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# Assessment of the Relationship between Financial Integration and Industrial Sector Growth: Evidence from Nigeria

**Ezeaku, Hillary Chijindu[1*], A. Anidiobu Gabriel[2] and I. P. Okolie Paschal[3]**

*[1]Department of Banking and Finance, Caritas University, Enugu, Nigeria.*
*[2]Department of Banking and Finance, Enugu State University of Science and Technology, Enugu, Nigeria.*
*[3]Office of the Accountant General, Treasury House, State Secretariat, Enugu, Nigeria.*

***Authors' contributions***

*This work was carried out in collaboration between all authors. Author IPOP designed the study and managed the literature searches. Author AAG performed the statistical analysis and wrote the protocol. Author EHC wrote the first draft of the manuscript and managed the analyses of the study. All authors read and approved the final manuscript.*

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## ABSTRACT

This study assessed the relationship between financial integration and industrial sector growth in Nigeria. One of the major goals of financial integration is to boost investments and engender increased productivity among nations. In this study, we examined how international financial integration has impacted on the Nigerian industrial sector using annualized data from 1981 to 2014. The study employed the vector autoregressive (VAR) estimation in analyzing a modified growth model. The Johansen co-integration test and the VAR-Granger causality test were also utilized. From the unit root test, no evidence of long-run relationship was found to exist between financial integration and industrial growth over the study period - both at the instances of the Trace statistic and the Max-Eigen test statistic. The study found that trade openness and foreign direct

**Corresponding author: Email: gijindu@gmail.com;*

investment have positive but insignificant impact on the Nigerian industrial sector whereas financial market development exerted negative impact on industrial growth in Nigeria. No evidence of causal link was found between growth in industrial value added, openness and financial market development. However, we found evidence of unidirectional causality running from foreign direct investment to industrial value added. The study concludes that international financial integration has not exerted significant positive influence on the growth and development of the Nigerian industrial sector and therefore, recommends that policy actions aimed at promoting exports and building an import substitution economy be put in place.

*Keywords: Financial integration; industrial value added; vector autoregression; causality.*

*JEL codes: F3, D92, O4, O16.*

## 1. INTRODUCTION

Financial integration is the process through which the financial markets of two or more countries or regions become more connected to each other. Financial integration can take different forms, which may include cross-border capital flows, participation of foreign interests in the domestic markets, information sharing and practices among financial institutions, or unification of market infrastructures. Financial integration can have a regional or global dimension, depending on whether a country's financial market is more closely connected to neighbouring economies or to global financial centres [1]. There appears to be a consensus among financial economists and experts that there has been tremendous increase in the level of international financial integration (IFI) for many years now. Most economies are making constant efforts to relax restrictions and promote cross-border capital movement, ensure domestic financial market deregulation and encourage investment by fostering competitive investment environment. Moreover, the deregulation of national financial markets and the liberalization of international capital flows ultimately lead to rapid increase in the size of capital flows [2]. Some authors have argued that the opening process of the capital account and the liberalization of exchange rates regime have encouraged free flow of capital into economies that were hitherto closed [3], thereby promoting investment and growth, and expanding the range of financing opportunities [4].

International financial integration has different stages. At the initial stage, there is free capital flow globally and participating countries are availed the opportunity of taking advantage of highest returns by diversifying their portfolio. However, as the integration of global financial system increases, the benefits arising from the mechanisms tend to contract. In essence, due to differences in basic structures, financial integration among countries involved cannot be perfect, and, therefore, constrains the benefits of integration. [1] asserts that financial integration is practically always imperfect, and the segmentation may take the form of capital flow restrictions, technical constraints hindering cross-border flows, insufficient harmonization of financial regulations, cultural barriers, and country-specific risks that discourage foreign investors.

