Nexus among Financial Openness Shocks, Institutional Development and Total Factor Productivity in Africa: A Panel SVAR Analysis

Solomon O. Okunade[†] and Rufus A. Ajisafe[‡]

Abstract

This study investigates the dynamic relationship among financial openness, institutional development, and TFP for the period of 1996 to 2019 across 28 selected African countries. We employ Panel Structural Vector Autoregression with orthogonalised structural identifying restrictions to find a dynamic negative relationship between financial openness and TFP; negative effect of institutional development on TFP; negative effect of institutional development on financial openness. Meanwhile, we find neutral effects of TFP and financial openness on institutional development in Africa. Therefore, the study concludes that the negative consequences of financial openness overwhelm its positive impact on TFP in Africa because the quality of institutions in most of the selected African countries are weak and poorly developed to checkmate excesses, corruptions and political interferences in the financial markets, to ensure appropriate channelisation of capitals, and to foster productive investments which would in turn increase TFP and sustain growth in the selected African countries. Therefore, we recommend that governments and policymakers in the selected African countries should ensure persistent improvements in the quality of institutional frameworks to premeditate the positive benefits of financial openness on TFP, rather than leaking its benefits on growth in the selected African countries.

Keywords: Financial Openness; Institutional Development; Total Factor Productivity; Growth; Panel Structural Vector Autoregression (PSVAR), Africa

JEL Classification Codes: F21, F36, O43, C23

[†] Corresponding Author, Department of Economics, Chrisland University, Abeokuta, Nigeria & Centre for Statistics and Econometrics (CeSEC), Chrisland University, Abeokuta, Nigeria, osolomon2085@gmail.com; sokunade@chrislanduniversity.edu.ng; Phone: +234-803-233-5789

[‡] Department of Economics, Obafemi Awolowo University, Nigeria, rajisafe@oauife.edu.ng

1. Introduction

The recurring economic and financial crisis has called for a reassessment of the linkage between capital inflows as a result of financial openness and growth (Cecchetti & Kharroubi, 2012). The widely supported theoretical position of positive links between financial openness and growth in both developed and developing countries have been challenged by the re-occurrence of the global financial crisis, especially in the mid-1990s and 2000s. This has ignited the quest to explain the nexus between financial openness and growth in developing countries, especially in Africa. Many African countries were believed to be insulated from the global economic and financial crisis as a result of the relatively limited openness to the global financial markets, however, the impact of the global economic and financial crisis slashed the growth rate of the African economy from 6.2% in 2007 to 5.2% in 2008 and 3.1% in 2009, although, Africa's economies aptly recovered in 2010 to 4.9% (Okunade, 2020; Anyanwu, 2012). Global economic and financial crises severely damaged the financial sectors of many African countries as a result of reduced foreign investment, trade, and remittances. It also resulted in growing budget and trade deficits, a high rate of inflation, and dwindling foreign reserves. Also, the global financial crisis revealed the need to bail most African' banks out of financial repression.

More importantly, the vulnerability of African economies to the global financial crisis as a result of financial openness was not uniform across the board. For instance, some African countries where vulnerability to the contagion effect is high include Cote d'Ivoire, Botswana, Central Africa Republic, and Lesotho due to foreign ownership of banks in these countries (Ashamu & Abiola, 2012). However, scarcity of foreign finance and limited capital inflows was the immediate effect of the financial crisis on South Africa and Nigeria, while fragile countries such as Burundi and Liberia were found vulnerable due to their heavy dependence on concessionary financing (Ajisafe & Okunade, 2020a; Ajisafe & Okunade, 2020b). All these negative impacts of financial openness had slowed down the pace of economic growth and banking sector development in Africa by weakening banks' balance sheets through an increase in non-performing loans and drying up of liquidity (Ashamu & Abiola, 2012). In the aftermath of the crisis, academics and policymakers have emphasized the need for a reassessment of the linkages among financial openness, institutional development, capital inflows, and the key determinant of long-run growth.

Also, the growth effects of macroeconomic policies have been over-stressed in the literature. In recent times, development economists have shifted attention from explaining general growth effects of macroeconomic policies towards explaining the effect of these policies on the key determinants of growth, especially Total Factor Productivity (TFP) as identified in the new growth theories (Serdaroglu, 2015; Bonfiglioli, 2008). Bekaert, Harvey & Lundblad (2011) orate that the productivity effects of macroeconomic policies are more essential than general growth effects; since the latter offers little explanation on how the development gap between developed and developing countries could be closed in the long-run.

TFP describes variable that accounts for the change in output that does not depend on factor inputs such as labour and capital. Atesagaoglu, Elgin & Oztunali (2017) describes TFP as the main source of growth for several countries in the long run periods because TFP growth generally overshadows other inputs' contributions to aggregate growth regardless of the types of the production function. Among the structural economic determinants of TFP as identified in the literature include technology, education, financial openness, trade openness, financial development, research and development (R&D) expenditures, institutional development, and capital inflows (*see* Okunade,

2021; Okunade, 2020; Gregory, 2016), financial openness may promote the development of other factors to enhance TFP growth (Serdaroglu, 2015).

Financial openness, according to Serdaroglu (2015) is the integration of the financial activities and transactions of a particular country into global financial markets. It offers opportunities for countries to increase their competitiveness by making more resources available by facilitating capital inflows, human capital development, technologies and innovations, and even physical capitals in terms of infrastructural development. The endogenous growth models predict that financial openness could affect TFP through three main channels. First, by improving efficiency in foreign capital allocation such that financial capitals are allowed to flow to the most productive sectors; second, by enhancing international risk-sharing and diversification; and lastly, by promoting local financial sector development (Chen & Quang, 2014). However, the benefits of financial openness cannot be internalised to improve TFP in a particular country without quality institutions (Prasad *et al.,* 2007). For instance, Varela (2018) opines that capital-scarce economies, such as in African countries, cannot benefit from financial openness if some reasonable level of institutional infrastructures such as regulatory quality, rules of law, contract enforcement mechanisms, corruption control, government effectiveness, accountability, and political stability are not in place (Adams & Klobodu, 2017; Acemoglu *et al.*, 2003).

Ambiguities trail economic theories especially neoclassical and endogenous growth theories about the relationship between financial openness and TFP. On one hand, based on the model of efficient and competitive markets, some endogenous growth theorists believe in the efficacy of financial openness to raise TFP by improving capital allocation efficiency. On the other hand, neoclassical underscored the importance of market distortions which carry welfare-reducing effects of financial openness on TFP (Fratzscher & Bussiere, 2004; Stiglitz, 2002). Thus, the observed response of TFP to innovations in financial openness is hard to reconcile with the predictions of the existing theoretical models about the transmission of financial openness shocks. For instance, the endogenous models which predict that financial openness facilitates the free flow of capitals that contribute to TFP growth via knowledge and technology transfers from foreign countries also face serious difficulties in explaining the observed macroeconomic imbalances caused by capital inflow volatility, sudden halt in foreign capital inflows, unguided exchange rate appreciation, risk of capital reversals and contagion effects (Davis & Van-Wincoop, 2018).

