in the productive sector.

By 1999, Nigeria's Industrial production policy emphasized the phased privatization of public enterprises, while appropriate measures were taken to protect and encourage domestic manufacturers, and increase import duties on selected finished goods. The period also witnessed a shift in emphasis from revamping the economy through the ICP's and other industries to Foreign Direct Investment (FDI). An FDI-friendly framework, embodied in the provisions of the industrial Development Coordination Committee (IDCC), was created (CBN 2000).

Several reforms were carried out between 2003 and 2007 (Ekeocha, 2007). These reforms include macroeconomic reforms which include budget and public expenditure reforms (transparency and procurement reforms, due process; oil price-based fiscal rule), non-accommodating monetary policy; and exchange; and exchange rate management. Others are;

- Structural/institutional reforms, which include tax reforms, ports and customs reforms
- Banking and financial sector reforms
- Exchange rate and foreign exchange management
- Trade policy and tariff reforms-adoption of common external tariff
- Etc.

It was anticipated that 2007, Nigeria will pursue industrialization under the National Economic Empowerment and Development Strategy (NEEDS), which was to be a market driven sector-led growth development strategy (NEEDS Bulletin, 2004). But performance was relative and hindered but lack of political will.

The industrial policy objective of the government was the acceleration of the pace of industrial development through radical increase in value-added at every stage of production. Government intends to emphasize increases in Total factor Productivity (TFP) by pursuing knowledge and skill intensive production on the basis of available best practices. The nation's Industrial Development Strategy (NPC, 2004) was intended to encourage forward and backward linkages within a few chosen niches.

These targets were;

i. Increase in the annual growth of the manufacturing sector by at least 7 per cent per annum;
ii. Increase in capacity utilization to about 70 per cent; and
iii. Contribution of 70 per cent of total investment in industries by the private sector.

From all indications, the direction of the reform programme in the industrial sector since 1986 covered the entire spectrum of economic activities and policy was initiated to achieve minimal government involvement and influence in the industrial sector. However, government's intention was to create an efficient private sector-led industrial sector which would experience growth along trend (Ekpo, 2004). This could be observed in President Goodluck Jonathan's Transformation Agenda. It was planned to last between 2011 and 2015, the duration of his regime. Designed to correct the flaws in the country's drive for development which is fraught with absence of long-term perspective, lack of continuity, consistency and commitment to policy objectives. The flaws had resulted in a national growth without development; lacked of improvement in the overall welfare and human development index of Nigeria. This had also led to rising unemployment, inequality and poverty, and the Jonathan administration strongly felt the need for a holistic transformation of the Nigerian state with a strategy that takes care of the flaws in question. The agenda was based on a set of priority policies and programmes which, if implemented, were expected to transform the Nigerian economy (Businessday Publications, 2012).

Table 1 :Trend of Industrial and Agricultural Sectors to GDP ratio

Year	GDP(Nm)	INDU/GDP	AGRIC/GDP
1970-1974	7.011	0.246	0.3638
1975-1979	29,399.84	0.3134	0.2363
1980-1984	270,915.7	0.4058	0.2820
1985-1989	213,683.8	0.8028	0.3416
1990-1994	161,123.06	0.4018	0.3282
1995-1999	300049.73	0.3788	0.3492
2000-2004	424897.1	0.3252	0.3952
2005-2009	636,231.28	0.2412	0.4172
2010-2014	3,418,174.6	0.25743	0.4192

Source: CBN Statistical Bulletin (various issues)

Where:
INDU/GDP = Share of Industrial output in GDP
AGRIC/GDP = Share of Agricultural output in GDP
Nm = Millions of Naira

From Table 1, the trend of industrial and agricultural ratio to GDP is shown. Industrial share is so unstable over the years, irrespective of the trade policies embodied in all development plans accept 1985-1989, maybe caused by introduction of SAP. Agricultural ratio fell in the 1970s due to invention of oil that led to abandonment of agriculture. But it rose minimally from 1985 to 2014.

