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EXPORT DIVERSIFICATION, IMPORT COMPETITION AND INDUSTRIAL SECTOR EMPLOYMENT IN NIGERIA

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Abstract
The study employs the bound testing approach to cointegration and error correction analysis to investigate the effects of export diversification and import competition on industrial sector employment in Nigeria during the period from 1995 to 2021. Main findings of the study are that export diversification adversely affects industrial sector employment in the short-run with a one-year lag. The long effect of export diversification on industrial sector employment is positive and significant. Import competition is also found to adversely affect industrial sector employment in the short-run with a lag. The long run effect of import competition on industrial sector employment is positive and significant. Based on the evidence, the study recommends efforts by the government (through articulation, design and implementation of policies and programmes) to diversify the nation's exports baskets, and imports control as some measures to enhance employment generation in the nation's industrial sector.

Keywords: Export Diversification, Import Competition, Industrial Sector Employment
JEL Classification: E24, E59, F10

Introduction

A major problem of Nigeria's economy is low level of employment, especially industrial sector employment. The sector (particularly the manufacturing sub-sector) has remained largely underdeveloped. Data from the World Bank's World Development Indicators (2022) reveals that for nearly three decades, industrial sector's share of total employment has been quite low compared to the employment shares of other sector (services and agriculture). This is not unexpected, considering the low volume and quality of output of the sector. Partly responsible for low industrial output and employment are the high cost of doing business caused by erratic power supply, unfavourable tax regimes, poorly developed infrastructure including transportation and telecommunication infrastructure, high energy cost, high inflation, low level of effective demand, etc. All of these tend to adversely affect industrial firms' production and profitability, engendering decline in their demand for labour.

Nigeria is a resource-rich, developing country that is highly dependent on the crude-oil sector which accounts for over 90% of her total export earnings. For nearly four decades, the country's export has remained highly concentrated (or less diversified) in crude oil. This is indicated by her high export concentration index computed by various authoritative institutions such as the World Bank and the International Monetary Fund. Edo (2015) identified crude oil exploitation as the bane of the country's manufacturing sector. At the same time, the nation's import bills has been quite high as a result of precarious dependence on final goods imports (Aigheyisi, 2015). These have also adversely affected the level of development and performance of the manufacturing sector considering that most of the output of local industrial (manufacturing) firms are not able to compete favourably with imported goods locally and in global markets.

Strategies prescribed by researchers to curb the unemployment problem in developing countries particularly the resource-dependent countries include export diversification and less dependence on imports (of final consumption goods). Export diversification which refers as the spread of production (and export capacities) over many sectors (Samen, 2010) is envisaged to boost and stabilize their export earnings, while less dependence on imports is expected to provide a shield to local industries, thereby encouraging domestic production and consumption of home-made goods. These are expected to boost output (income), which in turn is expected to enhance employment generation as predicted by the Keynes theory of output and employment.

Whereas several studies have been conducted to investigate the factors affecting employment in Nigeria, to our knowledge based on a wide search of the literature, the effects of export diversification and import competition on industrial sector employment in Nigeria have not been investigated. This leaves a gap in the literature which this study shall fill. The study is motivated partly by the need to boost employment generation particularly in the industrial sector in view of its low contribution to employment in the country. In light of the foregoing, the objectives of this study are to investigate the effects of export diversification and import competition on industrial sector employment in Nigeria. The study will therefore determine whether or not export diversification and import competition are critical factors for employment generation in Nigeria's industrial sector.

Literature Review

Theoretical Literature

The export-led growth hypothesis attributed to Findley (1984) and Krueger (1985) posits that economic growth is export-led. This implies that exports enhances economic growth. However Bebczuk and Berretoni (2006) argued that export does not always and in everywhere engender economic growth. The structuralists argued that growth is enhanced by *export diversification*, not just export. This is because export diversification enhances and stabilizes exports earnings, serves as a buffer against external shocks (especially where country's export is concentrated geographically and in a single or few products), improves exchange rate stability and guarantees sustainable economic growth.

The Keynes' theory of employment, income and output posits that economic growth (improvement in output) is associated with improvement in employment especially where there is sustained effective demand. Buttressing this, the Okun's law argued that economic growth engenders reduction in unemployment (or improvement in employment). Considering that export diversification enhances growth, which in turn enhances employment (all things being equal), a linkage is deem to exist between export diversification and employment as argued by the UNCTAD (2018).

Rodrik (1999) argued that the benefits of trade lies more on the export side than on the import side. Through importation, countries are able to access items (including consumption goods and capital goods or technologies) which they do not have the capacity or resources to produce. However, the growth and employment effects of imports depend on several factors including absorptive capacity, composition or structure of imports, etc. Where absorptive capacity such as institutional and human capital quality are low and imports largely comprises consumption or final goods, import competition could have adverse effects on employment and economic growth. On the other hand, technology imports and high quality human capital and institution could enhance the growth and employment effect import competition in the long run.