The growth and strengthening of financial globalization have, indeed, drawn the attention of policymakers and economists alike to the macroeconomic effects of free capital flows across national borders. Although the general perception of global financial integration has been that it has strong potentials of promoting economic performance, the real long-term economic benefits remain highly debatable. Evidence from previous studies indicate that most of the studies that focus on financial integration in relation to the aggregate economy leave a glaring gap in knowledge of determining implication of financial integration on activity sector of the economy. The need to disaggregate the economy specifically arises out of the fact that enhancing the growth in real productive sector has been considered the major reason for cross-border capital flows. Against this background, the goal of this study is to investigate the relationship between financial integration and industrial sector growth in Nigeria, from 1981 to 2014. Less controversial though is the fact that capital flows are most probably beneficial for recipient countries as they find inroad to cheaper finances, the accounts of

international financial integration has neither been smooth nor risk-free. For instance, in developing countries, challenges of rapid increase in capital flows like credit growth, currency appreciation pressures, rise in market bubbles and rapid escalation of asset prices threaten the stability of the financial sector [5]. In their own contribution, [6] emphasise that international financial flows have been acknowledged to wield significant positive influence in an economy, since they are expected to promote economic growth through technology transfer, resource reallocation, and capital accumulation. Nonetheless, they are found to precipitate increase in a country's vulnerability to international financial crises, usually occasioned by sudden reversals in international capital flows.

## 2. THEORETICAL REVIEW

It is widely acknowledged that international financial integration is expanding. Restrictions on capital account have been relaxed in many countries, other barriers to investing in a foreign country are also being dismantled, and the level of capital mobility and other activities in international financial markets have strikingly increased over the last decades. To understand the possible future trends as well as sustainability in the growth of global asset trade, the determinants and sources of such growths will have to be identified. Growth that is driven by a short-lived elimination of restrictions to asset trade may not be sustained but could mark a movement towards a higher level of activity. On the contrary, growth that is associated with long-lasting elimination of barriers, and positively trending variables such as output per capita and goods trade can be predicted to persist into the future [7].

Capital flows have increased markedly in recent years and remain key aspects of global financial system. [8] assert that globalization in the 1990s made Asia a more integrated region through increased cross-border trades and economic activities. During the same period, [9] reports that financial instability was particularly severe in the African region which inhibited the potential gains arising from global financial integration, and same was the outcome and scenario in later periods in Latin America [1]. The strong intraregional economic links in the Asian region have led to increased cross-border financial activities. Notably, economies in the region have made efforts to diversify their sources of funding, deemphasizing their dependence on the banking sector and relying more on other financing instruments such as equities and bonds ([10]; [8]). This shift from banking sector funding to capital market sourcing has also been found to stimulate the economy and financial system in the Euro Area [11].

[12] maintains that regional benefits of financial integration arises from more efficient capital allocation, broader opportunities for risk diversification, minimal probability of asymmetric shocks, and more robust market structure. However, in a world of high mobility of capital, risk of cross-border contagion may be on the rise when regional economies become more interdependent with greater intensification of financial linkages. Hence, there is the likelihood that financial instability in one economy could be transmitted to neighbouring countries more rapidly [8].

A number of theories have been advanced as explanatory power or rationale for closer economic integration of national or regional economies and markets. These include the globalisation theory, modernisation theory, and the World Systems theory [13]. The globalization theory, for instance, suggests a global mechanism that promotes economic transactions through greater integration. The theory advocates for international ties while emphasizing that global connection has become very necessary given the inequalities in the world economic system and the relative differences in culture and economic factors. The theory proposes an extensive unification among different countries. Such interdependence and communications among different countries generally manifest through trade and finance. Integration is considered to have significant influence on the development of economies as well as improving social indicators [13].

Modernisation theory is yet another theory of economic development that identifies differences in ideas, technology, culture and institutional structures, especially among the non-industrialised countries, as the reasons for inequality in the global economy. Modernisation theory is akin to the globalization theory. The theory supposes political development, social and cultural reforms as necessary for economic advancement. Modernisation theory argues that alliance between industrialized countries and the

underdeveloped economies would ultimately lead to transfer of wealth, skill, ideas and technology from the former to the latter. The theory contends that industrial production is a function of shift of modern technology, developed institutions and labour habits.

