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THE IMPLICATIONS OF FREE TRADE AREA ON DOMESTIC INDUSTRIES: EMPIRICAL EVIDENCE FROM NIGERIA

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ABSTRACT

The paper sought to examine the impact of Free Trade Area on Nigeria's domestic industries from 1980 to 2019. It employed the autoregressive distributive lag (ARDL) estimation technique to analyze the short-run and long-run relationships between the independent and the explanatory variables, thereby validating the objective of the study. All the variables were stationary after the first difference, except Ease of Doing Business (EDB). In the short run, all the explanatory variables were statistically significant after two-period lags. However, in the long run, the estimated ARDL results revealed all the explanatory variables were negatively related to the industrial growth in the Nigerian economy. Such a negative relationship between Free Trade Area (FTA) as captured by trade openness and growth of the industrial output will portend a deleterious consequence on the industrial sector of the Nigerian economy. By implication, when fully consummated with the dearth of trade infrastructure coupled with a lack of competitive network structures, Free Trade Area will ensure that the industrial sector in Nigeria becomes manifestly dependent on imported goods produced from low-cost production centres in Africa. Based on this conclusion, it is recommended that a cautious and guided opening of the Nigerian economy should be the operational template between Nigeria and the rest of Africa in terms of the Africa Continental Free Trade Area (AfCFTA).

Keywords: AfCFTA, Trade Openness, Ease of Doing Business, Political Stability.

INTRODUCTION

Among the channels through which a politically independent nation can assume an economically sovereign status and become self-sustaining is the industrialization of the productive spectrum of its economy. This can sometimes be attained through active and competitive involvement in regional free trade areas. According to Dijkstra (2000), and Alam and Morrison (2000), taking advantage of the regional free trade areas has the capacity to stimulate productivity on the domestic front and, at the same time, engender the needed technological transfer. The African Continental

Free Trade Area (AfCFTA) was agreed to be established in 2012 by the fifty-four member-states of the African Union. It was expected to take off in 2017. It is widely seen as the vehicle that could convey and deliver economic growth, create the needed employment for the teeming unemployed youths in the continent, foster industrialization, and spur up sustainable development. The proponents of the AfCFTA are of the opinion that if African countries leverage its establishment, it has the propensity to create a large market base for the continent. This could reduce the unfavorable terms of trade between the economic powerhouse of Europe and America viz-a-viz the feeble African economies, whose predominant exports are primary commodities, with export prices determined by the importing nations. In the long run, the economic benefits of such a transaction related to AfCFTA will be domiciled in the African continent when the trade agreement is fully internalized (Saygili, Peters, & Knebel, 2018).

Despite its numerous benefits and advantages, the question that readily comes to mind is how industrially weak nations like Nigeria can benefit from AfCFTA. The Nigerian federal government's reluctance to agree to the deal until July 2019 in Niamey, Niger Republic, was not unconnected to the Nigerian economy's weak industrial and manufacturing base and the inadequate capacity to compete with the likes of South Africa and the North African countries. The fear was that the large market base of the Nigerian economy would be of immense economic benefit to the already advanced economies of South and North Africa, thereby making the Nigerian economy a fruitful and fertile dumping ground for these 'industrialized' economies in Africa. However, these fears can be allayed when the needed trade infrastructure is implemented. According to Ekpo and Umoh (2008), we cannot totally avoid opening our economy to the international community, especially within the African context. They reasoned that openness of an economy would create access to better and cheaper technology, improve economies of scale, and create exposure to foreign competition. Umoh and Effiong (2013), and Hui and Ghee-Thean (2020) also averred that it would enable local firms to adopt the best global practice and production techniques as well as produce goods with more efficient scale, create technological spill-over, and foster competition among firms in the region, as this is central to regional trade policy.

Given the views expressed by Saygili et al. (2018) viz-a-viz those of Umoh and Effiong (2013) and Ekpo and Umoh (2008), it can be deduced that there is no consensus on the effect of AfCFTA on the member countries. Investigating the impact of AfCFTA on the Nigerian economy as one of the constituting units is crucial. However, empirical studies of this nature are rather scarce in the literature. Studies on the Nigerian economy, such as Onakoya and Fasanya (2012) and Umoh and Effiong (2013), measured trade openness in Nigeria with the rest of the world. None of the studies isolated Nigeria's trade with other African countries from capturing the impact of AfCFTA on Nigeria's domestic industrial output. This gap is what this study seeks to fill.

The paper is significant to several stakeholders in several respects. Firstly, it greatly contributes to the growing literature in international economics. Secondly, it is quite useful to policymakers who will guide the Nigerian government on the best policy option to adopt with regard to Africa Free Trade Area. Therefore, this paper's ultimate objective is to empirically examine the implication of the Africa Continental Free Trade Area on the Nigerian industrial environment. This paper is stratified into five sections. Section one focuses on the introductory background. Section two reviews the relevant literature, while the theoretical underpinnings of the subject matter are structured in section three. The empirical studies, results, and concluding remarks are taken care of in sections four and five, respectively.