Empirical Literature

In this subsection, the linkages between exports (or export diversification) and employment, and the linkages between imports and employment are reviewed. This is done to have an understanding of the related existing literature (or empirical evidence) as well as identify and highly the gaps therein.

Exports and Employment

Tuhin (2015) investigated the effects of exports and imports on employment in Australian manufacturing firms using annual data covering the period from 1969 to 2012. The empirical evidence indicated that exports positively affected employment, while imports negatively affected it.

The effects of exports and domestic sales on employment in Turkey were investigated by Aydina (2016) using firm-level data on top 1000 exporting firms in the country. The result found positive effect of export on employment. Specifically, a 1% rise in exports was associated with 0.20% rise in employment in the country. Similarly, increase in domestic sales also positively affected employment. Further evidence from the study was that the employment effect of exports was larger and more significant in labour intensive sectors than in capital intensive sector. This may be attributed to the likelihood of machines (or capital equipment) to substitute labour in the capital-intensive production process.

Yolanda (2017) examined the effect of export development on employment in Indonesia during the 1986-2016 period, using multiple regression analysis. The study found that export development positively affected employment in the country. The study also found that export development in the country was adversely affected by interested rate. The implication of the findings is that since export development promotes employment generation, there is need for interest rates to be lowered to ease access to investment funds by the exporters.

Amri and Nazamuddin (2018) employed vector autoregressive modeling and granger causality analysis to investigate the causal relationship between exports and employment in Indonesia using time series data that spans the period 1987-2013. The Johansen cointegraation test indicated no long run relationship between exports and employment. The causal relationship however found unidirectional causality running from exports to employment.

Feenstra, et al. (2019) investigated the effect of export expansion and import competition from China on employment in the United States during the period from 1991 2011. The study found that import competition from China engendered job-destroying effect, while export expansion was associated with job-creation in the country.

The empirical study by Black et al. (2021) on the effect of exports on employment in the United Kingdom using data from the National Office of Statistics and the UK input-output tables found that exports positively affected job creation (especially full-time equivalent jobs) in the country. The output of the IO modeling further showed that the job creations were more visible in the exporting sectors and export-linked job creation in the UK resulted mainly from the exports to the U.S.

Imports and Employment

Tomiura (2001) examined the effect of import competition on manufacturing firms' employment in Japan using longitudinal data on 390 manufacturing industries during the 1992-1995. The study employed fixed effect modeling technique. The study found that import competition negatively affected employment. In particular, it was found that 3% fall in import price was associated with 2% fall in labour demand. Thus manufacturing sector employment was sensitive to import prices, and the sensitivity depends on industrial sector's share of import.

Castro et al. (2006) estimated a dynamic econometric model using the system GMM technique in a study to investigate the effects of import penetration form China and India on employment in Argentina's manufacturing sector. The empirical results suggest that import competition from China and India had small negative effects on employment in Argentina's manufacturing sector. The researchers concluded that the decline in manufacturing employment in Argentina can only be marginally attributed to import competition from China and India.

Sasaki (2007) investigated the effect of import competition on manufacturing employment in 354 industries in Japan during the period 1994 to 2003. Data used for the study are survey data on Japan's domestic firms, and they were analysed using the dynamic GMM approach. The study found positive relationship between import prices and employment in labour-intensive industries that are exposed to severe import competition. This implies that fall in prices of imports which engenders intensification of import competition engenders decrease in employment in labour-intensive industries that are exposed to severe import competition.

Onaran (2008) examined the effect of import penetration on labour market outcome in Austria, focusing on the manufacturing industry in the 1990-2005 period in a panel data modeling framework. Imports were disaggregated imports according to their origin and their stages in production (final versus intermediate). The empirical evidence indicates that imports penetration adversely affected employment, wages and wage

share. The adverse effect of import penetration was more severe on highly-skilled workers. The effect of import competition from Eastern Europe and developed countries on employment was also found to be negative and significant.

The employment effect of international trade in South Africa during the period from 1970 to 2008, was investigated in Chinembiri (2010). The methodology involved OLS estimation of linear regression model with dummy variable (capturing the effect of the first election democratic elections of 1994). The empirical results indicated that import penetration adversely affected employment in the secondary sector, though the effect was significant at the 10% level. The employment effect of import penetration in the primary sector was also negative, and significant at the 5% level. Thus the job-displacement effect of import penetration in South Africa was more severe in the primary sector than in the secondary sector. The empirical study involving Chenery decomposition and regression analysis by Edwards and Jenkins (2015) on the effect of Chinese import penetration on manufacturing employment in South Africa found that manufacturing sector employment is negatively affected by Chinese import competition during the1992-2010 period.
Langdon (2011) examined the effect of import penetration on employment in the textile industries of three European countries namely France, the Netherland and the United Kingdom. The study found that the Netherland, which was the most opened economy among the three derived the greatest benefit from trade, while France which is the most protected among them was adversely affected by international trade. Thus, the study recommended articulation and implementation of liberal trade policy for countries that wished their textile industries benefitted from international trade.

