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Testing the Relationship between Financial Inclusion, Institutional Quality and Inclusive Growth for Nigeria

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Abstract

This paper examines the causal relationship between financial inclusion, institutional quality and inclusive growth within a four-variate ARDL-EC framework and forecast error variance decomposition technique for the period of 2003-2018 using quarterly data in Nigeria. The paper incorporates two variables to capture institutional quality (government effectiveness and regulatory quality) in order to eliminate variable omission bias in which most existing studies are characterised. Those adopted techniques confirm the long-run and bi-causal relationships mainly between financial inclusion and inclusive growth in Nigeria. In addition, bi-directional causal relationships of the outcome of the study are also established between financial inclusion and government effectiveness, likewise between inclusive growth and regulatory quality mainly in the short-run. The results based on the model and empirical outputs suggest that for the authorities of this economy to achieve and sustain equitable growth, fully disciplined policies that can promote and enhance financial inclusion and inclusive growth of the greater proportion of the population should not be managed and handled by loosed hands

Keywords: Financial Inclusion; Inclusive Growth; Institutional Quality; ARDL Causality Model; Variance Decomposition

1. Introduction

The pressing issue of concern in most today developing and emerging economies is a result of persistent and widening income inequality and poverty increase in relation to higher economic growth rate and improved financial development. It implies such growth rates are associated with those actions of a minority of the economic agents in societies, where distributions of the gains from economic growth and better financial development have been restricted to the small segment of the society. It has been established that development should cut across various aspects instead of economic growth by promoting quality growth which tends to be growth inclusion. In addition, 2030 Agenda for Sustainable Development Goal (SDG) declared that to achieve sustainable growth and development, inclusive growth is highly crucial and fundamental towards achievement of 2030Agenda. By Inclusive growth, there is development not only associated with increase in output but also ensures and promotes even income distribution, low level of unemployment and alleviation of poverty including benefit for the most marginalized segment of the population or society in the economies.(UNDP, 2015; Berg and Ostry, 2011; ADB, 2012; Syamsul et al. 2017). Development economists agitate for rapid quality economic growth which is sustainable in the long run such is associated with inclusive growth ensuring participation of citizens in the growth process by having equal access to economic opportunities, contributing and benefitting from the outcome of the growth.(Iyoha, 2015; Ayinde and Yinusa, 2016). It suggests that the poor are not only benefitting from economic growth but they participate in the growth process due to equal access on the economic opportunities available for the majority of the labour force and absence of gender inequality. Lanchovichina and Gable (2012) and Werner (2012) have viewed that inclusive growth stimulates poverty reduction and inequality sustainable and rapidly which could ensure that all the labour force

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contribute and benefit from the economic growth process. Such inclusiveness tends to improve the income of developing countries to have a relatively faster growth and no segment of population is left behind in the growth process.

However, the extent of inclusive growth depends crucially on the quality of institution and finance which are relevant for economic development having inclusive effects which are drivers of inclusive growth. Studies have identified significant impact of finance on growth inclusiveness where financial inclusion is regarded as an important means by which economic growth performance can ensure inclusiveness. Neaime and Gaysset (2018) established that as long as the poor are prevented from having access to funds towards saving and investment which would tend to be income generating enterprise, poverty and inequality could then persist due to inability to obtain finance, despite economic growth recorded in some developing and emerging economies. Zins and Weill (2016) argued that to have accelerating sustainable economic and social growth, poverty alleviation, unemployment reduction and income equality, it is a must for all segments of the population to have full access to and use of financial service. Such has tendency to improve welfare of the public including poor people in the society at large. Dabla Norris et.al (2015) supported Neaime at.al (2018) and Zins at.el (2016) that greater financial inclusion should help reduce income inequality by raising the income of the poor through increasing access and reducing participation costs. These could benefit the poor, promoting socio-economic welfare of the poor.

