

Trivariate Modelling of the Nexus between Financial Development, Globalization and Economic Growth: Insight from African Countries

Azeez Olarewaju Ahmed

Department of Economics, Shenyang University of Chemical Technology, Shenyang City, Liaoning Province, China.
E-mail: abmolazdbase03@yahoo.com

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Abstract: Financial development has been identified as main drivers of economic growth. However, empirical probe of this nexus remains inconclusiveness due use of an inappropriate proxy by previous studies, and the inability of previous studies to consider globalization in this nexus. To this end, we probe the finance-growth nexus in the presence of globalization by applying the Pooled Mean Group (PMG) estimator to a sample of 21 countries spanning 1990–2017. The empirical results affirm the supply-leading hypothesis which indicates that financial development spur economic growth. In addition, our estimate provides evidence of a positive linear relationship between globalization and economic growth. Further, results indicate that physical capital investment plays an important role in accelerating economic performance of African economies. Based on these findings, it is important for African countries to promote globalization-financial development policies in order to have access to alternative sources of external financing and attract foreign investment that can spur growth of African countries.

1. Introduction

The objective of every economy is to achieve sustainable economic development because economic progress is essential for poverty reduction and infrastructure development in the long run (Shahbaz, Nasir, Hille and Mahalik, 2020). Financial development increases a country's resilience and boosts economic growth. It mobilizes savings, promotes information sharing, improves resource allocation, and facilitates diversification and management of risk. It also promotes financial stability to the extent that deep and liquid financial systems with diverse instruments help dampen the impact of shocks (Sahay *et al.*, 2015). Thus, a well-developed financial system attracts foreign direct investment, reducing the costs of acquiring information, enforcing contracts, and augments growth (Levine, 2005 and Ang, 2008a). Theoretically, relationship between finance and economic growth has been a controversial issue as it has led to the establishment of three positions, which are the supply-leading hypothesis, the demand-

following hypothesis, and the neutrality hypothesis. The first view is the supply-leading hypothesis also known as finance-led hypothesis suggests that financial development causes industrial productivity; hence, economic growth. The view supported by Bagehot (1873), Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969), McKinnon (1973), King and Levine (1993), Levine *et al.* (2000), and Christopoulos and Tsionas (2004), Shan and Jianhong, (2006), Odhiambo (2008) argues that the supply of financial services creates the impetus for enterprises to demand for them which ultimately causes growth. The implication of this view point is that policies that move toward the development of financial systems facilitate economic growth. On the other hand, the demand-following hypothesis assert enterprise leads, finance follows suggesting that it is growth which creates the demand for financial services and not vice versa. The third position, the neutrality hypothesis implies that there is no causation between financial development and economic growth and finance is seen as an over-stressed determinant of economic growth. Developing countries across the globe face a myriad of problems ranging from poor governance, poor programme implementation, and corruption, just to mention a few (Adelowokan, 2012). African countries exhibited the weakest economic performance relative to other regions of the world. For instance, in 2010 the average per capita GDP in Africa is US\$ 1,669, which is far below the lower middle income groups' average of US\$ 2,530.5 (Abdulsalam, Salina and Mohammed, 2015).

Globalization is the process through which corporations, governments, and other organizations around the world increasingly interact (Zaidi, Zafar, Shahbaz & Hou, 2019). It represents a set of economic, political, and cultural processes that manifest in increased interdependence among nations (Goldberg & Pavcnik, 2007; Mills, 2009; and Sethi, Chakrabarti and Bhattacharjee, 2020). Globalization plays an important role on economic development by providing competitive environment via opening access to foreign investors in local financial markets, strengthens the quality of financial institutions and enhanced integration of economies by virtue of trade openness and financial flows (Mishkin, 2009; Kandil *et al.* 2015 and Atil *et al.*, 2020). Rousseau and Sylla (2003) also reported that nations should remain open to rest of the world, as innovative products, investment, and new ideas will come to host countries, generating wealth and raising per-capita income.

