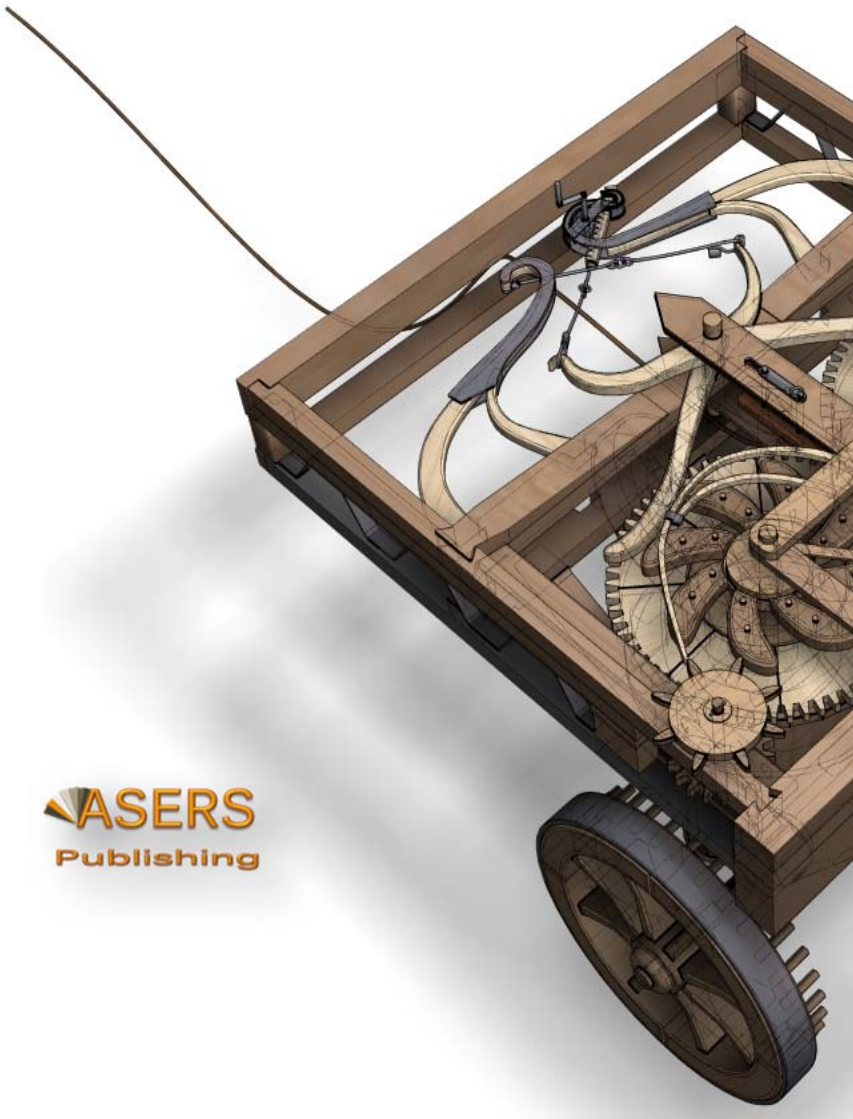
Theoretical and Practical Research in Economic Fields



Biannually

Volume X
Issue 2(20)
Winter 2019

ISSN 2068 – 7710
Journal **DOI**
https://doi.org/10.14505/tpref

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Volume X
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ASERS Publishing
http://www.asers.eu/asers-publishing
ISSN 2068 – 7710
Journal's Issue **DOI**:
https://doi.org/10.14505/tpref.v10.2(20).00

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TRADE OPENNESS AND INDUSTRIAL OUTPUT GROWTH IN NIGERIA: EMPIRICAL LESSONS FOR DIVERSIFICATION

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Suggested Citation:
Mba, P.N., Orji, A., Chukwumaeze, D., Anthony-Orji, O. (2019). Trade Openness and Industrial Output Growth in Nigeria: Empirical Lessons for Diversification, *Theoretical and Practical Research in Economic Fields* (Volume X, Winter 2019), 2(20): 105 - 112. DOI: 10.14505/tpref.v10.2(20).03.
Article's History:
Received August 2019; *Revised* September 2019; *Accepted* October 2019.

