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# Financial Development and Liberalization, Trade Openness and Continue Economic Growth in Nigeria using Combined Cointegration Analysis

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## Abstract

The study investigates the impact of financial development and liberalisation by integrating trade openness, using Bayer and Hanck combined cointegration approach. The results revealed there is cointegration among the variable and their determinants. The impact of capital openness on the economy's growth is positive and significant, but that of financial development on the economy's growth is negative. Thus, policymakers must fine-tune financial reform policies and programs to effect positive changes in the growth of the Nigerian economy in order to merge up with the fourth industrial revolution.

**Keywords:** Financial liberalisation, development, trade openness, Nigeria combined cointegration

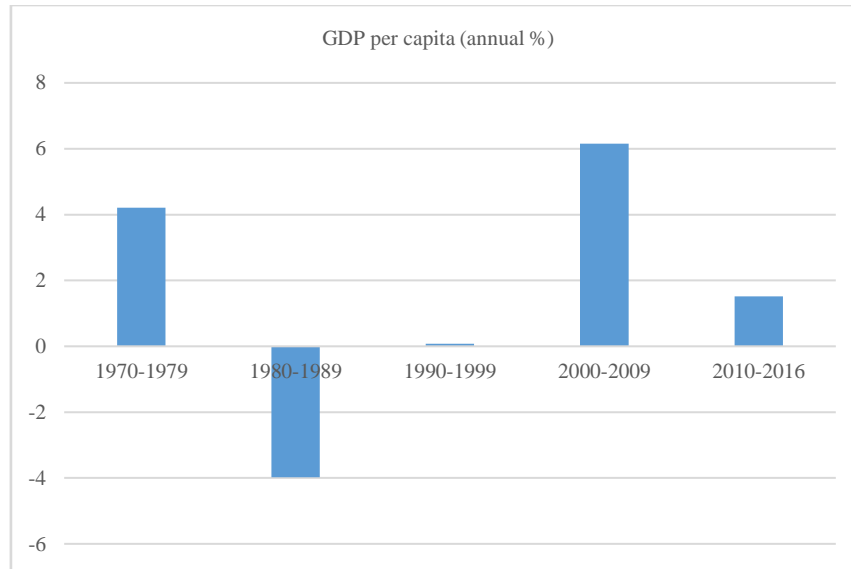
## 1. INTRODUCTION

The distinguishing feature of a prosperous economy is to achieve rapid economic growth. This is because such an economy that proliferates stands a chance to enjoy a higher standard of living than others that grow slowly or experience a variable growth rate. Therefore, the gain from minor increases in the economic growth rate can be significant. The economy of Nigeria has experienced mixed growth in GDP per capita from the period 1970 to 2016. This indicates that welfare gained had suffered within the period, as seen in figure 1.1. Finance is argued to be a good determinant of economic growth by Schumpeter (1921), McKinnon (1973), and (Shaw (1973). However, some economists believe that finance is not relevant to economic growth that it merely follows the direction of the real sector (Robison, 1952). There are two ways relationship between finance and economic growth such as supply leading and demand following phenomena. The supply leading is that financial development leads to development in the real sector, while demand following is that real sector development leads to financial development Ono (, 2017).

Few studies in Nigeria capture the impact of finance on economic growth. The current literature indicated that many developed and developing economies had explored the two channels of finance-growth nexus, such as money and capital markets. On the contrary, it is not the case in Nigeria. The emphasis has been on the money market with less concern for the capital market. Additionally, none of the past studies focused on the effect of polity on growth. Therefore, the study at hand dwells on the analysis of sustainable growth on real GDP per capita of Nigeria concerning financial development, capital openness, trade openness, government expenditure and political stability. It is crucial to determine the effects of these factors on growth to formulate better policies to ensure better growth in per capita gross domestic product in Nigeria, more so, as the country is facing election this year in order to stand up with the fourth industrial revolutions in the comity of nation.

The paper is organized as follows: the next section covers the literature review that is important to the analysis of this study. The following section gives the data set and empirical strategies. The fourth and fifth section describes and discusses the empirical findings, and finally, the conclusion is drawn respectively.

Figure 1: Figure 1.1 GDP per capita (annual growth rate %) from 1970-2016.