A plethora of studies with mixed findings on the nexus between financial development and economic growth are available in the existing literature

(Adeniyi, Oyinlola, Omisakin and Egwaikhide, 2015; Samargandi, Fidrmuc, and Ghosh, 2015; Kenza & Eddine, 2016; Muazu and Ibrahim, 2018; Botev and Jawadi, 2019; Alimi and Adediran, 2020; Wu *et al* 2020; and Redmond and Nasir, 2020). The present study contends that the divergent findings recorded could be because the authors did not account for globalization in their regressions. In addition, existing empirical studies have used a single indicator to examine the finance-growth nexus. Given the complexity of services provided by the financial system, capturing financial development with a single indicator could lead to potential bias and mislead the findings. To this end, this study employs financial development index of World Bank Global Financial Development index and KOF index that considers economic, social and political aspects of globalization to probe the link among financial development, globalization and economic growth in African economies. Given the motivation around the attainment of economic development, there is need to evaluate the distinctive role of financial development and globalization in African economies to help project the trend of economic performance. This empirical exercise is important to help reveal the source of economic development in African economies and guide finance and growth policies appropriately.

The rest of the paper is structured as follows. The next section takes a look at the empirical facts on globalization in finance-growth nexus. Section 3 present the methodology while section 4 focuses on result and discussion of finding and section 5 concludes the paper.

2. Empirical Facts on globalization, financial development and economic growth

The link between financial development, globalization and economic growth has received great interest by scholars and policy makers during the past few years. Among these is the study of Ahmed, Zhang and Cary (2021) which incorporated globalization and ecological footprint into finance-growth nexus in Japan employed ARDL and NARDL estimation technique with annual data from 1971 and 2016. Their finding established that globalization and financial development enhance the footprint in Japan in the linear ARDL while positive and negative changes to globalization lessening the footprint whereas, positive shocks in financial development arouse ecological footprint. For Malaysia, Ahmed *et al* (2019) applied ARDL and annual data for 1971 and 2014 to assay the nexus between globalization and the ecological footprint. They found that population density lessens ecological footprint while energy consumption and

economic growth accelerate ecological footprint. The result further indicates globalization hampers ecological carbon footprint in Malaysia. On the nexus between ICT, globalization and Co2 emission, Ahmed and le (2020) applied CUP-FM estimation technique for 6 ASEAN countries over the period of 1996 and 2017. The empirical result of the study disclosed that ICT reduces co2 emission and thereby enhance environmental quality while .

Similarly, trade globalization is also sustainable in the region as it reduces emissions Focusing on ECOWAS countries, Alimi and Adediran (2020) examined finance-growth nexus by incorporating ICT diffusion using PARDL technique spanning 2005 and 2016. The study finds that financial development retards growth while the interactive effect of financial development and ICT diffusion accelerate the growth in ECOWAS region. The study of Muhammad *et al.* (2016) employed panel estimation technique and discovered that financial development foster GCC economies. For China, Japan and India using bootstrapping ARDL spanning 1960 and 2016, Wu *et al* (2020) validates the supply-leading and demand-following hypotheses for Japan and India but support the supply-leading theory in China. Samargandi, Fidrmuc, and Ghosh (2015) analyzed the link between financial development and economic growth in a sample of 52 middle-income countries over the 1980 – 2008 period. They find an inverted U-shaped relationship between finance and growth in the long run while the short run relationship was insignificant. For 11 MENA countries over the period of 1980 and 2012, Kenza & Eddine (2016) established that financial intermediary has a negative effect on the growth rate in the MENA countries both in the short and long run.

In Nigeria, Adeniyi, Oyinlola, Omisakin and Egwaikhide (2015) employed the threshold modelling to examine the relationship between financial development and economic growth in Nigeria using data covering the period 1960 – 2010. They discovered that financial development impedes growth. Similarly, in investigating the finance-growth nexus for a sample of 100 developed and developing countries, Botev and Jawadi (2019) shows that finance stimulate economic growth in developed countries but exact an insignificant influence in close economies. For SSA countries, Brueckner and Lederman (2015) probed the linkage between trade openness and growth. They report that greater openness to international trade augment economic growth in both short-run and long run. In the same region, Muazu and Ibrahim (2018) finds that financial development hinders SSA growth when financial sector development is not complemented by real sector growth. Examining 30 countries

spanning 1990 and 2016, Redmond and Nasir (2020) incorporated natural resources, trade openness, institutional quality and international trade into finance-growth nexus. Their empirical finding reveals that natural resource abundance and trade openness promotes growth while international trade and financial development inhibits growth.