Abstract: *This study examines the relationship between trade openness and industrial output growth in Nigeria using time series data, endogenous growth framework as well as export-led growth model. The adopted framework contends that domestic policies on trade liberalization cannot be avoided but harnessed for optimal benefit of the economy. The empirical results show that trade openness contribute positively to industrial output growth and supports general economic diversification. In the short-run, the dynamic impact of trade openness on industrial output growth is insignificant while its long-run impact is significant.*

Keywords: trade; openness; industrial output; growth; Nigeria.

JEL Classification: F13 ; F14 ; L50 ; L60 ; O24.

Introduction

In many developing economies, discussions on trade openness and industrial output determinants have received some serious attention. This is largely due to various contenting arguments in the literature and the relatively declining performance of the industrial sector in these economies. Having realized the backwardness associated with protected trade policies to earn economic success; developing countries in Africa including Nigeria are implementing trade liberalization policies. However, to achieve some sustainable levels of growth and greater diversification in any economy through the expansion of the industrial sector, domestic policies on trade openness and liberalization have critical roles to play.

Many economists and policy commentators see economic development as being synonymous with industrialization or modernization. It is also widely accepted that the speed of industrial development is dependent on domestic policies and organization of international trade; hence the importance of studying how economy grows is also linked to trade openness, industrial output and diversifying away from traditional commodities.

Nigeria is a monoculture economy which depend majorly on crude oil production with neglect in other areas of investments resulting to fall in foreign exchange earnings, high rate of unemployment and inflation due to lack of investment in other key areas. Indeed, industrialization has been a top priority of government to move

population out of poverty. Thus, focus has been on identifying factors capable of boosting industrial performance in Nigeria, among the key issues are openness of trade and industrial output growth leading to diversification.

The manufacturing sectors performances in Nigeria have not been impressive due to the preference and reliance on imported goods. The poor performance may be for other reasons such as policy instability, poor macroeconomic environment, bureaucratic bottlenecks, legal environment which does not guarantee property rights and safety, poor governance, corruption and low commitment of governments to industrial development (Albaladejo 2003). It could be the case of high rise of importation of production input that may hinder industrial performance in Nigeria. Ajakaiye, Jerome and Alaba (2016) argued that the sharp depreciation of the naira adversely affected the manufacturing firms because of the increasing cost of importation of spare parts and infrastructural deficit, weak demand resulting from declining domestic purchasing power, high interest rate and gross under-utilization of capacity.

It is worthy to note that the adoption of the structural adjustment programme (SAP) in 1986 initiated the process of termination of the hostile policies towards trade. A new industrial policy was introduced in 1989 with the debt to equity conversion scheme as a component of portfolio investment. In summary, the polices embarked on by the Nigerian government to attract foreign investors as a result of the introduction of the SAP could be categorized into five: the establishment of the Industrial Development Coordinating Committee (IDCC), investment incentive strategy, non-oil export stimulation and expansion, the privatization and commercialization programme, and the shift in macroeconomic management in favour of industrialization, deregulation and market-based arrangements (Mba 2010, and Orji and Mba 2011).

The second trade policy created the National Economic Empowerment and Development Strategy (NEEDS) in 2003 which was a medium-term economic strategist covering 2003-2007. According to African Trade Policy Centre (2007) NEEDS was described as Nigeria's plan for prosperity and vision for greater tomorrow with focus on: re-orienting values, reducing poverty, creating wealth and generating employment. In the trade policy area, it deepens Nigeria's integration with the rest of the world and maximizes the benefits of strategic integration with regional integration and trade as the two instruments. However, the impact of these policy thrusts on our economic performance still remains ambiguous.

Against this background, this article examines the impact of trade openness on industrial output performance, and equally draws some lessons for diversifications.

1. Literature Review

Smith and Ricardo's theory commonly known as the orthodox or traditional theory of international trade by the classical economists argues that trade will promote growth and development in the form of higher production and consumption. But the theory attracted lots of criticisms from the modern trade theory due to its bases on unrealistic assumptions such as the assumption of labour cost; since it neglected other cost like capital. The Heckscher-Ohlin-Samuelson (HOS) model postulates that trade will help in reducing the income gap between poor and rich countries. Therefore, countries that have abundance labour (L) should use more of labour in production while the ones that have capital abundance should use more capital (K) in production so that at the long run, the gap of inequality will be wiped out.

