Sub-Sahara African Academic Research Publications
March, 2022 Editions

JMSCD
Journal of Management Science & Career Development.
Vol.23, No.7, ISSN 2385-8148

FINANCIAL DEVELOPMENT AND INDUSTRIAL OUTPUT IN NIGERIA

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Abstract
This study examines the relationship between financial development and industrial output in Nigeria using unit root tests, co-integration tests and Auto-Regressive Distributed Lag (ARDL). The study finds that the variables are stationary at level and first difference – I (0); I (1). Also, the results reveals that all the variables are co-integrated i.e. they are related in the long run. The results of the ECM test within the framework of ARDL also confirm the co-integration tests. The results further show the direction of causality running from financial development to industrial output in Nigeria. The study confirms the existence of a long run relationship between financial development and industrial output in Nigeria. The study posits that the economy will benefit from the development of financial institutions in industrialising the country in as much the government promote and encourage sound macroeconomic policies, strong institutions and political stability.

Keywords: *Financial development, Industrial output, ARDL, Co-integration, Relationship, Results, Variables and Nigeria.*

Introduction
Theoretically, industrialization serves as an integral and fundamental part of structural transformation of economies. Many economists and institutions still consider it to be a precondition for increasing growth rate, and improving the livelihood of the people. The United Nations Industrial Development

Organization (UNIDO, 2009) stated that industrialization is integral to economic growth and development; and scarcely any country has grown without industrializing.

Industrialization is said to be a significant measure of modern economic growth and development but the Nigerian industrial sector has suffered from decades of low productivity. Industrialization is generally argued as capable of increasing the pace of economic growth and ensuring swift structural transformations of the economy (Ewetan and Ike, 2014). The critical role of the industrial sub-sector is predicated on the fact that it acts as an engine of growth by broadening the productive and export base of the economy, reducing unemployment and minimizing rural-urban drift as well as helping to reduce poverty (see Ewetan and Ike, 2014).

In the light of the forgoing, financial sector development plays a crucial role in improving industrial sector of any economy. There is need to investigate whether finance led growth of industry or otherwise in the Nigerian economy. In literature, generally, the finance-industrialization nexus still remain controversial particularly in Nigeria. For instance, Olanrewaju, Aremo and Aiyegbusi (2015) investigate the effect of banking sector reforms on the output of manufacturing sector in the Nigerian economy and find that the effects of bank assets, lending rate, exchange rate and real rate of interest on manufacturing output were positively significant but with very low impact. They further show that financial deepening and interest rate spread negatively and significantly impacted on the output growth of manufacturing sector in Nigeria. Ewetan and Ike (2014) also reported in their study that financial development has a negative relationship with industrial output in Nigeria. They further assert that there is urgent need for government to consolidate on past financial sector reforms to address the challenges of financial intermediation in the domestic financial sector to improve loan disbursement to the industrial sector of the Nigerian economy.

However, this study investigates nexus between financial development and industrial output in Nigeria as well as direction of causality between financial development and industrial output in the country. The study is further organized as follows: section 2 discusses the literature review; section 3 presents the methodology employed while section 4 presents the empirical results and discussion; and section 5 concludes the study.

Literature Review

The relationship between financial development and industrialization has been studied broadly in the literature. Neusser and Kugler (1998) investigate the nexus of manufacturing growth and financial development among OECD countries. The neo-Schumpeterian growth model is constructed and analysed by using Johansen co-integration method and Granger causality tests. The results suggested a long term relationship between total factor productivity and financial development. Also, Granger causality indicated bidirectional causality from financial sector to manufacturing factor productivity. In the case of production output volatility; it has been revealed that industrial output is more stable in industrialized countries in comparison to developing ones (Acemoglu et al. 2003). Financial development provides wider opportunities for firms to borrow more freely since financial constraints in those countries are relaxed. Moreover, financial constraints cause agency costs and asymmetric information to increase which are reduced as financial development is improved (Hubbard, 1997; Stein, 2003).