4. Trade Policies in Nigeria

According to Ekpo (2004), the trade policy reforms that have been adopted by successive governments during the study period are;

i partial abolition of import license scheme

ii granting of special tax incentives and tax holidays to enable local industries build up enough funds for expansion purposes and to encourage firms invest in economically disadvantaged areas.

iii reduction of corporate income tax and introduction of tax free dividends, for foreign persons and to encourage local research and development (R&D).

iv the export incentive degree was promulgated in which various incentives to enhance export promotion were stipulated

v the export credit guarantee and insurance scheme was established to assist Nigerian companies compete effectively in the international market.

vi Government granted up to 140 percent tax relief to firms in respect of research and development (R&D) expenses in the development of raw materials.

vii the Export Stimulated Loan (ESL) scheme was put in place to provide foreign exchange producers that require imported inputs essential to the production of export products.

viii firms were allowed to open and maintain domiciliary accounts to keep their export earnings in foreign currencies.

ix several institutional supports were put in place by the government through the establishment of industrial Development Coordinating Committee (IDCC), Industrial Data Bank, Raw materials Research and Development Council (RMRDC), project Development Agency (PRODA), Federal institute of industrial Research (FIIRO), Export Processing Zone (EPZ), Nigerian Investment Promotion Council.

x Simplification of industrial licensing.

xi The exchange market was deregulated to enhance access of firms to foreign exchange.

xii Devaluation and full convertibility of the naira on trade account were embarked upon to bring it nearer to acceptable parity and make Nigerian products enhance greater profitability of Nigerian manufactured export.

xiii Structural/institutional reforms, which include tax reforms, ports and customs reforms, exchange rate and foreign exchange management, trade policy and tariff reforms-adoption of common external tariff.

All these reforms were embedded in development and sectoral plans from 1962-2014 and are classified as follows: 1962-1967: First development plan which was challenged by civil war.

1970-1979: Second and third development plan was faced by oil boom. The oil sector became major foreign earner for Nigeria and dominated every other sector. 1980-1998: Military regime, global recession, period of consolidated on the gains of SAP and alleviation of the losses from SAP and 1999 - 2014: This was the period of democratic governance, packaging and implementation of reforms.

5. Model and Methodology

The theoretical underpinning of this study is modified Cobb-Douglas production function of neoclassical growth theory and it is complemented by a series of control variables usually introduced in growth models. The growth

of the industrial sector is specified to depend on trade policy indicators. Thus, the study adopted an augmented Cobb-Douglas production function.

$Y = A K^{\alpha} L^{\beta}$ - - - - - - - - - 1

Where Y= Output

A =Technical progress or efficiency parameter

K = Capital (measured by gross fixed capital formation in thee context of this stud)

L = Labour

α and β = Output elasticities of capital and labour

In the context of this study, the efficiency parameter may be captured by trade policy indicators like exchange rate (EXHR), Openness (OPEN) and tariff (TAR).

Therefore, A = f(trade policy variables including Exchange Rate, Openness and Tariff)). Thus, the functional and general form of industrial sector and manufacturing subsector models for estimation are:

$Y = IND = f(K, L, EXHR, OPEN, TAR, \mu)$ - - - - - - 2

$Y = MAN = f(K, L, EXHR, OPEN, TAR, \mu)$- - - - - - - 3

Where IND and MAN = Growth rates of Industrial and Manufacturing Outputs respectively, μ is the stochastic error term and all other variables are as previously defined.

Given the nature of the study, unit root tests based on the Augmented Dickey-Fuller (ADF) test was conducted to ascertain the integrating properties of the variables. Co-integration test based on unrestricted Auto Regressive Distributed Lag (ARDL) bounds testing approach was adopted to establish long run relationships among the variables, while the short run dynamics was examined using the Error Correction Mechanism (ECM). The linear econometric form of Industrial sector and Manufacturing subsector development equations are as shown in equation 4 and 5 respectively.