The effects of Chines import competition on labour demand in manufacturing sectors of emerging markets of Europe and Latin America during the 1996-2009 period were examined in the study by Filomeni (2011). The study focused on how import competition from China affected manufacturing sector employment in Turkey (a transcontinental country spreading from Asia to part of Europe) and Brazil (a Latin American country). Dynamic panel data model was estimated using the system GMM technique. Other methodologies employed included the OLS and fixed effect modeling. The empirical results showed that import penetration generally had no significant effect on employment in the manufacturing sector of Brazil, but impacted positively on employment in Turkey's manufacturing sector. The effect of Chinese import competition on manufacturing employment was negative in both countries, but significant only in Brazil, particularly in those sector where labour is the primary input in the production process.
Autor (2013) investigated the effect of Chinese import competition on local labour market in the United States in the period 1970-2007. The study employed the two-stage least squares technique for analysis of panel data on manufacturing firms. The empirical evidence showed that import competition negatively and significantly affected manufacturing employment in local labour market.
Acemoglu, et al. (2013) examined the role of increased China's import competition in the United States' sluggish employment growth in the 2000s. The 2SLS technique was employed for estimation of the specified model. The study found that the rapid increase in China's imports in the country after year 2000 was largely responsible for the decrease in manufacturing sector employment in the country. The study also revealed that through input-output linkages, and other general equilibrium effects, import competition from China tended to suppress overall job growth in the country. The evidence further revealed that job losses attributed to China import competition between 1999 and 2011 ranged between 0.6 million and 1.25 million.
The effect of imports on manufacturing sector employment in Nigeria during the period 1970-2021 was investigated in Osigwe (2015) using the generalized method of moments (GMM) technique. The study found that increase in imports adversely affected manufacturing sector employment in the country. A 1% rise in imports was found to be associated with about 6% decrease in manufacturing sector employment. However, FDI and economic growth were found to be favourable to manufacturing sector employment in the country.
Köllner (2016) investigated the effect of import penetration on manufacturing sector employment in a sample of 12 OECD countries during the period from 1995 to 2011. The analysis involved alternative panel estimation techniques and different measures of import penetration. The study found that overall, manufacturing employment effect of trade was weak, though positive. It also found that import competition

from China and the new EU member countries adversely affected employment in highly developed countries, while imports from EU-27 countries were supplementary to domestic manufacturing sector output.
Akus (2016) studies the effect of import competition on employment and wages in Turkish manufacturing sector during the 2003-2008 period using the two-stage-least-squares panel estimation technique. The study found that import competition positively and significantly affected employment in Turkish manufacturing sector. The study also found the effect of import competition on manufacturing firms' wages to be statistically non-significant.

The relationship between import competition and employment in Japan during after the bubble boom was examined in Tomiura (2016). The period included the 1988-1990 period which was the yen-depreciating period and the 1990-1993 period which was the yen-appreciating period. The study sample included 334 manufacturing industries and the methodology involved regression analysis. The empirical evidence showed that job creation associated with plant startup was sensitive to import competition; job destruction associated with plant shutdown was as sensitive to import competition.
The effect of Chinese import competition on manufacturing employment in France was examined in a study by Malgouyres (2016). The study found that Chinese import competition negatively affected employment in the manufacturing sector and this adverse effect split over to employment in non-manufacturing sector through negative externality effect. Specifically, it was estimated that each job loss in the local manufacturing sector was associated with loss of 1.5 local non-manufacturing jobs. This underscores the relevance of (employment in) the manufacturing sector to other sectors of the economy, and shows that the non-manufacturing sectors in France are closely connected to the manufacturing sector, so much so that the decrease in reduction in employment in the sector engendered loss of jobs in other (non-manufacturing) sectors.

The effect of Chinese manufacturing import competition on manufacturing employment in Sweden during the period 1996-2007 was investigated in Jiang et al. (2022). The pooled OLS and 2SLS techniques were used for estimation of panel data utilized in the study. The empirical results showed, *inter alia*, that import completion exerted no significant effect on employment in manufacturing and non-manufacturing sectors. It however found significant and positive effect of Chinese import penetration on employment in the transportation sector. An earlier study by Paulie (2021) however found that for Swedish private-sector manufacturing firms, increase in global import competition engendered decease in domestic industry-level labour shares during the period from 1997 to 2016. The researcher attributed this effect to low compensation to labour which did not match increase in productivity.
Owusu, et al. (2022) examine the effect of import penetration on manufacturing employment in Africa during the period from 1990 to 2015. The study used manufacturing and industry-level data on 20 African countries, and employed the methodology of fixed effect modeling. The empirical evidence revealed that intermediate goods import penetration positively affected employment, while final goods import penetration adversely (that is negatively and significantly) affected employment in the manufacturing sector of the countries included in the sample. Further evidence from the study are that increase in real wages was associated with reduction in employment level, while increase in value addition positively affected employment.
We observed from the literature that the effects of export diversification and import competition on industrial sector employment in Nigeria has not yet being investigated in spite of the dire need to improve the employment generating capacity of the sector in view of its relevance to sustainable growth. A gap therefore exists in the literature. This study shall contribute to extant knowledge in this regard by filling this gap.