However, For all citizens to have equal access to opportunities for investment, self-improvement with access to the benefits to be derived from the growth process, the quality of institutions in the economy play vital role. Where good and uncompromised institutions are established, such environment tends to promotes economic activity, inventiveness, growth and development. Acemoglu and Robinsons (2013) posits that better institutional quality stimulates potentially unlimited economic growth due to provision of protection of physical and intellectual property for individual entrepreneur, and inventors. This ensures the adequate, timely and uncompromised dissemination of information to economic agents, and ensure transparency and accountability for the growth of the society. United Nations Economic for Africa (2016) highlights essentiality of institutions and effective economic governance for inclusive development in Africa, that financial inclusion including inclusive growth must be backed up with critical drivers which include effective checks and balances with strong enforcement mechanisms, adequate regulatory including efficient legal frameworks.

There are literatures which capture the effects of financial inclusion on inclusive growth or institutional quality on inclusive growth while few studies focused on institutional quality on financial inclusion where these empirical works rely on regression method (panel of cross section and specific country analysis). Our study adopts causality technique in order to comprehend the directions of causal effects between the variable interests for better policy decision. This study avoids one on one relationship where two variables may be highly correlated by exploring four-ways causality between these variables. In addition, covering several inclusive growth and financial inclusion dimensions, most of the authors offer no concrete index of both inclusive growth index and financial inclusion index in their studies. Our focus of study is Sub-Saharan African country, Nigeria.

2. Empirical Literature Review

Based on the existing studies with regards to either relationship between financial inclusion and inclusive growth or institutional quality-inclusive growth or financial inclusion-institution nexus and recently few studies disclose linkages between financial inclusion-inclusive growth nexus and inclusive growth and institutions. Such studies include Olaniyi and Alenoghena (2017), Adeola and Evans (2017), Sethi and Acharya (2019), Afolabi (2020), Ubi and Udah (2014), Ifere, Okoi and Bassey (2015) where some studies are time-series based, while others are both time-series and cross-section based (panel data analysis). Olaniyi and Alenoghena (2017) conducted a study towards translation of GDP per capita into higher financial inclusion using datasets for 15 African countries over the period from 2005 to 2014 exploring a Bayesian VAR model. The findings show that GDP per capita has significant impacts on financial inclusion, signifying that increases in GDP per capita can be used to drive the needed financial inclusion and concluded financial inclusion has an insignificant and positive impact on GDP per capita. Adeola and Evans (2017) examined the impact of financial development and financial inclusion on economic diversification in Nigeria for the period 1981-2014 and the fully modified least square (FMOLS). The results show that financial inclusion, in terms of financial access and usage had positive significant effects on economic diversification, suggesting that

financial inclusion could be seen as a potent accelerator of economic diversification. This outcome contracted Olaniyi and Alenoghena (2017) who disclosed that in Africa financial inclusion did not have significant impact on GDP per capita.

Sethi and Acharya (2019) assessed the dynamic impact of financial inclusion on economic growth for a large number of developed and developing countries for the period of 2004-2010 by exploring panel cointegration, and panel causality tests. The empirical findings revealed that there was a positive and long run relationship between financial inclusion and economic growth across 31 countries in the world. Further, panel causality test showed bidirectional causality between financial inclusion and economic growth Thus, the study confirmed that financial inclusion is one of the main drivers of economic growth. This finding is in support of Evans and Lawanson (2017) who tested the causal links between financial inclusion and economic output, using cointegration and Granger causality test. The study found a bi-directional causality between financial inclusion and the aggregate economy in Nigeria.

Afolabi (2020) investigated the effect of financial inclusion on inclusive growth in Nigeria covering the periods of 1981 to 2017 with the adoption the Auto-Regressive Distributed Lag (ARDL) model. The study found financial inclusion, in the form of rural loan, number of bank branches and level of liquidity have a positive and significant effect on inclusive growth (GDP per capita) in the short and long run, while interest rate impeded inclusive growth. The study concluded that more and improved financial services should be made available to rural dwellers and the economy in general to help them participate and contribute more to national productivity. This study has similar observation with Abdullahi and Fakunmoju (2017) who revealed the effect of financial inclusion on SMEs contribution to sustainable economic growth between 1970 and 2015 in Nigeria that financial inclusions have positive and significant effect on sustainable economic growth. The study concluded that there was high propensity for SMEs output to boost sustainable growth if all the financial inclusion indicators could well be put in place by the monetary authorities. Whereas, Anh et.al (2019) investigated the linkages between financial inclusion and macroeconomic stability for 22 emerging and frontier economies from 2008 to 2015, with particular focus on a potential optimal level. Using the panel threshold estimation technique, the empirical findings showed that financial inclusion, as approximated by the growth rate in the number of bank branches over 100,000 account holders, was found to enhance financial stability under a certain threshold. Financial inclusion was also found to be of benefit to maintaining stable inflation and output growth