Goldsmith (1969) emphasized the role that intermediaries play in steering funds to the highest-valued users in the economy. First, intermediaries collect and analyse information before they invest in businesses. Based on this information, they determine whether to commit savers' funds. If they proceed, then they must decide how much to invest and on what terms. Second, after allocating funds intermediaries must monitor firms to ensure that savers' best interests are protected. Increases in the efficiency of financial intermediation, due to improved information production, are likely to reduce the spreads between the internal rates of return on investments in firms and the rate of return on savings received by savers. The spreads between these returns reflect the costs of intermediation. These intermediation wedges include the costs of gathering ex ante information about investment projects, the ex post information costs of policing investments, and the costs of misappropriation of savers' funds by management, unions, and soon that arise in a world with imperfect information. An improvement in financial intermediation does not necessarily affect the rate of return earned by savers. Aggregate savings may adjust in equilibrium so that this return always equals savers' rate of time preference.

Olanrewaju, Aremo and Aiyegbusi (2015) investigate empirically the effect of banking sector reforms on the output of manufacturing sector in the Nigerian economy between 1970 and 2011, using co-integration test and Error Correction

Mechanism (ECM), and find that the effects of bank assets, lending rate, exchange rate and real rate of interest on manufacturing output were positively significant but with very low impact. They further show that financial deepening and interest rate spread negatively and significantly impacted on the output growth of manufacturing sector in Nigeria. They conclude that the effects of banking sector reforms on the output growth of manufacturing sector were significantly low in the Nigerian economy. Simon-Oke and Jolaosho (2016) assert that the effective performance of industrial sector of every economy depends largely on the level of development in the financial system of the country and also on the intermediation between the surplus and the deficit units of the economy. Based on the assertion, they investigate the impact of financial reforms on industrial productivity growth in Nigeria using vector auto-regression analysis. They find that the various financial services reforms put in place since the introduction of the Structural Adjustment Programme (SAP) in Nigeria have not significantly brought about the needed improvement in the level of industrial productivity growth in the country.

In another related study by Ogunleye and Saliu (2013), it was revealed from empirical results that financial institutions reform has not impacted positively on manufacturing sub-sector in Nigeria; while Owolabi et al. (2013) also reported no evidence of causal relationship between reforms in the banking sector and growth of manufacturing output despite the general belief that a well-developed financial sector is capable of accelerating growth in the real sector of the economy. Akinlo and Egbetunde (2010) also foud that financial development Granger causes economic growth in Central African Republic, Congo Republic, Gabon and Nigeria; while on the contrary, Adekunle et al. (2013) argue that a robust financial system is capable of performing several critical functions which includes "enhancing the efficiency of intermediation by reducing information, transaction and monitoring costs; a well-developed financial system enhances investment by identifying and funding good business opportunities, mobilizes and encourages savings and trading, hedging and diversification of risk, as well as facilitating the exchange of goods and services".

Ewetan and Ike (2014) while examining the long run and causal relationship between financial sector development and industrialization in Nigeria for the period 1981 to 2011 using a multivariate VAR and VECM, they discovered the evidence of long run relationship between financial sector development and

industrialization in Nigeria. It was also evidenced from their study that the two measures of financial development had contrasting effects on industrial output, that is, ratio of private sector bank credit to GDP has a positive relationship with industrial output while the ratio of broad money stock to GDP has a negative relationship with industrial output. They further show that Granger causality test had long-run unidirectional causal link running from industrialization to financial development. Gokmenoglua, Ozatac and Eren (2015) empirically investigate the long run relationship between industrialization, financial development and carbon emissions by using Granger causality test in Turkey, and found that a unidirectional relationship from financial development to carbon emissions

Greenwood, Sanchez and Wang (2012) adopt a model that matches facts about the U.S. economy, such as the intermediation spreads and the firm-size distributions for 1974 and 2004, using cross-country interest rate spreads and per capita GDP and find a country like Uganda could increase its output by 116 percent if it could adopt the world's best practice in the financial sector. Still, this amounts to only 29 percent of the gap between Uganda's potential and actual output. Gupta (2016) investigates the differential impact of increased financial development on industrial output, across state and industry categories. Using an unbalanced panel of 15 Indian states, 22 industries at the 2-digit level, and an 11-year period spanning 1992-2002, his paper reveals that financial depth facilitates increased use of contract labour by industries, which in turn mitigates the effects of industrial disputes and increases output. This beneficial impact is uniformly felt across the country, regardless of state-level labour regulations. However, financial depth has failed to directly benefit industries with the greatest need for external financing, i.e. those with moderate and high dependence on external sources of finance. Overall, increased financial depth alleviated the working capital constraints of firms, but not their investment constraints. The negative effects of the latter outweigh the positive effects of the former, and help explain the sharp deceleration of growth across industries categories.

