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Modelling financial openness growth-nexus in Nigeria: evidence from bounds testing to cointegration approach

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Abstract

Financial liberalization is theoretically known to be an important driver of economic growth; the emergence of new industries, the availability of money in the circulation and how it affects prices, extent of international trade in the countries among others are necessities that any economy cannot survive without. This paper examines the impact of financial liberalization on economic growth in Nigeria for the period of 1981–2013 using the autoregressive distributed lag bounds testing approach. The findings of this study reveal strong relationship between the indicators of financial liberalization and economic growth in Nigeria. We find that very high levels of financial openness generally erode the growth-promoting role of financial development. From the policy perspective, there is an ardent need to stabilize the performance of financial system in Nigeria.

Keywords: Financial openness, Trade liberalization, Bound tests, Economic growth

Introduction

The objective of financial deregulation is to improve the broad economic performance towards sustained economic development through increased competitive efficiency within the financial system thereby channelling resources to the real sector of the economy. However, since the introduction of financial liberalization, Nigeria's economy has failed to witness impressive results such as attraction of foreign investment and containing capital flight. Empirical evidence in Nigeria indicates that neither the domestic savings nor investment have increased remarkably since the introduction of the broad-based structural reform package.

Needless to emphasize that since 1986, the banking industry has witnessed considerable structural changes coupled with attracting due attention from the banking public as well as the regulators and monetary authorities. Liberalization, therefore, created a vista of expansion and

intense competition within and between the commercial and merchant banks in the banking sector. From a total of 40 banks in the existence in 1986, the number had increased to over 120 by 1991. Despite this remarkable growth in the number of banks during the liberalization era, the sector's capacity to supply credit to the economy has been constrained. This might not be unconnected with widespread distress in the banking sector that occurred in the early part of the 1990s.

Among the several factors adduced to have worsened, the deterioration in the financial state of distressed banks is insider abuse, mismanagement and outright fraud [7, 31]. Other factors are excessive competition which erodes franchise value [5], portfolio structure and composition and economic downturn, capital inadequacy (which is a critical factor inhibiting banks' solvency and ability to supply credit [33], policy sequencing and instability [32].

Moreover, during this era of deregulation of the financial system, interest rates fluctuated greatly and the Naira depreciated continuously. This unusual volatility in interest and exchange rates severely constrained the banks' ability to supply credit. For instance, the gap between the lending and savings deposit rates began to rise since

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1994 and reached a high point of 17% in 1998. Similarly, exchange rate depreciated significantly from 21.9% in 1994 to 81.2% in 1995 and hovered around 85.6% in 1998. Subsequently, it became obvious that banks could no longer afford to offer the growing interest rates and borrowers could no longer repay the loans with the high interested rates. This culminated in a steady build-up of non-performing loans and advances, diminished supply of credit, capital erosion and above all liquidity crises in the banking industry.

Furthermore, the high rates of inflation aggravated the situation by making real interest rates to become negative. At that period, people preferred to invest their surplus funds in tangible goods than keeping their money in banks. This eventually created a process of dis-intermediation with depositors having preference for inflation hedges. The cumulative impacts of these distortions on the economy seemed enormous. Although real gross domestic product (GDP) growth rate was still positive in 1993 (during the era of chronic banking crisis), the growth per capita has been negative or at best very low.

Consequently, by 1993, seven banks consisting of six commercial banks and one merchant bank and 19 other banks in 1995 were taken over by the regulatory authorities and placed under the control of Interim Management Boards, while other banks experiencing deteriorating financial conditions were placed under close surveillance and imposed to various holding actions. In 1994, for the first time in decades, the Central Bank of Nigeria (CBN) ordered the closure of some banks and non-bank financial institutions considered to be "terminally distressed". These included one commercial bank, three merchant banks and twenty finance houses. Furthermore, the number of banks adjudged to be technically insolvent rose from eight in 1990, to 34 in 1994 and to 54 in 1995. The systemic financial distress soon pervaded the primary mortgage institutions and community banks with reported cases of closure due to contravention of contractual obligations. Thus, the supervising authority for community banks declared that 200 of such banks were experiencing symptoms of financial failures as at September 1995 [6].

By 2002, the CBN adopted a medium-term policy framework to free monetary policy from the challenges of time inconsistency and reduce over-reaction to temporary shocks. By 2005, in order to sanitize and restructure the financial system, the CBN came with the banking sector consolidation aimed at recapitalizing the banks and achieving a stable and sustainable financial system that would energize the real sector of the economy. However, in 2009 with the emergence of the global financial crisis, the gains that were realized through the 2004/2005 Nigerian banking sector consolidation have been strained. The global financial meltdown adversely impacted the Nigerian financial industry particularly the banking sector. Obviously, a section of the banking sector was grossly affected as some banks were in dismal conditions and faced acute liquidity problems, due to their marked exposure to the capital market in the form of margin loans and share-backed lending, which stood at about N900 billion as at the end of December 2008. This amount represented about 12% of aggregate credit of the sector or 31.9% of shareholders' funds.

The excessive exposure culminated in some weaknesses; specifically, liquidity problems were manifested by some banks towards the end of 2008. As part of its liquidity support, the CBN Discount Window was broadened in October 2008 to accommodate money market instruments such as commercial papers and bankers' acceptances. As at June 2009, the banks' total commitments under the expanded discount window (EDW) was over N2,688.84 billion, while the outstanding commitments was over N256 billion, most of which were owed by less than half of the banks in the system. When the CBN closed down the EDW and replaced it with the guaranteed inter-bank placements, it was discovered that the same banks were the main net-takers under the guarantee scheme, revealing that they had more deep-seated liquidity problems.