Ubi and Udah (2014) studied impact of corruption and institutional quality on economic performance in Nigeria. The study unfolded that corruption and institutional quality had a statistically significant effect on economic performance in the country. The study pointed out that if corruption was successfully fought, institutions would be strengthened and inclusive growth would result.in a similar vein, A study by Okoh and Ebi (2013) on the effect of interaction of infrastructure investment and institutional quality (corruption and contract enforcement) on economic growth in Nigeria, using correlation matrix and granger causality test uncovered that Corruption has a negative and significant effect while contract enforcement has positive and significant effect on quality on economic growth. It appeared that low levels of contract enforceability and increase in corruption rendered the positive infrastructure investment – economic growth nexus insignificant in Nigeria. To complement of studies of Okoh and Ebi (2013) and Ubi and Udah (2014), Ifere, Okoi and Bassey (2015) validated in their study of the relationship between institutional quality, macroeconomic policy and economic development in Nigeria indicated that institutional quality did not have a significant impact on the development indices used in the study. The study concluded that a systematic strengthening and development of institutions tends to enable the country achieve its development objectives.

In conclusion, there are mixed outcomes of most findings associated either between financial inclusion-inclusive growth nexus or institution-economic growth relationship which can be attributed to sample periods of their studies. This study distinguishes itself by assessing causality testing between the variables (financial inclusion, institutional quality and inclusive growth) by exploring ARDL-EC causality model and dynamic interaction (variance decomposition) between the variables in order appreciate the causal direction between those variables of interest for policy decision.

3. Model Estimation

This study attempts to explore empirical relationship between financial inclusion, institutional quality and inclusive growth by applying the autoregressive distributed lag (ARDL) bounds co-integration technique to determine the long

run relationships and short run dynamics between these variables which was developed by Pesaran and Shin (1999) and Pesaran et al. (2001). This estimation technique possesses some advantages over other previous and traditional co-integration methods. One, this technique does not need all the variables under study to be integrated of the same order and it can be applied when the under-lying variables are integrated of order one, order zero or fractionally integrated. Two, it is relatively more efficient in the case of small and finite sample data sizes. Lastly, by applying the ARDL technique, we obtain unbiased estimates of the long-run model (Harris and Sollis, 2003). By adopting this technique, the study specifies the empirical ARDL model as:

$$\Delta GR_t = \emptyset_1 + \sum_{i=1}^{n} \beta_{10}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \beta_{11}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \beta_{12}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \beta_{13}\,\Delta RQ_{t-1} + \beta_{14}\Delta GR_{t-1} + \beta_{15}\Delta FI_{t-1} + \beta_{16}\Delta GE_{t-1} + \beta_{17}\Delta RQ_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.1$$

$$\Delta FI_t = \emptyset_2 + \sum_{i=1}^{n} \beta_{20}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \beta_{21}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \beta_{22}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \beta_{23}\,\Delta RQ_{t-1} + \beta_{24}\Delta FI_{t-1} + \beta_{25}\Delta GR_{t-1} + \beta_{26}\Delta GE_{t-1} + \beta_{27}\Delta RQ_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.2$$

$$\Delta GE_t = \emptyset_3 + \sum_{i=1}^{n} \beta_{30}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \beta_{31}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \beta_{32}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \beta_{33}\,\Delta RQ_{t-1} + \beta_{34}\Delta GE_{t-1} + \beta_{35}\Delta GR_{t-1} + \beta_{36}\Delta FI_{t-1} + \beta_{37}\Delta RQ_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.3$$