Another development theory that advocates for economic interconnections is the World Systems theory. However, the theory stresses that unequal exchange is inimical to growth and economic advancement of poorer and less developed countries. The theory argues that foreign capitalist economies are the cause of underdevelopment of poor countries. This takes the form of trade specialization and resources transfer from underdeveloped countries to highly industrialized countries, thereby hindering progress and development in poor underdeveloped countries since less developed countries are made to rely on developed countries [13]. Against this background, the view point of the World System theory is that the world economy has all the trappings of unequal relations on the international hierarchy.

## 3. EMPIRICAL REVIEW

In recent times, the debate on the linkages between financial integration and growth appears to generate broader attention from researchers. Proponents of integrated world economic system strongly argue that widespread integration allows for free flow of resources, technology and skill while fostering a more connected and efficient global financial system. [14] extended the IFI debate to the ‘welfare’ level by using a balanced panel on more than 31,000 households in 22 European countries over the period, 1994-2000. His findings revealed that the largest gains from financial integration emerged on the asset side and benefited, in particular, households that had already invested in financial markets.

The anti - integration school of thoughts contends, from the views of World System theory, that the theory of ‘one price’ of traded assets does not hold due to inequality in trade exchanges, resources and level of financial sector development. The critics argue that financial crisis is mainly transmitted through financial integration especially through credit boom and the related stocks of private foreign debt [15]. The scholars also stressed that extensive global financial integration would lead to transfer of financial contagion from weak and unstable economies to other countries of the world.

From the perspective of growth at industrial level, [16] evaluated the impact of financial integration on industry growth using Ordinary Least Squares and Instrumental Variable Estimation. The results provided evidence that financial openness has a positive effect on growth of industrial sectors, in spite of their peculiar characteristics. Moreover, the study stated that industries that rely relatively more on external finance grow disproportionately faster in countries that have more integrated financial systems. However, this industry-specific effect of financial openness decreases with a control for the development of the domestic financial system. Financial integration was also found to promote growth by enhancing the functioning of the domestic financial system. There was also an evidence of indirect transmission channel of financial openness. Such evidence was further examined in [6] and they argue that financial integration has an additional, indirect impact on economic growth by exerting influence on other determinants of growth like volume of international trade and the development of domestic financial markets.

[17] investigated the effects of financial integration on economic growth in Nigeria using the ordinary least squares (OLS) estimation and time series data for the period, 1986-2008. The results showed that financial openness has a positive and non-significant effect on the country’s economic growth while human resource development was found to have significant and positive impact on economic growth. The study further revealed that gross capital formation and financial depth have not caused economic growth in Nigeria.

[18] used models of co-integration and Vector Error Correction Model (VECM) to estimate the relationship between international financial integration and economic growth in India between 1981 and 2011. The study found that international financial integration (IFI) impacts the growth of the economy positively and also that financial development accounted for 8.63 percent change in economic growth. However, the view of [5] is that countries that are able to reap the benefits of IFI must have satisfied certain threshold conditions regarding the level of economic, institutional and financial development, and the inflation level.

[19] examined the effect of trade and financial integration on the relationship between growth and volatility. Estimations on the comprehensive new dataset used in the study revealed that while there is negative relationship between growth and volatility, both trade and financial integration significantly weaken this negative relationship. The estimated coefficient showed that the interaction between volatility and trade integration is significantly positive whereas the interaction is less significant between financial integration and volatility.

[20] investigated the effects of international financial integration on economic growth and also assessed whether this relationship depends on the level of economic development, financial development, legal system development, government corruption, and macroeconomic policies. The study used different measures of international financial integration on 57 countries and a variety of statistical methodologies. The results showed that international financial integration accelerate economic growth.