$(IND) = \alpha_0 + \alpha_1 Ln(K) + \alpha_2 Ln(L) + \alpha_3 Ln(EXHR) + \alpha_4 Ln(OPEN) + \alpha_5 Ln(TAR) + U_1$ - - 4

$(MAN) = \alpha_0 + \alpha_1 Ln(K) + \alpha_2 Ln(L) + \alpha_3 Ln(EXHR) + \alpha_4 Ln(OPEN) + \alpha_5 Ln(TAR) + U_1$ - -5

The theoretical a priori expectations about the signs of the coefficients of the parameters are as follows: $\alpha_1, \alpha_2, \alpha_4 > 0$, $\alpha_3, \alpha_5 < 0$

EXHR = exchange rate (units of naira per US dollar)

OPEN = trade openness in terms of export and import GDP ratio

TAR = tariff rates (in naira)

6. Presentation and Discussion of Results

The unit root test that was conducted aimed at establishing the stationarity conditions of the variables. The test was based on the Augmented Dickey-Fuller (ADP) test. The results of the unit root test are reported in table 2, revealed that variables such as industrial sector was stationary at level. This is because their calculated ADF absolute statistics at level were greater than the critical value of 2.929734 at five percent level of significance. While other variables like exchange rate, capital formation, manufacturing, labour force and tariff were not stationary at level but at first difference, because their ADF statistics values were less than the critical ADF statistics at five per cent level of significance. Given the fact that the series was integrated of either 1(0) or 1(1), it satisfied the requirement for the application of ARDL bounds testing procedure for co-integration test and in the estimation of both long and short run dynamics.

Table 2 Unit Root Test

Variables	ADF Statistics		Order of
	Level	Ist Difference	integration
LEXHR	-0.298075	-5.289006	1(1)
LL	-0.378494	-5.109759	1(1)
MAN	-2.787588	-5.412037	1(1)
IND	-3.17691	-	1(0)
LOPEN	-3.336053	-	1(0)
LTAR	-0.150306	-6.177466	1(1)

ADF critical value at level : 5% = -2.929234

ADF critical value at 1st diff.: 5% = -2.929234

Table 3: Wald Test of Industrial sector model for Cointegration

Test Statistic	Value	K
F-statistic	4.300358	6
Critical Value Bounds:	I0 Bound	I1 Bound
Significance level:		
5%	2.45	3.61
Decision: There is co-integration		

Source: Researcher's Computation, 2017

Table 3 showed that the F-Statistic value of 4.30 was greater than the upper bound critical value of 3.61 at

five per cent level of significance to confirm that there is a cointegration and hence existence of a long run relationship between the variables.

Table 4 : ARDL Long Run Regression Estimates
Dependent Variable: IND

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	53.69876	140.2439	3.828956	0.005
D(LOG(K)	1.041181	0.619514	1.680643	0.1313
D(LOG(L)	33.61517	8.648039	3.887028	0.0046
DLOG(EXHR)	-0.618586	0.269803	-2.292731	0.0510
D(LOG(TAR)	-1.465189	0.353498	-4.144833	0.0032
LOG(OPEN)	0.875986	0.354605	2.470319	0.0387

Source: Computation using E-views, 2017

Table 4 is the long run ARDL result for aggregate industrial sector. Capital, exchange rate, trade openness, labour force and tariff are correctly signed. This means that these variables conform to economic theoretical expectations. Interestingly, capital is not a significant variable that influences industrial performance but all other variables (labour, exchange rate, tariff and trade openness) do influence.

7.1 Parsimonious dynamic short run estimates of industrial sector model

The result of the short run dynamics as presented in table 5 showed that the error correction variable has the expected negative coefficient and was statistically significant in accordance with theoretical expectation. Its coefficient of 0.614 showed that 61 percent of the systemic disequilibrium in the industrial sector development model was corrected each year. This represented a fast speed of adjustment from short run disequilibrium to long equilibrium.