$$\Delta RQ_t = \emptyset_4 + \sum_{i=1}^{n} \beta_{40}\,\Delta RQ_{t-1} + \sum_{i=0}^{n} \beta_{41}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \beta_{42}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \beta_{43}\,\Delta GE_{t-1} + \beta_{44}\Delta RQ_{t-1} + \beta_{45}\Delta GR_{t-1} + \beta_{46}\Delta FI_{t-1} + \beta_{47}\Delta GE_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.4$$

where GR, FI, GE and RQ are inclusive growth, financial inclusion, regulatory quality and government effectiveness respectively; $\emptyset$ and β are the parameters of the model; Δ is the first difference operator; t is the time period; and μ_tis the error term assumed to be identically and independently distributed.

The procedures to carry out the ARDL approach to co-integration technique include the determination of the long run relationships among the variables by using the Bounds F-Test and the estimation of the coefficients of the long and short run relationships by using error correction model from ARDL approach. The ARDL bounds-testing procedure for co-integrating relationships follows a non-standard asymptotic F-distribution under the null hypothesis, which maintains that there exists a minimum of one co-integrating vector. Two sets of critical values were constructed by Pesaran, Shin, and Smith (2001) under this null hypothesis. The first set of critical values is constructed under the assumption that variables in the ARDL model are integrated of order zero, I(0).

The second set of critical values is constructed under the assumption that variables in the model are integrated of order one, I(1). We do not reject the null hypothesis of no co-integrating relationship when the F-statistic falls below the lower bound. Similarly, we reject the null hypothesis of no co-integration when the calculated F-statistic is greater than the upper bound. However, the test is inconclusive when the F-statistic falls between the lower and upper bounds.

3.1. The Granger Causality Test Specification

In order to test the short- and long-run causal linkages between inclusive growth, financial inclusion and institutional quality, the study adopts two dimensions of institutional quality which include government effectiveness and regulatory quality in order to identify the impact of each on one another. To examine the short- and long-run causal

linkages between inclusive growth, financial inclusion and institutional quality (government effectiveness and regulatory quality), the study specifies the mode below:

$$\Delta GR_t = \gamma_1 + \sum_{i=1}^{n} \alpha_{10}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \alpha_{11}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \alpha_{12}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \alpha_{13}\,\Delta RQ_{t-1} + \beta_{14} ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.5$$

$$\Delta FI_t = \gamma_2 + \sum_{i=1}^{n} \alpha_{20}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \alpha_{21}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \alpha_{22}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \alpha_{23}\,\Delta RQ_{t-1} + \beta_{24} ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.6$$

$$\Delta GE_t = \gamma_3 + \sum_{i=1}^{n} \alpha_{30}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \alpha_{31}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \alpha_{32}\,\Delta GE_{t-1} + \sum_{i=0}^{n} \alpha_{33}\,\Delta RQ_{t-1} + \beta_{34} ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.7$$

$$\Delta RQ_t = \gamma_4 + \sum_{i=1}^{n} \alpha_{40}\,\Delta RQ_{t-1} + \sum_{i=0}^{n} \alpha_{41}\,\Delta GR_{t-1} + \sum_{i=0}^{n} \alpha_{42}\,\Delta FI_{t-1} + \sum_{i=0}^{n} \alpha_{43}\,\Delta GE_{t-1} + \beta_{44} ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.8$$

where ECM(t-1) is the error correction term and μ_t is the mutually uncorrelated white noise residual. The coefficient of the ECM variable contains information about whether the past values of variables affect the current values of the variables under study. The size and statistical significance of the coefficient of the error correction term in each ECM model measure the tendencies of each variable to return to the equilibrium.

In order to examine the short- and long-run causal linkages between financial inclusion, institutional quality and inclusive growth following the previous works, evidence suggests that once there is a long-run relation between the variables, in this case financial inclusion, institutional quality and inclusive growth, then there is a case for causality in one or more directions (Narayan and Smyth, 2005). Nonetheless, we could only establish the direction of the long-run causality between the variables by conducting a test of statistical significance (a t-test) on the lagged error-correction term in each equation. The direction of the short-run causal relationships between the variables could also be established by conducting a joint test of statistical significance (a P-value) of the explanatory variables in each of the equations (see Oh and Lee, 2004; Narayan and Smyth, 2005).