It was against this ugly scenario that the CBN took a bold step to strengthen the industry with a view to safeguarding depositors' and creditors' funds, securing the integrity of the industry and restoring public confidence. To this end, the CBN removed the Chief Executives/Executive Directors of the banks identified as the source of instability in the sector and injected the sum of N620 billion into the banks in order to contain a systemic crisis. Efforts was also put in place to recover the non-performing loans from banks' debtors, while guaranteeing all foreign credits and correspondent banking liabilities of the affected banks.

From the foregoing, it would be difficult to infer whether or not financial liberalization has been beneficial, and also determine its relationship to resource mobilization, credit allocation, and economic growth in Nigeria. Also much criticism of financial liberalization has been based on the assumption that markets, if left unregulated, will work reasonably efficient. Another important critique has been predicated on one of the critical assumptions that for the financial liberalization and growth link to work, savings would increase following an increase in interest rate induced by liberalization, which spurs credit to private sector and invariably economic growth. However, there is no unanimous agreement on this issue. The relationship is complex not only because there are short- and long-term effects involved, but also financial liberalization is a process with many dimensions. Given all the ambiguities about the outcomes of the financial process, it is relevant

to ask what systematic, country-specific evidence reveals on the questions of what happens to key macroeconomic and financial development variables following domestic and external financial liberalization in Nigeria? On the debate of the impacts of financial liberalization, it is critical to evaluate and ascertain within Nigeria's context if liberalization has fostered effective mobilization of resources, efficient financial and credit allocation and ultimately economic growth considering the lingering issues of weak corporate governance and bank ethics, loans/credit appraisal and misappropriation, failing banks, and government take-over, bearish capital market and the derailing of public confidence in the financial system.

While numerous studies have been conducted, no consistent evidence exists for a significance relationship between financial liberalization and economic growth, in a positive or a negative direction. Results and evidence differ by countries/region, analytical method employed and time frame. This study aims at examining the relationship between financial liberalization and economic growth in Nigeria covering the period 1981–2013, and this will assist the policy makers on the nature of relationship between financial liberalization and economic growth in Nigeria.

The remainder of the paper is organized as follows. "Brief review of literature" section deals with the literature review. In "Underlying theory" section, the theoretical underpinnings of the paper are exposed, while the methodological framework of the study is pursued in "Methods and data" section. The empirical results are discussed in "Results and discussion" section, and "Conclusion" section concludes the paper.

Brief review of literature

Several studies have assessed the impact of financial liberalization on savings, investment and growth in the economy both from theoretical, analytical and empirical point of view. Not surprisingly, the debate on the relative merits of domestic and external liberalization has a long history. In early literature on the subject, McKinnon [19] put forth that financial liberalization leads to a more efficient allocation of resources, higher level of investment and higher economic growth. The study argues that higher interest rate brought about by liberalization would stimulate savings, which in turn would lead to higher level of investment and economic growth. The deregulation of the financial markets by eliminating distortions such as subsidized interest rate and credit rationing will most likely improve economic efficiency and the productively of investment. In essence, deregulation attempts to rationalize the existing regulatory framework in such a way that efficiency and competition will be further promoted for the growth of the banking industry and the economy as a whole [20].

There have been a number of views as regards the role of financial development in enhancing economic growth. A considerable body of literature suggests a strong and positive link between finance and growth. According to this view, the financial sector plays an important role in facilitating trade and risk management, allocating resources and mobilizing of savings, enabling the exchange of goods and services and providing public information. In this regard, there is growing consensus that the more developed and efficient a financial system is, the better it can direct resources, foster efficient investment and support long-run development [4, 10, 14–17, 19, 24, 26–28, 30].

Fry [14] reported that across a sample of 14 Asian countries, savings and interest rate are positively related. Thus, if financial liberalization would induce increased interest rate, then saving should increase. Other supporters of this view are Levine [18], Bekaert et al. [3] and Fowowe [11]. Fowowe [12] attempts a shift from previous studies by constructing an index of financial liberalization. Unlike the earlier studies which narrowed down to an integral part of financial reform, that is, interest rate liberalization, the index captures the notion that the progression of liberalization policies was gradual rather than abrupt. Using two alternative indices, alongside the constructed reform index, finance is statistically and positively linked to economic growth suggesting evidence for the supply leading hypothesis. In a later attempt, however, Fowowe [13] using a heterogeneous panel Granger causality framework found bidirectional causality in a sample of 17 countries not too different from the 19 in the previous study. Besides the multiplicity of outcomes in panel assessments, it is arguably dubious to infer any specific policy thrust from panel regression estimates. Since they suggest responsiveness of the regressand to specific independent variables in the average panel member, there is really little that individual countries can garner as policy lessons. Hence, country-by-country assessments have a huge potential in terms of enriching the debate. Financial liberalization, which leads to large capital inflow, can also have short-term implications for savings and growth. Bandiera et al. [2] have argued that the impact on savings of financial liberalization comes through the related changes in the availability and cost of credit, expected income growth and increased wealth due to higher property value. In light of this, Eichengreen and Leblang [8] contend that the effect on growth is negative. However, recent studies and empirical evidences show that though financial liberalization results in higher interest rates and financial deepening, it does not necessary lead to higher savings and investment [9].