Recently, Atil *et al* (2020) considered the link between natural resources and financial development through globalization, oil price and economic growth in Pakistan spanning 1972 and 2017. The outcome of their study suggests that natural resources, economic growth and oil price aid financial development while globalization dampen financial development. By employing ARDL, FMOLS and DOLS estimation technique, Guan, Kirikkaleli, Bibi and Zhang (2020) also investigated the same nexus in the presence of human capital in China. Their empirical result validates the demand-following and resources curse hypotheses which suggests that natural resources impedes financial development whereas globalization and human capital foster financial development in China. Osei and Kim (2020) probed the contribution of foreign direct investment in finance-growth nexus for 62 middle- and high-income countries between 1987 and 2016. Their panel threshold methodology results suggested foreign direct investment improves economic growth but retards economic growth whenever financial development exceeds the threshold of 95%. For 40 African countries, Ibrahim and Sare (2018) explored the determinants of financial development and established that trade openness and human capital stimulates Africa's financial development.

Using a sample of 23 European countries spanning 1989 and 2016, Nasreen, Mahalik, Shahbaz and Abbas (2020) employed GMM estimation to analyze the linkage between Financial Globalization, Institutions, Economic Growth and financial sector development. Their empirical finding indicates that financial globalization inhibits financial development while institutions support financial inflows and augment financial development in European countries. In a related study, Nasreen *et al.* (2015) explore the linkages between financial development, institutions, globalization and economic growth. The finding of the PVAR technique reveals that globalization promote financial development through financial reforms and thereby spur economic growth. With the aid of Westerlund panel cointegration test and annual data from 1984 to 2008, Law *et al.* (2015) assessed the nexus between globalization, institutional reforms and financial development in East Asian economies. The study discovered that globalization strengthen financial development via institutional reforms. However, in India,

Shahbaz *et al.* (2018a) estimated the link between globalization, institutional quality, economic growth and financial development. The result of the study reveals that globalization and institutional quality have detrimental effects on financial development whereas economic growth accelerates financial development.

By applying panel cointegration and causality methodologies for 32 developing and developed countries, Kandil *et al.* (2015) examined the role of globalization (proxied by globalization index) on financial development. The empirical result of the study suggests that globalization hinders financial development while financial development spurs globalization by relaxing the of constraints of external financing. Further, Kandil *et al.* (2017) probe the influence of globalization in the finance-growth nexus in China and India. The outcome of their study shows that globalization spurs economic growth in India but hampers growth in China. Concentrating on 3 economic blocs (BRCIS, MINTS and ECOWAS), Muye and Muye (2017) investigated the relationship between financial development, institutional quality and globalization. Their empirical result indicates that globalization promotes financial and quality institution boosts globalization-financial development nexus. The outcome of the study of Balcilar *et al.* (2019) indicates that economic globalization stimulates by improving the effectiveness of financial institutions in 36 developed and developing countries. In investigating the association between environmental degradation, globalization, financial development, economic growth and energy consumption in India over the period of 1980 and 2015, Sethi, Chakrabarti and Bhattacharjee (2020) employed ARDL technique and finds that globalization, economic growth increased energy consumption and degrades the environment. Likewise, Shahbaz, *et al.* (2020) employs Bootstrapping ARDL methodology to examine the link among economic growth, R&D expenditures, financial development, and energy consumption and carbon dioxide emissions in UK. According to their empirical finding, energy consumption and financial development degrades the environment while R&D expenditures reduce CO2 emissions. By incorporating corruption into finance-growth linkage in 142 countries spanning 2002 and 2016, Song, Chang and Gong (2020) established that economic growth strengthens financial development in both developed and developing countries while corruption worsen financial development in developing countries.

In sum, the above literature suggests a diverse finding on the nexus between financial development and growth and its determinants across countries. To

the best of our knowledge, no research work has been carried out on African countries using comprehensive globalization and financial development index, making it a motivation.