Source: World Bank 2017

## 2. LITERATURE REVIEW

In Nigeria, Orji et al. (2015), using time series data from 1981-2012, found that financial liberalization is positively related to economic growth. However, Orji, Anthony-Orji, et al. (2015), in another study for 1986-2011 in Nigeria, found that financial liberalization is negatively related to economic growth, but financial development is positive and significant. This implies that financial liberalization can indirectly influence economic growth through financial development. In a time-series study in Nigeria, Nike (2014) from 1987-2012 found that the degree of openness of the inflow of portfolio investment causes economic growth in Nigeria, but financial development does not.

Onanuga (2016) found in Nigeria that economic growth cause financial development, and financial openness is positively related to financial development. However, trade openness is negatively associated with financial development. He finally argued that trade and finance must be simultaneous openness for the economy to benefit. If one is opened without the other, it would be detrimental to the economy. Trade openness will not benefit the developing countries as they lack enough products to compete in international trade. Capital openness will reduce the negative effect of trade openness. This is because multinational firms will cease the chance to invest in emerging economies due to their excess capacities with the experience of the industrial revolution. In another development, Owusu and Odhiambo (2014), in their study from 1969-2008, found that financial liberalization and financial development are positively related to economic growth in Nigeria. However, still in the opposite Adeniyi, Oyinlola, Omisakin, and Egwaikhide (2015) study revealed the contrary that there is a weak relationship between financial development and economic growth in Nigeria.

Menyah, Nazlioglu, and Wolde-rufael (2014) argue that recent financial developments do not significantly impact economic growth. Bezemer (2016) also agrees that financial development's impact on economic growth is not in theory, as its effect does not spur economic growth. Gossel and Biekpe (2014) found that in South Africa, export, not import, led growth, and economic growth drives foreign direct investment. Mireku et al. (2017) found in Ghana that financial openness and financial development are negative related to output volatility. However, trade openness is positive to output volatility.

Makhetha-kosi et al. (2017) revealed that in South Africa, stock market development and the gross domestic product is positive and significant to the inflow of portfolio and foreign direct investment. Polat et al. (2014) found in South Africa that real gross domestic product per capita, capital stock and trade openness have bidirectional causality. Moyo, Roux, and Roux (2018), on the contrary, in South Africa, found that trade openness has a weak

relationship with gross domestic product growth. Uddin, Sjö, and Shahbaz (2013) findings in Kenya supported the theory that financial development drives economic growth. Keho (2017), in Cote d'Ivoire, indicated that trade openness led to economic growth. Ono (2017) found a bidirectional relationship between financial development and gross domestic product in Russia. In Pakistan, Naveed and Mahmood (2017) revealed that financial liberalization strongly relates to economic growth.

Ahmed (2016), in Sub-Sahara Africa, the study revealed that financial development has a good positive relationship with economic growth in the region. However, financial integration has a negative relationship with economic growth. However, financial development and financial integration have a positive relationship. This means financial integration indirectly impacts economic growth through financial development. The results further revealed that trade openness and financial integration boost financial development, but just one of them cannot. The institutions in property rights, the transparent legal system, investors' friendly laws and education boost growth. Nevertheless, inflation and government expenditure do not. Assefa and Mollick (2017), in Africa, however, found that foreign direct investment and portfolio investment are positively related to economic growth.

Huang and Ji (2017), in a cross-countries study of sixty middle-income countries, found that a democratic system of government is paramount for sustainable economic growth through financial liberalization even though their results revealed that trade openness has a weak relationship with continuous economic growth. In another perspective, Yang and Liu (2016) revealed that trade openness positively affects economic growth. However, financial development, liberalization, and polity have a weak relationship with continuous economic growth in fifty-six emerging and developed economies.

Elkhuizen et al. (2017), in a study of eighty-two countries, revealed that financial liberalization policies do not influence economic growth where there are weak democracy and poor political constraints. However, social capital can substitute them for effective financial liberalization policies. Karnane & Quinn (2017) indicated that political instability is not suitable for the continuous growth of the economy. Okafor (2017), in a study among ECOWAS countries, discovered that political instability, corruption, lack of voice and lack of government effectiveness which he refers to as poor governance and also group grievance and fractionalized elites, termed as social unrest, are the major's factors that affect sustainable growth in the region. Gong and Rao (2016) supported this view by asserting that coup proxy by political instability is detrimental to real GDP per capita growth.

However, the relationship between financial liberalization policies and economic growth has been widely discussed. However, the effect of political stability is not well captured, especially in Nigeria. The political stability used in this study is the continuity of government policies and programmes. Similarly, the sample size and variables vary, especial the capital account openness to be used in the study is unique. This current study needs to fill the gap by analysing its effect on the sustainable growth of gross domestic product per capita in Nigeria.