3.2. Variables and Sources of Data

The study is carried out using quarterly data over 2003/first quarter to 2018/fourth quarter period. The data were converted into quarterly data using e-view package. Following World Bank (2014), Inclusive growth variable can be proxy with the growth rate of inequality adjusted human development index (IHDI) i.e. 100 x (HDI(-1) – HDI)/(HDI). The human development index (HDI) is defined as the mean of achievements in the following three principal categories which are decent living standards, knowledge and long life and health. The proxy is better for inclusive growth having integrated pro-poor ameliorations in social opportunities and equal access to economic opportunities. Data are sourced from UNDP database. Data with regards to institutional quality, such as government effectiveness and regulatory quality are sourced from World Governance Indicators of the World Bank.

To construct financial inclusion indicator, our study adopts Sarma (2008) methodology for financial inclusion index in order to arrive at a comprehensive index by incorporating multidimensional index of financial inclusion. He developed financial inclusion index using three dimensions of FI which include accessibility dimension, availability dimension and usage dimension of banking service. Each dimension was measured by an indicator as availability indicates Number of branches of commercial banks per 100,000 adults, accessibility suggests number of deposit

accounts with commercial banks per 1,000 adults and usage indicates outstanding loans with commercial banks (% of GDP). Data are sourced from World Development Indicators. The following steps are adopted to derive financial inclusion index. Firstly, we calculate the yearly dimension index of each FI dimension before quarterly conversion using the following formula:

$$DIi = (Ai - MINi)/(MAXi - MINi) \ldots\ldots\ldots\ldots \text{eq.9}$$

where DIi is the dimension index of dimension i, Ai is the actual value of dimension i, Mini is the minimum value of dimension i, and Maxi is the maximum value of dimension i. Then, the yearly FII before quarterly conversion is measured as follows:

$$FII = 1 - \frac{\sqrt{(1-AV)^2 + (1-ACC)^2 + (1-US)^2}}{\sqrt{3}} \ldots\ldots\ldots\ldots\ldots\ldots eq.10$$

where AV, ACC, and US denote the dimension index for the availability, accessibility and usage dimensions, respectively. The value of FII ranges from 0, which indicates low FI, and 1, which indicates high FI.

4. Empirical Result

4.1. Results of the ARDL Bounds Test for Co-Integration

Table 1: ARDL Bounds Test for Co-Integration

Dependent variables	Function	F-statistic
FII	FII(HDI; GE; RQ)	3.32**
HDI	HDI(GE;RQ; FII)	2.79*
GE	GE(RQ;FII; HDI)	1.86
RQ	RQ(FII;HDI;GE)	0.50

Critical Value Bound			
5%		10%	
I (L)	I (U)	I (L)	I (U)
2.58	3.94	2.11	3.25

Our study employed the ARDL bounds-testing procedure to investigate the potential long-run relationships between these variables (financial inclusion, institutional quality and inclusive growth). From Pesaran et al. (2001), an F-test on equations (7) to (11) would be sufficient to test whether or not there were co-integrating relationships between the candidate variables. The study performed an F-test on equations (7) to (11) and reported the results in Table 3. In equation (7), the inclusive growth equation shows that the F-statistic, 3.32, calculated for equation (7) was greater than the upper bound value at 10 percent levels of significance. The null hypothesis of no co-integration was rejected, which implies that there is a long-run relationship between FII, HDI, GE and RQ. In equation (8), the inclusive growth equation, the F-statistic, 2.79, was in-between lower and upper bound value at the 5 percent and 10 percent levels of significance. This implies that the null hypothesis of no co-integration was inconclusive. Therefore, HDI, GE, RQ and FII were said to be inconclusive to be co-integrated, and the co-integrating vector was inconclusively explaining HDI.