LITERATURE REVIEW

There are two opposing strands in the existing literature regarding opening an economy to the outside world in relation to the industrial growth of a domestic economy. The first strand is held by the orthodox mercantilists and conservative economists, who believed in growing an economy from an endogenous template with less interaction from the outside world (Smith, 1776; Panchamukhi, 1978). They were of the opinion that local and infant industries should be protected

with little or no trade liberalization. This position of infant industry protection and export pessimism was further reinforced by Prebisch (1950). According to these protagonists of trade protectionism, free trade, when fully consummated and embraced, leads to undue competition between local and foreign industries and unfavorable terms of trade on the part of economically weak nations. Also, it could result in exporting employment, importing inflation, and eventually hamper industrial growth in the domestic economy (see, for example, Johnson & Subramanian, 2001; Kayode & Teriba, 1977; Posta & Necadova, 2021; Rodriquez & Rodricks, 1999).

The second view was held by those who argued in favor of trade openness, outright competition, and an outward-inclined trade framework (see Edwards, 1998; Haddad, 1993; Krugman, 1987; Ricardo, 1817; Sun & Tai, 2021; Tybout, 2000). They averred that free trade policy could stimulate industrial productivity via exposure of the domestic economy to foreign competition, efficiency in resource allocation, and exposure to foreign technological interaction. From the high growth rate of global industrial economies as well as the lessons from recent emerging economies, it is obvious and more persuasive on the part of the protagonist of free trade that the path to industrial growth, particularly in the developing countries of Sub-Saharan Africa, lies in trade openness.

According to Saygili, Peters and Knebel (2018), though Africa's continental free trade area offers substantial economic opportunities for sustainable economic development, there are threats and challenges ahead. There is the fear of experiencing significant tariff revenue losses and uneven distribution of production costs and benefits, and countries with large industrial capabilities may witness substantial economic growth. In contrast, economies with fewer capabilities may be faced with significant fiscal revenue shortfalls. This uneven operational economic space among member-states in the region may prolong and hinder the implementation process and the smooth take-off of AfCFTA. Kutiyi (2016) observed that there are challenges and threats in the short run at the foundation stage of the free trade area. However, as the short-run hindrances are collectively addressed, free trade leads to long-run benefits and opportunities for all participating economies, eventually resulting in enduring economic growth.

Theoretical Literature

A budding number of theoretical literature exists on the implication of free trade area on the domestic industrial sector of an economy. The theories explain the nexus between a nation's free trade area and the manufacturing sector. The emphasis is on theories of the Free Trade Area and Customs Union.

Viner's (1950) Custom Union Theory: Viner's (1950) Customs Union Theory is basically focused on reducing tariff restrictions among countries that constitute the free trade area while maintaining trade barriers against imports from outside the union or region. In other words, the customs union is regarded as a form of arrangement where members have tariff-free internal and a common external tariff. When this is in place, it will translate into an increase in the volume of trade among participating countries. This arrangement is often known as trade creation. Vine (1950) defined a perfect Free Trade Area or Customs Union as an area devoid of trade restrictions or barriers, an area or union where tariffs have been eliminated among the union's entities. This will undoubtedly improve the manufacturing sector within the customs union. Corroborating this view, Oslinghton (2013) averred that the implementation of a common tariff on imports outside the free trade area and the distribution of customs revenue among members of the free trade area is usually in relation to an agreed formula. The bedrock of Viner's (1950) theory on free trade areas is hinged on trade diversion and trade creation effects of different arrangements of regional integration.

Viner (1931) demonstrated that the impact of a regional trade agreement in the form of free trade area could either be positive or negative. The entire gamut of regional trade integration suggests a system of custom or tariff discrimination among member countries since the imports of the same products are subject to diverse tariffs and barriers depending on whether the country is a member

of the group of integration or not. In this regard, some countries within the union are positively impacted by such regional trade, while those countries outside the union are deleteriously and negatively impacted.

Viner's (1950) customs union theory has been conceptualized into trade creation and trade diversion. Trade creation occurs when there is an increase in the volume of trade among member nations that forms a free trade area or customs union. It means changing from more expensive to less expensive producers. Therefore, the higher the number of participating countries in the free trade area, the greater the level of trade creation. Also, the higher the previous tariff among countries which constitute the union, the greater the level of trade creation. Trade creation also occurs when trade flows are redirected as a result of the establishment of a free trade area or a customs union. On this note, the cost of the goods under consideration nosedives, resulting in increased efficiency of economic integration. The essence of trade creation is to remove custom tariffs within the border of member-states that form the free trade area and establish a common external tariff against non-member states. This exercise may lead to a further reduction in the prices of goods. There may be instances of a new trade flow of goods between the nations that decide to integrate economically (Wamsley, 1996).