### 3. DATA, MODEL SPECIFICATION AND EMPIRICAL STRATEGY

In this study, the researcher explores the relationship between financial development and liberalization on the continuous growth of GDP per capita using time series data from 1970 to 2016. The data are obtained from World Bank (2018), World Development Indicators (WDI), Marshall, Gurr and Jagers (2016) and Lane and Milesi-Ferretti (2014). The detail is in Table 1.

Table1: Data sources and variables descriptions

variables	Descriptions	Data source
RGDP	Represent the nominal GDP divided by GDP deflator multiplied by 100. The product is divided by the total population.	World Development Indicators (2017)
COP	This represents capital account openness measures in US currency is the sum of total foreign assets and total foreign liabilities (% of GDP)	External Wealth of Nations Mark II Database.
FD	It represents financial development index proxy by broad money, domestic credit to the private sector, domestic credit to the private sector by banks, domestic credit provided by financial sector all (% of GDP), using Principal Component Analysis to develop the index	World Development Indicators (2017)
TOP	It measures the countries volume of export and import as measured in US currency (% of GDP).	World Development Indicators (2017)
GEX	It stands for government expenditure on final goods and services excluding military expenditure (% of GDP)	World Development Indicators (2017)
PST	It is a political stability index that measures the durability of government executive leader policies from past regimes	Marshall et al. (2016) polity iv database.

The relationship between real GDP per capita, capital account openness, financial development, trade openness, government expenditure and political stability can be tested by using the following function and linear equation:

$$RGDP=f(COP,FD, TOP,GEX,PST) \tag{1}$$

$$\ln RGDP=\beta_0+\beta_1 \ln COP+\beta_2 \ln FD+\beta_3 \ln TOP+\beta_4 \ln GEX+\beta_5 \ln PST+\pi \tag{2}$$

Where in RGDP is the natural log of real GDP per capita, which is the dependent variable, the independent variables are ln COP, which is the natural log of capital account openness, ln FD that is the natural log of financial development, ln TOP, is the natural log of trade openness, ln GEX is the natural log of government expenditure, and ln PST is the natural log of political stability. The  $\pi$  is the stochastic error term.

Sequentially, the empirical strategy starts with the stationarity test, the cointegration analysis, and the long-run and short-run impacts of the determinants of continuous economic growth. The test of stationarity is done on all variables to ascertain that they are integrated at the order I(0) or I(1) or a mixture of both, but not I(2) (Subramaniam et al. 2016). Dickey and Fuller (1979) test of stationarity, Augmented Dickey-Fuller, is employed. However, to improve the assurance of stationarity of the variables and avoid the limitations of the assumption that the errors term are independent with constant variance in the ADF test, the Phillips and Perron (1988) test of non-augmented DF is also employed. The unit root test robustness is higher with Zivot and Andrews (1992) and Perron (1997) that can detect the existence of an unknown single break in the deterministic trend of the series.

The time series are cointegrated in Econometrics analysis if two or more series are individually integrated. However, some combination of them has a lower order of integration linearly. Engle and Granger (1987) contributed the necessary procedure for the cointegration test; the procedure gives vital tools when the time series data are of limited length as most economic data set are characterized. Another cointegration test is by Johansen (1995) termed Johansen maximum eigenvalue test. This test is more generally applicable because it allows more than one cointegration relationship than Engle and Granger test. Phillips–Ouliaris cointegration test by Phillips and Ouliaris (1990) is another effective approach of cointegration test. Other approaches are the Error Correction Model (ECM) F test based (Boswijk, 1994) and the ECM t test-based (Bannerjee et al., 1998).

The different tests might provide different results. In order to improve on that a particular way of getting a joint test-statistics for the null of no-cointegration according to Engle and Granger, Johansen, Peter Boswijk, and Banerjee test was developed by Bayer and Hanck (2013), this approach allows for a combination of others to provide a conclusive finding. The Bayer and Hanck approach will be applied in this study. The combination of the individually computed p-value following Fisher’ formula as developed by Bayer and Hanck (2013) is as follows:

$$EG-JOH=2[\ln \sum_{i=1}^k p_i] \tag{3}$$

$$EG-JOH-BO-BDM=-2[\ln \sum_{i=1}^k p_i] + (p_{joh}) + (PBO) + (PBDM) \tag{4}$$

Where: PEG, PJOH, PBO and PBDM are the p values of an individual test of cointegration, respectively. The assumption is that if the critical values provided by Bayer and Hanck (2013) is lower than Fisher’s statistics estimated that the null hypothesis will be rejected of no cointegration.