Okpara [21] studies the effect of financial liberalization on macroeconomic variables, employing three alternative test, namely parametric paired sample statistic t

test, nonparametric Wilcoxon signed rank test to treat for macroeconomic variable sensitivity to financial liberalization and the discriminating analysis to determine the direction of the variables in response to financial liberalization. The findings of the study led to the conclusion that though financial liberalization has a positive effect on economic growth, its effect on savings was limited. Thus, he inferred that increased saving might not necessarily be the ultimate aim of the policy. This was corroborated by Fasanya et al. [10], which examines the relationship between capital market development and economic growth and suggest that the capital market is an essential catalyst for economic growth and is on the average and beneficial to the economy.

The work of Shahnoushi et al. [29] uses data from 1961 to 2004 in Iran to test for the presence or absence of long-run causality relationship between financial development (the study's proxy for financial liberalization) and economic growth, using ADF test for number of cointegration, and Granger causality test for determining short- and long-run relationship. Their result found no mutual relationship between financial development and economic growth. They therefore concluded that financial development is not an effective factor in economic growth. As opposed to the above two empirical findings, the result of Rehmat et al. [25] using ARDL-Bounds test approach to test for cointegration between rate of interest, financial liberalization and domestic savings behaviour in Pakistan from the period 1973–2007 revealed that the real interest rate, financial liberalization and economic growth positively affect savings in Pakistan. This result was supported by Shahbaz [26] which suggests that economic growth gets boosted from capital formation, labour, financial development and trade openness which help sustained economic growth in the long run. Although trade openness in Pakistan has positive impact on economic growth in the long run, it is not necessarily the desirable outcome.

In a more recent study, Shahbaz et al. [27] explores the determinants of economic growth in India and China through globalization or financial development. The study observes that financial development spurs economic growth in China and India. The results also reveal that globalization induces economic growth in India but, surprisingly, drags economic growth in China as it increases competition for exports. In another similar study, Shahbaz et al. [28] analyses the relationship between globalization and financial development by endogenizing economic growth, population density, inflation and institutional quality for India. Using the more conclusive combined cointegration method, the study provides evidence of cointegration among these variables. The results suggest that globalization and inflation are detrimental to financial development, while economic growth and population

density both promote financial development. In extension, the results also point out that institutional quality drags financial development in India, and there exists a feedback effect between financial development and inflation. Moreover, financial development is influenced by economic growth, institutional quality and population density.

Most of the studies examine the direction of causality between financial liberalization and economic growth. Also, the nature of relationship between financial liberalization and economic growth in Nigeria in the existing literature is controversial. In order to guide policy makers in Nigeria, there is need to investigate the short-run and long-run relationship between financial liberalization and economic growth using ARDL for effective policy making, hence this paper.

Underlying theory

Using the augmented Solow growth model, the relationship between economic growth and financial openness can be derived. Recall the Solow–Swan growth model of a simple Cobb–Douglas production function $Y = AK^\alpha L^\beta$, augmenting this equation will allow us derive a relationship; the relationship between economic growth rate and financial liberalization can then be presented as

$$Y = K^\alpha F^\beta \text{CPI}^\gamma (AL)^{1-\alpha-\gamma-\beta} \tag{1}$$

where $Y = $ RGDP, $K = $ gross fixed capital formation, $F = $ financial openness, $F = \left(\frac{\text{CSP}}{\text{GDP}}, T, \frac{M_2}{\text{GDP}}\right)$; $T = $ trade openness; $\text{CSP} = $ credit to private sector; $M_2 = $ money demand, $\text{CPI} = $ consumer price index, $A = $ technological progress.

Taking the log of Eq. 1

$$\ln Y = \alpha \ln K + \beta nF + \gamma \ln \text{CPI} + (1-\gamma-\beta)(\ln A + \ln L) \tag{2}$$

$$\ln Y = (1-\gamma-\beta)\ln A + \alpha \ln K + \beta \ln F \\ + \gamma \ln \text{CPI} + (1-\gamma-\beta)(\ln L) \tag{3}$$

Technological progress (A) is constant over a relatively short period of time, therefore

$$(1-\gamma-\beta)\ln A = k$$

$$\ln Y = k + \alpha \ln K + \beta \ln F + \gamma \ln \text{CPI} + (1-\gamma-\beta)\ln L \tag{4}$$

Let $(1-\gamma-\beta) = \pi$

$$\ln Y = k + \alpha \ln K + \beta \ln F + \gamma \ln \text{CPI} + \pi \ln L \tag{5}$$