## 4. DATA AND METHODOLOGY

The research design to the study is *ex-post facto* design. The nature of the data used in the study is annualized quantitative data and sourced from the World Development Indicators within the period, 1981-2014. The preliminary tests of descriptive statistics and Philips Perron unit root test are conducted on the proxy variables. The methods of estimations employed are Johansen cointegration test – for long run relationship, the vector autoregressive (VAR) estimate. The VAR Granger causality test, on the other hand, is used to determine the direction of causality among the variables. Diagnostic LM tests for autocorrelation are conducted and Autoregressive Characteristic Polynomial is employed to check for model stability.

### 4.1 Model Specification

The baseline model in this study is fashioned after the model developed by [6] in a study aimed at appraising the interrelationship between financial integration and economic growth. The authors regressed economic growth against selected financial integration variables. The model presented by the authors is of the form:

$$(y_{i,t} - y_{i,t-1}) = \alpha + \beta y_{i,t-1} + \gamma F_{i,t} + z_{i,t} + n_i + \mu_i + \varepsilon_{i,t,} \quad (1)$$

Subscripts $i$ & $t$ denote country and time period, respectively. $\alpha$ is constant, $y_{i,t-1}$ is the log of 5 period lag of per capita GDP, $F_{i,t}$ measures international financial integration, $Z_{i,t}$ is the vector of other variables that have possible effects on economic growth, $u_t$ represent time dummies and $\varepsilon_{i,t}$ is error term. We modify equation (1) to arrive at our primary model which takes into account the peculiarity of our proxy variables. The baseline model is represented below as:

$$IVA_t = \alpha_0 + \beta_1 OPN_t + \beta_2 FMD_t + \beta_3 FDIR_t + \varepsilon_t \quad (2)$$

Where t denotes time period, $IVA$ = industrial value added as a share of gross domestic product (GDP), $\alpha_0$ = intercept, $\beta_1$ to $\beta_3$ = coefficient parameters, $OPN$ = trade openness (sum of export and import of goods and services) as a percentage of GDP, $FMD$ = market capitalization as a share of GDP, $FIDR$ = ratio of foreign direct investment to GDP, and ε is the white noise process.

The model employed for this study will be a system equation derived from equation (2). The vector autoregressive (VAR) model is a general structural model that describes the dynamic interrelationship among stationary variables. If we have I(1) and I(0) orders of integration in our series, then it is an indication that our variables are not co-integrated (if confirmed by Johansen co-integration test), and the appropriate technique will be the unrestricted autoregressive model. Equation will then be modified to capture the model, thus:

$$IVA_t = \beta_0 + \sum_{i=0}^{n} \beta_1 IVA_{t-1} + \sum_{i=0}^{n} \beta_2 OPN_{t-1} + \sum_{i=0}^{n} \beta_3 FMD_{t-1} + \sum_{i=0}^{n} \beta_4 FDIR_{t-1} + \varepsilon_t \quad (3)$$

However, the vector error correction (VEC) model, which this study adopts, is a special case of VAR model for variables that are integrated of order one [i.e., I(1)]. The vector error correction

also processes any co-integrating relationships among the variables. Given our time-series variables, the general dynamic relationships among our variables given that they are stationary after first difference yield the equation:

$$\Delta IVA_t = \beta_0 + \sum_{i=0}^{n} \beta_1 \Delta IVA_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta OPN_{t-1} + \sum_{i=0}^{n} \beta_3 \Delta FMD_{t-1} + \sum_{i=0}^{n} \beta_4 \Delta FDIR_{t-1} + \sum_{i=0}^{n} \beta_9 ECT_{t-1} + \varepsilon_t \quad (4)$$

Where $ECT_{t-1}$ is one period lag of the error correction term, and $\Delta$ = first differencing.