Udoh and Ogbuagu (2012) examine the link between financial sector development and industrial production, using an aggregate production framework and autoregressive distributed lag (ARDL) and find a co-integration relationship between financial sector development and industrial production. They further reveal that both the long run and short run dynamic coefficients of

financial sector development variables have negative and statistically significant impact on industrial production. They contend that the most important task for government of Nigeria is to introduce further financial sector reforms to improve the efficiency of the domestic financial sector which is a pre-requisite for the achievement of industrial development; and the inefficiency of the financial sector is responsible for the adverse impact on industrial production. Neusser and Kugler (2016) contend that the development of the financial sector is essential for economic growth. They report in their study that financial sector GDP is co-integrated for many OECD countries not so much with manufacturing GDP but mostly with manufacturing total factor productivity.

Recently, Gui-Diby and Renard (2015) examine the relationship between inward foreign direct investment (FDI) and the industrialization process in Africa using panel data from 49 countries over the period of 1980–2009, and find that FDI did not have a significant impact on the industrialization of these countries, while other variables, such as the size of the market, the financial sector, and international trade were important. They conclude that the role of FDI in the transformation agenda, which is currently being discussed in Africa, should be carefully analysed to maximize the impact of these capital inflows. In another study, Castro, Kalatzis and Martins-Filho (2015) investigate the effects of the financial system on a firm's investment decisions using data from 404 Brazilian firms over the 1998–2006 periods. They also use country-level data and classify firms as financially constrained and unconstrained according to the KZ and WW indexes. Their results show that financial development has a significant impact on a firm's investment. They further report that the financial structure has an effect on the investment behaviour of constrained firms even after controlling for the level of financial development. Their finding points to a market-based financial system in order to reduce the constrained firms' dependence on internal resources. Also, Ma and Lin (2016) investigate the relationship between financial development and the effectiveness of monetary policy using panel data from 41 economies, and find that the effect of monetary policy on output decreases more with financial development in developing economies while the effect of monetary policy on inflation is strengthened with financial development in advanced economies. They argue that this could be as a result of the fact that advanced economies tend to have deeper and more efficient financial intermediaries and financial markets than developing

economies; more stable and less capital flight in advanced economies due to economic and political stability; the availability of more financial instruments to direct money and credit to increase output in advanced economies; and more independent central banks and the adoption of explicit inflation targeting as the dominant monetary policy regime to control inflation in advanced economies.
In the literature, scholars assert that industrialization is a pathway to economic development and growth. The linkages between financial development and economic growth have long been a subject of intense scrutiny. However, attention has not be shifted on the finance – industrialisation nexus, particularly in Nigeria, hence this study.

Methodology

This study investigates the nature of relationship between financial development and industrial output in Nigeria. This study adopts the aggregate production framework following Udoh and Ogbuagu (2012). The aggregate production framework is an extension of the conventional production function, which emphasizes labour and capital as the main factors of production. The general form of the function linking aggregate output in t period with inputs or factors of production is specified thus

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \quad \text{..... 1}$$

Where Y_t denotes the aggregate production of the industrial sector at time t; A_t, K_t, and L_t also denote the total factor productivity (TFP), the capital stock and the stock of labour at time t respectively. We assume that TFP is a function of financial depth (FD), interest rate (R), and other exogenous factors.

$$A_t = f(FD_t^{\delta}, R_t^{\gamma}) \quad \text{..... 2}$$

Incorporating Eq(2) in Eq(1) and expresses them in linear form, we have

$$\ln Y_t = c + \alpha \ln K_t + \beta \ln L_t + \delta \ln FD_t + \gamma \ln R_t + \varepsilon_t \quad \text{..... 3}$$

To empirically analyze the impact of financial development on industrial output, the ARDL model specification is used to show the long-run relationships and dynamic interactions between financial development and industrial output using Autoregressive Distributed Lag (ARDL) co-integration test popularly known as bound test. This method is adopted for this study for three reasons. Firstly, compare to other multivariate co-integration methods (i.e. Johansen and Juselius (1990), the bounds test is a simple technique because it allows the co-integration relationship to be estimated by OLS once the lag order

of the model is identified. Secondly, adopting the bound testing approach means that pretest such as unit root is not required. That is the repressor's can either I(0), purely I(1) or mutually co-integrated. Thirdly, the long-run and short run parameters of the models can be simultaneously estimated. Therefore, the newly Autoregressive Distributed Lag (ARDL) bound test proposed by Pesaran, Shin and Smith (2001) is used to show the relationship between financial development and industrial output in Nigeria from 1970 to 2014. The ARDL method estimates $(p+1)^k$ number of repressor's in order to obtain the optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in each equation. An appropriate lag selection based on the Schwarz Information Criteria (SBC) and Akaike Information Criteria (AIC) are employed.