When a mixed lag condition comes up, the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SBC) and the Hannan–Quinn Information Criterion (HQC) will be used by employing the Hatemi-J Criterion (HJC) (2003) for the optimal lag order selection. The Hatemi-J (2003) criterion is according to the lag selection condition of Schwarz (1978) and the HQC by Hannan and Quinn (1979). The condition of this criterion is as follows:

$$HJC = \det \Omega + j \left( \frac{n^2 \ln T + 2n^2 \ln(\ln T)}{2T} \right) \tag{5}$$

Where  $\Omega$  represents the maximum likelihood estimate of the variance and covariance matrix while T is the size of the sample, the HJC will perform well in choosing the lag that will be optimal to estimate VAR. Both SBC and HQC are combined in equation (5). The optimal lag order to estimate the VAR is the minimum HJC.

After the long-run relationship and the lag order selection, the researcher will carry out the test of causality by use of the error correction representation below:

$$(1-L) \begin{bmatrix} \ln RGDP \\ \ln COP \\ \ln FD \\ \ln TOP \\ \ln GEX \\ \ln PST \end{bmatrix} = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \\ \beta_6 \end{bmatrix} + \sum_{i=1}^p (1-L) \begin{bmatrix} \beta_{11i} & \beta_{12i} & \beta_{13i} & \beta_{14i} & \beta_{15i} & \beta_{16i} \\ \beta_{21i} & \beta_{22i} & \beta_{23i} & \beta_{24i} & \beta_{25i} & \beta_{26i} \\ \beta_{31i} & \beta_{32i} & \beta_{33i} & \beta_{34i} & \beta_{35i} & \beta_{36i} \\ \beta_{41i} & \beta_{42i} & \beta_{43i} & \beta_{44i} & \beta_{45i} & \beta_{46i} \\ \beta_{51i} & \beta_{52i} & \beta_{53i} & \beta_{54i} & \beta_{55i} & \beta_{56i} \\ \beta_{61i} & \beta_{62i} & \beta_{63i} & \beta_{64i} & \beta_{65i} & \beta_{66i} \end{bmatrix} * \begin{bmatrix} \ln RGDP_{t-1} \\ \ln COP_{t-1} \\ \ln FD_{t-1} \\ \ln TOP_{t-1} \\ \ln GEX_{t-1} \\ \ln PST_{t-1} \end{bmatrix} + \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \\ \beta_6 \end{bmatrix} ECT_{t-1} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{1t} \\ \varepsilon_{1t} \\ \varepsilon_{1t} \\ \varepsilon_{1t} \\ \varepsilon_{1t} \end{bmatrix} \quad (6)$$

Where (1 - L) is the lag operator and ECTt-1 stance for the lagged of the residual of the long-run relationship of the ARDL to be obtained. The  $\varepsilon_{1t}$ ,  $\varepsilon_{2t}$ ,  $\varepsilon_{3t}$ ,  $\varepsilon_{4t}$ ,  $\varepsilon_{5t}$ ,  $\varepsilon_{6t}$  and  $\varepsilon_{7t}$  are all error terms with the assumption that they are (N,  $\sigma$ ). Long-run causality requires that the t-statistics be significant on the coefficient of ECTt-1. The short-run causality is when the F-statistics on the variables' first difference is significant. The joint significance of the ECTt-1 and the estimate of lagged independent variables indicate the estimate of joint long-run and short-run causal relationships.

Table 2: Descriptive Statistics

	RGDP	COP	FD	TOP	GEX	PST
Mean	9.6857	4.1543	-4.26E-11	3.7883	2.2942	1.4753
Median	8.3682	4.0134	-0.2060	3.8585	2.3204	1.7918
Maximum	12.865	5.1912	6.3591	4.4044	2.8872	2.7081
Minimum	7.2836	3.3966	-2.5805	2.9766	1.5755	0.0000
Std. dev	2.2023	0.5323	1.6819	0.3841	0.3996	0.9282
Jarque-Bera	6.1786	3.5074	52.010	3.1124	4.4828	4.7057
	(0.0455)	(0.1731)	(0.0000)	(0.2109)	(0.1063)	(0.0951)

The figure in parenthesis is the probability values

#### 4. RESULTS AND DISCUSSION

The Jarque-Bera (JB) test results indicated that financial development and real GDP per capita are not normally distributed. However, capital account openness, trade openness, government expenditure and political stability are generally distributed as revealed by the probability values. The test of stationary is paramount to avoid spurious regression.