Regarding trade diversion, trade flow is diverted from cost-efficient partner economies to cost-inefficient economies within the economic bloc. The goods of cost-efficient economies become cheaper within the free trade area but higher than in the rest of the world. In essence, trade creation and diversion effects occur due to the formation of a free trade area or economic union. The efficiency of a free trade area is evaluated based on the final outcome between trade creation and diversion effects, whether it is cost-effective or otherwise.

The Optimum Currency Areas Theory: The Optimum Currency Areas Theory was put forward by Mundell (1961) in the '60s to determine what should be the appropriate domain within which exchange rates are fixed. He noted then that exchange rate flexibility was no longer feasible between the USA and Canada due to a shock to the industrial structure; both countries were hurt by a shift in the relative economies of their eastern and western parts. Instead, what is needed is a change in the relative prices of products in both regions.

On the basis of this, the right criterion for designing and introducing a currency area should be the degree of factor mobility; essentially, labor within the region. This is because a degree of factor mobility would provide the needed adjustment mechanism and channel lost in a fixed exchange rate regime. In light of this, Mundell (1961) opined that the optimal zone for a single currency was determined by the area within which labor was willing and able to move freely. Within the African continent, there is relatively high labor mobility. This may not constitute much difficulty in the consummation and actualization of AfCFTA as a regional or continental free trade area. Based on the currency differential among member countries of AfCFTA, the African free trade area would certainly not be an optimal currency zone.

In addition, Mundell (1961) argued that a fixed exchange rate system tends to have an inherent deflationary bias, while common currency areas have a built-in inflationary bias. For instance, if Country 'A' exporters succeed in exerting export dominance on Country 'B's domestic market, Country 'B's balance of payment will become weakened while that of 'A' will be strengthened. Country 'B's policymakers will then be forced to raise domestic interest rates and tighten credit to strengthen the balance of payments. This will reduce Country 'B's demand for Country 'A's export, transmitting a deflationary impact on Country 'A's economy. In contrast, Mundell (1961) argued that if both countries decide to form part of a currency area, the authorities will be more preoccupied with preventing unemployment in Country 'B'. Hence, in response to the same initial shift of demand for the countries' exports, they will tend to loosen monetary conditions in the currency zone as a whole, thereby giving an inflationary boost to both countries.

Empirical Literature

Several studies have emerged on the empirical relationship between trade liberalization and the productive sector in several economies. From the international perspective, Hathaway (2007) evaluated the impact of free trade on the industrial sector in the United States of America between 1970 and 2000. Trade openness was used to capture free trade. The analysis showed a direct or positive relationship between trade openness and the industrial sector in the United States. The positive impact of trade openness on the industrial sector was occasioned by low production costs, competitive advantages, large market share, and an efficient labor force. Affirming this position, Mouelhi (2007) analyzed the impact of trade liberalization on the manufacturing industry in Tunisia for the period between 1987 and 1995. By using the simple ordinary least squared method, the result shows that trade liberalization, measured by trade openness, had a positive impact on the manufacturing sector of the Tunisian economy; however, the relationship was statistically insignificant. The statistically insignificant result was attributed to the limited number of years under consideration. Golden and Agrawal (2005) demonstrated in their study that a positive relationship existed between trade liberalization and the manufacturing sector in India. Using the error correction mechanism (ECM) from 1980 to 2002, it was revealed that trade liberalization measured by trade openness positively impacted the Indian manufacturing sector. Amr (2012) examined the impact of trade openness on value-added, profit margins, productivity, and trade balance. The revealed results showed a decline in the index in both the profit margin ratio and the trade balance and an improvement in productivity and value-added. Using the error correction mechanism from 1985 to 2010, he observed that trade openness was statistically significant to the manufacturing sector's competitiveness in the Jordanian economy. Examining the impact of trade openness on the pharmaceutical industry in Jordan and using cross-sectional data from 1980 to 2008, Nsour (2009) observed a positive relationship between trade openness and selected pharmaceutical industries. It also revealed that trade openness was statistically significant to pharmaceutical industries in the Jordanian economy. Alawin et al. (2017) studied the impact of trade liberalization on the manufacturing sector in Jordan. Using the error correction mechanism, the study found a positive relationship between trade openness and the manufacturing sector in Jordan. The result also showed that trade openness was statistically significant in changes in the dependent variable.