In equation (9), the government effectiveness equation, the F-statistic, 1.86, was less than the upper bound value at the 5 percent, and 10 percent levels of significance. This implies that the null hypothesis of no co-integration was not rejected. Therefore, GE, RQ, FII, and HDI were said to be not co-integrated, and the co-integrating vector was not explaining GE. In equation (10), the regulatory quality equation, the F-statistic, 0.50, was also less than the lower and upper bound value at the 5 percent, and 10 percent levels of significance. This implies that the null hypothesis of no co-integration was not rejected. Therefore, RQ, FII, HDI and GE were said to not be co-integrated, and the co-integrating vector was not explaining RQ.

This study verifies the long-run error correction model of equation (11) to (14) by estimating the long-run error correction model of equation (11) to (14). Only the result of equation (11) shows that the error correction term was negative and significant at a 5 percent level of significance. So, for equation (11), the conclusion was that HDI was a co-integrating vector. Thus, the null hypothesis of level effects or co-integration was rejected in that case. In conclusion, the findings disclosed the existence of a long-run co-integrating relationship in the empirical evidence of the inclusive growth and financial inclusion in Nigeria between the periods of under review.

4.2. Results of the Granger Causality Test

As regards the evidence of ARDL Bound co-integration test, it is of our interest to conduct the Granger causality test in order to understand the direction of causality between financial inclusion, institutional quality and inclusive growth so as to appreciate appropriate economic policies and human development policies. Henceforth, the Granger causality in the ARDL Error Correction mechanism is used to exploit the directions of causality between the aforementioned variables as well as to decompose the directions of causality into the short run and long-run effects. In addition, the error correction reveals the long run relationship and assist to identify which variable is exogenous (strong) and which endogenous (weak) and the ECM(-1) is the speed of adjustment that discloses on how long it takes to revert back to long-term equilibrium if that variable of adjustment is perturbed. The results of the Granger test are shown in the Table 2 reporting the results of short-run and long-run Granger-causality test.

The long-run causal flow between inclusive growth and financial inclusion indicates a bi-directional causality, which was supported by the negativity and significance of the error correction terms of equations, the inclusive growth and financial inclusion equations with a 1 percent significance level of the t-test. As evidenced from the t-statistic of the ECM(t-1), only inclusive growth and financial inclusion variables are significant and thus endogenous. Other variables (government effectiveness and regulatory quality) are found to be exogenous (not statistically significant in the ECM results). This shows that a shock to inclusive growth and financial inclusion will have strong effect on one another including government effectiveness and regulatory quality.

Surprisingly, there is unidirectional short run causal flow from financial inclusion to inclusive growth in Nigeria. The evidence of short run causal flow from financial inclusion to inclusive growth could be seen from p-value of 0.060 associated with associated with the joint statistical test of significance of the inclusive growth at five percent significance level. It implies that there is the presence of inclusive growth-led financial inclusion in the case of Nigeria in the short run.

Table 2: Granger Causality between Financial Inclusions, Institutional Quality and Inclusive Growth

	t- statistics (P-value)				$ECM_{(T-1)}$
Variables	FII	HDI	GE	RQ	coefficient (t-statistic)
FII	-	0.76(0.453)	-6.27(0.000)***	2.69(0.010)*	-0.15(-2.69)**
HDI	1.93(0.060)*	-	1.69(0.098)*	-2.91(0.006)***	-0.35(-3.35)***
GE	-6.27(0.000)***	0.91(0.370)	-	3.35(0.002)***	-0.05(-1.15)
RQ	2.70(0.010)*	-2.97(0.005)***	2.75(0.009)***	-	-0.02(-0.86)

Note: *, **, and *** imply statistical significance at the 10%, and 1% significance levels, respectively

Evidence of a bi-directional causality relationship is reported between the financial inclusion and government effectiveness in short-term causal relationships. The financial inclusion equation reveals a negative short-run causal flow from government effectiveness to financial inclusion with a p-value of 0.000 associated with the joint statistical test of significance of the financial inclusion at a 1 percent significance level. In case of reverse causality, the government effectiveness equation shows evidence of a negative short-term causal flow from the financial inclusion to government effectiveness with a p-value of 0.000 associated with the joint statistical test of significance of government effectiveness at a 1 percent significance level