The ARDL model specification of the above functional form is;

$$\Delta \ln Y_t = c + \sum_{i=1}^{n} \phi \Delta \ln Y_{t-i} + \sum_{i=0}^{n} \alpha_i \Delta \ln K_{t-i} + \sum_{i=0}^{n} \beta_i \Delta \ln L_{t-i} + \sum_{i=0}^{n} \delta_i \Delta \ln FD_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta \ln R_{t-i}$$
$$+ \vartheta_1 \ln Y_{t-1} + \vartheta_2 K_{t-1} + \vartheta_3 L_{t-1} + \vartheta_4 FD_{t-1} + \vartheta_5 R_{t-1} + \varepsilon_t \quad \text{..... 4}$$

Where:

n = lag length for the Model

Δ = first differencing operator

ε = white noise disturbance error term

The bound test approach for the long-run relationship between the financial development and industrial output is based on the Wald test (F statistic) by imposing restrictions on the long-run estimated coefficients of one period lagged level of the financial development and industrial output to be equal to zero, that is, the null hypothesis of no co-integration states that $H_0 : \vartheta_1 = \vartheta_2 = \vartheta_3 = \vartheta_4 = \vartheta_5 = 0$ is tested against the alternative hypothesis of $H_0 : \vartheta_1 \neq \vartheta_2 \neq \vartheta_3 \neq \vartheta_4 \neq \vartheta_5 \neq 0$. Then the calculated F-statistic is compared to the tabulated critical value in (Pesaran, Shin and Smith, 2001). The explanatory variables are assumed to be integrated of order zero, or I(0) for values of the lower bound while the upper bound values assumed that are integrated of order one, or I(1). Therefore, the decision rule is that if computed F-statistic falls below the lower bound value, I(0), the null hypothesis (no co-integration) cannot be rejected. Contrarily, if the computed F-statistic exceeds the upper

bound value, I(1) then it can be concluded that financial development and industrial output are co-integrated.

The long-run and short-run parameters of equation 5 and 6 would be estimated once a co-integration relationship has been established. The co-integrating long-run relationship can be estimated using the following specifications:

$$\ln Y_t = \phi + \sum_{i=1}^{n} \vartheta_1 \ln Y_{t-i} + \sum_{i=0}^{n} \vartheta_2 \ln K_{t-i} + \sum_{i=0}^{n} \vartheta_3 \ln L_{t-i} + \sum_{i=0}^{n} \vartheta_4 \ln FD_{t-i} + \sum_{i=0}^{n} \vartheta_5 \ln R_{t-i} + \varepsilon_t$$

….. 5

However, to restore equilibrium immediately may not be possible because of the speed of adjustment. This could be caused by the lags and adjustment process used to capture changes in any of the factors affecting financial development or industrial output overtime. Hence, the error correction model can be used to capture the speed of adjustment of industrial output model. This model is expressed below:

$$\Delta \ln Y_t = c + \sum_{i=1}^{n} \phi \Delta \ln Y_{t-i} + \sum_{i=0}^{n} \alpha_i \Delta \ln K_{t-i} + \sum_{i=0}^{n} \beta_i \Delta \ln L_{t-i} + \sum_{i=0}^{n} \delta_i \Delta \ln FD_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta \ln R_{t-i} + \lambda ect_{t-1} + \varepsilon_t$$

..... 6

Where:

εct_{t-1} = the error correction term lagged for one period

λ = the coefficients for measuring speed of adjustment in equation 5

Multivariate VECM causality test was also employed to determine direction of causality between financial development and industrial output in the country; while annual time series (secondary) data covering the period 1970 to 2015 were considered for analysis. All the variables were sourced from CBN Statistical Bulletin, 2016 except gross capital formation sourced from World Development Indicators (WDI), 2016.