Aside from the theoretical issues, empirical literature regarding the link between TFP and financial openness are also controversial. For instance, Rodriguez (2017); Gregory (2016); Serdaroglu (2015); Bekaert *et al.,* (2011); and Kose *et al.,* (2009) find that financial openness has a significant positive effect on TFP, whereas, a host of other studies (Varela, 2018; Stiglitz, 2002) submit that financial openness may be detrimental to TFP growth. Based on the above theoretical and empirical controversies, the response of TFP to positive innovation in financial openness may be somewhat confusing or ambiguous if shocks resulting from lagged interdependencies among countries and cross-sectional variation of variables are not given serious consideration (Pedroni, 2013) to explain the contingent dynamic relationship in the African region. Thus, this study contributes to the empirical literature on the nexus between financial openness and TFP in Africa using a relatively sophisticated econometric technique; Panel Structural Vector Autoregression (PSVAR).

The rest of this study is organized in the following way. Section 2 explains the African experience of the global economic and financial crisis while Section 3 deals with a review of relevant

literature. In section 4, empirical methodology and data sources were presented; and section 5 presents the interpretation of the empirical results of the study. Finally, the conclusion and policy recommendations were presented in section 6.

2. Review of Relevant Literature

Theoretically, endogenous growth theory developed by Romer (1986) served as the theoretical foundation for this present study. Endogenous growth theory implies that policies that embrace openness, competition, change, and innovation would promote growth through an increase in TFP. Following Bailliu (2000), financial openness and its resultant capital inflows can stimulate TFP growth by increasing the local investment rate and the investments connected with positive spillovers, and by growing domestic financial intermediation role which will likely involve the intermediation of foreign resources by the domestic financial system. Consequently, the existing financial system development is reflected in its ability to perform functions such as mobilizing savings, allocating capital to most productive use, and facilitating risk diversification management. This could play an important role in determining the extent to which financial openness could affect TFP (Mallick & Moore, 2008). However, technological progress and organizational knowledge brought about by capital inflows are the results of the gradual evolution of institutions (Popescu, 2007; Acemoglu, *et al.* 2003; North, 1990) which provides a conducive environment for international capital accumulation through a developed financial system that leads to higher saving rate which in turn increases TFP (Okunade, 2018; Ajisafe & Okunade, 2017; Ajisafe & Okunade, 2016; Adams & Klobodu, 2017).

Empirically, erstwhile studies have been concentrated on the link between financial openness and economic growth in both developed and developing countries. (*See* Njikam, 2017; Bekaert, Harvey & Lundblad, 2005; Chen & Quang, 2014; Karadam & Ocal, 2014). Specifically, few studies have been conducted on the nexus between financial openness and TFP, which is the focus of this present study. For instance, Varela (2018) assessed the impact of capital controls on productivity in Hungary between 1992 and 2008 and found that capital controls harmed productivity growth in Hungary. Therefore, the study concluded that the removal of capital controls and other restrictive policies following financial liberalization reform led to a rise in aggregate productivity in Hungary. Moreover, Gregory (2016) applied the GMM estimator and found that financial openness positively contributed to TFP growth for a panel of 89 countries covering the period of 1995 to 2014.

In Turkey, Serdaroglu (2015) analyzed the effects of financial openness on TFP from 1989 to 2011. The study employed OLS after smoothing all series through HP-filter and reported that financial openness had a significant positive effect on TFP. Also, Bekaert, *et al*. (2011) investigated the relationship between financial openness and productivity by dissecting two channels of growth: capital stock growth and TFP growth between 1980 and 2006. The study found that financial openness had a significant positive impact on TFP growth, real capital stock, and economic growth (real GDP per capita), but the impact of financial openness on TFP was greater than investment (real capital stock growth). Using a sample of 70 countries, Bonfiglioli (2008) employed system GMM and found that both de jure and de facto indicators of financial integration had direct positive effects on TFP but exerted an insignificant effect on capital accumulation in developed countries. Therefore, the study concluded that financial integration had a greater impact through TFP on long-run growth than factor accumulation in developed countries. Also, Kose,

Prasad & Terrones (2009) found that capital account openness (de jure) had a significant positive effect on TFP growth; but financial integration (proxied by de facto measure) had an insignificant effect on TFP growth.

A host of other studies also reported dissecting findings on these relationships, for instance, Challe, Lopez & Mengus (2019) employed a dynamic GMM estimator for an unbalanced panel of 95 countries for the period covering 1996 to 2013 and found that financial openness proxied by capital inflows affected the quality of institutions negatively for the period under study. Also, Kant (2018) examined the effect of financial openness on institutional quality and reported that greater financial market openness (stock and bonds markets) ensured better institutions. Furthermore, Issar, Lim & Mohapatra (2017) examined the relationship between firm-level productivity growth and institutional quality at the country level using 3,446 firms in 58 advanced and emerging economies from 2006 to 2014. The result revealed that the institutional quality index obtained through PCA has a statistically significant positive effect on changes in firm TFP. Using fully modified OLS, Fadiran & Akanbi (2017) found that institutions have positive effects on TFP in the long run. In a more related study, Kaasa (2016) investigated the effect of institutional quality and social capital on productivity using regional-level data of 80 regions from 24 European countries for the period of 2008 and 2010. The result of the regression showed that institutional qualities had positive effects on productivity. A few studies have also been found in the literature to identify the role of institutional development in the relationship between financial openness and productivity (*see* Chinn & Ito, 2006; Tebaldi, 2016). These studies found that institutional quality and financial openness were significant determinants of TFP growth through different methods.