$$\ln \text{RGDP}_t = k + \alpha \ln K_t + \beta_1 \ln \frac{\text{CSP}}{\text{GDP}}_t + \beta_3 \ln \frac{M_2}{\text{GDP}_t} \\ + \gamma_1 \ln T_t + \gamma_2 \ln \text{CPI}_t + \pi \ln L_t + e_t \tag{6}$$
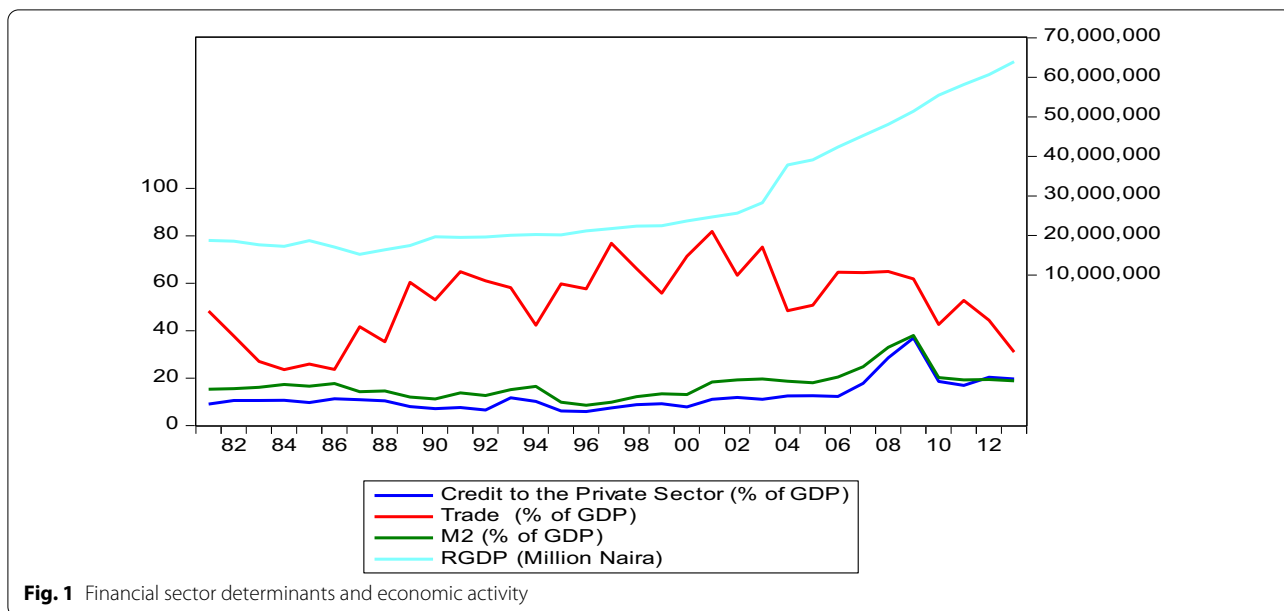
Fig. 1 Financial sector determinants and economic activity

Methods and data

Data

This study employed annual data that covers the period 1981–2013 for Nigeria. The data are primarily gathered from various issues of Central Bank of Nigeria Statistical Bulletin. Figure 1 shows the relationship between each of the financial variables with economic growth; all the variables exhibited trend; this may suggest the present of unit root. Also, the percentage shares of the credit to the private sector seem close and move in the same direction as that of the total money demand (quasi money); this may suggest that the majority of the money demanded for investment in the economy is by the private sector. All the economic variables as shown in Fig. 1 respond to the meltdown of 2008; from this period, the slope of increase in the real GDP as changed positively, and the pattern it takes within the periods of 1981–2005 differs from that of 2006–2013. However, trade openness which is the share of trade in the GDP has reduced after 2008, and the zigzag pattern maintain from 1981 to 2005 is only fairly present and as well-decreasing at a continuous rate than previously. Credit to the private sector (CPS) and money demand (M_2) is of the same pattern. Their slopes or movements were stable from 1981 to 2008, after which an all-time highest point is reached and immediately followed by a relatively stable annual share. This could be that after the world recession, private sector operators demanded more for money to raise investment or in the other way round, i.e. more credit released to the private sector to boost the economic challenges posed by the recession. However, after this period of peak, the share has been rather stable.

Methods

The autoregressive distributed lag (ARDL) model also referred to as the bound test, unconditional or unrestricted error correction model, developed by Pesaran et al. [23], is employed to show the dynamic relationship between, economic growth and financial liberalization. The technique is adopted because, it allows for the estimation of the regression with ordinary least square regardless of the order of integration, and it allows the simultaneous estimation of both the long- and short-run dynamics. The model for this study is therefore specified as given in Eq. 6,

$$
\begin{aligned}
\Delta \ln \text{RGDP}_t = {} & \gamma + \sum_{i=1}^{p} \alpha_i \Delta \ln \text{RGDP}_{t-i} + \sum_{i=0}^{q1} \beta_i \Delta \ln K_{t-i} \\
& + \sum_{i=0}^{q2} \delta_i \Delta \ln \frac{\text{CPS}}{\text{GDP}}_{\,t-i} + \sum_{i=1}^{q3} \pi_i \Delta \ln \frac{M_2}{\text{GDP}}_{\,t-i} \\
& + \sum_{i=0}^{q4} \theta_i \Delta \ln T_{t-i} + \sum_{i=0}^{q5} \mu_i \Delta \ln \text{CPI}_{t-i} \\
& + \sum_{i=0}^{q6} \rho_i \Delta \ln \text{POP}_{t-i} + \vartheta_1 \ln \text{RGDP}_{t-1} \\
& + \vartheta_2 \ln K_{t-1} + \vartheta_3 \ln \frac{\text{CPS}}{\text{GDP}}_{\,t-1} + \vartheta_4 \ln \frac{M_2}{\text{GDP}}_{\,t-1} \\
& + \vartheta_5 \ln T_{t-1} + \vartheta_6 \ln \text{CPI}_{t-1} + \vartheta_7 \ln \text{POP}_{t-1} + \varepsilon_t
\end{aligned}
\tag{7}
$$

Equation 7 is the ARDL model; the aim is to test the hypothesis that H_0: $\vartheta_1 = \vartheta_2 = \vartheta_3 = \vartheta_4 = \vartheta_5 = \vartheta_6 = \vartheta_7 = 0$ against the hypothesis that $\vartheta_1 \neq \vartheta_2 \neq \vartheta_3 \neq \vartheta_4 \neq \vartheta_5 \neq \vartheta_6 \neq \vartheta_7 \neq 0$; this test, using the Wald F-statistic will inform us whether there is a long-run relationship or not. The coefficients in Eq. 6 represent the coefficients in the long run,