Empirical Results and Discussion

Time series data such as the ones used in this study tend to exhibit either a determistic and/or stochastic time trend and are therefore non stationary; i.e., the variables in question have, means, variances and covariance's that

are not time invariant. As pointed out by Engle and Granger (1987), the direct application of OLS or GLS to non-stationary data produces regressions that are misspecified or spurious in nature. Consequently, we tested the variables for a unit root (non-stationarity) using an Augmented Dickey-Fuller test (ADF) and Phillips-Perron test (PP), and the results are presented in Table 1 below.

Table 1: Unit Root Test Results

Variables	ADF		PP		Order of Integration
	Level	1st Difference	Level	1st Difference	
Y	-0.383	-5.446***	-0.126	-6.097***	I(1)
FD	-2.678*	-5.259***	-2.429	-8.949***	I(0)
R	-3.030**	-7.981***	-2.989**	-8.340***	I(0)
K	-0.296	-3.183**	-1.342	-4.428***	I(1)
L	-1.769	-5.737***	-0.301	-5.737***	I(1)

,,*** indicate 10%, 5% and 1% level of significance.*

The results of the stationarity tests at level show that one of the indicators of financial development and interest rate were stationary at level, while other variables were stationary at first difference. Having confirmed that all variables included in the tests are integrated of order zero and one[1]. The next step is to test for the existence of a cointegration relationship among the variables using the Johansen-Juselius approach.

Table 2: Johansen Cointegration Tests

H_o:r	Trace Statistic	Critical Value (0.05)	Max-Eigen Statistic	Critical Value (0.05)
r = 0	135.693***	95.753	42.085**	40.077
r ≤ 1	93.608***	69.818	34.847**	33.876
r ≤ 2	58.761***	47.856	23.629	27.584

[1] Bound testing is required for time series and any dynamic panel model for cross countries if the stationary levels are of different order (see Baltagi, 2008). This study used Auto-Regressive Distributed Lag (ARDL) in estimating the model.

r ≤ 3	35.131**	29.797	16.488	21.131
r ≤ 4	18.643**	15.494	10.120	14.264
r ≤ 5	8.522***	3.841	8.522***	3.841

,,*** indicate 10%, 5% and 1% level of significance.*

The results presented in Table 2 indicate the existence of co-integration between industrial output, financial development indicators, labour force, gross capital formation and interest rate. The trace and maximum eigenvalue statistics reject the null hypothesis of no co-integration at 5 per cent level. Since the order of integration is mixed i.e. I(0) and I(1), dynamic econometric technique of analysis is required. ARDL is necessary as dynamic technique of analysis because of the time series nature of data for the study.

The empirical results from the estimated ARDL model needed for discussion is presented in Tables 3 to 7. In the first step of the ARDL analysis, the study tested for the presence of long-run relationships using Equation (4). The study used a general-to-specific modeling approach guided by the short data span and SIC respectively to select a maximum lag order for the conditional ARDL. Following the procedure in Peseran, Shin and Smith (2001), the study first estimated an OLS regression for the first differences part of equation (4) and then test for the joint significance of the parameters of the lagged level variables when added to the first regression. According to Peseran, Shin and Smith (2001), "this OLS regression in first differences are of no direct interest" to the bounds co-integration test. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero (i.e. no long-run relationship exists between them). The calculated Wald test (F-statistics) when each variable is considered as a dependent variable (normalized) in the ARDL-OLS regressions. The results for the computed Wald test (F-statistics) reported in Table 3 reveals that the calculated F-statistics of 6.203 is higher than the upper bound critical value 6.650 at 1% error level. Based on this result, the study concludes that a level long run co-integration relationship exists for the estimated ARDL models. Thus, the null hypotheses of no co-integration are rejected, implying long-run co-integration relationships amongst the variables when the regressions are normalized on industrial output (Y). Tables 4 to 6 respectively report the result of the long run coefficients, the short-run dynamic coefficients and the model diagnostic and stability tests.

Table 3: ARDL bound test result for equation (4)

Computed F-Statistic: 6.203	**K=2 (lag length)**
1% critical bound value	I(0): 4.428, I(1): 6.650

Notes: Critical values are extracted from Narayan (2005); Unrestricted Intercept and No Trend (Case III)

Once it has been established that a long-run co-integration relationship existed, equation (5) is estimated using the ARDL specification. The result obtained by normalizing on Y in the long run is reported in Table 4.