Considering the relationship between trade openness and the growth of the manufacturing sector in Nigeria, Onakoya and Fasanya (2012) revealed that a positive and significant relationship existed between the manufacturing industry in Nigeria and trade openness. Relying on the strength of the error correction model (ECM), they observed a long-run equilibrium relationship between manufacturing output growth and trade openness in Nigeria. Umoh and Effiong (2013) examined the nexus between trade openness and the manufacturing sector performance in Nigeria from 1970 to 2008. Using the autoregressive distributed lag in their model, they observed a long-run relationship between trade openness and the performance of the manufacturing sector in Nigeria, captured by the manufacturing index.

Theoretical Underpinnings and Method

Data Sources

This research applied the annual time series data for the period between 1980 and 2019. The span of time was carefully considered to enable us to account for the short-run and long-run dynamics adequately. The data were obtained from different editions of the Central Bank of Nigeria (CBN) Statistical Bulletin and the CBN Annual Report and Statements of Account. The selected macroeconomic variables of interest are the manufacturing index (MfGi) and openness of the economy (OPNS), measured by the aggregate total export and import ratio to Gross Domestic Product. Other variables include ease of doing business (EDB), a reflection of the institutional variable, inflation rate (INFR), interest rate (INTR), electricity supply (ESS) – indicative of critical and enabling infrastructure, and political stability (PST), expectedly a dummy variable.

Method

This study relies on the autoregressive distributed lag (ARDL), also known as the bound testing model, to establish the short-run and long-run dynamics of the relationships amongst all variables under consideration. The ARDL method of analysis is necessary for investigating the relationship between series with different orders of integration. The bounds testing cointegration technique, credited to Pesaran and Shin (1998) and Pesaran, Shin, and Smith (2001), is adopted to elicit robust inference irrespective of whether the underlying series are entirely integrated of order zero I(0) or integrated of order one I(1) or a mixture of both. The reparameterized result gives the short-run dynamic and the long-run relationship of the variables being considered. The time-series properties of the considered variables were ascertained with the aid of the Augmented-Dickey (ADF) and the Phillips-Perron (PP) stationarity test. With the model being specified, the order of integration of the series was gauged or verified before conducting the test for cointegration in alternate specifications using the bounds test of analysis (Phillips & Perron, 1988).

The ARDL has certain advantages. According to Pesaran et al. (2001), firstly, ARDL is applicable whether the series is purely I(0), I(1) or fractionally integrated. Secondly, the numbers of lags are sufficient enough to reflect the data-generating process in general to the specific modelling framework. Thirdly, the ECM is derived from the ARDL through a simple linear combination, taking care of the short-run and long-run adjustments without necessarily losing vital information. Fourthly, the small sample properties of the autoregressive distributed lag technique are far more advanced than those of the multivariate cointegration procedures. Finally, the serial correlation and the endogeneity problems are resolved through appropriate lag selection.

Model Specification

Relying on the theoretical underpinnings above (Viner's (1950) custom union theory), the empirical literature review, and the strength of the previous studies carried out by Umoh and Effiong (2013), the domestic manufacturing and trade openness nexus or model can be specified as follows:

$$MfGi_t = \lambda_0 + \lambda_1 OPNS_t + \lambda_2 EDB_t + \lambda_3 INFR_t + \lambda_4 INTR_t + \lambda_5 ESS_t + \lambda_6 PST_t + Ut \quad (1$$

where,

$MfGi$ = Manufacturing Index

$OPNS$ = Openness of the Economy (measured by total export and total import divided by GDP)

EDB = Ease of Doing Business (as a measure for institutional variable)

$INFR$ = Inflation Rate

$INTR$ = Interest Rate

ESS = Electricity Supply (as a measure for enabling and critical Infrastructure)

PST = Political Stability (Dummy variable – 0 and 1 for military and civil rule, respectively)

Ut = Error term

Concerning the variables in the Equation (1), we can now specify the long-run relationships among the variables in ARDL form as follows:

$$\Delta MfGi_t = \alpha_0 + \sum_{i=o}^{n} \alpha_{1i} \Delta MfGi_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta MfGi_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta EDB_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta INFR_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{5i} EDB_{t-i} + \sum_{i=0}^{n} \alpha_{6i} INFR_{t-i} + \sum_{i=0}^{n} \alpha_{7i} INTR_{t-i} + \sum_{i=o}^{n} \alpha_{8i} ESS_{t-i} + \sum_{i=0}^{n} \alpha_{9i} ESS_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{10i} PST_{t-i} + U_t \quad (2)$$

Data Presentation and Discussion of Empirical Results

The results presented in Table 1 indicate the descriptive statistics of the variables of interest. The manufacturing index (MfGi) had an average of 114.7, with a maximum value of 177.9 and the minimum value of 49.7. The real interest and inflation rates spread averaged 16.4 and 17.5 percent per annum, respectively. From the descriptive evidence, electricity supply (ESS) and political stability (PST) had the highest and least variability, respectively, judging from the standard deviation. With respect to the magnitude of the skewness, only the manufacturing index (MfGi) and political stability (PST) were adjudged to be negatively skewed to the left of the normal distribution curve. All other variables were positively skewed. Only ease of doing business (EDB) and inflation rate (INFR) were seen to be normally distributed at 1 percent level of significance, as revealed by the probability values of the Jarque-Bera statistics. Other variables were normally distributed at 5 percent and 10 percent level of significance. This reveals that all the variables under consideration were stable over time and normally distributed.