Table 5: Short run Parsimonious Error Correction Result of Industrial Sector Model
Dependent Variable: IND
Selected Model: ARDL(1, 1, 3, 3, 2, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IND(-1)	0.670912	0.193856	3.460884	0.0025
DLK	0.296345	0.183526	1.614729	0.1220
DLK(-1)	0.277494	0.173069	1.603369	0.1245
DLL	4.337582	1.651729	2.626087	0.0162
DLL(-2)	3.971826	1.788977	2.220166	0.0381
DLEXCH	0.471938	0.294588	1.602027	0.1248
DLEXCH(-1)	-0.761866	0.383792	-1.985101	0.0610
LOPEN(-1)	0.470658	0.319028	1.475289	0.1557
DLTAR	0.117509	0.163447	0.718945	0.4805
ECM(-1)	-0.613840	0.298728	-2.054847	0.0532
C	11.11293	5.997715	1.852861	0.0787

R-squared	0.931622	Mean dependent var	11.22811
Adjusted R-squared	0.866663	S.D. dependent var	0.982264
F-statistic	14.34167	Durbin-Watson stat	1.850404

Source: Computation using E-views, 2017

The high values of R-squared of 0.932 and adjusted R-squared of 0.867 showed the estimated industrial sector model has a very good fit on the data. In specific term, the adjusted R-squared of 0.867 indicated that about 89 percent of total variation in the dependent variable (industrial output) was accounted for by variations in the independent variables (capital formation, labour force, tariff, openness and exchange rate). This means that the estimated model has a very high explanatory power.

The high F-statistic value of 14.34 showed that the overall model was statistically significant. This was because the F-statistic value calculated of 14.34 was greater than the tabulated value of 2.12 at five percent level of significance. The zero probability value also buttresses the fact that the R-squared is significant. Hence, the overall model was statistically significant. This means that the explanatory variables have joint impact on the explained variable.

The Durbin-Watson statistic of 1.850 is closer to 2 and fell in the region of no auto-correlation of the Durbin-Watson regions. This result showed that the residuals were not correlated and hence there was no serial correlation. The estimated model was therefore well-specified and well-behaved.

Evaluation of the short run coefficients showed that one period lagged of industrial output has a positive relationship with current value of industrial output in Nigeria. This result was consistent with the theoretical expectation, showing that a one percent increase in the previous one period of industrial output led to an increase in the current value of industrial output by 0.67 percent, ceteris paribus. The variable was also significant in influencing industrial output in the current period in Nigeria at five prevent level of significance. This is because its probability value of 0.0025 was less the 0.05.

The result also showed that capital has a positive relationship with industrial sector output in Nigeria. This result is in line with theoretical postulate indicating that a one percent increase in the current and previous one period lagged value of capital led to an increase in industrial output by 0.30 percent and 0.28 percent, respectively. The variables were however not statistically significant because their p – values of 0.1220 and 0.1245 were greater than 0.05.

The result showed that labour force has a positive impact on industrial sector development in Nigeria during the evaluation period. This result is consistent with theoretical expectation, indicating that a one percent increase in the current and two periods lagged value of labour force led to an increase in industrial output by 4.34 percent and 3.97 percent, respectively, ceteris paribus. The variables were also significant in affecting industrial output in the current period in Nigeria at five prevent level of significance. This is because the probability values of 0.0162 and 0.0381 were less the 0.05.