Table 4: Estimated long run coefficients using the ARDL approach

Variables	***Coefficient***	***Std. Error***	***t-Statistic***	***p-value***
C	2.824***	0.464	6.087	0.0000
LNFD	0.102***	0.006	15.094	0.0000
R	-0.003**	0.001	-2.192	0.0362
LNK	0.063*	0.035	1.770	0.0867
LNL	-0.001	0.003	-0.128	0.8987

Note: Dependent variable LNY; ***(**)[*] indicates rejection of the null hypothesis at 1% (5%)[10%] significance level.

The estimated coefficients of the long-run relationship show that financial development had a positive and significant impact on industrial output in Nigeria. This suggests that financial sector development will support industrialization positively in the country. The results also show that interest rate had a negative and significant impact on industrial output in the economy. This implies that a low interest rate will motivate investors to obtain loanable funds for industrial development in the country. The results further reveal that gross capital formation had positive and significant effect on industrial output in Nigeria. This indicates that gross capital formation enhances industrial productivity in the country.

Table 5: Error correction representation for the selected ARDL model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**p-value**
C	0.025	0.011	2.125	0.044
D(LNY(-1))	0.161	0.174	0.930	0.361
D(LNFD(-1))	-0.197**	0.094	-2.091	0.047

D(LNFD(-2))	0.051	0.098	0.520	0.607
D(R(-1))	-0.000	0.001	-0.557	0.582
D(LNK(-1))	0.019	0.052	0.378	0.708
D(LNL(-1))	0.003	0.003	1.179	0.249
ECT(-1)	-0.461***	0.169	-2.730	0.011
R-squared	0.614	Adjusted R-squared		0.501
F-stat	3.0505**	Schwarz criterion		-4.0720

****, ** and * indicate significant at 1%, 5% and 10% respectively*

The result of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM equation (6) is reported in Table 5. The signs of the short-run dynamic impacts are maintained to the long-run. However, financial development had negative and significant impact on industrial output in Nigeria. The result implies that financial sector is not well developed in the short run which in turn hinders industrial productivity in Nigeria. The estimated coefficient for the error correction term had negative sign and significant at 1% level. The results also confirm that industrial output in Nigeria has an automatic mechanism which responds to deviations from equilibrium in a balancing manner. A value of -0.461 for the ECM coefficients suggests a fast speed of adjustment strategy of 46%. This means that approximately 46% of discrepancy in the previous year is adjusted for the current year i.e. approximately 46% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. The regression for the underlying ARDL equation (6) fits very well at R^2 of 61%. The reason for being a good fit is that it is statistically above the bench mark of 50 percent. As the adjusted (R^2) tends to purge the influence of the number of included explanatory variables, the (R^2) of 0.614 shows that having removed the influence of the explanatory variables, the model is still of good fit and the dependent variable explained by the equation by 61.4 percent, hence, in terms of the goodness of fit it can be inferred that the test is fair. The model also passes the diagnostic test against serial correlation as indicated in Table 6. According to Pesaran and Shin (1999), the stability of the estimated coefficient of the error correction model should also be graphically investigated. A graphical representation of the Cumulative Sum (CUSUM) and the Cumulative Sum of Square (CUSUMSQ) of the Recursive Residual were also established. The

cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) plots which is shown in Figure 1 from a recursive estimation of the model also indicate stability in the coefficients over the sample period.