## 5. RESULTS AND ANALYSIS

### 5.1 Descriptive Statistics

Table 1 explains individual characteristics of the proxied variables. Industrial value added relative to GDP averaged 37.2 percent between 1981 and 2014. The highest industrial value added was in 1992 at 53 percent while it recorded lowest in 2014 at 24.25 percent. Openness, market capitalization and foreign direct investment averaged 2.1%, 0.94% and 3.07%, respectively, over the 34-year period. It can also be observed that the mean and the median of the variables are approximately equal – an indication that the series appear normally distributed.

### 5.2 Unit Root Test

Stationarity test results presented in Table 2 show that all the series are stationary after first differencing (i.e., at order one) with the exception of FDI ratio that attained stationarity at level. This means that all the variables are stationary but not integrated of same order. We may not go ahead with Johansen co-integration test since there is no indication of long-run association among the series. This, however, means that our series will be estimated using restricted vector autoregressive (VAR) other than vector error correction (VEC) model since the series do not have long-run association.

Table 3 confirms the absence of co-integrating (long-run relationship) among our variables.

The Johansen co-integration result presented in Table 3 indicates that there is no co-integrating equation. Null hypothesis of no co-integration was accepted in both the trace statistic and the Max-Eingen statistic as the p-value of “None” is greater than 5% level of significance.

### 5.3 Model Estimation

In the absence of I(1) order of integration and the confirmation of no co-integrating equations in Table 3, we rule out VEC as the appropriate estimation technique, and employ restricted VAR in processing our model.

**Table 1. Descriptive statistics result**

| | IVA | OPN | FMD | FDIR |
|---|---|---|---|---|
| Mean | 37.21353 | 2.110068 | 0.942353 | 3.077353 |
| Median | 37.30500 | 2.390944 | 0.895000 | 2.650000 |
| Maximum | 53.00000 | 3.680082 | 3.590000 | 10.83000 |
| Minimum | 24.25000 | 0.236089 | 0.370000 | 0.660000 |
| Std. Dev. | 8.031336 | 1.009458 | 0.642160 | 2.264581 |
| Observations | 34 | 34 | 34 | 34 |

**Table 2. Phillip-perron unit root test**

| Variable | ADF-Statistic | 5% critical value | P-value | Order of integration |
|---|---|---|---|---|
| IVA | -11.92055 | -3.557759 | 0.0000 | I(1) |
| OPN | -11.83696 | -3.557759 | 0.0000 | I(1) |
| FMD | -6.207040 | -3.557759 | 0.0001 | I(1) |
| FDIR | -3.471182 | -2.954021 | 0.0153 | I(0) |

*Source: Authors’ 2017*

**Table 3. Johansen co-integration test**

Date: 11/01/16 Time: 10:26
Sample (adjusted): 1983 2014
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: FDIR FMD IVA OPN
Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None | 0.554153 | 39.35605 | 47.85613 | 0.2464 |
| At most 1 | 0.206690 | 13.50711 | 29.79707 | 0.8671 |
| At most 2 | 0.167644 | 6.097782 | 15.49471 | 0.6840 |
| At most 3 | 0.007036 | 0.225935 | 3.841466 | 0.6346 |

*Trace test indicates no co-integration at the 0.05 level*
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None | 0.554153 | 25.84893 | 27.58434 | 0.0820 |
| At most 1 | 0.206690 | 7.409330 | 21.13162 | 0.9360 |
| At most 2 | 0.167644 | 5.871847 | 14.26460 | 0.6297 |
| At most 3 | 0.007036 | 0.225935 | 3.841466 | 0.6346 |

*Max-Eigenvalue test indicates no co-integration at the 0.05 level*
** denotes rejection of the hypothesis at the 0.05 level*