Methodology

Theoretical Framework

The Keynesian's theory of employment and output (Keynes, 1936) provides the theoretical framework for this study. This theory posits that employment depends on the level of income and output. Increase in output (which is a measure of economic growth) backed up by increase in effective demand, engenders increase in employment, all things being equal. Buttressing this theory is the Okun's law which posits that economic

growth is associated with decrease in the rate of unemployment or increase in the employment rate. To achieve the objective of this study, the Keynesian theory is augmented by incorporating trade variables which are the key variables of interest – export diversification and import competition. This is in view of the theoretical and empirical linages linkages established between export diversification and employment, and import competition and employment as seen in the theoretical literature review.

The base model is specified functionally based on the Keynesian theory:

$$\text{INDEM} = f(\text{RGDPG}) \quad [1]$$

Following the works of Autor (2013), UNCTAD (2013), Osakwe (2018), Guillou and Treibich (2019), equation 1 is augmented by incorporating export diversification and import competition as explanatory variables. The equation is expanded as:

$$\text{INDEM} = f(\text{XDIV}, \text{IMCOM}, \text{RGDPG}, \text{MPR}) \quad [2]$$

INDEM represents industrial sector employment share of total employment; SERVEM represents services sector employment share of total employment; XDIV represents export diversification index; IMCOM stands for import competition; RGDPG represents economic growth rate; MPR represents monetary policy rate. Equation 2 hypothesises that employment is a function of export diversification, import competition, economic growth and the monetary policy rate.

Model Specification and Estimation Procedure

The econometric models to investigate the effects of export diversification and import competition on sector employments are specified as:

$$\text{INDEM}_t = \theta_0 + \theta_1\text{XDIV}_t + \theta_2\text{IMCOM}_t + \theta_3\text{RGDPG}_t + \theta_4\text{MPR}_t + u_{1t} \quad [3]$$

The *a priori* expectations are: $\theta_1 > 0$, θ_2, </> 0 (indeterminate, to be empirically determined as the effect of import competition is dependent on the absorptive capacity of the economy, composition of imports or imports structure and several other factors); $\theta_3 > 0$, economic growth is expected to enhance employment generation in the industrial sector as predicted by the Keynes' theory and the Okuns Law; θ_4 </> 0, the effect of MPR on industrial sector employment may vary according to time horizons. The short run effect could be negative, while the long run effect may be positive.

The ARDL (Bounds test) approach to cointegration and error correction analysis developed by Pesaran et al. (2001) was adopted to investigate the short run and the run effects of the explanatory variables on the dependent variable. This technique was adopted for several reasons. First, it is quite flexible as it can be used irrespective of the order of integration of the variables, so long as none of the variables is integrated of order 2. This is to say that it can applied with I(0) variables (which are variables that are stationary at levels) and I(1) variables(which are variables that stationary at first difference). Second, it can be applied in cases of small finite data sizes. Studies involving small sizes which employed this methodology include Akbota and Baek (2018) and Bhuyan and Oh (2021) which used 24 and 25 observations respectively. Third, it yields consistent and efficient long run estimates irrespective of the problem of endogeneity (where the explanatory variables correlate with the error terms), which is peculiar with cointegrated regresors (Harris & Sollis, 2003).

To operationalize the Bounds test, an unrestricted error correction version of the autoregressive distributed lag (UEC-ARDL) model is specified for each of equations 3.7 – 3.9 respectively as:

$$\Delta\text{INDEM}_t = \gamma_0 + \sum_{j=1}^{n}\left(\gamma_{1j}\Delta\text{INDEM}_{t-j}\right) + \sum_{j=0}^{n}\left(\gamma_{2j}\Delta\text{XDIV}_{t-j}\right) + \sum_{j=0}^{n}\left(\gamma_{3j}\Delta\text{IMCOM}_{t-j}\right) + \sum_{j=0}^{n}\left(\gamma_{4j}\Delta\text{RGDPG}_{t-j}\right) + \sum_{j=0}^{n}\left(\gamma_{5j}\Delta\text{MPR}_{t-j}\right) + \pi_1\text{XDIV}_{t-1} + \pi_2\text{IMCOM}_{t-1} + \pi_3\text{RGDPG}_{t-1} + \pi_4\text{MPR}_{t-1} + \xi_{1t} \quad [4]$$

In Equation 4, $\gamma_{2j} \ldots \gamma_{5j}$ correspond the short run effects, while $\pi_1 \ldots \pi_4$ correspond to the long run parameters. The bounds tests involves OLS estimation of equation 4, and testing the null hypotheses $\pi_1 = \pi_2 = \pi_3 = \pi_4 = 0$ which imply no long run relationships, against the alternative hypothesis: $\pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq 0$ which imply existence of long run relationships, using the Wald's F-test.

Pesaran et al. (2001) developed two sets of asymptotic critical values for the F-statistic at different level significance. They are the lower bounds critical values (LBCV) which assumes all the variables are I(0) and the upper bounds critical values (UBCV) which assumes the variables are all I(1). The decision rules and their implications are shown in Table 1.