3. Methodology

Theoretically, endogenous growth theory developed by Romer (1986) as expanded by Pagano (1993) provides a framework in which financial openness can permanently increase the rate of growth in the host country through technology transfer, diffusion, and spillover effect from foreign countries. The endogenous growth model can be expressed by the simple but open equation of Cobb-Douglas production function where the elasticity of output concerning capital input is unity ($\alpha = 1$), thus making the production function linear in the capital but with increased returns to scale due to the spillover effects of technology as a result of the openness of financial markets to the rest of the world. The over-simplified endogenous AK growth model is expressed as:

$$Y_{it} = A_{it}K_{it} \qquad 1$$

Where Y represents the aggregate output, K represents the capital stock. But in endogenous growth theory, there are no diminishing returns to capital; and A is the efficiency factor or inputs' productivity which is intended to represent any factor that affects knowledge and technology. Financial openness and the quality of institutions are expected to affect the efficiency factor or TFP (A) as well as the quantity of capital accumulation (K). In line with Pagano (1993), it is further assumed that there is no population growth in this model and the economy produces only one good, which can be consumed or invested. Thus, the capital stock depreciates at a rate of the per period, gross investment (I) equals:

$$I_{it} = K_{it+1} - (1-\delta)K_{it} \quad 2$$

Where I_{it} is the investment is rate at time t and for country i, and δ is the rate of depreciation. Assuming further that a proportion of income of households in recipient countries available for investment is ϕ, thus $(1-\phi)$ is left with financial intermediaries as the cost of capital and services rendered. Financial and capital markets set at equilibrium when the proportion of savings for investment equals actual investment in the economy ($\phi S_{it} = I_{it}$). S_{it} is the gross saving at time t and for country i and ϕ is the domestic investment rate. From equation (1), the growth rate of output, given that technological progress is constant and substituting the capital stock (K_{t+1}) in equation 2 is expressed as;

$$g = \frac{Y_{t+1}-Y_t}{Y_t} = \left(\frac{K_{t+1}-K_t}{K_t}\right) = \left(\frac{I_t+(1-\delta)K_t-K_t}{K_t}\right) = A\left(\frac{I_t}{Y_t}\right) - \delta = A\phi s_t - \delta \quad 3$$

Where $s_{it} = \frac{S_{it}}{Y_{it}} = \frac{S_{it}}{AK_{it}}$ is the gross savings rate, and g is is the growth rate of output. The steady-state growth rate of output in an AK model with emphasis on the role of finance is represented in equation (3), where the growth rate of output is dependent on technological efficiency or TFP (A), investment rate, gross savings rate (s) and capital stock depreciation. Building on a model of financially open economies as an extension of the endogenous growth model of Romer (1986), Baillu (2000) opines that financial openness can be incorporated into Eq. (3) by assuming that economy or the financial market becomes open (financial openness) such that foreigners are allowed to invest in the local economy through local financial intermediaries. Financial openness would then increase the pool of savings available for investment than when the economy is closed without capital inflows. Thus, we started by extending Eq. (2) to include the effect of financial openness in line with Bailliu (2000):

$$\phi^*(S_t + NCF_t) = I_t^* \quad 4$$

Where NCF is net international capital inflows facilitated by financial openness, ϕ^* comprises the domestic and international investment rates, and I^* represents the gross domestic and international investment level. In the presence of financial openness, savings comprises of both domestically mobilized savings and cross-border capitals that enter into domestic financial institutions of the host countries as a result of financial markets openness. Thus, the steady-state growth rate is given in Eq. (3) becomes:

$$g^* = A^*\left(\frac{I_t^*}{Y_t}\right) - \delta = A^*\phi^*\frac{(S_t+NCF)}{Y_t} - \delta = A^*\phi^* s_t^* - \delta \quad 5$$

Where g* and A* are the growth rate of aggregate growth and TFP influenced by positive spillovers from financial openness respectively, while ϕ^* and s* are the net domestic and international investment rate and saving rate respectively. Eq. (5) depicts the steady-state growth rate of the AK version of endogenous growth model incorporating the influence of financial openness. When NCF is positive, s* will be greater than s, and domestic and international investment rate (ϕ^*) will increase. This implies that the net inflow of capital is used to finance investments. Therefore, g* will be larger than g as a result of financial openness.

However, there exists the need for developing sound institutions to prevent foreign capital-financed investments from crowding out domestic capital-financed investments. Okada (2013) observes that if the quality of institutions is good in a particular country, financial openness promotes international capital inflows which in turn lead to greater investment and productivity growth, whereas if a country's institution is poor, financial openness does not influence but rather hinder international capital inflows. Building on the financially open economies model, the relationship among financial openness, institutional development and TFP growth could be stated by expressing TFP (A^*) as a subject of other variables:

$$A^* = f(\phi^*, s_t^*, g^*, \delta) \quad 6$$

In the steady state, therefore the growth rate of the aggregate output (g^*) is constant. Thus, this model can be simply written as;

$$A^* = f(\phi^*, s_t^*, \delta) \quad 7$$

3.1 Panel Structural Vector Autoregression (PSVAR)

The PSVAR is empirically useful in studying the underlying dynamic relationships among economic variables in the face of cross-sectional dependency and heterogeneity (Pedroni, 2013). This method is particularly appropriate since the endogenous growth theories show bilateral interactions among financial openness, institutional development and TFP. Thus, the hypothesized intertemporal linear dependencies among these variables require a structural modelling to determine the dynamic response of these economic variables to various disturbances or shocks. Therefore, a fully structural approach was developed following Pedroni (2013) with impulse responses based on orthogonalized structural shocks and structural identifying restrictions on the dynamics. A structural model depicts the interrelationship among economic variables in an economy (Christiano, 2006). With a view to presenting a PSVAR model for the purpose of this study, the component vector ($Z_{i,t}$) of the endogenous variables is defined as:

$$Z_{i,t} = (tfp_{i,t}, fo_{i,t}, ins_{i,t})' \quad 8$$

Where i denotes the country and *t* is the time period; TFP represents total factor productivity; FO denotes financial openness; INS denotes institutional development index; and $Z_{i,t}$ is a vector of all demeaned endogenous variables. To investigate the dynamic relationships among financial openness, institutional development, and TFP in African regions, the study starts by presenting the "Reduced form" of the PSVAR model can be written as:

$$Z_{i,t} = \eta_j + \beta_j Z_{i,t-1} + ... + \beta_k Z_{i,t-k} + \alpha_i + \gamma_t + \varepsilon_{i,t} \quad 9$$

Where, $\eta_j$is a 3×1 vector of country-specific intercepts;$\beta_j's$ $(j = 1\ldots, k)$ are coefficients of a 3×3 matrices; α_i denotes unobserved country effects; γ_i denote time effect; and $\varepsilon_{i,t}$ is 3×1 vector of idiosyncratic errors.