Table 1
Descriptive Statistics

	MfGi	*OPNS*	*EDB*	*ESS*	*INFR*	*INTR*	*PST*
Mean	114.792	75.505	69.351	1354.945	17.477	16.488	0.600
Median	130.100	80.950	30.255	110.850	11.985	16.050	1.000
Maximum	177.900	128.760	1721.000	2409.110	72.730	36.090	1.000
Minimum	49.650	27.800	11.670	335.900	3.220	7.750	0.000
Std. Dev.	38.247	23.199	268.124	587.093	16.251	6.0557	0.496
Skewness	-0.441	-0.398	6.065	0.260	2.020	0.990	-0.408
Kurtosis	1.876	2.943	37.868	1.713	6.093	4.293	1.167
Jarque-Bera	3.405	1.062	2271.4	3.215	43.132	9.255	6.713
Probability	0.1822	0.587	0.000	0.200	0.000	0.009	0.034
Observation	40	40	40	40	40	40	40

Source: Authors' Computation

Table 2
The Pair-Wise Correlation Matrix

	Mmegi	*OPNS*	*EDB*	*ESS*	*INFR*	*INTR*	*PST*
MfGi	1.000	0.664	-0.090	0.637	-0.123	0.144	0.562
OPNS	0.664	1.000	-0.054	0.830	-0.009	0.001	0.550
EDB	-0.090	-0.054	1.000	-0.062	0.303	0.266	-0.162
ESS	0.637	0.830	-0.062	1.000	-0.122	-0.105	0.613
INFR	-0.123	-0.009	0.303	-0.123	1.000	0.629	-0.451
INTR	0.144	0.001	0.266	-0.105	0.629	1.000	-0.370
PST	0.562	0.550	-0.162	0.613	-0.451	-0.370	1.000

Source: Authors' Computation

Table 2 shows the correlation matrix revealing evidence of the magnitude and direction of the nexus between each pair of variables in the model. The correlation matrix was symmetric about the diagonal with values of 1.000000, showing a perfect correlation of each variable with itself. From the revealed results, all the variables expected to expand manufacturing capacity in Nigeria possess the expected positive sign except the ease of doing business (EDB), which indicated a negative relationship with the dependent variable (MfGi). Inflation rate expectedly showed a negative relationship, revealing that a high rate of inflation increases the cost of production, thereby threatening manufacturing capacity. This is actually in line with the a priori expectation in the model specified.

Unit Root Tests

Table 3 shows the results of the time series properties of the variables of interest in this analysis. To ascertain the stationarity or otherwise of the variables, Augmented Dickey-Fuller (ADF) and

the Phillips-Perron (PP) unit root tests were employed. The results revealed that the manufacturing index (MfGi), openness (OPNS), inflation rate (INFR), interest rate (INTR), electricity supply (ESS), and political stability (PST) were non-stationary at levels. These series, however, became stationary after the first difference. Only ease of doing business (EDB) was stationary at levels. On the strength of this, each variable can be said to have a unit root, and all series are integrated after the first difference. On the basis of this, we can proceed to carry out our analysis since the considered variables became stationary after the first difference (see Table 3).

Table 3
Result of Unit Root Test

Variables	Augmented Dickey-Fuller (ADF) Test			Phillips-Perron (PP) Test		
	Level	First Difference	Order of Integration	Level	First Difference	Order of Integration
MfGi	-2.938**	-2.941**	I(1)	-2.939**	-2.941**	I(1)
	(0.0074)	(0.0072)		(0.0073)	(0.0072)	
OPNS	-2.943**	-2.939**	I(1)	-2.939**	-2.941**	I(1)
	(0.0072	(0.0073)		(0.0073)	(0.0072)	
EDB	-2.964**	-2.654**	I(0)	-2.939**	-2.787**	I(0)
	(0.0073)	(0.0076)		(0.0073)	(0.0076)	
INFR	-2.939**	-2.941**	I(1)	-2.939**	-2.941**	I(1)
	(0.0073)	(0.0072)		(0.0073)	(0.0072)	
INTR	-2.939**	-2.943**	I(1)	-2.939**	-2.941**	I(1)
	(0.0073)	(0.0072)		(0.0073)	(0.0072)	
ESS	-2.939**	-2.941**	I(1)	-2.939**	-2.941**	I(1)
	(0.0073)	(0.0072)		(0.0073)	(0.0072)	
PST	-2.939**	-2.941**	I(1)	-2.939**	-2.941**	I(1)
	(0.0073)	(0.0072)		(0.0073)	(0.0072)	

Source: Authors' Computation

The lag selection criteria are shown below. From Table 4, two lag selection criteria were revealed.