*Source: Author' 2017*

**Table 4. Vector autoregressive (VAR) estimate**

Dependent Variable: IVA
Method: Least Squares
Date: 11/01/16 Time: 11:22
Sample (adjusted): 1982 2014
Included observations: 33 after adjustments
IVA = C(1)*IVA(-1) + C(2)*OPN(-1) + C(3)*FMD(-1) + C(4)*FDIR(-1) + C(5)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1)*IVA(-1) | 0.551867 | 0.166854 | 3.307480 | 0.0026 |
| C(2)*OPN(-1) | 1.394721 | 1.341431 | 1.039727 | 0.3074 |
| C(3)*FMD(-1) | -0.140029 | 1.870641 | -0.074856 | 0.9409 |
| C(4)*FDIR(-1) | 0.295631 | 0.568544 | 0.519978 | 0.6072 |
| C(5) | 12.64908 | 5.746004 | 2.201370 | 0.0361 |
| R-squared | 0.731112 | Mean dependent var | | 37.13030 |
| Adjusted R-squared | 0.649843 | S.D. dependent var | | 8.140958 |
| S.E. of regression | 6.564245 | Akaike info criterion | | 6.739879 |
| Sum squared resid | 1206.501 | Schwarz criterion | | 6.966623 |
| Log likelihood | -106.2080 | Hannan-Quinn criter. | | 6.816172 |
| F-statistic | 5.304712 | Durbin-Watson stat | | 1.753043 |
| Prob(F-statistic) | 0.002616 | | | |

*Source: Authors' 2017*

***Model Equation:***

*IVA = 0.551867058519*IVA(-1) + 1.39472123011*OPN(-1) - 0.140028923308*FMD(-1) + 0.295630796584*FDIR(-1) + 12.6490799647*

The vector autoregressive (VAR) estimate above reveals that one period lag of trade openness and foreign direct investment (all expressed as a share of GDP) have positive effects on industrial sector performance in Nigeria between 1981 and 2014. Financial market development (FMD), however, has negative effects on industrial sector growth. It is noteworthy that none of these exogenous (OPN, FMD and FDIR) effects are significant. Since our estimation is autoregressive, a period lag of industrial value added has significant positive effect on the industrial sector output. As indicated by the F-statistic, the overall effect of the regressors on the explained variable is significant. The Durbin-Watson value shows that our model is free from serial correlation.

VAR Granger causality results in Table 4 revealed that there is no causality between openness and financial market development. However, there is an evidence of a unidirectional causality running from industrial value added to foreign direct investment.

With respect to the lag length applied in Tables 4 and 5, our choice of lag and lag selection criteria were explained in Table 5 where all the criteria indicated that one lag length is appropriate.

**Table 5. Result of granger causality test**

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 12/05/16 Time: 01:59
Sample: 1981 2014
Included observations: 31

Dependent variable: IVA

| Excluded | Chi-sq | Df | Prob. |
|---|---|---|---|
| OPN | 4.398081 | 1 | 0.2216 |
| FMD | 5.161630 | 1 | 0.1603 |
| FDIR | 1.808333 | 1 | 0.6131 |
| **All** | 11.30669 | 3 | 0.2553 |

Dependent variable: OPN

| Excluded | Chi-sq | Df | Prob. |
|---|---|---|---|
| IVA | 0.698033 | 1 | 0.8737 |
| FMD | 0.177561 | 1 | 0.9811 |
| FDIR | 0.931949 | 1 | 0.8177 |
| **All** | 1.739353 | 3 | 0.9950 |

Dependent variable: FMD

| Excluded | Chi-sq | Df | Prob. |
|---|---|---|---|
| IVA | 0.474504 | 1 | 0.9245 |
| OPN | 1.986587 | 1 | 0.5752 |
| FDIR | 1.173408 | 1 | 0.7594 |
| **All** | 3.298001 | 3 | 0.9513 |

Dependent variable: FDIR

| Excluded | Chi-sq | Df | Prob. |
|---|---|---|---|
| IVA | 10.48197 | 1 | 0.0149 |
| OPN | 6.584329 | 1 | 0.0864 |
| FMD | 1.354152 | 1 | 0.7163 |
| **All** | 19.48089 | 3 | 0.0214 |