In other words, HOS imply that poor countries with abundant labour should specialize in producing and trading in labour intensive goods while the richer countries with relatively scarce labour but abundant capital should specialize in capital intensive commodity. It also implies that free trade specializing in production will tend to bring about factor price equalization and thus increase the return to labour in poor countries that will be equivalent to the rich countries. This is based "on the assumption that some factors of production" are perfectly immobile internationally. The HOS model is found by utilizing Heckscher's observations such as: (i) countries differ in their relative endowments of the factors, (ii) production processes for different goods employ different relative intensities of the factors. Thus, the HOS have a growth dimension with implications for future outputs and trade patterns (Verick 2006).

Dunning (1981) put forward his eclectic integrated approach to international trade. He observed that technology is not the main determinants that give a country advantage over another country through internationalizing. Internationalization could occur through transfer, price manipulation, security of supplies and markets and control over use of intermediate goods. While Caves (1971) opined that avoidance of oligopolistic uncertainty and erection of barriers to the entry of new rivals are the factors underpinning the investment decision in LDCs. This observation was further enhanced by the deficiencies of capital, technology and expertise to exploit and enhance the natural resources that abound in the less developed countries.

Empirical studies on trade openness and industrial output varies in their findings and conclusions. Some studies have focused on developing country specifics and some on cross country studies of developed or developing countries. Spiezia (2004) examines the impact of trade on the manufacturing sector using a set of panel data for a sample of 39 countries over different periods within the mid-1980s to 1990s. The study found no significant employment impact of Foreign Direct Investment (FDI) and domestic investment. But when disaggregated by income level, it showed a positive and significant impact of foreign direct investment on middle- and high-income countries with the low-income countries not showing any impact on FDI on employment. He observed that in 21 out of the 39 developing countries under study, an increase in the volume of trade resulted in an increase in employment, increased integration produced reduction in employment in the remaining 18 countries.

Njikam (2009) examined the effect of trade openness and growth of industrial performance in Cameroon and explored whether relationship exists between infrastructure and industrial performance during the two time periods, before and after trade openness. The study utilized the annual values throughout the import-substitution era (1986-94) and proximately after trade restructuring (1995-2003) for a sample of 29 industrial sectors. By means of panel data techniques, it established that advancement in infrastructure tends to boost the efficiency of industrial sector and in trade openness agenda.

On impact of trade related reforms and openness on technical efficiency with reference to agro based industries in Pakistan, study by Sheikh and Ahmed (2011) showed their effect which is closely linked with the overall development of the country with a contribution of 25% share in Gross Domestic Product (GDP). Another study in Pakistan by Ahmed, Arshad and Afzal (2015) utilizing a panel of twenty-seven 3-digit manufacturing industries over the period of 1980-2006 with a variant of Cob-Douglas function and estimating output elasticity and Total Factor Productivity (TFP). Result showed trade liberalization has positive but negligible impact on TFP, and effective rate of protection exerts negative impact on TFP in the post liberalization than the pre-liberalization period.

There are some studies whose findings were divergent. The study by Ulaşan (2015) introduced four categories of openness indicators: trade volumes; direct trade policy measures, such as tariff rates and parallel premium for exchange rate; measures that indicate the difference between predicted and actual trade; and subjective measures, such as real exchange rate distortion index. Relationship between trade openness and growth in a panel of 119 countries was conducted by using dynamic panel data methods for the period from 1960 to 2000. The study outcome is in the opposite that openness has a direct robust relationship with economic growth in the long-run". Kim (2011) introduced the differential effect of openness on economic growth using fixed effect model with data from 61 countries from 1960 – 2000. Findings showed that trade openness has a positive effect on economic growth in high income countries, but the opposite effect is the case of low economies.

Studies focusing on crowding out or crowding in and their effect are few. Silajdzic and Mehic (2017) focused on less technologically advanced economies given their limited ability to reap off the benefits of free trade including limited absorptive capabilities, pervasive market and coordination failures inhibiting development of strategic, infant or new industries, and potential 'crowding out' effect of trade covering Central and Eastern European transition economies in the period from 1992-2014. The results point to the specification of trade, proper treatment of the possible simultaneity bias in the relationship, and the differences in the levels of industrial and technological development across countries and positive significant impact of trade intensity indices on economic growth in CEE countries robust to different methods of investigation. However, the results of their empirical studies do not render support to the hypothesis that trade liberalization policy is beneficial to growth performance in the specific context of selected transition economies.