Table 1 Description of variables. *Source*: Compiled by the Researchers, 2017

Variables	Definition
RGDP	Real gross domestic product is used as a measure of economic growth
K	Gross fixed capital formation is used as proxy of investment
POP	This represents the population the natural log of which is represented as lnPOP to yield population growth rate
$\ln \frac{M_2}{RGDP}$	It measures the depth of financial sector and has inducement to saving investment. It is calculated as the natural log of the ratio of M_2 to real GDP and expects the positive impact on growth and investment
$\ln \frac{CPS}{RGDP}$	This measure stimulates the more credit to private sector and provides risk management and mobilizing savings. It is obtained as the natural log of the ratio of private sector credit to real GDP with the expectation of positive impact on explained variables
T	This concept is also used for economic globalization as a proxy variable and is used here as a control variable. It is calculated as the ratio of the sum of real exports and imports to real GDP with natural log and is supposed have positive impact on the economy
CPI	This is defined as log CPI, to capture the rate of inflation

while the coefficients of the differenced parts in Eq. 7 represent the short-run relationship.

The error correction term indicates the speed of the adjustment which restores equilibrium in the dynamic model. The ECM coefficient shows how quickly variables return to equilibrium, and it should have a statistically significant coefficient with a negative sign. Error correction technique corrects for disequilibrium between short-run and long-run behaviour of the dependent variable. Since disequilibrium may exist in the short run, there is need to tie the value of the dependent variable to its long-run value. The error term from the cointegrating initial regression is thus called "equilibrium error". The error correction model can be classified as (Table 1)

$$
\begin{aligned}
\Delta \ln \text{RGDP}_t = {} & \gamma + \sum_{i=1}^{p} \alpha_i \Delta \ln \text{RGDP}_{t-i} + \sum_{i=0}^{q1} \beta_i \Delta \ln K_{t-i} \\
& + \sum_{i=0}^{q2} \delta_i \Delta \ln \frac{\text{CSP}}{\text{GDP}}_{t-i} + \sum_{i=1}^{q3} \pi_i \Delta \ln \frac{M_2}{\text{GDP}}_{t-i} \\
& + \sum_{i=0}^{q4} \theta_i \Delta \ln T_{t-i} + \sum_{i=0}^{q5} \mu_i \Delta \ln \text{CPI}_{t-i} \\
& + \sum_{i=0}^{q6} \rho_i \Delta \ln \text{POP}_{t-i} + \sigma \text{ECM}(-1) + \nu_t
\end{aligned}
$$

Results and discussion

To avoid the misuse of econometric tools, the properties of the data must be checked before determining which tool suites. Table 2 presents the descriptive statistics of the data.

Table 2 therefore presents the descriptive statistics again after real GDP and real gross capital formation have been logged, since the two are the only observations not in percentage. Taking their logarithm will reduce them to the level of other variables.

After taking the log, all series except CPS, M_2 became normally distributed. These observations are then subjected to unit root test, to check for the presence of trend, which may be causing the misbehaviour of the mean and thereby generating unit root or non-stationary situations.

The test for the presence of stationary of the mean of the variables is given in Table 3; the table shows that all the series are integrated of order 1 except real gross capital formation. That is, they all contain unit root at 5% (non-stationary of the mean) at level, but after first differencing, their means became constant. But a curious look at the log of real gross capital formation, informs us that it is actually stationary at level if compared with 10% significance level. This is the kind of situation for which the autoregressive distributed

Table 2 Summary of statistics. *Source*: Computed by the Researchers, 2017

	log RGDP	log RGCF	CPS (% GDP)	TRADE (% GDP)	M_2 (% GDP)	log CPI	POPG (%)
Mean	30.90350	28.86317	12.43636	52.63764	17.10000	20.39206	2.596561
Maximum	31.78901	29.89185	36.90000	81.81285	38.00000	72.83550	2.792753
Minimum	30.35512	27.99502	5.900000	23.60888	8.600000	5.382224	2.495284
SD	0.450298	0.518473	6.529013	15.79951	5.984877	18.26210	0.093914
Skewness	0.769348	0.572736	2.138538	− 0.29634	1.721946	1.539861	0.738214
Kurtosis	2.077368	2.128047	7.869085	2.251580	6.850445	4.080227	2.328614
Jarque–Bera	4.425901	2.849561	57.75188	1.253209	36.69368	14.64593	3.617073
Probability	0.109377	0.240561	0.000000	0.534403	0.000000	0.000660	0.163894
Observations	33	33	33	33	33	33	33

Table 3 Phillips–Perron unit root test (intercept and trend). *Source*: Computed by the Researchers, 2017

	ln RGDP	ln RGCF	CPS (%GDP)	TRADE (%GDP)	M_2 (%GDP)	ln CPI	Population growth (%)
Level	− 1.7748 (0.6933)	− 3.2987 (0.0846)	− 2.4819 (0.3342)	− 2.1040 (0.5242)	− 2.4647 (0.3421)	− 2.5899 (0.2869)	− 1.9632 (0.5985)
1st difference	− 4.8633 (0.0024)	− 4.8702 (0.0024)	− 9.9854 (0.0000)	− 9.0758 (0.0000)	− 5.6024 (0.0004)	− 9.5068 (0.0000)	− 3.8010 (0.0301)
Conclusion (5%)	*I*(1)	*I*(0)	*I*(1)	*I*(1)	*I*(1)	*I*(1)	*I*(1)