Table 4
Lag Length Selection Criteria

Endogenous Variables: *MfGi, OPNS, EDB, INFR, INTR, ESS, PST*						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-983.2	NA	1.020	52.117	52.419	52.224
1	-819.5	258.6	2.530	46.077	48.489	46.935
2	-770.7	59.0	3.360	46.089	50.614	47.499

Source: Authors' Computation

Ascertaining the Existence of Long run Relationships among the Variables

A cointegration test was carried out to help establish and ascertain the existence of a long-run relationship or otherwise amongst the variables. The bounds testing procedure was the guiding measuring instrument to that effect. The result of the estimation is presented in Table 5.

Table 5
The Bounds Testing for Cointegration

Test Statistics	Value	K
F-Statistics	4.650	6

Critical value bounds

Significance	10 Bound	11 Bound
10%	2.12	3.25

5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Note: ***, ** and * denotes level of significance at 1%, 5% and 10% respectively.
Source: Author's Computation

Bound Testing Analysis for Cointegration

To determine the existence of a long-run relationship, the bounds testing technique was applied using the F-test for MfGi, OPNS, EDB, INFR, INTR, and ESS. The null hypothesis of the F-test stated that there is no cointegration among the variables being considered while the alternative hypothesis stated the contrary. To establish the presence of cointegration among the variables, the estimated F-test was compared to the upper and lower bounds test critical values, as revealed by Pesaran et al. (2001).

From the bound test procedure, when the estimated F-statistics is higher than the upper bound critical value, a long-run relationship exists among the variables of interest. However, when the estimated F-statistics is below the lower bound critical value, it shows the absence of cointegration among the variables. When the estimated F-statistics lies between the lower and upper bounds critical values, the estimated result becomes indeterminate or inconclusive.

The cointegration results in Table 5 indicate that the estimated F-statistics of 4.6501 was higher than the lower bound critical value of 5 percent, revealing a long-run relationship among the variables. Hence, there was cointegration among the considered variables. Therefore, there was a long-run relationship among the variables under consideration. We can now proceed with other empirical studies on the strength of this analysis.

Table 6
The Presentation of ARDL Short Run Result

Regressors	Coefficient	P-Value
MFGi (-1)	0.3943	0.003***
OPNS	10.1326	0.415
OPNS (-1)	-16.7336	0.199
OPNS (-2)	37.2411	0.003***
EDB	0.0113	0.037**
EDB (-1)	0.0126	0.096**
EDB (-2)	-0.0215	0.007**
ESS	-0.0238	0.002***
INFR	0.1621	0.337
INFR (-1)	-0.2209	0.305
INFR (-2)	0.3422	0.151
INTR	-0.9116	0.063**
PST	43.4145	0.001***
PST (-1)	15.7216	0.024**
Constant	28.6973	0.004***
R-Squared		0.6733
DW-Statistic		1.9607

Note: ***, ** and * denotes level of significance at 1%, 5% and 10% respectively.
Source: Author's Computation

The result above showed that the lag values of the manufacturing index (MfGi), openness of the economy (OPNS), and ease of doing business (EDB) were statistically significant at 1 and 5 percent levels, respectively. The result revealed that the two-period value of the manufacturing index (MfGi) was highly critical to the current industrial output in Nigeria. Ordinarily, openness did not impact on the manufacturing sector. The variable became significant after a two-period lag,

showing that trade openness did not immediately impact the manufacturing sector. It will take about two years before Nigeria's manufacturing sector responds to trade openness. This could be because most raw materials needed in the manufacturing sector are always imported, and it takes time before they are imported and the manifestation of their products is not immediately visible. The coefficients of considered variables conformed to the a priori signs except for OPNS and ESS. With respect to the magnitude, the lag value of the manufacturing index exerted the largest impact on the current value of the manufacturing index. This suggests that the policymakers in the Nigerian economy must be cautious and systematic in opening the economy to the outside world, especially within the African context. From the results also, the coefficient of determination (R^2) showed that over 67 percent of the systematic variations in the dependent variable (MfGi) were explained by the independent variables. The value of the F-statistics and its probability indicated that the independent variables adequately explained the behavior of the dependent variable.