Joining the contentious debate on capacity utilization and its role on economic performance of the manufacturing firms, Gu and Wang (2013) examined the Canadian manufacturing industries and findings showed that industrial productivity slowdown was associated with decline in capacity utilization. While Okunade (2018) also finds a positive but insignificant relationship between capacity utilization and manufacturing firms' output in Nigeria using data from 1981 to 2016 and Autoregressive Distributed Lag (ARDL) model approach.

In Nigeria, results of some studies such as Onakoya, Fasanya and Babalola (2012), Umoru and Eborieme (2013), Okoye, Nwakobi and Okorie (2016) and Adamu and Dogan (2017) are not unanimous with regards to output growth. Hence there is no consensus on the impact of trade openness on industrial output in the short and long run. Studies on Nigeria did not take into account the period of economic recession and subsequent devaluation/depreciation of Nigerian naira (2015-2017) which significantly reduced export than import. This research therefore empirically studied the relationship between openness and industrial output growth by

augmenting other works done and adding core variables like gross domestic investment and their lessons for diversification.

2. Methodology

2.1 The Models

The study seeks to empirically assess the impact of trade openness on industrial output growth with the assumption that dynamic industrial output model is represented as an error correction model framework and that time series data are non-stationary at level. The generalized error correction model framework is represented as follows:

$$\Delta y_t = \beta_0 + \Delta\alpha_1 y_{t-1} + \beta_i \Delta x_{it} + \varphi(x_{t-1} - y_{t-1}) + \varepsilon_t \quad (1)$$

where: Δ is the difference operator;

y_t = endogenous variable;

y_{t-1} = lagged value of the endogenous variable;

x_{it} = exogenous variables;

$(x-y)_{t-1}$ = error correction term;

ε_t = stochastic error term;

φ = coefficient of the error correction term which measures the degree of adjustment;

β_0, β_i are intercept and slope coefficient;

α_1 = coefficient of the lagged dependent variable.

From Equation 1, the empirical model is presented as follows:

$$\Delta INDOUT_t = \lambda_0 + \sum_{i=1}^{i} \lambda_{1i} \Delta OPN_{t-i} + \sum_{i=1}^{i} \lambda_{2i} \Delta GDI_{t-i} + \sum_{i=1}^{i} \lambda_{3i} \Delta EXR_{t-i} + \sum_{i=1}^{i} \lambda_{4i} \Delta FDI_{t-i} + \sum_{i=1}^{i} \lambda_{5i} \Delta INF_{t-i} + \phi ECM_{t-i} + \mu_t \quad (2)$$

The functional form of our model is specified as thus:

$$INDOUT = f(OPN, GDI, EXR, FDI, INF) \quad (3)$$

where: INDOUT = Industrial Output;
OPN = Trade Openness measured as exports + imports / GDP;
GDI = Gross Domestic Investment;
EXR= Exchange rate;
FDI = Foreign Direct investment;
INF=Inflation Rate.

To address the objective of the study, we estimate a long run relationship using a specified econometric model as:

$$\text{Log (INDOUT)} = \alpha_0 + \alpha_1 \text{LogOPNt} + \alpha_2 \text{Log GDIt} + \alpha_3 \text{LogEXRt} + \alpha_4 \text{LogFDIt} + \alpha_5 \text{LogINFt} + \mu_t \quad (4)$$

2.2. Descriptive Analysis of Variables

Table 1 Summary Statistics

Statistics	INDOUT	OPN	GDI	EXR	FDI	INF
Mean	275993.3	2567202	2302.279	76.34289	296477.3	18.54711
Std. Dev.	286585.5	1756860	3487.667	70.82855	359881.4	18.49105
Jarque-Bera	4.847835	3.191205	1.948764	2.229035	1.085788	1.025960
Probability	0.088574	0.202786	0.706913	0.520692	0.604388	0.690179
Observations	38	38	38	38	38	38

Source: Computed using E-Views 9 software

The summary of descriptive statistics of variables of study is as reported in Table 1. It provides the mean, standard deviation and Jarque-Bera statistic values of the variables under consideration. The mean measures the average value of the series. Standard deviation (std. dev.) measures the dispersion or spread in the series. The higher (lower) the value, the higher (lower) the deviation of the series from its mean. Jarque-Bera is a test statistic for normal distribution. The null hypothesis for the test is that the series is normally distributed at conventional level of statistical significance of 5% (0.05). Thus, if the computed probability value for the test is greater than 5% (0.05), we do not reject the null hypothesis otherwise, we reject it.