Figures in bracket are probability values

Table 4 ARDL model. *Source*: Computed by the Researchers, 2017

Dependent variable: log RGDP
Method: ARDL
Number of models evaluated: 1458
Selected model: ARDL(1, 2, 0, 0, 0, 0, 2)

Variable	Coefficient	SE	*t* statistic	Prob.*
log RGDP(−1)	0.476616	0.168777	2.823938	0.0112**
log RGCF	− 0.010106	0.060996	− 0.165688	0.8702
log RGCF(−1)	− 0.022971	0.054456	− 0.421821	0.6782
log RGCF(−2)	− 0.196785	0.067095	− 2.932922	0.0089*
CPS(%GDP)	0.005711	0.006792	0.840821	0.4115
TRADE(%GDP)	− 0.001128	0.001120	− 1.007096	0.3272
M_2(%GDP)	− 0.004978	0.006435	− 0.773634	0.4492
ln CPI	0.000599	0.000585	1.024949	0.3190
POPG	7.422624	2.057226	3.608073	0.0020*
POPG(−1)	− 12.87886	3.524206	− 3.654400	0.0018*
POPG(−2)	7.035549	1.842623	3.818225	0.0013*
C	18.28812	4.003935	4.567537	0.0002*
@TREND	0.028699	0.005876	4.883939	0.0001*
R-squared	0.993274	Mean dependent var	30.92578	
Adjusted R-squared	0.988789	SD dependent var	0.455869	
F-statistic	221.4994	Akaike info criterion	− 2.929006	
Prob(*F*-statistic)	0.000000	Schwarz criterion	− 2.327656	
Hanna–Quinn criter.	− 2.732981	Durbin–Watson stat	2.314653	

*,**,*** represents 1%, 5% and 10% respectively

lag model is suited. The presence of unit root at level means the mean today is not the in the years to come; this may be hinting us that there is a long-run relationship among the variables. Hence, the adjustment from short run to long run and the short-run and long-run parameters has to be estimated, in order to arrive at a reasonable conclusion with dependable parameters. The bound testing approach to test cointegration will be adopted, which requires the estimation of the model using ARDL and then testing for the presence of cointegration using bound test.

Table 4 presents the estimated ARDL model with trend. The trend is found to be significant which means time is also an important variable affecting the growth of real GDP. However, the purpose of estimating the equation in Table 4 is to carry out the bound test, after which the estimation will be broken down into its short-run and long-run components as well as the speed of adjustment to equilibrium in the case of disequilibrium. The adjusted R^2 which is not far from the R^2 tells us that very few irrelevant variables are included in the model. Also, a value of 98% guarantees a powerful predictive capability of the model. The *F*-statistic also tells us with conviction that at least one of the variables is significant.

Figure 2 gives the values of the Schwarz information criterion for the estimated ARDL model; the purpose is to see clearly that the model that minimizes the SIC is chosen given the maximum lag selected (Table 5).
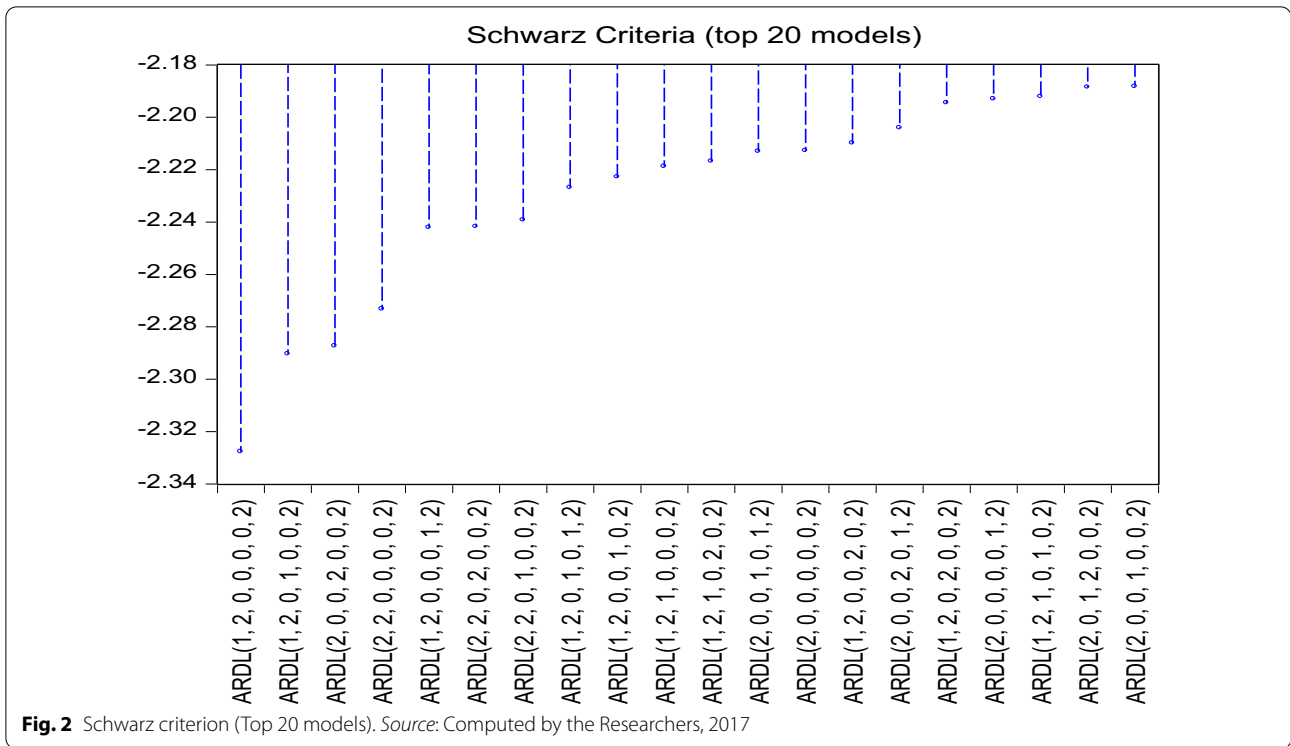
Fig. 2 Schwarz criterion (Top 20 models). *Source*: Computed by the Researchers, 2017