The ADF and PP test of unit root result is presented in Table 3. The results indicated that the variables are in order of integration with I(0) and I(1) in the case of ADF. In contrast, for PP, they are all in the order I(1). The unit root test with an unknown singular break of ZA and Perron revealed that all the series reject the null hypothesis at I(1). Since all the variables are integrated at I(1), the ARDL can be used for estimation.

Table 3: ADF and PP unit root test

Variable	ADF Unit root test At level	ADF Unit root test At first difference	PP Unit root test At level	PP Unit root test At first difference
Lncop	-1.9784 (0.5973)	-5.8521* (0.0001)	-1.9784 (0.5973)	-5.8308* (0.0001)
Fd	-3.3742*** (0.0678)	-6.1434* (0.0000)	-2.5611 (0.2991)	-11.736* (0.0000)
Lntop	-1.5937 (0.7802)	-8.8235* (0.0000)	-1.5168 (0.8093)	-8.7611* (0.0000)
Lngex	-2.8106 (0.2010)	-7.4299* (0.0000)	-2.9627 (0.1536)	-7.4562* (0.0000)
Lnpst	-2.5095 (0.3224)	-6.3419* (0.0000)	-2.7115 (0.2370)	-6.3842* (0.0000)

Table 4: Zivot Andrew and Perron unit root test with an unknown single break

Variables	ZA		P	
	I(0)	I(1)	I(0)	I(1)
Lnrngdp	-3.2223	5.8765*	-3.2800	-5.9988*

	(2004)	(1981)	(2003)	(1993)
Lncop	-4.0130	-6.1469*	-3.9620	-7.2358*
	(1983)	(1990)	(1982)	(1999)
Fd	-3.8312	-6.2419*	-3.9047	-6.6040*
	(1980)	(1997)	(2009)	(2008)
Lntop	-2.1720	-10.4230*	-2.9673	-10.3080*
	(1989)	(1987)	(2009)	(1986)
Lngex	-3.7674	-8.1070*	-3.6303	-9.5489*
	(1994)	(1992)	(1993)	(1994)
Lnpst	*	-6.5831*	-3.0262	-7.1327*
		(1986)	(1977)	(1978)

\*, \*\*, \*\*\*, means 1%, 5% and 10% level of significance respectively, the P-value in parenthesis

Table 5: Lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-275.5056	NA	0.019567	13.09329	13.33903	13.18391
1	-74.56699	336.4554*	9.28e-06*	5.421720*	7.141962*	6.056092*
2	-49.92655	34.38201	1.74e-05	5.950072	9.144807	7.128191
3	-23.73496	29.23711	3.61e-05	6.406277	11.07551	8.128144
4	27.64481	43.01562	3.24e-05	5.690939	11.83466	7.956554

\* Indicates lag order selected by the criterion LR Sequential modified LR test statistic (each test at 5 % level), FPE Final prediction error, AIC Akaike information criterion, SC Schwarz information criterion, HQ Hannan-Quinn information criterion

Table 6: Lag length selection Criteria according to Hatemi J

AIC	SC	HQ	HJC
5.421720(1)	7.141962(1)	6.056092(1)	6.2066(1)

The test for long-run cointegration using Bayer and Hanck combined cointegration test is done in Table 7. It includes EG-JOH and EG-JOH-BO-BDM tests. Nevertheless, in Table 6, the lag length selection indicated that lag (1) should be used as the Hatemi-J criteria for selection choices lag (1).

Table 7: The results of Bayer and Hanck cointegration analysis

Estimated model	EG-JOH	EG-JOH-BO-BDM	Cointegration
$RGDP = f(COP, FD, TOP, GEX, PST)$	9.7441***	10.3010	Yes
$COP = f(RGDP, FD, TOP, GEX, PST)$	9.7543***	11.3927	Yes
$FD = f(COP, RGDP, TOP, GEX, PST)$	10.0194***	10.5601	Yes
$TOP = f(COP, FD, RGDP, GEX, PST)$	9.8365***	14.6198	Yes
$GEX = f(COP, FD, TOP, RGDP, PST)$	10.4759**	20.1651**	yes
$PST = f(COP, FD, TOP, RGDP, GEX)$	10.63684**	20.984962**	Yes
Significance level	Critical values	Critical values	
1 %	15.701	29.85	
5%	10.419	19.888	
10%	8.242	15.804	

\*, \*\*, and \*\*\* represent significant at 1%, 5% and 10% respectively.