Meanwhile, the result showed that current period and previous one period lagged exchange rates have a positive and negative effect respectively on industrial sector output in the current period in Nigeria. In real term, a one percent increase in exchange rate in the current and previous one period lagged led to an increase and decrease in industrial sector output by 0.47 percent and 0.76 percent respectively. In real terms, it means that a one percent increase in previous one period exchange rate would lead to a decline in industrial sector output by 0.76 percent, other things being equal. Previous one period exchange rate was statistically insignificant at 5 percent level given that its probability value of 0.0610 is greater than 0.05. This result supports the findings of Ayinde (2014) who investigated the impact of exchange rate volatility on the performance of manufacturing firms in Nigeria and discovered that exchange rate has a negative and significant impact on manufacturing output within the period of study. Though, the result of this study indicates that exchange rate has a negative and insignificant influence output, it underscores the fact that it is a cardinal macroeconomic variable that can be manipulated to achieve output growth in Nigeria.

The result showed that trade openness has a positive relationship with industrial output in Nigeria. This in real term means that a one per cent increases in trade openness resulted to an increase in industrial output by 0.47 percent, ceteris paribus. The variable was however not statistically significant. All the same, it give credence to the fact that trade openness can be used as a policy tool to drive industrial growth given the fact that it is correctly signed. This result is in line with what was achieved by Adenikunju and Olofin (2007) who examined the quantitative effects of the role of economic policy in the growth performance of the manufacturing sector development in Nigeria.

Lastly, the result showed that tariff has a positive relationship with industrial output in Nigeria. This is at variance with theoretical expectation. This in real term means that a one per cent increase in tariff resulted to an increase in industrial output by 0.12 percent, ceteris paribus. The variable was however not statistically significant at five percent because its p-value of 0.4805 is greater than 0.05. Given the fact that the tariff variable is positively signed but insignificant, it further emphasizes the fact that tariff is inherently an important macroeconomic variable in boosting output growth in a developing country like Nigeria if properly administered. Arogundade, Obalade and Ogumakin (2015) had established this fact when they carried out a study to find out whether the protection of infant industries argument still holds in Nigeria. Arogundade, Obalade and Ogumakin (2015) employed ordinary least squares regression technique and it was discovered that tariff positively impact on manufacturing output growth during the period of evaluation. Based on this, it was recommended that apart from protection of infant industries through tariff, government should provide physical and financial infrastructures to engender industrial growth in Nigeria.

7.2 Analysis of manufacturing subsector

The result of the bounds test as reported in table 6 showed that the F – statistic value of 5.41 was greater than the upper bound critical value of 3.79 at five per cent level of significance.

Since it is established from the bounds testing procedures that the calculated F-statistics value has exceeded the upper critical bound value at five percent significant level, the study concluded that the variables were co-integrated and hence there was a long run relationship among them.

Table 6: Wald Test for Co-integration

Test Statistic	Value	K
F-statistic	5.407494	5
Critical Value Bounds:	I0 Bound	I1 Bound
Significance level:		
5%	2.62	3.79
Decision: There is co-integration		

Source: Computation using E-views, 2016

7.3 ARDL long run estimation of manufacturing Sub-sector model

The empirical results of the long run estimation of the manufacturing subsector model using the auto-regressive distributed lag estimation procedures are presented in table 7.

Table 7: Long run Regression estimates of manufacturing subsector model

Dependent Variable: DMAN				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(K)	0.808019	0.605257	3.389981	0.0061
D(LOG(L)	0.226548	0.348269	0.650497	0.5246
D(LOG(EXCH)	-3.348068	2.367934	-1.413919	0.1765
D(LOG(TAR)	-1.816455	0.353408	5.139817	0.0000
LOG(OPEN)	0.362590	0.183399	3.740296	0.0011
C	8.843732	3.969249	2.228062	0.0355
R-squared	0.533131	F-statistic		9.397811
Adjusted R-squared	0.514199	Prob(F-statistic)		0.000723
Durbin-Watson stat	1.939234			

Source: researcher's computation, 2017

Analysis of the long run coefficients as indicated in table 7 showed that capital, labour and Openness have long term period positive relationship with manufacturing subsector in Nigeria. This is in line with theoretical expectations. In absolute terms, a one per cent rise in capital, labour and trade openness would lead to to a 0.808 per cent, 0.22 per cent and 0.36 per cent increase in manufacturing subsector output in the long run, all things being equal. However, only capital and trade openness are statistically significant at 5 per cent level while labour is statistically insignificant.