Table 5 Bound test for cointegration. *Source*: Computed by the Researchers, 2017

Test statistic	Value	k
F-statistic	4.428387	6
Critical value bounds		
Significance	*I*(0) Bound	*I*(1) Bound
10%	2.53	3.59
5%	2.87	4
1%	3.6	4.9

As presented in table five, the parameter k is simply equal to total variables minus one that is 6. The *F*-statistic value is greater than the upper boundary of 10% and 5%, respectively, but not above that of 1%. This tells us that at 5% significance level, there is cointegration, that is, there is the presence of long-run relationships among the variables. The study therefore moves on to the estimation of the short-run and long-run situations as presented in tables.

The short-run parameters are given in Table 6; real gross capital formation in the current year is not significantly different from zero by its effect on economic growth but capital (real gross capital formation) last year has a positive and highly significant effect on economic growth, such that if real gross capital formation in the previous year is raised by 10%, the real gross domestic product will rise by a less than proportionate 1.97%. Credit to the private sector (CPS), trade openness (TRADE), money demand (M_2) all as percentages of GDP are not significantly affecting real economic growth in the short run; inflation also does not seem to have a significant effect in the short run. However, population, either in previous or current year, has a significant effect on economic growth, but the effect of the population growth in the previous year exhibits a negative relationship with growth; this may be as a result of underutilization of population potential and capacity; hence, people will consume without producing. The error correction mechanism (speed of adjustment) is negative as expected and stands at a high rate of 52%. The implication of this result is that it takes over 9 months to restore the economy back to equilibrium within the short period (Table 7).[1]

The financial liberalization variables remain insignificant even in the long run; only inflation, population growth and time affect significantly, real economic growth, the model specified.

Diagnostic result

The diagnostic test shows that our model is not mis-specified; there is homoscedasticity, and there is no presence

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[1] The analysis of the speed of adjustment is $\frac{1}{|ecm|} - 1$.

Table 6 Short-run parameters and the speed of adjustment. *Source*: Computed by the Researchers, 2017

Dependent variable: log RGDP
Selected model: ARDL(1, 2, 0, 0, 0, 0, 2)
Cointegrating form

Variable	Coefficient	SE	t statistic	Prob.
D(log RGCF)	− 0.010106	0.060996	− 0.165688	0.8702
D(log RGCF(−1))	0.196785	0.067095	2.932922	0.0089*
D(CPS(%GDP))	0.005711	0.006792	0.840821	0.4115
D(TRADE(%GDP))	− 0.001128	0.001120	− 1.007096	0.3272
D(M_2(%GDP))	− 0.004978	0.006435	− 0.773634	0.4492
D(log CPI)	0.000599	0.000585	1.024949	0.3190
D(POPG)	7.422624	2.057226	3.608073	0.0020*
D(POPG(−1))	− 7.035549	1.842623	− 3.818225	0.0013*
D(@TREND())	0.028699	0.005876	4.883939	0.0001*
ECM(−1)	− 0.523384	0.168777	− 3.101032	0.0062*

Cointeq = LRGDP − (−0.4392 * LK + 0.0109 * CPSRGDP − 0.0022

* TRAGDP − 0.0095 * M_2GDP + 0.0011 * LCPI + 3.0175 * POPG

+ 34.9421 + 0.0548 * @TREND)

*,**,*** represents 1%, 5% and 10% respectively

Table 7 Long-run parameter estimates. *Source*: Computed by the Researchers, 2017

Long-run coefficients

Variable	Coefficient	SE	t statistic	Prob.
log (RGCF)	− 0.439184	0.286833	− 1.531149	0.1431
CPS(%GDP)	0.010912	0.013938	0.782877	0.4439
TRADE(%GDP)	− 0.002155	0.002252	− 0.957303	0.3511
M_2(%GDP)	− 0.009512	0.013028	− 0.730115	0.4747
log CPI	0.001145	0.001201	0.953640	0.3529
POPG	3.017509	0.902546	3.343329	0.0036*
C	34.942095	6.248357	5.592205	0.0000*
@TREND	0.054833	0.009868	5.556506	0.0000*

*,**,*** represents 1%, 5% and 10% respectively

of serial correlation; the error is as well as normally distributed (Fig. 3).

The plot of the cumulative sum and cumulative sum of square which falls within the boundary of 5% critical value also confirmed the diagnostic tests in Table 8 that the coefficients estimated are stable over time.