*Source: Authors' 2017*

**Table 6. Lag selection criteria**

VAR Lag Order Selection Criteria
Endogenous variables: FDIR FMD IVA OPN
Exogenous variables: C
Date: 11/01/16 Time: 09:19
Sample: 1981 2014
Included observations: 32

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -250.7898 | NA | 96.82781 | 15.92436 | 16.10758 | 15.98509 |
| 1 | -215.5778 | 59.42021* | 29.44219* | 14.72361* | 15.63970* | 15.02727* |
| 2 | -202.7595 | 18.42638 | 37.83629 | 14.92247 | 16.57142 | 15.46905 |

*Source: Authors' 2017*

**Table 7. Serial correlation LM-test**

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 11/01/16 Time: 12:09
Sample: 1981 2014
Included observations: 33

| Lags | LM-Stat | Prob |
|---|---|---|
| 1 | 16.55970 | 0.4146 |
| 2 | 18.16069 | 0.3146 |
| 3 | 11.39638 | 0.7844 |
| 4 | 6.970813 | 0.9738 |
| 5 | 25.79074 | 0.0570 |

Probs from chi-square with 16 df.

*Source: Authors' 2017*

### 5.4 Diagnostic Tests

The stability of our series is confirmed in Fig. 1 below. The dots lie within the circle which indicates that our series are stable.

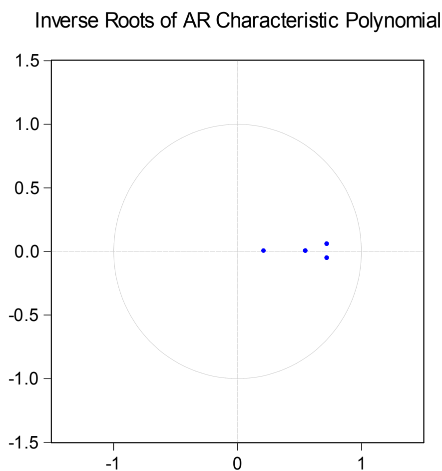


**Fig. 1. Autoregressive characteristic polynomial**

The results in Table 7 (above) confirm the Durbin-Watson result in Table 4, and indicate that even if our lag length is extended to five, there will be traits of autocorrelation in our model. We, therefore, conclude that our VAR model is from serial correlation problems.

## 6. CONCLUSION AND RECOMMENDATIONS

International financial integration has been broadly examined theoretically and empirically. Free flow of capital, technology and human resources across national borders are widely acknowledged as enhancing financial sector development, investment and growth. Most of the existing works on the subject mainly sought to find out how international financial integration affects economic growth and development. One of the major goals of financial integration is to boost investments and engender increased productivity among nations. For this reason, we deemed it necessary to disaggregate the economy with the particular aim of determining how international financial integration has impacted on the Nigerian industrial sector. Such

studies in the Nigerian context are sketchy and the need to fill the knowledge gap actually motivated this study. Various analytical techniques were employed to achieve our goal. Financial integration, proxied by trade openness, financial market development and foreign direct investment which were all expressed as a percentage of GDP, was examined vis-à-vis industrial sector performance in Nigeria. The study found that trade openness and foreign direct investment had positive but non-significant impact on the Nigerian industrial sector, whereas financial market development exerted negative impact on industrial growth in Nigeria. The Johansen co-integration test result indicated that there was no co-integrating equation among our variables of interest. No evidence of causal relationship was found between industrial value added, trade openness and financial market development. However, we found evidence of unidirectional causality running from foreign direct investment to industrial value added. The study concludes that international financial integration is necessary for the growth and development of the Nigerian industrial sector. We, therefore, recommend that policy actions aimed at promoting exports and building an import substitution economy be put in place. The government should put in place basic infrastructures and boost security across the country. These are critical for a thriving industrial sector and will help to attract foreign direct investment.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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