Results further show that there was a distinct unidirectional short-run causal flow from government effectiveness to inclusive growth, and from regulatory quality to inclusive growth, which was supported by the p-value associated with the joint statistical test of significance of government effectiveness and regulatory quality while the coefficients of the error-correction terms were negatively and statistically insignificant. Evidence of a bi-directional causality relationship is reported between the financial inclusion and regulatory quality in short-term causal relationships. The financial inclusion equation reveals a positive short-run causal flow from regulatory quality to financial inclusion with a p-value of 0.010 associated with the joint statistical test of significance of the financial inclusion at a 10 percent significance level. In case of reverse causality, the regulatory quality equation shows evidence of a positive short-term causal flow from the financial inclusion to regulatory quality with a p-value of 0.010 associated with the joint statistical test of significance of government effectiveness at a 10 percent significance level. Other results show that there was a distinct bi-directional short-run causal flow between government effectiveness and regulatory quality which were supported by the p-value associated with the joint statistical test of significance of their respective equation while the coefficients of the error-correction terms were negative and statistically insignificant.

As error correction model can show the absolute endogeneity or exogeneity of a variable; it fails in giving us the relative degree of endogeneity and exogeneity of a variable. To achieve this; we generate the variance decompositions of the variables. Variance decompositions test (VDCs) discloses the percentage of forecast error variance for each variable that can be explained by its own shocks and to fluctuation in the other variables. It means how much of the forecast error variance for each endogenenous variable can be contributed by each shock. Such may be termed as causality tests outside the estimation time period. The results from VDCs are as shown in Table 3 for the 20 -year's horizon. Variation in inclusive growth is contributed by past inclusive growth, government effectiveness, regulatory quality and financial inclusion. In short-run, inclusive growth and regulatory quality played important roles while its past contribution, financial inclusion and government effectiveness had contributed significant impact more on the long-run. Variation in financial inclusion is explained by past financial inclusion; government effectiveness, inclusive growth and regulatory quality where its past innovations and government effectiveness played significant impact in both short-run and long-run more than inclusive growth and regulatory quality.

Table 3: Variance Decompositions (VDCs)

Forecast Error Variance Decomposition for FII

Horizon	FII	GE	HDI1	RQ
0	1.00000	.37212	.010541	.010289
1	.99794	.37104	.018723	.0085516
2	.99539	.36987	.025412	.0074384
3	.99313	.36887	.030563	.0066871
4	.99130	.36807	.034474	.0061574
5	.98985	.36745	.037458	.0057700
6	.98871	.36696	.039765	.0054777
7	.98781	.36658	.041579	.0052512
8	.98708	.36627	.043030	.0050714
9	.98649	.36601	.044212	.0049257
10	.98599	.36580	.045188	.0048056
11	.98558	.36563	.046008	.0047050
12	.98523	.36548	.046704	.0046195
13	.98493	.36535	.047303	.0045461
14	.98466	.36524	.047823	.0044824
15	.98443	.36514	.048279	.0044265
16	.98423	.36505	.048681	.0043772
17	.98405	.36498	.049040	.0043333
18	.98389	.36491	.049360	.0042940
19	.98374	.36485	.049649	.0042586
20	.98361	.36479	.049911	.0042266

Forecast Error Variance Decomposition for GE

Horizon	FII	GE	HDI1	RQ
0	.37212	1.0000	.050455	.072501
1	.36460	.99799	.065627	.078831
2	.35906	.99553	.076970	.083241
3	.35502	.99336	.085321	.086369
4	.35205	.99160	.091505	.088637
5	.34981	.99023	.096154	.090323
6	.34811	.98915	.099716	.091606
7	.34677	.98829	.10250	.092605
8	.34571	.98760	.10472	.093399
9	.34485	.98704	.10652	.094044
10	.34413	.98658	.10801	.094575
11	.34354	.98619	.10925	.095019
12	.34303	.98586	.11031	.095397
13	.34260	.98557	.11122	.095721
14	.34222	.98533	.11201	.096002
15	.34189	.98511	.11270	.096249
16	.34160	.98492	.11331	.096466
17	.34134	.98475	.11385	.096660
18	.34111	.98460	.11434	.096833
19	.34090	.98446	.11477	.096989
20	.34071	.98434	.11517	.097130