Conclusion

Financial liberalization is theoretically known to be an important driver of economic growth; the emergence of new industries, the availability of money in the circulation and how it affects prices, extent of international trade in the countries among others are necessities that any economy cannot survive without. Then why are these variables not significantly affecting economic growth?

Starting from the trade openness, it has not been affecting real growth significantly despite positive correlation; this is not however surprising. Nigeria imports product goods as well as resource goods from abroad, but export majorly oil. This will not benefit in terms of real economic growth. The economy has chosen to be a consuming nation rather than a producing one. Of course the gross domestic product may rise using the income approach; however, real economic growth is concerned with production. Oil is naturally available, with little efforts of man to explore; however, the population that imports consumables, daily needs and so on, must produce, in order to meet up with its consumption and export, else the exportation of oil will raise income, but if the income is not used to produce things needed and exporting the remaining, real production will not be positively affected significantly.

Credit to the private sector has also been found by Adeniyi et al. [1] and Omisakin and Adeniyi [22] to be
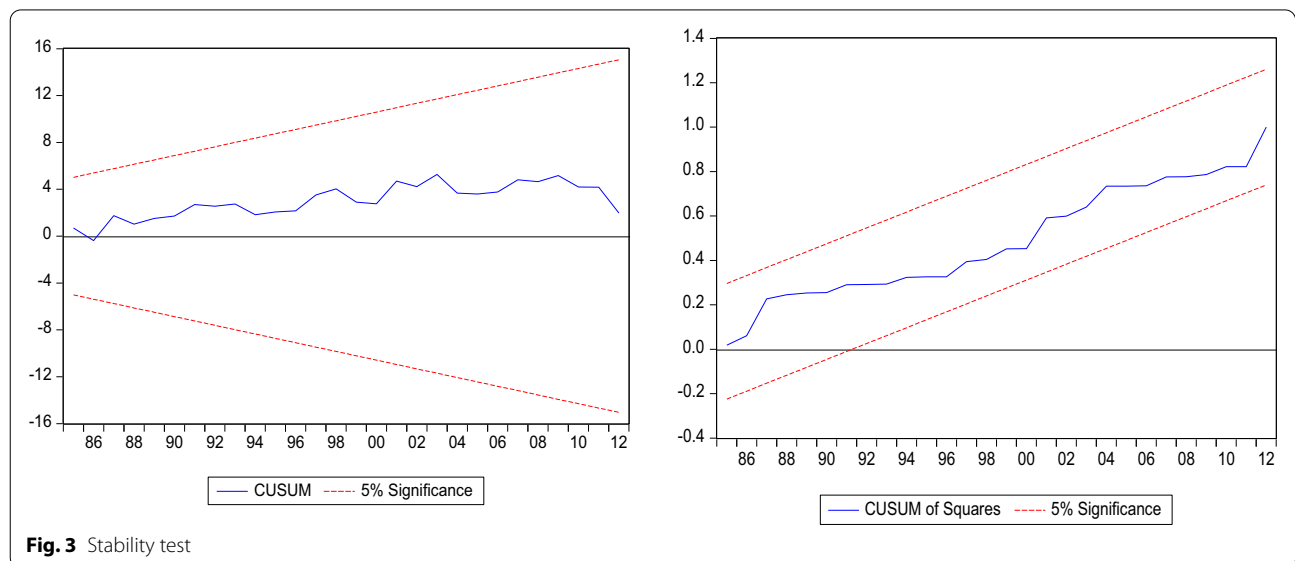

Fig. 3 Stability test

Table 8 Diagnostic test. *Source*: Authors Computation 2017

Test	Results	Prob.
Heteroskedasticity test	17.88	0.42
Breusch–Godfrey LM test	2.79	0.53
Normality test	1.0880	0.24

insignificant with economic growth. The environment is less suitable for business thrive; only the already present private firms still maintain their stand; the market is not conducive for the thriving of new business, and private firms expands but their sources of manpower has been external, employing labour trained abroad to hold the management places as well as some production levels. The level of infrastructure as well as the policies of the government that are most time tended towards the public sector will not allow private sector to move real economic growth significantly. In essence, infrastructural financing should be private sector driven with reasonable governmental policies facilitating its positive outcome in spurring economic growth.

Quasi money or broad money (M_2) is not also affecting real economic growth significantly; the hungry man demands for money for his consumption and not necessarily for the feeding of others (production). And the poor man saves for a nearest withdrawal date for immediate consumption rather than save for investment. The two situations on the aggregate translate into a consuming and not producing nation. Money demand for investment continues to be done by the present firms who just need helping hands to raise their profits, new firms mostly misuse credit facilities and may not even be able to get a loan worthy of investment. In fact, since labour, machines are still important variables bought from abroad, all amount to consumption.

Then, the majority of money demand is directed towards consumption rather than production. This thought may affect real economic growth, but it will not affect it positively and significantly. Hence, banks should be reorganized; if money demand is to affect economic growth significantly, then interest rates must be reviewed, and the direction of credit must be reviewed, so that the already filled lion will not continue to be fed when the sheep continues to be hungry.

Abbreviations
ARDL: autoregressive distributed lag; GDP: gross domestic product; CBN: Central Bank of Nigeria; CPS: credit to the private sector; EDW: expanded discount window.

Authors' contributions
The authors contribute in the ratio 70–30%. Corresponding author (IF 70%); second author (IO 30%). IO analysed and interpreted the preliminary analysis and provided the review of the empirical literature. IF prepared the introductory and methodological sections of the paper, performed the full empirical analysis of the paper, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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