Table 1.

Bounds Test's Decision Rules and their Implications

s/n	Observations	Decision and Implications
1	Computed F-stat > UBCV	Reject null hypothesis, cointegration exists
2	Computed F-stat < LBCV	Do not reject null hypothesis, no cointegration
3	LBCV < Computed F-stat < UBCV	Inconclusive, no decision on cointegration

Source: Author's compilation

If cointegration is found to exist among the variables of the specified models, the associated error correction model (ECM) for the each equation shall be derived by replacing the linear regression model component corresponding to the long run relationship in the respective UEC-ARDL with its lag error as:

$$\Delta \text{INDEM} = \beta_0 + \sum_{j=1}^{\eta} \left(\alpha_{1j} \text{INDEM}_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{2j} \Delta \text{XDIV}_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{3j} \Delta \text{IMCOM}_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{4j} \Delta \text{RGDP}_{t-j}\right) + \sum_{j=0}^{\eta} \left(\alpha_{5j} \Delta \text{MPR}_{t-j}\right) + \psi_i \text{ECT}_{t-1} + \mu_{it} \quad [5]$$

The coefficients of the error correction term ψ_1 is expected to be negatively signed and statistically significant in order to play the role of error correction (maintaining equilibrium) in the model.

Prior to the cointegration test and the model estimation, the variables shall be tested for unit root to ascertain their time series properties. The study shall employ the augmented Dickey Fuller test to test for unit root. This shall be complemented with the KPSS test for stationarity to be quite certain that none of the variables is I(2).

Data, Measurements and Sources

The study uses annual time series data spanning the period from 1995 to 2021. The scope of this data was determined by the data availability. The data were obtained from different sources.

Data on INDEM measured by industrial sector share of total employment was obtained from the World Bank's World Development Indicators (WDI, 2021).

Data on export concentration from which export diversification (XDIV) data were derived, was obtained from the recently updated UNCTAD (2021) export diversification database. The data is based on the normalized Herfindahl Hirschman index (HHI). Data from this source spanned the period from 1995 to 2021. Following Agosin (2009), XDIV data was derived by subtracting XCON data from 1 to maintain the normalisation. By this transformation, XDIV ranges from 0 to 1, with higher values indicating higher level of diversification and lower values indicating lower levels of diversification.

Import competition was derived as imports as percentage of domestic demand.

$$IMCOM = \frac{M}{GDP + M - X}$$

Where M represents imports, GDP stands for gross domestic product, and X stands for exports. This measure was also used in studies by Altomonte, et al. (2008) and Olper, et al. (2015). Data on variables used to derive the data were obtained from.

Economic growth was measured by annual growth rate of real GDP. Data for this variables was obtained from the WDI (2021). Data on the MPR was obtained from the CBN Statistical Bulletin, 2021.

Results and Discussion

In this sub-section the estimation results of the model specified to examine the effects export diversification and import competition on industrial sector employment are presented and analysed. This is done with a view to achieving the first and fourth objectives of the study. The analysis begins with the correlation

analysis. This is followed by the unit root and stationarity tests and the cointegration test. Following these are the presentation and analysis of the estimated model.

Correlation Analysis

The pairwise correlation coefficients for the variables used for the model estimation are presented in Table 2. The coefficients show that the correlation between XDIV and INDEM, and RGDPG and INDEM weak and negative. Positive and weak correlation is also observed between IMCOM and INDEM. However, MPR strongly correlates positively with INDEM. It should be noted that these are preliminary analysis and the coefficients neither indicate causal relationships or magnitude of effect of one variable on the other. The correlation between pairs of the explanatory variables are quite weak as they are all less than 0.5. Thus, we do not expect the model to be estimated using the variables to be plagued with the problem of multicolinearity.

Table 2.

Correlation Coefficients

	INDEM	XDIV	IMCOM	RGDPG	MPR
INDEM	1.00				
XDIV	-0.44	1.00			
IMCOM	0.28	-0.49	1.00		
RGDPG	-0.20	-0.33	-0.04	1.00	
MPR	0.74	-0.31	0.17	-0.10	1.00

Source: Author's computations using EVIEWS 9.

Unit Root and Stationarity Tests

The results of the ADF test for unit root, and the KPSS test which directly tests for stationarity are presented in Table 3. The ADF test results indicate that INDEM, IMCOM and RGDPG are stationary at first difference, as they are integrated of order 1 [I(1)]. At levels, the variables contain unit root, but at first difference forms, they do not contain unit root. XDIV and MPR do not contain unit root at level forms, they are stationary at levels and are therefore integrated of order 0. The KPSS test for stationarity which is stronger and more reliable than the ADF test for unit root shows that INDEM and RGDPG are stationary at first difference, while XDIV, IMCOM and MPR are stationary at levels.