In line with theoretical expectation, tariff and exchange rate turned out with negative coefficients. This implies that a one per cent increase in tariff and exchange rate would bring about a decrease in manufacturing subsector by1.81 per cent and 3.34 per cent respectively in the long run, ceteris paribus. The statistical test conducted on the variable has indicated that tariff and exchange rate are statistically significant and statistically insignificant respectively in influencing manufacturing subsector output in Nigeria at five percent significant level. The implication of this result is that exchange rate has no significant influence on the manufacturing subsector output in Nigeria in the long run.

7.4 Short run Parsimonious Error Correction Result of the Manufacturing Sub-sector

The parsimonious error correction result of the manufacturing sector equation is reported in table 8. The result of the short run dynamics showed that the error correction variable has the expected negative coefficient and is statistically significant in accordance with theoretical expectation. Its coefficient of 0.889 showed that 89 percent of the systemic disequilibrium in the manufacturing sector model was corrected each year. This represented a fast speed of adjustment from short run disequilibrium to long equilibrium.

Table 8: Short run Parsimonious Error Correction Results
Dependent Variable: DMAN
Selected Model: ARDL(3, 4, 2, 4, 3, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DMAN(-1)	0.698102	0.079857	8.741923	0.0000
DLK	0.144486	0.057542	2.510975	0.0260
DLK(-1)	-0.021200	0.055574	-0.381464	0.7090
LOPEN	-0.145105	0.061766	-2.349263	0.0353
DLL	1.088397	0.393485	2.766049	0.0160
DLL(-1)	1.126694	0.313917	3.589147	0.0033
DLTAR	0.970154	0.325527	-2.980254	0.0106
DLTAR(-1)	0.206970	0.085579	-2.418473	0.0310
DLEXCH	-0.384836	0.065916	-5.838282	0.0001
DLEXCH(-1)	-0.049796	0.076927	-0.647316	0.5287
ECM(-1)	-0.888781	0.123962	-7.169786	0.0000
C	0.135963	0.056629	2.400963	0.0320
R-squared	0.957365	Mean dependent var		0.086809
Adjusted R-squared	0.872094	S.D. dependent var		0.238540
F-statistic	11.22740	Durbin-Watson stat		2.186847
Prob(F-statistic)	0.000024			

*Note: p-values and any subsequent tests do not account for model selection
Source: Computation using E-views, 2017

The high values of R-squared of 0.957 and adjusted R-squared of 0.872 showed the estimated manufacturing sector development model has a very good fit on the data. In specific term, the adjusted R-squared of 0.872 indicated that about 87 percent of total variation in the dependent variable (manufacturing output) was accounted for by variations in the independent variables (capital, labour force, trade openness and exchange rate). The high value of adjusted R-squared implied that the estimated model has a very high explanatory power.

The high F-statistic value of 11.23 showed that the overall manufacturing sector development model was statistically significant. This was because the F-statistic value calculated of 11.23 was greater than the tabulated value of 2.38 at five percent level of significance. The zero probability value also buttressed the fact that the R-squared was statistically significant. Hence, the overall model was statistically significant, indicating that there was a high degree of linear relationship between the dependent variable and the independent variables. This means that the explanatory variables have joint impact on the explained variable.

The Durbin-Watson statistic of 2.19 fell in the region of no autocorrelation of the Durbin-Watson acceptance regions. This result showed that the residuals were not correlated and hence there was no serial correlation in the model. This means that the estimated manufacturing sector development model was well-specified and well-behaved and its findings can be used for policy purposes in the Nigerian economy.