As can be observed from table 1, the mean values of INDOUT, OPN, GDI, EXR, FDI and INF are 275993.3, 2567202, 2302.279, 76.34289, 296477.3 and 18.54711 respectively while their respective standard deviations are 286585.5, 1756860, 3487.667, 70.82855, 359881.4 and 18.49105. The results showed that EXR and INF had the lowest or least mean and variability (standard deviation) while INDOUT and FDI had the highest or largest mean and variability (standard deviation). Lastly, the Jarque-Bera statistic values showed that INDOUT, OPN, GDI, EXR, FDI and INF are all normally distributed.

2.3. Unit Root Test Results

Table 2 Augmented–Dickey Fuller (ADF) Test Results

Variables		ADF Statistics	Remark
	Level	First Difference	
INDOUT	-0.068763	-3.179421**	I(1)
OPN	-1.560945	-10.39922**	I(1)
GDI	2.748521	-5.261166**	I(1)
EXR	0.251892	-5.785191**	I(1)
FDI	-0.549672	-5.654844**	I(1)
INF	-3.006429**	-	I(0)

Note: ** indicates the rejection of the null hypothesis of existence of unit root at 5% significance level. Lags are selected based on Schwarz Information Criteria (SIC)
Source: Computed using E-Views 9 software

The ADF unit root test results as reported in Table 2 showed that INDOUT, OPN, GDI, EXR and FDI were non-stationary at level except INF. This means that INDOUT, OPN, GDI, EXR and FDI have mean, variance and covariance that are not constant overtime. However, after first differencing, each of these time series variables became stationary. The implication of the unit root test results is that INDOUT, OPN, GDI, EXR and FDI are integrated of order one, *i.e.,* I(1) while INF is integrated of order zero, *i.e.*, I(0). Therefore, in testing for cointegration, the appropriate method to use is the bounds cointegration test method which is based on autoregressive distributed lag (ARDL) framework. The choice for bounds test approach is based on the assumption that it is best suitable for cointegration test involving mixture of I(0) and I(1) integrated time series.

2.4. Bounds Cointegration Test Results

Table 3 Results of Bounds Cointegration Relationship

Critical Bounds Value of the F-statistic							
K	*1% level*		*5% level*		*10% level*		
	I(0)	*I*(1)	*I*(0)	*I*(1)	*I*(0)	*I*(1)	
5	3.93	5.23	3.12	4.25	2.75	3.79	
Calculated *F*-statistic= 7.185877							

Note: The lag length was selected based on the Schwartz Information Criterion (SIC). K is the number of regressors.
Source: Computed using E-Views 9 software.

The results of the bounds test for the presence of long-run relationships between the variables are reported in Table 3. Since this study employed annual data, we follow the tradition of Narayan and Smyth (2005) and set the maximum lags in the ARDL model to 2 ($i_{max} = 2$). The estimated model of the ARDL-bounds test is based on minimizing the Schwartz Information Criterion (SIC). The bounds *F*-test for cointegration test yields evidence of a long-run relationship between the concerned variables. The computed *F* statistic, $F_C = 4.396907$ is respectively greater than the lower and upper bounds at 1%, 5% and 10% critical value resulting in the rejection of the null hypothesis of no long-run relationship between the examined variables. This evidence implies that a

long-run relationship exists between the variables which rules out the possibility of estimated relationship being spurious.

3. Regression Results and Discussion

Table 4 The Short-run Relationship and Error Correction Mechanism

Dependent Variable: INDOUT				
Variable	*Coefficient*	*Standard Error*	*t-Statistic*	*P-Value*
C	15761.61	6702.081	2.351749	0.0272
D(OPN)	0.005976	0.001437	0.363446	0.7195
D(OPN(-1))	0.003342	0.006233	0.536140	0.5968
D(GDI)	5.587820	1.244110	4.491419	0.0003
D(GDI(-1))	19.86873	5.693714	3.489590	0.0014
D(FDI)	0.020353	0.048362	0.420857	0.6776
D(FDI(-1))	0.027682	0.053452	0.517877	0.6093
D(EXR)	-752.1723	320.7247	-2.345227	0.0196
D(EXR(-1))	-41.88969	14.94348	-2.803208	0.0075
D(INF)	-108.0239	306.8214	-0.352074	0.7279
D(INF(-1))	-100.6335	307.3354	-0.327439	0.7462
ECM(-1)	-0.564320	0.116271	-4.853489	0.0000

Diagnostic Checks

R-Squared: 0.78
Adjusted R-Squared: 0.75
Durbin-Watson: 2.01
F-Statistic: 53.32014; PV: 0.000000

Note: PV= Probability Value.
Source: Computed using EViews 9 Software.