Table 3.
ADF and KPSS tests

ADF Unit Root Test							
Variables	**Levels**			**1st Difference**			**I(d)**
	ADF test stat	**Critical Value (5%)**	**Inference**	**ADF test stat**	**Critical Value (5%)**	**Inference**	
INDEM	-0.472	-1.955	NS	-2.349	-1.955	S	I(1)
XDIV	-4.346	-3.595	S	-	-	-	I(0)
IMCOM	-2.105	-3.603	NS	-10.347	-3.603	S	I(1)
RGDPG	-3.189	-3.595	NS	-6.948	-3.603	S	I(1)
MPR	-2.431	-4.356	NS	-6.890	-3.603	S	I(0)
KPSS Stationarity Test							
Variables	**Levels**			**1st Difference**			**I(d)**
	KPSS test stat	**Critical Value (5%)**	**Inference**	**KPSS test stat**	**Critical Value (5%)**	**Inference**	
INDEM	0.149	0.146	NS	0.077	0.146	S	I(1)
XDIV	0.129	0.146	S	-	-	-	I(0)
IMCOM	0.101	0.146	S	-	-	-	I(0)
RGDPG	0.167	0.146	NS	0.069	0.146	S	I(1)
MPR	0.104	0.146	S	-	-	-	I(0)

NS stands for non-stationary; S stands for stationary, I(d) represents order of integration.
For the ADF unit root test, a series is said to be non-stationary if the ADF test statistic is greater than the (5% level) critical value, but stationary if the test statistic is less than the (5% level) critical value.
For the KPSS stationarity test, a series is said to be non-stationary if the KPSS test statistic is greater than the (5%level) critical value, but stationary if the test statistic is less than the (5% level) critical value.
Source: Author's estimations using EVIEWS 9.

Cointegration Test

Since the variables are integrated of mixed order (1 and 0), and none is integrated of order 2, the Bounds test approach was used to test for long run relationships. Cointegration was tested using the 5% significance level. The result of the test is presented in Table 4. The computed F-statistic (16.09) is greater than the upper bound critical value at the 5% significance level (4.01). The null hypothesis (of no long run relationship) is therefore rejected at the 5% significance level. The inference is that long run relationship exists between the variables. Thus the variables are cointegrated.

Table 4
ARDL Bounds Test

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	16.09	4
Critical Value Bounds		
Significance	LB	UB
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

LB represents lower bound, UB represents upper bound, k represents number of explanatory variables
Source: Author's Estimations using EVIEWS 9.

Estimated Models
Considering that the variables were found to be cointegrated, the short run (error correction) and long run models can be derived from the unrestricted ARDL model. Table 5 shows the error correction representation whose parameters indicate the short run effects of the explanatory variables on the dependent variable.
We observe that the contemporaneous short run effects of the key variables of interest (export diversification and import competition) on the industrial sectors are of total employment are negative, but not significant. However, the one-year lagged effects are negative, and significant at the 1% level. A unit increase in XDIV reduces INDEM by as much as 3.91 units after a one year lag in the short run. This may be associated with decrease in demand for low skilled labour in firm's quest to diversify their production and exports. This observation is in sync with evidence from Guillou and Treibich (2019). A unit rise in IMCOM engenders reduction in INDEM by about 0.05 unit after a one-year lag. This finding buttresses the evidence from Osigwe (2015) which found that imports adversely affects manufacturing sector employment in the short run. These suggest that in the short run, export diversification and import competition are not favourable to job creation in the nation's industrial sector. The observation with respect to the export diversification may be attributed to the short run cost of diversification which may induce firms in the sector to reduce their demand for labour, while the observation with respect to import competition may be attributed to the intense global competitive pressures to which industrial firms are exposed, which affects their competitiveness, profit level and demand for labour in the short run.
The short run effect of RGDPG (economic growth) on INDEM is positive, as expected, but not statistically significant at any of the conventional levels. This suggests that the nation's economic growth during the period did not engender job creation in the industrial sector. This may not be unconnected to the near mono-product nature of the nation's economy, the cost of doing business in the industrial sector caused by factors such high energy cost, etc., as well as years of successive neglect of the industrial sector. These tend to have weakened the employment-generating effect of economic growth in the nation's industrial sector.
The contemporaneous short run effect of MPR on INDEM is positive and significant at the 1% level. A unit increase in MPR is associated with 0.04 unit increase in industrial sector share of total employment. Thus, tight monetary policy implemented by the monetary authority by raising the MPR tends to be favourable to employment generation in the industrial sector. This may be due to the inflation effect of the policy as it is implemented by the central bank as a strategy to control money supply, thereby reducing inflation which adversely affects production and employment. This result, to some extent, lends support to the trade-off between inflation and unemployment posited by the short run Philips curve. Though the lagged effect of MPR is negative, yet it is only significant at the 10% level. The lagged negative effect of MPR on INDEM which corroborates evidence from Esien et al (2016) may be attributed to the implied increase in cost of capital (that is increase in lending interest rate) engendered by the increase in MPR which is the baseline interest rate for commercial or deposit money banks. This could adversely affect investment and

employment, but the effect is delayed as seen in the result. However, comparing the magnitudes of the coefficients MPR and MPR(-1) and their statistical significance, it can be inferred that the net short run effect of the monetary policy rate on INDEM is positive and significant.