ARDL Long Run Analysis

The result presented in Table 7 showed that the previous lag value of the manufacturing index (MfGi) had a negative impact on the current value of MfGi in Nigeria. All other variables were statistically significant at 10 percent except OPNS and INTR, which were significant at 5 percent. Only inflation rate was not statistically significant. The result also revealed that apart from INFR, all other variables were significant after the first and second-period lags. This shows that the domestic industries in Nigeria did not immediately respond to changes in these explanatory variables (OPNS, EDB, ESS, INTR, and PST), as indicated by their first and second-period lags.

Table 7
Presentation of ARDL Long Run Result

Cointegrating Form		
Regressor	Coefficient	P-Value
D[MFGi (-1)]	-1.4470	0.0381**
D[MFGi (-2)]	-0.9366	0.0636**
D(OPNS)	69.2234	0.0958**
D[OPNS (-1)]	-28.7362	0.1039
D[OPNS (-2)]	-91.4739	0.0087*
D(EDB)	0.0052	0.4549
D[EDB (-1)]	-0.0718	0.0091*
D(ESS)	-0.0503	0.1329
D[ESS (-1)]	0.1467	0.0301**
D[ESS (-2)]	-0.0650	0.0623**
D(INFR)	1.0893	0.0898**
D[INFR (-1)]	0.1479	0.6630
D[INFR (-2)]	-0.1639	0.6203
D(INTR)	-2.6902	0.1092
D[INTR (-1)]	-1.1711	0.2082
D[INTR (-2)]	-2.7184	0.0083***
D(PST)	-42.8316	0.2434
D[PST (-1)]	-23.9099	0.0477**
D[PST (-2)]	-34.2814	0.0764**
Coint-Eq (-1)	-0.5255	0.0752**

NOTE: ***, ** and * denote 1%, 5% and 10% Significance level. The parenthesis of the variables indicates lag period of variables: -1 (one period lag) and -2 (two period lags).
Source: Authors' Computation

Diagnostics Tests

Ramsey RESET Tests

This study carried out the single equation and system misspecification tests to ascertain the statistical adequacy of the model. The Ramsey's Regression Specification Error Test (RESET) was

employed to confirm the correctness of the model. From the revealed results, the null hypothesis of no misspecification error cannot be rejected, implying that the model was adequately specified. The result is presented in Table 8.

Table 8
Ramsey RESET Specification Tests

	Value	P-Value
T-Statistic	1.0349	0.3090
F-Statistic	1.0711	0.3090

Source: Authors' Computation

Breusch-Pagan-Godfrey Heteroscedasticity Test

The white heteroscedasticity test was deployed to ensure that the disturbances adequately reflect the equal variance or homoscedasticity assumption. The test conducted showed the absence of heteroscedasticity in the model and that it was not heteroscedasticity biased (see Table 9).

Table 9
Breusch-Pagen-Godfrey Heteroskeledasiticity Test

F-Statistics	1.4848	Prob. RF (0,31)	0.2091
Obs. R-Squared	9.7924	Prob. Chi-square (7)	0.2006
Scaled explained SS	5.5425	Prob. Chi-square (7)	0.5941

Source: Authors' Computation

Breusch-Godfrey Lagrange Multiplier (LM) Test

In validating the absence of higher order of serial correlation in the disturbances from our estimated short-run dynamic model, we employed the Breusch-Godfrey Lagrange Multiplier autocorrelation test. The results revealed no serial correlation in the model. The result of the estimated model is shown in Table 10.

Table 10
Breusch-Godfrey Lagrange Multiplier (Serial Correlation) Test

F-Statistics	1.3412	Prob. F (2.29)	0.2773
Obs* R-Squared	3.3019	Prob. Chi-square (2)	0.1919