Analysis of the short run dynamics showed that previous one and period value of manufacturing output impacted positively on the current value of manufacturing output in Nigeria in accordance with theoretical expectation. Numerically, the result showed that a one percent increase in one lag and three lag periods, the manufacturing output will result to an increase in the current value of manufacturing output by 0.70 percent and 0.35 percent, ceteris paribus. The variables were also statistically significant at one percent and five percent levels of significance given the low probability values of 0.0000 and 0.0043, respectively, which were less than 0.01 and 0.05.

Similarly, the result showed that current capital has a positive and significant impact on manufacturing output in Nigeria. This outcome was consistent with theoretical expectation, showing that a one percent increase in capital would lead to an increase in manufacturing output by 0.14 percent, ceteris paribus. The variable was also statistically significant at five percent level of significance because the probability value of 0.0260 was less than 0.05.

Further analysis showed that labour force has a significant positive relationship with manufacturing output in Nigeria. This result is in line with a priori expectation, depicting that a one percent increase in current and one period lagged labour force led to an increase in manufacturing output by 1.09 percent and 1.13 percent, respectively, other factors remaining the same. Labour force was also found to be statistically significant at five percent level of significance, given that its probability values of 0.0033 and 0.0106 respectively were less than 0.05.

The positive sign of trade openness conforms to theoretical expectation. In absolute terms, a one per cent increase in trade openness leads to an increase in the manufacturing subsector by 0.145 per cent in the long run.

The statistical test conducted on the variable indicated that it is significant in influencing manufacturing subsector output in Nigeria at five per cent level of significance. This is because the large probability value of 0.0353 is less than 0.05. This implies that trade openness significantly influences manufacturing subsector in the short run.

In the same vein, the positive signs of the current and previous one period lagged value of tariff do not meet the theoretical expectation. In absolute terms, a one per cent increase in current and one period lagged value of tariff would lead to an increase in the manufacturing subsector by 0.97 per cent and 0.20 per cent respectively in manufacturing output in the short run. The results also indicate that the coefficients are statistically significant in influencing manufacturing subsector output in Nigeria at five per cent level of significance. This is because the probability values of 0.01 and 0.03 are less than 0.05. Current Exchange rate has a significant negative relationship with manufacturing output as result revealed. This means that a one percent increase in exchange rate led to a decrease in manufacturing output by 0.21 percent, ceteris paribus. The result also showed that previous exchange rate has an insignificant effect on manufacturing output in Nigeria. This means in real terms that a one percent increase in current and one period lagged exchange rate would lead to a decrease in manufacturing output by 0.38 per cent and 0.05 percent, respectively. Statistically, current exchange rate is significant while one period lagged exchange rate is insignificant in influencing manufacturing output at five percent level of significance.

7. Conclusion And Policy Implications

The thrust of this study was to investigate empirically, the impact of trade policy on industrial sector performance in Nigeria, using contemporary economic techniques of bounds testing procedure within the framework of ARDL modeling. The result shows a unique long run cointegration relationship between the index of industrial sector productions and the trade policy variables. The estimated aggregate of the industrial sector performance in the long run and short run showed mixed results with respect to trade variables. But it is certain that all the variables specified in the models (capital, labour force, exchange rate, trade openness and tariff) have significant impact on industrial output in Nigeria. Also, to determine the relative effectiveness of the trade policies, the short term parsimonious dynamics on the equilibrium relationship estimated using ECM (error correction model) showed that index of industrial sector performance has a very rapid speed of systematic adjustment from the short period disequilibrium to the long period steady equilibrium.

Based on the analysis, the following policy implications are deduced. Labour force has positive significant impact on industrialization in Nigeria. Skilled and unskilled workers should be employed where and when necessary. The negative effect of exchange rate on industrial output demands that appropriate exchange rate policies that will promote activities in the industrial sector should be implemented. The negative and significant impact of tariff on industrial output necessitates the implementation of tariff policies that protect domestic firms from external competition. But moderate tariff on importations of raw materials and machineries should be adopted and enforced.

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