The schematic summary of the assumptions of the PSVAR model linking financial openness and institutional development to TFP shows that the TFP is affected by a set of variables such as the openness to global financial markets and the institutional variables. The financial openness would affect TFP through technology transfers and foreign capitals allocation efficiency while the second group (institutional variable) would affect TFP through the creation of favourable business environments. By modeling the sampled countries as small-open economies which are affected by external shocks but do not affect these external conditions. To characterize these relationships, the following PSVAR model for each economy is considered:

$$AZ_{i,t} = B(L)Z_{i,t-1} + \alpha_i + \gamma_t + \varepsilon_{i,t} \quad 10$$

Where, A is the matrix of contemporaneous coefficients in the structural form; B is the matrix of contemporaneous relationship among financial openness, institutional development and TFP; $B(L)$ is a matrix polynomial in the lag operator; Now, $\varepsilon_{i,t}$ is 3×1 vector of structural disturbances, such that $\varepsilon_{i,t} = Ae_{i,t}$. Where, $e_{i,t}$ is a vector of residuals from the corresponding "reduced-form" of PSVAR in Eq. 10. Expressing Eq. 9 and 10 explicitly into a PSVAR (2) matrix, in line with in equation 8, we have;

$$\begin{bmatrix} tfp_{i,t} \\ fo_{i,t} \\ ins_{i,t} \end{bmatrix} = \begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \end{bmatrix} + \sum_{m=1}^{p} \begin{bmatrix} \alpha_{1m} & \beta_{1m} & \delta_{1m} \\ \alpha_{2m} & \beta_{2m} & \delta_{2m} \\ \alpha_{3m} & \beta_{3m} & \delta_{3m} \end{bmatrix} \begin{bmatrix} tfp_{i,t-m} \\ fo_{i,t-m} \\ ins_{i,t-m} \end{bmatrix} + \begin{bmatrix} \alpha_{1,i} \\ \alpha_{2,i} \\ \alpha_{3,i} \end{bmatrix} + \begin{bmatrix} \gamma_{1,t} \\ \gamma_{2,t} \\ \gamma_{3,t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1,it} \\ \varepsilon_{2,it} \\ \varepsilon_{3,it} \end{bmatrix} \quad 11$$

To achieve identification of the PSVAR, this study draws from the theoretical and empirical literature as well as the 'endogenous growth model' to impose restrictions on the matrix of contemporaneous relationship (matrix B) from Eq. 10 which is in diagonal and of order 3×3.

However, it should be noted that the recursive identification scheme was employed to impose restrictions on the B-matrix in equation (11) in line with Pedroni (2013) regarding the dynamic relationship among financial market openness, institutional development, and TFP in Africa. Our apriori expectations are β_i & $\delta_i > 0$. That is, financial openness and institutional development are expected to exert a positive response on TFP.

4. Data Description, Sources and Scope

Table 1: Summary of the Data Sources and Measurements

Variable	Symbol	Description	Measurement	Sources
Total Factor Productivity	TFP	The portion of output that is not explained by the traditional inputs of production such as labour and capital.	TFP level at current PPPs (USA=1)	Penn World Table (PWT) 9.1, 2020 Edition
Financial Openness	FO	The *de jure* index, otherwise known as KAOPEN or Chinn-Ito index constructed by Chinn & Ito (2006), is based on the information from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). It shows overall level of restrictions on domestic financial markets towards openness to international financial markets.	Index	KAOPEN of Chinn and Ito, 2020 Update
Institutional Development	INS	(1) Rule of Law (2) Regulatory Quality (3) Government effectiveness (4) Political Stability and Absence of Violence/Terrorism (5) Control of Corruption (6) voice and accountability	Index (Re-scaled average)	World Governance Indicator (WGI), 2020 Edition

Source: Author's Compilations, 2021

All these six indicators of institutions are essential to ensuring financial openness facilitating more capital inflows and leading to greater TFP growth (Karadam & Ocal, 2014). Moreover, the study re-scale the institutional variables for better interpretation, the six institutional variables were re-scaled from 0 to 10 following the formula: $Y = \left(\frac{X - X_{min}}{X_{range}}\right) n,$ where Y is the adjusted or re-scaled value; X is the actual or the original value or variable; X_{min} represents the minimum observed value on the original variable; X_{range} is the difference between the maximum potential score and the minimum potential score on the original variable and n represents the upper limit of the rescaled

variable. The value of 0 (corresponds to -2.5 of the original scaling) indicates a very poor institutional environment while the value of 10 (corresponds to +2.5 of the original scaling) indicates a very strongly developed institutional environment. Thus, the closer the value to 10, the stronger the institution, and the closer the value to 0, the weaker the institution appears. After re-scaling, we take the average of the six variables. This average index portrays the characteristics of all six indicators and each of the six variables ranges from 0 to 10 after re-scaling instead of -2.5 to +2.5 for easy interpretations.

Based on the data availability, twenty-eight (28) African countries were selected for this study. The selected countries were Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Egypt, Gabon, Kenya, Lesotho, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, and Zimbabwe.

5. Empirical Results and Findings

Table 2 presents the descriptive characteristics of the variables for the panel of selected African countries. From 1996 to 2019, the average of TFP in the panel of African countries was 0.47, which was higher than the median value of 0.42, indicating that the distribution of TFP was slightly skewed to the right. This showed that the majority of selected African countries have TFP that was lower than the mean value. However, the mean and median of TFP growth lie between the minimum of 0.09 in Zimbabwe in 2008 and a maximum of 1.109 in Egypt in 1996. This implied that Egypt and Zimbabwe attain the highest and lowest levels in Africa respectively. The standard deviation of TFP growth of 0.23 is relatively low, meaning that African countries have TFP growth very close to the mean value (*see* Table 2). Also, the average of financial openness (FO) in Africa was -0.82, which was higher than its median value (-1.21), indicating that the distribution of FO was skewed to the right, implying that most selected African countries have FO that was lower than the mean value (*see* Table 2).

The statistics showed that financial markets or capital account were most open to international financial markets or foreign investors in Botswana, Egypt, and Mauritius, with the maximum value of the Chinn-Ito Index of 2.35 while Burundi and Sierra Leone was least opened to foreign investors due to the minimum value of -1.92. However, the standard deviation of financial openness of 1.03 was relatively high compared to the mean and median values (-0.82 and -1.21), meaning that financial openness was fairly dispersed away from the mean value in African countries. Furthermore, Table 2 also showed that the average of institutional development (INS) in Africa was 3.90, lower than the median value of 3.94, indicating that the distribution of INS is slightly skewed to the left. Institutions were most developed (maximum) in Botswana which was 6.76, but the Central African Republic has the least developed institutions (minimum) which was 1.60. The standard deviation of institutional development (INS) of 1.22 was relatively low compared to the mean and median values, showing that African countries have institutional factors very close to the mean value (*see* Table 2).