The coefficient of the error correction term is negative, as expected. It is statistically significant the 1% level. These further corroborates the outcome of the cointegration test which indicated that the variables are cointegrated. The size of the coefficient indicates that 33.70% of short run deviation from equilibrium is corrected annually to restore the long run position. Thus, the speed of adjustment to equilibrium in the event of short-run deviation therefrom is quite low.

The estimated model has a high goodness of fit as indicated by the coefficient of determination (R^2) value of 0.911 which shows that about 91.10% of the systematic variation in INDEM is explained by the model. The F-statistic of 12.091 passes the test of statistical significance at the 1% level. This indicates that the explanatory variables are jointly significant in explaining variations in INDEM. The Durbin-Watson (DW) statistic pints to absence of autocorrelation in the model.

Table 5

Error Correction Model

Dependent Variable: INDEM			
Selected Model: ARDL(1, 2, 2, 0, 2)			
Variable	Coefficient	t-Statistic	Prob.
D(XDIV)	-0.557	-0.423	0.679
D(XDIV(-1))	-3.909***	-3.202	0.007
D(IMCOM)	-0.024	-1.311	0.213
D(IMCOM(-1))	-0.046***	-3.594	0.003
D(RGDPG)	0.004	0.290	0.776
D(MPR)	0.042***	3.035	0.010
D(MPR(-1))	-0.033*	-1.973	0.070
CointEq(-1)	-0.337***	-3.623	0.003

R^2 = 0.911, Adj. R^2 = 0.836, F-stat = 12.091, p(F-stat) = 0.000; DW = 2.446

***, * *signify statistical significance at 1% and 10% level respectively*.

Source: Author's estimation using EVIEWS 9.

The long run estimates are presented in Table 6. The results show that the long run effect of export diversification on industrial sector share of total employment is positive and significant at the 5% level. A unit increase in XDIV is associated with 18.32 unit increase in INDEM. Thus, export diversification will engender significant increase in employment in Nigeria's industrial sector. This may be attributed to the likely employment generation effect of vertical export diversification as the nation diversify her exports from crude oil to manufactures.as a result of development of the industrial sub-sector of the economy. This observation corroborates evidence from the study by UNCTAD (2018) which found that industrial sector hare of employment rises with export diversification. The long run effect of import competition on industrial sector employment is also positive and significant. A unit rise in IMCOM is associated with about 0.30 unit increase in INDEM. Thus, in the long run, import competition will enhance the job-creating or employment generating capacity of Nigeria's industrial sector as a result of the positive spillover effect resulting in a boost in industrial productivity.

As in the short run, industrial sector employment effect of economic growth is also positive, but not statistically significant in the long run. Thus Nigeria's economic growth neither promotes industrial sector employment in the short- nor long-run. Neither the Keynes theory of employment and income nor the Okun's law is validated with respect to industrial sector employment in Nigeria.

The long run effect of monetary tightening on employment in industrial sector is also positive, and significant at the 1% level. A unit increase in the MPR is associated with 0.32 unit increase in INDEM. This may not be unconnected with the inflation-controlling effect of tight (or contractionary) monetary policy which is favourable to the sector's employment generating capacity.

Table 6
Long Run Estimates

Dependent Variable: INDEM			
Variable	Coefficient	t-Statistic	Prob.
XDIV	18.324**	2.502	0.027
IMCOM	0.296**	2.862	0.013
RGDPG	0.011	0.276	0.787
MPR	0.316***	7.434	0.000
C	-0.287	-0.091	0.929

Source: Author's Estimation using EVIEWS 9.

Model Diagnostics

Various diagnostics tests were performed to ensure the reliability of the model. They include the residual normality test, the serial correlation test, the heteroskedasticity test and the specification error test. The test were performed using the 5% significance level for the test statistics. The results are summarized in Table 7.

The residual normality test result indicate that the residuals are normally distributed as the p-value of the test statistic (0.772) is greater than 0.05. It also evident that the residuals are not serially correlated as the null hypothesis of no serial correlation is not rejected at the 5% level. This is indicated by the p-value of the test statistic which is greater than 0.05 (0.452 > 0.05). The heteroskedasticity test result indicates that the residuals are homoscedastic, the p-value of the test statistic (0.801) being greater than 0.05. Thus the null hypothesis of no heteroskedastic error is not rejected at the 5% significance level. The test for accuracy of model specification indicates that the specification is error-free. The null hypothesis of no specification error is not rejected at the 5% level, as the p-value of the test statistic is greater than 0.05.