Forecast Error Variance Decomposition for HDI1

Horizon	FII	GE	HDI1	RQ
0	.010541	.050455	1.0000	.20935
1	.040523	.096958	.97742	.22189
2	.079503	.14765	.93704	.22732
3	.12012	.19625	.89020	.22830
4	.15836	.24005	.84390	.22705
5	.19272	.27848	.80124	.22489
6	.22300	.31190	.76314	.22248
7	.24952	.34096	.72951	.22014
8	.27278	.36633	.69992	.21796
9	.29324	.38860	.67382	.21599
10	.31134	.40827	.65070	.21422
11	.32745	.42576	.63012	.21262
12	.34185	.44140	.61170	.21119
13	.35481	.45547	.59513	.20990
14	.36653	.46819	.58015	.20874
15	.37717	.47973	.56654	.20767
16	.38688	.49027	.55412	.20670
17	.39577	.49992	.54275	.20582
18	.40394	.50879	.53229	.20500
19	.41148	.51697	.52265	.20425
20	.41846	.52454	.51373	.20355

Forecast Error Variance Decomposition for RQ

Horizon	FII	GE	HDI1	RQ
0	.010289	.072501	.20935	1.0000
1	.016361	.058595	.28346	.98350
2	.020580	.050089	.33231	.96555
3	.023466	.044646	.36488	.95114
4	.025479	.040991	.38727	.94030
5	.026922	.038426	.40319	.93222
6	.027987	.036556	.41490	.92612
7	.028796	.035147	.42376	.92143
8	.029425	.034055	.43064	.91776
9	.029926	.033188	.43612	.91482
10	.030333	.032485	.44056	.91243
11	.030670	.031904	.44423	.91045
12	.030952	.031417	.44732	.90878
13	.031192	.031002	.44994	.90737
14	.031399	.030646	.45220	.90615
15	.031579	.030335	.45416	.90509
16	.031736	.030063	.45588	.90416
17	.031876	.029823	.45740	.90333
18	.032000	.029609	.45876	.90260
19	.032111	.029417	.45998	.90195
20	.032212	.029243	.46107	.90135

Government effectiveness innovations are explained by mainly past government effectiveness and financial inclusion in short run and long-run while the contribution of inclusive growth was more significant than regulatory quality to government effectiveness innovation in long run period. Regulatory quality innovations are explained by mainly past regulatory quality and inclusive growth in short run and long-run while the contribution of financial inclusion and government effectiveness growth were insignificant in both periods.

5. Concluding Remark

This paper studies the relationship between financial inclusion, institutional quality and inclusive growth in Nigeria using quarterly time-series data for the sample periods of 2003Q1 to 2018Q4 by means of ARDL co-integration, Granger causality techniques and Variance Decomposition of variables The findings observe a bi-directional causality relationship between financial inclusion and inclusive growth the candidate variables in the long run. It implies that the outcome of the findings is in support of the proposition of a long-run relationship between the finance and growth in Nigeria due to a co-integration test demonstrating the existence of a long-run equilibrium relationship between the financial inclusion and inclusive growth. In addition, the short-run causal relationship of the outcome of the study states the direction of causality running from financial inclusion to inclusive growth. It implies financial inclusion-led inclusive growth in short-run in Nigeria.

However, there are policy implications in these findings: a negative and bi-directional causal relation between financial inclusion and government effectiveness as well a negative and bi-directional causal relation between inclusive growth and regulatory quality mostly in the short-run; these indicate that the government itself and regulatory authorities have not be concerned about the persistent and widening income inequality and poverty increase in relation to higher economic growth rate despite improved financial development.

More importantly, for authorities of this economy to achieve and sustain equitable growth, fully disciplined policies that can promote and enhance financial inclusion and inclusive growth of the greater proportion of the population should not be managed and handled by loosed hands. Furthermore, it is a must for authorities to establish enhancing human development policies through health, education, infrastructure improvement and poverty eradication as well as access to financial services to spur inclusive development instead of economic growth. Importantly, authorities should strengthen the rule of law and strict enforcement of the minimum necessary set of regulation

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