3. Data and Methodology

For this study, we analyze annual data from 1990 to 2018 for 25 African economies to probe the finance-growth nexus in the presence of globalization. The justification for the selected countries and time frame is based on availability of data. In order to simplify coefficient interpretations and overcome the problem of heteroscedasticity, all the dataset is transformed to natural logarithm (Faisal, Sulaiman and Tursoy, 2019). The data employed in this study are economic growth (proxied by GDP per capita measured at constant A2010 US Dollars), Following Dreher (2006) and Gygli *et al.* (2019), globalization is measure as economic, social and political globalization. In line with Sahay *et al.* (2015) and Nasreen *et al.*, (2020), financial development is measured financial access (proxied by commercial bank branches per 100,000 adults and ATMS per 100,000 adults), financial depth (proxied by private-sector credit to GDP, stock market capitalization to GDP, stock traded to GDP and liquid liability to GDP) and efficiency (proxied by stock market turnover ratio). Data on economic growth is sourced from World Bank Indicator 2020 edition while data on globalization is collected from the KOF index of globalization of Dreher (2006) and Gygli *et al.* (2019). Lastly, data on financial development is collected from World Bank Global Financial Development Database (GFDD). The selected countries for this study are: Angola, Algeria, Benin, Botswana, Cameroon, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Kenya, Morocco, Mali, Mauritania, Mauritius, Namibia, Nigeria, Senegal, Seychelles, Tunisia and South Africa.

3.1. Econometric Strategy

Building on the previous empirical studies, the general form of the finance demand function is modelled as:

$$Y = f(FIN, GLOB) \quad (1)$$

Where Y is economic growth, FIN denotes financial development and $GLOB$ is globalization. Expressing equation (3.1) in econometric form becomes:

$$Y_{it} = \sigma + \pi FIN_{it} + \eta GLOB_{it} + \beta Z_{it} + \mu_{it} \quad (3.2)$$

where Y denote economic growth, σ denotes country – specific intercept, FIN is financial development and $GLOB$ is globalization while i denotes the country,

t is the time period, error term is symbolized by μ_{it} and Z_{it} denote the control variable (macroeconomic uncertainty (proxied by CPI-based inflation) and domestic investment (proxied by gross capital formation as a ratio of GDP)) because they have been empirically proven to have vital impact on economic growth (Osei and Kim (2020)).

In order to probe the presence of globalization in finance-growth nexus, panel autoregressive distributive lag model (PARDL) approach developed by Pesaran *et al.* (1999) using the autoregressive distributed lag ARDL(p,q) method, where p is the lag of the dependent variable, and q is the lag of the independent variables. This estimation technique has several merits over static models such as OLS, fixed and random effects and GMM models. The PARDL framework considered the heterogeneity of the dynamic panel setting, the short-run dynamic and the long run equilibrium of the model (Rafindadi, Muye & Kaita, 2018; Samargandi, *et al.* 2015). Second, this method is consistent in the face of I (0) and/or I(1) variables or the mixture (Rafindadi, Muye & Kaita, 2018); and also, it yields consistent estimates in the presence of endogeneity (Chen & Vujic, 2016; Chudik *et al.*, 2013; Pesaran *et al.*, 1999; Pesaran & Smith, 1995). Lastly, the short-run and long-run models are estimated simultaneously (Pesaran *et al.*, 1999). Thus, this technique gets rid of problem of slope heterogeneity across countries, order of integration in variables and cross-sectional dependence (Rafindadi, Muye & Kaita, 2018; Chen & Vujic, 2016).

The mean group (MG) estimator introduced by Pesaran and Smith (1995) estimates the long-run parameters by taking an average of the long-run coefficients of each cross-section. The MG assumes heterogeneity in all coefficients (both short-run and long-run and the intercepts) across units. The dynamic fixed effect (DFE) estimator evolves from the fixed effects estimator, with the lagged term of the dependent variable incorporated as one of the independent variables. The DFE estimator assumes homogeneity in all coefficients (both short-run and long-run) across units except the intercepts. The pooled mean group (PMG) estimator proposed by Pesaran, Shin and Smith (1999) is an intermediate estimator between DFE and MG. The PMG allows only the long-run slope coefficients to be homogeneous. The appropriateness of these estimators is determined using the Hausman test.

The general form of panel autoregressive distributed lag (ARDL) (p, q) is model as follows:

$$Y_{i,t} = \sigma_i + \sum_{k=1}^p \pi_{ij} Y_{i,t-j} + \sum_{k=0}^q \phi'_{ij} X_{i,t-j} + \mu_{it} \quad (3.3)$$

Where $X_{i,t} = (FIN_{i,t}, GLOB_{i,t}, Control_{i,t})$, and $Control_{i,t} = (INF_{i,t}, INV_{i,t})$

(3.4)