Table 7
Model Diagnostic Tests

Tests	**Test Stat**	**p-value**
Residual normality (Jarque-Bera)	0.518	0.772
Serial correlation (Breusch-Godfrey LM)	0.855	0.452
Heteroskedasticity (Breusch-Pagan-Godfrey)	0.597	0.801
Specification Error (Ramsey RESET)	0.261	0.799

Source: Author's estimation using EVIEWS 9

Model Stability

The stability of the model was tested using the plots of cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared recursive residuals (CUSUMSQ). This approach was developed by Brown et al (1975) to test the constancy of regression parameters over time. The results of the test are presented in Figures 1a and 1b respectively. The plot of CUSUM (shown in Figure 1a) lies between the 5% significance bands. Similarly, the plot of CUSUMSQ (shown in Figure 1b) also lies between the 5% significance bands. In view of these, it can be inferred that the model is structurally stable, and it can therefore be relied upon for policy purposes.

Figure 1a
CUSUM

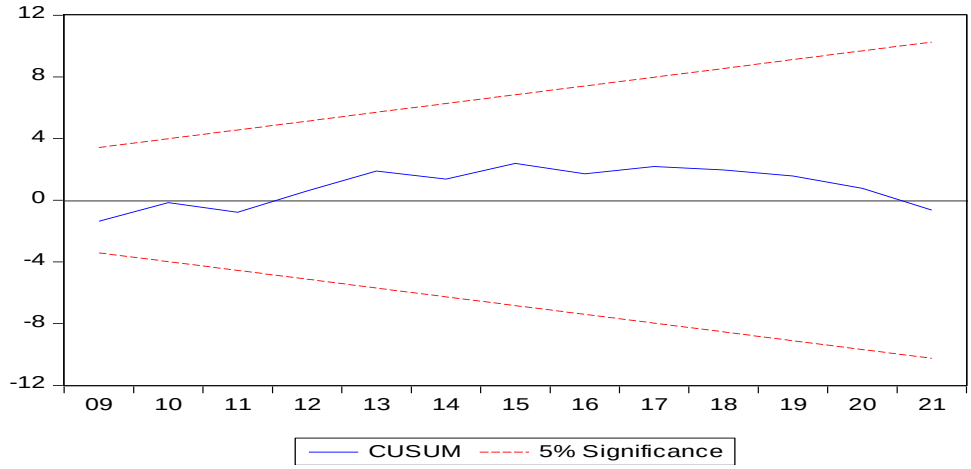
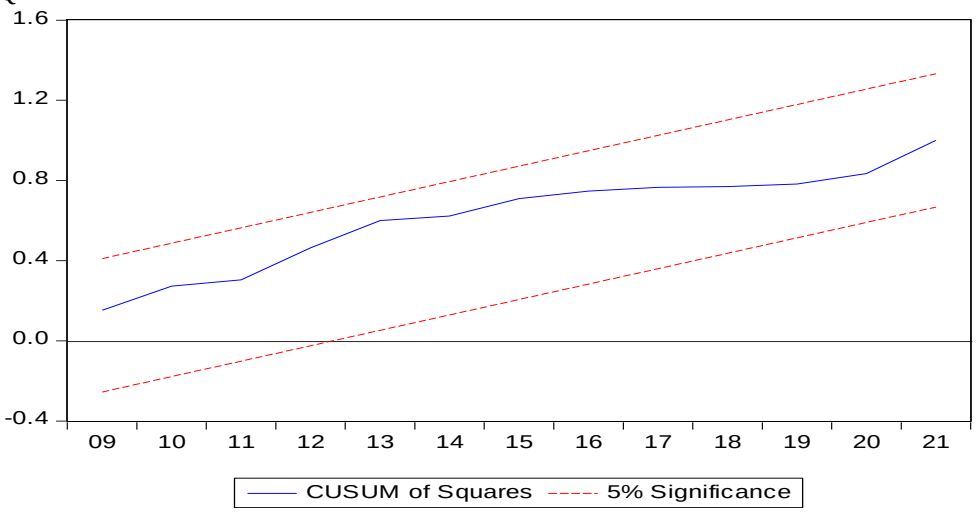


Figure 1b
CUSUMSQ



Conclusion and Recommendations

The study investigated the effects of export diversification and import penetration on industrial sector employment in Nigeria, while controlling for the effects of economic growth and monetary policy rate. The bounds test approach to cointegration and error correction analysis was employed. The study found that though export diversification could adversely affected employment generation in the industrial sector in the short run, the long run effect is positive and significant – suggesting that export diversification will enhance industrial sector employment in the long run in the country. Import competition adversely affected industrial sector employment with a one-year lag in the short-run, but the long run effect was positive and significant. No significant short-run or long run effect of economic growth was found for industrial sector employment in the country. Though the contemporaneous short-run effect of MPR on industrial sector employment was positive and significant, yet its lag effect was negative and significant. However, the long run effect of MPR on the sector's employment was positive and significant.

In view of the empirical evidence, the following are the recommendations of the paper:

i. Considering that the long run effect of export diversification on industrial sector employment was found to be positive and significant, there is need for the government to intensify efforts at diversifying the country's export baskets.
ii. Import controls backed by expansion in absorption capacity, are needed to hence the positive long run effect of import competition on industrial sector employment, and minimize the adverse short run effect.
iii. Appropriate and well-timed use of the monetary policy rate as an instrument of monetary policy to influence employment generation in the industrial sector.

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