Table 4 presents the parsimonious encompassing error correction model which shows the short-run evolution of the time series under consideration and their dynamics of adjustments overtime. At 5% level of significance, trade openness (OPN) and foreign direct investment (FDI) impacted positively and insignificantly on industrial output growth (INDOUT) in the short-run while the short-run impact of gross domestic investment (GDI) on INDOUT was positive and statistically significant. Both exchange rate (EXR) and inflation rate (INF) impacted negatively on INOUT in the short-run, however, while EXR impacted significantly on INOUT on one hand, the impact of INF on INDOUT on the other hand, was statistically insignificant. The coefficient of the loading factor *i.e.*, error correction term (ECM) is correctly signed and statistically significant at 5% level of significance. This implies that an error correction mechanism exists so that the deviation from long-run equilibrium has a significant impact on INDOUT in Nigeria. The value of -0.56 implies that 56% of the disequilibria in INDOUT of the previous years' shocks adjust back to the long-run equilibrium in the current period. It also implies that adjustment to long-run equilibrium is moderate.

The adjusted coefficient of determination value of 0.75 shows that the estimated error correction model has a good fit. The F-statistic of value of 53.32014 with probability value of 0.000000 suggests that the parameters of the model are jointly significant while the Durbin-Watson statistic of 2.01 indicates the absence of first-order autocorrelation; implying that the estimated model is free from the problem of spurious regression.

From the long-run regression results as reported in Table 5, it can be observed that in exception of inflation rate (INF), other factors such as trade openness (OPN), foreign direct investment (FDI), gross domestic investment (GDI) and exchange rate (EXR) had positive relationship with industrial output growth (INOUT) in the long-run. Thus, a percentage change in OPN, GDI, FDI and EXR, on average, increased INDOUT by 7.36%, 8.33%, 0.0916% and 82.81% respectively. Since INF negatively relates with INDOUT, a percentage change, on average, reduced the value of INOUT by 0.1662%. But while the long-run impacts of OPN and FDI on INDOUT were statistically significant, those of GDI, EXR and INF were statistically insignificant.

In terms of the goodness of fit of the estimated long-run model, the adjusted coefficient of determination value of 0.96 indicates a good fit. The F-statistic of value of 66.70032 with probability value of 0.000000 suggests that the parameters of the model are jointly significant while the Durbin-Watson statistic of 1.92 indicates the

absence of first-order autocorrelation; implying that the estimated model is free from the problem of spurious regression.

Table 5 The Long-run Relationship

Dependent Variable: Log (INOUT)				
Variable	Coefficient	Standard Error	t-Statistic	P-Value
C	1.128408	0.829815	1.359831	0.1834
LOG(OPN)	0.073641	0.011485	6.411929	0.0000
LOG(GDI)	0.083336	0.127951	0.651315	0.5195
EXR	0.000916	0.002429	0.377057	0.7086
LOG(FDI)	0.828123	0.124085	6.673822	0.0000
INF	-0.001662	0.003002	-0.553615	0.5837

Diagnostic Checks

R-Squared: 0.98
Adjusted R-Squared: 0.96
Durbin-Watson: 1.92
F-Statistic: 66.70032; PV: 0.000000

Note: PV=Probability value.
Source: Computed using EViews 9 Software.

Conclusion and Recommendations

The observed short-run and long-run positive relationship between trade openness and industrial output growth is in agreement with the findings of, for example, Spiezia (2004) for panel of 39 countries, Njikam (2009) for Cameroun, Sheikh and Ahmed (2011) for Pakistan, Arshad and Afzal (2015) for Pakistan, and Ulaşan (2015) for 119 countries. However, just like these studies observed, evidence from the present study shows that in the short-run, the dynamic impact of trade openness on industrial output growth is insignificant while its long-run impact is significant.