Table 2: Descriptive Analysis

Variable	Mean	Median	Max	Min	Std. Dev.	Kurtosis	Jarque-Bera	Prob.	Obs
TFP	0.4741	0.4167	1.1094	0.0986	0.2260	2.3577	35.3431	0.000	616
FO	-0.822	-1.21	2.3467	-1.917	1.025	5.7167	577.11	0.000	616
INS	3.9007	3.9383	6.7633	1.6033	1.2157	2.6604	13.736	0.001	616

Source: Authors' computation, 2021; *Note: TFP, FO and INS represents Total factor productivity, Financial openness and Institutional Development respectively.*

5.2 Cross-sectional Dependence Test

The cross-sectional dependence (CSD) test is another necessary preliminary test following Pesaran (2004); Chen & Vujic (2016); Beckmann & Czudaj (2017) and Adams & Klobodu (2017) to determine whether disturbances in the panel models are cross-sectionally dependent or not. The act of ignoring CSD might lead to severely biased estimation when testing panel unit roots (Chen & Vujic, 2016). The consideration of cross-country dependencies is crucial when African economies and emerging markets are analyzed based on historical evidence during the nineties since financial openness may stimulate spillover effects which could result in contagions and significantly affect the real economy. The result of the Pesaran (2004) cross-sectional dependence (CSD) test in Table 3 showed the existence of cross-sectional dependence as the test strongly rejected the null hypothesis of cross-sectional independence at a 1% significance level. This finding highlighted the importance of accounting for cross-unit lagged interdependence across countries of the study. This cross-sectional dependence implied that the corresponding effects or relationships among variables of the study were highly heterogeneous across countries so that a country-specific consideration when analyzing a response to shock might result in a biased conclusion about the region.

Table 3: The Result of Panel cross-sectional dependence Test

Pesaran's test of cross-sectional independence (CSDp)		15.654*
Average absolute value of the off-diagonal elements		0.416
Probability value		0.0000
F(27, 582) =	87.28	
Prob > F =	0.0000	

Source: Authors' Computation, 2021. *Note: (*) indicates significant at 1%.*

5.3 Panel Unit Roots Tests

Since Pesaran's CSD test revealed cross-sectional dependence across units, indicating that the panel was heterogeneous; the study, therefore, tested the time-series properties of the variables with panel unit root tests, assuming heterogeneous slopes. The heterogeneous panel unit roots tests include Im, Pesaran & Shin test (IPS), Choi test or ADF-Fisher and Maddala-Wu test or Phillips-Perron (PP)-Fisher chi-square. The results of the IPS test, Choi test and Maddala-Wu test in Table 4 indicated that financial openness (FO) was stationary at level I(0), while TFP was stationary at the first difference, I(1). However, the results of the IPS test and Choi test showed that institutional development was stationary at the first difference, I(1) while it was stationary at the level when the Maddala-Wu test was conducted. Conclusively, since the orders of integration of the study

variables do not exceed one, it justified the application of the structural modeling of the panel dynamics.

Table 4: Heterogeneous Panel Unit Root Tests for selected African Countries

Variable	IPS	ADF-Fisher	PP-Fisher
TFP	-1.19194	12.0338	16.1916
FO	-1.79946**	39.2019**	59.3801*
INS	0.16558	56.1256	81.6286**
Δ TFP	-7.70905*	157.526*	340.653*
Δ FO			
Δ INS	-8.1718*	167.724*	

Source: Author's Compilation, 2021. *Note 1: (*), (**) and (***) indicates significant at 1%, 5% and 10% level respectively.* Δ represents the first difference. *Note 2: TFP, FO and INS represents Total factor productivity, Financial openness and Institutional Development respectively.*

5.4 Results of Panel Structural Vector Autoregression

To employ the Panel Structural Vector Autoregression (PSVAR) to examine the dynamic relationship among financial openness, institutional development, and TFP in Africa in equation 11, it is important to identify an appropriate lag length. This was depicted in Table 5.

Table 5: Lag Length Selection Criteria and VAR Stability Test

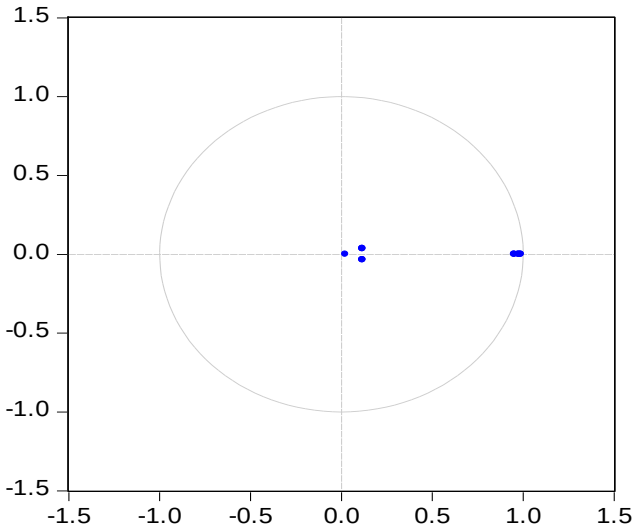
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1509.44	NA	0.096286	6.173203	6.198883	6.183289
1	1395.243	5761.932	7.09e-07*	-5.645889*	-5.543169*	-5.605547*
2	1403.225	15.73672	7.12e-07	-5.64174	-5.46198	-5.57114
3	1409.074	11.45848	7.21e-07	-5.62887	-5.37207	-5.52802
4	1416.120	13.71882	7.27e-07	-5.6209	-5.28706	-5.48979
5	1424.468	16.15149	7.29e-07	-5.61824	-5.20736	-5.45687
6	1428.978	8.669283	7.42e-07	-5.59991	-5.11199	-5.40829
7	1440.609	22.21793*	7.34e-07	-5.61065	-5.04569	-5.38877
8	1445.267	8.840779	7.48e-07	-5.59293	-4.95093	-5.34079

Source: Author's Compilation, 2020

*Note: * indicates lag order selected by the criterion, while LR, FPE, AIC, SC and HQ indicates sequential modified LR test statistic (each test at 5% level), Final Prediction Error, Akaike Information Criterion, Schwarz Information Criterion and Hannan-Quinn Information Criterion respectively.*

The result in Table 5 showed that all information criteria indicated a maximum lag length of 1 except the sequentially modified LR test statistic which indicated a maximum lag length of 7. Thus, the VAR stability test was conducted at lag 1 and lag 7 respectively and the result showed that no root lies outside the unit circle which indicated that PSVAR at lag 1 satisfied the stability condition (*see* Figure 1).