Where t symbolize time element (annual), country index is represented by i and σ_i denotes country fixed effects. In addition, k time lags. In equation (3.4), the dependent variable is denoted by Y_{it} ; the vector X_{it} represents financial development, globalization and control variables (investment and macroeconomic uncertainty). Equation (3.3) can be re-parameterized into:

$$\Delta Y_{i,t} = \sigma_i + \phi_i Y_{i,t-k} + \mathcal{G}'_i X_{i,t} + \sum_{k=1}^p \pi_{ik} Y_{i,t-k} + \sum_{k=0}^q \theta'_{ik} X_{i,t-k} + \mu_{it} \quad (3.5)$$

Where

$$\phi_i = -1 \left(1 - \sum_{k=1}^p \gamma_{ik} \right) \quad (3.6)$$

$$\mathcal{G}'_i = \frac{\sum_{k=0}^q \theta_{ik}}{\left(1 - \sum_{k=1}^p \gamma_{ik} \right)}, \gamma_{ik}^* = - \sum_{n=k+1}^p \gamma_{ik} \text{ and } \theta_{ik}^* = - \sum_{n=k+1}^q \theta_{ik} \quad (3.7)$$

Equation [3.7] in Error correction form is specified as:

$$\Delta Y_{i,t} = \sigma_i + \phi_i (Y_{i,t-j} - \mathcal{G}'_i X_{i,t}) + \sum_{k=1}^p \pi_{ik} Y_{i,t-k} + \sum_{k=0}^q \theta'_{ik} X_{i,t-k} + \mu_{it} \quad (3.8)$$

$\phi_i < 0$

Where $\phi_i (Y_{i,t-j} - \mathcal{G}'_i X_{i,t})$ is the adjustment in Y_{it} to the deviation from its long-run relationship and short-run coefficients linking Y_{it} with its lag values and other independent variables are γ_{ij}^* and θ_{ij}^* . In addition, ϕ_i is the error-correction coefficient estimates which measures the speed of adjustment of Y_{it} toward its long-run equilibrium in case of a change in any of the independent variables X_{it} . In order to ensure that long run relationship exist among the variables, the speed of adjustment ϕ_i must be negative and significant.

4. Result and Discussion

This section focuses on result presentation and discussed in stages, starting with the preliminary analysis, after which the PARDL result is discussed. We carried out descriptive statistics and correlation matrix in order to provide first-hand descriptions of the relevant data employed in this study. Table 1 presents the result of the descriptive statistic and correlation matrix of 21 African economies spanning 1990 and 2017. From Table 1, the average income per capita is \$3282.20 and ranges between \$14014.87 and \$164.33. The mean values of financial and globalisation index are 0.1957 and 50.1258 while the average of investment and macroeconomic uncertainty are 21.17 and 25.47 respectively. Volatility in economic growth is higher than volatility stems in financial development and globalization index. The correlation matrix shows a positive association between growth and urbanization, which is not surprising for a heavily income per capita and financial development and globalization index. Similarly, we observe that growth and inflation are negatively related.

Table 1: Summary Statistics and Correlation

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>Min</i>	<i>Max</i>
Y	588	3282.20	3016.683	164.3366	14014.87
FIN	588	0.1957	0.1106	0.0645	0.6266
GLOB	588	50.1258	9.8571	22.356	72.354
INV	588	21.1779	10.2619	1.9833	61.4690
INF	588	25.4795	215.1075	-11.6861	4145.106
Y	1.000				
FIN	0.4627	1.0000			
GLOB	0.4038	0.6721	1.0000		
INV	0.1322	-0.0002	0.0802	1.0000	
INF	-0.0418	-0.0600	-0.1089	-0.1547	1.0000

Note: Y, FIN, GLOB, INV, INF denote income per capita, financial development, globalization, investment (proxied by gross capital formation) and macroeconomic uncertainty (proxied by consumer price index) respectively.

It is important to check for stationary and nonstationary properties of variables because nonstationary variables invalidated the assumptions of a regression analysis and could result in a spurious regression (Roquez-Diaz and Escot, 2018). In order to check the unit root property of the variables employed in this study, first generation panel unit root tests such as Levin, Lin and Chu

(LLC), Im, Pesaran and Shin (IPS) and Breitung panel unit root tests are utilized. The null hypothesis for these tests is the panel data has unit root while the alternative hypothesis is that the panel data has no unit root. The empirical result of the panel unit root test is presented in Table 2. We observed that gross domestic product per capita (LY), globalization index (LGLOB) and investment (LINV) contain unit root while financial development index and macroeconomic uncertainty are found to be stationary at level. After the first difference, all the variables are stationary. This shows that the variables have a mixed order of integration. According to Pesaran et al. 1995, 1999, panel ARDL is applicable if variables contain a mixed order of integration, based on this, we proceed to evaluate the nexus between financial development and economic growth in the presence of globalization.