This study therefore recommends that Nigeria's trade liberalization policies targeting industrial growth should have a long-term outlook. Again, the study also recommends that government should evolve sound policies to ameliorate the short-run distortions and adverse effects that come with trade openness. Important lessons can also be drawn for diversification here. For example, since the impact of trade openness on industrial output is not significant in the short run, it could be a pointer to the government that there is need to diversify the economy and stop depending on a mono product. When the economy is diversified it will open up more frontiers of businesses with the international community which could be beneficial to the domestic economy both in the short run and in the long run. Finally, the government should be careful while implementing trade openness policies to avoid making the country a dumping ground for unwanted developed countries' goods and service.

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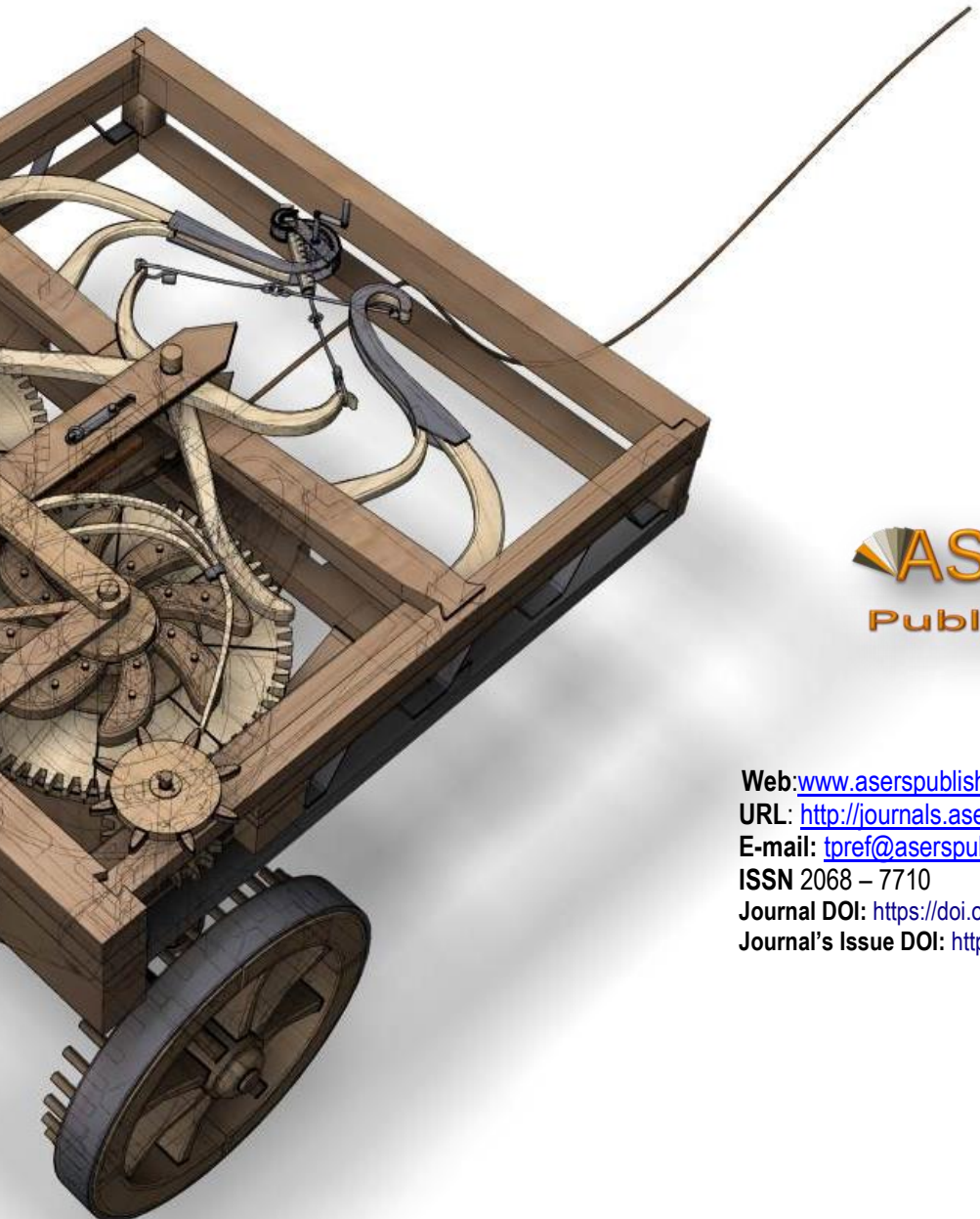

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