Figure 1: Inverse Roots of AR Characteristic Polynomial (Stability test at Lag 1)



Having determined the appropriate lag order in Table 5 and Figure 1, the PSVAR model was estimated and the impulse-response function and variance decomposition were employed to explain the dynamic relationship among financial openness, institutional development and TFP in Africa. The ordering applied is the log of demeaned TFP, log of demeaned financial openness (FO), and log of demeaned institutional development (INS). The series are demeaned and transformed to avoid biased effects of taking the natural logarithm of negative values. The impulse response function in Figure 2 showed that TFP responded positively to a one standard deviation innovation in itself and the response was marginally decreasing over the study periods. That is, the current TFP level was affected contemporaneously by the shocks from its past value but the response diminished over time. This is corroborated by the result of FEVD in Table 6 which revealed that about 92.6% variation in TFP was explained by its innovative shocks in the first period, before declining to 71.8% and 71.7% in the fifth and tenth period. This implied that TFP's shocks diminished and gradually fade out in the long run. Furthermore, the IRF in Figure 2 showed that the impulses from financial openness (FO) attract limited or no contemporaneous negative response from TFP for the periods of study. That is, the response of TFP to a one standard deviation innovation in financial openness was close to neutral though marginally oscillating around the negative and mean lines.

Also, financial openness responded negatively to a one standard deviation innovation in TFP throughout the study periods. This implied that financial openness responded negatively and contemporaneously to one standard deviation innovation in the TFP in both medium-run and long-run periods. The limited or no contemporaneous negative response of TFP to structural shocks in financial openness was corroborated by the result of FEVD in Table 6 which showed that shocks to financial openness explained little variations in TFP of about 5.62% of the variation in TFP in the first period before decreasing steadily to 4.47% and 4.46% in fifth and tenth periods respectively. This implied that financial openness has little or no power to predict variations in TFP in the panel of African countries in the short run. It could also be interpreted that financial openness has an insignificant negative effect on TFP growth in Africa.

Financial openness could lower TFP in Africa due to some macroeconomic problems that usually accompany financial openness such as embedded macroeconomic imbalances caused by capital

inflow volatility, sudden halt in foreign capital inflows, unguided exchange rate appreciation, risk of capital reversals, and contagion effects (Okunade, 2021). Thus, the macroeconomic imbalances caused by financial openness suppressed or overwhelmed its positive effects on TFP in Africa. The lack of developed institutions in many African countries to avert the negative influence of financial openness might also play a significant role in the negative relationship between financial openness and TFP. This supported the theoretical proposition of Fratzscher & Bussiere (2004) and Stiglitz (2002); and equally buttressed the empirical positions of Davis & Van-Wincoop (2018), Kose, Prasad & Taylor (2011), Gourinchas & Jeanne (2009), which underscored welfare-reducing effects of financial openness on TFP as a result of market distortions as attenuated in the neoclassical growth theory.

Furthermore, Figure 2 showed that there exists a dynamic negative relationship between institutional development and TFP in Africa. The result of the significant negative effect of institutional development on TFP in selected African countries is against a priori expectation, and it does not reflect the general notion in institutional theories that "institutions matter for growth and development." This may occur because institutional environments have not been developed enough in the selected Africa countries to create enabling environments for businesses to thrive and to enhance foreign investors' confidence in the domestic financial markets in the selected African countries. This finding negates the studies of Issar, Lim & Mohapatra (2017), Fadiran & Akanbi (2017), Serdaroglu (2015), and Kaasa (2016) who reported significant positive effects of institutions on TFP in other developing and developed countries. The economic intuition of this finding is that institutions have not significantly created necessary and conducive business environments to aid positive effects on TFP in Africa; rather institutional development poses some problems and constitutes itself to be the clog in achieving higher TFP growth in African countries.

Also, the response of institutional development to a one-period standard deviation shock or innovation in financial openness was positive in the medium and long run. This finding implies that financial market openness has a positive effect on institutional development in African countries. However, the response of financial openness to a one-period standard deviation shock in institutional development was negative throughout the periods.

Table 6: Structural Variance Decomposition of Shocks (e_1 ,e_2 and e_3)

FEVD of TFP				
Period	S.E	e_1	e_2	e_3
1	0.630317	92.58009	5.617818	1.802096
3	0.772072	71.93559	4.458939	23.60547
5	0.775008	71.80071	4.468142	23.73115
8	0.775154	71.78630	4.469409	23.74429
10	0.775155	71.78621	4.469414	23.74438
FEVD of FO				
1	1.256972	6.259843	92.44313	1.297024
3	1.428651	8.888839	74.04237	17.06879
5	1.429437	8.887110	74.04436	17.06853
8	1.429471	8.886961	74.04101	17.07203
10	1.429471	8.886962	74.04100	17.07204
FEVD of INS				
1	1.001708	0.009894	2.385420	97.60469
3	1.024136	0.370930	5.511690	94.11738
5	1.024778	0.371757	5.509666	94.11858
8	1.024783	0.372213	5.509658	94.11813
10	1.024783	0.372215	5.509658	94.11813
Structural Factorization Ordering: TFP FO INS				