The combined cointegration results reveal that Fisher-statistics for EG-JOH tests for the RGDP, COP, FD and TOP are greater than 10% critical values indicating the rejection of the null hypothesis of no cointegration between variables. However, for GEX and PST, both EG-JOH and EG-JOH-BO-BDM is greater than 10% critical values indicating the rejection of the null hypothesis of no cointegration between variables. The findings revealed cointegration between RGDP, COP, FD, TOP and GEX, and PST and their determinants. This implies a long-run relationship between financial development, capital and trade openness, government expenditure, political stability, and economic growth throughout 1970–2016. The long-run and short-run results are presented in Table 8. It revealed that all the determinants of economic growth are not significant in the long run.

Similarly, only capital openness and government expenditure positively relate to real GDP per capita. They are significant at the 5% level. Financial development, trade openness and political stability are negatively related to real GDP per capita. The coefficient of determination is 61%. It implies that only 39% of the real GDP per capita variation is determined by other variables outside the model, all in the long run.

In the short run, capital openness, financial development, government expenditure and political stability are negatively related to economic growth. However, only trade openness is positive but not significant. The estimated

lagged error term, that is, ECMt-1 is statistically significant at 10% level. However, the speed of adjustment to long-run equilibrium in case of any shock in the short run is minimal at merely 5%.

Table 8 Long-run estimates, Dependent variable: ln RGDP

Variables	Coefficient	T-statistics	Probability
ln COP	1.1152**	2.0400	0.0478
ln FD	-0.3921*	-3.0529	0.0040
ln TOP	-1.5089**	-2.5614	0.0142
ln GEX	3.9482*	5.6477	0.0000
ln PST	-0.2127	-0.2127	0.3889
Constant	7.1678*	2.4822	0.0172
R <sup>2</sup>	61%		
F-stat	12.62		
Short-run analysis			
Variables	Coefficient	T-statistics	Probability
Constant	-0.0174	-0.2195	0.8275
dln COP	-0.0737	-0.6112	0.5446
dln FD	-0.0120	0.3753	0.7096
dln TOP	0.0034	1.1063	0.2759
dln GEX	-0.2635	-1.4728	0.1495
dln PST	-0.0196	-0.4409	0.6620
ECT <sub>t-1</sub>	-0.0504*	-1.6964	0.0984
Trend	-0.0022	-0.7380	0.4653
R <sup>2</sup>	30%		
F-stat	1.97		

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

## 5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

This paper examines the relationship between financial development and liberalization and economic growth by adding trade openness in the case of Nigeria over the period 1970-2016. The stationarity properties were examined by applying the structural break unit root test. The combined cointegration test of Bayer and Hanck was used to investigate the presence of cointegration. The empirical evidence confirms a long-run relationship between capital account openness, financial development, trade openness and economic growth in Nigeria.

The findings revealed that capital account openness stimulate economic growth, but financial development does not. This means that policymakers in Nigeria can formulate policies and programs that will ensure that capital account openness continues to influence economic growth positively while adopting policies measures to improve financial development for sustainable growth. If financial development is not adequately done, it merely increases the accessibility of credit to the wealthy people in the country. Thus, affecting the continuous growth of the economy. Ensuring overall financial development that reduces income inequality is good for Nigeria. Because the importance of financial inclusiveness can improve continuous economic growth

Trade openness is negative in the long run and significant. However, it is positive but not significant in the short run, with a very negligible coefficient. The fourth industrial revolution is causing massive cost reduction in production and exploring innovative ideas in the process.

Nigeria must improve innovation and cost reduction techniques in producing goods and services to avert the negative impact of trade openness to real GDP per capita. The more advanced economies are already operating at excess capacity due to the industrial revolution in the home countries. The positive relationship of capital account openness to real GDP per capita needs to be supported with that of financial development for trade openness to effect positive changes in Nigeria. The sustainability of capital openness will yield a result with the help of political stability. Therefore, political institutions should be stable in Nigeria. This is because capital inflow will not be sustained with the negative relationship of political stability with real GDP per capita. All efforts should be on the ground to ensure that regimes change do not affect foreign investment.

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