Table 6: Diagnostic Tests Results

TEST	RESULT	PROB.
Breusch-Godfrey LM Test:	6.2125	0.0448

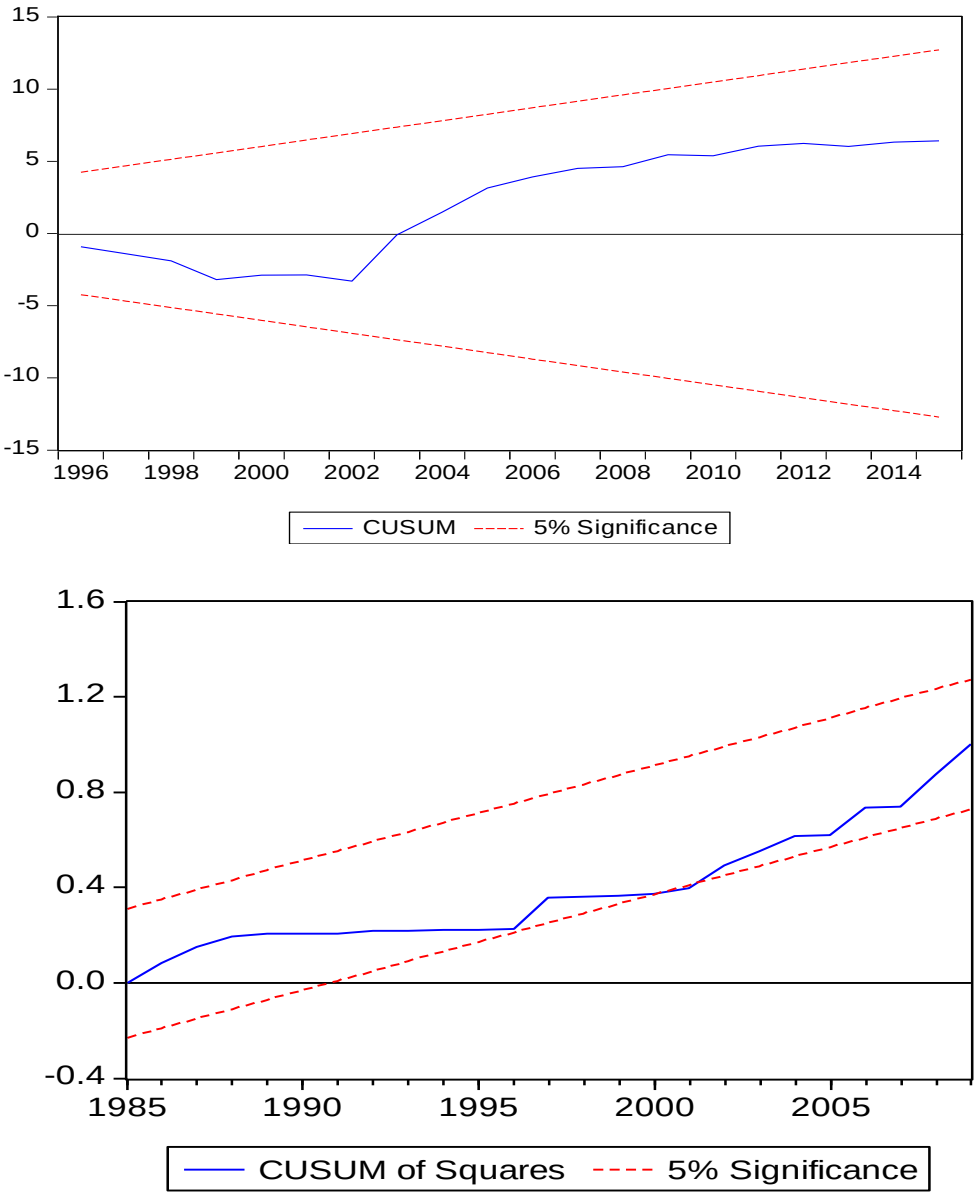

Fig. 2: Stability Test

Table 7: Causality Test

Direction of Causality: y fd Multivariate VEC Granger Causality		Direction of Causality: fd y Multivariate VEC Granger Causality	
χ^2	3.542	χ^2	8.613**

****, ** and * indicate significant at 1%, 5% and 10% respectively*

Table 7 presents the results of causality test which show that the direction of causality runs from financial development to industrial output in Nigeria. This implies that financial sector development promotes industrial output in the country. Government in the country needs to further strengthen and develop financial institutions for her to witness industrialization. This is because the financial institutions will be able to create loanable funds (both in the short run and long run) that industrial sector of the economy required for industrialization.

Conclusion

This study investigates the relationship between financial development and industrial output in Nigeria using Auto-Regressive Distributed Lag (ARDL). The study also determines direction of causality between financial development and industrial output in the country using multivariate VECM causality test.

The results showed that all the variables are co-integrated i.e. they are related in the long run. The results of the ECM test within the framework of ARDL also affirmed the co-integration tests. The results revealed that financial development had long run positive and significant impact on industrial output in Nigeria, but financial development had negative impact in the short run. The results of direction of causality revealed evidence of unidirectional causality running from financial development to industrial output in Nigeria. The study concluded that there is a long run relationship between financial development and industrial output in Nigeria. One of the implications of these results was that the economy will benefit from the development of financial institutions in as much the government promote and encourage sound macroeconomic policies and strong institutions. Therefore, the government in Nigeria should adopt policies that will prevent the sector from both internal and external shocks. Secondly, government should provide effective monetary and fiscal policies, strong institutions and physical facilities that will enhance industrial

productivity and financial development (both in the short run and long run) which positively transform the economic well-being of people residing in the country.

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