Source: Authors' Compilation, 2021

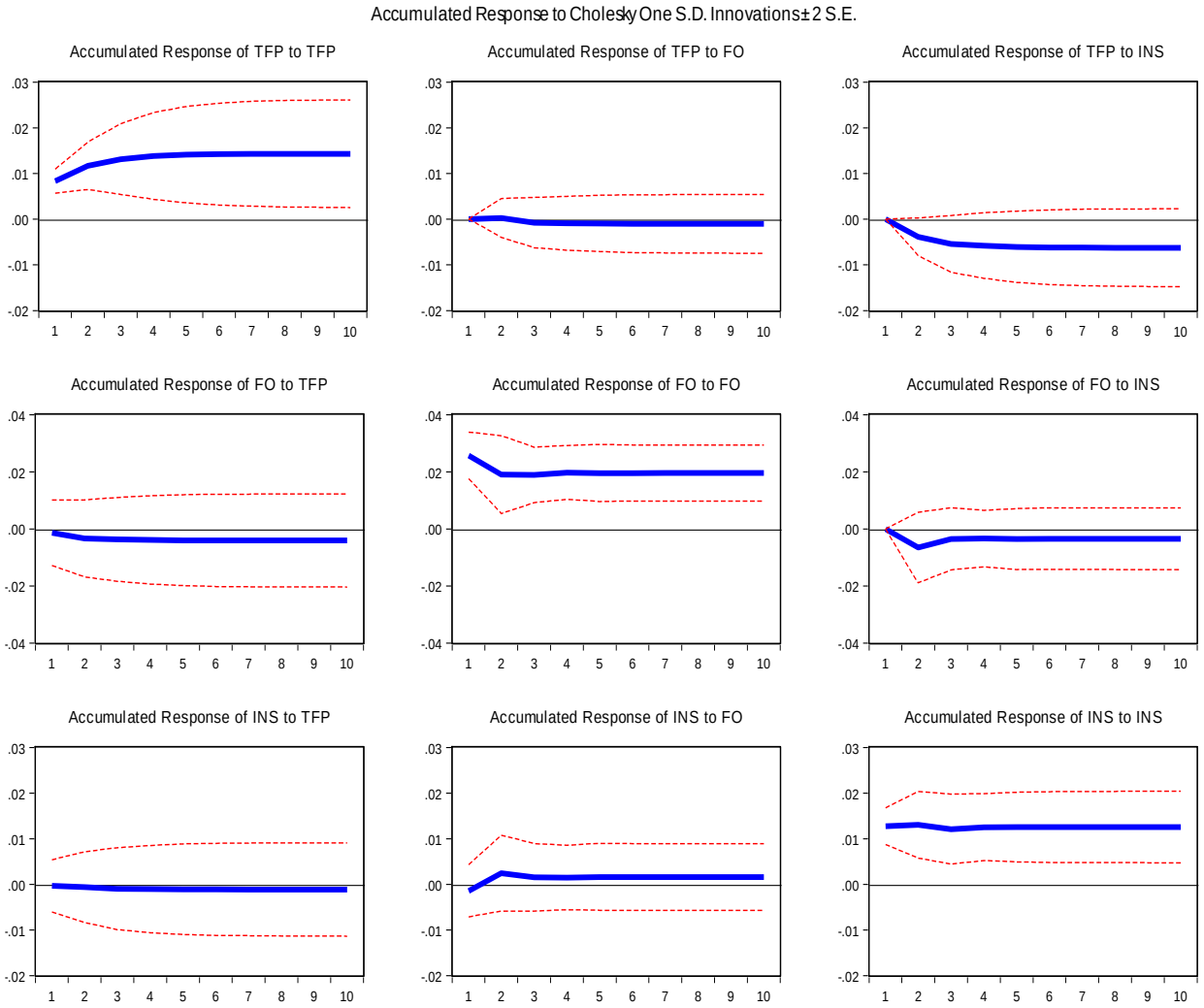


Figure 2: Dynamic Response of Estimates to Composite Shocks

6. Conclusion and Policy Recommendations

The study examines the dynamic relationship among financial openness, institutional development, and TFP in selected African countries for the periods covering the global economic and financial crises of the late 1990s and mid-2000s. This study employed PSVAR with orthogonalised structural identifying restrictions, impulse- responses and forecast error variance decompositions to find a negative relationship between financial openness and TFP; negative effect of institutional development on TFP; negative effect of institutional development on financial openness. Meanwhile, we find neutral effects of TFP and financial openness on institutional development in Africa. Therefore, the study concludes that the negative consequences of financial openness overwhelmed its seemingly positive impacts on TFP, thus resulting in the negative relationship between financial openness and TFP in Africa; and institutional environments have not been developed enough to exert a positive effect on TFP. This may result from the fact that the quality of institutional environments in most selected African countries are weak and poorly developed to checkmate excesses, corruptions, unaccountability, ineffectiveness and political interferences in the financial markets to achieve appropriate channelisation of capitals

to foster productive investments which would, in turn, ensure an increase in TFP and sustainable growth.

Based on the above conclusion, we recommend that governments and policymakers in the selected African countries should ensure persistent improvements in the quality of institutional environments and frameworks to premeditate the positive benefits of financial openness on TFP in Africa, rather than leaking the benefits of financial openness on growth. Also, African policymakers should influence the level of TFP by adopting several monetary and fiscal policies to guide financial openness and prompt more access to foreign capitals that could supplement the domestically available credits and finance productive investments which would increase growth and development via sustainable TFP growth. Such policies should include ensuring the removal of all restrictions on capital account transactions and challenging the presence of multiple exchange rates to tackle the adverse effect of exchange rate premium. This requires integrated efforts and political will to introduce radical changes in the economic, political, social, regulatory and institutional settings in many African countries.

References

Acemoglu, D., Johnson, S., Robinson, J. & Thaicharoen, Y. (2003). Institutional causes, macroeconomic symptoms: volatility, crises and growth. *Journal of Monetary Economics, 50(1), 49–123.*

Adams, S. & Klobodu, E.K.M. (2017). Capital flows and the distribution of income in sub-Saharan Africa. *Retrieved from http://dx.doi.org/10.1016/j.eap.2017.05.006*

Ajisafe, R.A. & Okunade, S.O. (2016). Financial sector development, economic growth and poverty reduction in Nigeria: Evidence from ARDL bound test and error correction model. *Journal of Economics and Social Studies, 26, 1-19. Ado-Ekiti.*

Ajisafe, R.A. & Okunade, S.O. (2017). Institutional regulation for sustainable development in sub-Sahara African countries. *Applied Research Conference in Africa (ARCA), XXV (25), 243-259.*

Ajisafe, R.A. & Okunade, S.O. (2020a). Finance-led-growth hypothesis and domestic investment in Nigeria. *Journal of Emerging Trends in Economics and Management sciences (JETEMS), 11(2), 40-52.*

Ajisafe, R.A. & Okunade, S.O. (2020b). International capital inflow and Sub-Saharan African economy: Does capital inflow lead growth? *Growth, 7(1), 26-34. 2020*

Anyanwu, J.C. (2012). Why does foreign direct investment go where it goes? New evidence from African countries. *Annals of Economics and Finance, 13(2), 425-462.*

Ashamu, S.O. & Abiola, J.O. (2012). The impact of global financial crisis on banking sector in Nigeria. *British Journal of Arts and Social Sciences, 4(2), 251-257.*

Atesagaoglu, O.E., Elgin, C. & Oztunali, O. (2017). TFP growth in Turkey revisited: The effect of informal sector. *Central Bank Review, 17, 11-17*

Bailliu, J.N. (2000). Private capital flows, financial development, and economic growth in developing countries. *Bank of Canada Working Paper 2000-15.*

Beckmann, J. & Czudaj, R. (2017). Capital flows and GDP in emerging economies and the role of global spillovers. *Journal of Economic Behavior &Organization. Retrieved from* http://dx.doi.org/10.1016/j.jebo.2017.07.031

Bekaert, G., Harvey, C. & Lundblad, C., (2005). Does financial liberalization spur growth? *Journal of Financial Economics 77, 3–55.*

Bekaert, G., Harvey, C. R. and Lundblad, C. (2011). Financial openness and productivity. *World Development, 39(1), 1–19. doi:10.1016/j.worlddev.2010.06.016*

Bonfiglioli, A. (2008). Financial integration, productivity and capital accumulation. *Journal of International Economics, 76, 337–355.*

Canova, F. & Ciccarelli, M. (2013). Panel vector autoregressive models: A survey. In VAR Models in Macroeconomics–New Developments and Applications: Essays in Honor of Christopher A. Sims, chap. 6, pg 205–246.