Table 2: Panel Unit Root Test

Variables	LLC Test		IPS Test		BREITUNG Test	
	Level	First Diff	Level	First Diff	Level	First Diff
IY	-1.6772	-14.3492***	0.0752	-13.1171***	1.4020	-6.5667***
FIN	-5.0807**	-20.9488***	-3.3693**	-15.6927***	3.1917**	-14.6132***
IGLOB	-2.3631	-18.7724***	-1.6871	-13.5437***	6.2188	-19.8292***
IINV	-7.1196	-19.3023***	-1.6878	-14.6279***	-0.7454	-12.6797***
IINF	-10.0543**	-23.5173***	-2.5786**	-14.017***	-5.5175**	-9.6037***

Note: Y, FIN, GLOB, INV, INF denote income per capita, financial development, globalization, investment (proxied by gross capital formation) and macroeconomic uncertainty (proxied by consumer price index) respectively. Note 2: ***, **, * indicate statistical significance at 1%, 5% and 10% respectively. The null hypotheses of Levin, Lin and Chu, Im, Pesaran and Shin (IPS) and Breitung tests are that the underlying series are nonstationary.

We employ cross dependence test developed by Pesaran (2004) test to check for cross-sectional dependence among the variables employed for this study. We apply CD test because African countries tend to exhibit similar traits and are interconnected via trade, globalization due economic union and other networks. The result of the Pesaran CD (2004) cross dependency test is displayed in the first column of Table 3 and the result indicates that all variables considered in this study have cross-sectional bias problem. Since the performance of traditional unit root tests such as LLC, IPS, Breitung tests can be influence by the presence of cross dependence (Nathaniel *et al.* 2020; and Ahmed and Le, 2020). Thus, in order to overcome this problem, we employed Cross-Sectional

Augmented Panel Unit Root (CIPS) and Cross-Sectional Augmented Dickey-Fuller (CADF) panel Unit root test of Pesaran (2007) which gives reliable and consistent result. The result of the CIPS and PESCADF panel unit root presented in Table 4 suggests that all the variables are stationary at level except economic growth (LY). After first difference, economic growth becomes stationary.

Table 3: Cross Dependency Test and Panel Unit Root Test

<i>Variables</i>	<i>CD Test</i>		<i>CIPS Test</i>		<i>CADF Test</i>	
	<i>CD</i>	<i>Obs(corr)</i>	<i>Level</i>	<i>First Diff</i>	<i>Level</i>	<i>First Diff</i>
IY	50.61***	0.828	-1.807	-4.225***	-1.810	-3.194***
FIN	43.66***	0.587	-2.645**	-5.344***	-2.467**	-4.342***
IGLOB	70.05***	0.914	-2.687**	-5.066***	-2.719**	-4.035***
IINV	4.92**	0.400	-2.485**	-4.986***	-2.434**	-3.729***
IINF	13.43**	0.273	-3.284***	-5.823***	-2.344**	-4.863***

Note: Y, FIN, GLOB, INV, INF denote income per capita, financial development, globalization, investment (proxied by gross capital formation) and macroeconomic uncertainty (proxied by consumer price index) respectively. Note 2: ***, **, * indicate statistical significance at 1%, 5% and 10% respectively. The null hypothesis of CD test states that there exist no CD among sample countries while the alternative hypothesis states there exist CD among sample countries. The null hypothesis for the CIPS and CADF unit root tests assumes homogeneous non-stationary as against the alternative hypothesis of possible heterogeneous alternatives.

Table 4 report the result of the panel ARDL (pooled mean group, mean group and dynamic fixed effect) on the nexus between financial development, globalization and economic growth among 21 African economies spanning 1990 and 2017. In order to select the best estimator among PMG, MG and DFE, we subject the results from these estimators to Hausman test. A non-rejection of the null hypothesis implies the adoption of the PMG estimator while the rejection indicates the adoption of the MG estimator. In other words, the PMG estimator is the efficient estimator under the null while the MG estimator is the efficient estimator under the alternative hypothesis. The result of the Hausman test support the PMG estimator as the efficient estimator, then the use of a MG or DFE estimator is unsuitable. Thus, the interpretation of this study will be based on PMG estimator. The result of the PMG estimator indicates that financial development exerts a positive and significant impact on economic growth in both short and long run, that is, a 1% increase in financial development foster African economies by 2.451 and 0.302 percent in both