Source: Authors' Computation

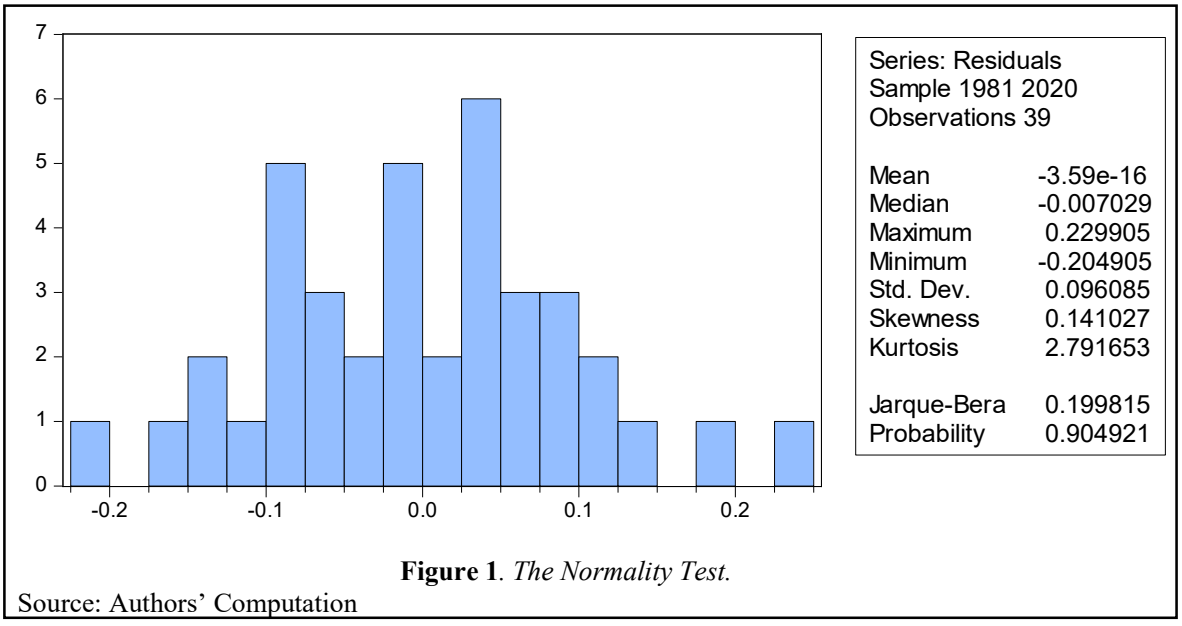

Figure 1. *The Normality Test.*

Source: Authors' Computation

The Jarque-Bera statistics were used to test the normality of the residual. Figure 1 shows that the residual was normally distributed.

POLICY IMPLICATION OF RESULTS

The foregoing results show the underlying critical nature and the sensitivity of the explanatory variables, especially trade openness (OPNS) and ease of doing business (EDB) to the Nigerian industrial environment. In the short run, a one-period lag of the manufacturing index (MfGi) and two-period lags in trade openness and ease of doing business were fundamentally critical to the manufacturing sector in Nigeria. The finding revealed that these variables do not have immediate impacts on the industrial sector in Nigeria since it will take over a year for the industrial sector to respond to these variables. With respect to openness, as a domestic economy like Nigeria embraces the AfCFTA agreement, the impact on the industrial sector will manifest after over two years. This becomes tenable when the appropriate structures and institutional framework are already in place. The negative relationship between ease of doing business and the manufacturing sector in Nigeria is not unconnected with the overwhelming institutional weakness in the Nigerian economy. This was further embellished with the correlation matrix, which showed that only ease of doing business was negatively correlated with the manufacturing index. Also, in the short run, political stability (PST) was positive and statistically significant to Nigeria's industrial growth. Electricity supply (ESS), which represents a critical infrastructure in Nigeria, is negatively related to the Nigerian manufacturing sector in the short run. The finding revealed that the manufacturing sector in Nigeria significantly relies on the independently generated power plant to stimulate the production process. By implication, as more industries are independently powered, the manufacturing sector will be negatively impacted. Openness of the economy (OPNS) was used to capture the conceptualized free trade area in this research. The results revealed that it will take quite some time before trade openness impacts the Nigerian manufacturing sector and that the industrial sector in Nigeria will not immediately be rewarded with the advent of free trade areas among African countries.

In the long run, all the variables were negatively related to the manufacturing sector in Nigeria, although statistically significant after two-period lags, except inflation and interest rates. This shows that free trade agreements may not be robustly beneficial to the Nigerian manufacturing sector in the long run. By extension, it means that the Nigerian industrial sector is not competitively prepared to engage in unrestrained trade relations with the outside world.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The paper investigated the implications of the Free Trade Area, with specific reference to AfCFTA, on the industrial and manufacturing sector of the Nigerian economy. The study relied extensively on the autoregressive distributed lag (ARDL) model for its analysis. The paper highlighted the relationships between the Nigerian industrial sector, captured by the manufacturing index, which is the dependent variable and some selected explanatory variables.

The results show that the manufacturing sector does not immediately respond to trade openness in Nigeria, especially in the short run. In the long run, trade openness, inflation rate, interest rate, and political stability become highly sensitive to the manufacturing sector after two periods of lag. In other words, they become statistically significant after two years. However, in the long run, all the variables are negatively related to the manufacturing sector. Against this backdrop, the Nigerian government should insist on guided openness of the Nigerian economy to the rest of the continent until its economy can favorably compete with other African countries. Also, measures should be put in place to strengthen the institutional framework of the Nigerian economy, especially concerning the ease of doing business. The fundamental variable that reduces production costs in an economy is the power supply. If Nigeria wants to favorably compete with other established economies in Africa, efforts must be directed at improving the power supply, which can be done

through an increase in the power generating mix. Therefore, critical infrastructure in the form of power supply should reasonably and adequately be provided before opening the economy on a full scale.

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