Cecchetti, G., & Kharroubi, E. (2012). Reassessing the Impact of Finance on Growth. *Bank for International Settlements (BIS) Working Papers No. 381.*

Challe, E., Lopez, J.I., Mengus, E. (2019). Institutional quality and capital inflows: Theory and evidence. *Journal of International Money and Finance, 96, 168–191.*

Chen, J. & Quang, T. (2014). The impact of international financial integration on economic growth: New evidence on threshold effects. *Economic Modelling, 42, 475–489.*

Chen, W. & Vujic, S. (2016). A reassessment of the relationship between income inequality and economic growth: New empirical evidence from China. *China Economic Review, 11(1), 1-15.*

Chinn, M. & Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics, 81, 163– 192.*

Chinn, M. & Ito, H. (2008). A new measure of financial openness. *Journal of Comparative Policy Analysis,10, 309– 322.*

Christiano, L. J. (2006). Temporal aggregation in structural inferences in macroeconomics. *Carnegle-Rochester Conference Series on Public Policy, 26, 63 – 130*

Davis, J.S. & Van Wincoop, E. (2018). Globalization and the increasing correlation between capital inflows and outflows. *Journal of Monetary Economics, 100, 83-100,*

Fadiran, D. & Akanbi, O.A. (2017). Institutions and other determinants of total factor productivity in Sub-Saharan Africa. *Economic Research Southern Africa (ERSA) Working Paper 714*

Feenstra, R.C., Inklaar, R. & Timmer, M.P. (2015). The next generation of the Penn World Table. *American Economic Review, 105(10), 3150-3182. Available for download at* www.ggdc.net/pwt

Fratzscher, M. & Bussiere, M. (2004). Financial openness and growth: Short-run gain, long-run pain? *European Central Bank Working Paper Series No. 348*

Gourinchas, P-O. & Jeanne, O. (2009). Capital flows to developing countries: the allocation puzzle. *Working Paper Series, WP-09-12.*

Gregory, R.P. (2016). Financial openness and total factor productivity Growth. Available at SSRN: https://ssrn.com/abstract=2859541 or http://dx.doi.org/10.2139/ssrn.2859541

Issar, A., Lim, J.J. & Mohapatra, S. (2017). Institutional quality and international differences in firm productivity. *Indian Institute of Management Working Paper No, 2017-02-01, 1-35.*

Kaasa, A. (2016), Social capital, institutional quality and productivity: Evidence from European Regions. *Economics and Sociology*, 9(4), 11-26.

Kant, C. (2018). Financial openness and institutions in developing countries. *Research in International Business and Finance. https://doi.org/10.1016/j.ribaf.2018.03.001*

Karadam, D.Y. & Ocal, N. (2014). Financial integration and growth: A nonlinear panel data analysis. *ERC Working Papers in Economics 14/15*

Kaufmann, D., Kraay, A. & Mastruzzi, M. (2010). The Worldwide Governance Indicators: A Summary of Methodology, Data and Analytical Issues. *World Bank Policy Research Working Paper No. 5430.* *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130.*

Kose, A., Prasad, E., Rogoff, K. & Wei, S-J. (2009). Financial globalization: A reappraisal. *IMF Staff Papers 56 (1), 8–62.*

Kose, M. A., Prasad, E. S., & Terrones, M. E. (2009). Does openness to international financial flows raise productivity growth? *Journal of International Money and Finance, 28(4), 554–580*

Kose, M.A., Prasad, E.S. & Taylor, A.D. (2011). Thresholds in the process of international financial integration. *Journal of International Money and Finance, 30, 147–179*

Njikam, O. (2017). Financial liberalization and growth in African economies: The role of policy complementarities. *Review of Development Finance, 7, 73–83.*

North, C.D. (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge University Press

Okada, K. (2013). The interaction effects of financial openness and institutions on international capital flows. *Journal of Macroeconomics, 35, 131–143.*

Okunade, S.O. (2018). Effect of capacity utilisation on manufacturing firms' production in Nigeria. *Global Journal of Management and Business Research, 18(1), 28-38.*

Okunade, S.O. (2020). Financial openness, institutional development and total factor productivity in selected African countries (1996-2017). PhD. Thesis. https://ir.oauife.edu.ng/handle/123456789/ 6485

Okunade, S.O. (2021). Institutional threshold in the nexus between financial openness and TFP in Africa. *Social Sciences and Humanities Open, Elsevier*. (In-print)

Pagano, M (1993). Financial markets and the macroeconomy: Financial markets and growth: An overview. *European Economic Review, 37, 613-622.* North-Holland

Pedroni, P. (2013). Structural Panel VARs. *Econometrics, 2, 180-206.*

Pesaran, M. (2004). General diagnostic tests for cross section dependence in panels. *Cambridge Working Papers in Economics No. 0435.*

Popescu, I. (2007). Institutions and economic growth theory. *Advances in Economics, Risk Management, Political and Law Science, 4, 253-256.*

Prasad, E.S., Rogoff, K., Wei, S-J. & Kose, M.A. (2007). Financial globalization, growth, and volatility in developing countries. *National Bureau of Economic Research Paper. http://www.nber.org/books/harr06-144*.

Ravn, M.O., Schmitt-Grohe, S, & Uribe, M. (2012). Consumption, government spending, and the real exchange rate. *Journal of Monetary Economics, 59, 215–234.*

Rodriguez, C. M. (2017). The growth effects of financial openness and exchange rates. *International Review of Economics and Finance, 48: 492–512*

Romer, P. M. (1986). Increasing returns and long-run growth?' *Journal of Political Economy*, 94, Pg. 1002-37.

Serdaroglu, T. (2015). Financial openness and total factor productivity in Turkey. *Procedia Economics and Finance, 30, 848 – 862*

Stiglitz, J. (2002) Globalization and its discontents. W. W. Norton and Company, New York.

Tebaldi, E. (2016). The dynamics of total factor productivity and institutions. *Journal of Economic Development, 41(4), 1-25.*

Varela, L. (2013). Financial liberalization, competition and productivity. *Job Market Paper, Mimeo University of Houston.*

Varela, L. (2018). Reallocation, competition and productivity: Evidence from a financial liberalization episode. *Review of Economic Studies, 85, 1279–1313.*