Table 4: Panel ARDL Regression result

<i>Dep. Variable: LY</i>			
<i>Variables</i>	<i>PMG</i>	<i>MG</i>	<i>DFE</i>
Long-run Estimate			
<i>LFIN</i>	2.451*** (0.329)	3.664 (2.610)	0.773 (0.655)
<i>LGLOB</i>	0.986*** (0.0826)	0.748* (0.402)	1.618*** (0.249)
<i>LINV</i>	0.129*** (0.0198)	0.162 (0.106)	0.0993*** (0.0353)
<i>LINF</i>	-0.0286*** (0.00881)	-0.0590** (0.0239)	-0.0409 (0.0254)
Short run Estimate			
<i>ECT(-1)</i>	-0.0985*** (0.0223)	-0.205*** (0.0325)	-0.0729*** (0.0124)
Δ <i>FIN</i>	0.302** (0.139)	0.307* (0.171)	0.233** (0.0942)
Δ <i>LGLOB</i>	0.0975 (0.0653)	0.126** (0.0534)	0.0435 (0.0475)
Δ <i>LINV</i>	0.00224 (0.0181)	-0.00103 (0.0166)	0.00926** (0.00434)
Δ <i>LINF</i>	-0.000466 (0.00196)	-0.00370** (0.00182)	-0.00424** (0.00174)
Constant	0.295*** (0.0708)	0.981*** (0.286)	0.0876 (0.0745)
Observations	567	567	567
Hausman	MG vs PMG		PMG vs DFE
Chi2(4)	1.30		1.01
Prob	0.8613		0.6821

Note: 1: *Y, FIN, GLOB, INV and INF* represents *income per capita, financial development, globalization, investment (proxied by gross capital formation) and macroeconomic uncertainty (proxied by consumer price index)*. Note 2: ***, **, * indicate statistical significance at 1%, 5% and 10% respectively while values in () are standard errors. Hausman test is indicating that PMG is consistent and efficient estimation than MG and DFE estimation.

long run and short run respectively. This finding validates the result of Botev and Jawadi (2019) that finance stimulate economic growth in developed countries but refutes the result of Muazu and Ibrahim (2018) and Redmond and Nasir

(2020) whose study finds that financial development hinders SSA growth. The result supports the supply-leading hypothesis which suggests that well-developed financial sector that minimizes transaction and monitoring costs and asymmetric information is a prerequisite to the process of economic growth. Furthermore, globalization has a positive and significant influence on economic growth in the long run though insignificant in the short run. Our results show that 1% of globalization resulted in an increase of 0.986% of economic growth in the long term and 0.0975% in the short-term, and this finding is aligned with Brueckner and Lederman (2015). This finding suggests that interacting African economies with the rest of the world provides competitive environment by opening access to foreign investors in local financial markets and helps firms to attract more external financing, competition, and investment opportunities; promotes economies of scale; and improves production processes which paves the way for economic development. The coefficient of physical capital investment is positive and significant in both short and long run, thus confirming the important role played by physical capital in African's growth. However, the coefficient of macroeconomic uncertainty (proxied by consumer price index) is negative and significant in the long run but insignificant in the short run. This implies that macroeconomic uncertainty impedes African economies. Lastly, a significant negative coefficient of the error correction is necessary to substantiate a statistically significant relationship over the long run. The results of empirical testing affirm a short- and long-run relationship between financial development, globalization and economic growth among African countries in OPEC countries. Table 4 suggests that error correction coefficient (ECM) is -0.0985, which is significant at the 1% level, implying that a 9.85% adjustment takes place after temporal shocks in the long-run equilibrium relationships between economic growth, financial development and globalization.

5. Conclusion

This study aims to investigate the link between growth, financial development and globalization using a multivariate framework on panel data sets of 21 African countries from 1990 to 2017. The findings of this study are vital for understanding the relationship among financial development, globalization and economic growth in African countries. Particularly, our findings suggest that financial development and globalization plays a significant role in promoting economic growth of African countries. Further, results indicate that physical capital investment has an important role in accelerating economic performance of African economies. Based on these findings, it is important for African

countries to promote globalization–financial development policies in order to have access to alternative sources of external financing and attract foreign investment that can spur growth of African countries.

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